



CANNABIS

The World's Most Misunderstood Botanical

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University of Maryland School of Pharmacy
Chair of Committee on Education
Society of Cannabis Clinicians

HISTORY OF CANNABIS MEDICINE

- 2700 BC PenTs'ao Kang Mu Chinese Pharmacopeia
- 1400 BC Egyptian Papyrus
- 840 AD First anesthesia (Hua Tuo)
- 1100 AD Avicenna/Canon of Medicine
- 1857 US Pharmacopeia

OFFICE HOURS:
8 TO 11:30 A. M.
4 TO 6 P. M.

DR. W. A. ADAMS,
BOTH PHONES. EASTON, KANSAS.

Mrs. S. S. Wesley - Sept. 24 1911
Lovesmount, Kans.
Fr Cannabis seed - 3 $\frac{1}{4}$
Fr Hyoscyamus Gr. 3 $\frac{1}{4}$
at sig.
Fifteen (15) drops in
water at bed-time -

W. A. Adams
M. D.

BOONE & BOONE
BOONE APARTMENT BUILDING
COR. CLEVELAND AND HOLLOWAY STREETS
DURHAM, NORTH CAROLINA
PHONES: OFFICE F-9301, RES. F-9302
(PARKING SPACES EASY TO FIND)

W. H. BOONE, M. D.
OFFICE HOURS
9:30 A.M. TO 12:30 P.M.
2:30 TO 5:30 P.M.

Miss. Dora [redacted] Date 9-7-37
Phos. barbital gr. VI
do Selsinium Rox gr. VII
3155
L. S. A.
exh Cannabis seed gr. II
Sig. caps. # 15.
Sig. = one cap. tid
W. H. Boone



炎帝神農氏
姜姓人身牛首
火德王

“WHAT IS MARIHUANA?”

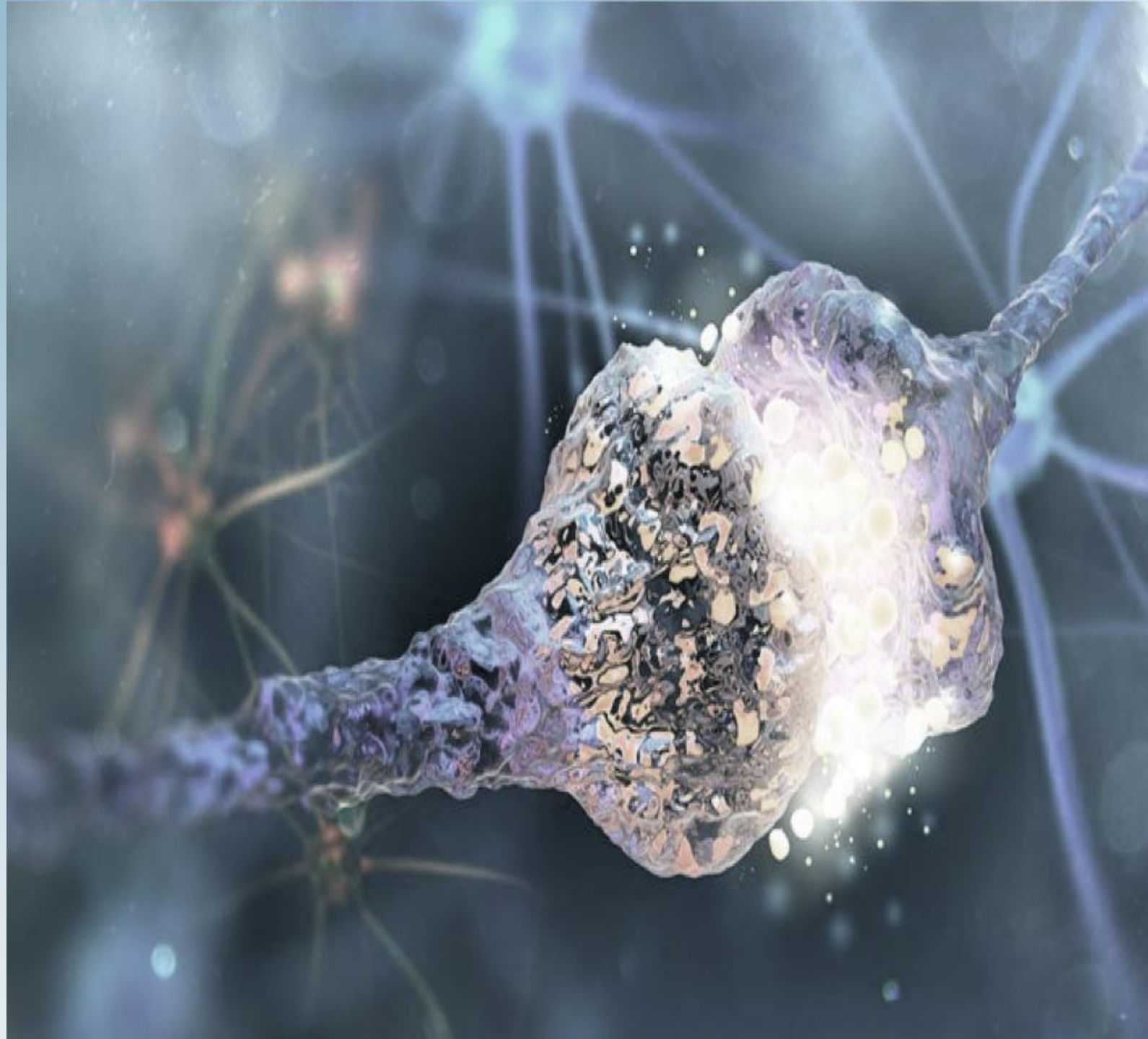
“Cannabis is the correct term...”

William C. Woodward, MD, JD
Legislative Counsel
American Medical Association
1937



ENDOCANNABINOID SYSTEM

- **300,000 yr old neuromodulating system**
 - Receptors
 - Ligands
 - Hydrolyzing enzymes
- **Maintains homeostasis by regulating**
 - Sleep
 - Appetite
 - Memory
 - Mood
- **Modulates immune system and almost every other neurotransmitter system**



ENDOCANNABINOID SYSTEM

RECEPTORS

CB1, CB2, GPR18, GPR55, PPAR, TRPV, TRPA

ENDOCANNABINOIDS

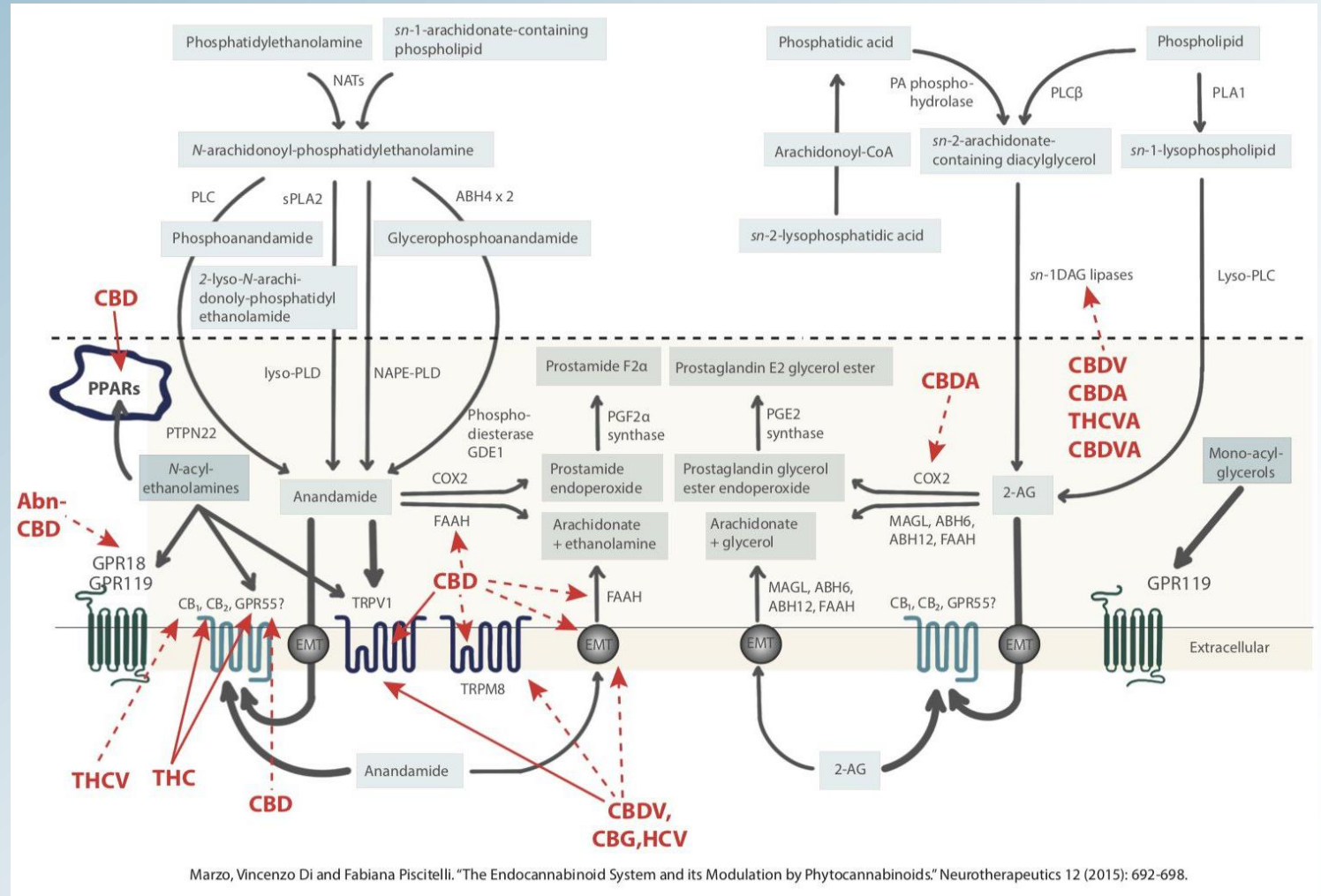
- Anandamide
- 2-AG

ENZYMES

- FAAH
- MAGL

PHYTOCANNABINOIDS (APPROX 120)

- CBGA
- CBDA
- THCA
- CBCA
- CBDVA
- THCVA
- CBG
- CBD
- Δ9-THC
- Δ8-THC
- CBC
- CBDV
- THCV
- CBCV



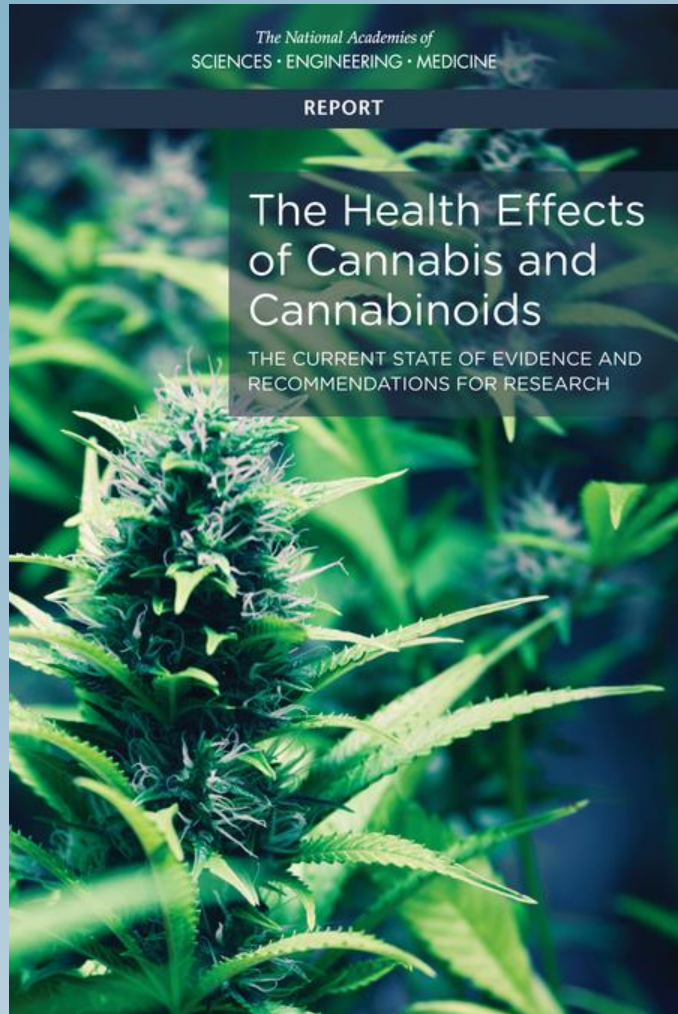
phytocannabinoids

- **CBG**
 - Anti-inflammatory
 - ↓neuroexcitability
 - ↓IOP
 - Antioxidant
- **CBDA; THCA**
 - Anti-inflammatory
 - Analgesic
 - Non-impairing
- **CBDV**
 - ↓neuroexcitability
- **CBD**
 - Anti-inflammatory
 - Antioxidant
 - ↓anxiety
 - Mood stabilizer
 - Anti-psychotic
 - ↑IOP
 - Muscle relaxant
 - Regulates GI motility
 - Reduces cravings:opioids, benzodiazepines, nicotine, ETOH
- Promotes sleep
- ↓ appetite
- ↑Glucose metabolism
- ↑osteoblast activity
- neuroprotective
- **THC**
 - Analgesic
 - Pain distraction
 - Antioxidant
 - ↓anxiety (low dose)
 - ↓IOP
 - Appetite stimulant
 - ↓tremor/tics
 - Fear extinction
 - Restorative sleep
 - ↑oropharyngeal tone
 - Anti-inflammatory (w/CBD)
 - neuroprotective
- **THCV**
 - ↓ appetite
 - ↑Glucose metabolism

MEDICAL BENEFITS:

- Alleviates pain
- Promotes restorative **sleep**
- Muscle relaxant
- **Mood elevation**
- **Anxiolytic**
- Interrupts chronic stress
- Appetite stimulant/suppressant
- Mood stabilizing
- Antipsychotic
- **Anti-inflammatory**
- Neuroprotective
- Cardioprotective
- Anti-oxidant
- **Modulates calorie, glucose, lipid metabolism**

NATIONAL ACADEMIES OF SCIENCES, ENGINEERING AND MEDICINE 2017 REPORT



Conclusive or substantial evidence that cannabis is effective:

- Treatment of **chronic pain** in adults
- Anti-emetic in the treatment of **chemotherapy-induced nausea and vomiting**
- Improving patient-reported **multiple sclerosis spasticity symptoms**

Moderate evidence that cannabis or cannabinoids are effective:






- Improving **short-term sleep outcomes** in individuals with sleep disturbance associated with sleep apnea, fibromyalgia, chronic pain, and multiple sclerosis

Limited evidence that cannabis or cannabinoids are effective for:

- Improving **anxiety symptoms**, as assessed by a public speaking test, in individuals with social anxiety disorders
- Improving **symptoms of posttraumatic stress disorder (nabilone)**

Takoma Park Integrative Care

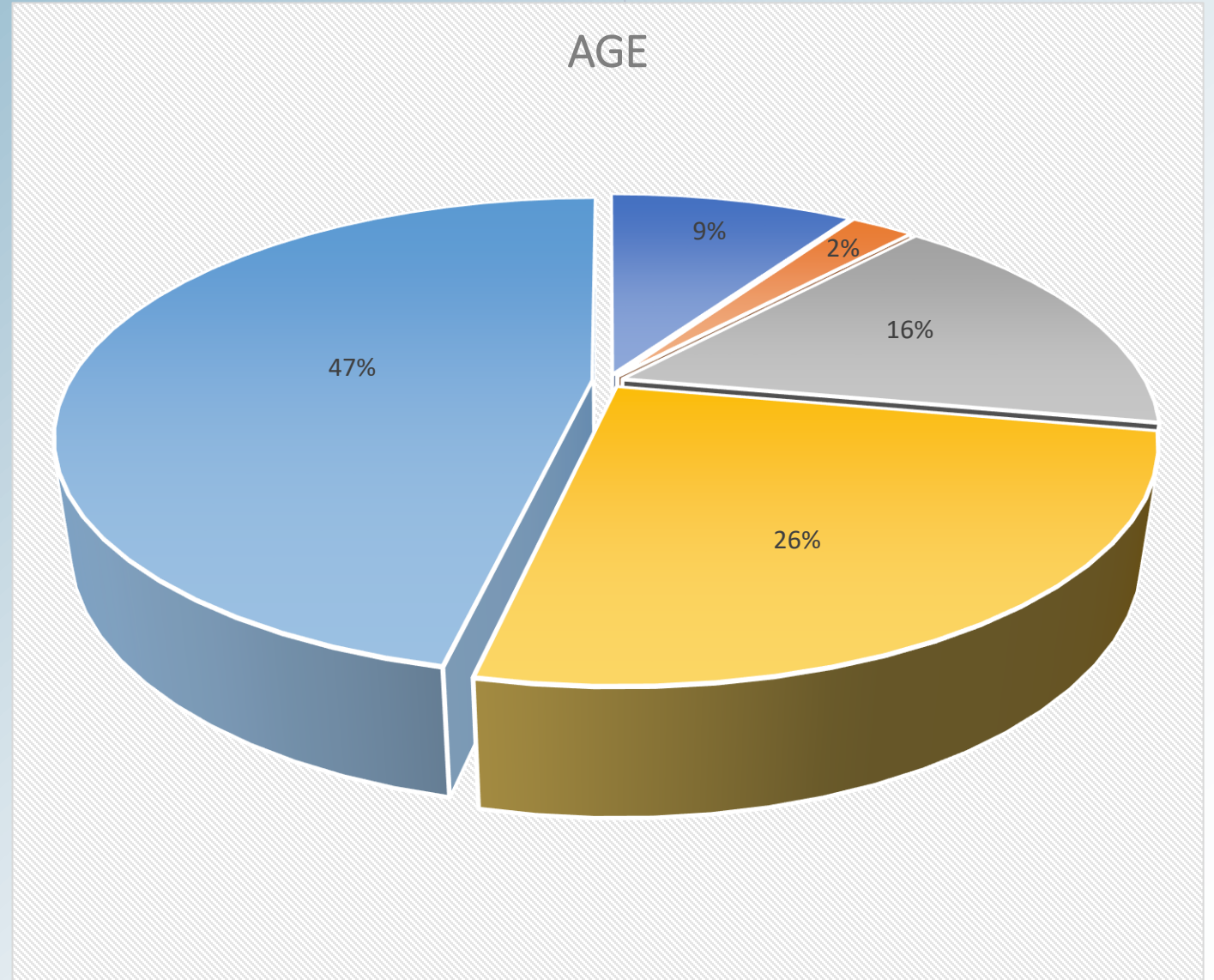
DEMOGRAPHICS

9%	< 18	
2%	18-24	
16%	25-39	
26%	40-59	
47%	> 60	

73% >40 years old

- Less interested in smoking
- Less interested in being impaired

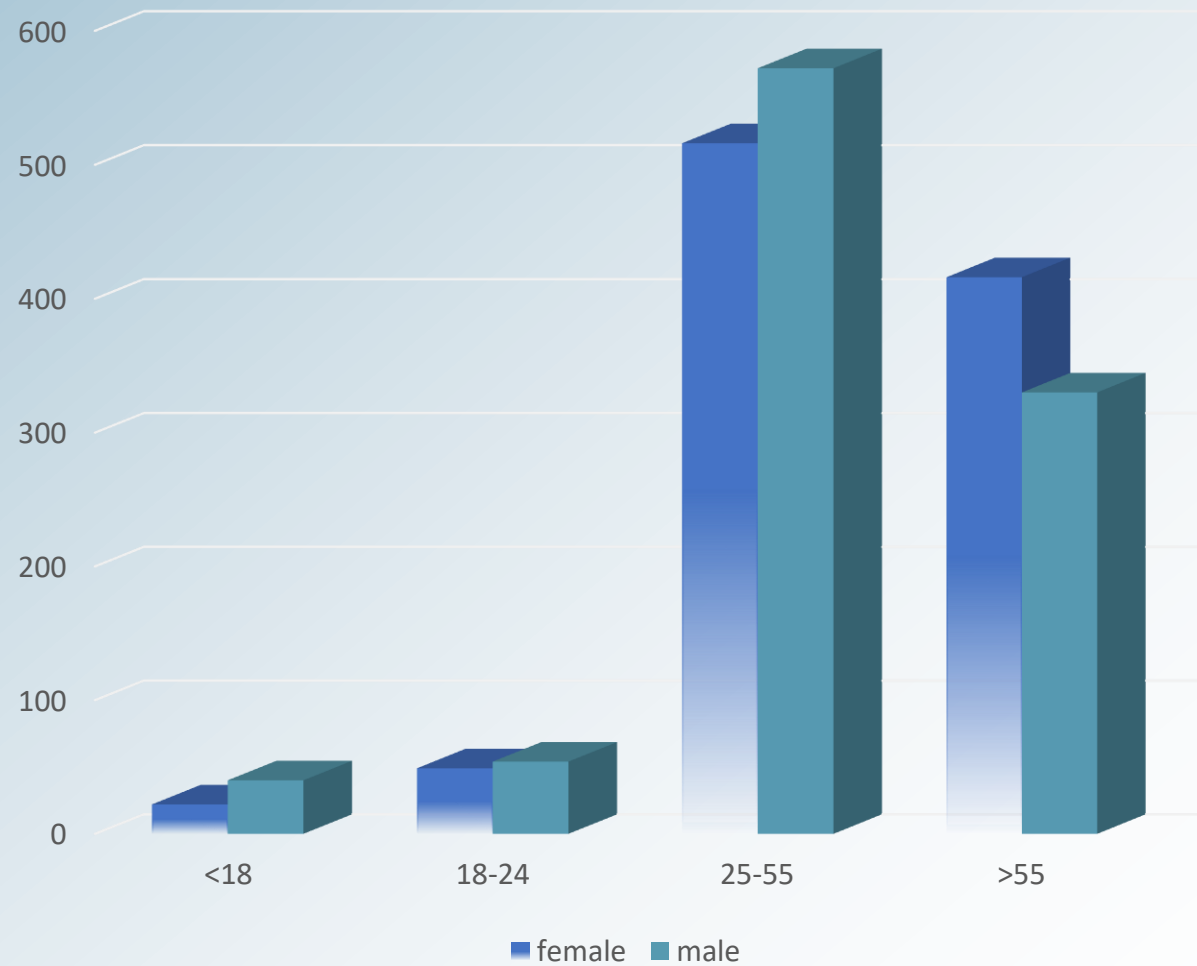
AGE



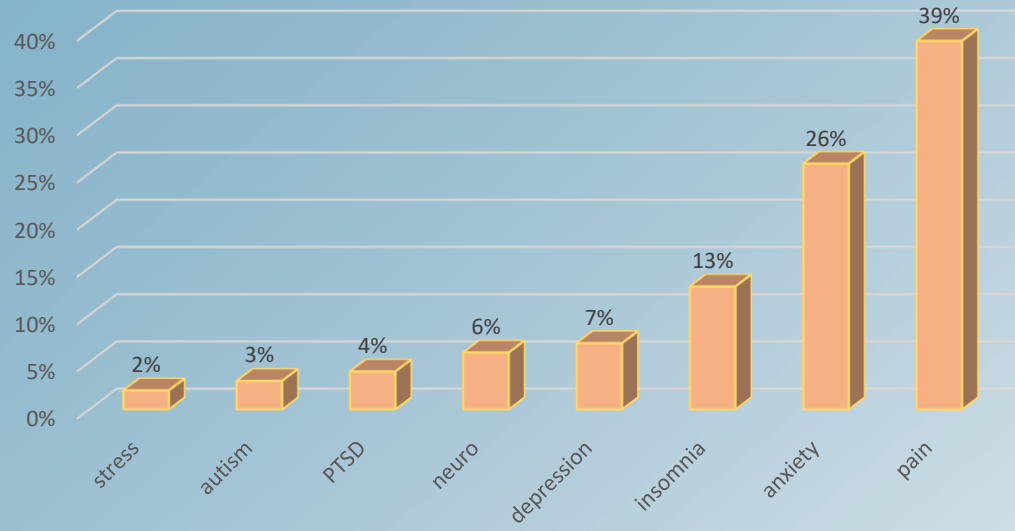
Takoma Park Integrative Care 2020

GENDER

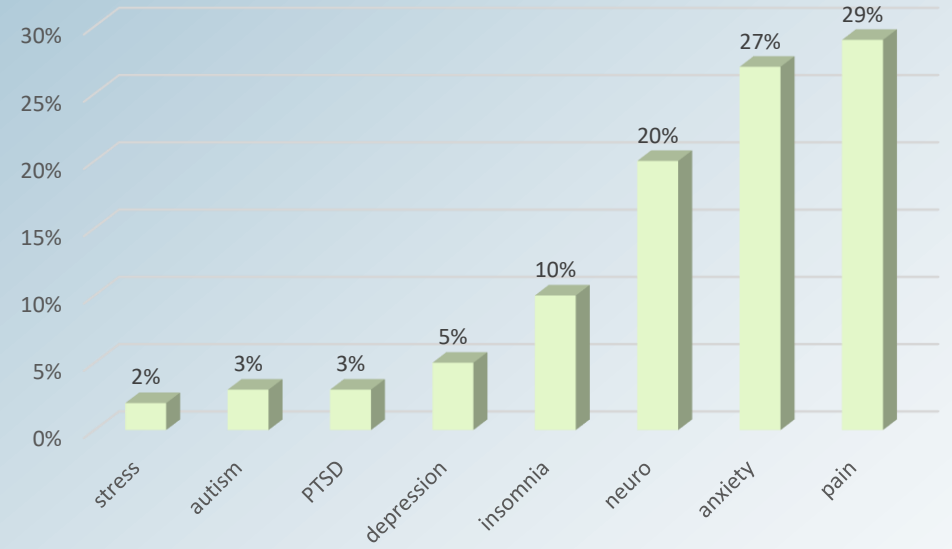
ONCE OVER AGE 55
FEMALES > MALES



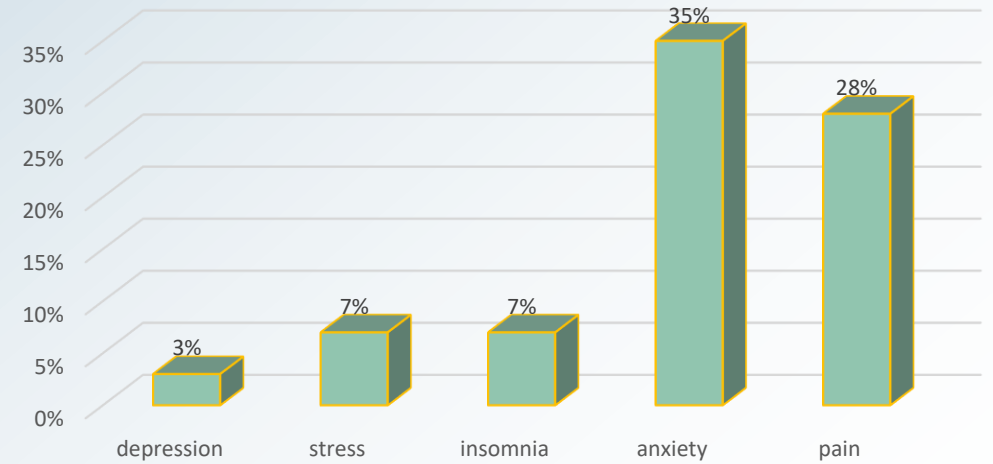
2019



2020



2021



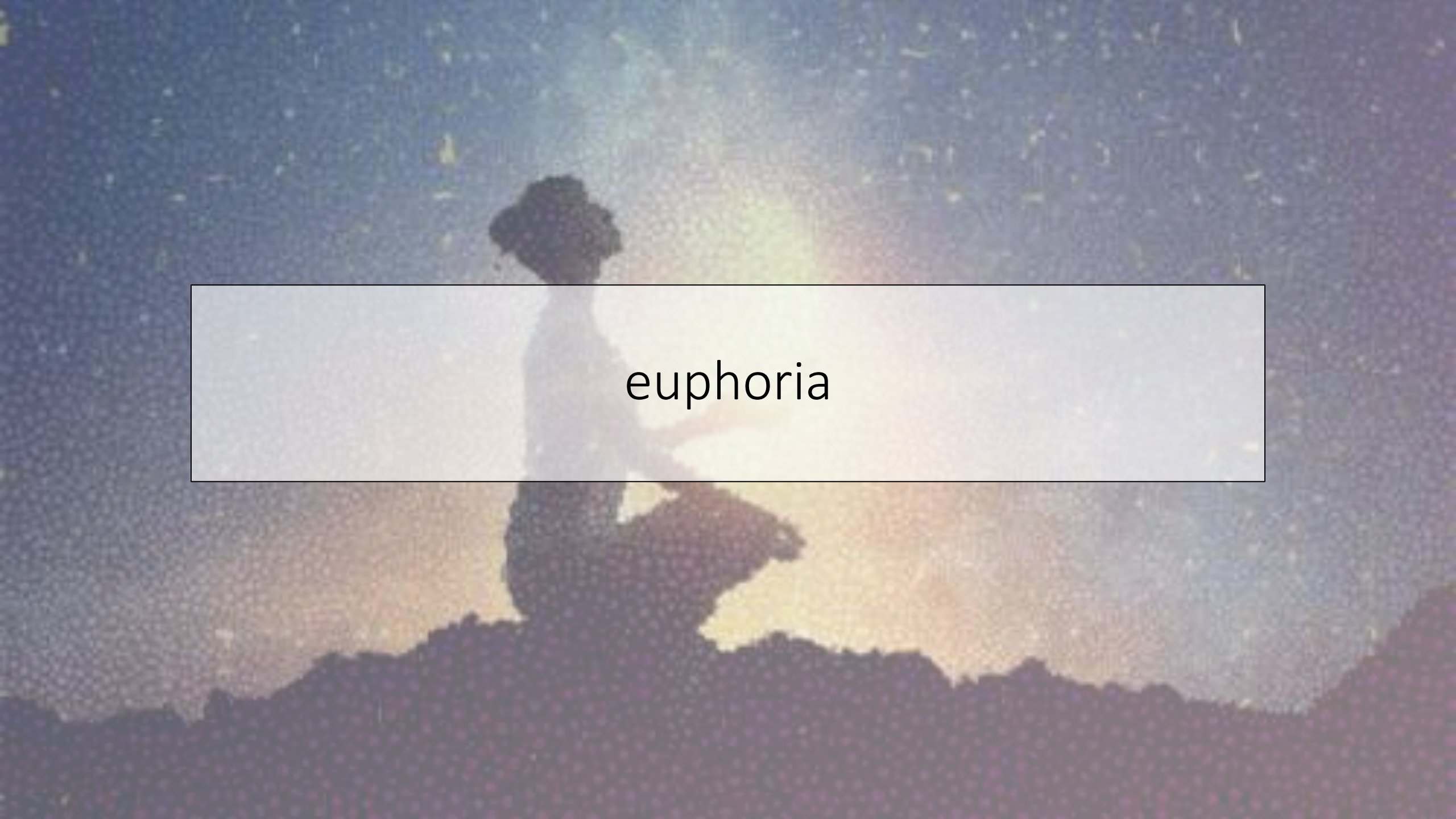
CONDITIONS THAT OFTEN RESPOND TO CANNABIS

- Autoimmune Disorders
 - Pain
 - Chronic fatigue
 - Brain fog
 - Muscle spasm
- Mental health
 - Anxiety
 - Depression
 - Irritability
 - Psychosis
- Insomnia/sleep apnea
- Metabolic Syndrome
 - Blood pressure
 - Diabetes
 - Obesity
 - Hyperlipidemia
- Chronic pain
 - Inflammatory
 - Neuropathic
 - Migraines
- Muscle spasticity
- Neurodegenerative Disease
- Sexual dysfunction
- Gastrointestinal
 - Irritable Bowel
 - Crohn's
 - Ulcerative colitis
 - Constipation
 - Diarrhea

ADVERSE EFFECTS

- D9-tetrahydrocannabinol (THC)
 - Dry mouth
 - Tachycardia (new users)
 - Decreased blood pressure (new users)
 - Impaired reaction time
 - Poor coordination
 - Amotivational Syndrome
 - Cannabis Hyperemesis Syndrome
 - Cannabis Use Disorder
 - The “High”
 - Euphoric for many
 - Dysphoric for many
- Cannabidiol
 - Potential drug-drug interaction
 - Appetite suppression
 - Decreased GES tone (GERD)
 - Increased IOP

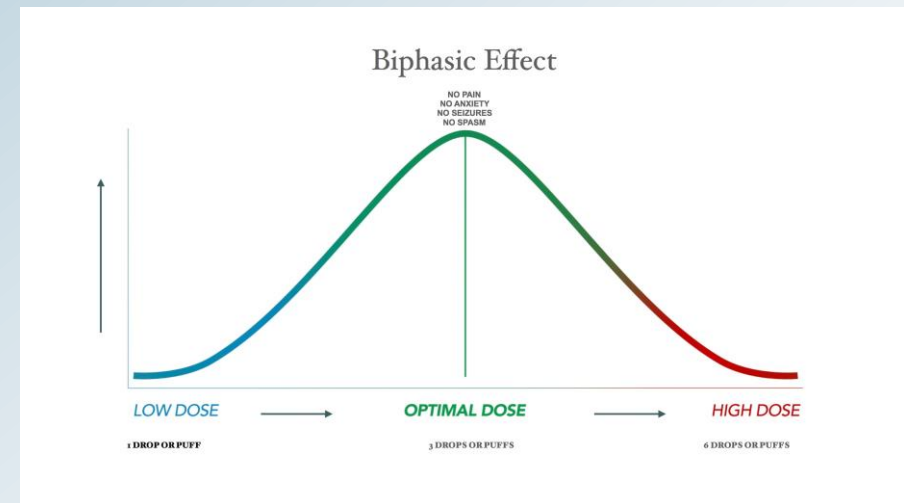
Most THC-mediated
Most mitigated by CBD

A silhouette of a person standing on a mountain peak at sunset. The person is facing right, with their arms slightly out. The sky is a mix of orange, yellow, and blue, with a bright light source behind the person. A white rectangular box is overlaid on the image, containing the word "euphoria" in a simple, black, sans-serif font.

euphoria

Start Low Go Slow

- Titration takes time
- Giving too much = not giving enough
- Giving way too much can make symptoms worse
- Combining CBD with THC:
 - Better efficacy for treating pain
 - Prevents the development of tolerance to THC



Mode of Delivery

Oromucosal: Tinctures, gummies, sprays, lozenges

- Seizures, Pain, IBS, Anxiety
- Sublingual or buccal x 2 mins
- **Onset: 20—30 mins**
- **Duration: 5-8 hrs**

Inhalation/Nasal: Flower, concentrates, resins; sprays

- Migraine, Seizure, Pain
- **Onset: 10 mins**
- **Duration: 1-4 hrs**

Transdermal Patch

- Seizures, ASD, pain
- Easy to titrate
- **24-36 hr duration**

Topical: Salves, balms, salts

- Arthritic Pain
- Muscle spasm
- Eczema/psoriasis
- **Onset: 5-10 mins**

Oral/Edible: Capsules, cookies, beverages, etc.

- Crohn's/colitis
- **Onset: 40-240 mins**
- **Duration: 8-10 hrs**

Why CBD:THC Ratios Are Important

- 30:1 - 10:1
 - pain, anxiety, spasticity, sleep
 - No impairment
- 8:1 - 1:1
 - pain, anxiety, depression, spasticity, sleep
 - Possible minimal impairment in 1st 60 mins
 - Usually non-impairing once patient acclimates to THC
- 1:2 - THC-dominant
 - Pain, PTSD, Parkinson's, Tourette's
 - Impairing; patients generally become acclimated so that impairment is not detrimental; educated not to drive, operate machinery, make important decisions

SOCIAL CONCERNS

RISK OF DEPENDENCE OR ADDICTION

- **Henningfield**

- Withdrawal < all
- Dependence < caffeine!
- Intoxication < alcohol

- **Benowitz**

- Withdrawal < alcohol, nicotine
- Dependence < caffeine!
- Intoxication < alcohol

	Henningfield Ratings				
Substance	Withdrawal	Reinforcement	Tolerance	Dependance	Intoxication
Nicotine	3	4	2	1	5
Heroin	2	2	1	2	2
Cocaine	4	1	4	3	3
Alcohol	1	3	3	4	1
Caffeine	5	6	5	5	6
Marijuana	6	5	6	6	4
	Benowitz Ratings				
Nicotine	3	4	4	1	6
Heroin	2	2	2	2	2
Cocaine	3	1	1	3	3
Alcohol	1	3	4	4	1
Caffeine	4	5	3	5	5
Marijuana	5	6	5	6	4



Cannabis Use in Pediatric Population

High school age

Cannabis

1997 - 47.1%.

2017 - 19.8%

Alcohol

1998 – 31.5%

2017 - 19.7%

MMWR, 2018

www.responsibility.org/alcohol-statistics/

underage-drinking-statistics

Dharmapuri, 2020

Association Between Recreational Marijuana Legalization in the United States and Changes in Marijuana Use and Cannabis Use Disorder From 2008 to 2016

Magdalena Cerdá, DrPH; Christine Mauro, PhD; Ava Hamilton, BA; Natalie S. Levy, MPH;
Julián Santaella-Tenorio, DrPH; Deborah Hasin, PhD; Melanie M. Wall, PhD;
Katherine M. Keyes, PhD; Silvia S. Martins, MD, PhD

National Survey on Drug Use and Health (NSDUH)

- (N=505,796)
- 2008-2016
- Problematic use in 12 to 17-yr-old increased from 2.18 to 2.72 %
- No change in young adults aged 18 to 25 yr-old
- 26 years or older
 - past-month marijuana use increased from 5.65% to 7.10%
 - past-month frequent use from 2.13% to 2.62%
 - past-year CUD from 0.90% to 1.23%

“This study is in no way meant to suggest that legalization shouldn’t take place. It’s a separate issue altogether.” Cerda

TEENS MORE LIKELY TO USE MARIJUANA THAN CIGARETTES



Past-month use among 12th graders

MOTOR VEHICLE ACCIDENTS

- Driving under the influence of cannabis” (DUIC)
 - measured reduction in cognitive or psychomotor skills AND a defined THC concentration in blood, oral fluid, or urine
- Cannabis-**impaired** driving vs. cannabis-**positive**
 - Time of administration, experience, and dose impact degree of impairment
 - Low THC concentrations can be detected for several days in chronic smokers
 - Lane weaving
 - THC-dominant and THC:CBD 1:1 > placebo at 40-100min **but not 240-300min**
 - no significant difference between CBD-dominant vs placebo
 - THC levels above 2 µg/L
 - occasional smokers for 26 h
 - frequent smokers had higher levels for >72 h.
- Cannabis users 25% more likely to be involved in MVA - age & gender???
- 10.7% of all fatally-injured drivers were known to have been opioid-positive

SUMMARY

- Old medicine
- Alleviates a wide variety of symptoms
- High safety profile/No fatal dose
- Undesirable effects are can be avoided
- Medical use differs from adult use and medical use should be protected, affordable, and non-taxable



History of Cannabis
Legalization
Endocannabinoid System
Laboratory Testing
Clinical Conditions
Adverse Effects
First Doctor's Visit
Modes of Delivery
Making Your Own Medicine
Hemp-Derived CBD
Toning the Endocannabinoid
Drug Interactions

THE
MEDICAL
MARIJUANA
GUIDE

Cannabis and Your Health



PATRICIA C. FRYE, MD
with DAVE SMITHERMAN



Thank you for your attention!



HEALTH EFFECTS OF CANNABIS LEGALIZATION

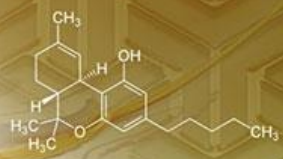
MARYLAND STATE DELEGATES
October 13, 2021

Susan R.B. Weiss
Director
Division of Extramural Research
National Institute on Drug Abuse



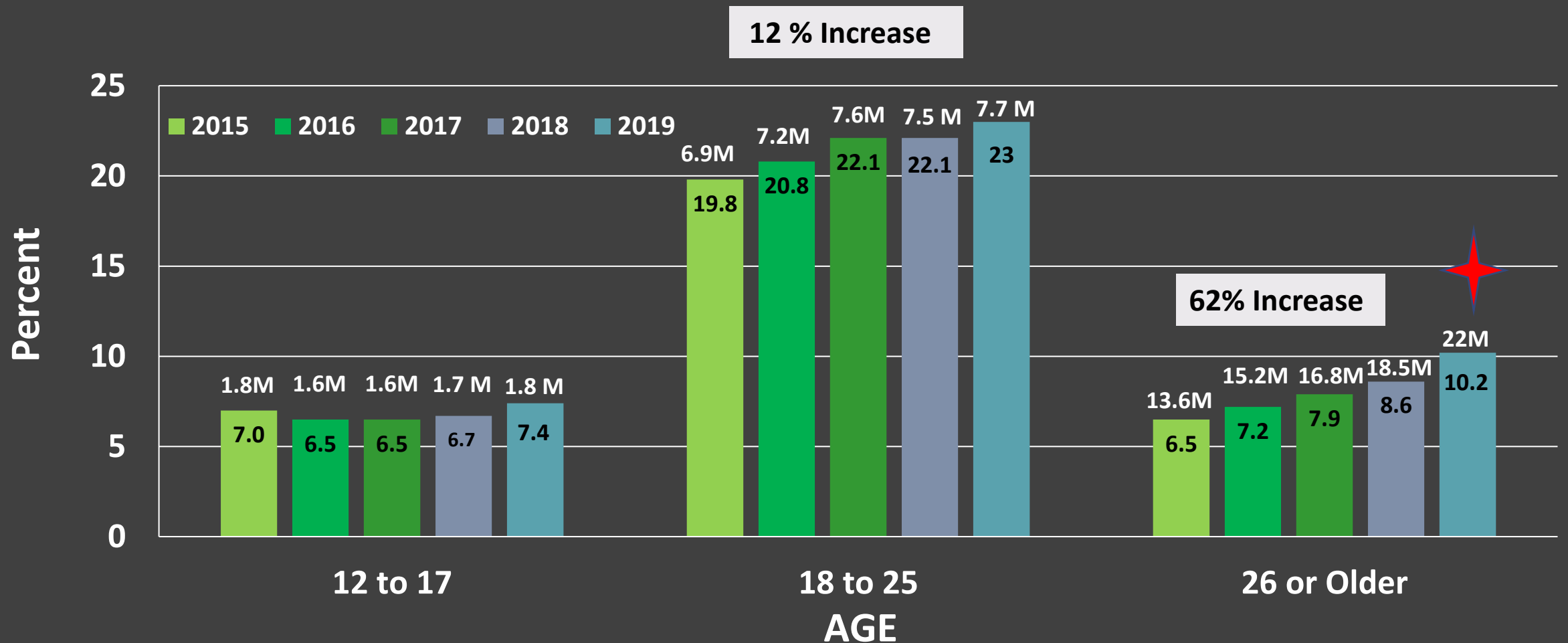
National Institute
on Drug Abuse

PSYBRY.NET
PATREON.COM/PIXELPUSHA



T.H.C
TETRAHYDROCANNABINOL

PAST MONTH MARIJUANA USE INCREASING IN ADULTS

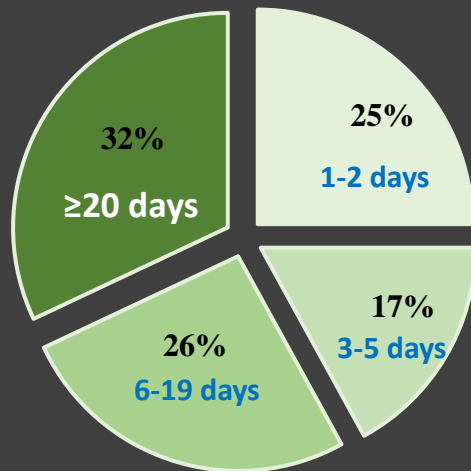


Source: SAMHSA, 2019 National Survey on Drug Use and Health (September 2020).

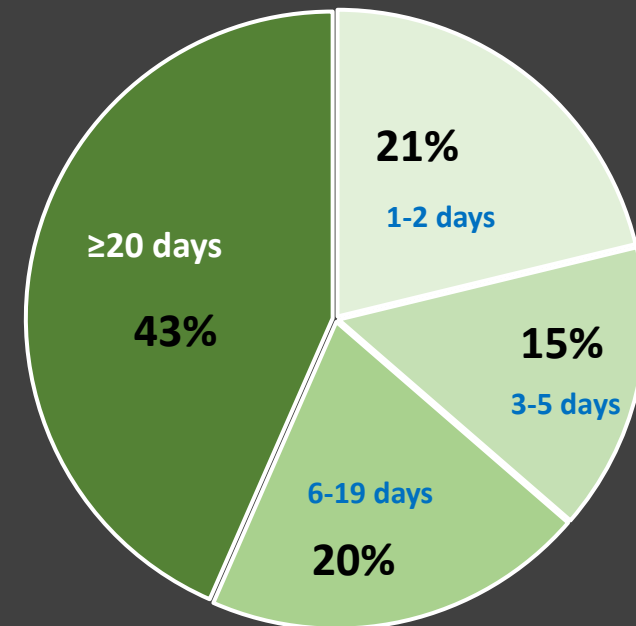
Among Past-Month Cannabis Users Aged ≥ 12 , More than Two in Five were Daily or Almost Daily Users in 2019

Frequency of use	2002	2019	<i>P</i> value for the difference between 2002 and 2019
1-2 days	24.55%	20.99%	.015
3-5 days	17.46%	15.09%	.041
6-19 days	25.70%	20.44%	<.001
20+ days	32.29%	43.48%	<.001
Estimated no. past-month users	14.6 Million	31.6 Million	<.001

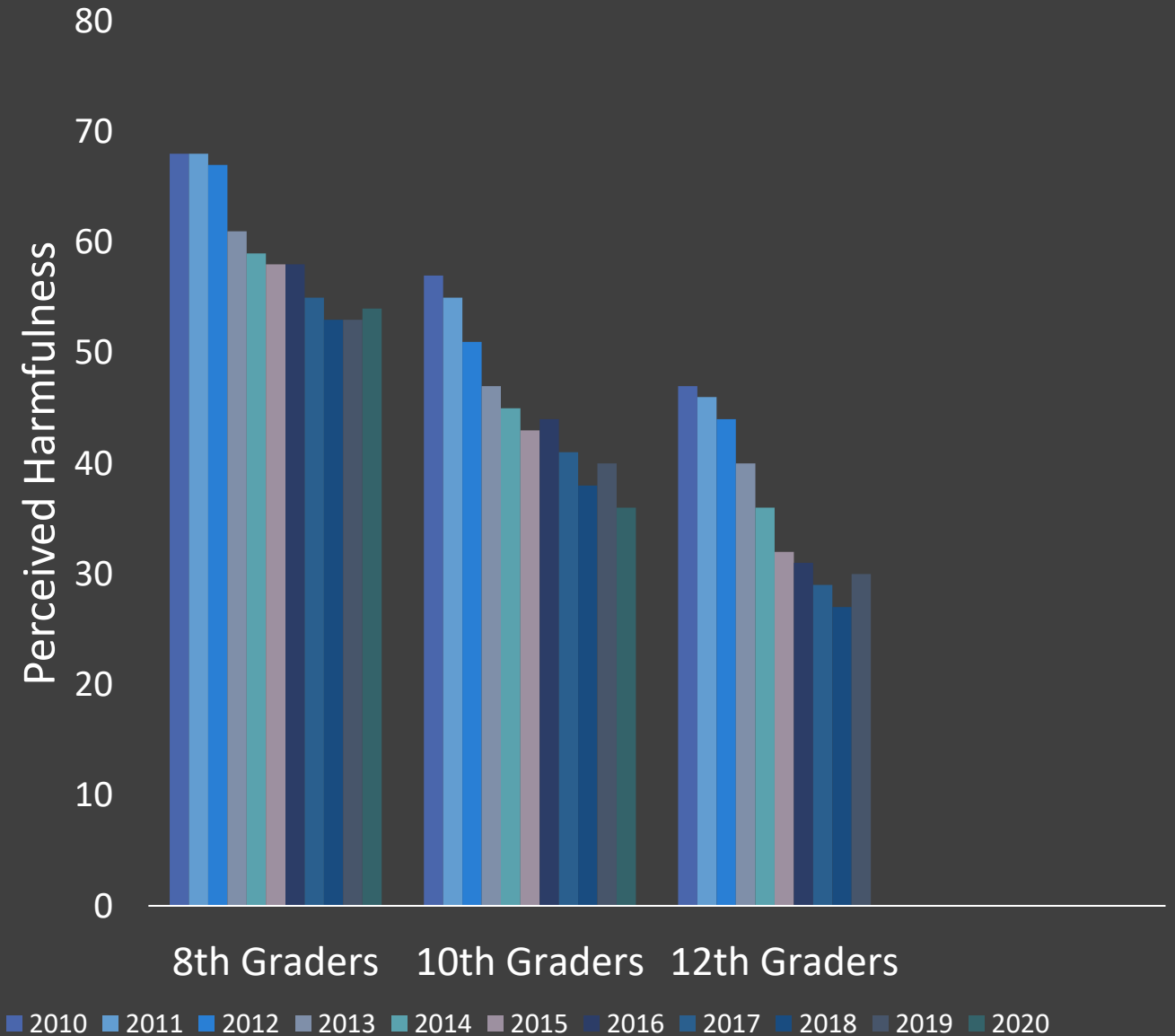
among 14.6 M people in 2002 reporting past-month use



among 31.6 M people in 2019 reporting past-month use

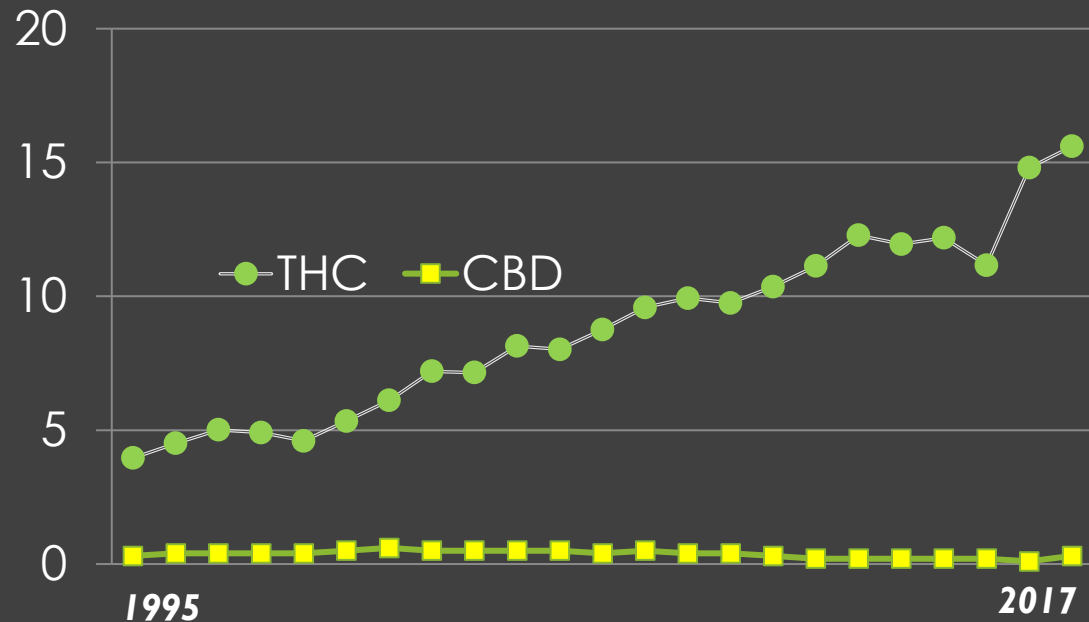


Perceived Harmfulness of Smoking Marijuana *Regularly* is Declining in 8th, 10th, and 12th Graders



Changing Landscape: Increasing Potency (%THC), New Routes of Administration, CBD products

Cannabis Potency Increasing



SOURCE: U Miss, Potency Monitoring Project

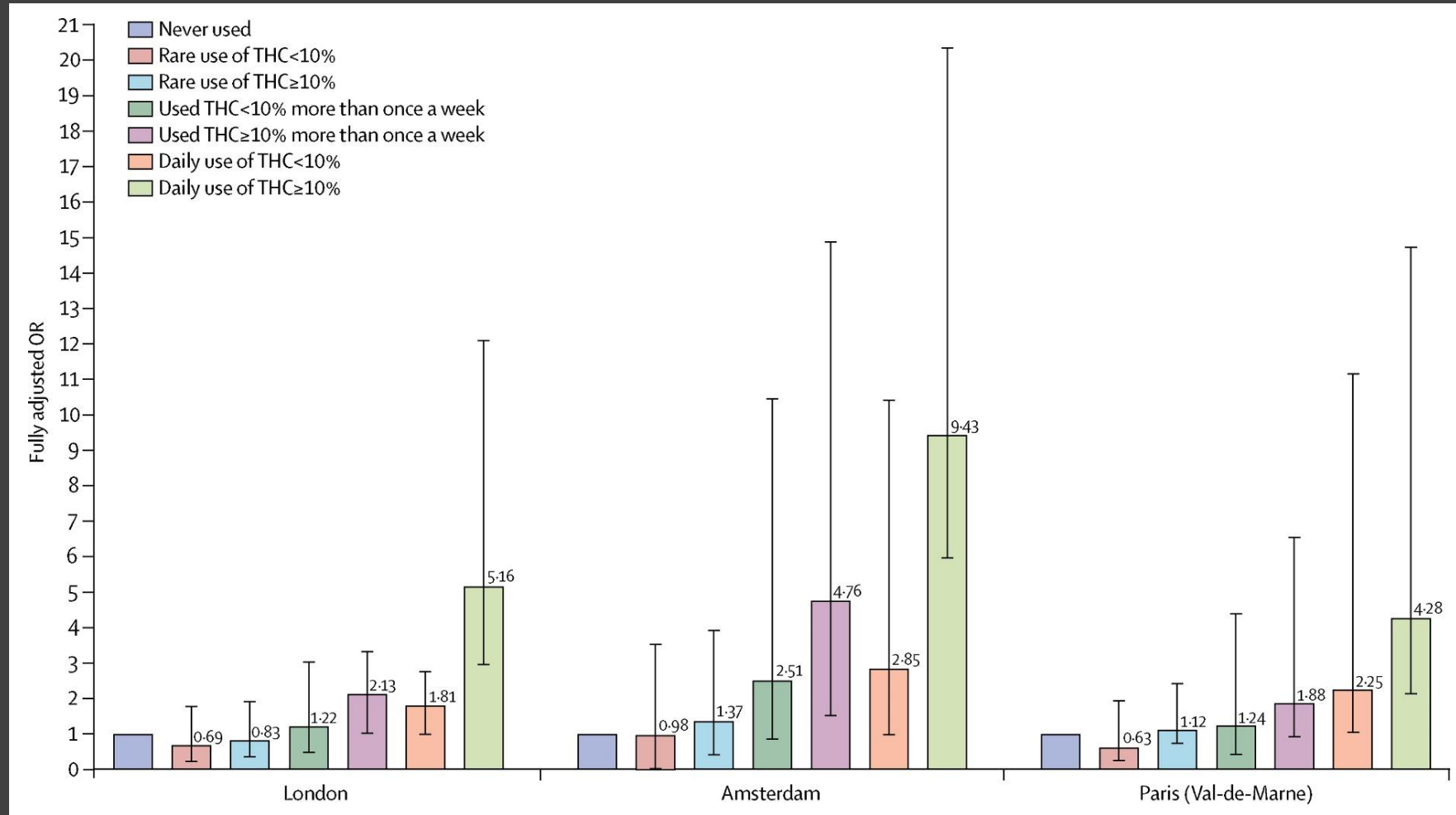


A New Kind of Consumer: Drinking 33 Cappuccinos to Get 65x Caffeine That You Could Get from One Cola



Slide courtesy of
Kevin Sabet, SAM

Odds Ratios of psychotic disorders for the combined measure of frequency plus type of cannabis used in three sites: London, Amsterdam, Paris



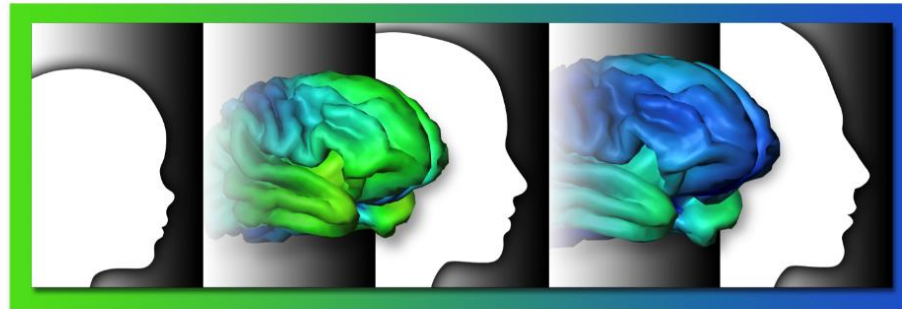
London (201 cases, 230 controls), Amsterdam (96 cases, 101 controls), and Paris (54 cases, 100 controls). Error bars represent 95% CIs. OR=odds ratio.

Adverse Health Consequences: Who Is At Greatest Risk?

Mothers/Newborns



Children and Adolescents



Adolescent Brain Cognitive Development[®]
Teen Brains. Today's Science. Brighter Future.

Older Adults?



**Persons With
Mental Illness**



**Tobacco
Smokers**

MARIJUANA USE IS INCREASING IN PREGNANT FEMALES IN CALIFORNIA (2009-2016)

Figure 1. Adjusted Prevalence of Marijuana Use Among 279 457 Pregnant Females in KPNC by Screening Type, 2009-2016

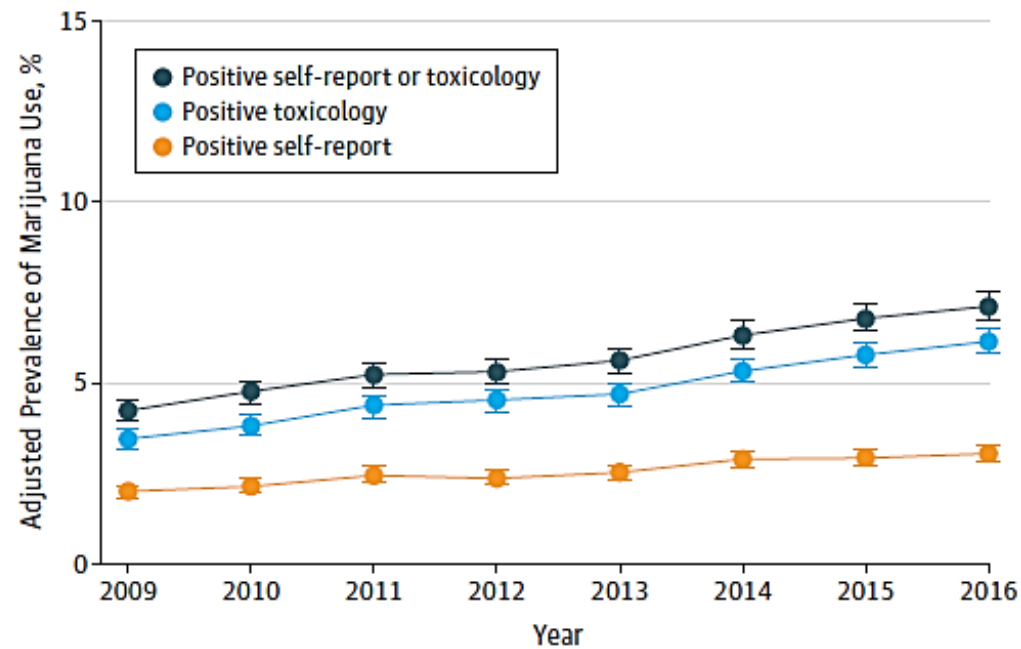
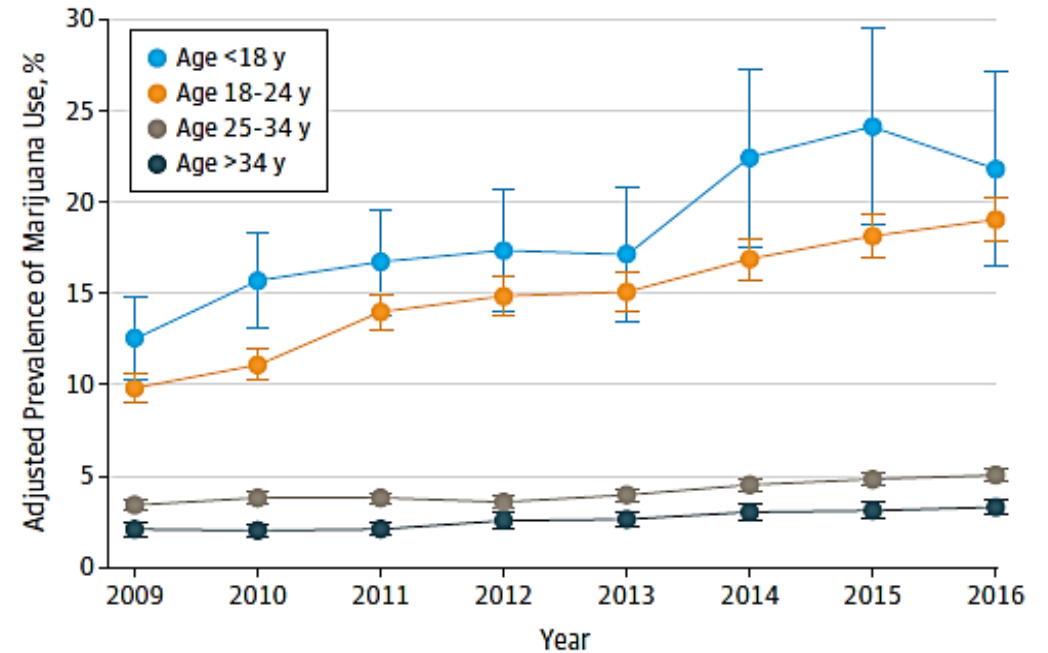
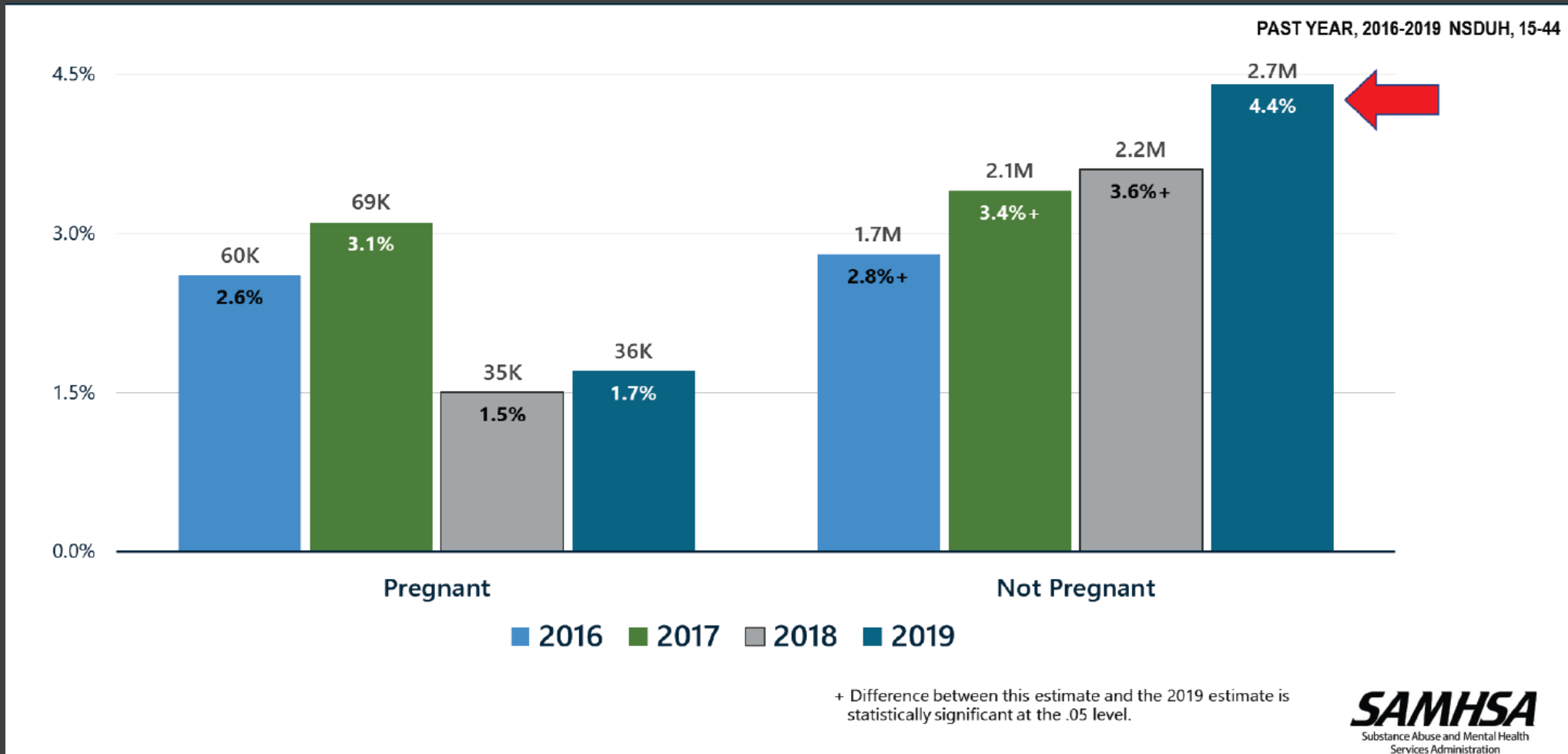


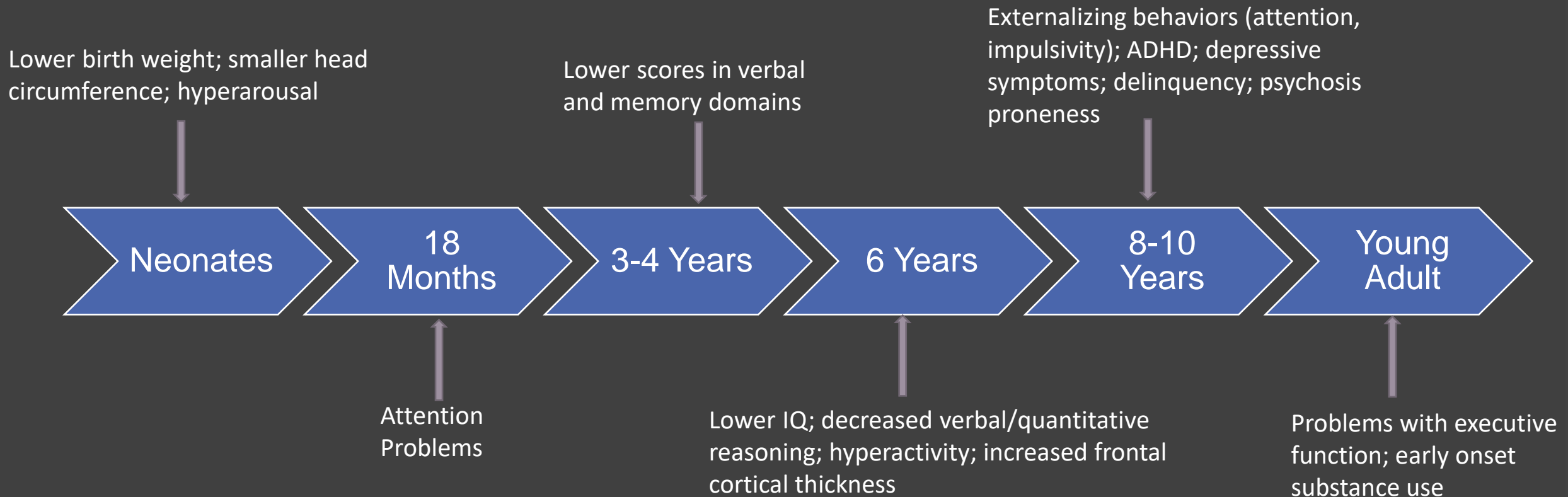
Figure 2. Adjusted Prevalence of Marijuana Use Among 279 457 Pregnant Females in KPNC by Age, 2009-2016



Daily or Almost Daily Cannabis Use among Women by Pregnancy Status



PRENATAL CANNABIS EXPOSURE: OVERVIEW OF EFFECTS*



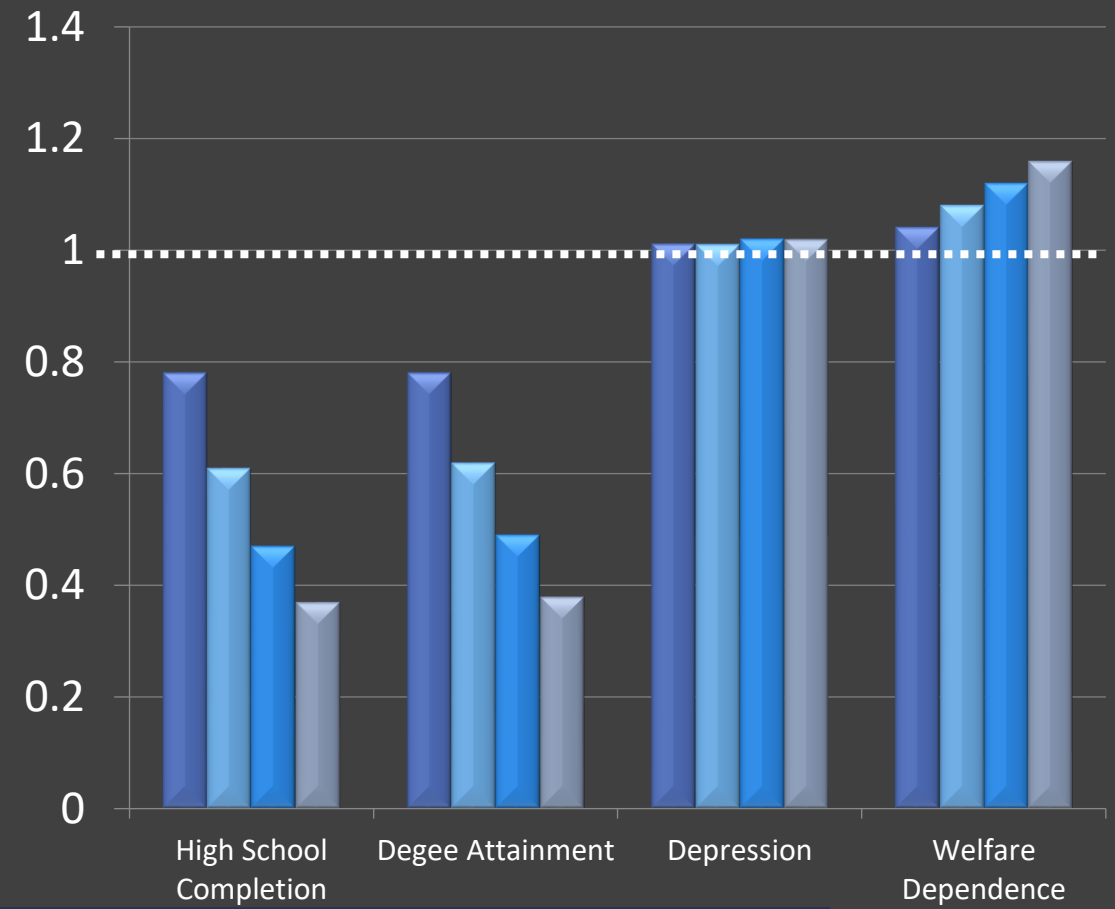
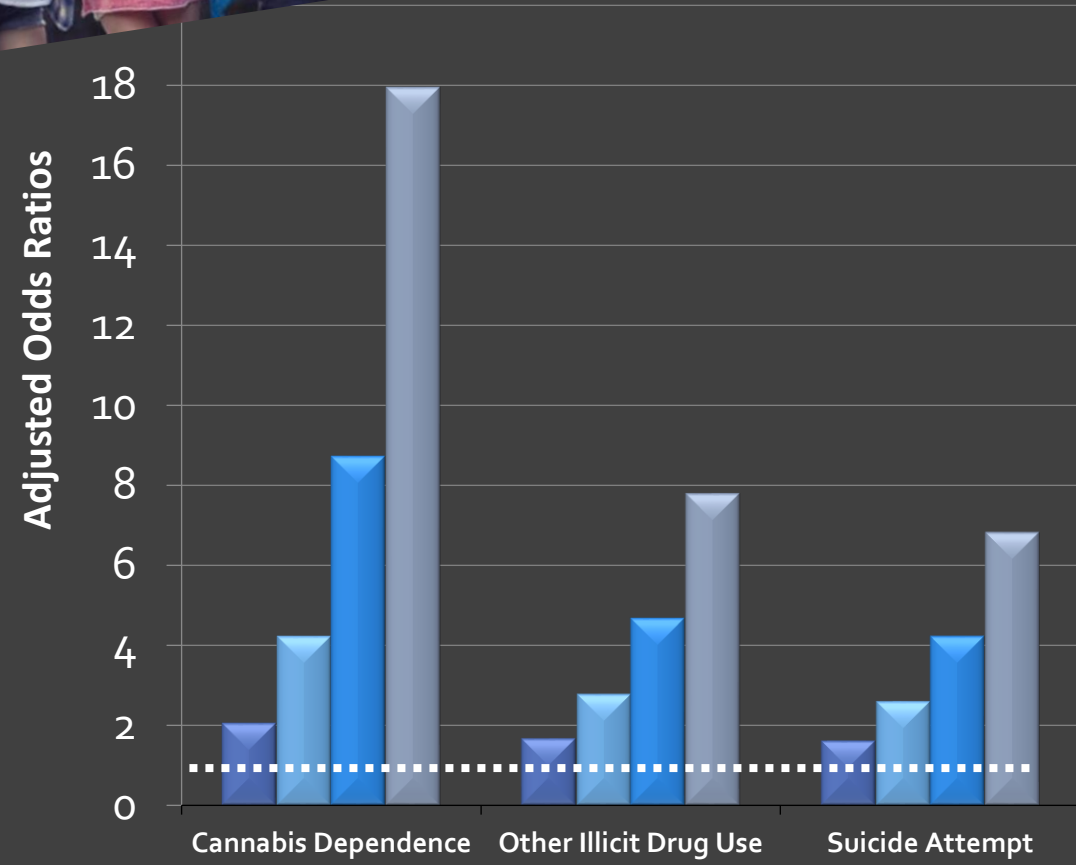
Prenatal Cannabis Exposure (PCE)



- Endocannabinoid system (ECS) is involved in implantation; placentation; fetal organ development; and neural development, including cell differentiation, axon migration, myelination.
- Exogenous cannabinoids cross the placenta and accumulate in fetal tissues, especially brain. Also found in breast milk.
- Human fetal imaging studies find alterations in dopamine D2 receptors; may be sex-dependent.
- Prenatal cannabis exposure is linked to fetal growth restriction and low birth weight.
- Longitudinal studies report subtle to modest impact on cognition and neuropsychiatric outcomes in children, adolescents, and young adults (with multiple caveats).
- Preclinical studies show lasting effects of THC exposure on adult drug seeking, stress responses, and brain reward systems.

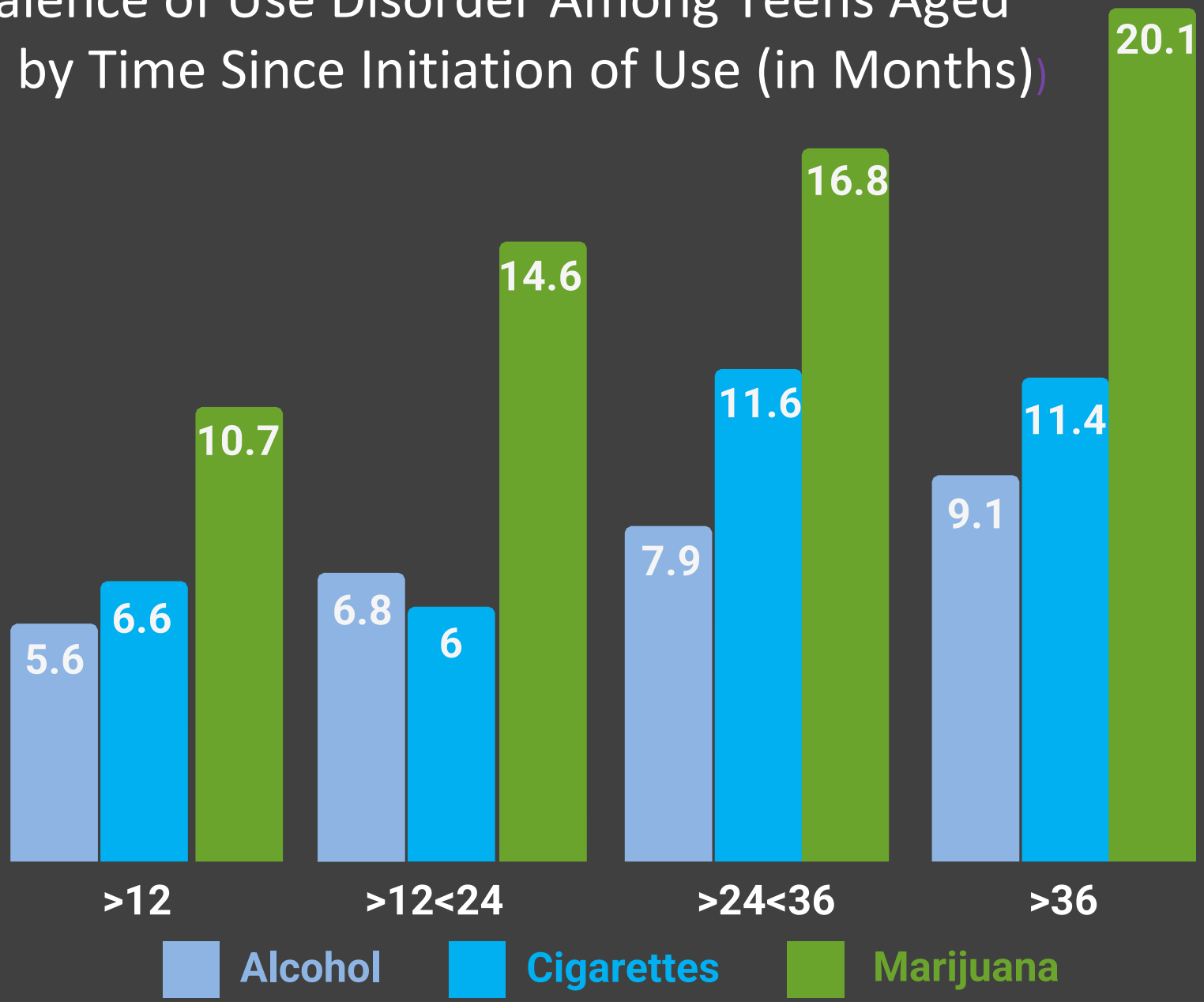


Frequency of Cannabis Use Before Age 17 and Adverse Outcomes at Age 30 (N=2500-3700)



■ Less than Monthly
 ■ Monthly or More
 ■ Weekly or More
 ■ Daily

Prevalence of Use Disorder Among Teens Aged 12-17 by Time Since Initiation of Use (in Months)

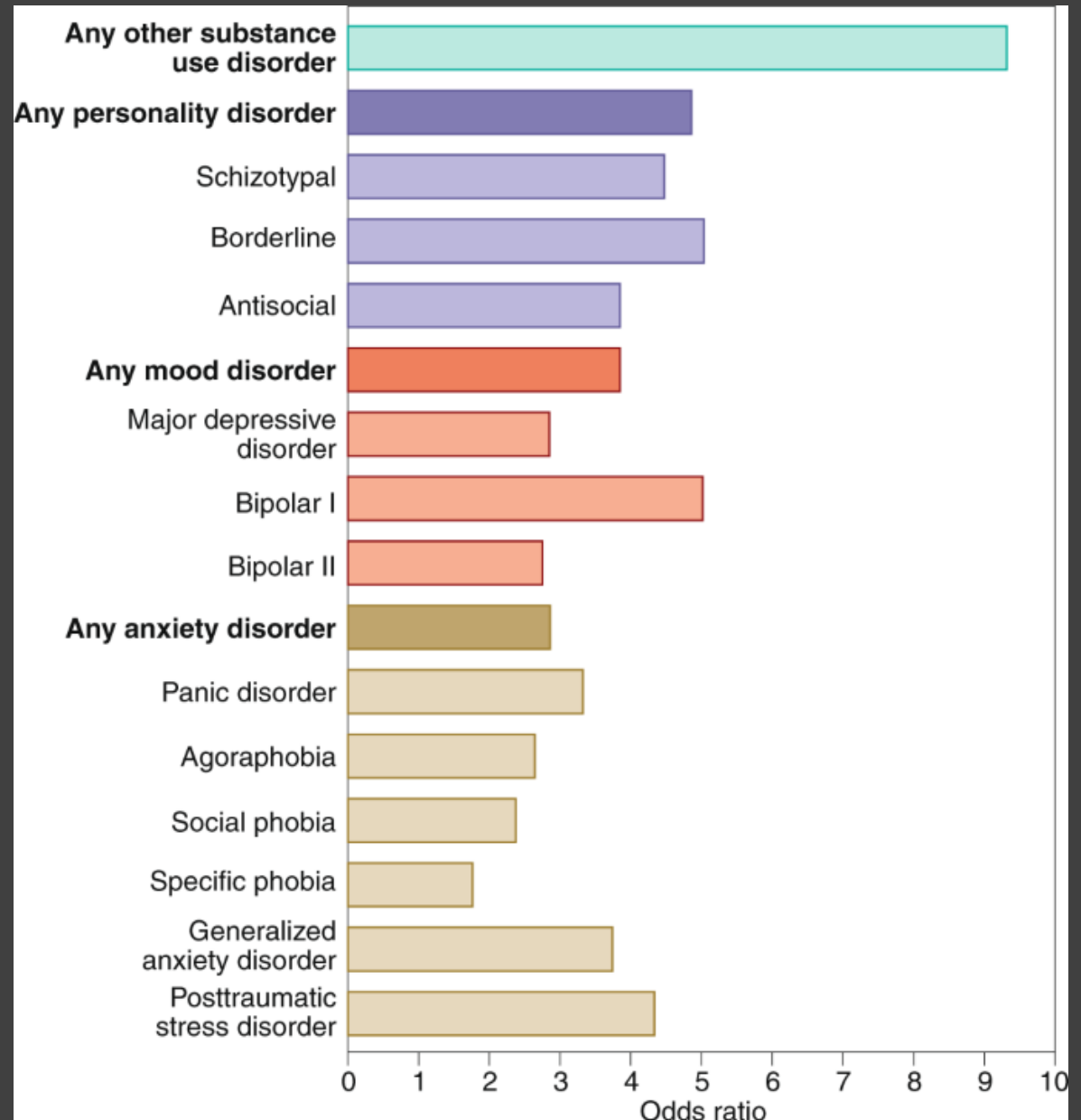


Youth Marijuana Addiction Prevalence Double That of Alcohol & Other Substance Use Disorders

Courtesy of Kevin Sabet, SAMHSA
Volkow et al, JAMA Pediatrics, 2021



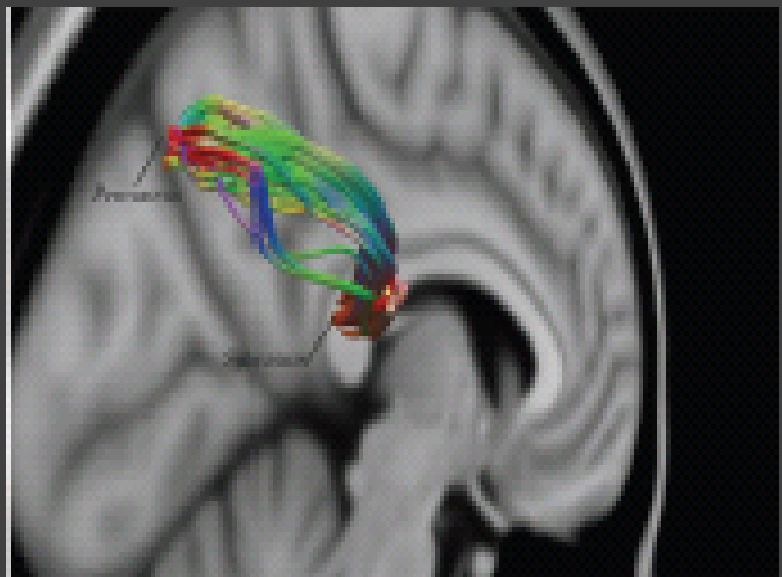
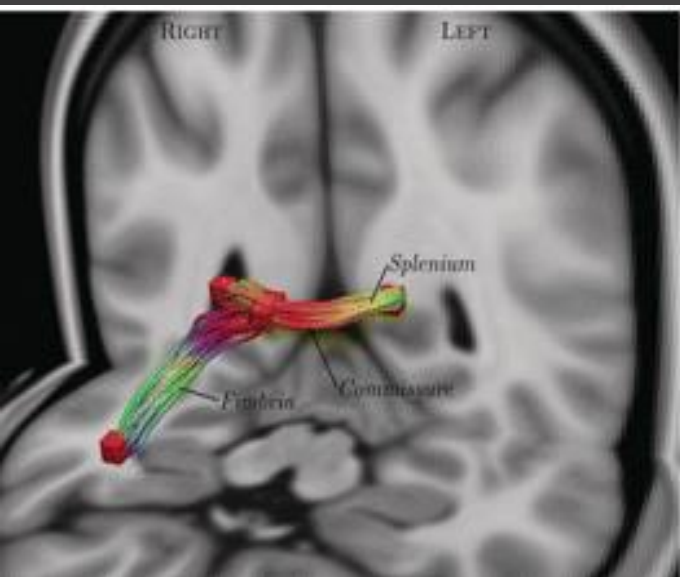
COMORBID PSYCHIATRIC CONDITIONS COMMONLY ASSOCIATED WITH CUD



Multiple, but not all, studies show altered Brain Structure and Function in Youth Who Regularly Use Cannabis

Decreased functional connectivity between PFC and N. Accumbens in adolescent cannabis users with escalating pattern of use

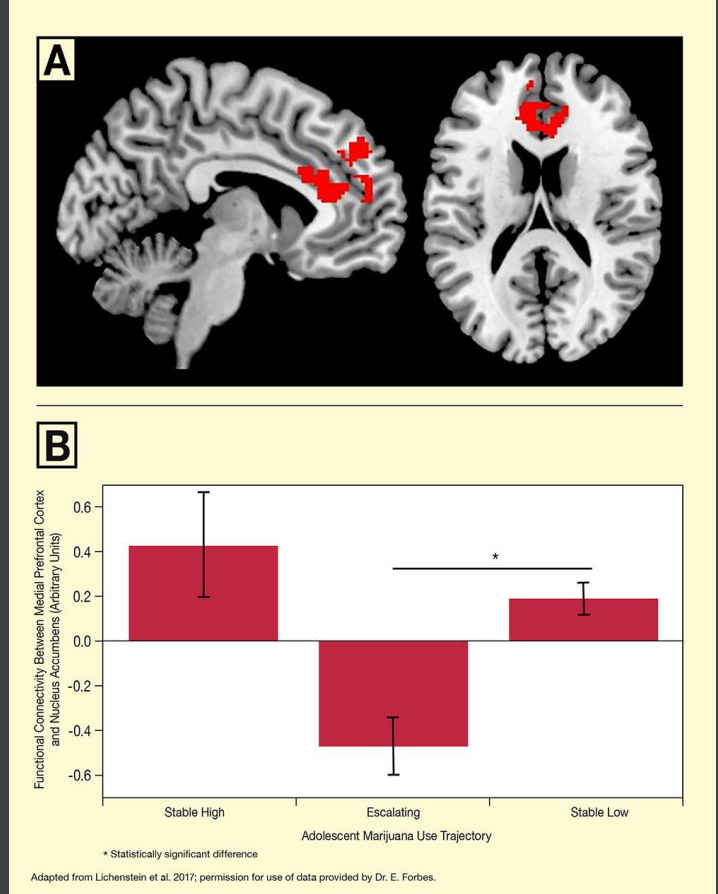
Early (<18y) Cannabis Use Decreases Axonal Fiber Connectivity



Diffusion-weighted MRI in cannabis users (n=59) vs. controls (N=33)

Zalesky et al Brain 2012

Lichenstein et al. Addiction, 2017





Cannabis Use in Adolescents: Risks for Adverse Neurodevelopmental Outcomes

- Endocannabinoid system (ECS) is involved in brain development, e.g., myelination
- Human imaging studies report alterations in CB1 receptor-rich brain areas following cannabis exposure
- Multiple studies indicate effects on learning, IQ, motivation, long term academic and career outcomes, mental health
- Preclinical studies of adolescent exposure show lasting effects of THC on adult drug seeking, stress responses, brain reward systems

Caveats:

- Users who start young and use frequently may have other risk factors for adverse outcomes
- Adolescents who use cannabis regularly often use multiple substances
- And....we don't know whether effects persist if cannabis use is stopped

What is the impact of Legalization?

- Use, Harmful Use, Use Disorders
- Mental Health
- Other Substance Use
- Academic Achievement
- Child/Adolescent Development
- Accidents, ER Visits
- Other Health Effects (e.g., cardiac, lung)
- Secondhand Smoke
- Pregnancy Outcomes
- Productivity
- Economics (Revenue vs. Costs)
- Criminal Justice Disparities
- Benefits

THE LEGALIZATION OF MARIJUANA IN COLORADO: *THE IMPACT*

Volume 8

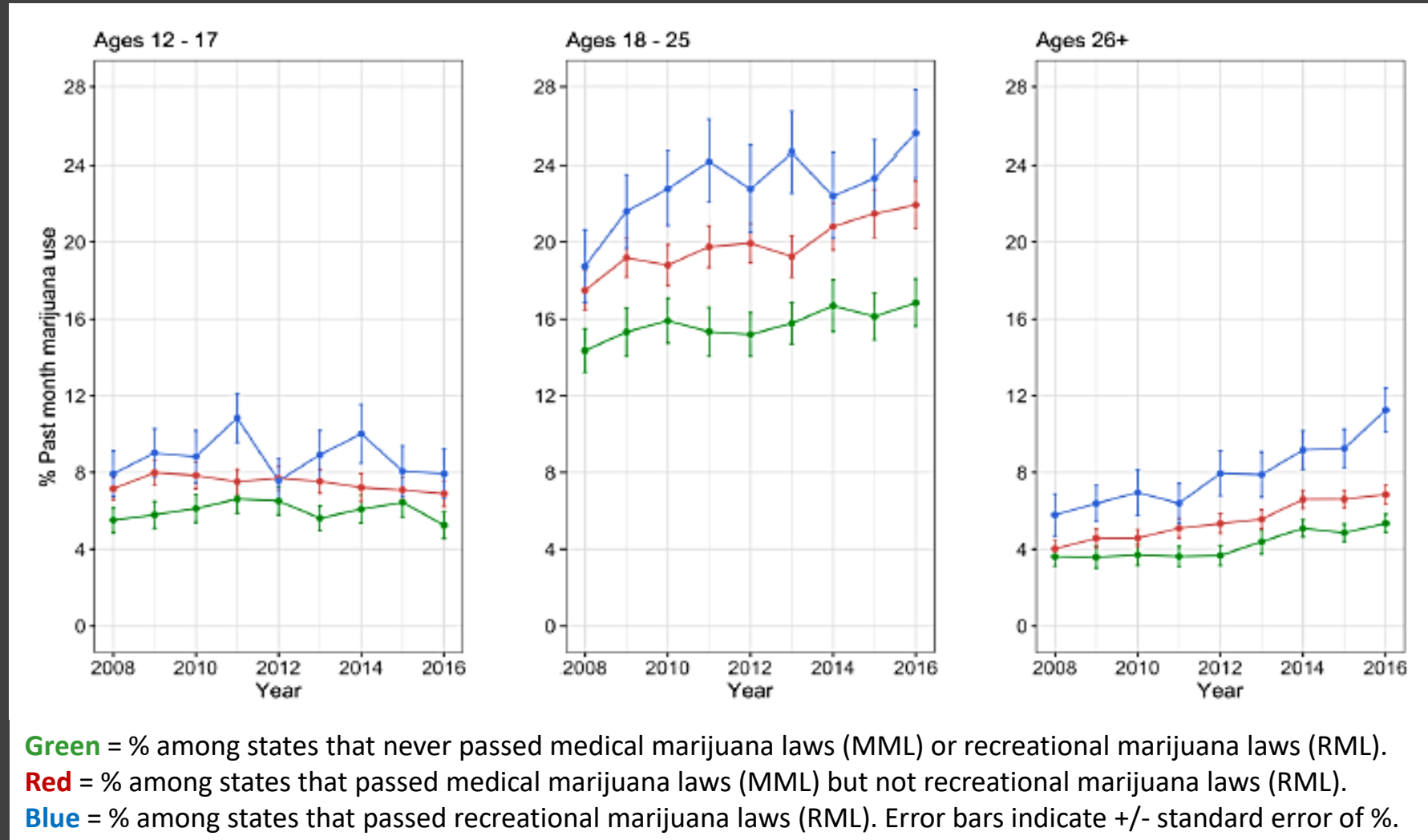
September 2021

Rocky Mountain High Intensity
Drug Trafficking Area

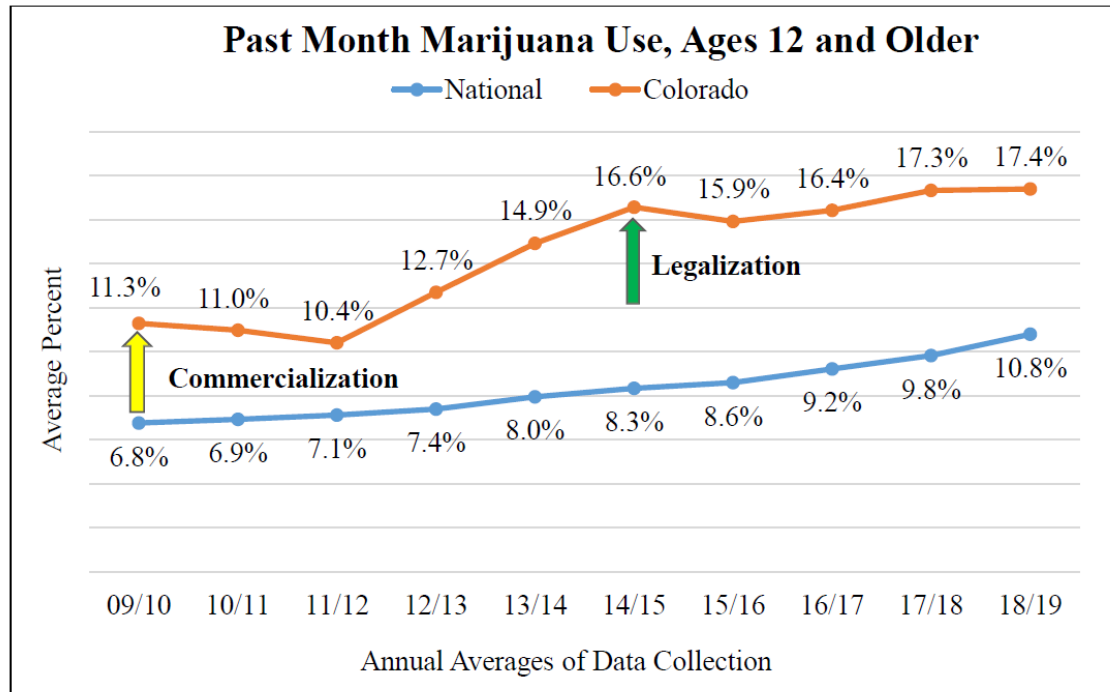


Marijuana Use is Increasing in Adults and Young Adults in States with Recreational/Medical Marijuana Laws

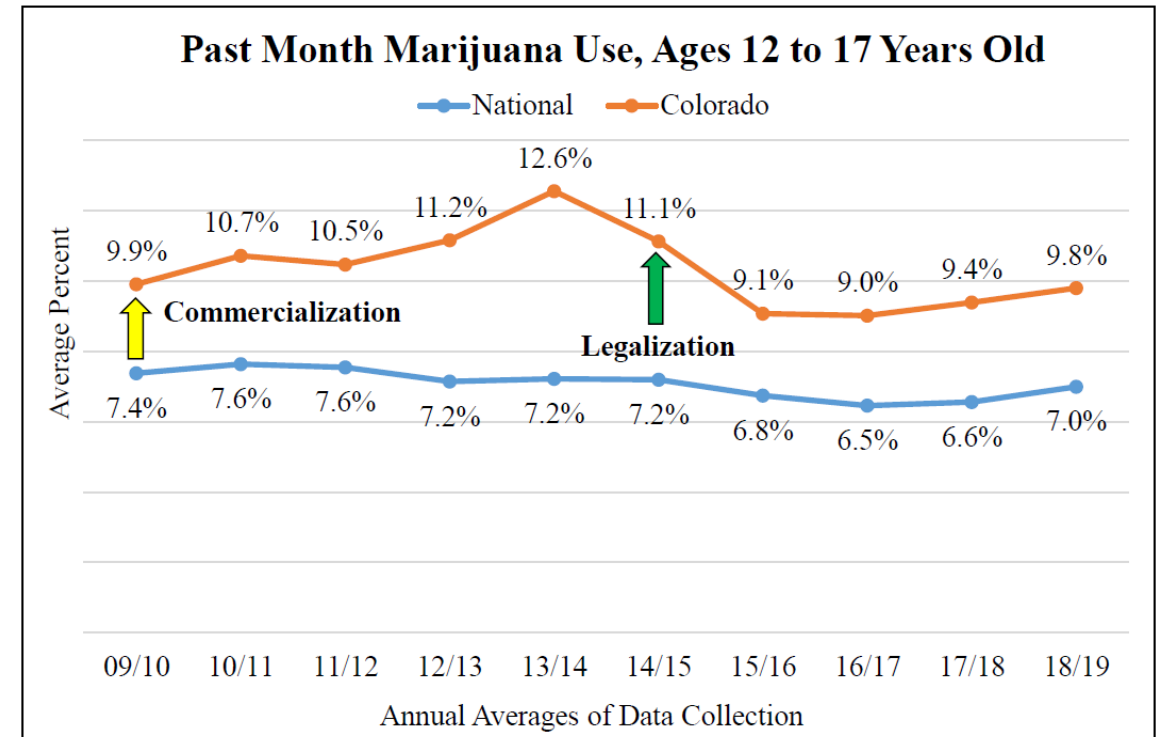
National Survey on Drug Use and Health, 2008-2016



Past Month Marijuana Use in Colorado Compared to National Data



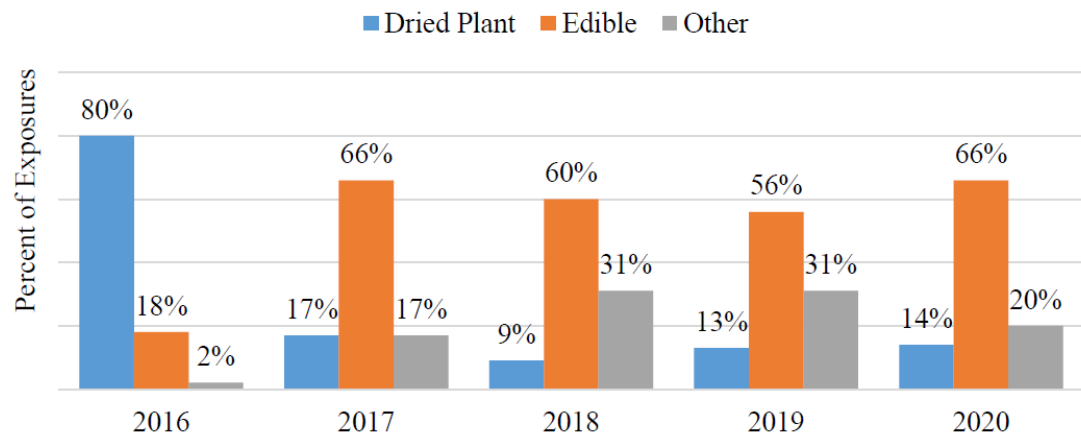
Source: SAMHSA, Center for Behavioral Health Statistics and Quality, NSDUH, 2018 and 2019



Source: SAMHSA, Center for Behavioral Health Statistics and Quality, NSDUH, 2018 and 2019

Unintentional Exposures

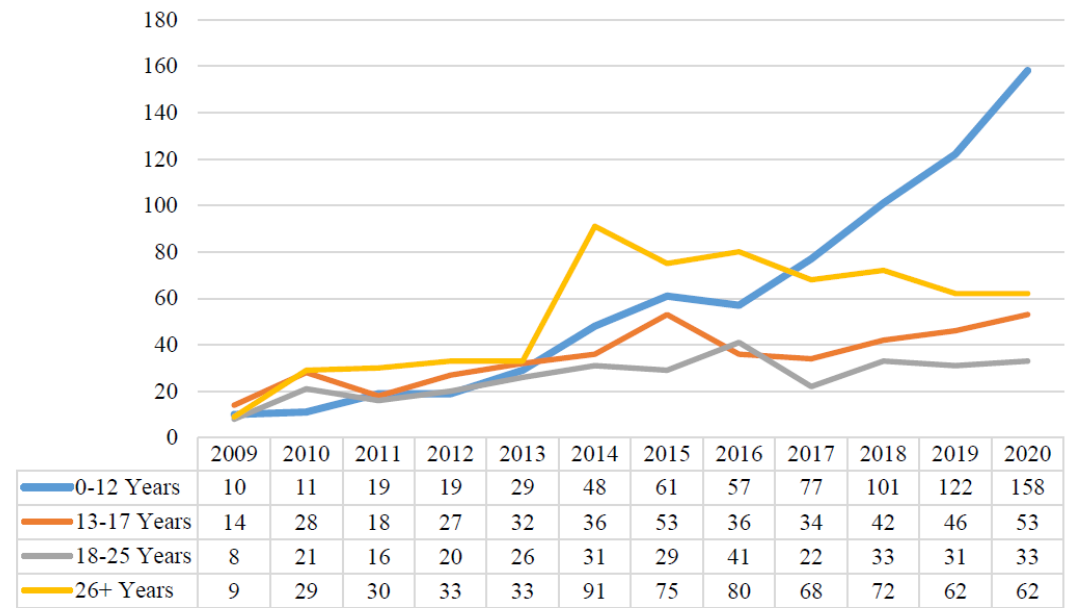
Percent of Marijuana Exposures 0-8 Year Olds, By Marijuana Type (2016-2020)



SOURCE: Rocky Mountain Poison and Drug Center

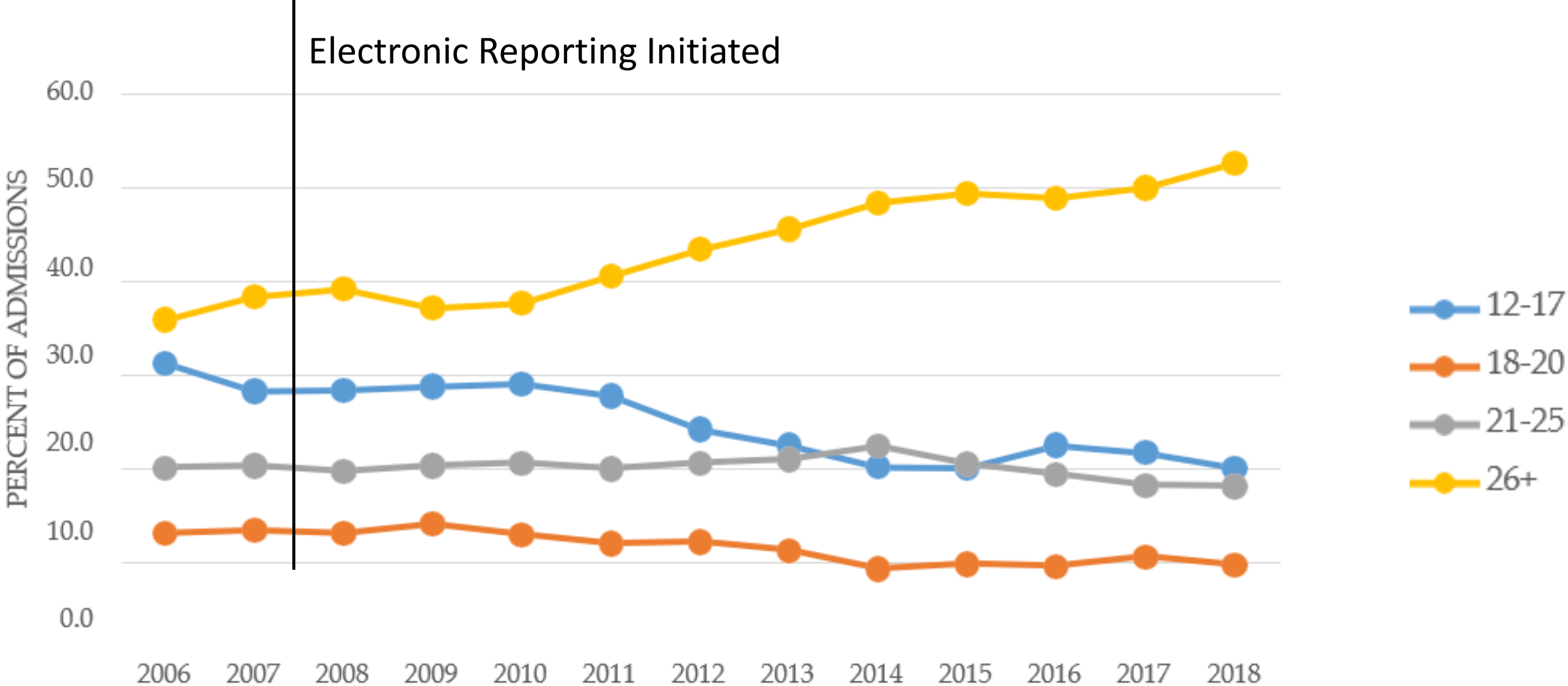
NOTE: The code for marijuana edibles did not go into effect until 2016. Therefore, any cases of edible marijuana exposure which occurred prior to 2016 were coded under "dry plant." Other marijuana includes oral pills/capsules, concentrated extracts (to include oils and tinctures), topical preparations, marijuana devices, and unknown/other forms of marijuana.

Marijuana-Related Exposures by Age Range (2009-2020)



SOURCE: Rocky Mountain Poison and Drug Center

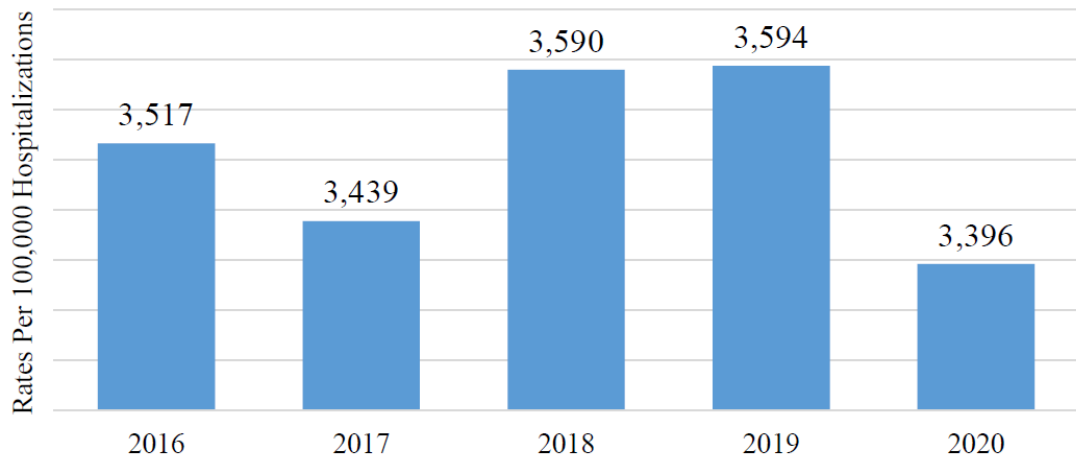
COLORADO: PERCENT OF MARIJUANA TREATMENT ADMISSIONS BY AGE GROUP



SOURCE: Center for Behavioral Health Statistics and Quality, Substance Abuse and Mental Health Services Administration, Treatment Episode Data Set (TEDS). Based on administrative data reported by states to TEDS through April 1, 2019.

ED and Hospitalization Rates (per 100,000) in Colorado

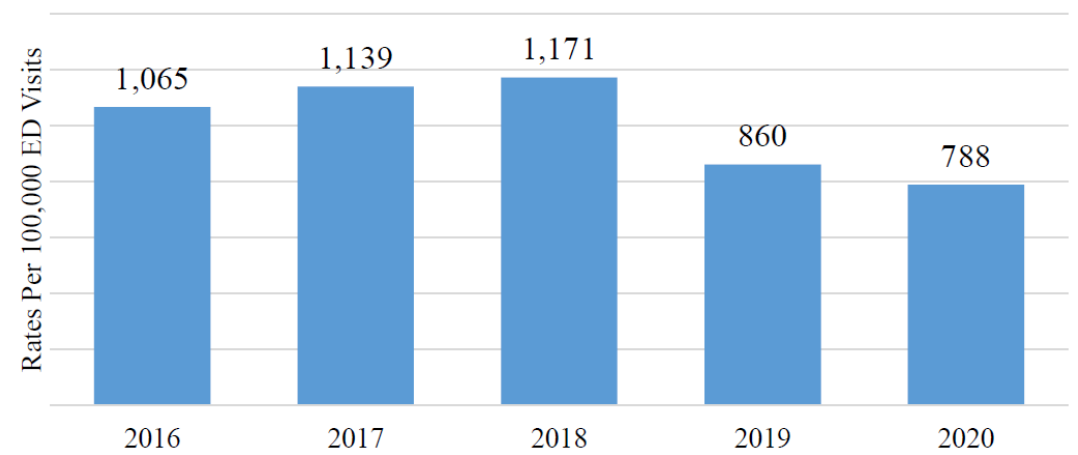
Hospitalization Rates Related to Marijuana



SOURCE: Emergency Department Discharge Dataset, as analyzed by the Colorado Department of Public Health and Environment; 2016-2020

NOTE: Due to changes in the way the hospitalizations and emergency department visits data were coded, data before 2015 was not included for trend analysis.

Emergency Department Rates Related to Marijuana



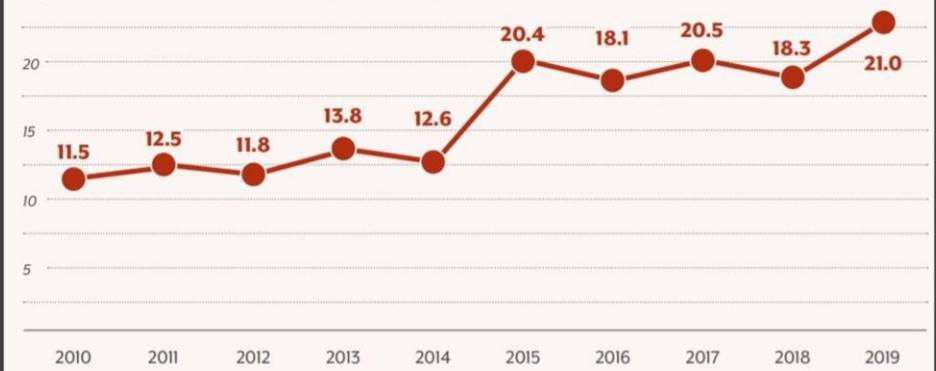
SOURCE: Emergency Department Discharge Dataset, as analyzed by the Colorado Department of Public Health and Environment; 2016-2020

NOTE: Due to changes in the way the hospitalizations and emergency department visits data were coded, data before 2015 was not included for trend analysis.

Increase in Teen Suicide Rates Associated with Increased Detection of Marijuana

Courtesy of Laura Stack

Figure 3. Rate of Suicide Among Youth Ages 15-19 in Colorado (Deaths Per 100,000)

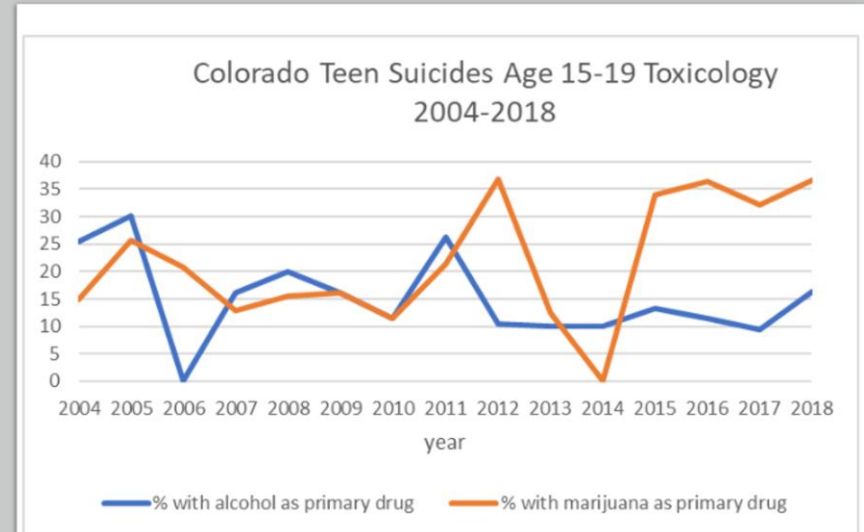


Source: Colorado Department of Public Health and Environment

**JOHNNY'S
AMBASSADORS**

**What happened in Colorado in 2014?
Coincidence?**

In Colorado in 2018, marijuana was present over 36% of the time in suicides ages 15-19.

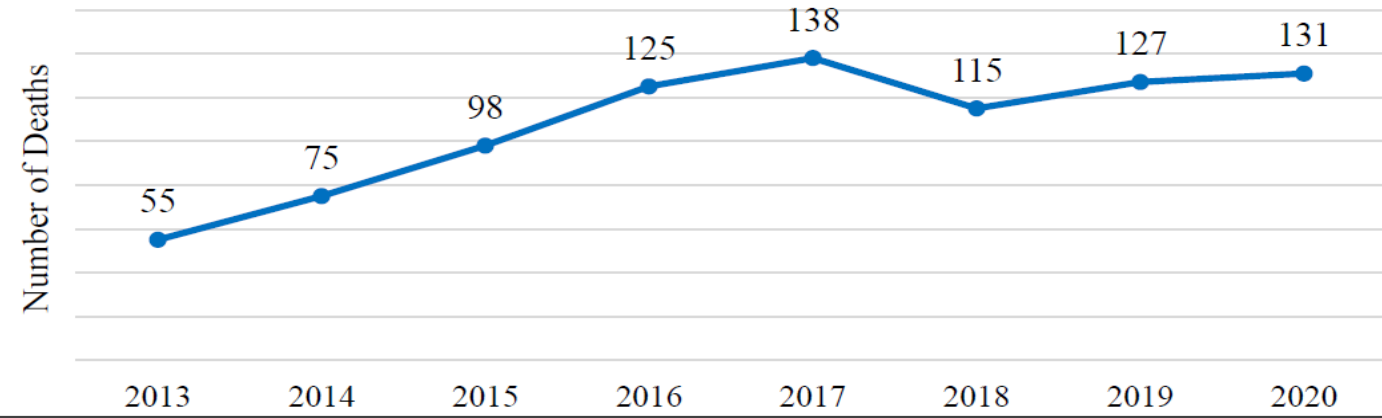


Source: Colorado Department Of Public Health And Environment

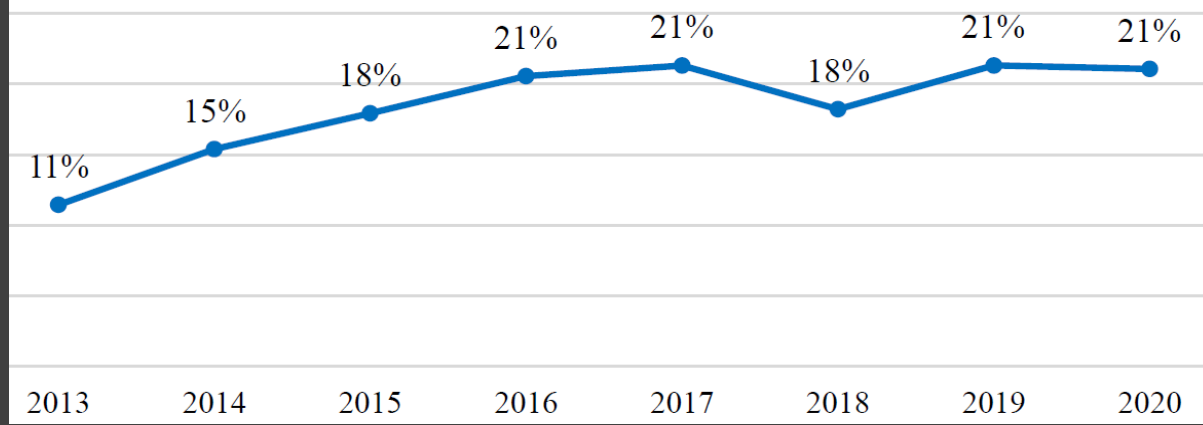
**JOHNNY'S
AMBASSADORS**

Impact of Legalization on Traffic Fatalities

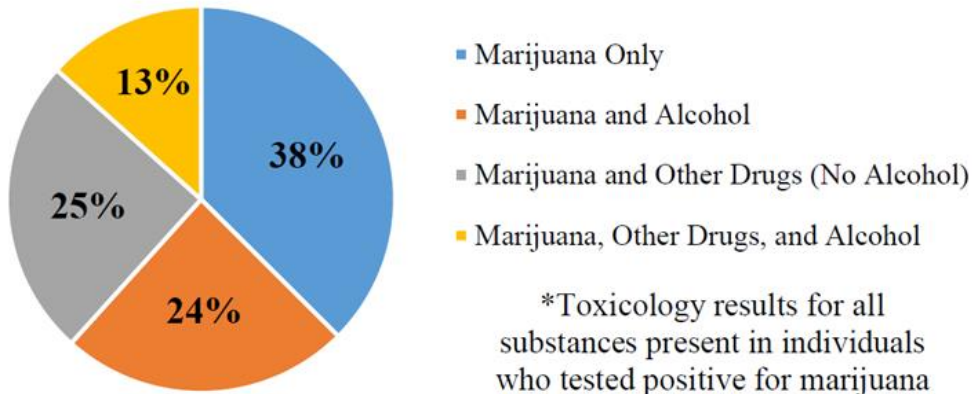
Traffic Deaths Related to Marijuana when a DRIVER Tested Positive for Marijuana



Percent of All Traffic Deaths That Were Marijuana-Related where a DRIVER Tested Positive for Marijuana



Drug Combinations for DRIVERS Involved in Fatal Crashes who Tested Positive for Marijuana* (2020)



*Toxicology results for all substances present in individuals who tested positive for marijuana

Caveats to HIDTA reports

- No baseline data before legalization went into effect (2014) or commercialization (2009)
 - No correction for changes in what is measured following legalization.
- Data on driving accidents or fatalities do not measure impairment (cannabis pharmacokinetics are complex). If use goes up, then increases in positive toxicology would be expected.
- Data not expressed as rates can be misleading since population has increased over time.
- Some serious adverse consequences (e.g., incidence of psychosis) are too rare to measure accurately.
- Uses surveillance measures that are available—not specifically targeted toward cannabis harms; may not have sufficient granularity.



REGULATIONS MATTER

- Regulatory Scheme (full commercialization in most states)
- Product Availability
- Serving Sizes/Potency Limits
- Marketing Restrictions
- Labeling Requirements (health warnings)
- Product Testing/Allowable ingredients
- Smoke – free laws
- Consumption sites
- Licensing requirements
- Taxes (how much and where does the money go?)
- Social Equity
- **WHO IS MAKING THESE DECISIONS?**

Bottom Line

- Risks to some are very serious
- Perceptions of harm are universally down—even among vulnerable populations (youth, pregnant women)
- Likely that unanticipated harms will emerge with chronic use over many years
 - Hyperemesis
 - Suicidal ideation, attempts, completion
 - IQ declines (in those who started young)
 - Increased vulnerability to infections
- Data so far don't support major changes in use, heavy use, CUD as a result of passage of medical or adult use laws. Caveats:
 - Adult populations 26 + do show changes on many measures (Use, heavy use, treatment admissions)
 - Increases in use and in product variety and potency started *before* enactment of some of the state laws
 - States with more liberal laws have been and continue to be above the National average on most measures
- Regulations matter and can help mitigate potential harms
- Strong public health campaigns need to be in place when laws change
- Baseline data should be collected NOW, before changes in the laws go into effect

Public health experiment is still in its early stages—especially related to high potency products, mass media campaigns, commercialization, “Big Cannabis”, etc.





THANK YOU!

CURRENT STATE CANNABIS SALES LIMITS ALLOW LARGE DOSES FOR USE (OR DIVERSION)

Pacula, et al; Am J Prev Med, 2021

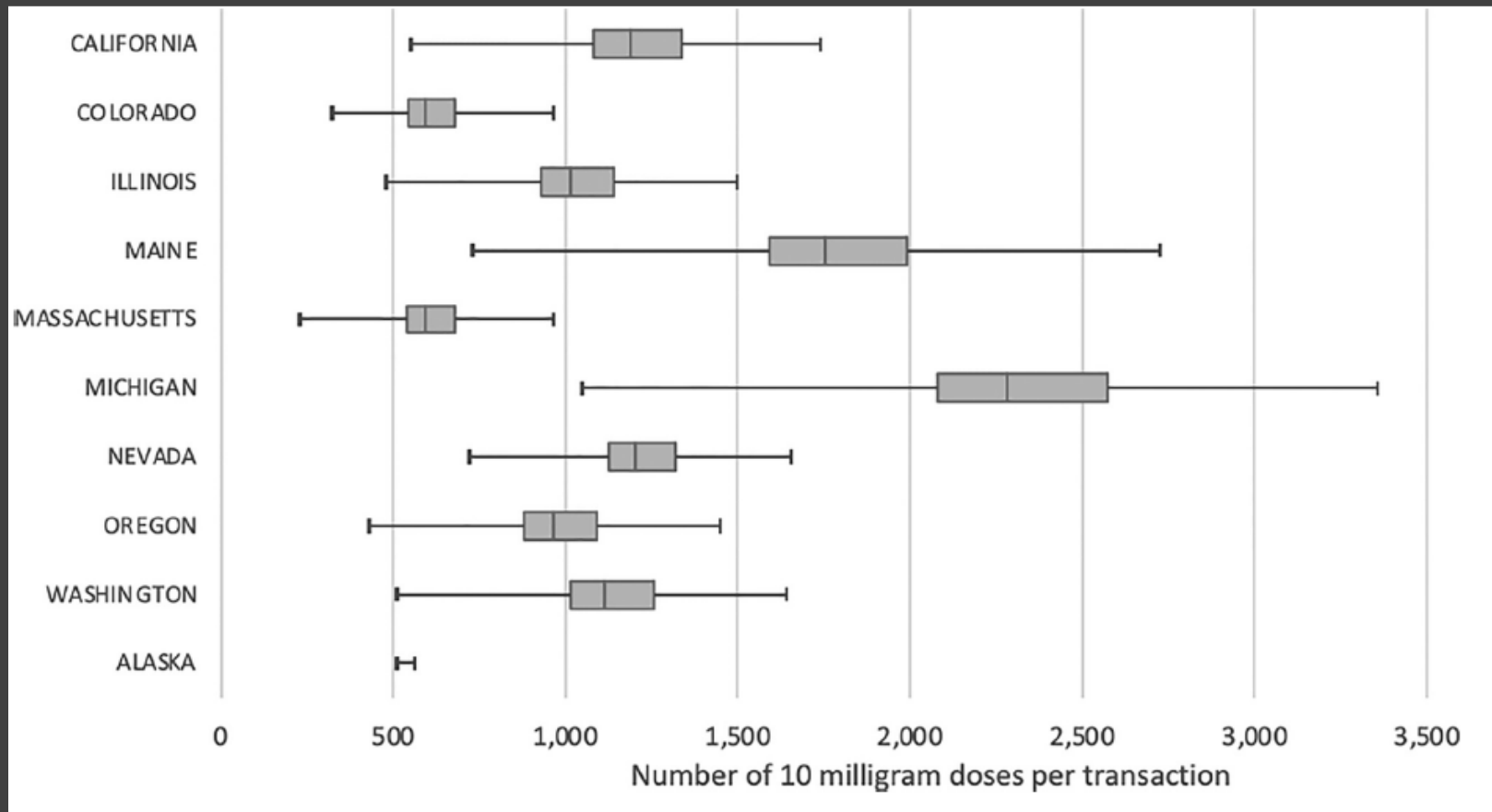


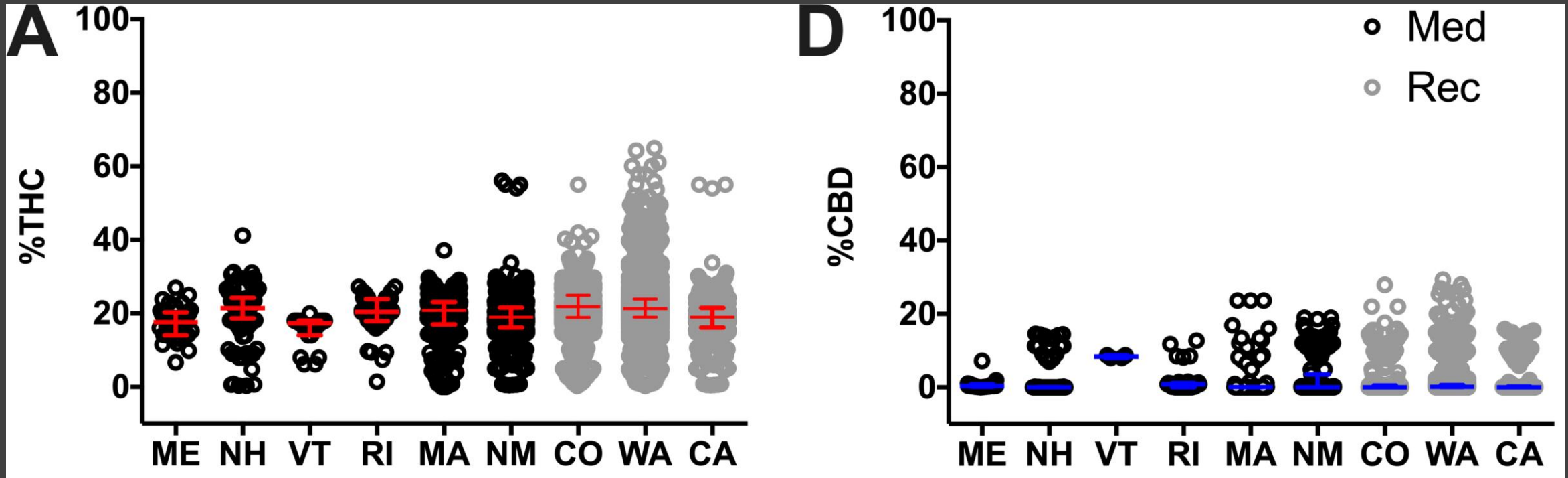
Figure 1. Implied ranges of 10 mg THC doses associated with state sales limits.

Conclusion:

All states allow a large number of THC doses per transaction, larger than what is typically consumed by daily users over a month.

Statesshould consider reducing sales limits and basing them on total THC content across all purchased products.

Cannabis Potency in Medical vs. Adult use states: Survey of dispensary products



Health and Safety Impact of Cannabis Legalization

October 13, 2021

Taylor Kasky, J.D.

**Director of Policy and Government Affairs,
Maryland Medical Cannabis Commission**



Overview

- Cannabis use by individuals 21 + increased in states post-legalization
 - Youth use remained stable or decreased
 - Youth perception of the harms associated with cannabis use decreased
- Mixed findings regarding the effect of cannabis legalization on traffic accidents
 - No causal link has been established
- Data indicate that Cannabis Use Disorder (CUD) may increase post-legalization, but has declined in certain states post-legalization

Youth Cannabis Use

- Cannabis remains the second most used substance by individuals under 21
 - Per the SAMHSA, overall substance use among teens is decreasing
- Youth perception of the risks from cannabis use are decreasing
- Data from Colorado and Washington post-legalization showed no increase in youth use
 - In WA youth use did not change in the 3 years post-legalization
 - In CO no change from 2009-2019; students trying cannabis before the age of 13 went down, from 9.2% in 2015 to 6.7% in 2019
- Massachusetts YRBS baseline data from 2007-2017 showed a drop in reported youth use

Driving Under the Influence

- No change in traffic fatality rates in Washington state and Colorado when compared to neighboring states that had not legalized cannabis
 - Per Fatality Analysis Reporting System data
- In Washington state, the number people to test positive for cannabis after a fatal crash doubled - from about 9% to about 18% - since the state legalized it in 2012
- In Michigan, the rate of annual fatal crashes has decreased 11.4% between 2004 and 2017, and the number of drug tests administered in fatal crashes has increased
 - Tests positive for cannabinoids rose from 6.7% in 2004 to 23.4% in 2017

Cannabis Use and CUD Post-Legalization

One of the most comprehensive studies examining national post-legalization CUD rates showed:

- An increase in adolescent CUD - from 2.18% to 2.72%. This increase was 25% higher than was observed in states with no legalization
- For adults 26+ an increase in:
 - past-month cannabis use from 5.65% to 7.10%.
 - past-month frequent* cannabis use 2.13% to 2.62%
 - past-year CUD among adults 26 years or older 0.90% to 1.23%.

*Past-month frequent use was defined as using 20 days or more in the past month

Cannabis Use and CUD Post-Legalization

- A study of Washington State 2-years post-legalization showed a decline in CUD treatment consistent with states that had not legalized
- In Colorado:
 - Treatment admission rate for those reporting marijuana as the primary substance used decreased, from 222 in 2012 to 182 in 2019
 - Hospitalization and ER admissions involving cannabis increased immediately post-legalization
 - Poison control calls increased immediately post-legalization, from 106 in 2012 to 223 in 2014, across all age groups. The number of exposures remained consistent from 2014 (223) to 2017 (222) but increased again in 2019 (276).

Limitations of Available Research

- Limited data pre-legalization
- Cannabis use data is self-reported
 - While cannabis use is illegal, adults and youth may not be truthful in responding;
 - Increases seen post-legalization may, in part, be due to reduced stigma and more willingness by respondents to answers truthfully
- The number of drug screens performed for cannabis in traffic accidents increases significantly post-legalization
- Lack of a clear definition for problem cannabis use

Considerations for Legalization

While data is mixed as to long-term effects of legalization, steps that can be taken to minimize harms:

- Allocate funding for improved data collection
- Consider implementing potency/strength restrictions
- Significant penalties for sales to minors and a robust compliance check program
- Funding for training and use of drug recognition experts
- Ensure a system in place for public outreach regarding prevention and education campaigns

**Any Questions?
E-mail:**

taylor.kasky@maryland.gov

Note: The information presented here are for informational purposes only and not for the purpose of providing legal advice. You should contact your attorney to obtain advice with respect to any particular issue or problem.

