



Cannabis Use & Provision of Medical Cannabis: Associations with Cannabis Use Disorder

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Adam's Brief Description

- I am an implementation scientist, health services investigator, and clinical scientist. I am the Elbert F. and Marie Christensen Endowed Research Professor, tenured Professor of Medicine and Psychiatry, at the University of Utah School of Medicine and the Section Chief of Addiction Medicine at the Salt Lake City VA Health Care System. I have been a full time VA Health Services Investigator since 1998. I am a board-certified internal medicine and addiction medicine physician and I am a Fellow in the American College of Physicians and a Distinguished Fellow in the American Society of Addiction Medicine. I am a Director of the Program for Addiction Research, Clinical Care, Knowledge, and Advocacy (PARCKA) and the Greater Intermountain Node (GIN), a Node of the NIH NIDA Clinical Trials Network. I am a Core Faculty member of the VA Salt Lake City Informatics, Decision-Enhancement and Analytic Sciences (IDEAS) Center, a Department of Veterans Affairs Health Services Research and Development HSRD Centers of Innovation (COIN).
- My professional mission is to improve the health of vulnerable patient populations.
- A major theme of my research include examining the efficacy, effectiveness, and implementation of evidence-based identification, assessment, and treatments for patients with addiction. I have a 20-year track record of conducting research on the quality, equity, and efficiency of health care for vulnerable populations. I have received efforts on grants (>70) from VA HSR&D and QUERI, the NIH, AHRQ, PCORI, SAMHSA and Foundations of over \$100 million. I have authored over 320 peer reviewed articles and presented/authored hundreds of other scholarly products. I am the Editor-in-Chief of the journal Substance Abuse. I have mentored undergraduate, graduate, MD, and PhD trainees, VA and K- Career Development Awardees, and junior through tenured faculty and am the national co-Director of the national coordinating center for the Interprofessional Addiction Fellowships in Addiction Treatment.

Disclosures

- Dr. Gordon has no fiduciary conflicts of interest
- In the last year, I have served on the Board of Directors (without payment or remuneration):
 - American Society of Addiction Medicine (ASAM)
 - International Society of Addiction Journal Editors (ISAJE)
 - Association for Multidisciplinary Education and Research in Substance use and Addiction (AMERSA)
- The views expressed in this presentation are Dr. Gordon's and do not necessarily reflect the position or policy any institution, agency, organization, or government



To promote and provide addiction related research/evaluation, clinical care services and training, knowledge, and advocacy to the University of Utah, the local community, the state, and the nation

- 1. Research*
- 2. Education*
- 3. clinical care*
- 4. community/advocacy*

PARCKA Scope (examples)

CLINICAL CARE	RESEARCH	KNOWLEDGE	ADVOCACY
<ul style="list-style-type: none"> • Veterans Administration, the Vulnerable Veteran Innovative Patient (VIP) Aligned Care Team Initiative National Initiatives • Syringe Service Program • Contingency Management in Primary Care • PC-SUD-Pain clinic integration • SCOUTT initiative • Womens' Health Integration 	<ul style="list-style-type: none"> • Individual Grant Awards (UofU and VA) <ul style="list-style-type: none"> • ~\$30 million UoU • ~\$25 million VA • Foundation grants • State grants • Service grants • NIH National Institute on Drug Abuse Clinical Trials Network (CTN) • Greater Intermountain Node (GIN) 	<ul style="list-style-type: none"> • Buprenorphine 101 Trainings • Half & Half Waiver Training • Conference Presentations • Host 2018 Addiction Health Service Research Conference • Coordinating Center of VA Interprofessional Addiction Fellowship • MAT-VA (Medication Treatment of Addiction in the VA) • Mentoring K-/CDAs- nationally (12+) 	<ul style="list-style-type: none"> • Monthly Webinars: <ul style="list-style-type: none"> • PARCKA • PARLEYS • On The Rocks • Community Advisory Board • Community Engagement & Networking • Buprenorphine 101 • RAIN Initiative

PARCKA Infrastructure

- Evaluation and Research Staff:
 - 35+, Interns, Graduate Trainees, etc.
- Clinical Staff:
 - VIP: 6 MDs, 3 Pharm, 4 Nurse Care Managers, Social Workers, +
 - Employ clinical champions and clinicians on research efforts
 - Many research staff are clinicians
- Affiliated Faculty: 20+ across upper and lower campus
- Affiliated Staff: 20+ across upper and lower campus
- Mentored Scholars across campus and across country

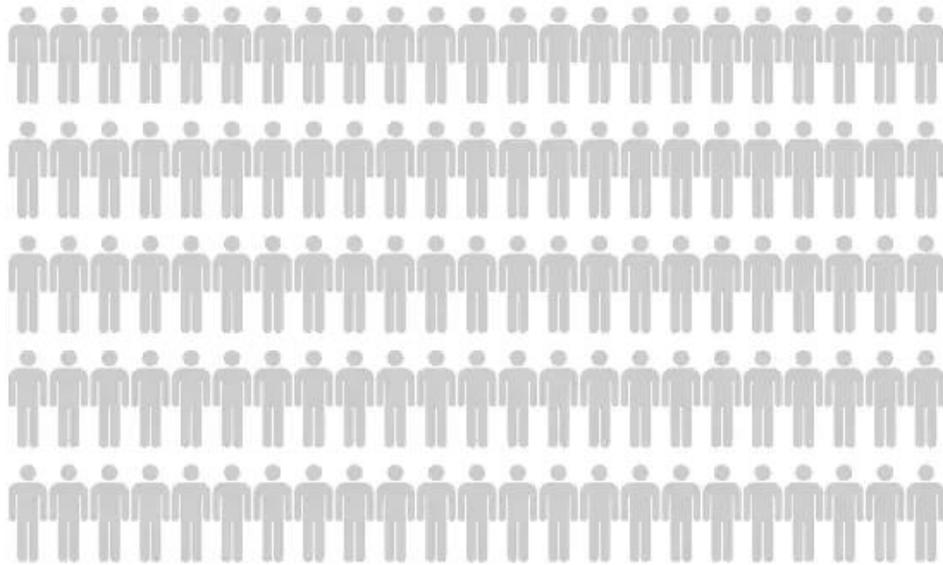


+ OTHERS !

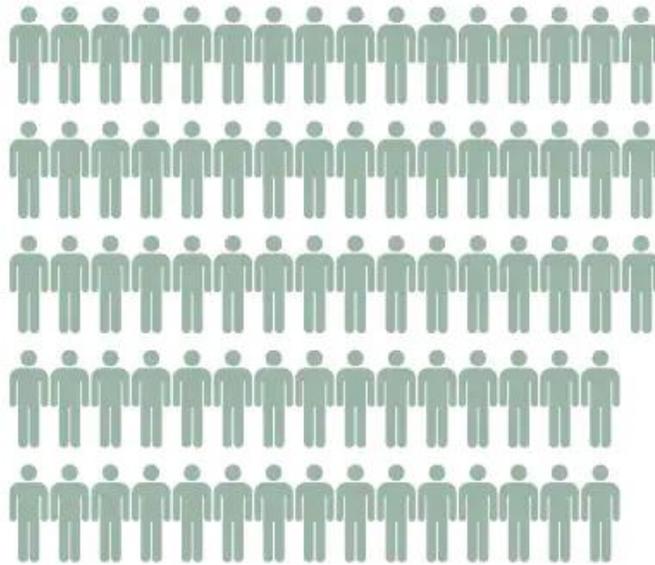
Central Question

What is the association between cannabis use and cannabis use disorder?

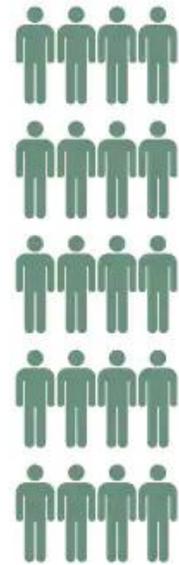
55 million adults currently use marijuana



115 million adults
have never tried
marijuana



78m
have tried, but don't
currently use



20m
use
mj.
yearly



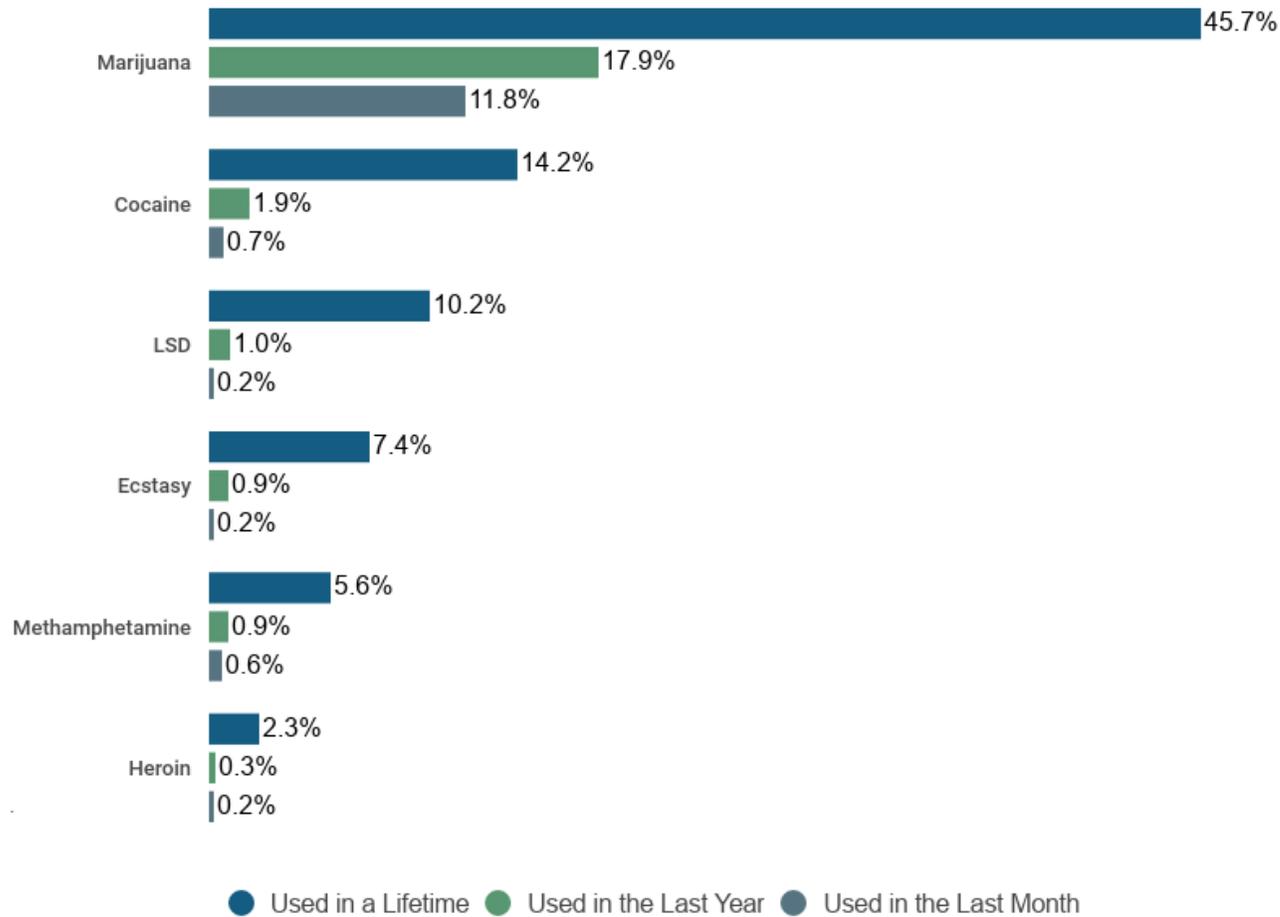
35m
use
mj.
monthly

WAPO.ST/WONKBLOG

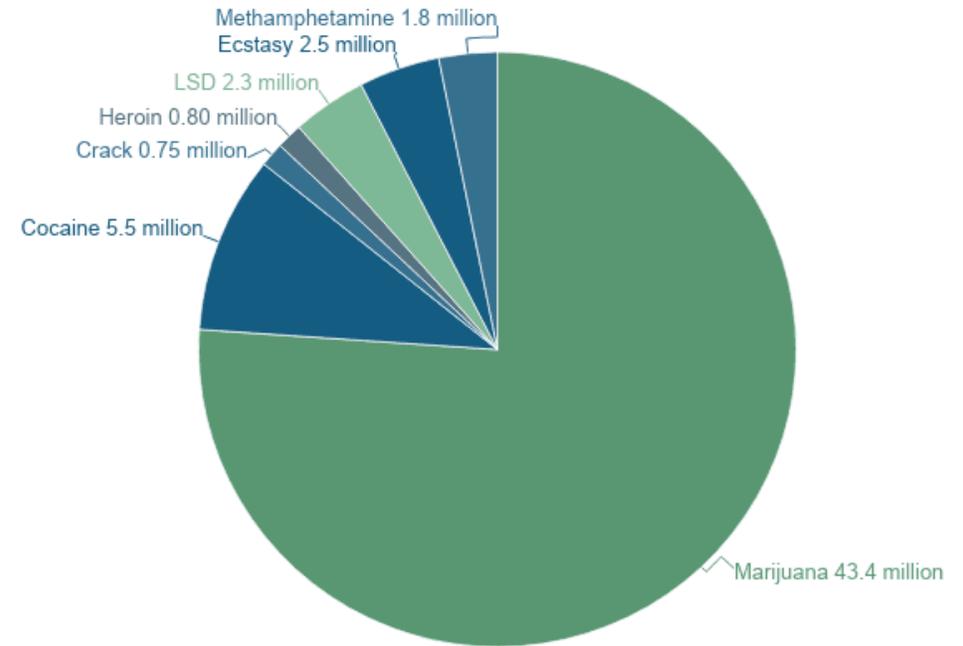
Source: Yahoo News/Marist survey

Marijuana use is common

Drug Usership Among Americans Aged 12 & Older



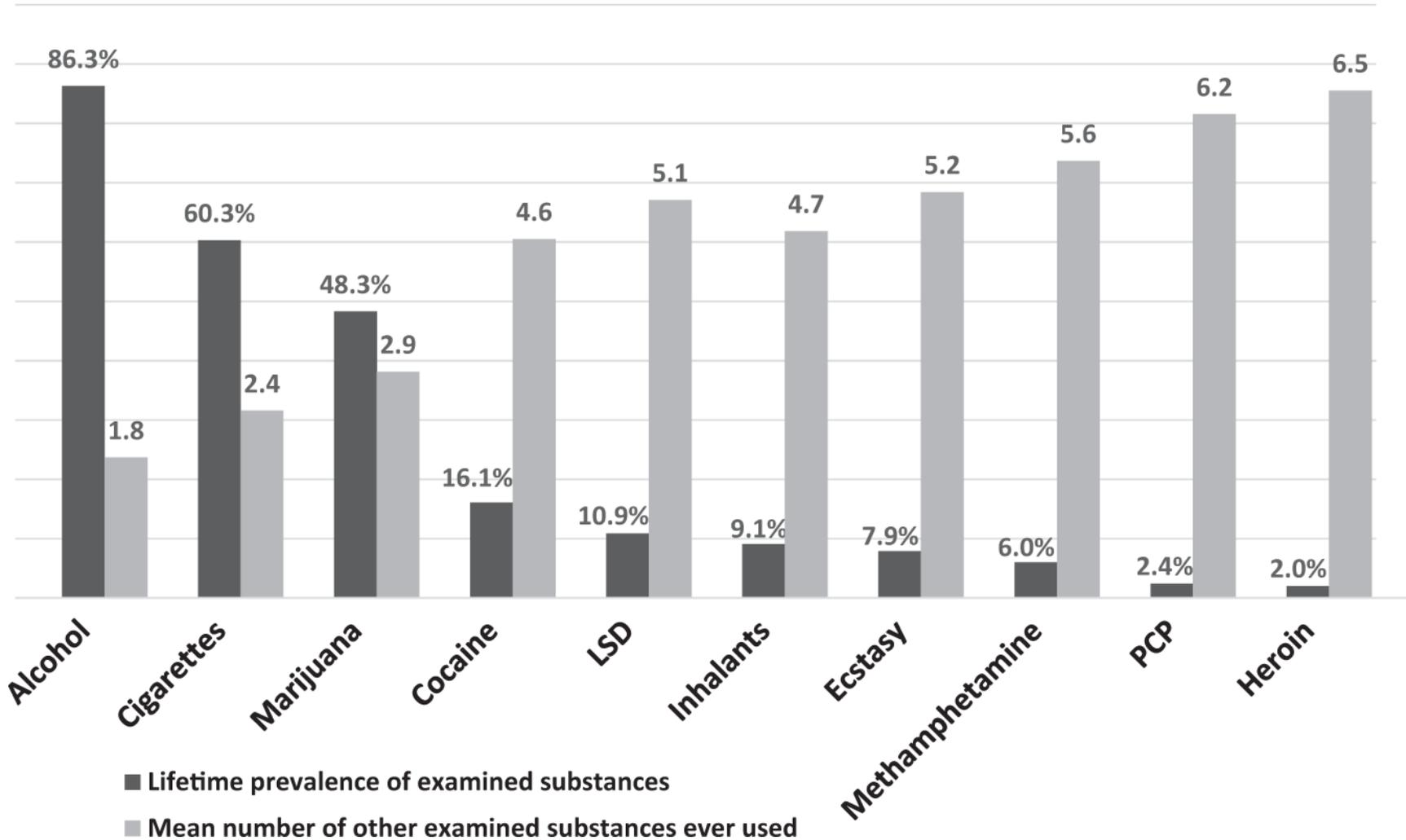
Number of people in the US who used selected illegal drugs in 2018



In 2018, **43.5 million people** reported using cannabis in the past year, making it the **most commonly-used illicit drug in the United States**

National Center for Drug Abuse Statistics, data from the Substance Abuse and Mental Health Services Administration 2020 National Survey of Drug Use and Health

Marijuana/Cannabis and other substances of abuse



Adolescent Cannabis Use Increases

- Research led by Oregon Health & Science University reveals adolescent cannabis abuse in the United States has increased drastically — **by about 245%** — from 2000–2020
 - National Poison Data System
 - As alcohol abuse among teens has steadily declined
 - more than 338,000 instances of intentional abuse or misuse
 - the majority of ingestions — 58.3% — occurred in males
 - more than 80% of all reported exposure cases occurred in young people aged 13 to 18
- Edible and vaping products are often marketed in ways that are attractive to young people, and they are considered more discrete and convenient

Volkow, N.D., Han, B., Einstein, E.B., & Compton, W.M. (2021). Prevalence of substance use disorders by time since first substance use among young people in the US. JAMA Pediatrics, DOI: 10.1001/jamapediatrics.2020.6981

Cannabis - Pharmacology

- Cannabis contains hundreds of constituent compounds, including the cannabinoids delta-9-tetrahydrocannabinol (THC) and cannabidiol (CBD)
 - two types of receptors: CB1 (glial cells and brain) and CB2 (immune cells)
 - THC: euphoria based on CB1 receptors
 - CBD: acts on brain signaling systems and immune system
- An addicting substance
 - Reinforcing
 - Rapid onset after inhalation
 - High lipophilicity
 - Rapid entry to brain and spinal cord
- Increased potency of recent products
 - Increased total THC
 - Increased dependence
- Dependence
 - Gradual increase in use
 - Cannabis does have a withdrawal syndrome
 - Major clinical effects: anxiety and mental clouding

Cannabis – Trends in THC

- Cannabis products with varying concentrations of THC, CBD, and other chemicals have proliferated
- The cannabis available today is *much more potent* than what was available in the past
 - The THC concentration in commonly cultivated cannabis plants increased three-fold between 1995 and 2014 (an increase from *4 to 12%* in that period)
- Cannabis available in dispensaries in some states has average concentrations of THC between *17.7 and 23.2%*
- Concentrated products, commonly known as dabs or waxes, are widely available in some states and may contain between *23.7 and 75.9%* THC

Elsohly, M. A., et.al. Changes in Cannabis Potency Over the Last 2 Decades (1995-2014): Analysis of Current Data in the United States. *Biological Psychiatry*, 2-16. 79(7), 613-619.
Jikomes, N. et.al. The Cannabinoid Content of Legal Cannabis in Washington State Varies Systematically Across Testing Facilities and Popular Consumer Products. *Scientific reports*, 2018 (1), 4519.
Alzghari, S. K., et.al. To Dab or Not to Dab: Rising Concerns Regarding the Toxicity of Cannabis Concentrates. *Cureus*, 2017. 9(9), e1676.

Cannabis – Intoxication effects

- Euphoria
- Dry mouth
- Hunger
- Reddened conjunctivae
- Tachycardia
- Hypertension with postural hypotension
- Impaired manual dexterity
- Poor concentration
- Memory impairment
- Agitation
- Anxiety and Paranoia
- Toxic psychosis

Cannabis – Withdrawal effects

- Withdrawal symptoms include those exactly opposite of the intoxication effects
 - Insomnia
 - Anorexia
 - Irritability
 - Depression
 - Tremor
- Cessation of use results in peak withdrawal effects 10 hours to 5 days
- Can require hospitalization

Morbidity of cannabis use

Organ System	Complication
Infectious	Bacterial, viral (Hep C)
Neoplastic	Respiratory cancer, bladder cancer
Musculoskeletal	spasticity
Stomatognathic	Oral health
Respiratory	Chronic inflammatory change, allergens
Nervous	Atrophy, decreased brain volume, psychomotor function, tardive dyskinesia, sleep disturbances
Ocular	Visual dysfunction
Cardiovascular	Acute cardiac effects, cannabis arteritis, coronary artery disease risk
Nutrition	Metabolic syndrome, appetite
Environment	Trauma

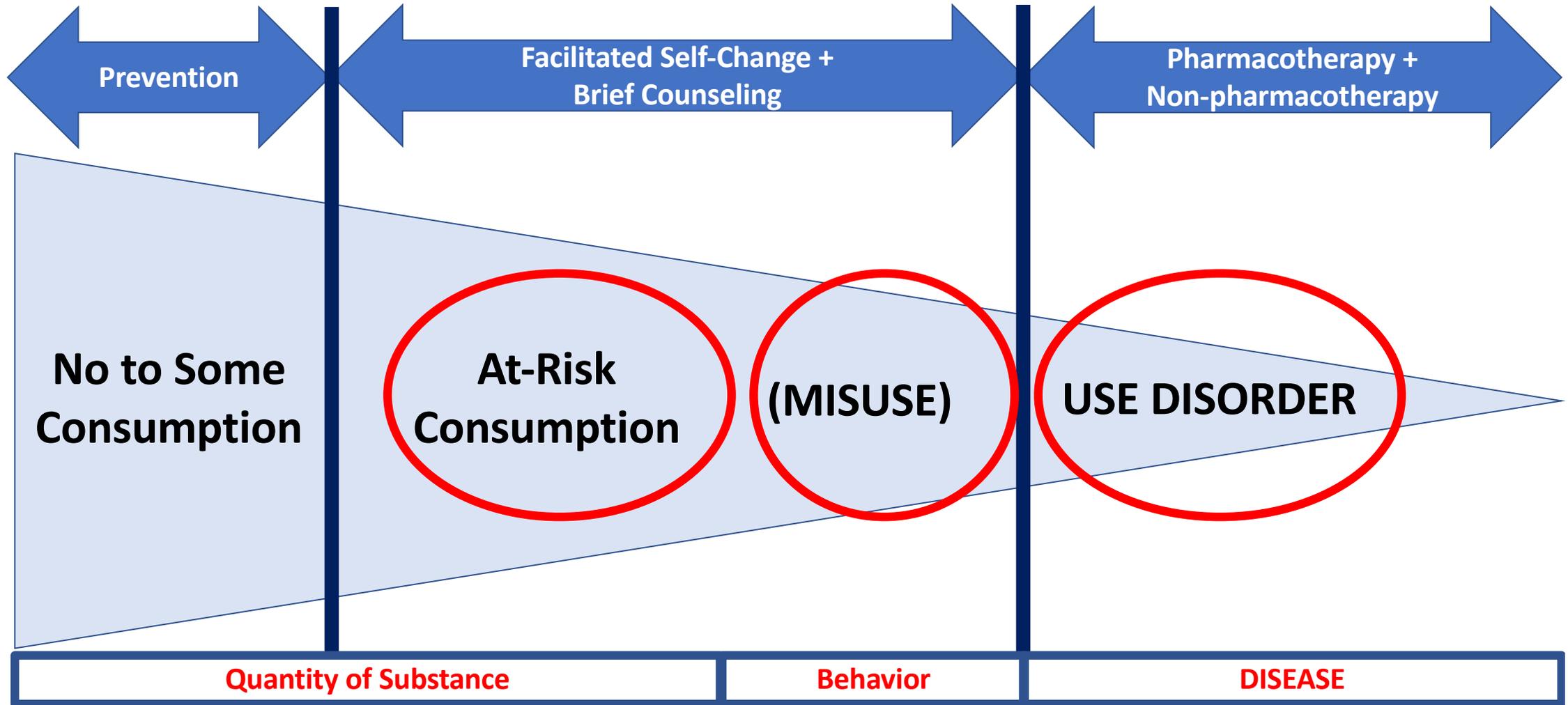
Consequences of legalization

- In states where marijuana has been legalized:
 - **Emergency-room visits related to marijuana** increased by **54%** and hospitalizations increased by 101% in 2018
 - **Suicides** where toxicology tests indicated marijuana had been used **increased from 7.6% in 2006 to 23% in 2017**
 - In Colorado, the cost of marijuana to taxpayers is nearly **\$5.00 for every \$1.00 gained in tax revenue** in addition to expenses such as **marijuana-related DUIs that cost \$25 million** in 2016.

Adverse Health Effects (NIDA)

- Prenatal and adolescent development
- ***Cannabis Use Disorder***
- Mental Illness
 - cannabis use has been associated with psychotic and depressive disorders, mania, suicide, and cognitive impairment
- Lung Injuries
- Other Medical Complications
- Impaired Driving

Substance Use Disorders Along a Continuum



DSM 5 DEFINITION: Cannabis Use Disorder (CaUD)

1. Failure to fulfill role obligations at work, school, or home
2. Recurrent use in hazardous situations
3. Continued use despite substance-related social or interpersonal problems
4. Tolerance
5. Withdrawal/physical dependence
6. Loss of control over amount of substances consumed
7. Preoccupation with controlling substance use
8. Preoccupation with substance use activities
9. Impairment of social, occupational, or recreational activities
10. Use is continued despite persistent problems related to substance use
11. Craving or a strong desire to use a substance

Criteria:

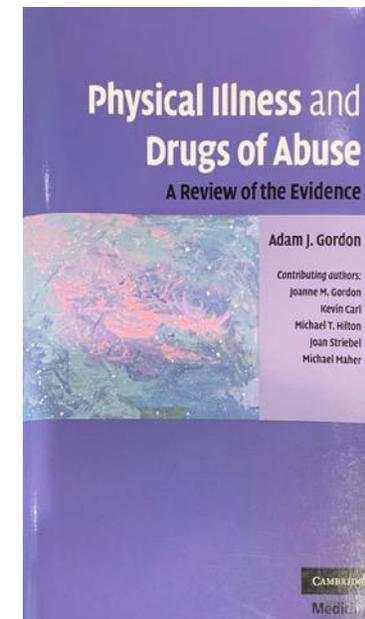
2-3 (mild)

4-5 (moderate)

6 or more (severe)

Brief Epidemiology

- Most frequently abused drug
- Use often leads to cannabis use disorder
- Cannabis use disorder is among the most prevalent addiction in the US
- Increase use in adolescents/young adults = more prone to cannabis use disorder
- Increase use and cannabis use disorder in states with medical marijuana laws
- Medical cannabis card = cannabis use disorder



Levesque A and Le Foll B. Med Clin N Am. 2018;102:667-681

<http://www.unodc.org/wdr2016/>

Lev-Ran S. et.al. Am J Addict 2013;22(1):7-13

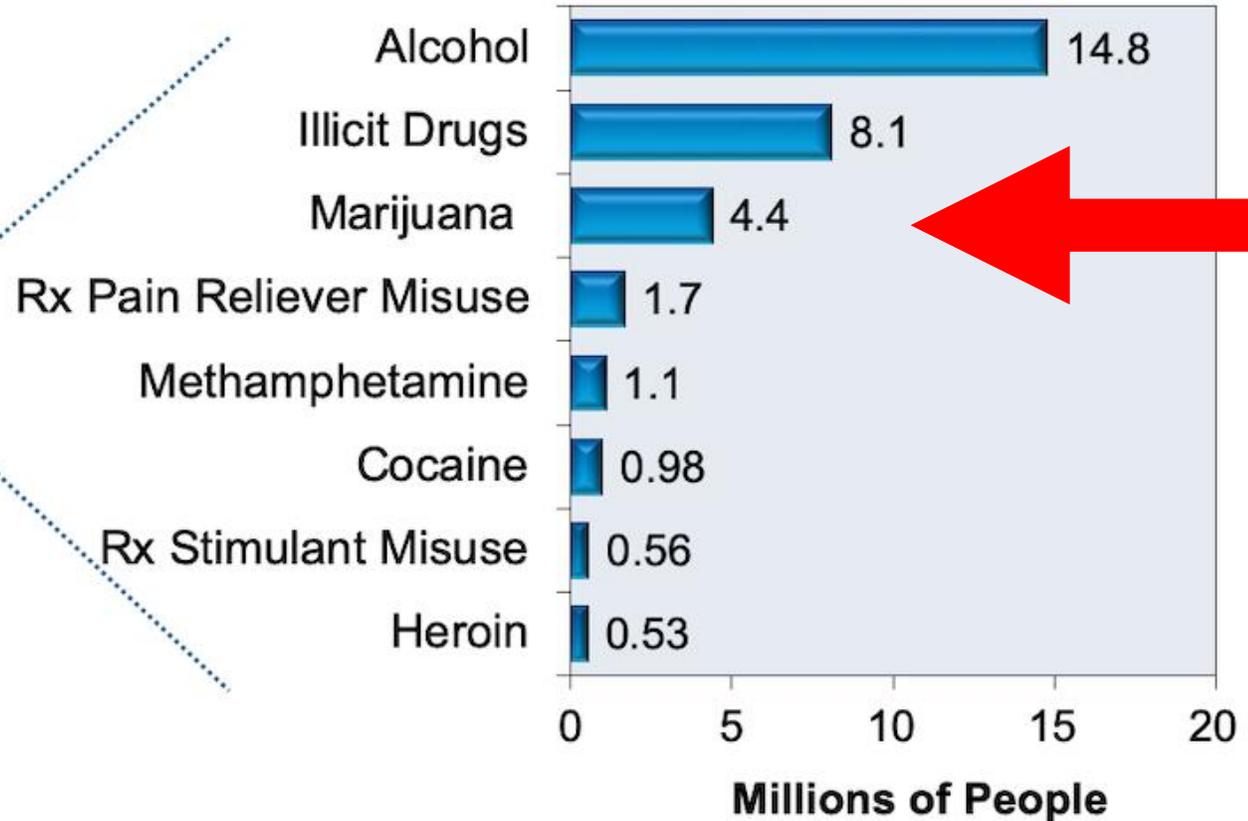
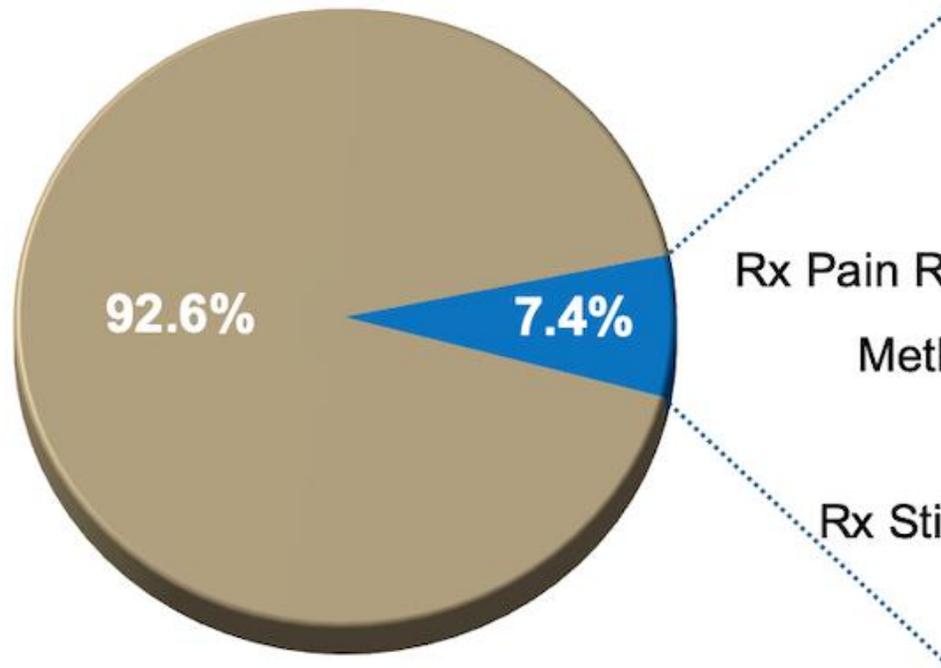
Lopez-Quintero C. et.al. Drug Alcohol Depend 2011;115(1-2):120-130

Le Strat Y. et.al. Acid Anal Prev. 2015;76:1-5

Hasin DS, et.al. JAMA Psych. 2017;74(6):579-588

Number of Persons with past year SUD, 2018

- No SUD in Past Year: 235.5 Million
- SUD in Past Year: 20.3 Million



Cannabis Use Disorder and Impairment

4.5 million people aged 12 or older
had a ***marijuana use disorder*** in the ***past year***
(***1.7% of the population***)

5.7 million people aged 12 or older
had a marijuana use disorder in the ***past year***
or were classified as having a ***marijuana use disorder***
with ***moderate or severe impairment***
(***2.2% of the population***)

NIDA: Cannabis Use Disorder

- Data suggest that nearly **10%** of people who use cannabis will become dependent on it
 - People who begin using cannabis **before the age of 18** are **4-7 times more likely** to develop cannabis use disorder than adults
 - The risk of dependence increases to
 - **17%** for those who start using marijuana in their teens
 - **25-50%** for those who use it daily
 - The risks of physical dependence, addiction, and other negative consequences **increase with frequent use and exposure to high concentrations of THC**

Hasin DS, Saha TD, Kerridge BT, et al. Prevalence of marijuana use disorders in the United States between 2001-2002 and 2012-2013. *JAMA Psychiatry*. 2015;72(12):1235-1242.

Lopez-Quintero C, de los Cobos JP, Hasin DS, et al. Probability and predictors of transition from first use to dependence on nicotine, alcohol, cannabis, and cocaine: Results of the National Epidemiologic Survey on Alcohol and Related Conditions (NESARC). *Drug and Alcohol Dependence*. 2011;115(1-2):120-130.

Winters KC, Lee C-YS. Likelihood of developing an alcohol and cannabis use disorder during youth: association with recent use and age. *Drug and Alcohol Dependence*. 2008;92(1-3):239-247.

NIDA: Cannabis Use Disorder

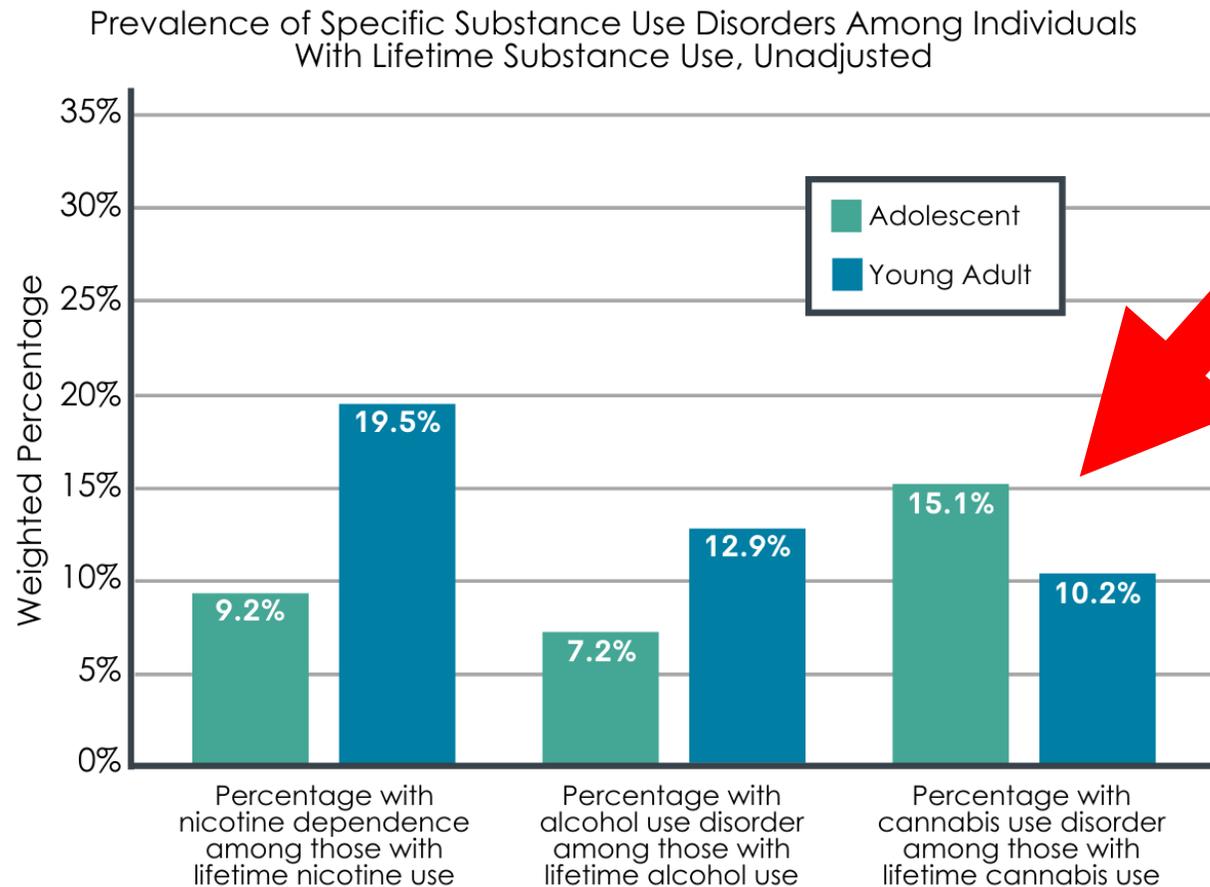
- 3 in 10 **(30%!)** US adults who use regularly use cannabis develop CUD
- 23% developing severe CUD, often with:
 - a tolerance to delta-9-tetrahydrocannabinol (THC)
 - withdrawal symptoms

Hasin DS, Saha TD, Kerridge BT, et al. Prevalence of marijuana use disorders in the United States between 2001-2002 and 2012-2013. *JAMA Psychiatry*. 2015;72(12):1235-1242.

Gonzalez S, Cebeira M, Fernandez-Ruiz J. Cannabinoid tolerance and dependence: a review of studies in laboratory animals. *Pharmacol Biochem Behav*. 2005;81(2):300-318.

Lichtman AH, Martin BR. Cannabinoid tolerance and dependence. *Handb Exp Pharmacol*. 2005;(168):691-717.

NIDA: Concern for youth



The rate of cannabis use disorder for those who initiated cannabis use within the past 12 months was 10.7% among adolescents and 6.4% among young adults and this rate was 20.1% among adolescents and 10.9% among young adults for those who initiated cannabis use greater than three years ago.

Volkow, N.D., Han, B., Einstein, E.B., & Compton, W.M. (2021). Prevalence of substance use disorders by time since first substance use among young people in the US. *JAMA Pediatrics*, DOI: 10.1001/jamapediatrics.2020.6981

Medical Cannabis and Cannabis Use Disorder

HEALTH & MEDICINE

Medical marijuana may trigger substance abuse



Original Investigation | Psychiatry

March 18, 2022

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

Jodi M. Gilman, PhD^{1,2,3}; Randi M. Schuster, PhD^{1,2}; Kevin W. Potter, PhD^{1,2}; et al

» [Author Affiliations](#) | [Article Information](#)

JAMA Netw Open. 2022;5(3):e222106. doi:10.1001/jamanetworkopen.2022.2106

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?

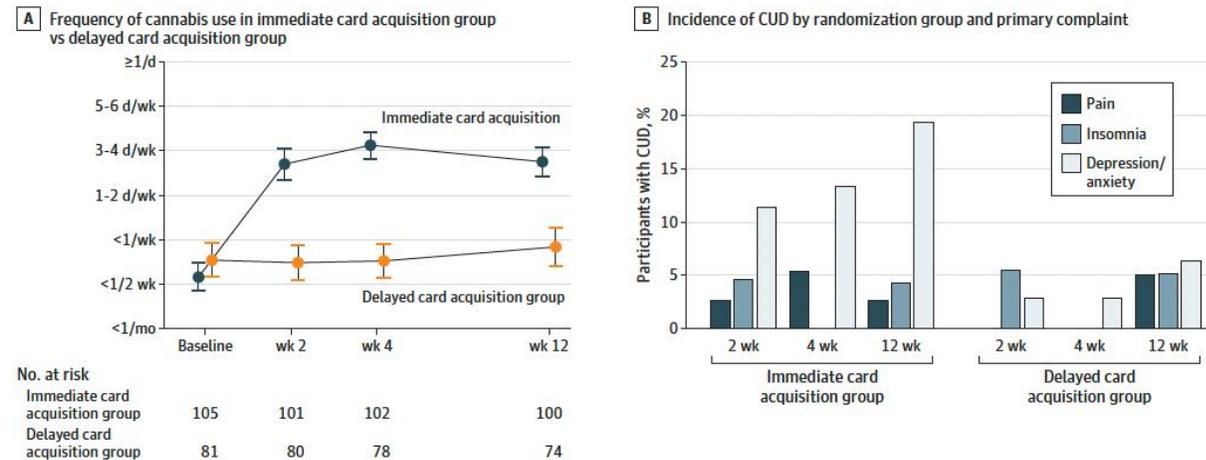
Findings In this randomized clinical trial involving 186 participants, immediate acquisition of a medical marijuana card increased the incidence and severity of cannabis use disorder (CUD) and resulted in no significant improvement in pain, anxiety, or depressive symptoms, but improved self-reported sleep quality.

Meaning Findings from this study suggest the need for further investigation into the benefits of medical marijuana card ownership for insomnia symptoms and the risk of CUD, particularly for those with anxiety or depressive symptoms.

Medical Cannabis and Substance Abuse

CONCLUSIONS AND RELEVANCE This randomized clinical trial found that immediate acquisition of a medical marijuana card led to a higher incidence and severity of CUD; resulted in no significant improvement in pain, anxiety, or depressive symptoms; and improved self-rating of insomnia symptoms. Further investigation of the benefits of medical marijuana card ownership for insomnia and the risk of CUD are needed, particularly for individuals with anxiety or depressive symptoms.

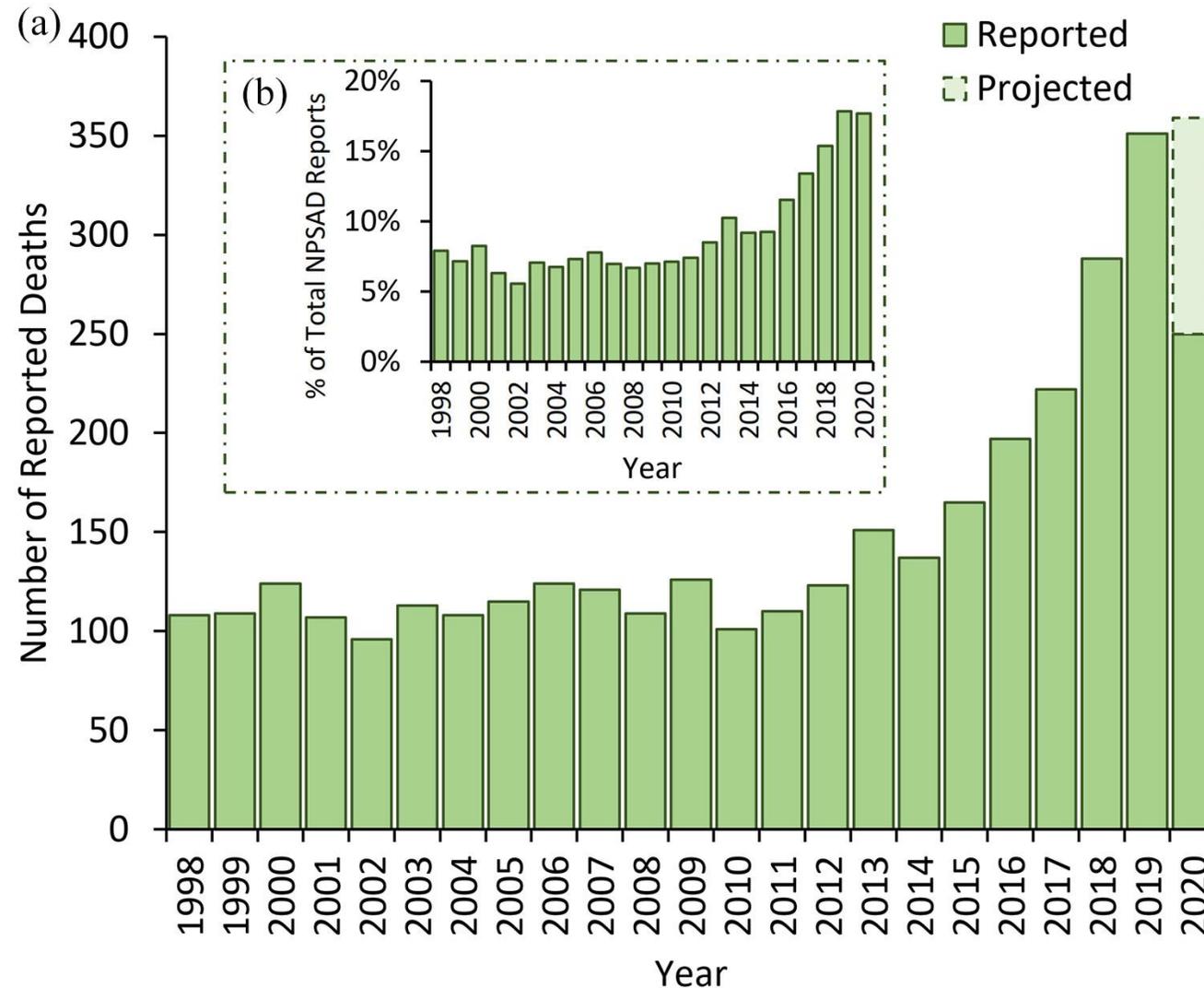
Figure 2. Frequency of Cannabis Use and Incidence of Cannabis Use Disorder (CUD) Diagnoses in Immediate vs Delayed Card Acquisition Groups



A, Cannabis use was assessed via a self-reported scale, which asked for frequency of cannabis use at each visit. There was a significant increase in use in the immediate card acquisition group vs the delayed card acquisition group (2.44; 95% CI, 2.08-2.81; $P < .001$). B, Cannabis use disorder was defined as 2 or more CUD symptoms on an

11-point scale. The odds of developing CUD were 2.9-fold higher in the immediate card acquisition group vs the delayed card acquisition group (adjusted odds ratio, 2.88; 95% CI, 1.17-7.07; $P = .02$).

Increase in deaths associate with Cannabis



SUMMARY POINTS

- Cannabis use is increasing
- THC content in cannabis is increasing (not medicinal)
- Medical cannabis THC content is relatively unknown
- Morbidity associated with cannabis use/CaUD are not trivial
- Adolescents/young adults are using cannabis increasingly
- **Cannabis use causes Cannabis Use Disorder (30%)**
- Adolescents/young adults are more likely to evolve to CaUD
- **Medical cannabis may be implicated in CaUD**
- More deaths are occurring due to cannabis exposure

Contact me!

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National Medication Treatment in the VA (MATVA)

Stepped Care for Opioid Use Disorder Train the Trainer (SCOUTT) Initiative Facilitation

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Stepped Care for
Opioid Use Disorder
Train the Trainer



National Coordinating Center for
the Interprofessional Advanced
Fellowships in Addiction
Treatment

