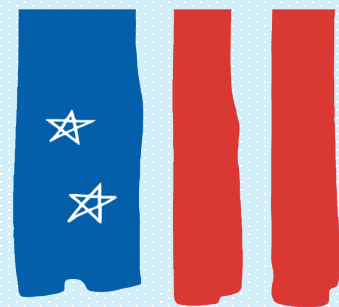




Partnership for a Drug-Free New Jersey

In Cooperation with the Governor's Council on
Substance Use Disorder and the NJ Dept. of Human Services

Marijuana Potency: New Research, New Risks in Your Home & Workplace

October 28, 2025



Partnership for a
Drug-Free New Jersey
In Cooperation with the Governor's Council on
Substance Use Disorder and the NJ Dept. of Human Services

Featured Presenters



Paige Williams, MD

Toxicology/Addiction Medicine Fellow

New Jersey Poison Information and Education System

Rutgers New Jersey Medical School



Ryan Vandrey, PhD

Johns Hopkins University School of Medicine



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Cannabis Exposure: Clinical and Toxicologic Perspectives

Paige Williams, MD

Toxicology/Addiction Medicine Fellow

New Jersey Poison Information and Education System

Rutgers New Jersey Medical School

Defining the Lingo

- Cannabis
 - Short for *Cannabis sativa*, also refers to products made from the cannabis plant
- Marijuana
 - Common name for mixture of dry leaves and flowers
- Cannabinoids
 - Chemicals produced by cannabis, bind to cannabinoid receptors
 - Cannabidiol (CBD)
 - Tetrahydrocannabinol (THC)
 - Cannabinol
 - Synthetic cannabinoids
 - "K2", "spice", "synthetic marijuana"

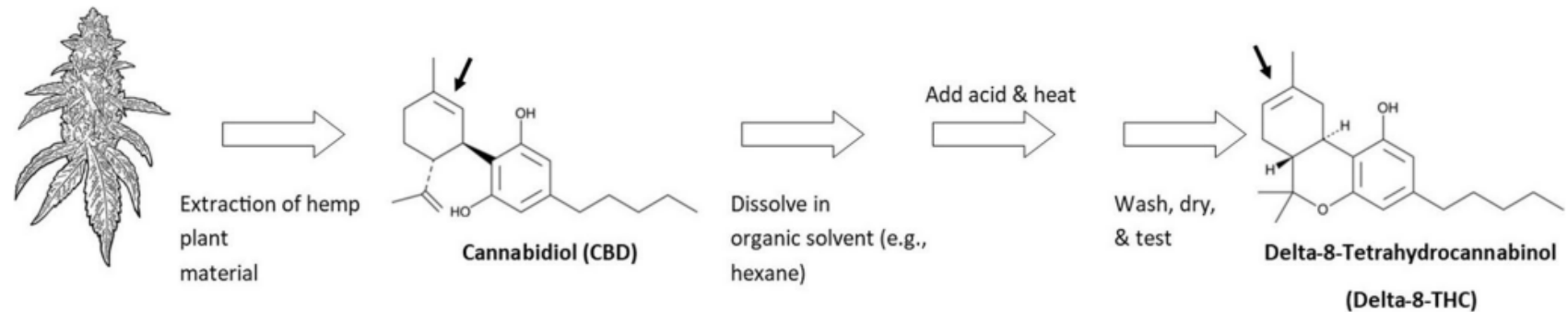
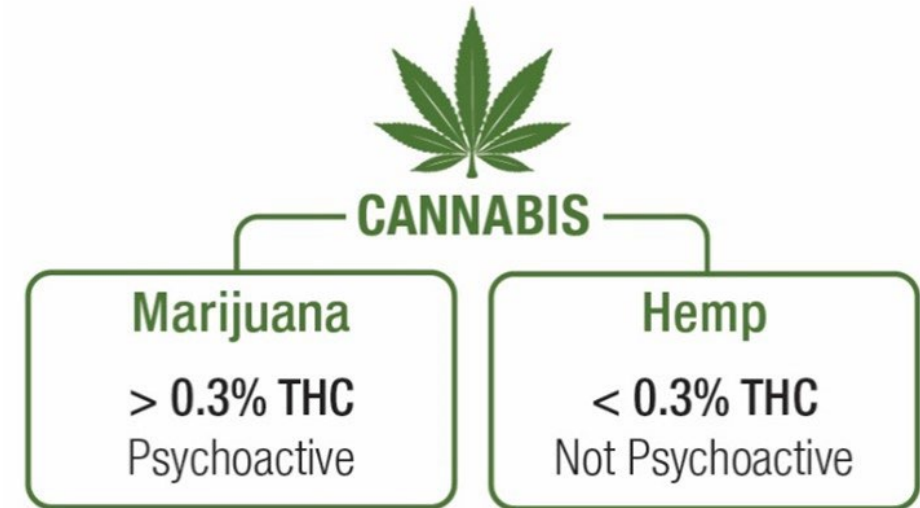
Cannabis

Cannabis sativa



2018 Farm Bill

- Removed hemp from federal list of controlled substances
- Hemp
 - Cannabis plant type containing no more than 0.3% THC by dry weight
- Loophole
 - Only specified delta-9 THC
 - Cannabinoids can still be extracted from hemp to create psychoactive products
 - No product regulations



New Jersey Law

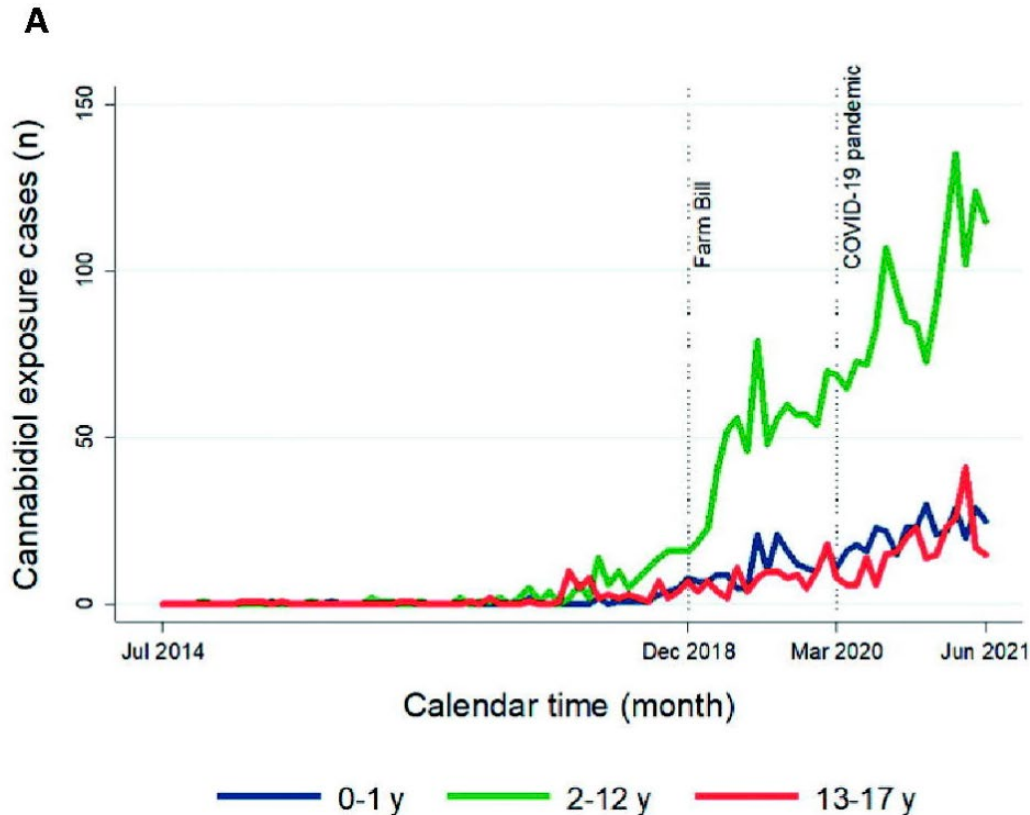
- Both medical and recreational use legal
- 21+
- Sale of products with $> 0.3\%$ THC limited to licensed cannabis dispensaries
- Product regulations
 - Child resistant packaging
 - Clearly labeled THC content
 - Proof of third party testing for potency and contaminants



What's the big deal?

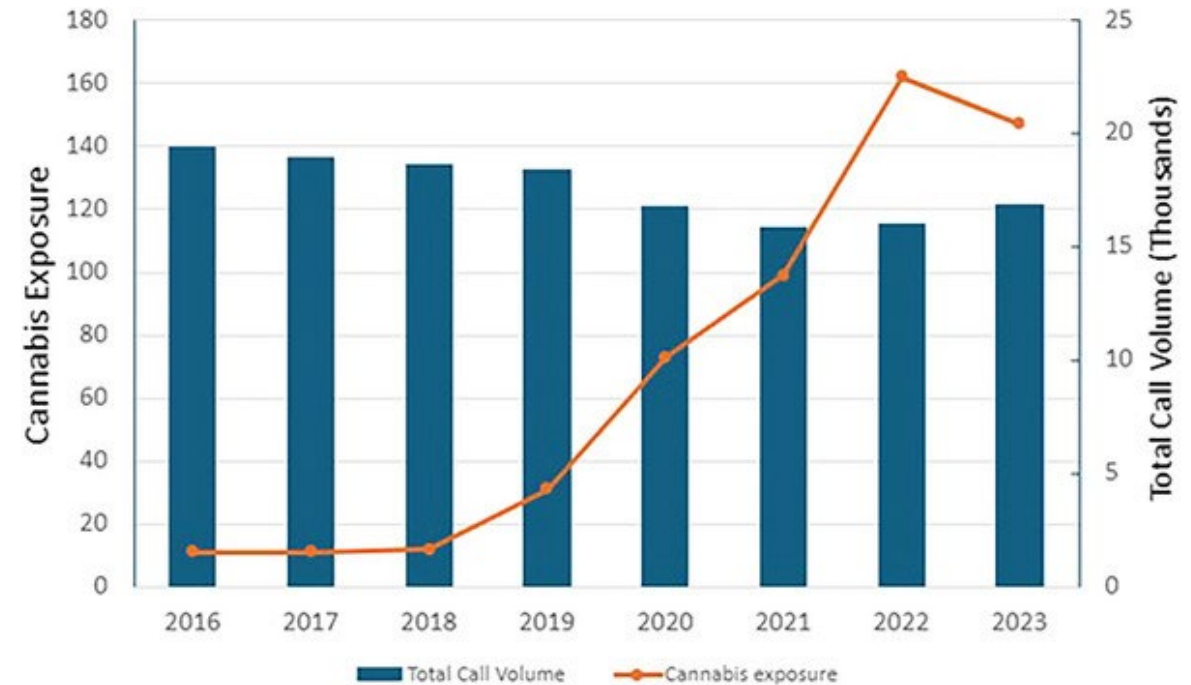


Pediatric Cannabis Exposure Trends



Perez-Vilar, 2021.

Ivanov I, 2024.



Reported number of pediatric cannabis exposures (<5 years old) overlying the total number of calls per year to New Jersey Poison Information and Education System (NJPIES) from 2016 to 2023.

Characteristics of Acute Toxicity

ARTICLES | JANUARY 03 2023

Pediatric Edible Cannabis Exposures and Acute Toxicity: 2017–2021

Marit S. Tweet, MD ; Antonia Nemanich, MD; Michael Wahl, MD

Clinical Effects for all Cases Followed to a Known Outcome (n=4827)

Clinical Effects	Number of Cases (%)
CNS Depression	3381 (70.0)
Agitation	342 (7.1)
Seizure	148 (3.1)
Vomiting	458 (9.5)
Respiratory Depression	148 (3.1)

Percent of Cases by Disposition for Each Year (n = 7043)

	2017	2018	2019	2020	2021
Admitted to ICU setting	8.7	4.7	7.3	8.2	9.0
Admitted to non-ICU setting	9.7	10.5	12.0	14.9	16.3
Treated/evaluated and released	44.9	42.4	39.7	32.6	35.9

Toxic Dose?

> [Pediatrics](#). 2023 Sep 1;152(3):e2023061374. doi: 10.1542/peds.2023-061374.

Toxic Tetrahydrocannabinol (THC) Dose in Pediatric Cannabis Edible Ingestions

Lesley C Pepin¹, Mark W Simon¹, Shireen Banerji¹, Jan Leonard², Christopher O Hoyte^{1 3}, George S Wang^{1 4}



TABLE 3A Tetrahydrocannabinol Ingestion Dose, Duration of Symptoms and Admission Needs for Pediatric Edible Ingestions, Stratified by Severity and Duration of Toxicity

	Severe Toxicity (<i>n</i> = 37)	Absence of Severe Toxicity (<i>n</i> = 43)	<i>P</i>
Median THC dose in mg/kg (IQR)	5.4 (3.2–8.2)	0.9 (0.6–1.9)	<.0001
Median duration of signs and symptoms in h (IQR)	20.3 (12.8–29.5)	6.3 (3–10)	<.0001
Required admission (%)	28 (76%)	12 (28%)	<.0001



Adult Toxicity

- Euphoria, heightened sensory awareness
- Sedation
- Anxiety, agitation
- Visual hallucinations
- Paranoia
- Psychosis
- Elevated heart rate
- Incoordination, slurred speech



Impacts on Healthcare Utilization

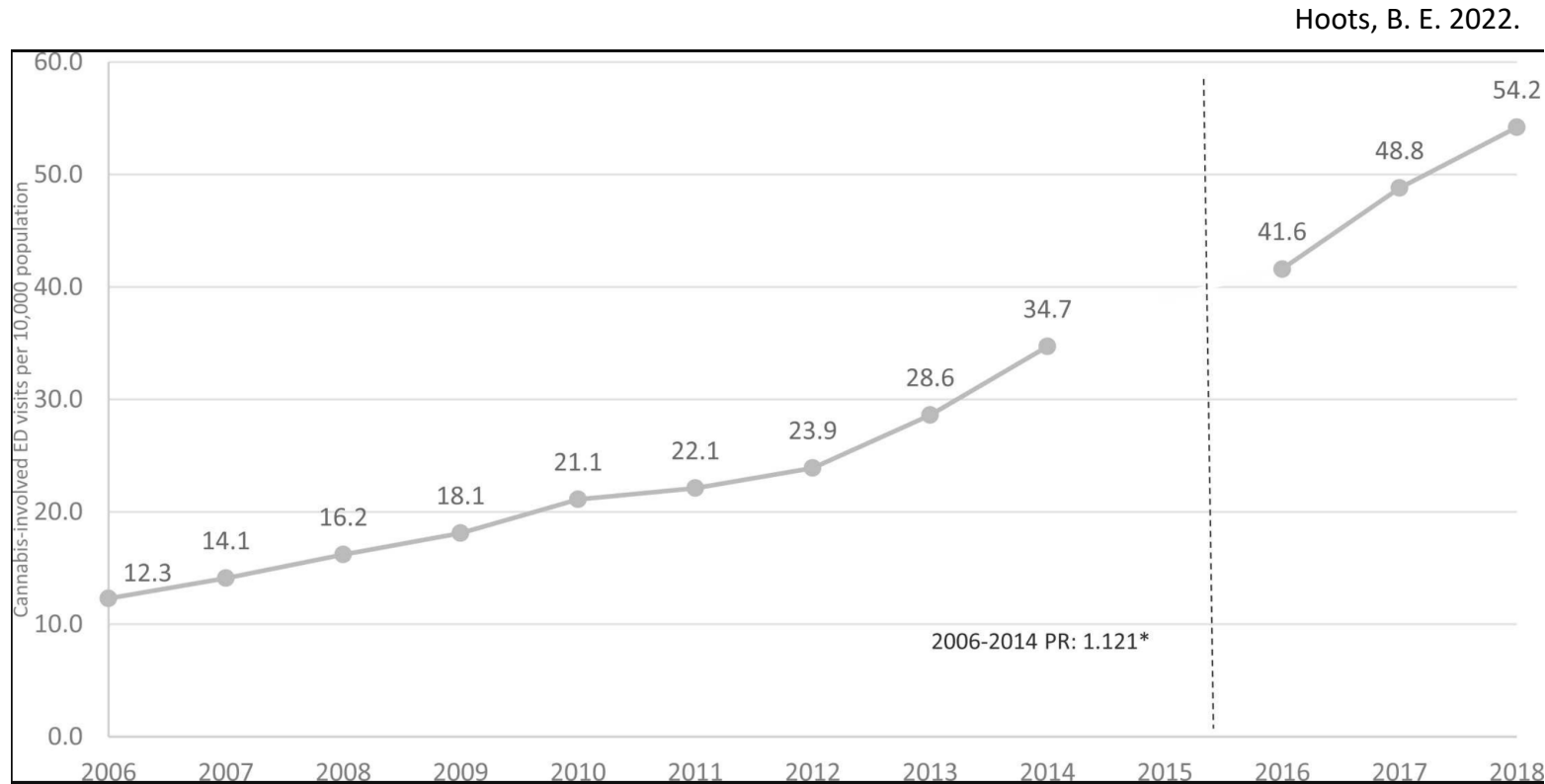


Fig. 1. Age-adjusted rates of cannabis-associated emergency department visits per 100,000 population, 2006–2018, United States.

Considerations in Chronic Use

Murtha L, 2023.

- Lung Disease
 - Carcinogens similar to tobacco smoke
- Cardiovascular Disease
- Cannabis Hyperemesis Syndrome

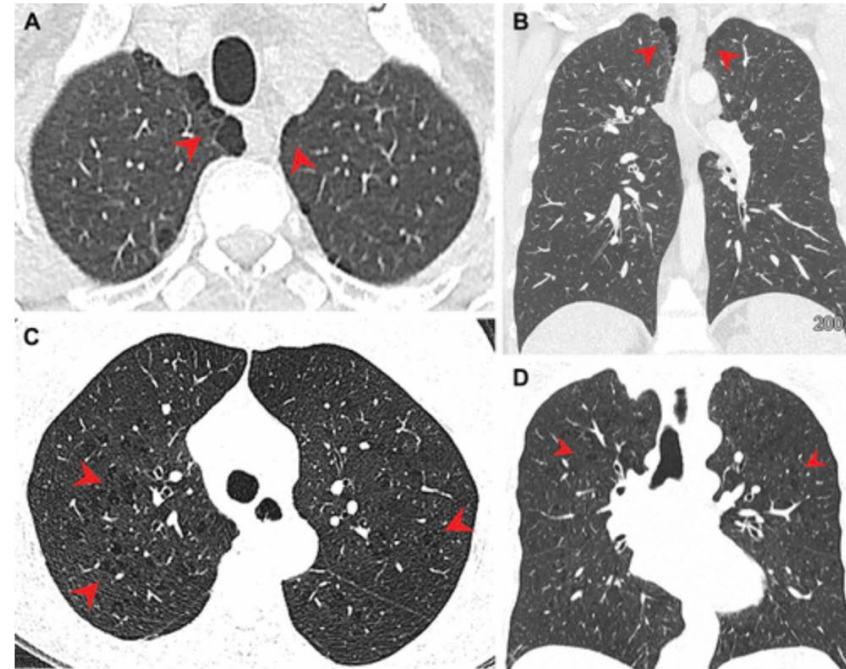


Figure 3: Pulmonary emphysema in (A, B) marijuana and (C, D) tobacco smokers. (A) Axial and (B) coronal CT images in a 44-year-old male marijuana smoker show paraseptal emphysema (arrowheads) in bilateral upper lobes. (C) Axial and (D) coronal CT images in a 66-year-old female tobacco smoker with centrilobular emphysema represented by areas of centrilobular lucency (arrowheads).

Cardiovascular Disease and Cannabis Use

Association of Endothelial Dysfunction With Chronic Marijuana Smoking and THC-Edible Use

Leila Mohammadi, MD, PhD¹; Mina Navabzadeh, PharmD¹; Nerea Jiménez-Téllez, PhD²; [et al](#)

Prevalence of cannabis consumption among acute myocardial infarction patients across various age categories over a two-decade span in the United States

[Kamleshun Ramphul](#)¹, [Nomesh Kumar](#)², [Jasninder-Singh Dhaliwal](#)³, [Hemamalini Sakthivel](#)⁴, [Lily Liu](#)⁵, [Camryn Schroeder](#)⁵, [Sarah MacKenzie Picker](#)⁶, [Manraj Sekhon](#)³, [Renuka Verma](#)⁷, [Raheel Ahmed](#)⁸

Myocardial Infarction and Cardiovascular Risks Associated With Cannabis Use



A Multicenter Retrospective Study

Ibrahim Kamel, MD, MHA,^a Ahmed K. Mahmoud, MD,^{a,b} Anu Radha Twayana, MD,^c Ahmed M. Younes, MD,^d Benjamin Horn, DO,^e Harold Dietzius, MD^f

HIGH STAKES: THE HIDDEN CONNECTION BETWEEN CANNABIS USE AND MYOCARDIAL INFARCTION

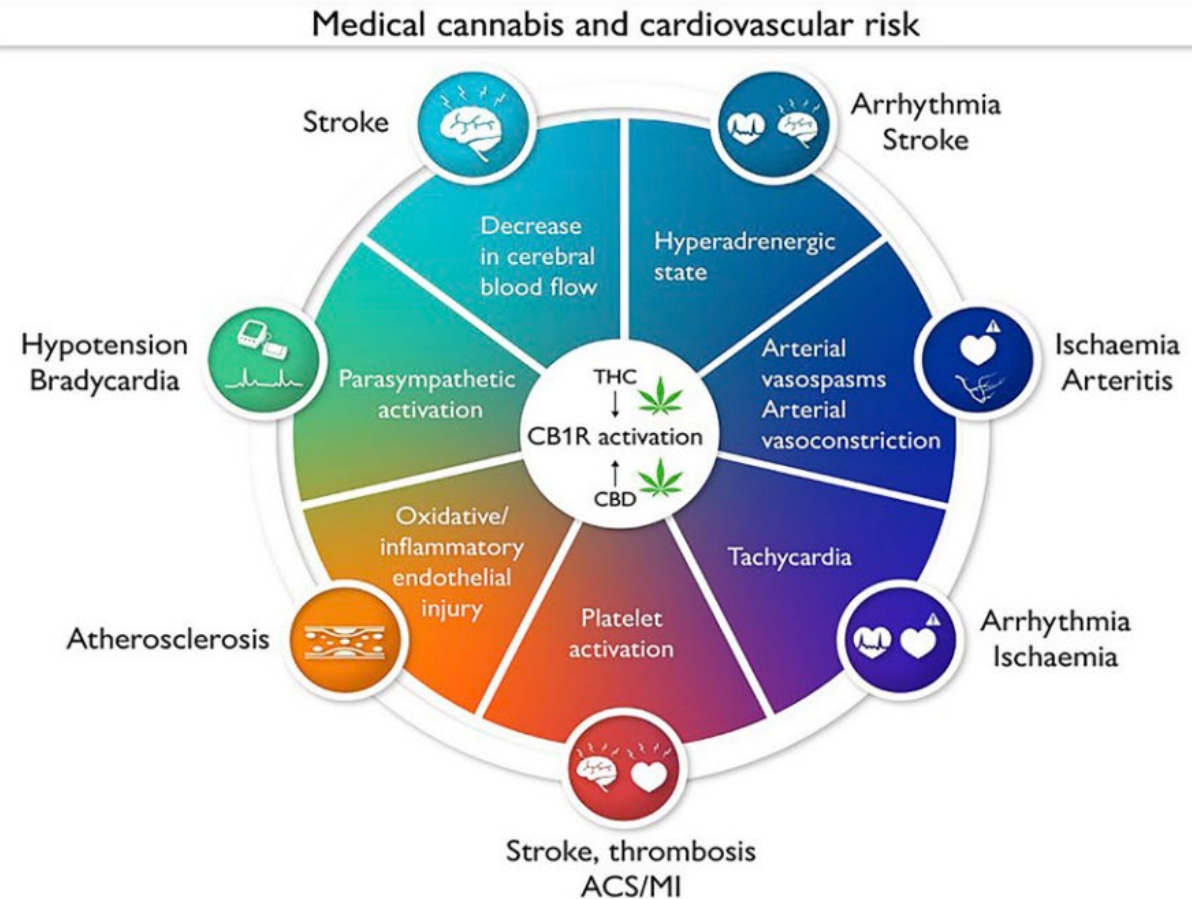
Authors: Roma Patel, Abdullah Ahmad, Dyuti Kumar, Yezin F. Shamoan, Raja Pullatt, and Razan Shamoan | [AUTHORS INFO & AFFILIATIONS](#)

Publication: JACC • Volume 85, Number 12_Supplement

Prevalence and impact of cannabis use disorder on acute ischemic stroke and subsequent mortality in elderly peripheral vascular disease patients: A population-based analysis in the USA (2016 – 2019)

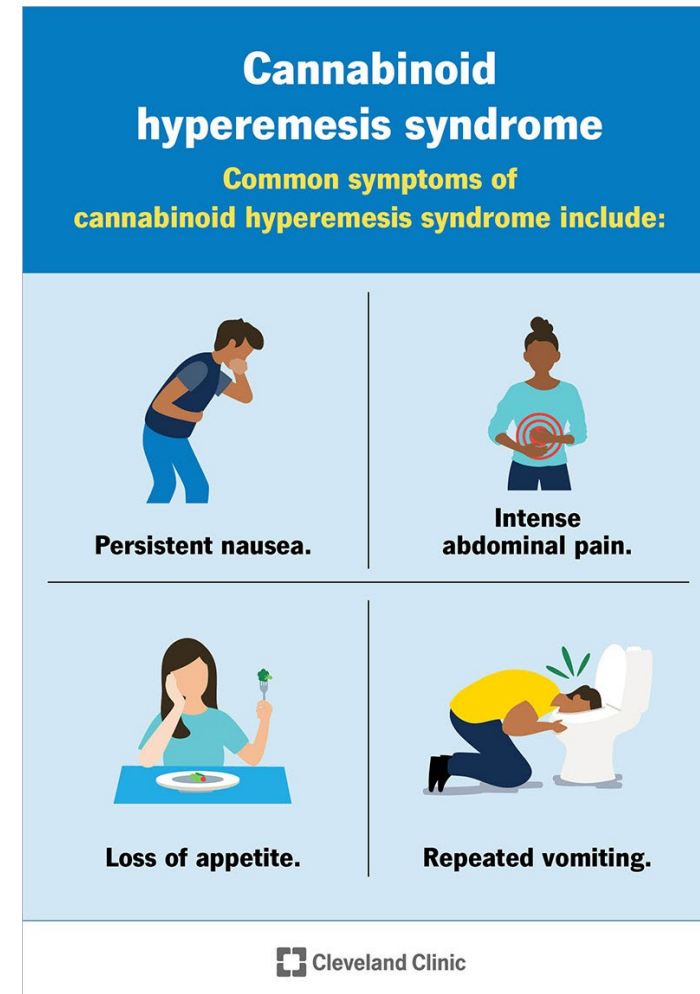
[Rupak Desai](#)¹, [Brian Brereton](#)², [Harika Varma Chintapalli Patta](#)³, [Prerna Bansal](#)⁴, [Akhil Jain](#)⁵, [Ankit Vyas](#)⁶

- 4.8x increased risk of heart attack in the first hour after smoking cannabis (Mittleman, Circulation 2001)
- 3x increased risk of mortality in patients with coronary artery disease who use cannabis > 1x/week (Mukamal, Am Heart J 2008)



Cannabinoid Hyperemesis Syndrome (CHS)

- Cyclic episodes of nausea, vomiting, abdominal pain
- Develops in chronic, heavy cannabis use
- High healthcare utilization
 - Multiple emergency department visits
- Hallmark is relief of symptoms with hot water



Summary

- Buyer beware with products from unlicensed sources
- Edibles pose greatest risk for unintentional pediatric exposures
- Just one gummy in children can be consequential
- Increased health risks associated with chronic use in adults

Thank you!

Questions?

pdw35@njms.rutgers.edu



The screenshot shows the homepage of the New Jersey Poison Center website. The header is red with the phone number 1-800-222-1222 and the text "NEW JERSEY POISON CENTER". Below the header is a navigation bar with links: ABOUT US, POISONS & PREVENTION, PUBLIC EDUCATION, HEALTH PROFESSIONALS, MEDIA, and RESOURCES. The main content area features a background image of bookshelves. Overlaid on this is a section titled "Research and Studies" with the subtitle "Conducted by NJPIES' staff & Rutgers faculty". Below this, there are three buttons: "Loperamide Misuse", "Naloxone Deserts", and "Phenibut Exposures". At the bottom left, there is a "CHAT NOW" button and a "Need help now? Contact us 24/7" section with icons for CALL, TEXT, and CHAT.



NJPIES.ORG



Ryan Vandrey, PhD
Johns Hopkins University School of Medicine



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Behavioral Pharmacology of Cannabis: Trends in Use, Novel Products, and Impact

Ryan Vandrey, PhD

Johns Hopkins University School of Medicine



Cannabis & Health
Research Initiative

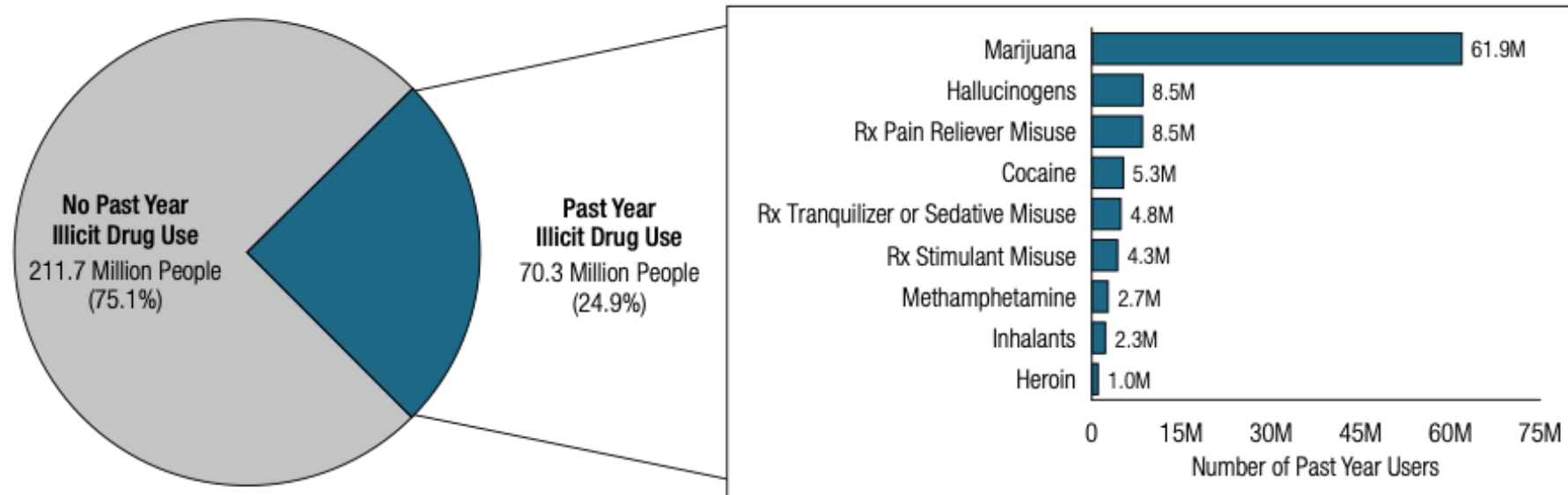
Disclosures

- Recent/current paid consultant or advisory board member: Syqe Medical Ltd., Charlotte's Web, Schedule 1 Therapeutics



Cannabis Use Prevalence

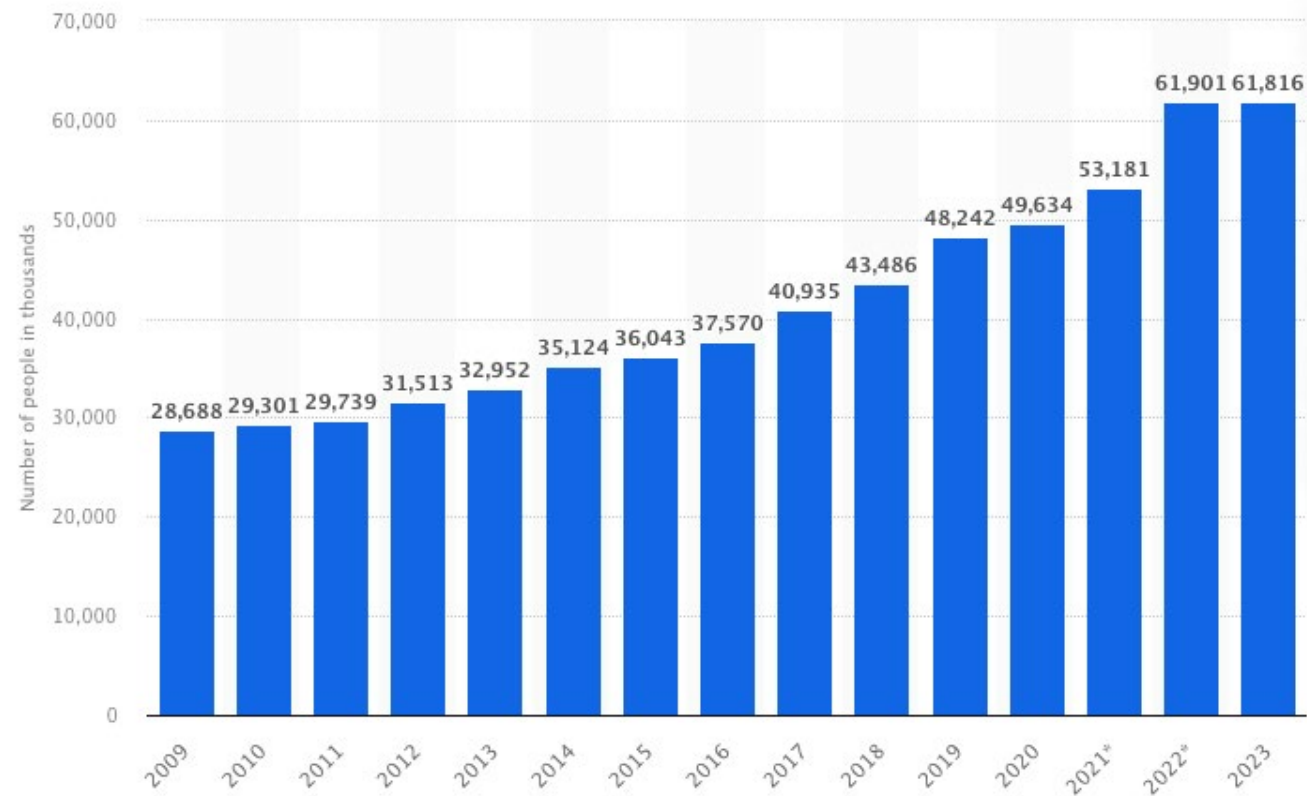
Figure 13. Past Year Illicit Drug Use: Among People Aged 12 or Older; 2022



Rx = prescription.

Note: The estimated numbers of past year users of different illicit drugs are not mutually exclusive because people could have used more than one type of illicit drug in the past year.

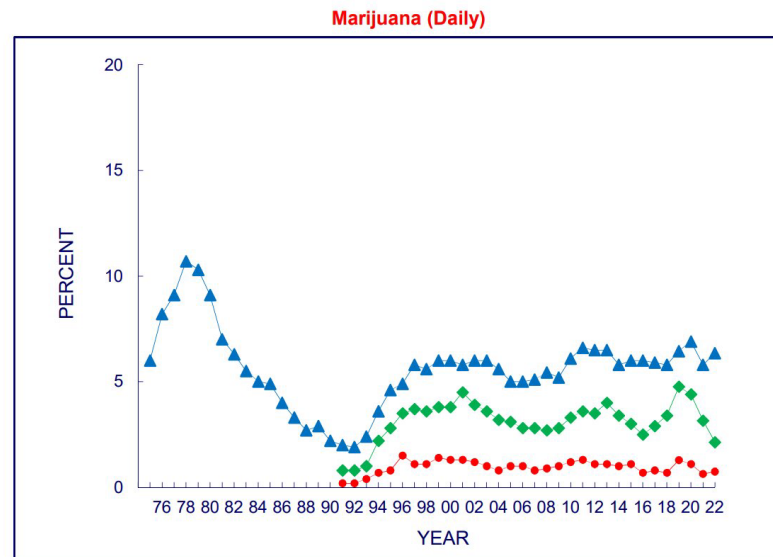
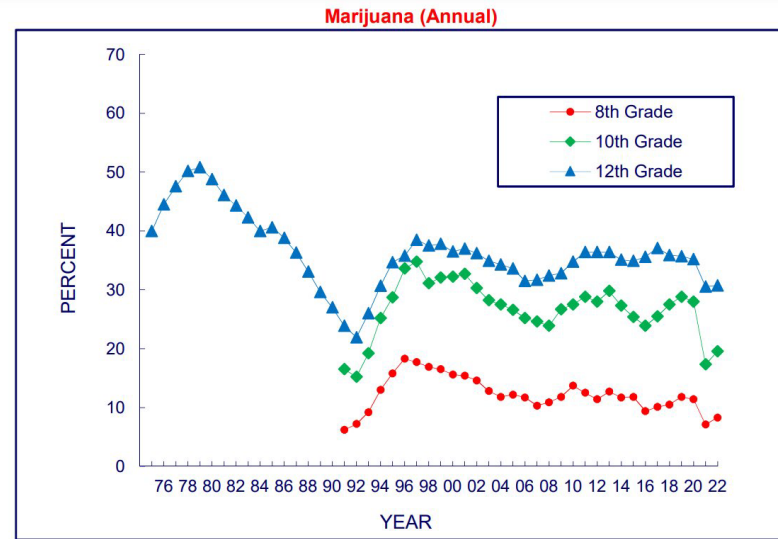
Past Year Use Age 12 and Up



Details: North America; United States; RTI International; 2009 to 2023; 67,679 respondents;
12 years and older

© Statista 2025

Use Among School Age Kids



MTF





Diversity of Product Types

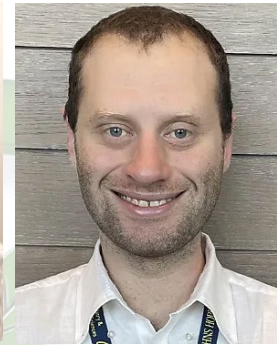
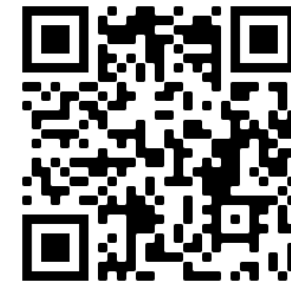
- **Chemotype: What is in the product?**
 - THC, CBD, other cannabinoids, terpenes
 - Impacts the effects of the product
- **Intended route of administration**
 - Inhaled, oral, topical, suppository
 - Impacts timing and magnitude of effects
- **Dose**
 - Impacts efficacy, abuse liability, and AE risk
- **Formulation**
 - Impacts absorption and excretion





Laboratory Research at JHU





What We Do

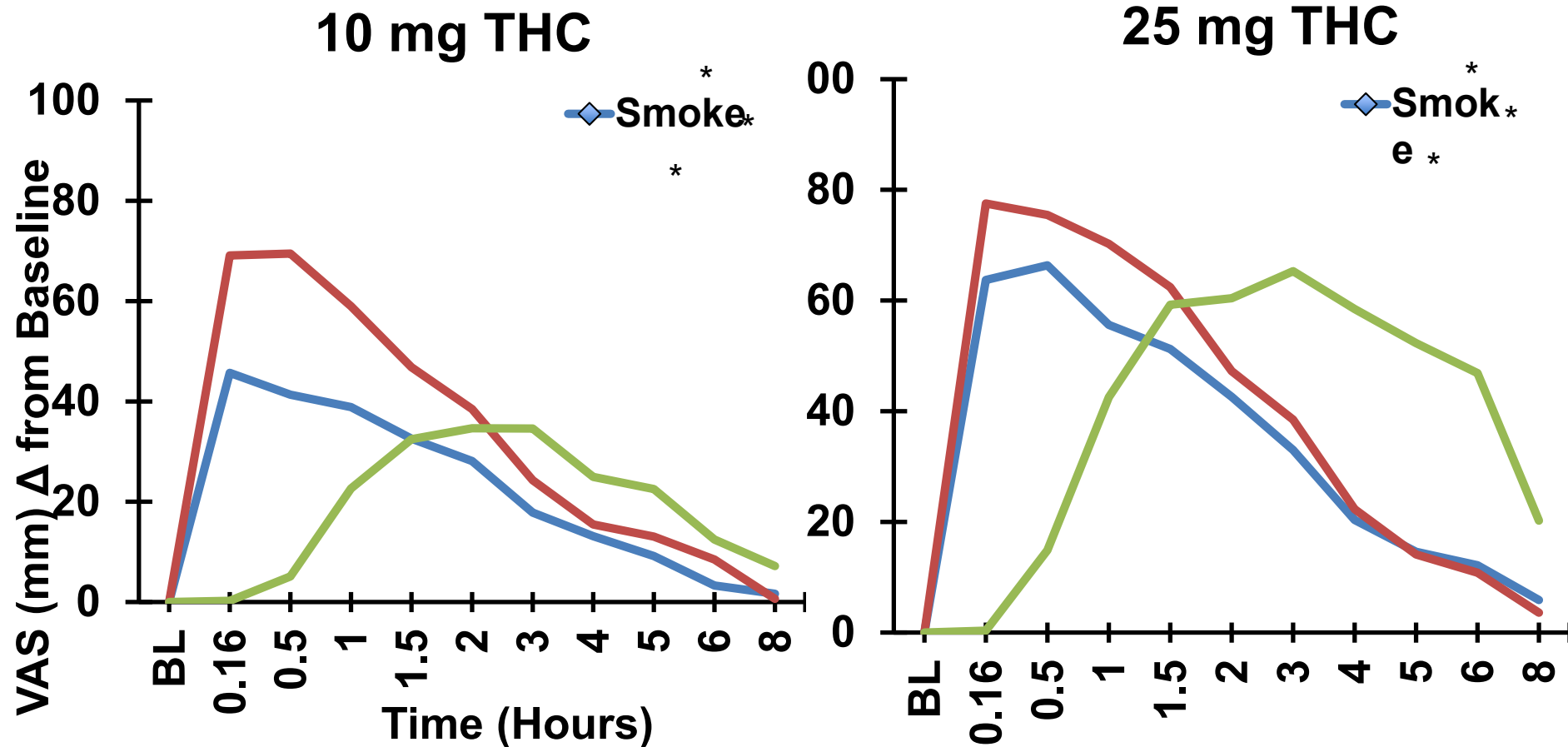
- **Systematic evaluation of cannabis products**
- **Impact of route, dose, formulation, chemotype**
- **Drug interactions**
- **Research methods development**
- **Detection of impairment**
- **Health impact of medicinal cannabis use**
- **Drug development for therapeutic application**



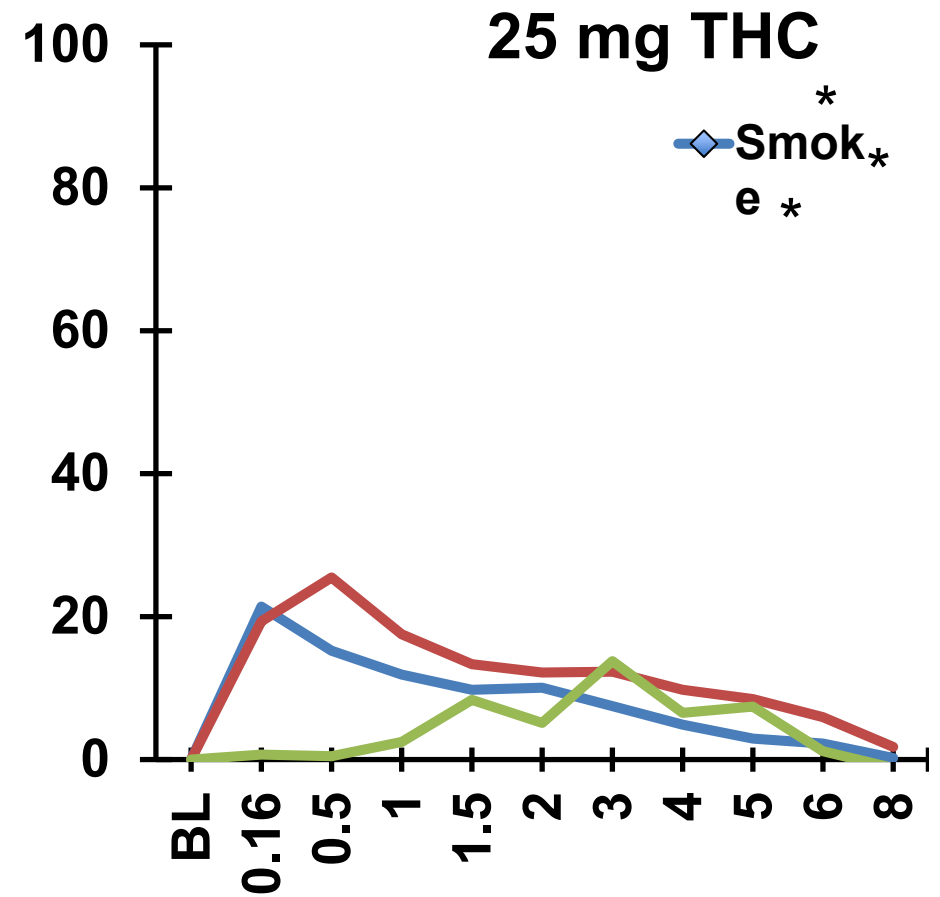
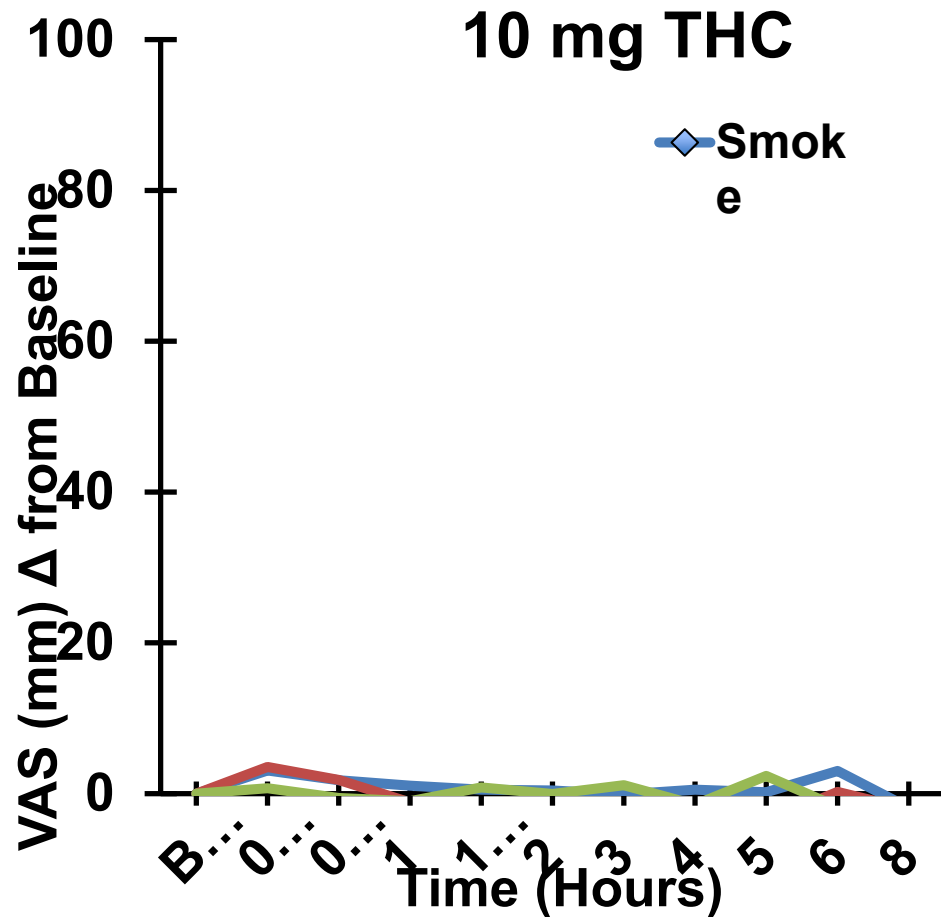
THC-Dominant Cannabis Research



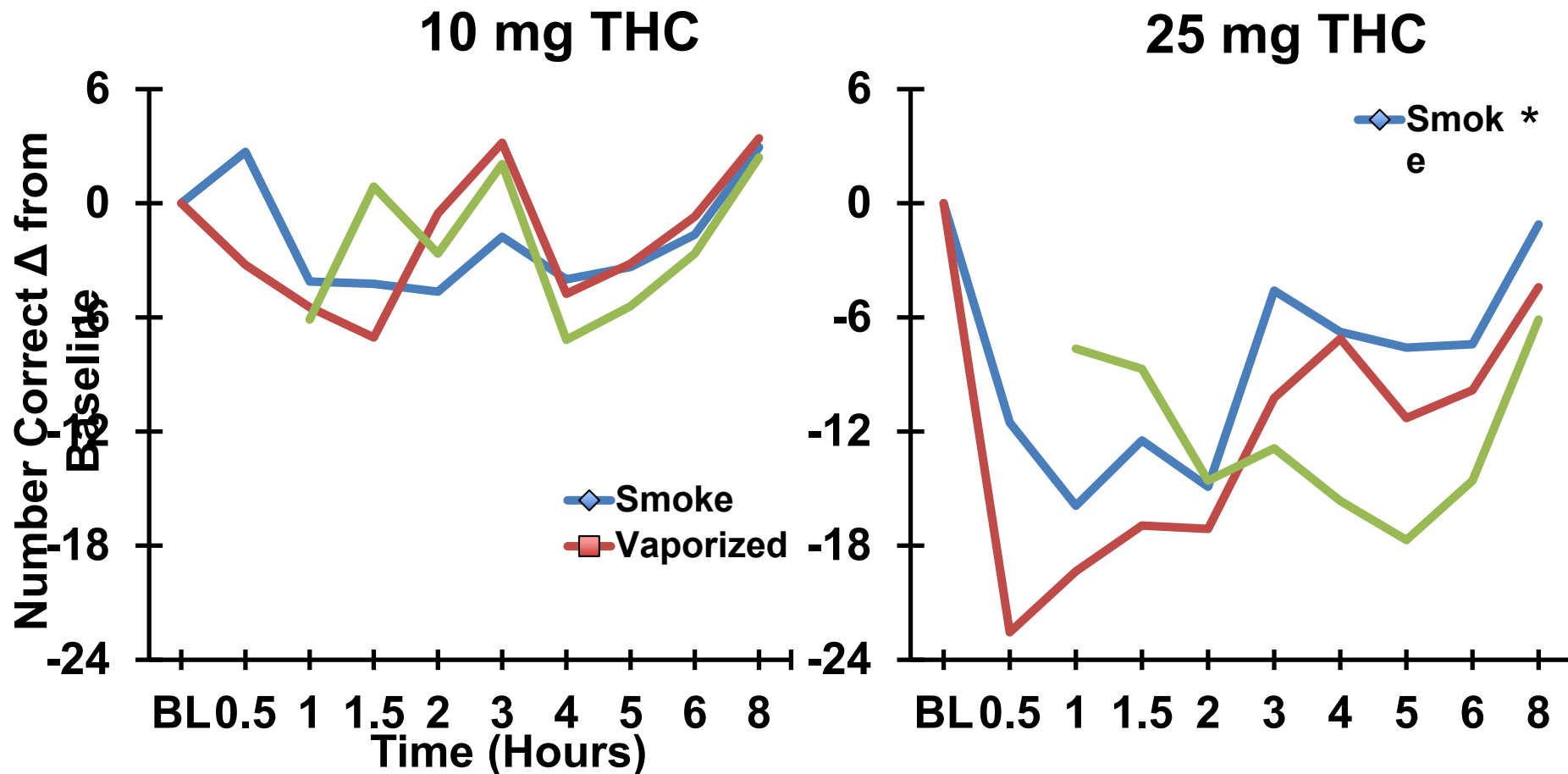
Impact of THC Dose and Route on Subjective Drug Effects



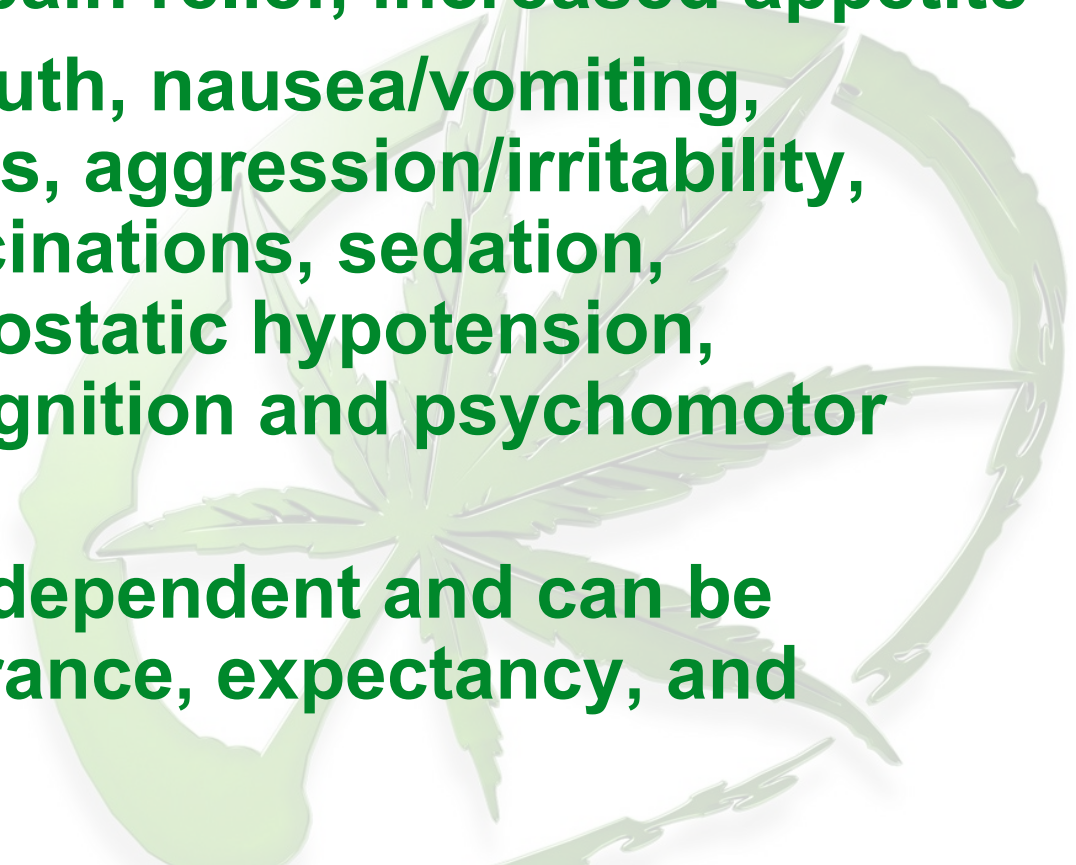
Anxious/Nervous



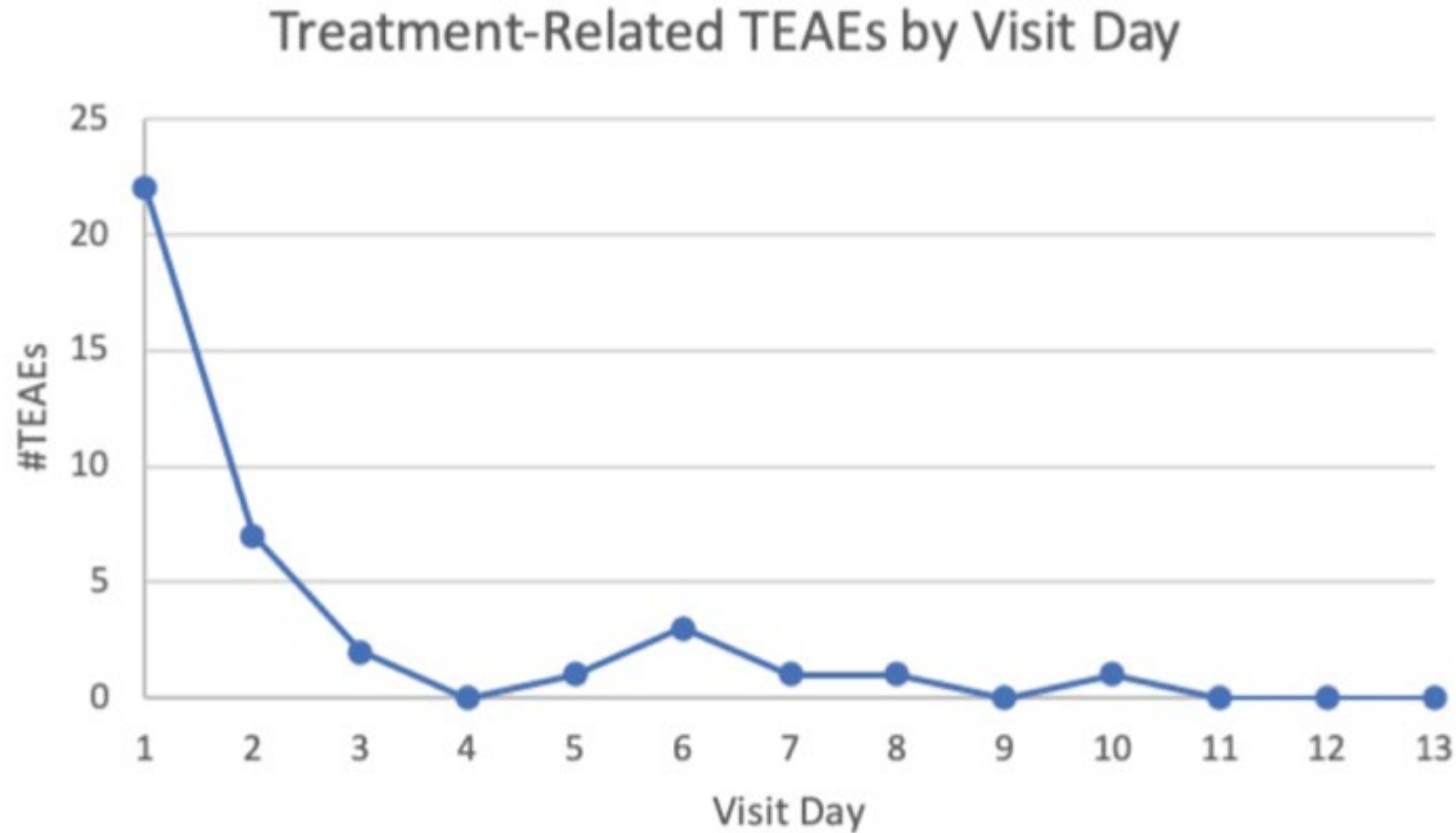
Working Memory (PASAT)



Other Acute THC Effects

- **Positive:** Subjective “high”, increased focus, appreciation of art/media, decreased arousal, improved sleep, pain relief, increased appetite
 - **Negative:** dry mouth, nausea/vomiting, paranoia, red eyes, aggression/irritability, psychosis, hallucinations, sedation, tachycardia, orthostatic hypotension, impairment of cognition and psychomotor ability
 - **Effects are dose dependent and can be impacted by tolerance, expectancy, and environment**
- 

Tolerance to 2.5-10mg THC b.i.d.

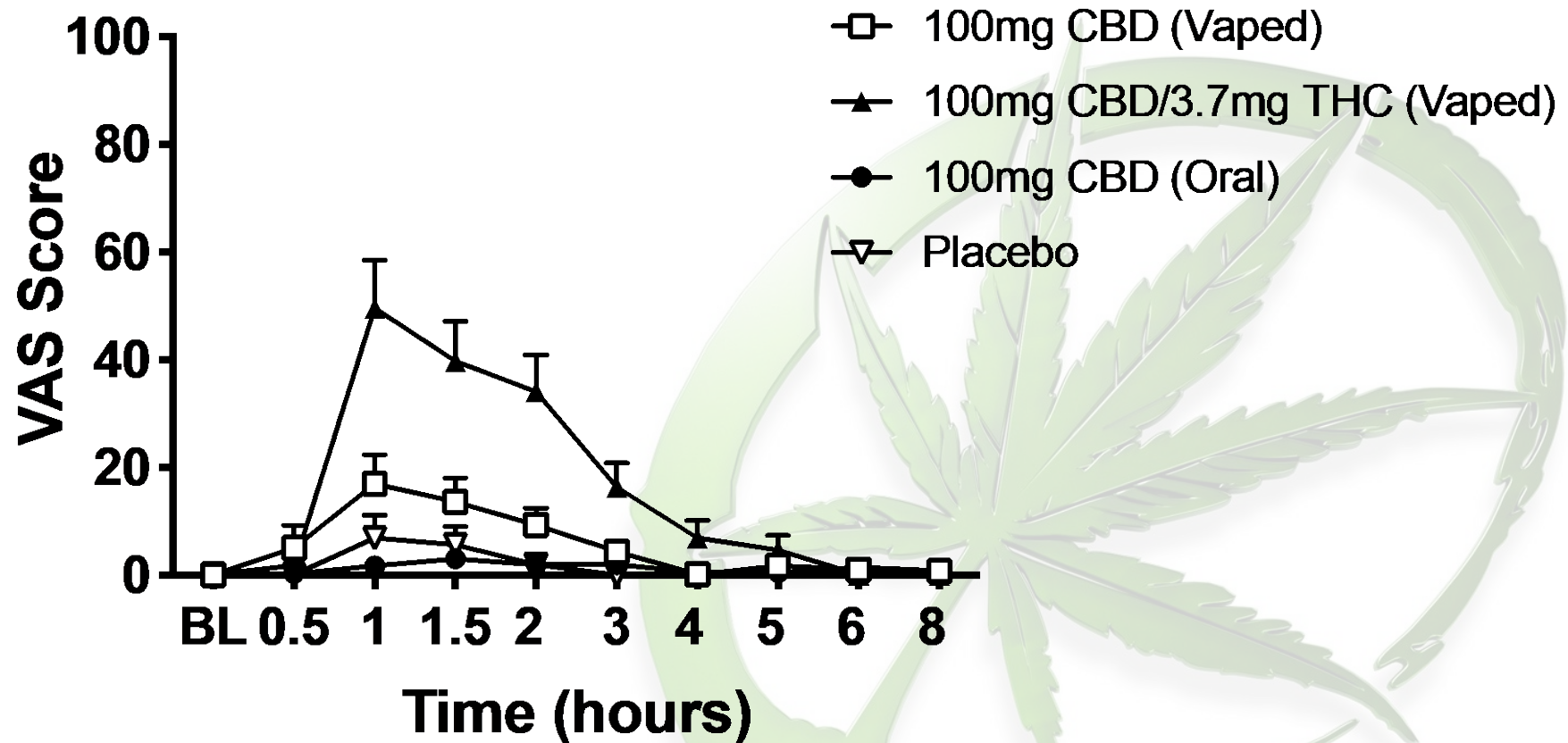


Peters et al., 2021

CBD-Dominant Cannabis Research

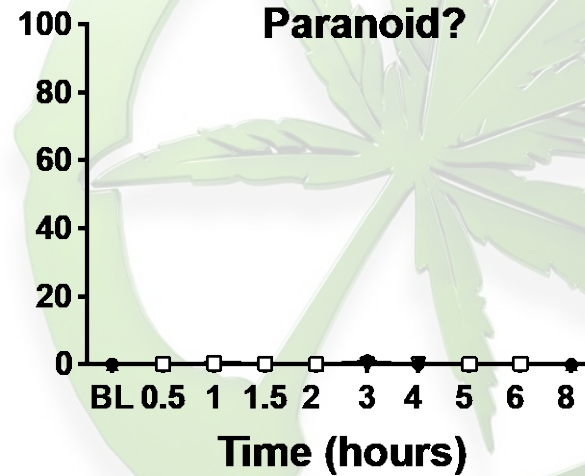
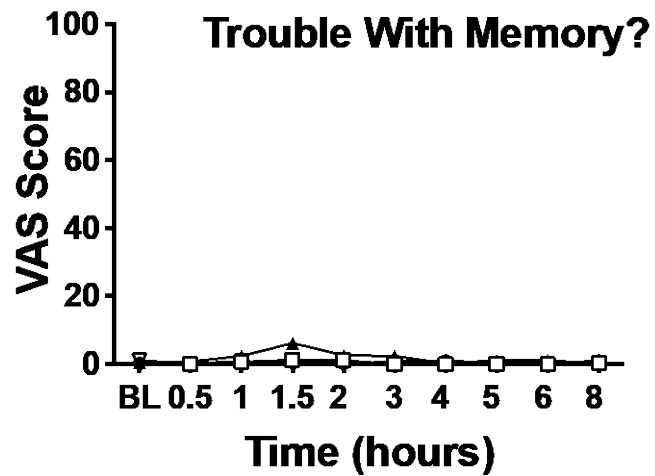
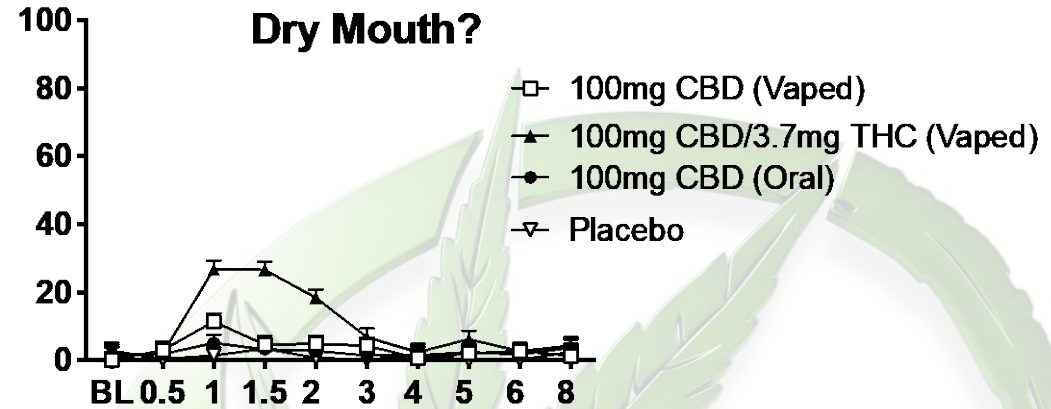
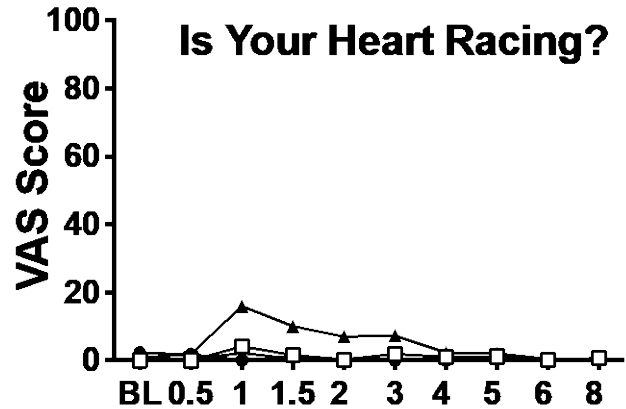


Acute CBD Drug Effects

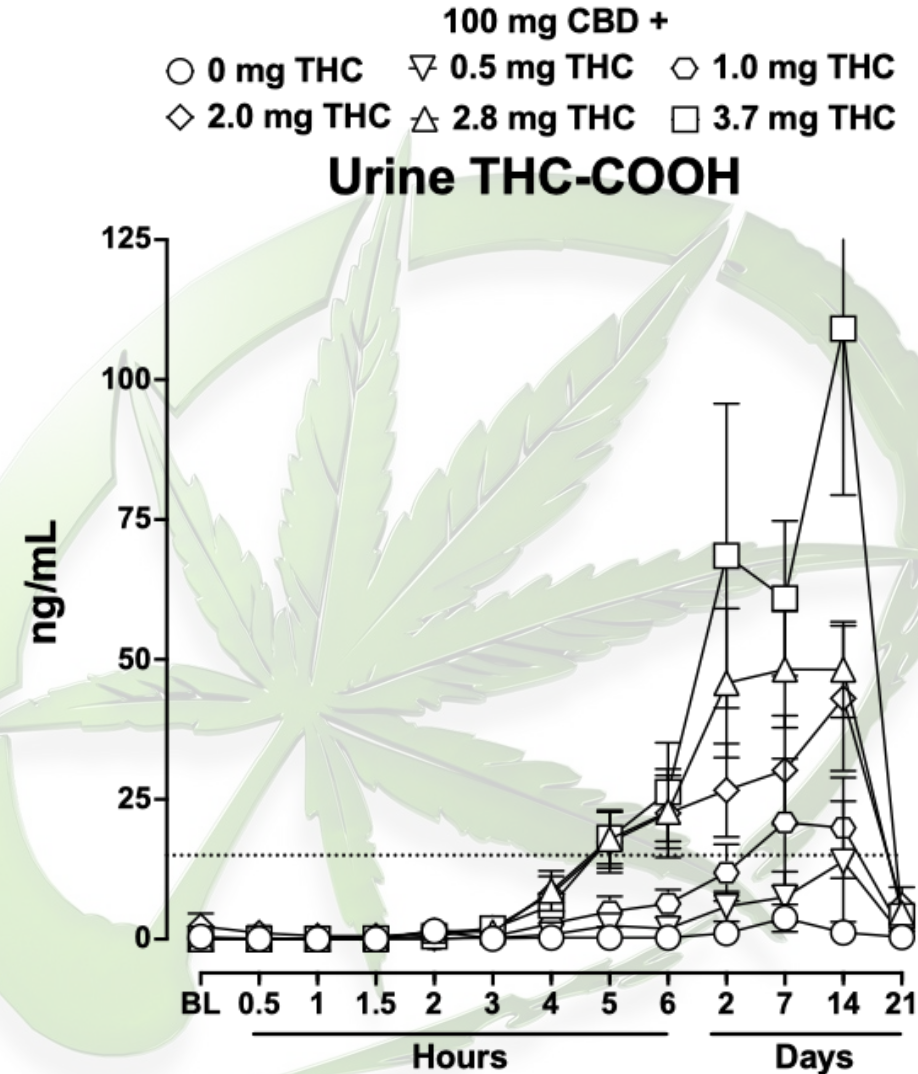
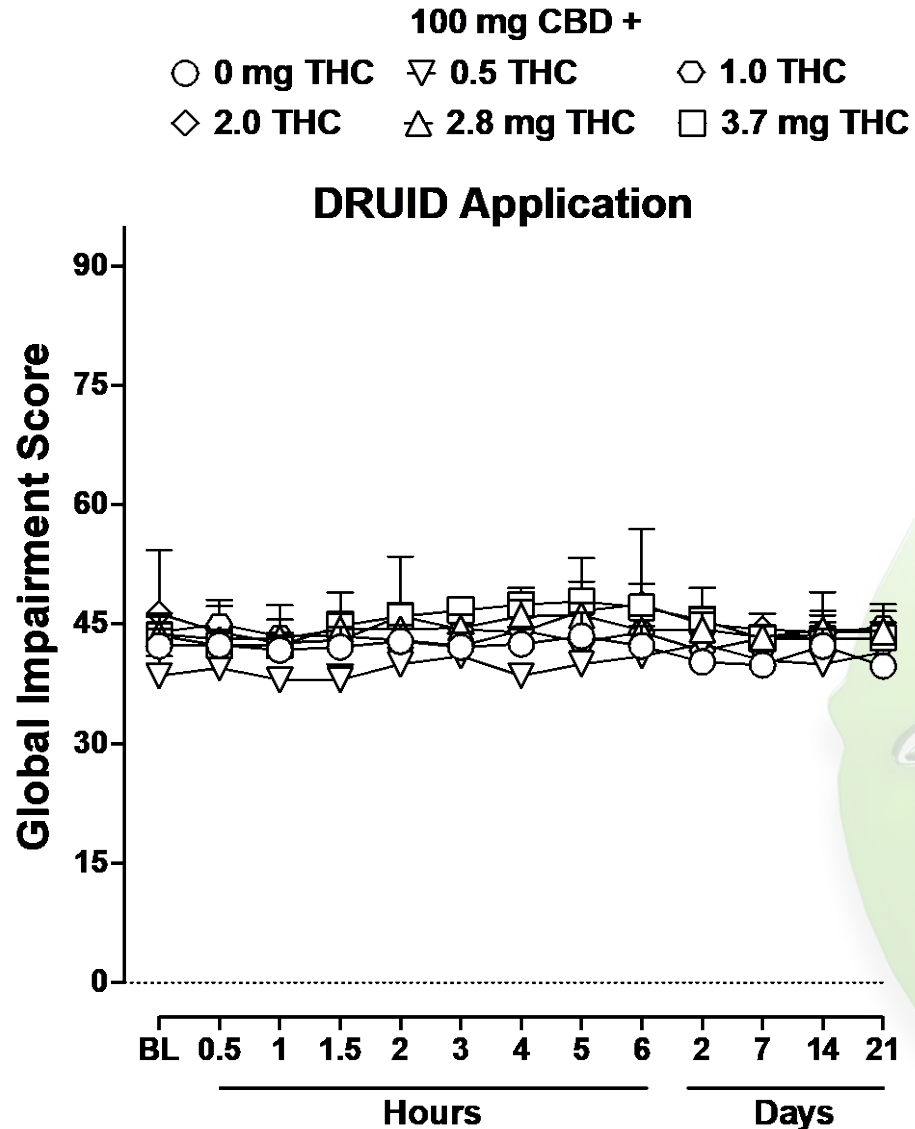


Spindle et al., 2020

CBD Not THC-Like



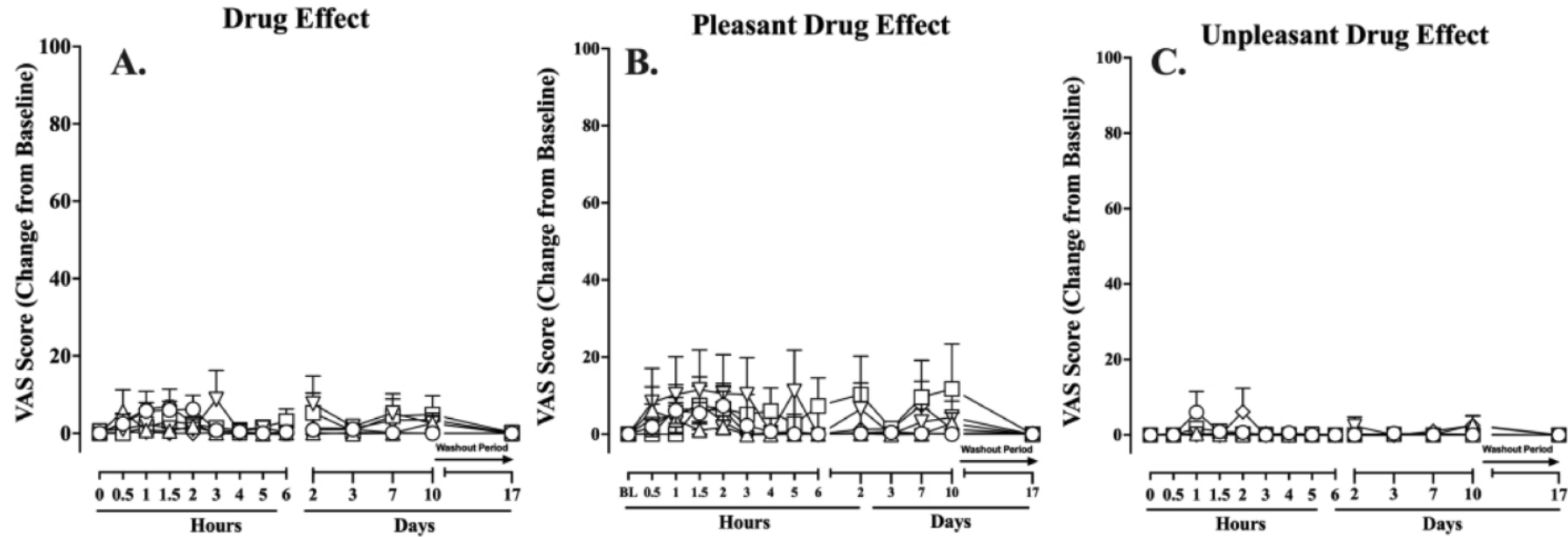
Performance and Drug Testing



Topical Cannabinoids: No Abuse Liability

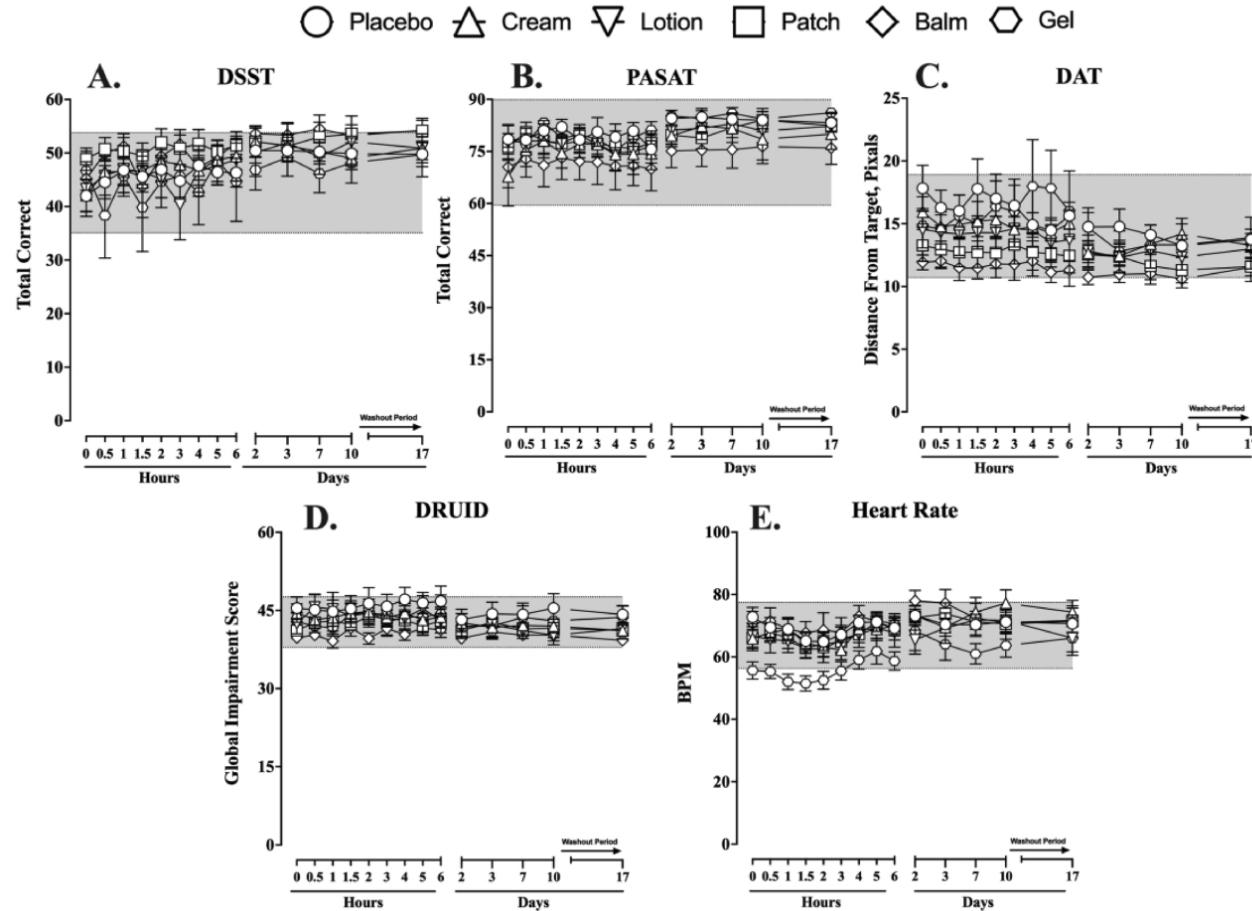
Topical Product Administration - Subjective Drug Effects

○ Placebo △ Cream ▽ Lotion □ Patch ◇ Balm ⬡ Gel



Topical Cannabinoids: No Impairment

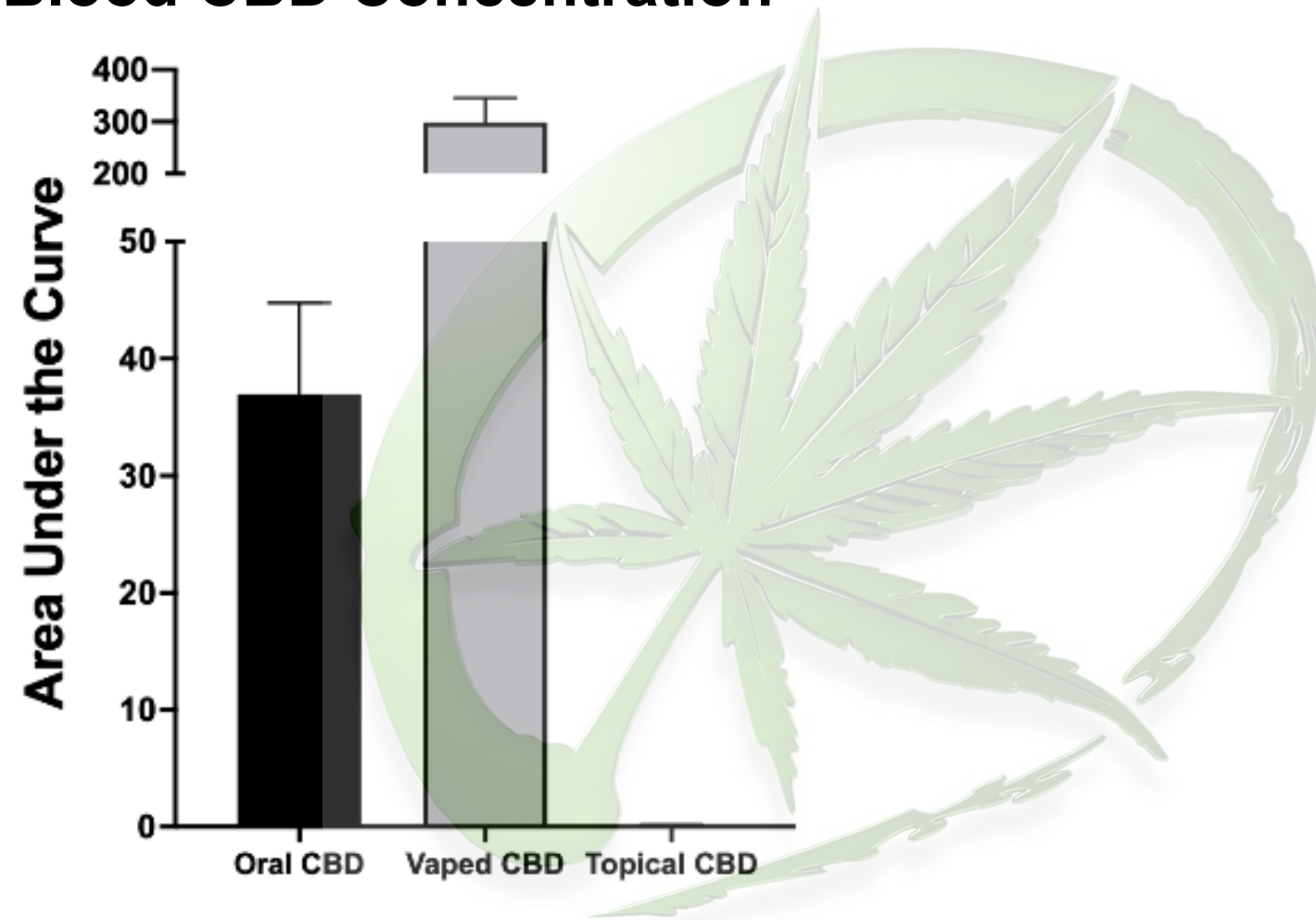
Topical Product Administration - Cognitive/Psychomotor and Physiological Effects



Zamarripa et al., 2024

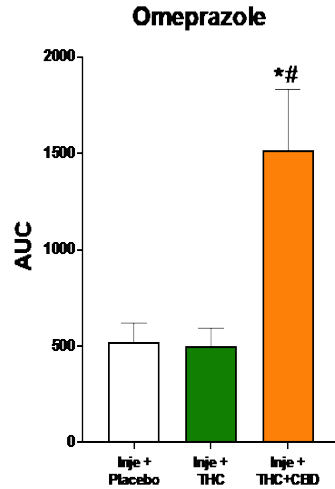
Topical Compared to Other Routes

Blood CBD Concentration

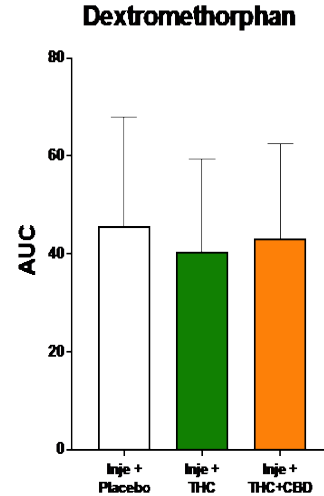


Impact of CBD on Liver

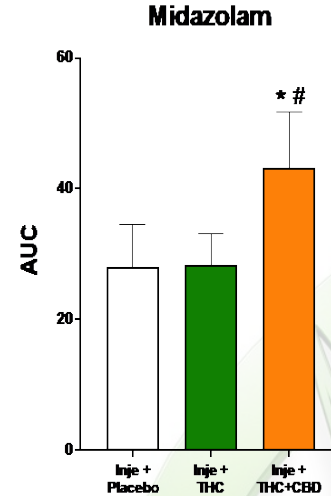
CYP 2C19



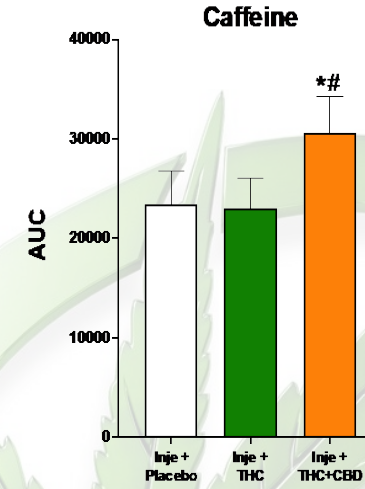
CYP 2D6



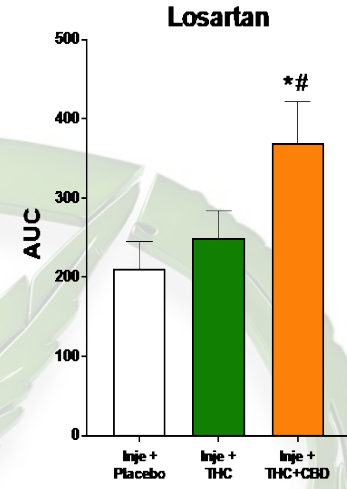
CYP 3A



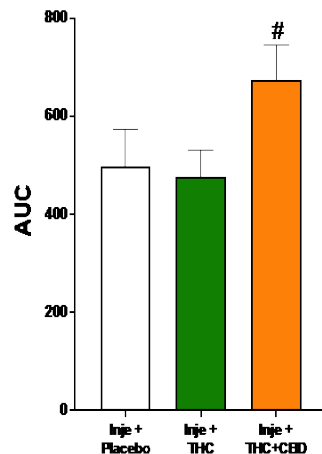
CYP 1A2



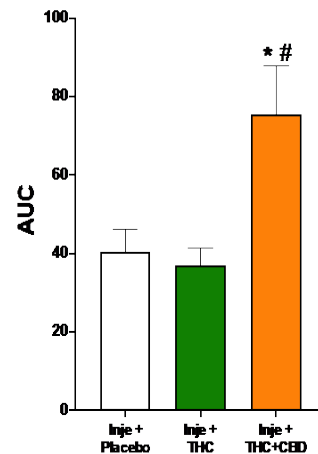
CYP 2C9



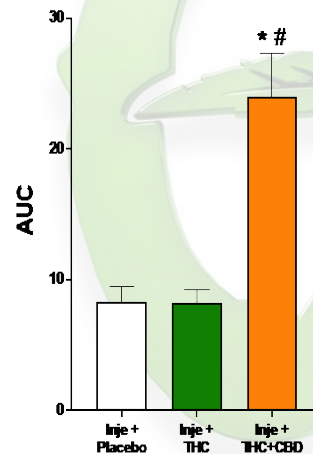
5-OH Omeprazole



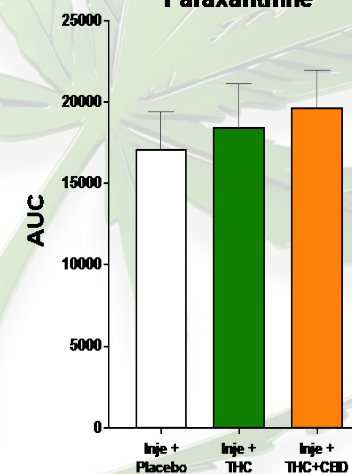
Dextrophan



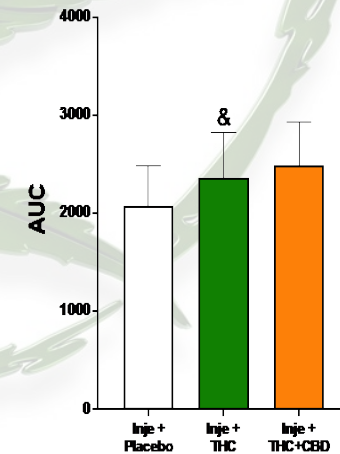
1-OH Midazolam



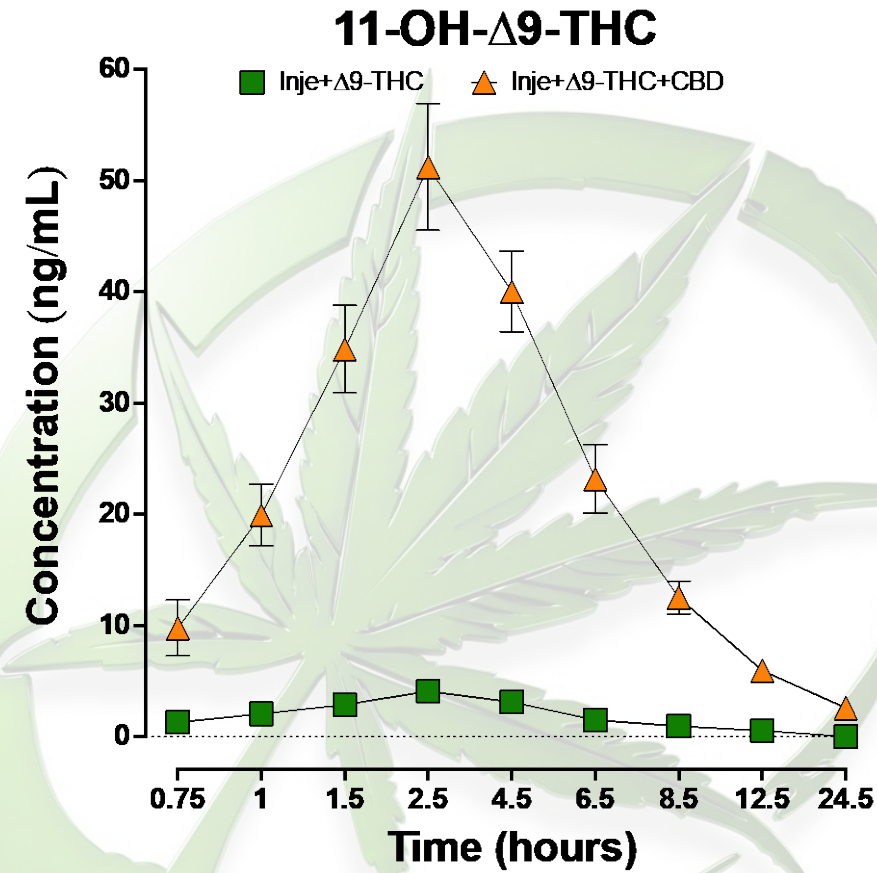
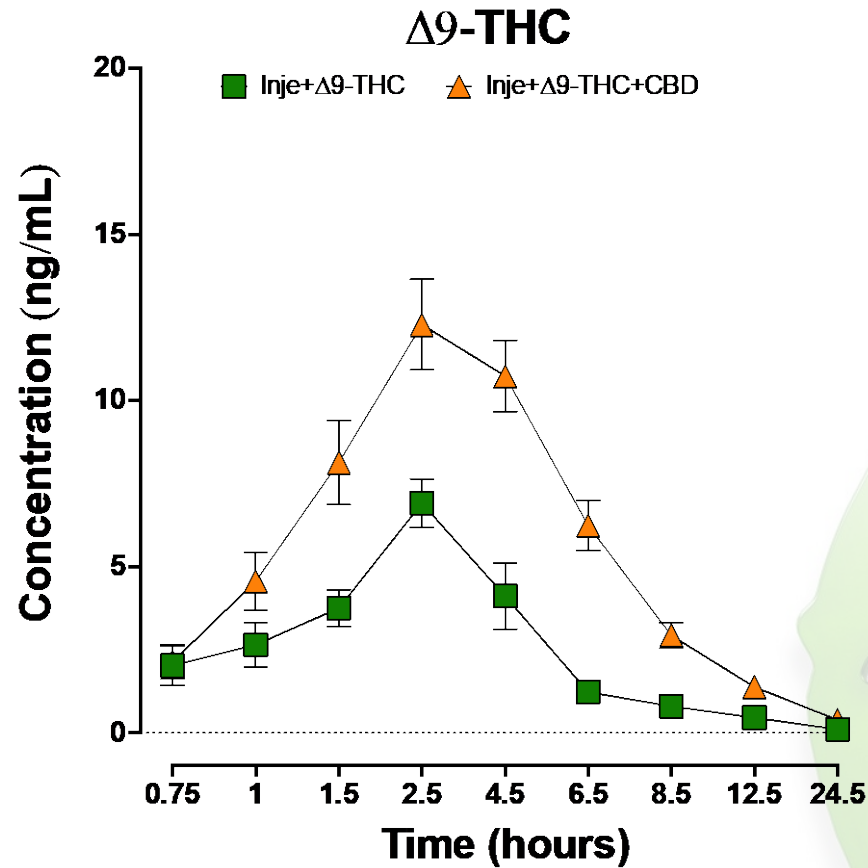
Paraxanthine



Losartan Carboxylic Acid



THC-CBD Interactions

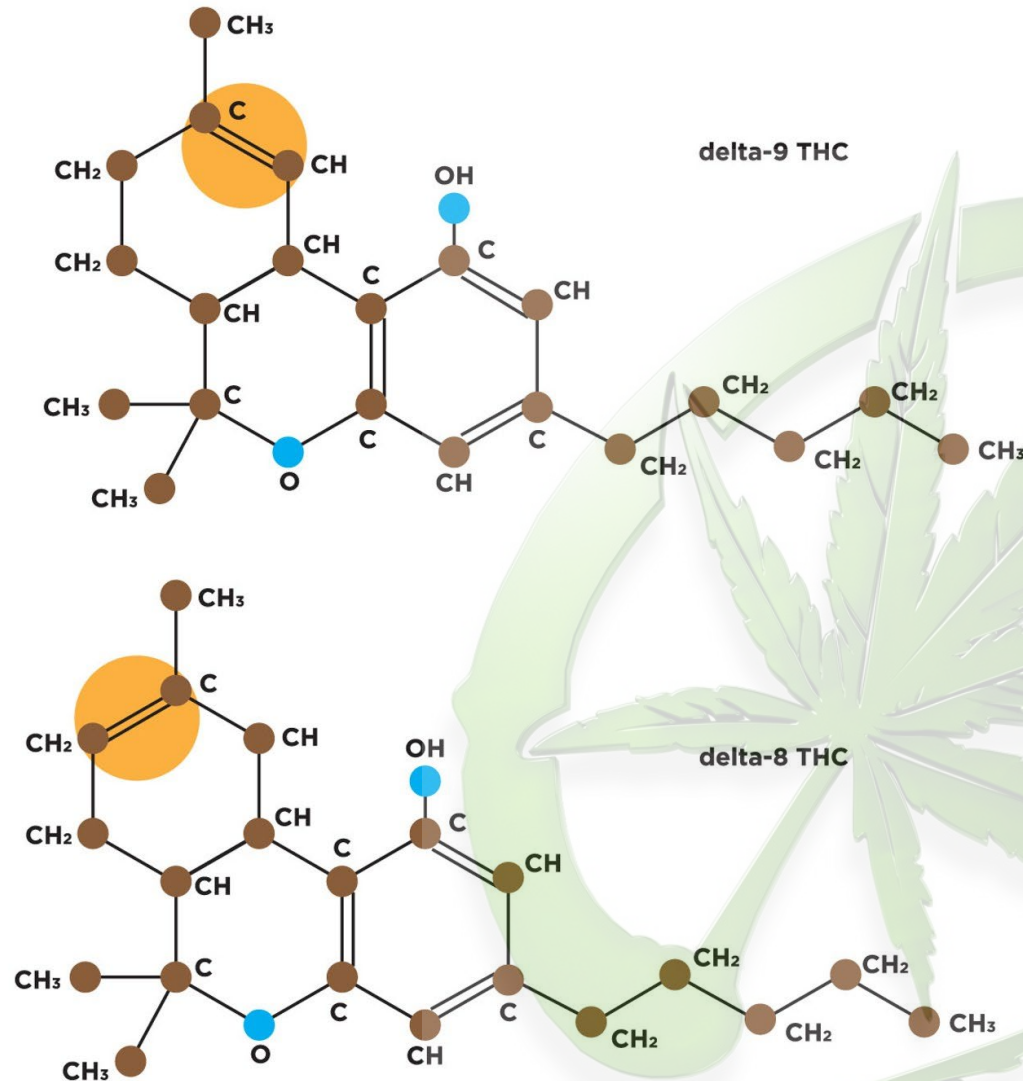


Zamarripa et al. 2023

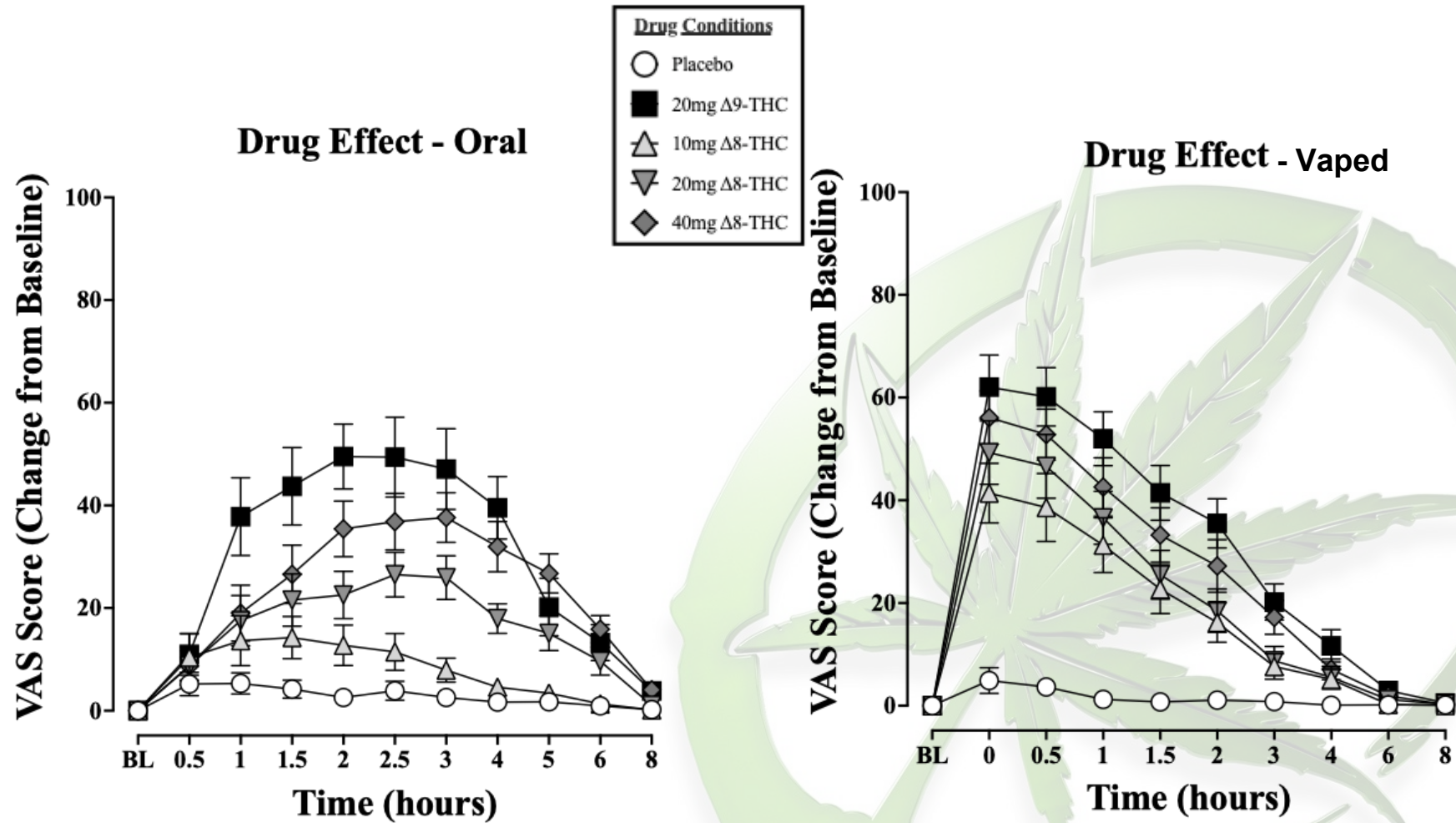
Other Cannabinoids



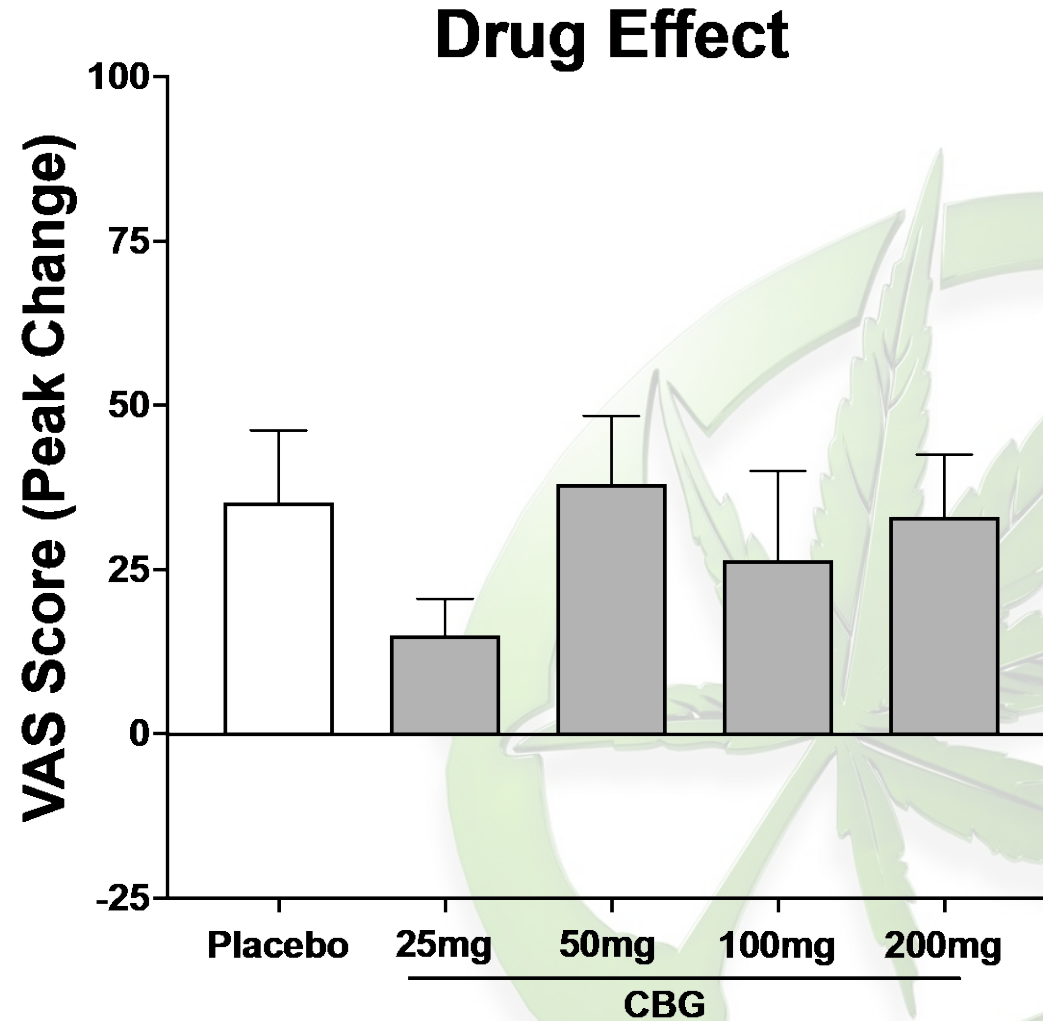
Delta-8-THC vs Delta-9-THC



Subjective Drug Effect



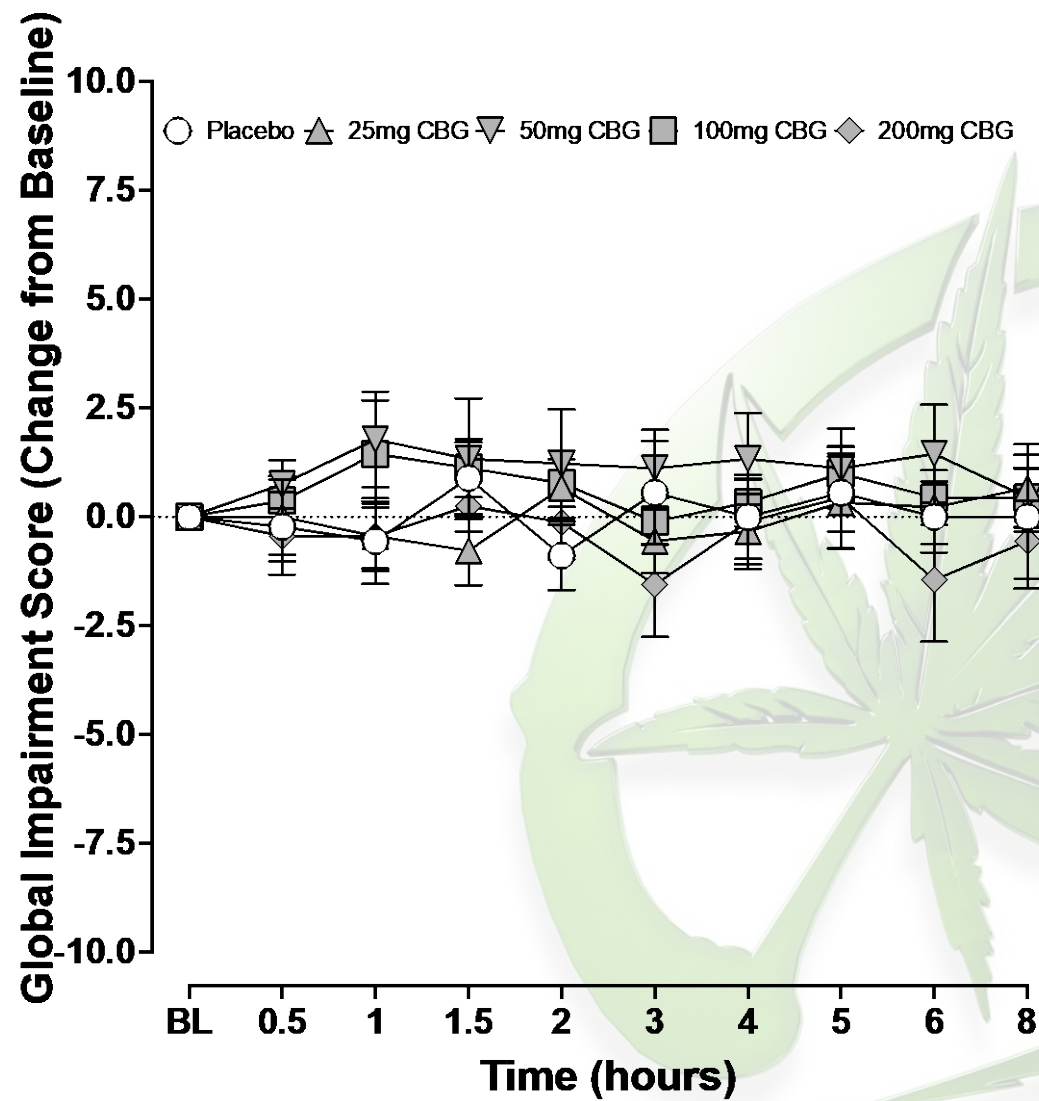
Acute Effects of CBG (N=9)



PI: Cecilia Bergeria

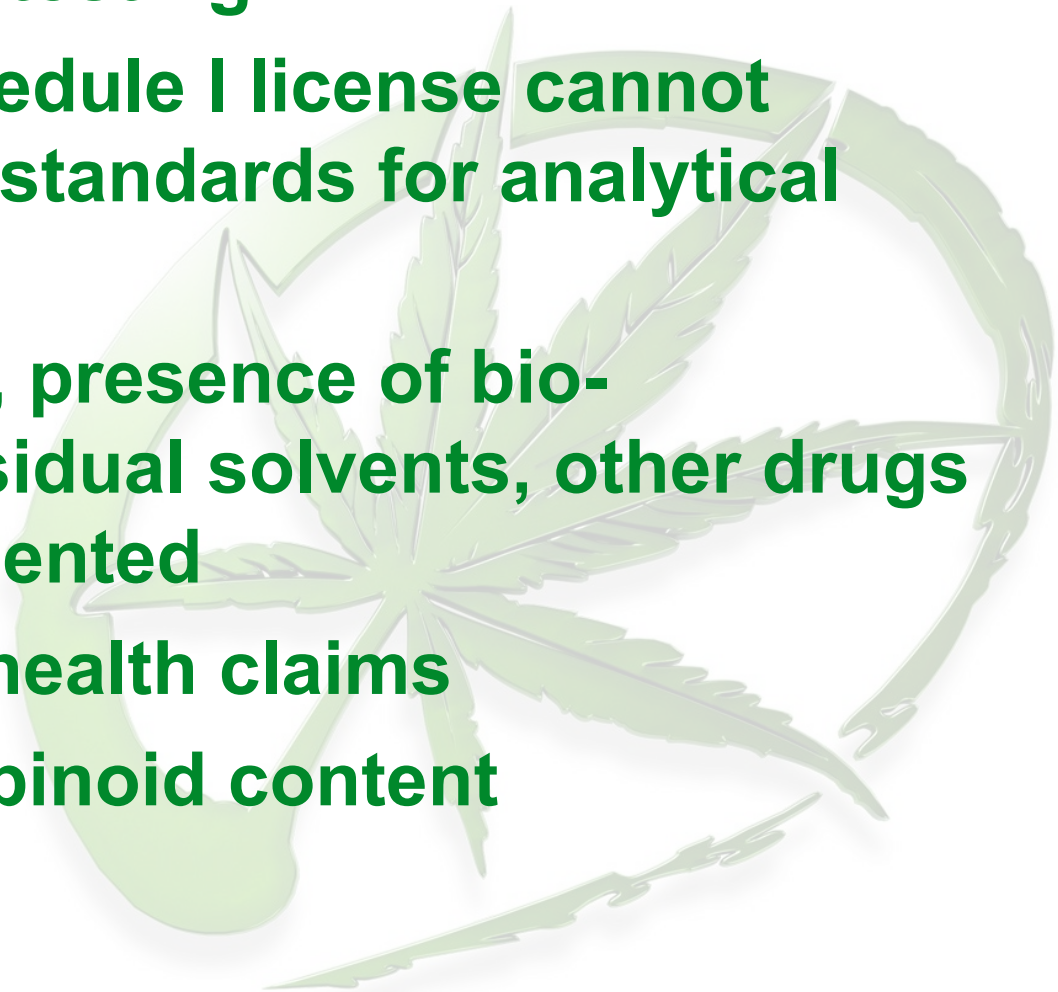
Cognitive Performance - CBG

DRUID



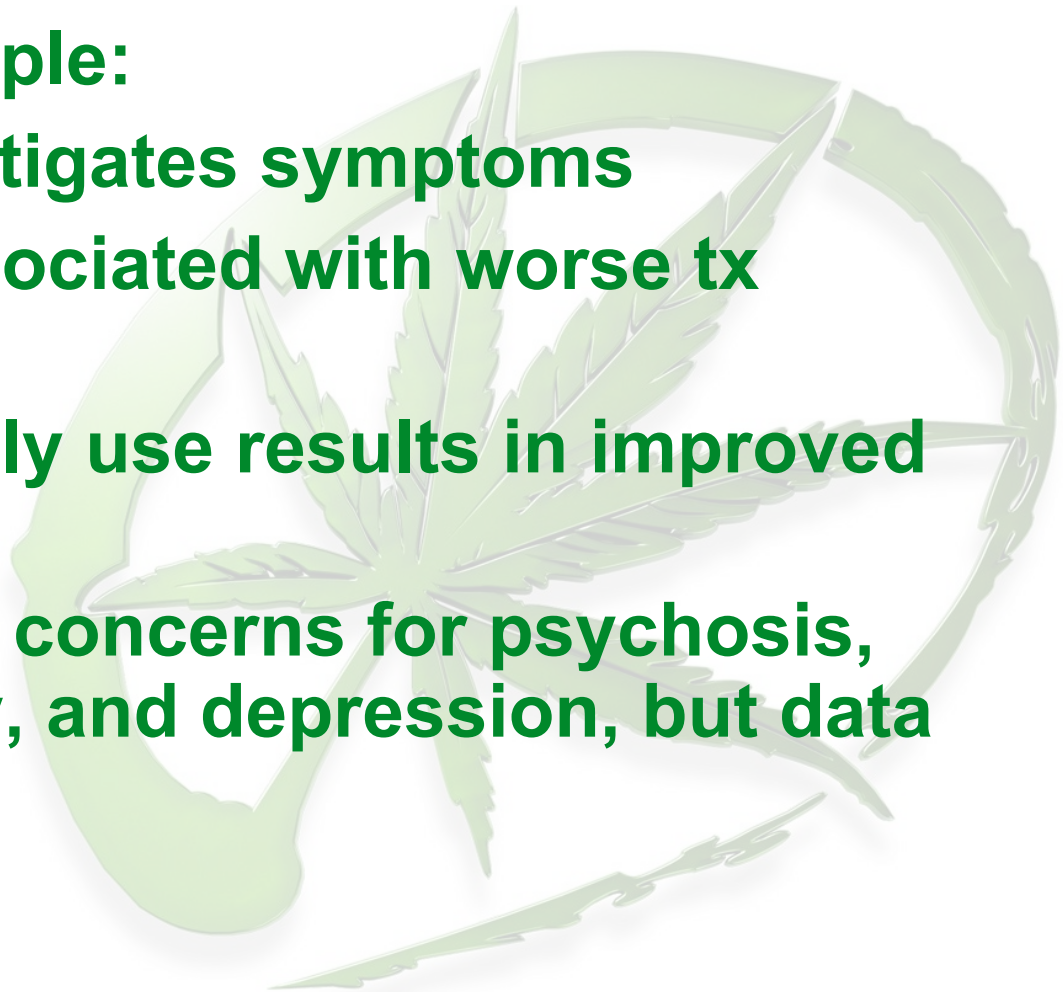
Quality Control Issues

- No industry standards for QC related to manufacturing or testing
- Labs without Schedule I license cannot access reference standards for analytical testing
- Use of pesticides, presence of bio-contaminants, residual solvents, other drugs have been documented
- Unsubstantiated health claims
- Inaccurate cannabinoid content

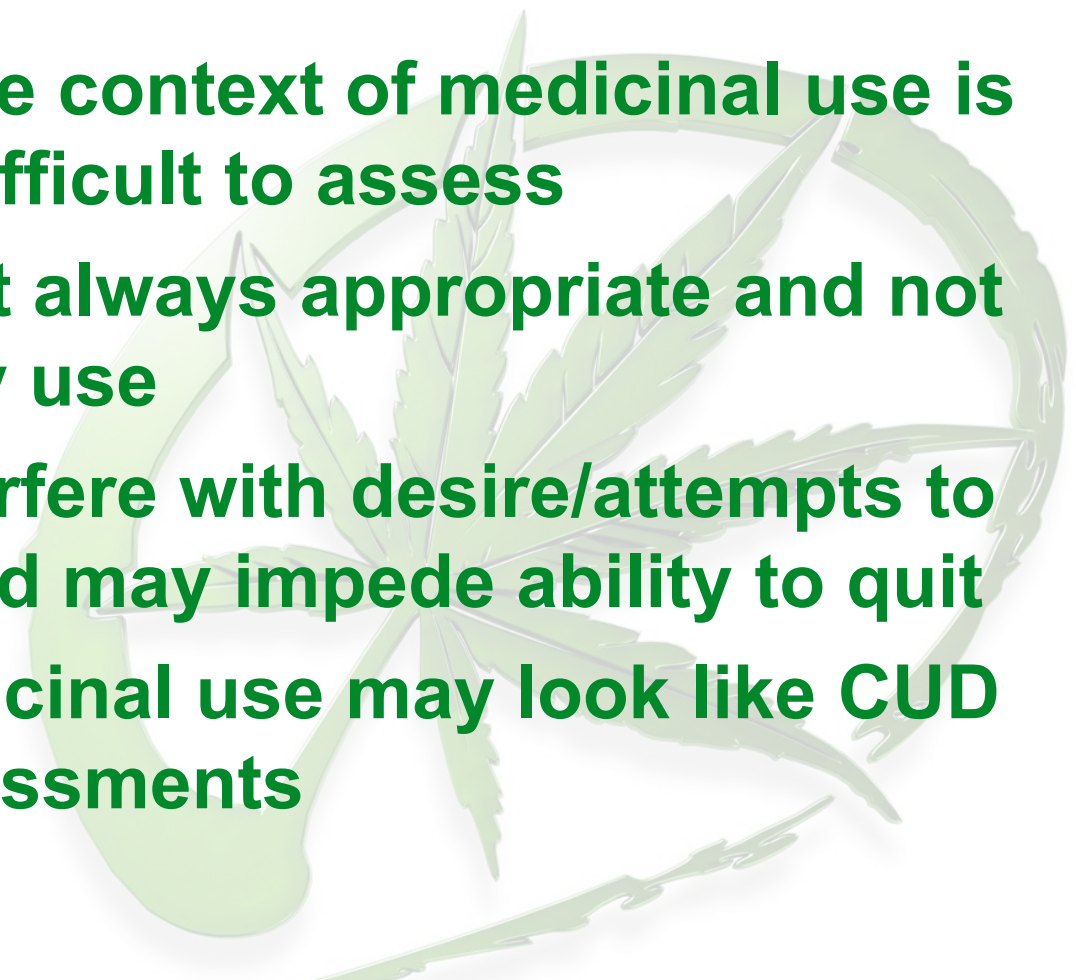


Psychiatric Risk

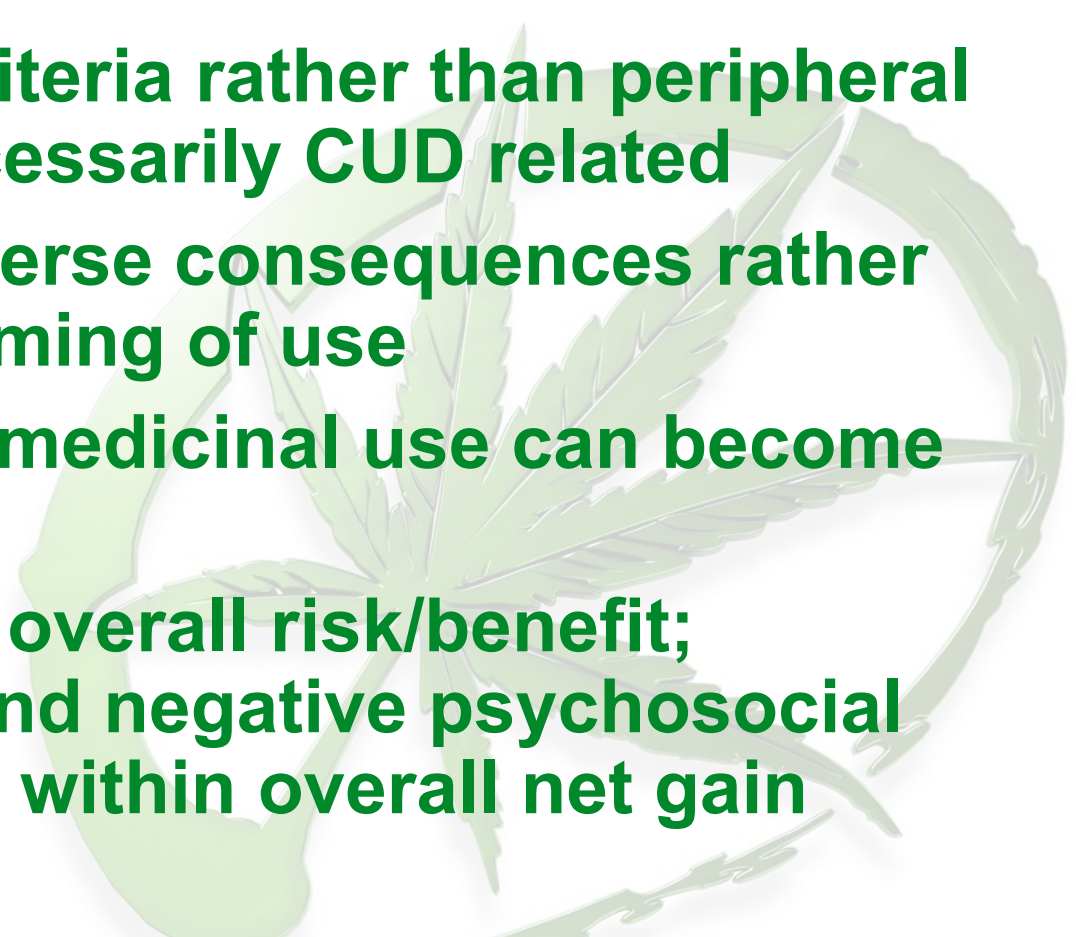
- Disentangling acute effects from long-term effects
- PTSD as an example:
 - Acutely, THC mitigates symptoms
 - Chronic use associated with worse tx outcomes
 - Cessation of daily use results in improved PTSD sx
- Similar long-term concerns for psychosis, insomnia, anxiety, and depression, but data is needed



Cannabis Use Disorder (CUD)

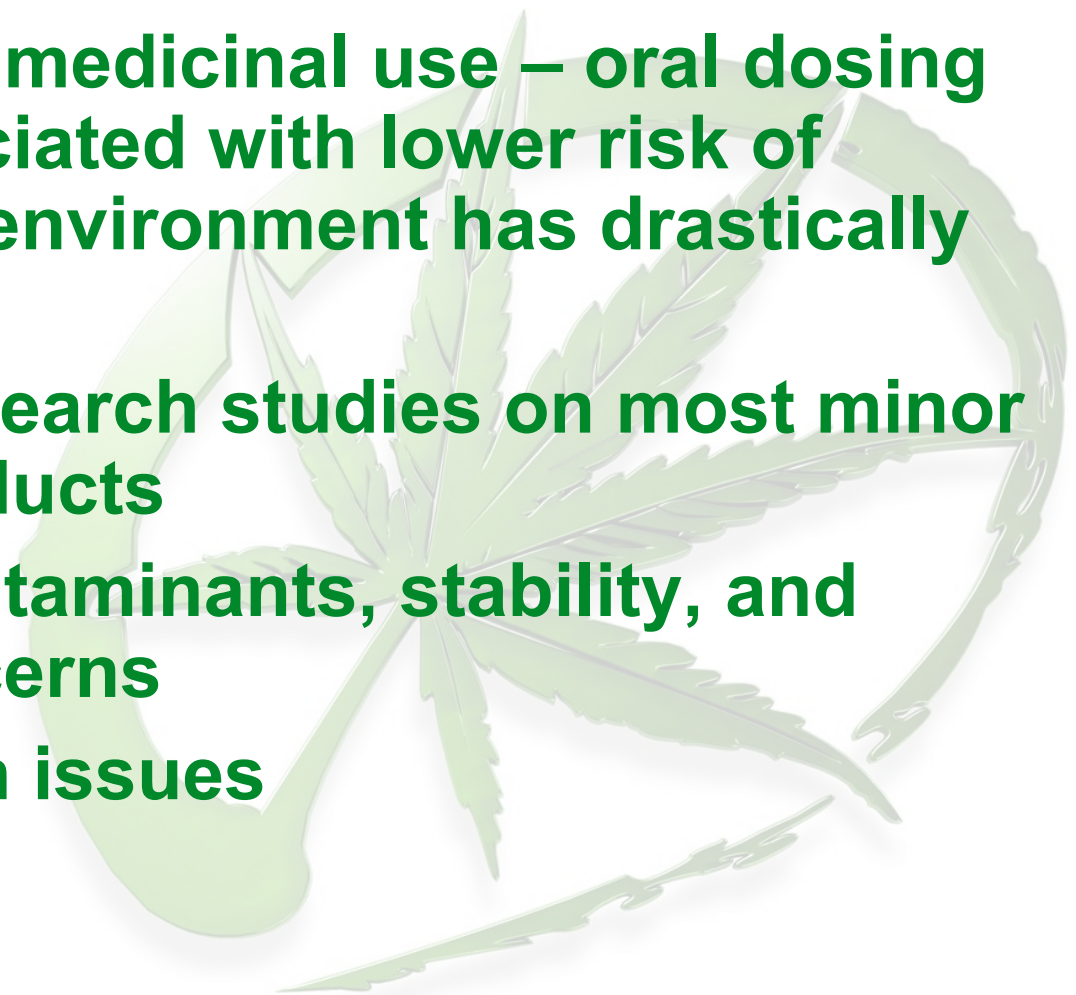
- CUD is very real, well defined, and clinically significant
 - Risk of CUD in the context of medicinal use is not known and difficult to assess
 - Medicinal use not always appropriate and not exclusive of risky use
 - Legality may interfere with desire/attempts to quit; medical need may impede ability to quit
 - Appropriate medicinal use may look like CUD with current assessments
- 
- A faint, light green background illustration featuring a cannabis leaf with serrated edges and a circular arrow that loops around the leaf, suggesting a cycle or process.

Identifying Problematic Use

- Dichotomization on medicinal use versus non-medicinal use seems uninformative
 - Focus on DSM criteria rather than peripheral concerns not necessarily CUD related
 - Emphasis on adverse consequences rather than frequency/timing of use
 - Recognition that medicinal use can become problematic
 - Must account for overall risk/benefit; adverse effects and negative psychosocial impact can occur within overall net gain
- 
- A faint, light green background image featuring a cannabis leaf with serrated edges and a circular arrow or ring-like shape surrounding it, positioned behind the list of bullet points.

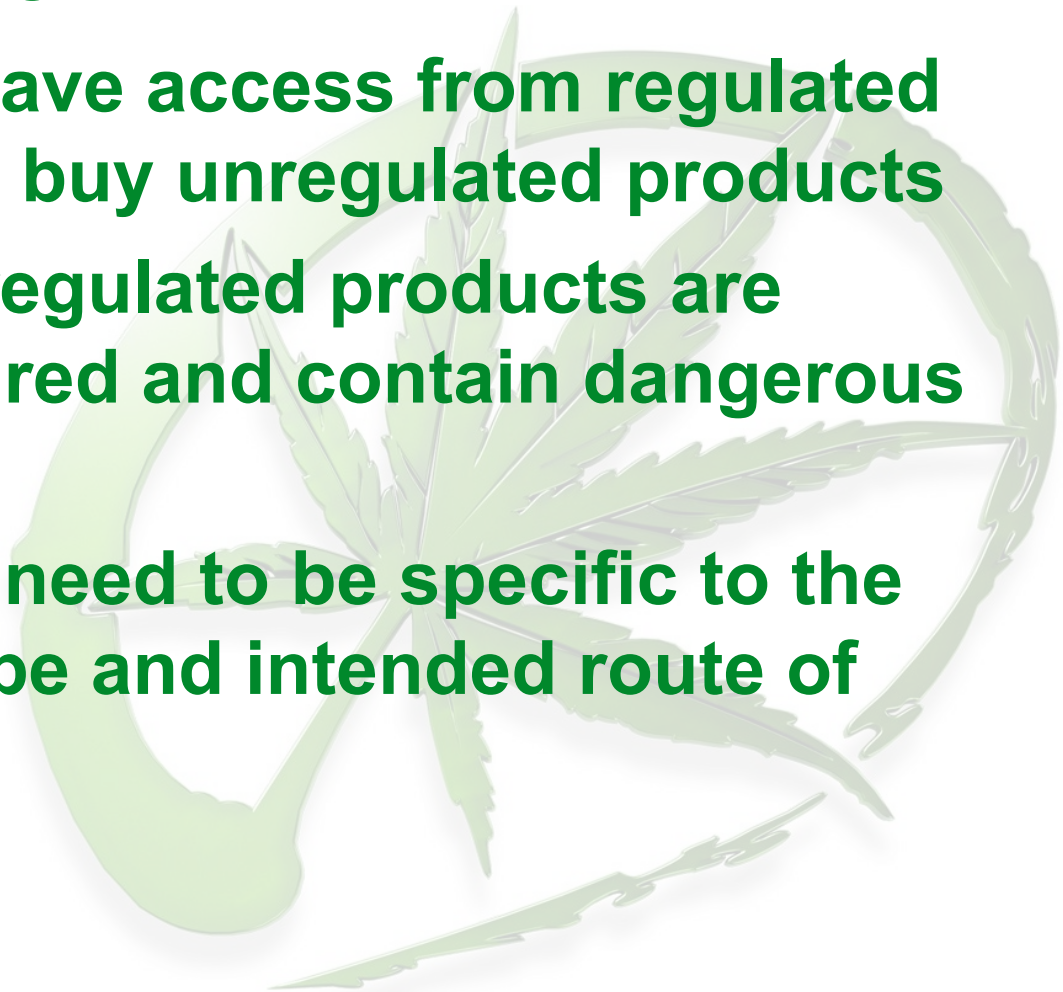
Where Science is Lacking

- Target doses for many therapeutic applications
- Abuse liability of medicinal use – oral dosing historically associated with lower risk of abuse, but retail environment has drastically changed
- No controlled research studies on most minor cannabinoid products
- Little data on contaminants, stability, and other safety concerns
- Pulmonary health issues



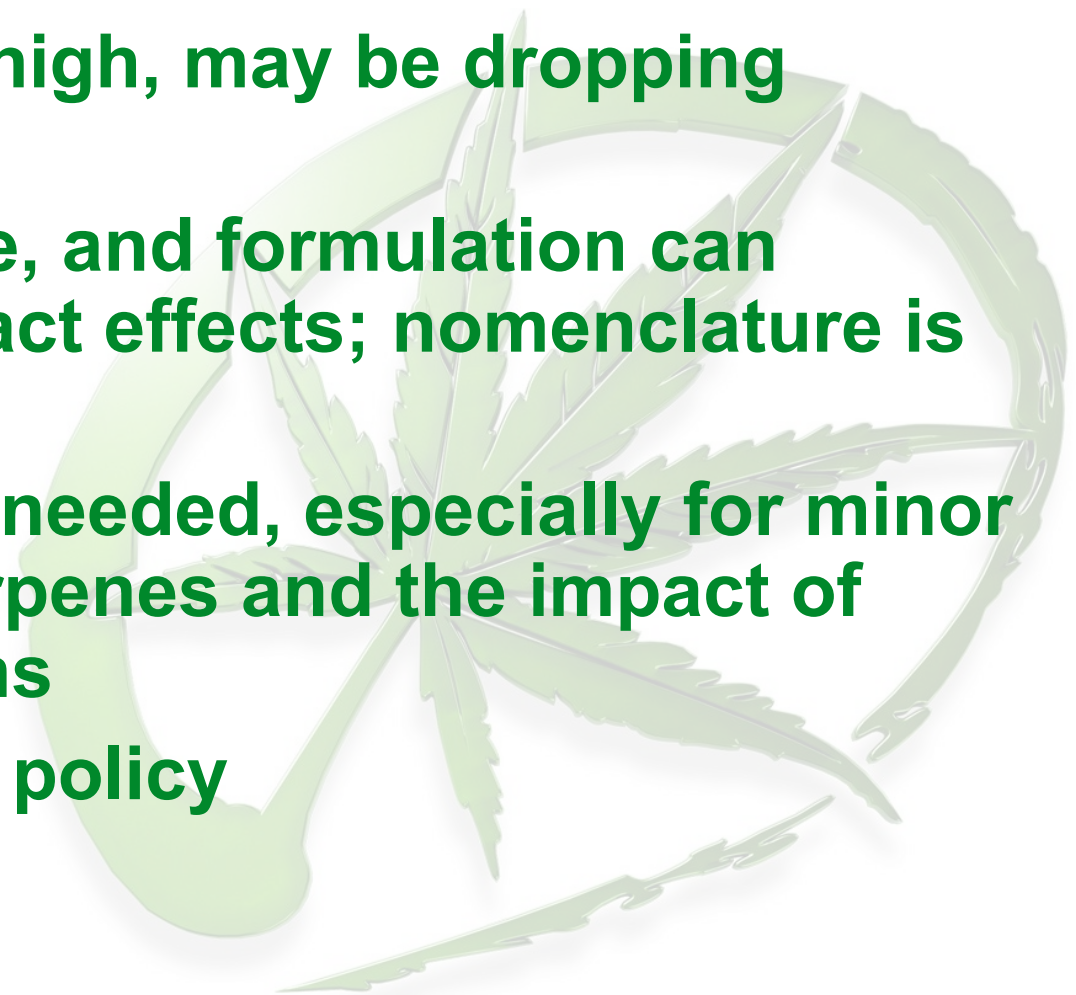
Relation to Policy

- Recommend a shift in regulation to be based on product type/risk
- If patients don't have access from regulated sources, they will buy unregulated products
- Studies show unregulated products are poorly manufactured and contain dangerous contaminants
- Dose constraints need to be specific to the product chemotype and intended route of admin



Summary

- Cannabis is chemically complex and has potential for both health benefit and harm
- Rates of use are high, may be dropping among youth
- Chemotype, route, and formulation can significantly impact effects; nomenclature is important
- More research is needed, especially for minor cannabinoids, terpenes and the impact of novel formulations
- Let science drive policy



Thanks!!



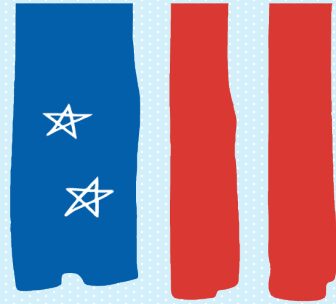
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<https://cannabisandhealth.org>



**Cannabis & Health
Research Initiative**



Partnership for a Drug-Free New Jersey

In Cooperation with the Governor's Council on Substance Use Disorder and the NJ Dept. of Human Services

Marijuana Toolkit

www.drugfreenj.org/marijuanatoolkit

Password: PDFNJ2025



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