Beyond brownies and joints: Cannabis manufactured products

Presentation to Maryland Cannabis Public Health Advisory Council
January 21, 2026

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UNIVERSITY of WASHINGTON

Legalization has transformed cannabis products and routes of administration

New cannabis products pose a public health challenge

Regulation is crucial to public safety

The road ahead: policy and regulatory recommendations

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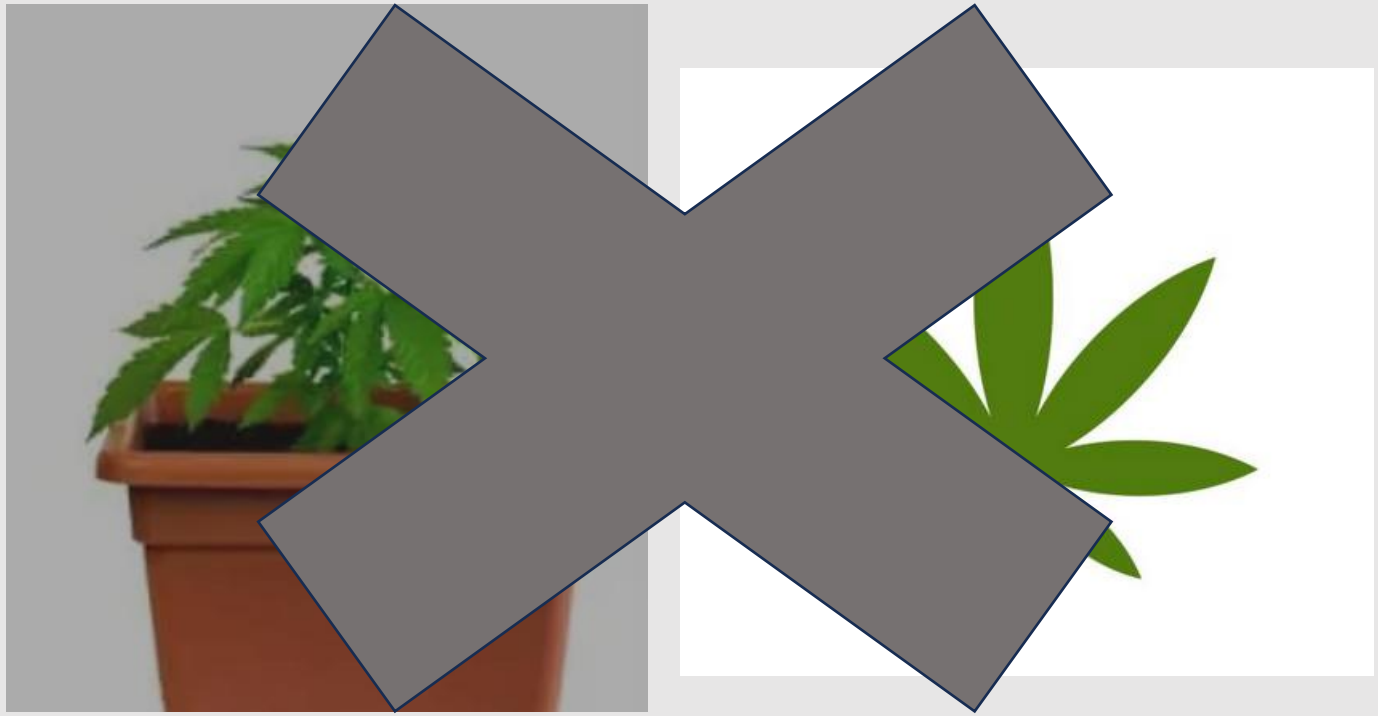
Campaign Imagery

Google search, January 19, 2026., Maryland cannabis legalization (images)



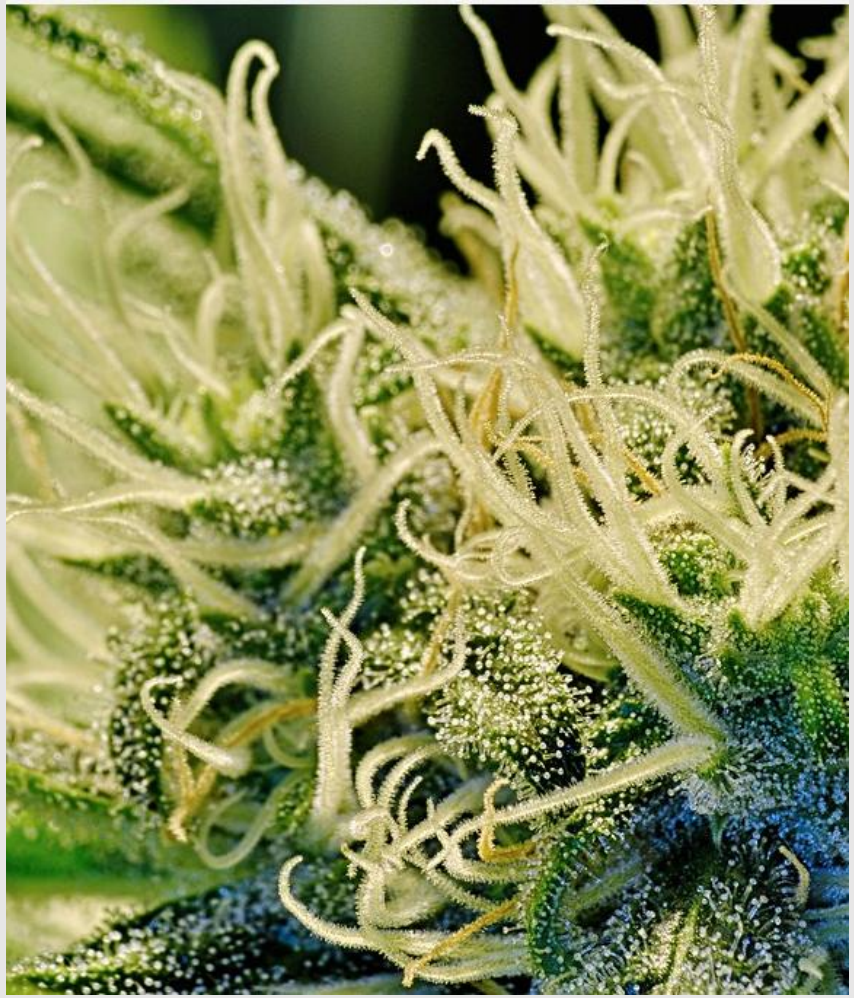
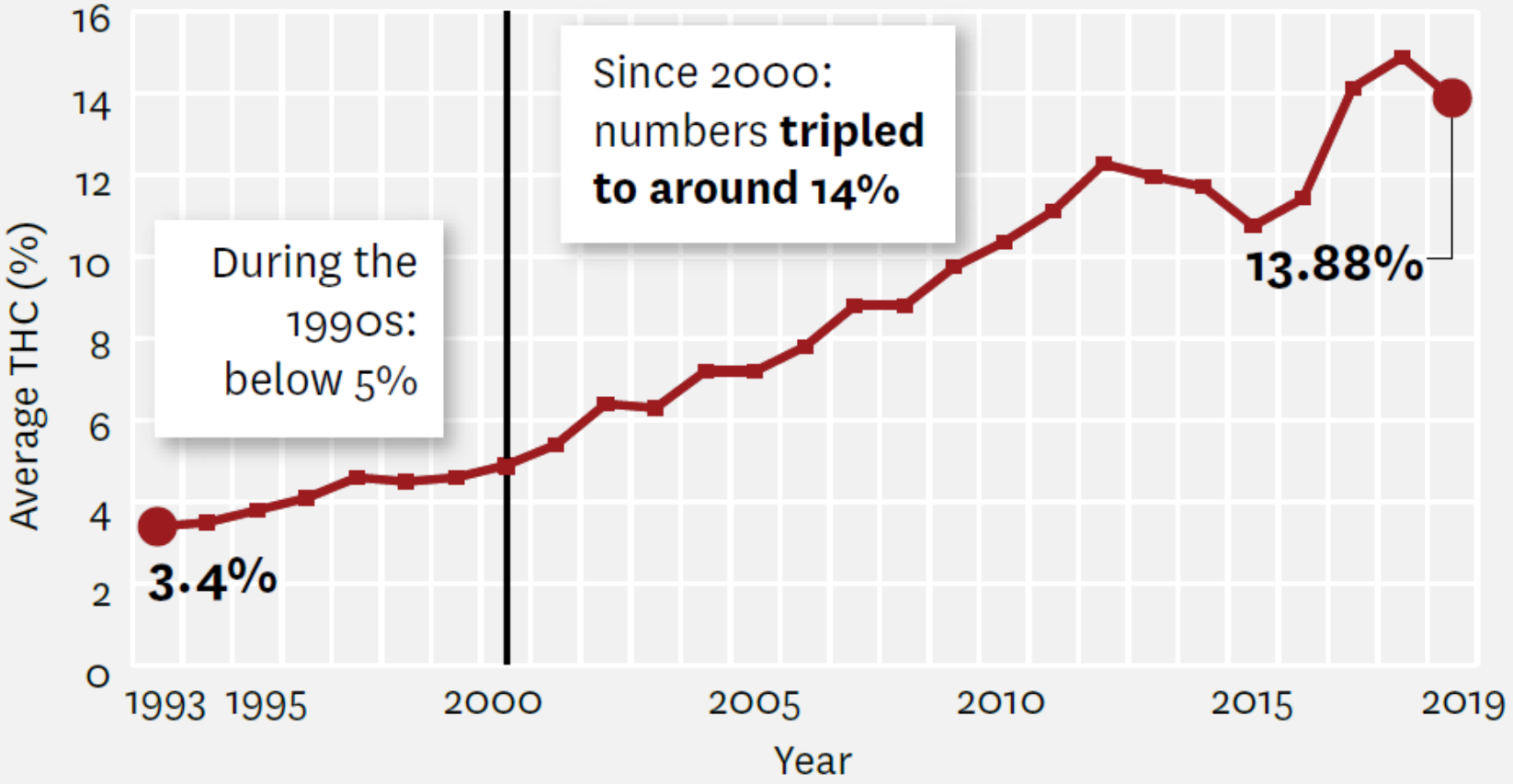


Figure 1. Average Δ^9-THC Concentration of Raw Plant Material Seized by the DEA, 1993 to 2019

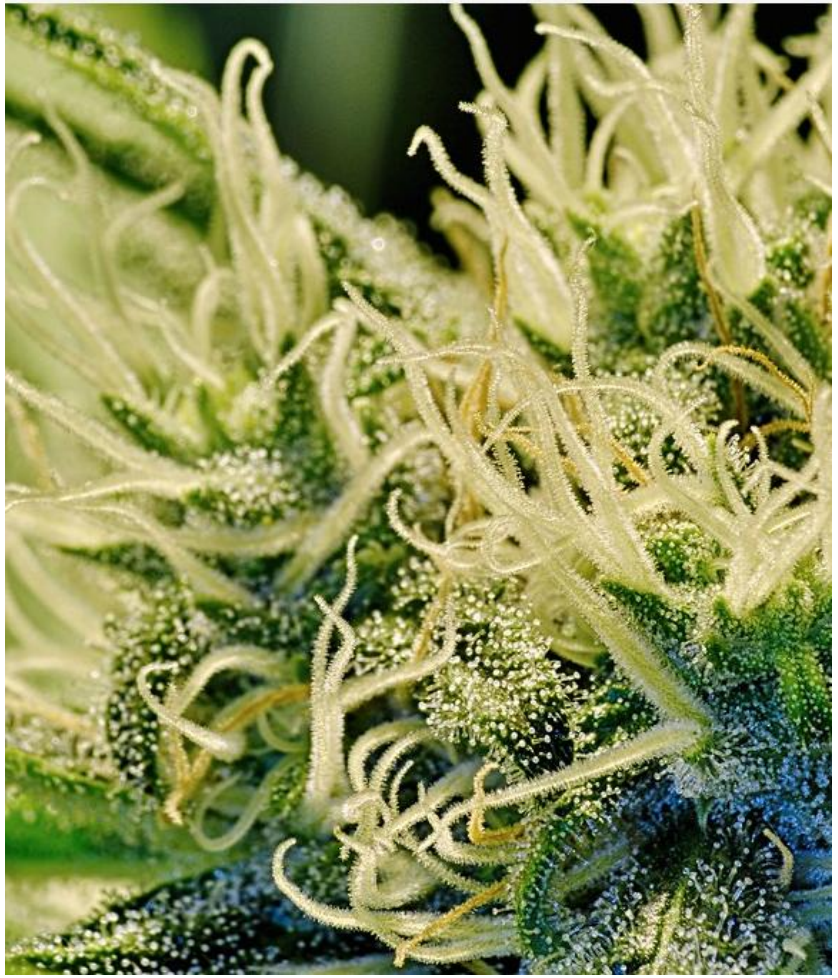


2017 WA 21%

Sources: ElSohly, M. A., S. Chandra, M. Radwan, C. G. Majumdar and J. C. Church. (2021). A Comprehensive Review of Cannabis Potency in the United States in the Last Decade. Biological Psychiatry: Cognitive Neuroscience and Neuroimaging, 6 (6): 603-6; Mehmedic, Z., S. Chandra, D. Slade et al. (2010). Potency Trends of Δ9-THC and Other Cannabinoids in Confiscated Cannabis Preparations from 1993 to 2008. Journal of Forensic Science, 55 (5): 1209-17.

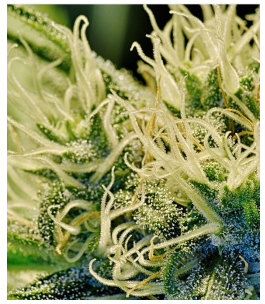
Pacula et al. (2022) https://healthpolicy.usc.edu/research/federal-regulations-of-cannabis-for-public-health-in-the-u-s/

High Potency cannabis - manufactured products



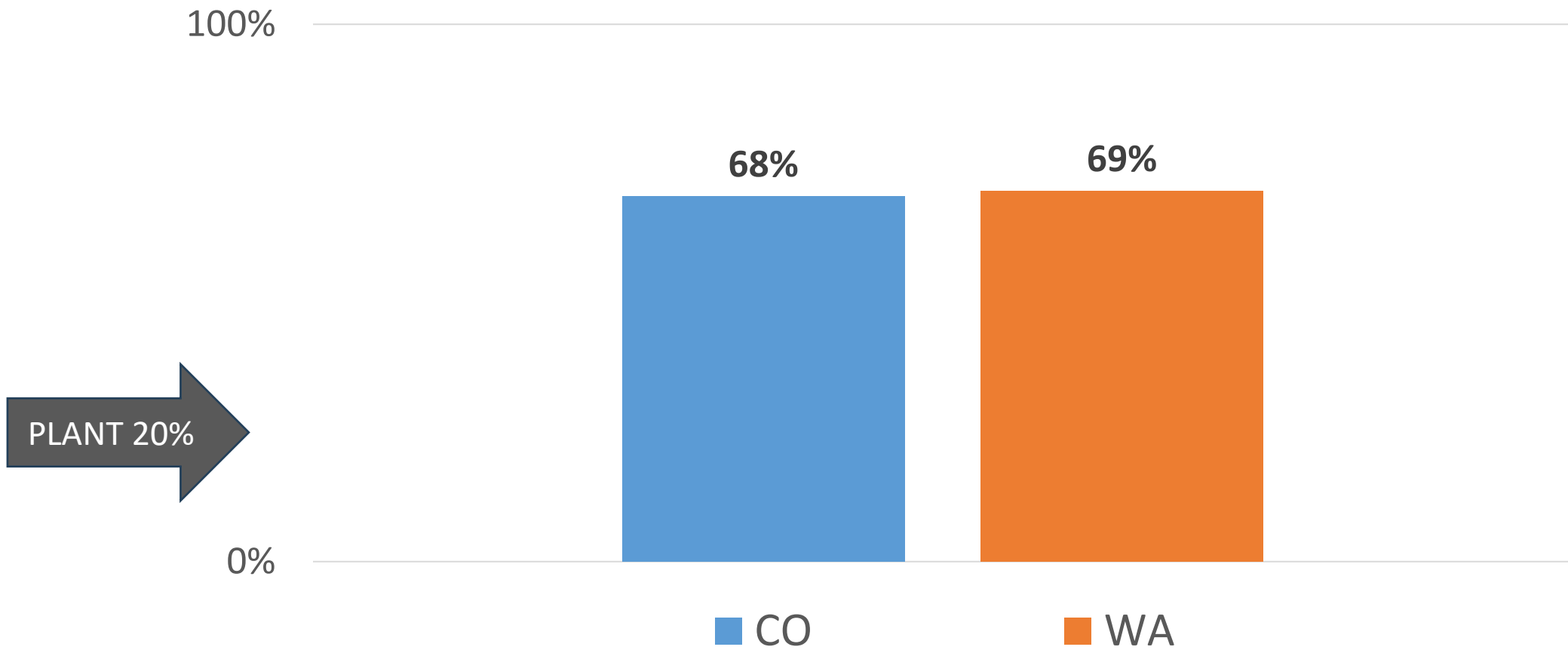
Processing
Extracting
Adding
Residues

How are concentrates made?



Method	Product Names
Solvent extraction (Butane, Propane, C02)	Shatter Wax Live Resin Badder Crumble Sugar Taffy Butter Butane Hash Oil (BHO) Rick Simpson Oil (RSO)
Solvent extraction and added dilutants+	Oil Cartridges
Solventless extraction (water, heat, pressure)	Hashish Kief Live Rosin

Average THC in concentrates



Pacula et al. (2022) https://healthpolicy.usc.edu/research/federal-regulations-of-cannabis-for-public-health-in-the-u-s/

How are concentrates used?

Vaping

How are concentrates used?

Dabbing

How are concentrates used?

Infused pre-rolls

https://weedmaps.com/learn/products-and-how-to-consume/infused-prerolls

Legalization has transformed cannabis products and routes of administration

New cannabis products pose a public health challenge – MUCH HIGHER INTAKE OF THC

Regulation is crucial to public safety,

The road ahead: policy and regulatory recommendations

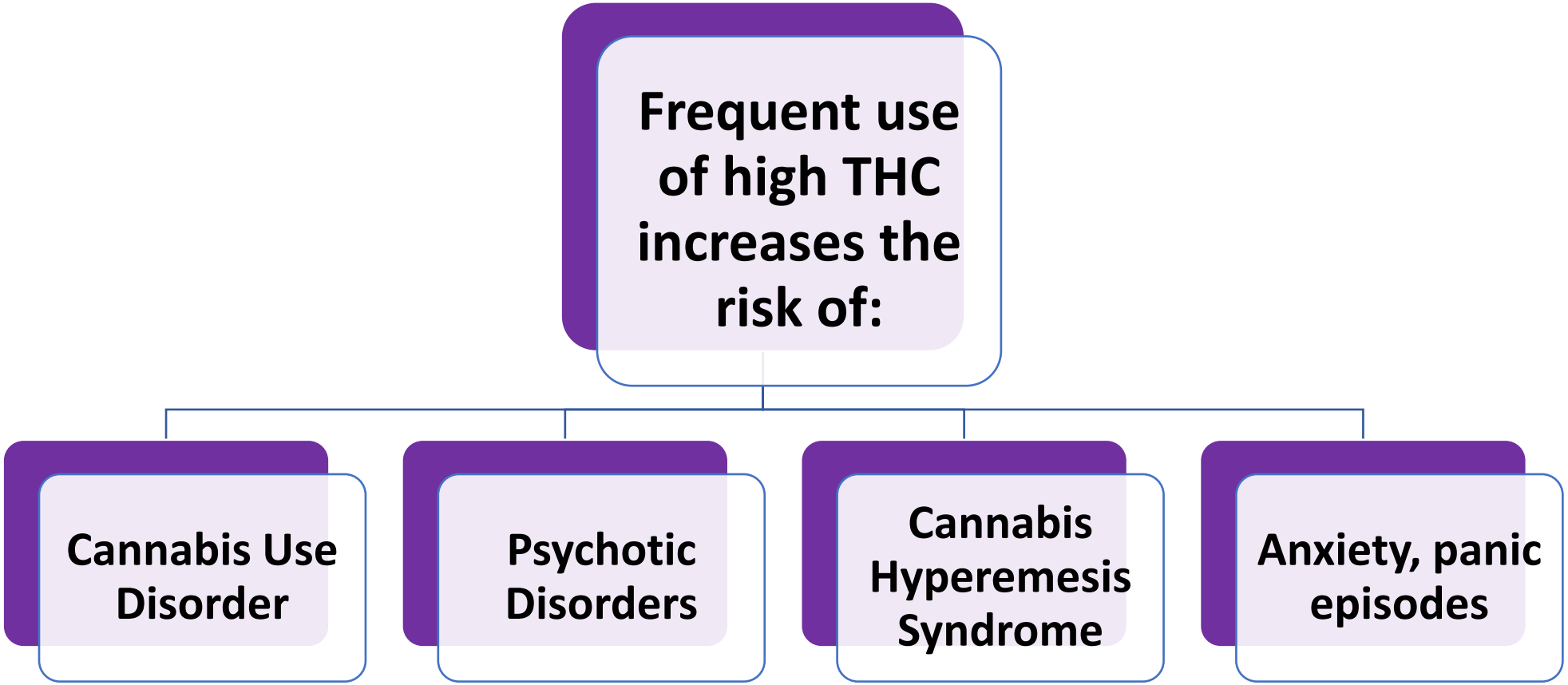
Experts Reports – WA and CA

The greater the potency of cannabis products, the greater the likelihood of adverse health effects.

Increased risk imposed is particularly concerning for young users and those with certain pre-existing mental health conditions.

Harms are likely to disproportionately affect historically marginalized populations (low income, minorities)

https://adai.uw.edu/wordpress/wp-content/uploads/2020/11/Cannabis-Concentration-and-Health-Risks-2020.pdf


Frequent use of high THC increases the risk of:
Cannabis Use Disorder
Psychotic Disorders
Cannabis Hyperemesis Syndrome
Anxiety, panic episodes

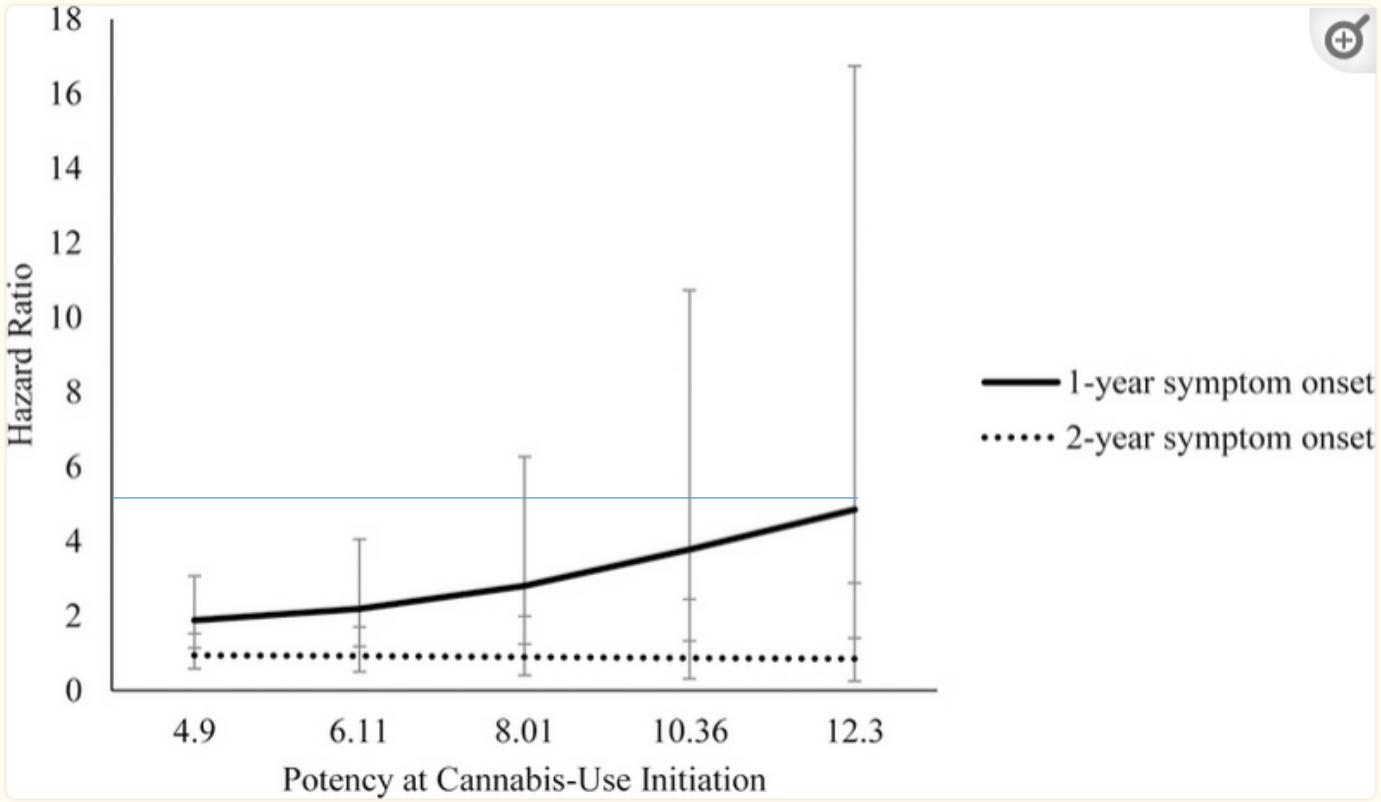
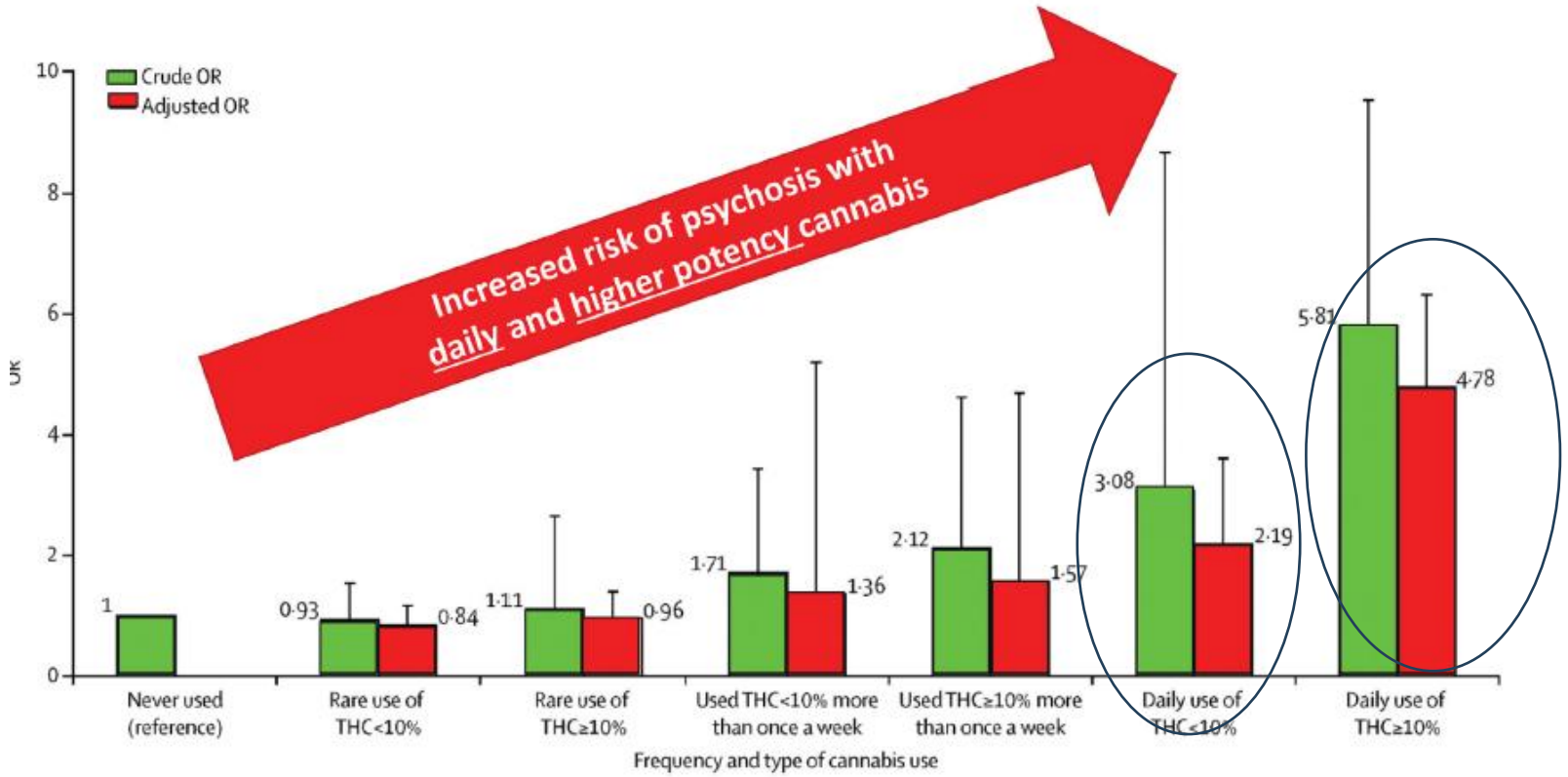


Figure 1.

Regular user status hazard ratios representing risk of reporting a CUD symptom in the first or second year after cannabis-use initiation by potency at year of initiation. Error bars reflect 95% confidence intervals for hazard ratios.

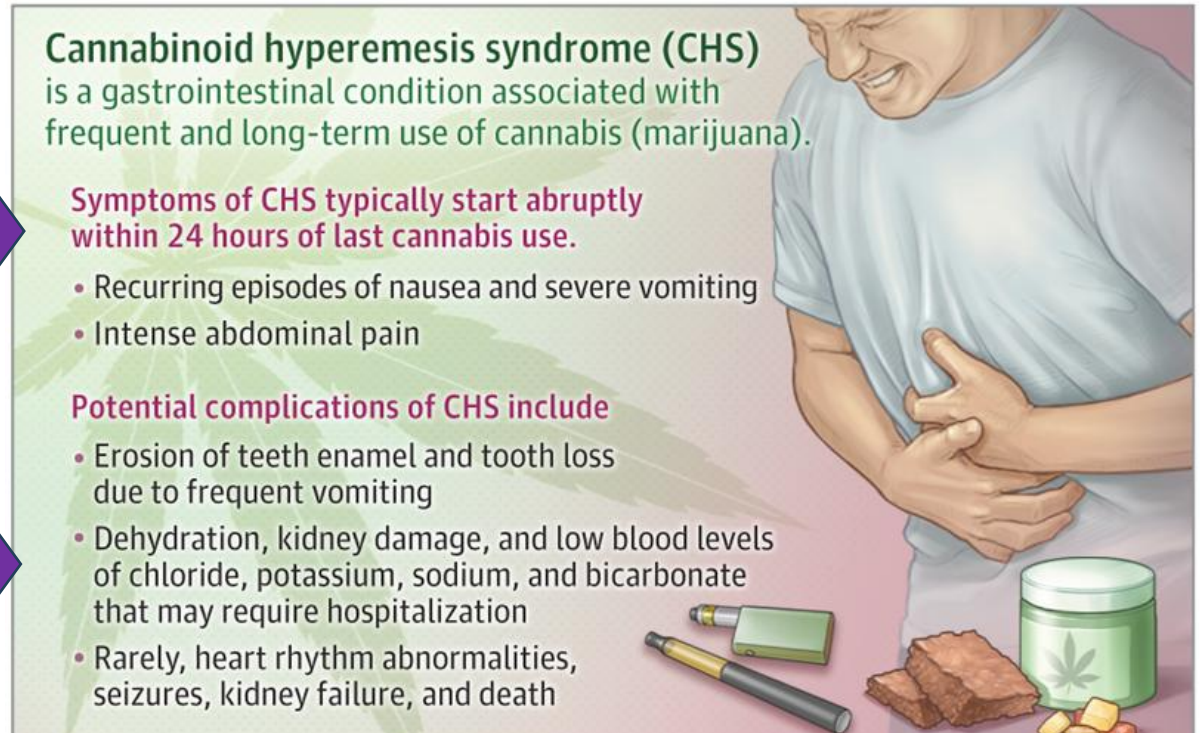
Arterberry, B. J., Treloar Padovano, H., Foster, K. T., Zucker, R. A., & Hicks, B. M. (2019). Higher average potency across the United States is associated with progression to first cannabis use disorder symptom. *Drug and alcohol dependence*, *195*, 186–192.

Odds of Psychotic Disorder



- Di Forti M, *et al.* The contribution of cannabis use to variation in the incidence of psychotic disorder across Europe (EU-GEI): a multicentre case-control study. *The Lancet Psychiatry*. 2019;6:427–436.

Bar graph by Dr. Hasin, 2020


Cannabinoid hyperemesis syndrome (CHS)
is a gastrointestinal condition associated with frequent and long-term use of cannabis (marijuana).
Symptoms of CHS typically start abruptly within 24 hours of last cannabis use.
• Recurring episodes of nausea and severe vomiting
• Intense abdominal pain
Potential complications of CHS include
• Erosion of teeth enamel and tooth loss due to frequent vomiting
• Dehydration, kidney damage, and low blood levels of chloride, potassium, sodium, and bicarbonate that may require hospitalization
• Rarely, heart rhythm abnormalities, seizures, kidney failure, and death

Cannabis Hyperemesis Syndrome (CHS)

JAMA PATIENT PAGE

Cannabinoid Hyperemesis Syndrome

Cannabinoid hyperemesis syndrome (CHS) is a gastrointestinal condition associated with frequent and long-term use of cannabis (marijuana).

CHS causes acute onset of recurrent episodes of severe nausea, bouts of vomiting, and intense abdominal pain that last less than 1 week. The symptoms typically start abruptly within 24 hours of the last cannabis use. People with CHS often report temporary relief of symptoms when taking hot showers or baths, which may lead to compulsive bathing.[1,2]

How Common Is CHS and What Are the Risk Factors?

Although the exact number of people with CHS is unknown, based on emergency department surveys, CHS is estimated to affect about 2.75 million people in the US yearly. From 2017 to 2021, emergency department visits for CHS doubled in the US and Canada and were most common among males aged 16 to 34 years. The rise in CHS coincides with legalization of recreational cannabis and increases in delta-9-tetrahydrocannabinol (THC) concentration in cannabis products.

Risk factors for CHS include heavy cannabis use (typically daily or multiple times per day) for more than 1 year. Higher rates of CHS are reported in people who use cannabis before age 16 years, have other substance use disorders, and/or smoke cigarettes.

How Is CHS Diagnosed?

The diagnosis of CHS can be made in people who have had 3 or more yearly episodes of nausea, vomiting, and abdominal pain that last less than 1 week, who have used cannabis more than 4 days per week for more than 1 year, and whose symptoms disappear with cannabis cessation for at least 6 months.

What Are the Complications of CHS?

Frequent vomiting due to CHS can cause erosion of teeth enamel and may result in tooth loss. CHS may also cause dehydration, acute kidney injury, and low blood levels of chloride, potassium, sodium, and bicarbonate, which may require emergency department visits and hospitalizations. Rare severe complications of CHS include heart rhythm abnormalities, kidney failure, seizures, and death.

Treatment for CHS

Patients who go to the emergency department with dehydration caused by CHS typically receive intravenous fluids and antinausea medications. Topical capsaicin (0.1%) cream applied to the upper abdomen may decrease nausea. Some patients may also benefit from acute and short-term use of benzodiazepines (antianxiety medication) and haloperidol (antipsychotic medication).

Complete cessation of cannabis use is the most effective long-term treatment for CHS. However, advising patients with CHS to stop cannabis use immediately may cause cannabis withdrawal symptoms and high rates of relapse. Counseling to achieve cannabis cessation and tricyclic antidepressants (such as amitriptyline) are recommended for long-term management of CHS. People with CHS who do not improve with these treatments may benefit from seeing a psychologist or psychiatrist.

FOR MORE INFORMATION
American College of Gastroenterology

Author: Maria Isabel Angulo, MD
Published Online: October 10, 2024. doi:10.1001/jama.2024.9716
Author Affiliation: Clinical Internal Medicine-Pediatrics, University of Illinois Hospital & Health Sciences System, Chicago, Illinois.
Conflict of Interest Disclosures: None reported.

1. Rubio-Tapia A, McCallum R, Camilleri M. AGA clinical practice update on diagnosis and management of cannabinoid hyperemesis syndrome. *Gastroenterology*. 2024;166(5):930-934. doi:10.1053/j.gastro.2024.01.040

2. Habboushe J, Rubin A, Liu H, Hoffman RS. The prevalence of cannabinoid hyperemesis syndrome among regular marijuana smokers in an urban public hospital. *Basic Clin Pharmacol Toxicol*. 2018;122(6):660-662. doi:10.1111/bcpt.12962

Based on emergency department surveys, CHS is estimated to affect **about 2.75 million people in the US yearly**.

From 2017 to 2021, emergency department visits for CHS **doubled** in the US and Canada and were most common among males aged 16 to 34 years.

"The **rise in CHS coincides with** legalization of recreational cannabis and **increases in THC concentration in cannabis products"**

Angulo MI. Cannabinoid Hyperemesis Syndrome. JAMA. 2024;332(17):1496. doi:10.1001/jama.2024.9716

Legalization has transformed cannabis products and routes of administration

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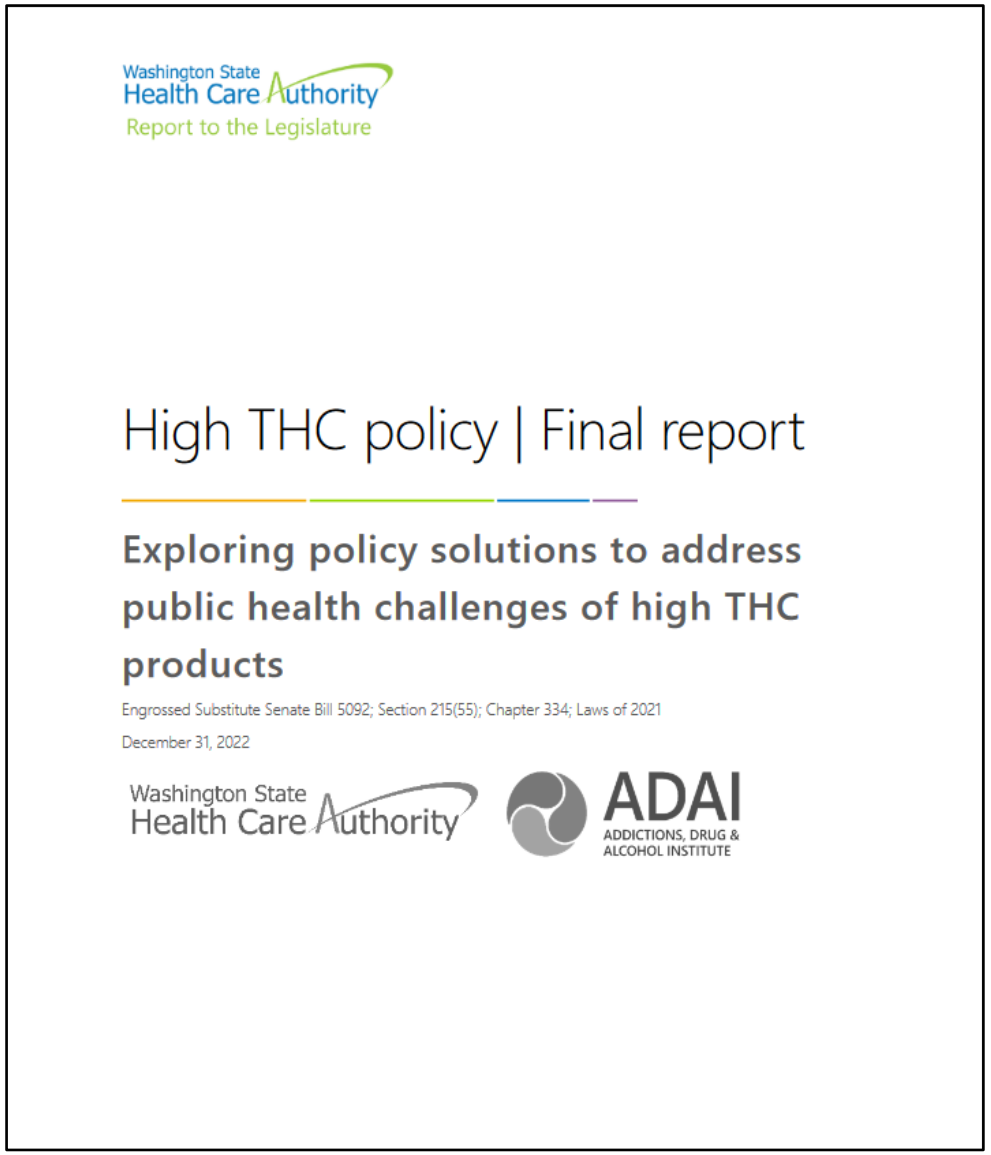
The road ahead: policy and regulatory recommendations

HB 1641, 2023


Washington State Health Care Authority
Report to the Legislature

High THC policy | Final report

Exploring policy solutions to address public health challenges of high THC products

Engrossed Substitute Senate Bill 5092; Section 215(55); Chapter 334; Laws of 2021

December 31, 2022

Washington State Health Care Authority

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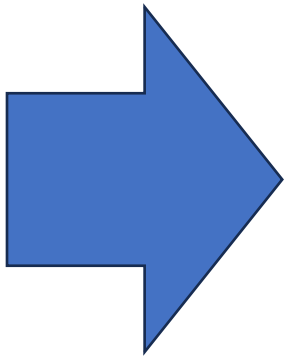

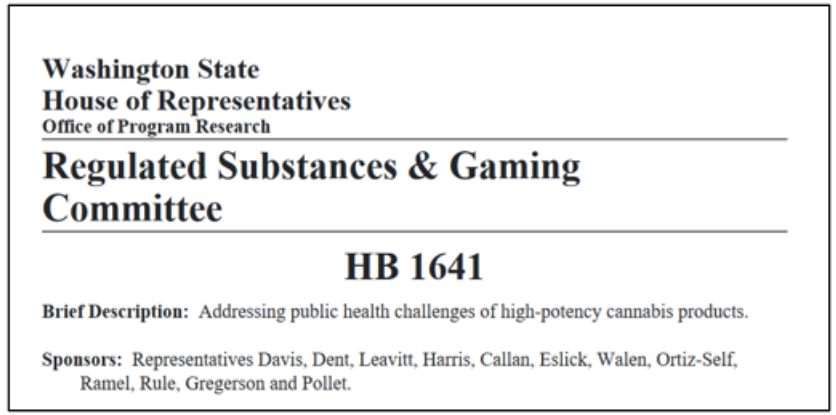
Washington State
House of Representatives
Office of Program Research

Regulated Substances & Gaming Committee

HB 1641

Brief Description: Addressing public health challenges of high-potency cannabis products.

Sponsors: Representatives Davis, Dent, Leavitt, Harris, Callan, Eslick, Walen, Ortiz-Self, Ramel, Rule, Gregerson and Pollet.

https://adai.uw.edu/wordpress/wp-content/uploads/High-THC-Policy-Final-Report-2022.pdf

North America Context

- Policies
- Initiatives
- Programs

Local Stakeholders

- Concept Mapping
- Interviews

Research evidence

- Cannabis
- Alcohol
- Tobacco
- Highly processed foods

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Policy Areas

Decrease Access to High THC Products

Prevent Initiation of High THC Products

Empower Consumers & the Public with Information & Education

Recommendation:
Decrease Access to High THC Products

Implement excise tax levels proportional to total THC content in products with greater than 35 percent THC concentration

- Earmark revenue collected for equity-focused initiatives
- Exempt high THC products recommended by a health care professional

Recommendation:
Prevent/delay initiation of High THC products

Prohibit advertisement of products with THC content 35% or higher

- Youth who see ads report more favorable attitudes toward cannabis and are more likely to intend to use
- Exempt high THC products recommended by a health care professional

Recommendation:
Prevent/delay initiation of High THC products

Raise Purchase Age for High THC products to 25 years old

- The human frontal lobe develops rapidly until ~ age 25
- Age restrictions for alcohol & tobacco protect young people's health & safety

Recommendation:
Empower consumers and the public with information

Define a standard “serving size” or “serving unit” of 5 or 10 mg of THC clearly indicated in product labels

WA professional and community groups viewed 10mg serving size as impactful

People who consumer cannabis have low “cannabis literacy”

Recommendation:
Empower consumers and the public with information

Deliver Point of Sale education about high concentration THC products

Consumers are more likely to change behavior when product content & health risks are understood

Budtenders want customers to have a good experience

Point-of-sale education in other areas works

Recommendation:
Empower consumers and the public with information

Targeted Social Media Campaigns & PSAs

Can be effective when developed well

Wide support across all stakeholder groups

Most effective when tied to an action

Thanks!

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

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