Medical Cannabis: State of the Evidence

Bethany Shorey Fennell, PhD,
Department of Family & Community Medicine

Shanna Babalonis, PhD,
Department of Behavioral Science
University of Kentucky

DISCLOSURES & ACKNOWLEDGEMENTS

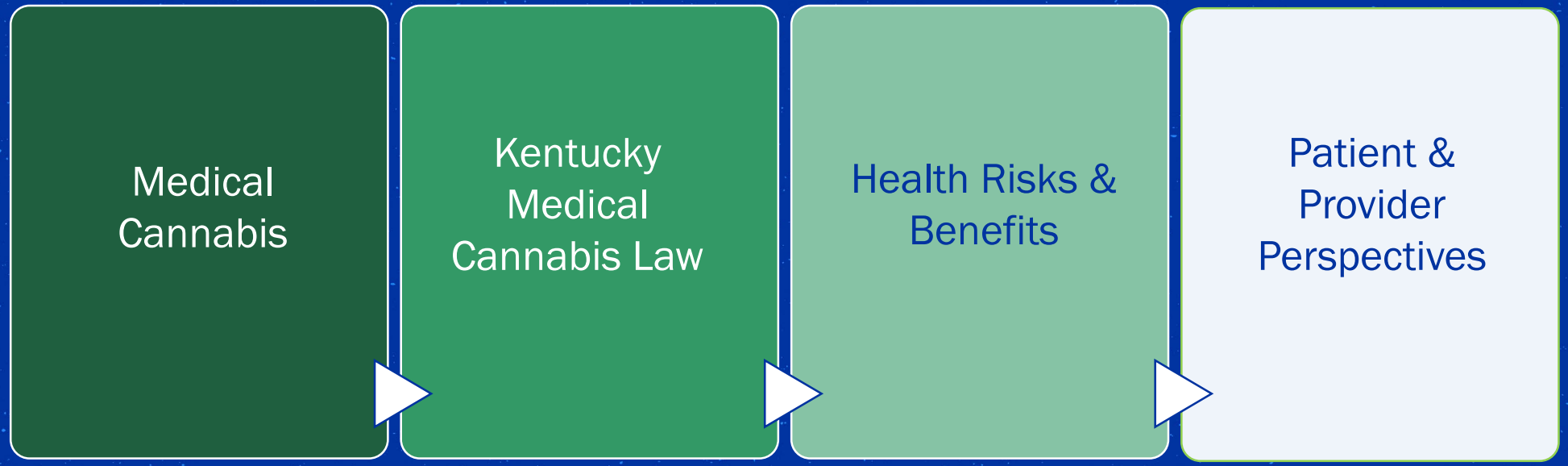
Acknowledgements: Dr. Shanna Babalonis

None of the authors have received industry funding and no off-label medications are discussed

This is a complicated topic! I’m not giving medical advice.

BACKGROUND

OUTLINE

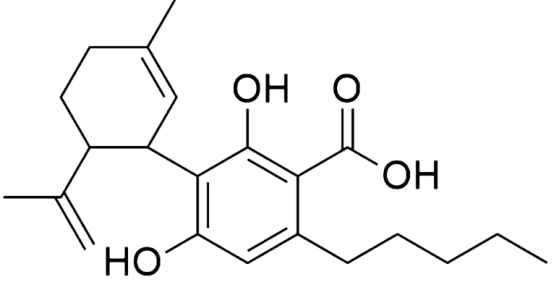

Medical Cannabis
Kentucky Medical Cannabis Law
Health Risks & Benefits
Patient & Provider Perspectives

WHAT IS CANNABIS?

Cannabis Sativa plant

Approx. 500 naturally occurring phytochemicals in the cannabis plant

Chemicals unique to the cannabis plant are called cannabinoids



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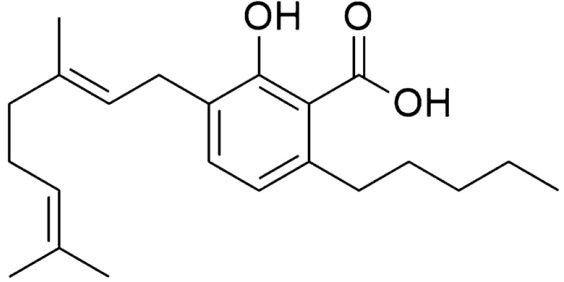

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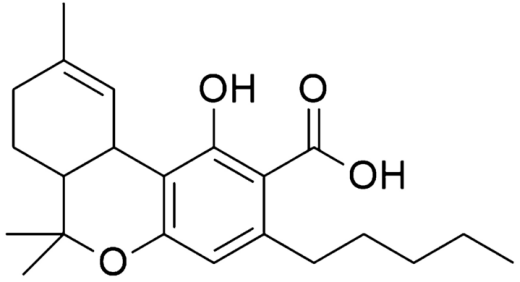
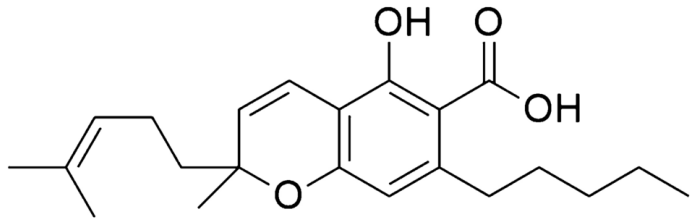


Δ^9-THCA



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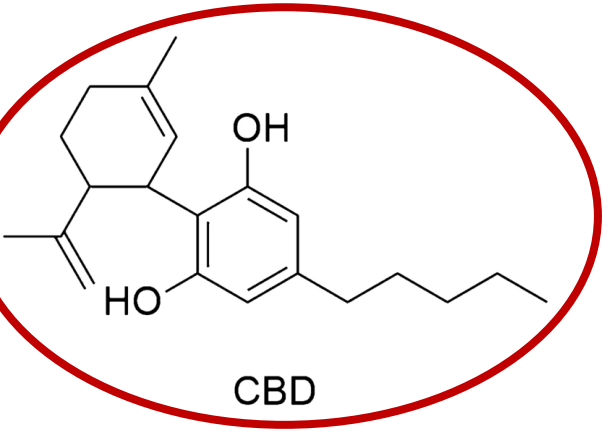

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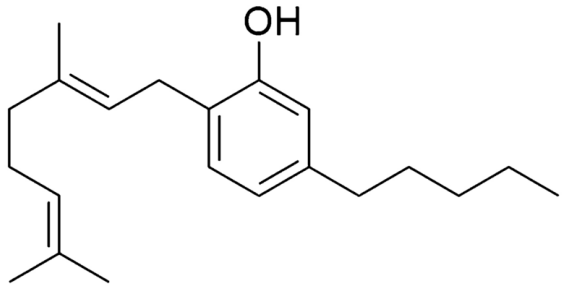

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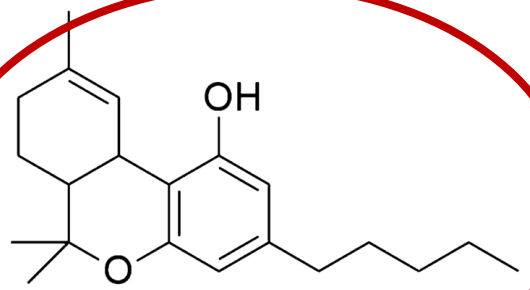
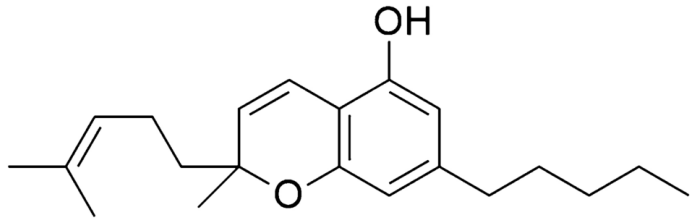


Δ^9-THC



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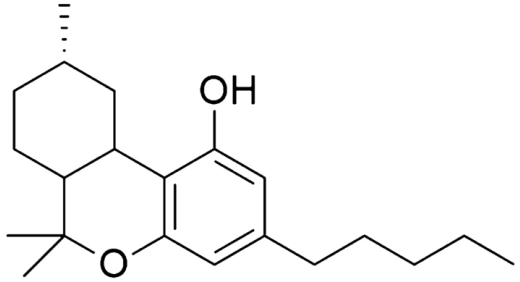
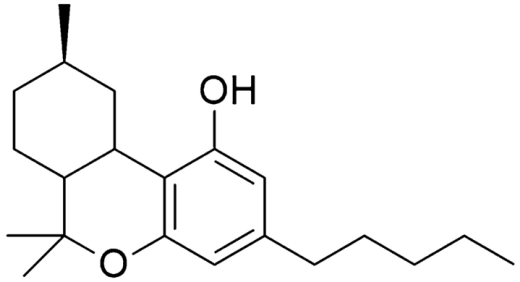
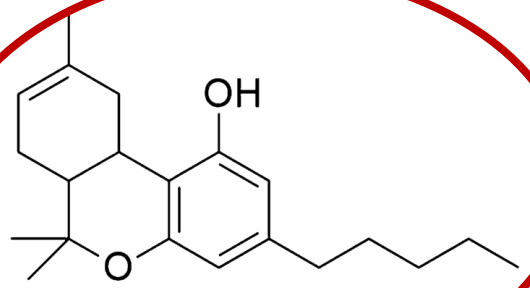


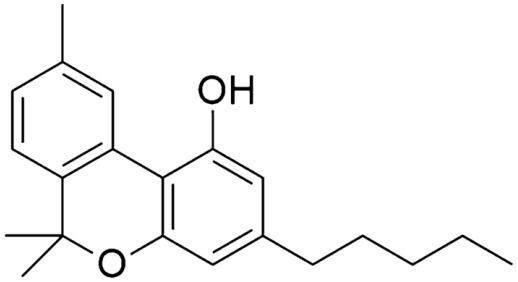
(9*S*)-HHC



(9*R*)-HHC



Δ^8-THC



CBN

Russo, F., Vandelli, M.A., Biagini, G. *et al.* Synthesis and pharmacological activity of the epimers of hexahydrocannabinol (HHC). *Sci Rep* **13**, 11061 (2023). https://doi.org/10.1038/s41598-023-38188-5

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Hemp

Primarily nondrug use

< 0.3% Δ-9 THC

Also called:

Industrial hemp

Cannabis

Primarily for psychoactive or medicinal effects

> 0.3% Δ-9 THC

Also called:

Marijuana	Hash
Weed	Herb
Pot	Bud
Grass	Mary Jane

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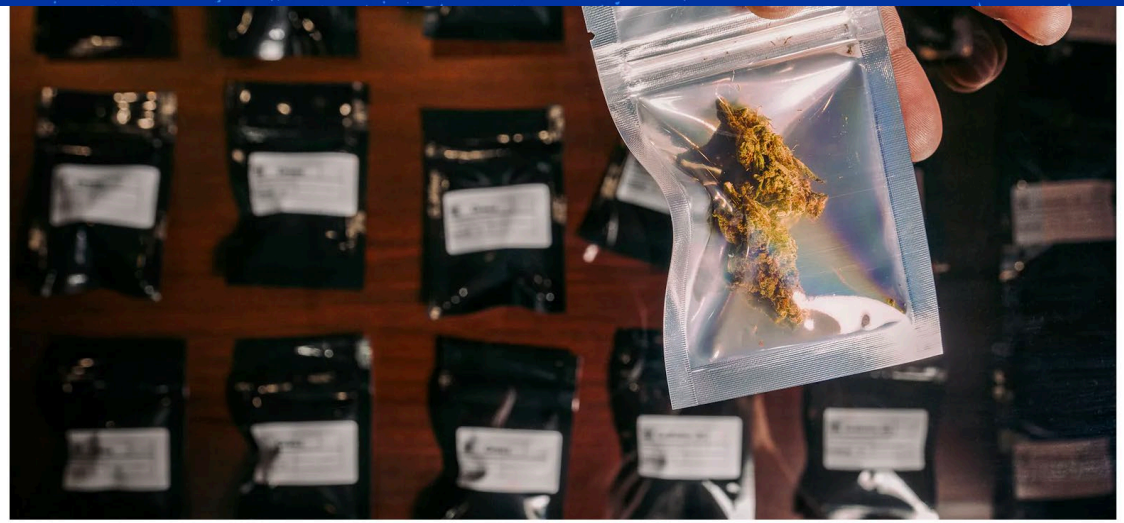
Primarily because you can get psychoactive product out of hemp



An assortment of premium hemp flower for sale at Green Haven Cannabis Co., in San Antonio, on June 21, 2024.

Photograph by JoMando Cruz

POLITICS & POLICY

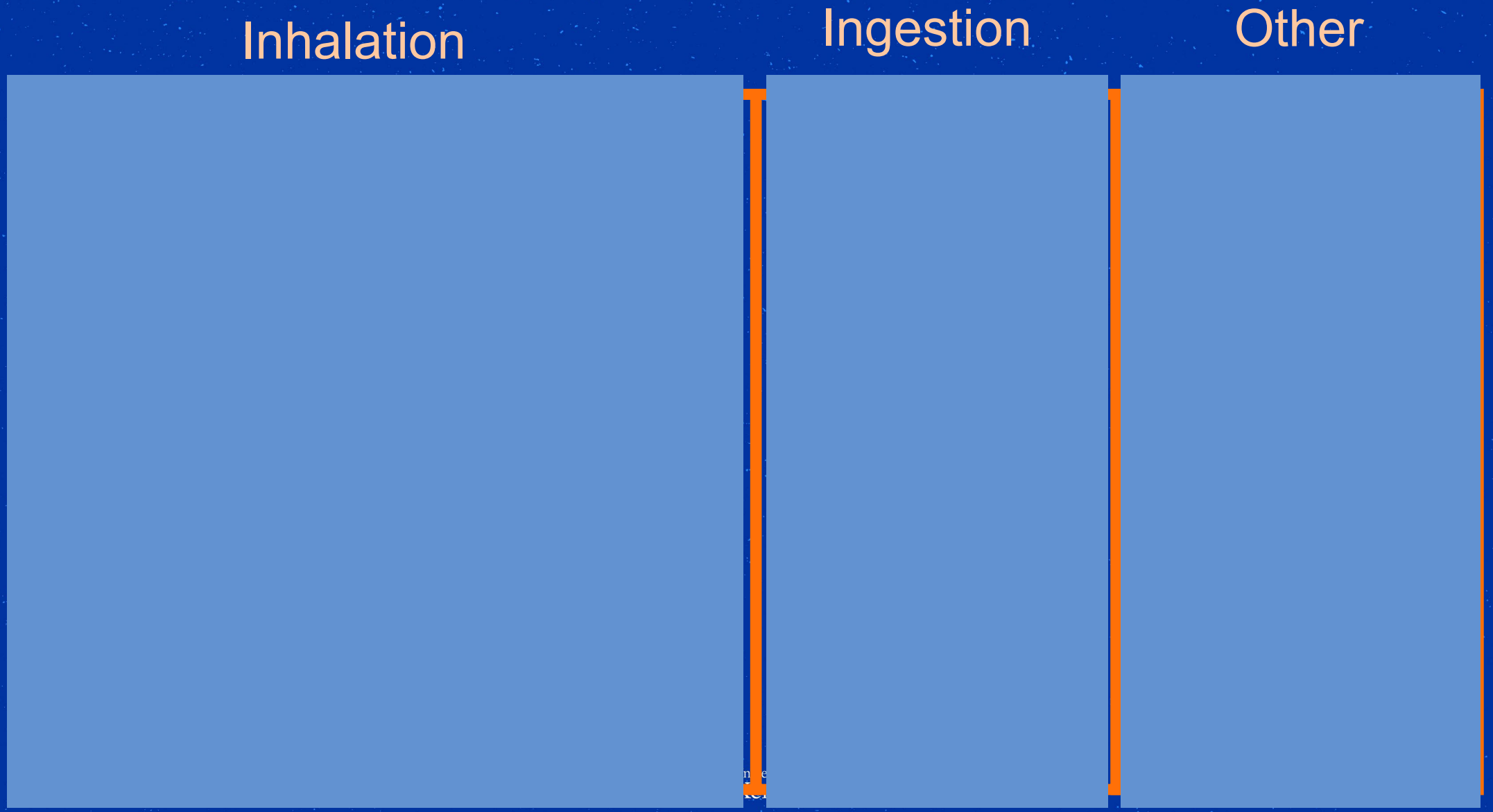
Texas Has Basically Legalized Marijuana. We Have the Proof.

Testing of smokable hemp at eight dispensaries around the state found that all were selling cannabis with potent levels of the psychoactive compound THC.

By Russell Gold

CANNABIS BUD: CLOSE-UP VIEW

ROUTES OF CANNABIS ADMINISTRATION



WHAT IS MEDICAL CANNABIS?

The use of cannabis or cannabis products for a medical condition

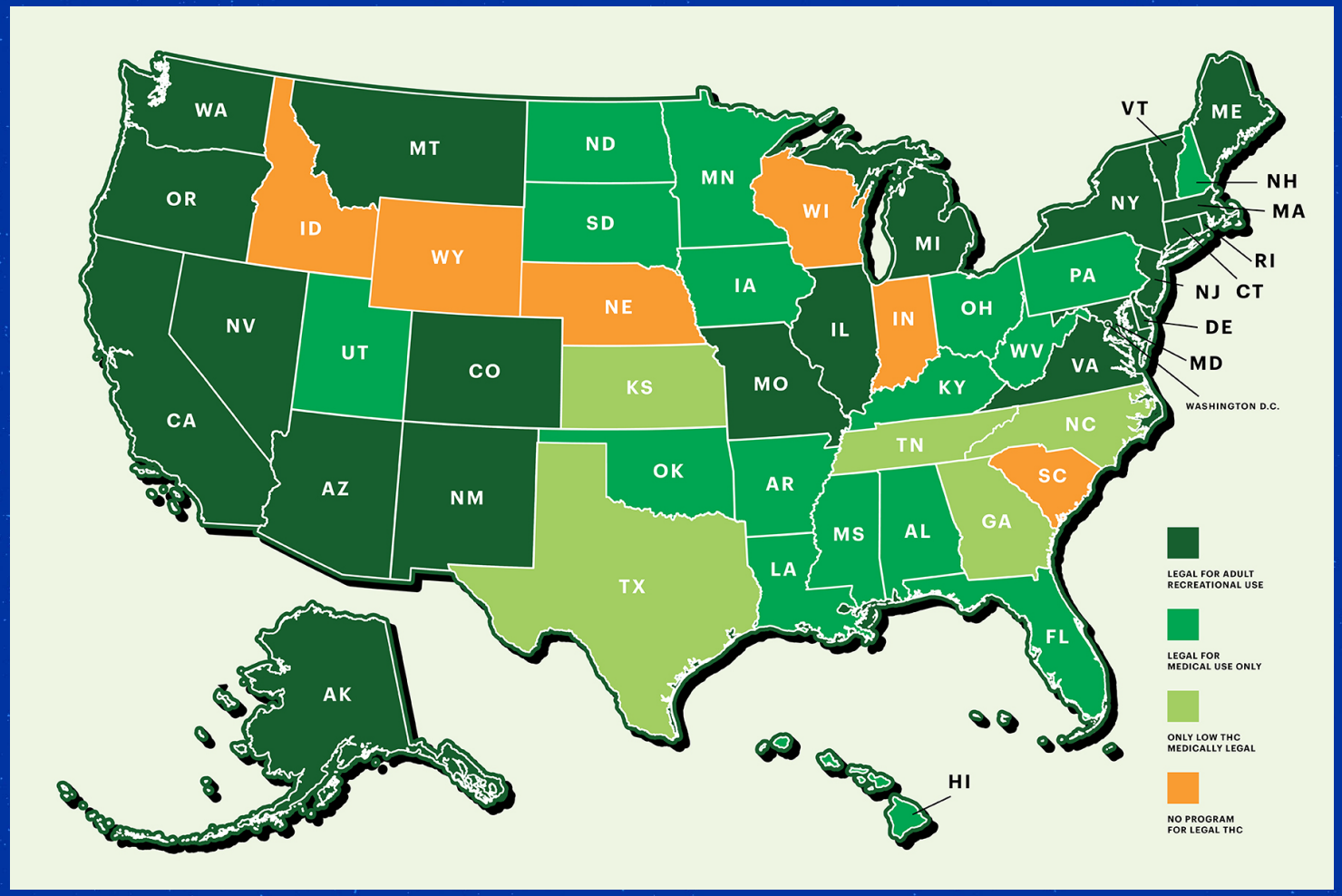
- Not about the product, it's about the reasons for use
- Does not refer to Rx use of FDA-approved products (Marinol/Dronabinol, Cesmaet/Nabilone, Epidiolex/Cannabidiol)

CANNABIS POLICY

Cannabis is a federally illegal Schedule I drug

Medical cannabis is legal in 48 states (~75% of the population)

Adult use or recreational cannabis is legal in 24 states (~54% of the US population)



MEDICAL CANNABIS REGULATIONS

State to state differences by:

- Qualifying conditions
- Product types for medical use
- Product regulations (marketing, warnings, packaging)
- Medical professional requirements
- Laws about possession

MEDICAL REGULATION AND USE

2016 law, specific qualifying conditions

4% of Floridians (900k of 23.4 million) registered for a medical card

2018 law, no specific qualifying conditions

8% of Oklahomans (337k of 4.1 million) registered for a medical card

POLICY IMPACT ON PROVIDERS

Providers “recommend” medical cannabis to patients

- Whole plant material or dispensary products cannot be officially prescribed

State laws generally shield providers from facing legal consequences from this process

POLICY IMPACT ON PATIENTS

Few protections in place for patients, vary state by state

Precarious situations: transporting medication, flying on airplanes, workplace impairment or drug testing laws, child custody laws, driving laws, etc.

Dispensary products are not FDA-approved, labels are often inaccurate

Products sometimes contain contaminants (heavy metals, fungus, pesticides)

MEDICAL CANNABIS PRODUCTS

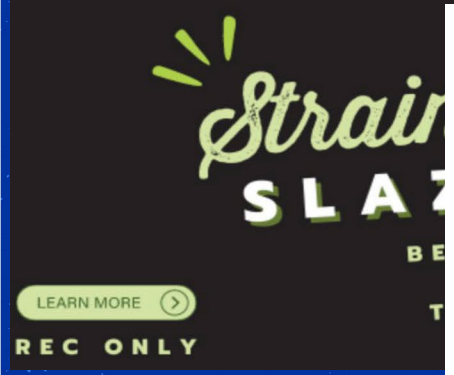
MEDICAL VS. RECREATIONAL CANNABIS

Virtually no difference in medical and recreational products in most states

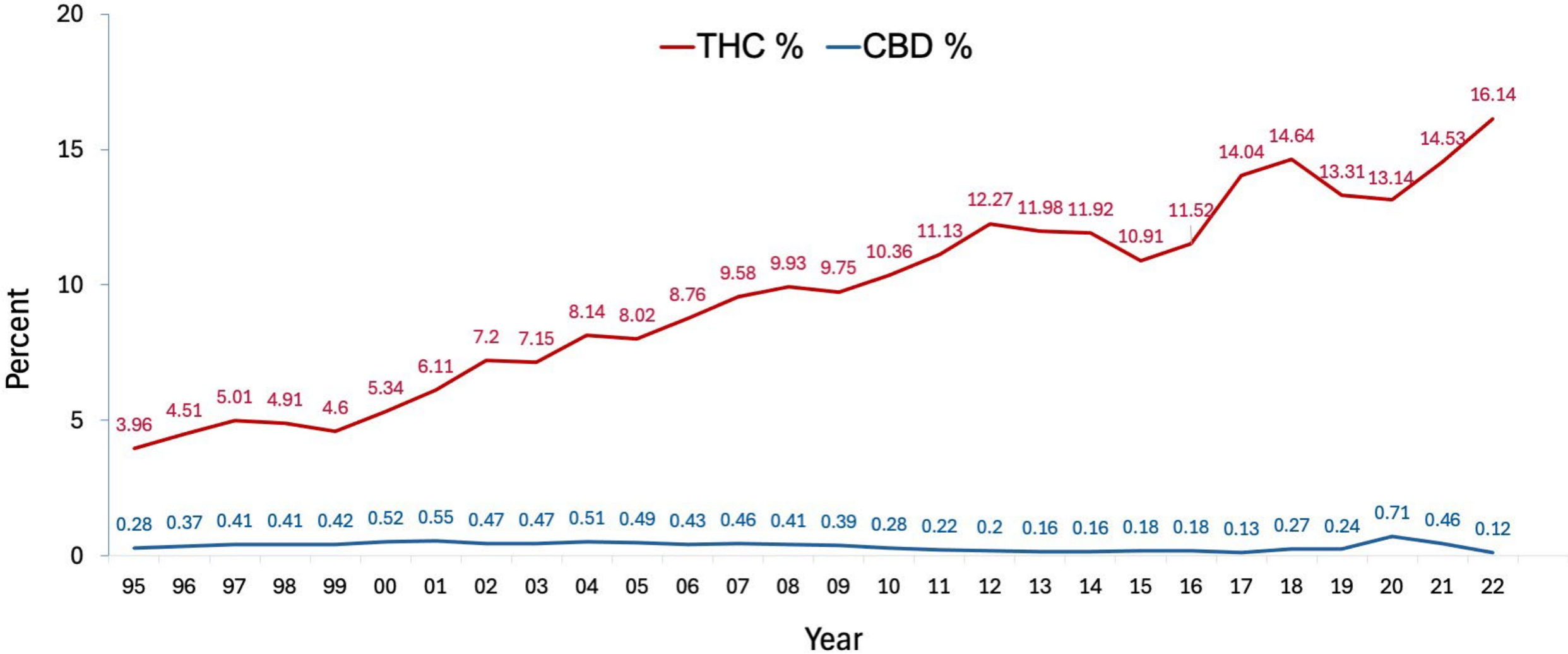
Similar THC concentrations across products

Often the same exact products (with same names, same branding)

DISPENSARY PRODUCTS



Percentage of THC and CBD in Cannabis Samples Seized by the DEA, 1995-2022



SOURCE: U Miss, Potency Monitoring Project

CANNABIS EVOLUTION

Rapid increase in the concentration of Δ-9 THC in cannabis in the US.

Differs by products

- Flower: avg 15-20%, can be as high as 35%
- Edibles: avg 10%
- Concentrates (oil, dab, shatter, wax, butter): avg 60-90%

Sometimes only high THC cannabis is available for medical users who might want to start at a lower level

MEDICAL CANNABIS IN KENTUCKY

MEDICAL CANNABIS IN KENTUCKY

Medical cannabis use legal in Kentucky as of January 2025

No dispensaries open yet – anticipated summer, late 2025

Nearby states do not allow KY residents medical dispensary access (West Virginia: exception for terminally ill cancer patients, Michigan under some conditions)

Neighboring states with fully legal adult/recreational use: Illinois, Ohio, Virginia, Missouri, Michigan

KENTUCKY: QUALIFYING CONDITIONS

1) Cancer: any type or form of cancer, regardless of stage

2) Pain: chronic, severe, intractable or debilitating pain

3) Seizure disorder: epilepsy or any other intractable seizure disorder

4) Muscle spasticity: multiple sclerosis, muscle spasms or spasticity

5) Nausea/vomiting: chronic nausea or cyclical vomiting syndrome resistant to other medical treatment

6) Post traumatic stress disorder

CONSIDERATIONS FOR KY PATIENTS

Costs can be high for patients:

1) Cost of state card is low ($25)
2) Initial visit with provider required to be in-person - not covered by insurance
3) Home cultivation not allowed (aka “grow your own”)
4) Cash only to purchase products at a dispensary

Kentucky will sell cannabis plant material, but indicates that it is illegal to smoke

KY PATIENTS: LEGAL HISTORY

If an individual has been convicted of a disqualifying felony offense, they cannot:

1) obtain a medical cannabis card
2) work for a medical cannabis business

This includes an individual:

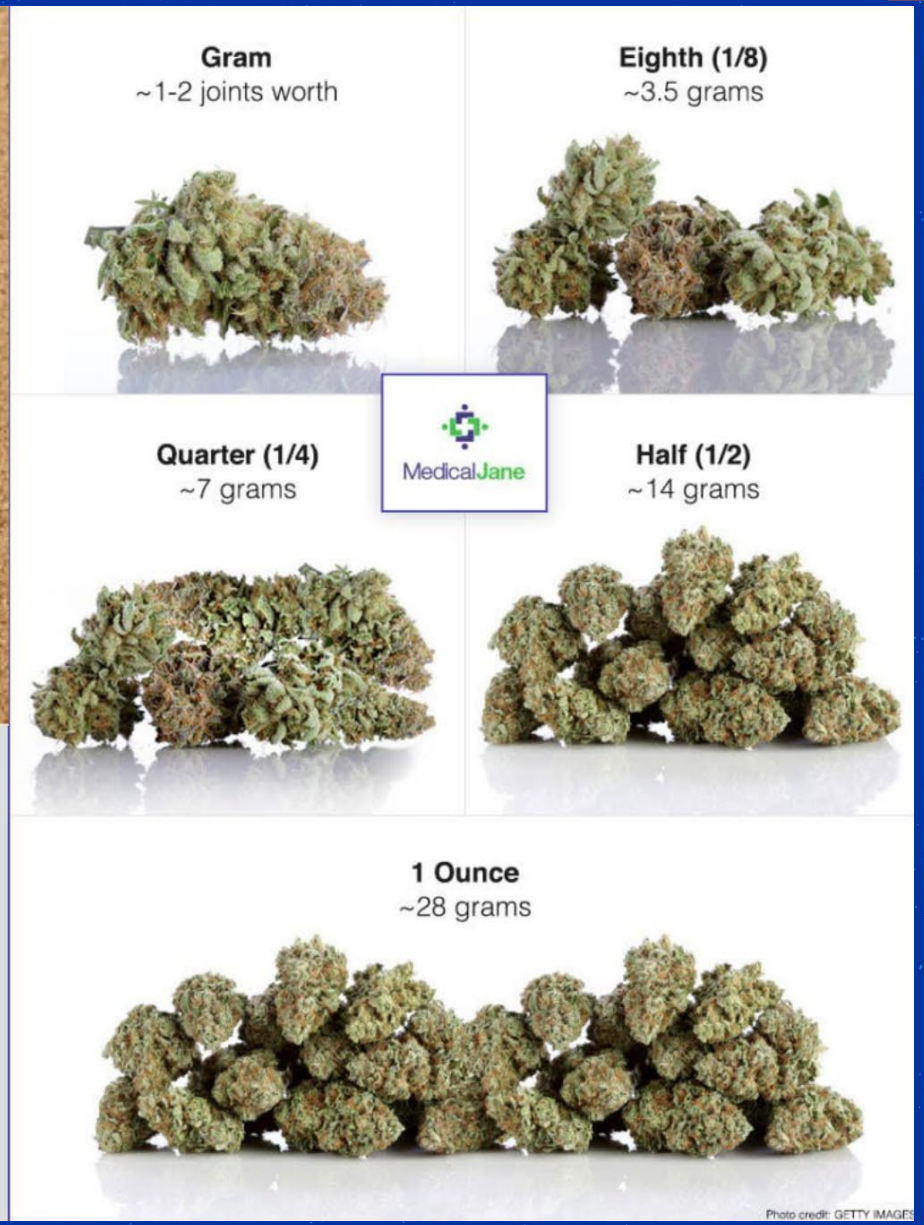
1) classified by DOC as a violent offender
2) convicted of a drug/substance felony

- Exemptions exist (ex: sentence/legal obligations completion >5 yrs ago)

KENTUCKY PURCHASING LIMITS

30-day supply:

- 112 g of plant material (4 oz)
- 28 g of concentrate (1 oz)
- 3,900 mg of THC infused in edibles



30-day limit in KY: 4 oz (or 112 g)

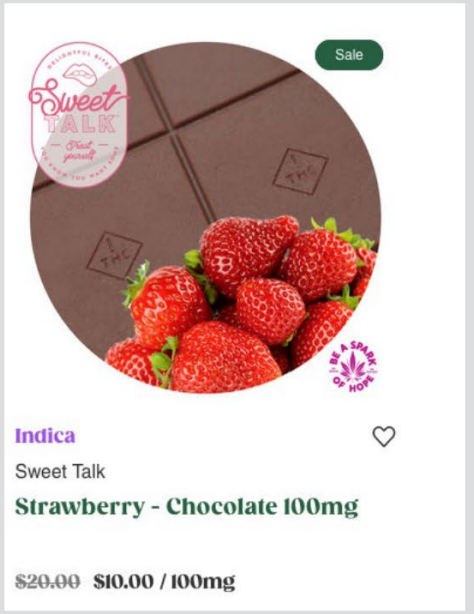
(112 moderate sized joints)

DAB CHART

Dab Size	THC Per Dose (assuming 80% THC Concentrate)	Effects
Smaller Dose (0.025 - 0.05 grams)	20 - 40 mg of THC	Expect a mild high with subtle effects lasting 1-3 hours.
Increased Dose (0.05 - 0.1 grams)	40 - 80 mg of THC	Expect a more pronounced high with more noticeable effects lasting 1-3 hours.
Moving up the Ladder (0.1 - 0.2 grams)	80 - 160 mg of THC	Expect a strong high, with more noticeable effects lasting 1-3 hours.
Big Dab (0.2 - 0.4 grams)	160 - 320 mg of THC	Expect a more intense high paired with a prolonged experience lasting 3-4 hours.
Heavy Hitter (0.5 - 1 gram)	400 - 800 mg of THC	Expect an extremely potent high, with effects lasting up to or more than 5 hours.

30-day limit in KY: 1 oz (or 28 g)

(280 moderate-sized dabs)

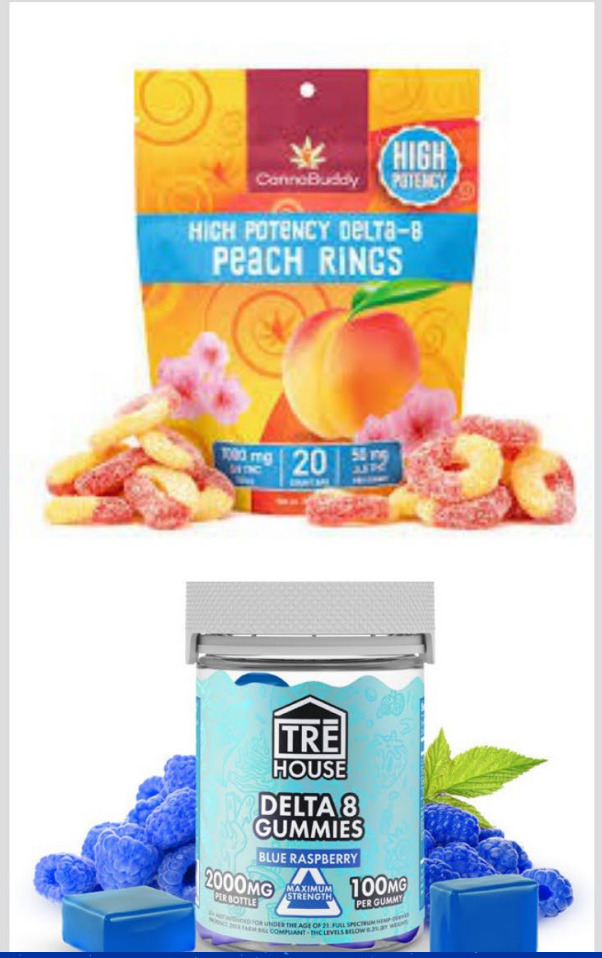


30-day limit in KY: 3,900 mg of THC

(390 servings of 10 mg THC)

(156 servings of 25 mg THC)

KY: LEGAL OVER THE COUNTER



DELTA-9 THC:

5 mg THC per 12 oz. beverage

21 yrs+

(allowing all doses through end of May)

DELTA-8 THC:

No known limit

All edibles, vapes, drinks, products permitted

21 yrs+

CBD:

Often contains THC – not indicated on label

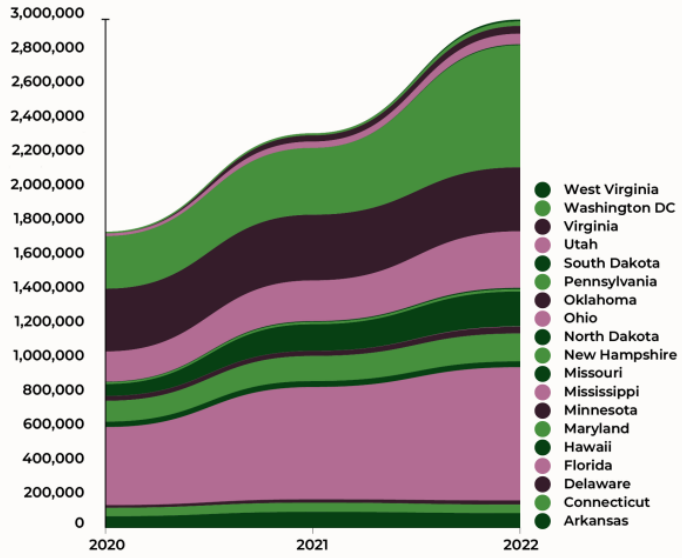
DELTA-8 THC & MORE

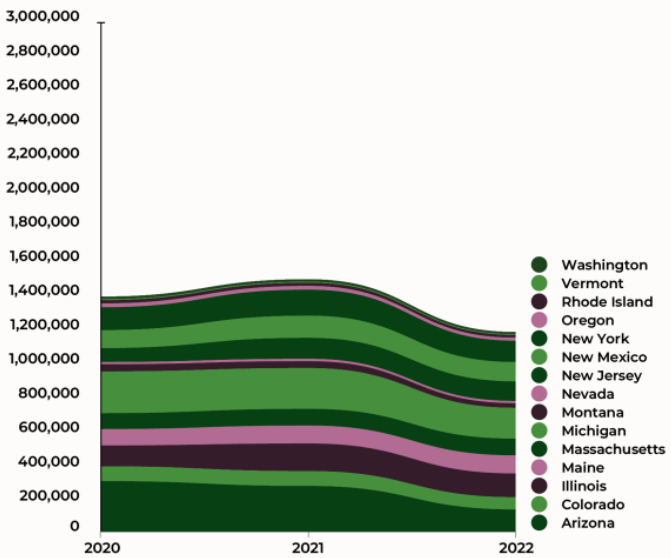
- Prevalent
- Farm bill products
- No technical age limit
- Easy to order online & accessible in the community

WHAT CAN WE EXPECT?

Medical-Only States

In states without legal recreational cannabis that reported data during the study period, the number of registered medical users grew overall





Adult Use States

By contrast, in states with legalized recreational cannabis, the number of registered cannabis users decreased

Data visualization credits: *Data Source, "Trends in U.S. Medical Cannabis Registrations, Authorizing Clinicians, and Reasons for Use From 2020 to 2022". Annals of Internal Medicine, DOI: 10.7326/M23-28. Data Visualization Created Using RawGraphs and Adobe Illustrator. Data Visualizations by Elizabeth Palmer Jarvis, Michigan Medicine*

Cannabis Risks and Benefits

SCIENTIFIC EVIDENCE

- Why don't we have good evidence about cannabis?
    - 1937 – Federally illegal
    - 1970 – Schedule I drug

- It is extremely difficult to do high quality clinical trials on the effects of cannabis (FDA/DEA requirements)

- Science has lagged far behind public perception and consumption

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SCIENTIFIC EVIDENCE

Solmi M, et al., 2023

Balancing Risks And Benefits Of Cannabis Use: Umbrella Review of Meta-analyses of Randomised Controlled Trials and Observational Studies.

British Medical Journal

UMBRELLA REVIEW

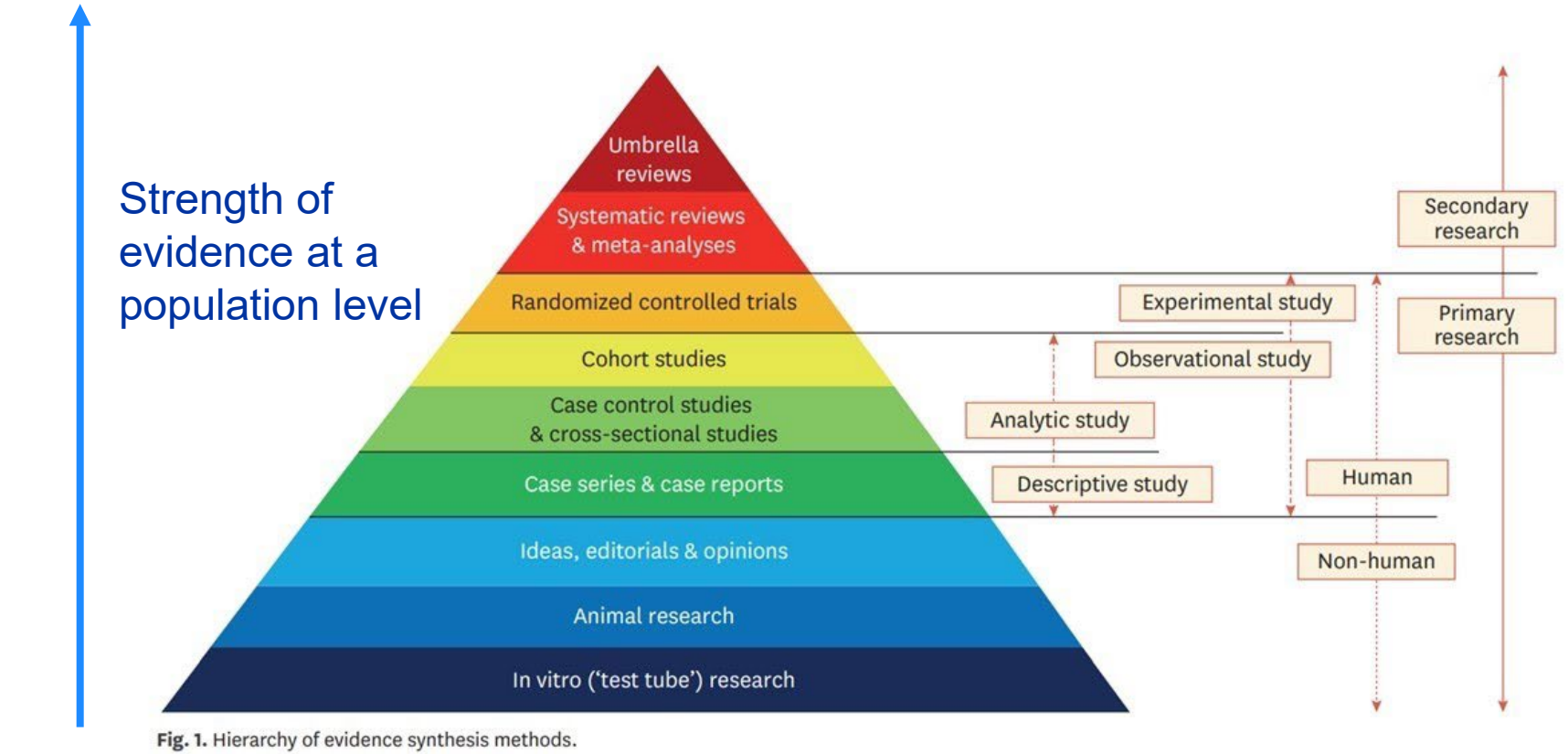


Fig. 1. Hierarchy of evidence synthesis methods.

Image from: Choi GJ, Kang H. Introduction to Umbrella Reviews as a Useful Evidence-based Practice. *J Lipid Atheroscler.* 2023 Jan;12(1):3-11.

REVIEW OBJECTIVES

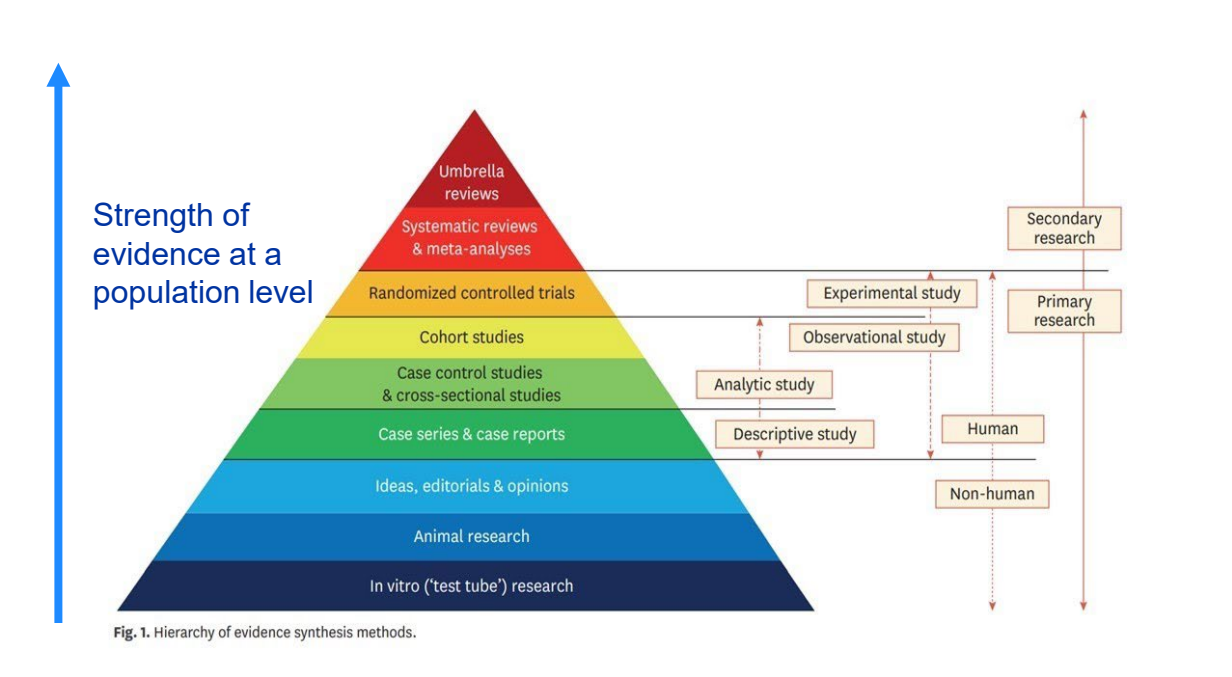
- Evaluate credibility and certainty of health outcomes linked to cannabis as of 2022 (pooled effect sizes)
  - Review both RCTs and observational studies

- Grade evidence using GRADE and AMSTAR 2 (quality of the research)

KEY METHODS

- 101 meta-analyses included:
  - 50 observational
  - 51 RCTs

- Outcomes assessed:
  - Efficacy
  - Safety
  - Adverse events



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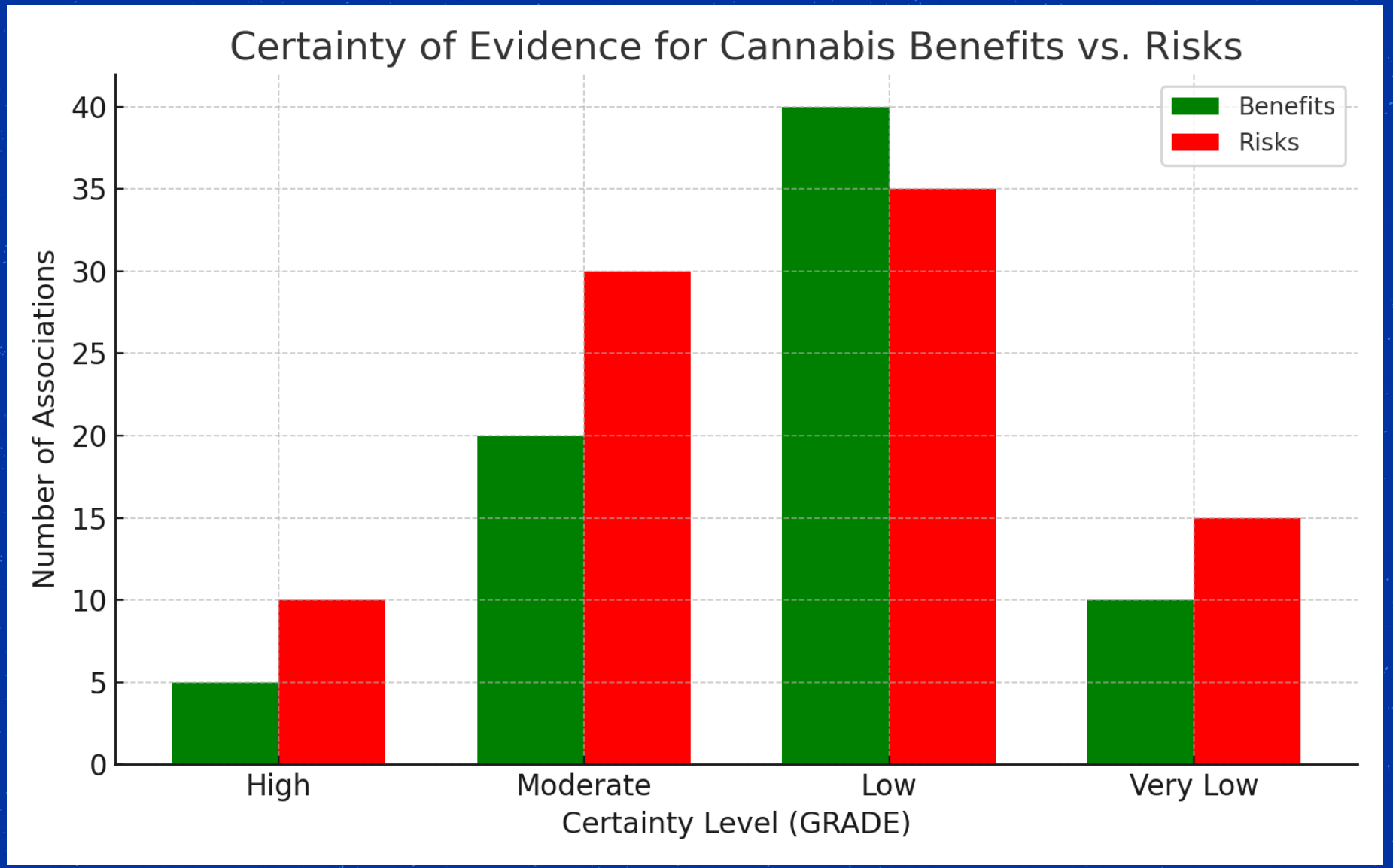

Certainty of Evidence for Cannabis Benefits vs. Risks
Benefits
Risks
Number of Associations
0
5
10
15
20
25
30
35
40
High
Moderate
Low
Very Low
Certainty Level (GRADE)

BENEFICIAL EFFECTS

(High/moderate certainty)

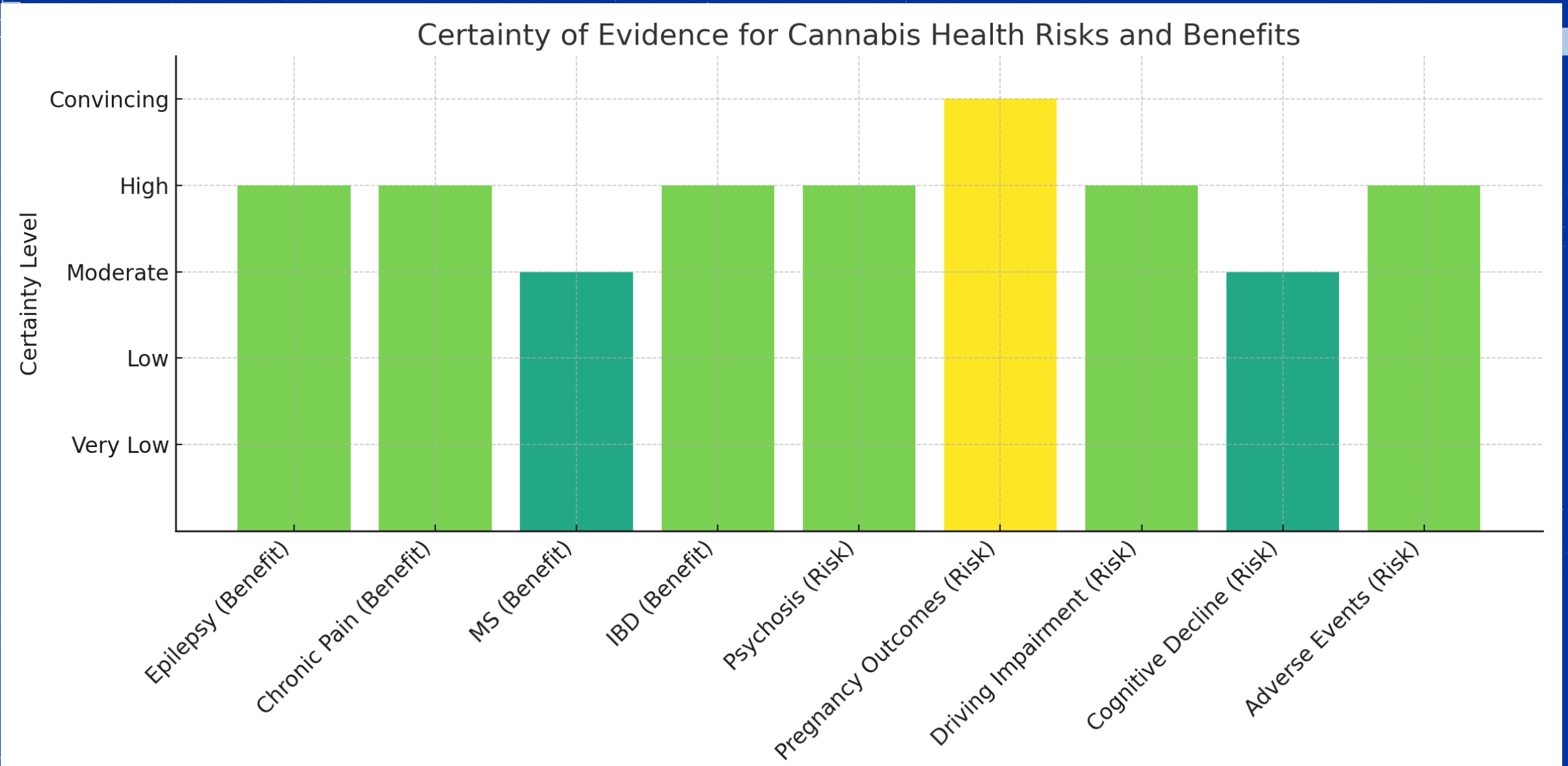
- Epilepsy (CBD): ↓ seizures (high)
- Chronic pain: 30% pain reduction (high)
- Inflammatory bowel disease: ↑ quality of life (high)
- Nausea/vomiting: ↓ symptoms (moderate)
- Multiple sclerosis: ↓ spasticity and pain (moderate)

HARMFUL EFFECTS

(High/moderate certainty)

- Pregnancy: ↑ risk of low birth weight and small for gestational age (convincing)
- Psychosis: ↑ psychotic symptoms (high)
- Driving: ↑ crash risk (high)
- Adverse events: ↑ psychological and vision-related adverse events (high)
- Cognition: ↓ cognition, learning, working memory (moderate)

- Cannabis Use Disorder (22-33% of users; Hoch, et al. 2025)


Certainty of Evidence for Cannabis Health Risks and Benefits
Certainty Level
Convincing
High
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Epilepsy (Benefit)
Chronic Pain (Benefit)
MS (Benefit)
IBD (Benefit)
Psychosis (Risk)
Pregnancy Outcomes (Risk)
Driving Impairment (Risk)
Cognitive Decline (Risk)
Adverse Events (Risk)

IMPLICATIONS

- Avoid cannabis in:
  - Adolescents
  - Pregnant women
  - Those predisposed to mental illness
  - While driving

- Evidence for many other benefits and risks remains weak or uncertain

- We need more and better quality evidence!

CONCLUSION

- Therapeutic use of cannabis requires caution

- Evidence supports specific medical uses

    Chronic pain, IBD, epilepsy, MS, nausea/vomiting/appetite stimulation (e.g., patients with HIV wasting, cancer cachexia)

- Policy and public health communications should focus on preventing or reducing known harms, especially in vulnerable populations

KY & THE EVIDENCE

Kentucky qualifying conditions

1) Cancer
2) Chronic Pain
3) Seizure disorder
4) Muscle spasticity
5) Nausea/vomiting
6) PTSD

High/moderate certainty benefits

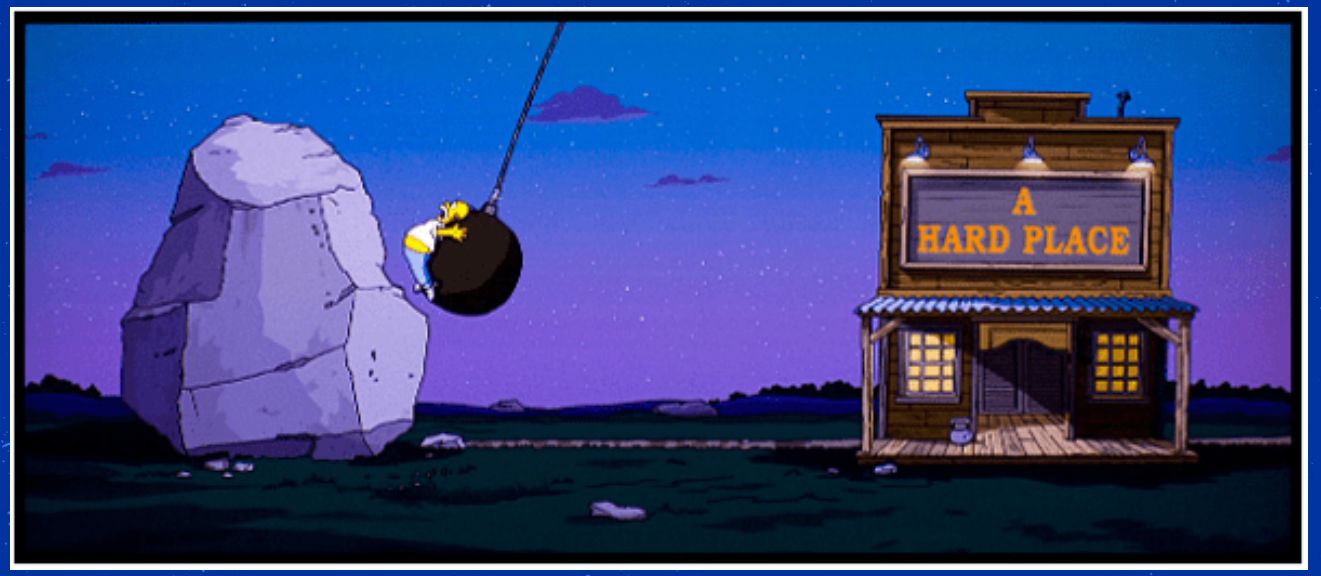
1) Chronic pain
2) Inflammatory bowel disease
3) Epilepsy/seizure disorder
4) Multiple sclerosis/spasticity
5) Nausea/vomiting

PROVIDERS, PATIENTS, AND CANNABIS

PROVIDERS

Patients will use and ask about cannabis

They will go somewhere for advice (e.g., budtenders)



There are no evidence-based recommendations for the best dose, strain, formulation, route of administration, or products available for any condition

PHYSICIANS & MEDICAL CANNABIS

- Physicians feel under-informed
  - 8% rated themselves as very/extremely knowledgeable
  - 18% were somewhat/very comfortable integrating cannabis into their patients' treatment regimens
  - 13% feel very/extremely competent at identifying harmful medical cannabis use

- Better knowledge linked to formal cannabis education

- Also perceive dispensary staff to be uniformed (5% very/extremely compentent)

(Kruger et al., 2024, Michigan, legal for adult use/medical)

PHYSICIANS & MEDICAL CANNABIS

Table 2. Frequencies of Responses for Cannabis Discussion Topics, Reasons for Not Recommending Medicinal Cannabis, and Attitudes Toward Medical Cannabis Dispensary Staff and Medical Cannabis Caregivers

Response	%	*n*
Discussion topics when assessing cannabis use		
Frequency	86.9	212
Administration method	61.9	151
Amount	32.4	79
Medical authorization card?	25.0	61
THC and CBD concentrations	12.3	30
Strain (sativa vs. indica vs. hybrid)	2.0	5
Reasons for not recommending medicinal cannabis		
Do not know enough	36.1	88
Other treatment options are more effective	22.1	54
Do not believe in its efficacy	13.9	34
Other	20.5	50
Coded other reasons		
Insufficient research	5.3	13
Outside of practice scope	4.5	11
Insufficient regulation	3.7	9
Adverse effects	3.3	8
Organizational policy	3.3	8

Discussions on cannabis primarily focus on risks (63%) over other topics such as harm reduction (25%) or dosage (6%).

USERS AND MEDICAL INFORMATION

- Most relied on personal experience, the internet, and friends/family for cannabis information
- Knowledge aligned with evidence for only ~50% of conditions
- Many overestimated effectiveness (e.g., cancer, depression, sleep)
- Frequent users were more likely to overestimate effectiveness

Kruger et al., 2020,

THE CONUNDRUM

- Providers do not feel equipped to have conversations about medical cannabis
    - Guidance and strong evidence are lacking

- Patients are turning to other (less reliable) sources of information about cannabis for medical purposes

- Doing nothing is not a good option
    - Pseudoscience prospers

RESOURCES

https://www.canada.ca/en/health-canada/services/drugs-medication/cannabis/information-medical-practitioners/information-health-care-professionals-cannabis-cannabinoids.html

CANNABIS AND TOBACCO CO-USE

- Tobacco and cannabis co-use is increasing
  - Across gender, racial/ethnic lines
- Cannabis use is common among current tobacco users (~18 - 39%)
  - ~25% of treatment seekers
- Tobacco use is common among cannabis users (~60% - 78%)

Schauer et al., 2015; Schauer et al., 2016; Goodwin et al., 2018; Fix et al., 2019; Weinberger et al., 2018; Strong et al., 2018; Hindocha et al., 2016; Pacek et al., 2018; Schauer et al., 2017; Carpenter et al., 2020; SAMSHA, 2017; Jamal et al., 2018

CONCLUSION

Image credit: Nathan Pyle

We need to do the best we can with what we have now

- Give patients trustworthy advice that matches the evidence
- Have conversations about harm reduction for those who do use

AND

We need better knowledge generation and guidance!

THANK YOU!

Bethany Shorey Fennell, PhD
Department of Family & Community Medicine

bethany.shoreyfennell@uky.edu

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APPALACHIAN TOBACCO REGULATORY SCIENCE TEAM

Markey Cancer Center
An NCI Comprehensive Cancer Center