

Cannabis Concentration and Health Risks

The Role of Potency in Cannabis Use Outcomes

A joint report from the University of Washington
and Washington State University Workgroup
for the Prevention and Research Sub Committee (PRSC)

October 2020



Cannabis Concentration Workgroup

Prevention Research Sub Committee (PRSC)

Main Goal:

Consensus Statement on Health Risks of Non-Medical Use of High Potency (High THC-Concentration) Cannabis

- Is high potency cannabis more detrimental to health than lower potency cannabis?
- Are marginalized and/or vulnerable populations disproportionately affected by high potency cannabis use?

The content expressed herein do not reflect the official position of the Division of Behavioral Health and Recovery at the WA State Health Care Authority. No official support or endorsement for the opinions described in this document is intended or should be inferred. The focus is on THC content and non-medical use.

DISCLAIMER

Agenda

- Why Concentration Matters
- Research Context
- Health Risks and Consequences
- Who is Most Affected?
- Questions and Next Steps





Why Concentration Matters

In a not distant past . . .

In a not distant land . . .

Average Potency = 3–8% THC

High Potency > 10% THC

And then market forces redefined cannabis . . .

Why Concentration Matters

Manufactured products have THC concentrations of 60-90%

Hash oil

Shatter

Wax



Honeycomb

Budder

CO2 oil

Why Concentration Matters

Delivery devices have changed



Vaping



Dabbing

Why Concentration Matters

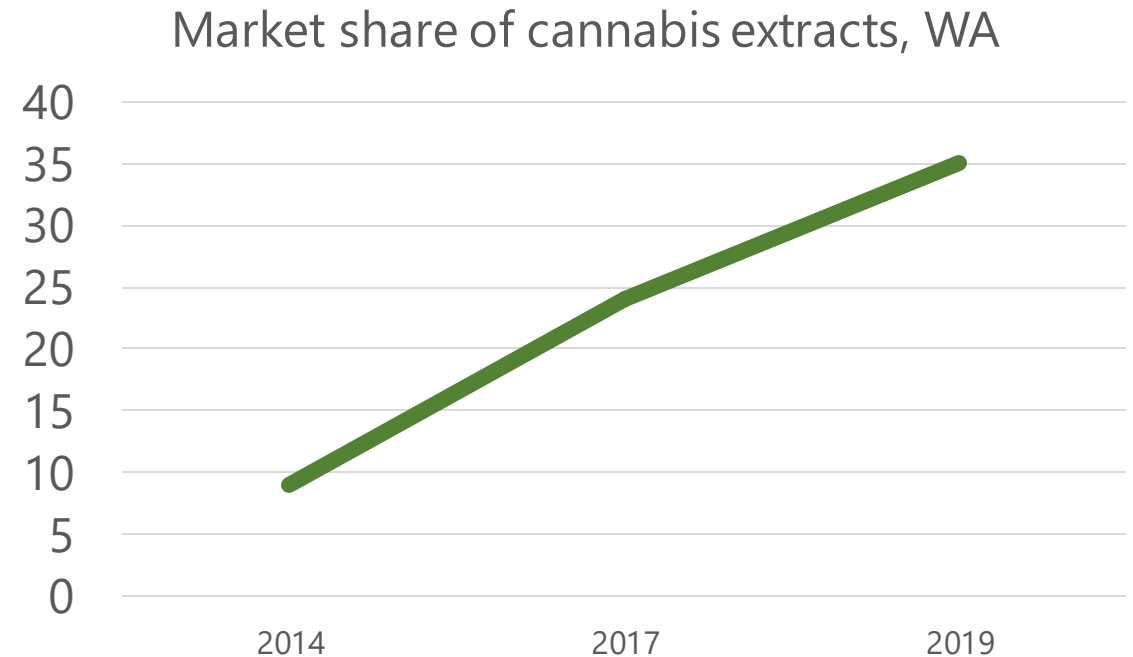
Sales of cannabis concentrates are increasing in WA

A nearly **ten-fold increase** in sales from extracts (from \$3.95 million in 2014 to \$311 million in 2017).

Why?

Extracts are Cheaper and Shelf-Stable

Legalization = Mass production



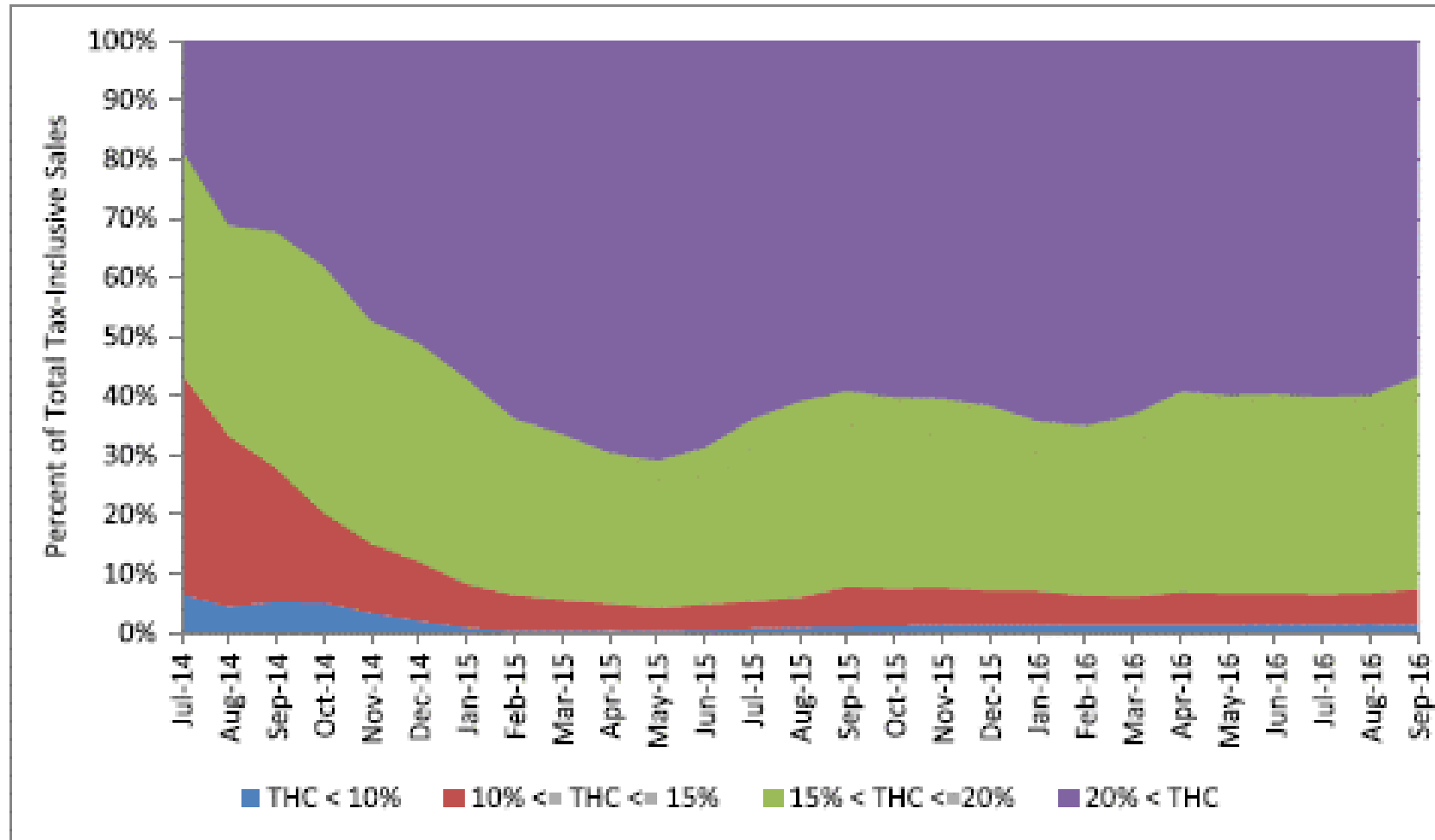
Kilmer, Beau, Steven Davenport, Rosanna Smart, Jonathan P. Caulkins, and Gregory Midgette, After the Grand Opening: Assessing Cannabis Supply and Demand in Washington State. Santa Monica, CA: RAND Corporation, 2019. https://www.rand.org/pubs/research_reports/RR3138.html.

Firth CL, Davenport S, Smart R, Dilley JA. How high: Differences in the developments of cannabis markets in two legalized states. *Int J Drug Policy*. doi:10.1016/j.drugpo.2019.102611

WA State House Commerce and Gaming Commission work session. Sep 15, 2020. <https://www.twv.org/watch/?eventID=2020091004>

Why Concentration Matters

Flower with less than 10% THC has vanished from the WA market





Research Context

Challenges exist:

Federally, Cannabis is a Schedule I Drug

This limits the ability of researchers to control the product, as they might when investigating dose for a pharmaceutical

Randomized Controlled Trials are Unethical

Researchers can't randomize people to a condition that may cause harm, like taking high-potency cannabis

Cannabis Products Used in the Real World are Difficult to Measure

Variations exist in product type, routes of use, frequency of use, and even individual patterns of use (e.g. depth of inhalations)

Research Context

Many strong research designs inform policy:

Observational Studies of People with Different Behaviors or Conditions

People with a particular health outcome or pattern of cannabis use are chosen and retrospectively or prospectively observed

Surveys and Secondary Analysis

People report cannabis use patterns, health behaviors, and health outcomes. Statistical methods can model these data.

Animal Studies

Randomization to high potency cannabis CAN occur in animals

These are the same designs and approaches that guide policy decisions for ALL substances used non-medically

Industry representatives use these challenges to:

- Minimize research findings
- Criticizing research designs
- Misinterpret data
- Confuse medical use with non-medical use
- Make potency sound more complicated than it is

Defining “high-potency”

Not all studies use the same definition.

This report included studies that:

- Examined a dose-response relationship between THC content and health outcomes
- or
- Recorded adverse events associated with consuming highly concentrated manufactured products





Health Risks and Consequences

Spoiler:

High potency cannabis is more detrimental to health than lower potency cannabis

Health Risks and Consequences

Cannabis Concentration and Poison Center Calls



Review by Julia Dilley, PhD

Dilley JA, Brooks-Russell A, Whitehill JM, Graves JM – Manuscript in preparation

Health Risks and Consequences

High-Potency Cannabis Product Exposures Increased Relative to Plant Materials (US, 2017-2019)

Plant materials:

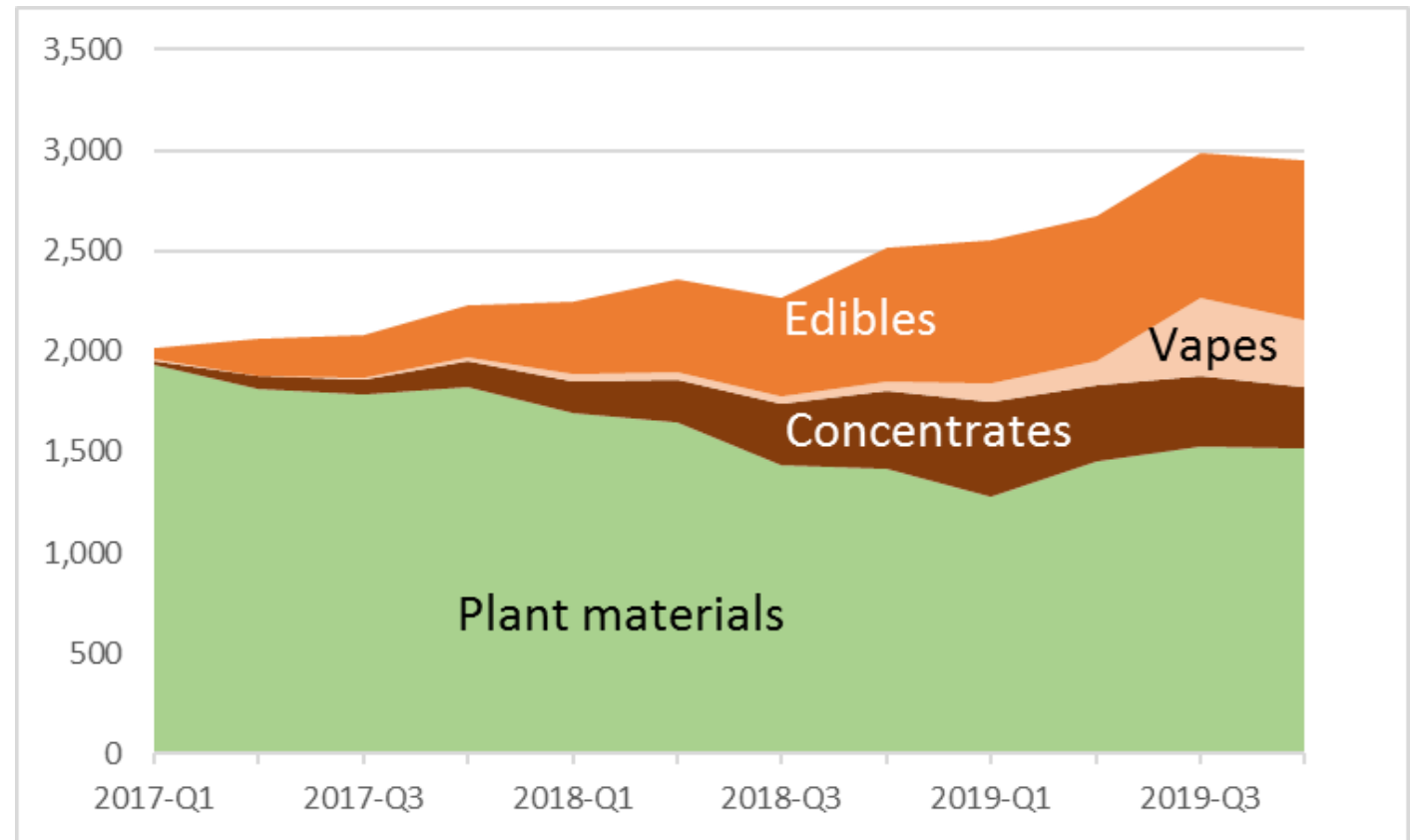
Majority co-use (61%)

9.8% children 11 or younger

Concentrates, edibles and vapes:

Majority cannabis-only (82%)

29.7% children 11 or younger

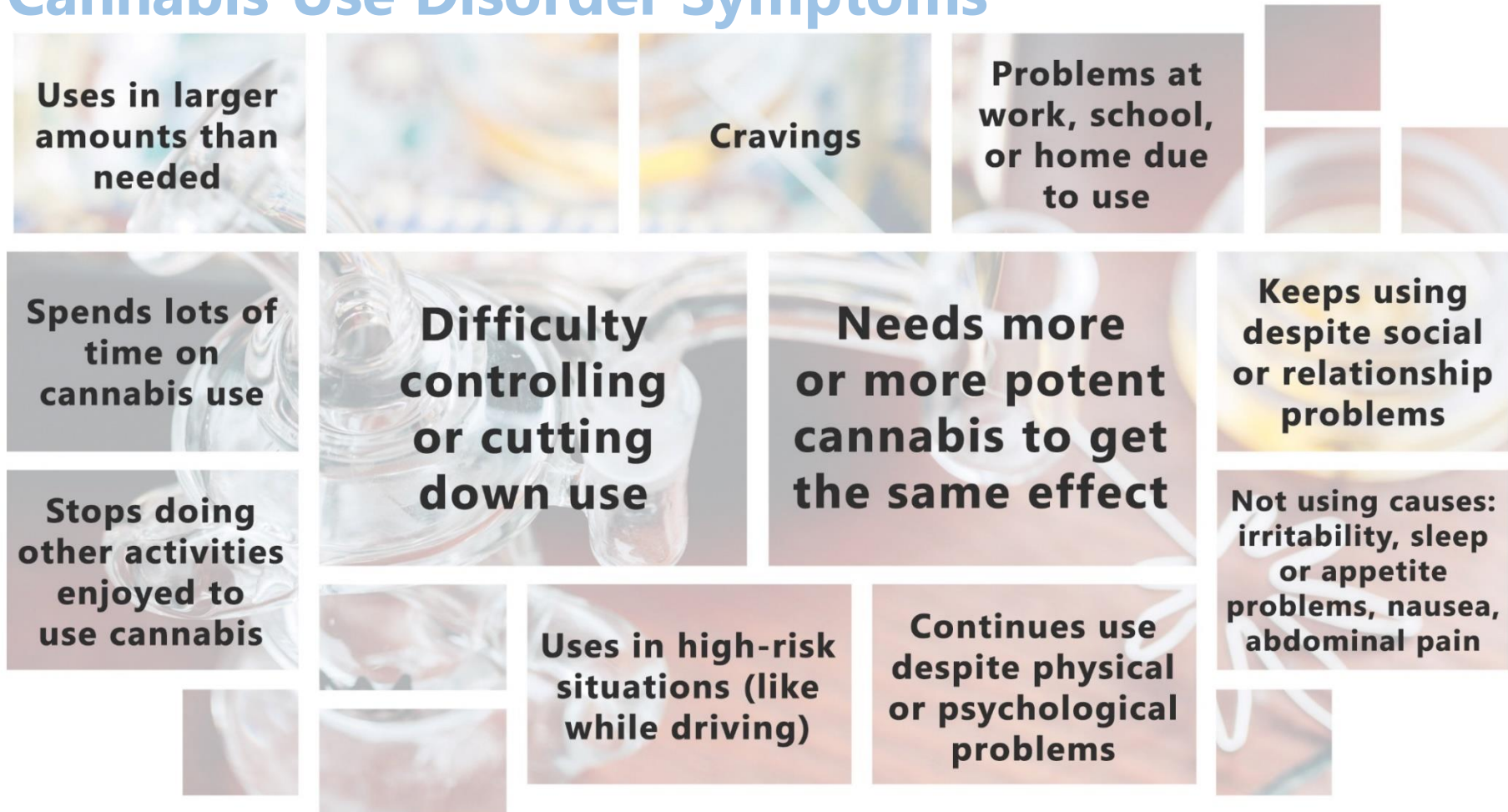


Types of exposures reported to poison centers

Health Risks and Consequences

Cannabis Concentration and Cannabis Use Disorder (CUD)

Cannabis Use Disorder Symptoms



Health Risks and Consequences

Higher potency increases risk of CUD

Takeaway:

Use of cannabis with high THC concentration (or high potency) increases the chances of developing Cannabis Use Disorder (CUD) or addiction to cannabis, particularly among young people.

Context:

- ✓ These studies have been conducted by observing people over time (prospectively or retrospectively.)
- ✓ It is not ethical to conduct studies that randomize people to different concentrations of cannabis to ascertain risk of addiction overtime.

Health Risks and Consequences

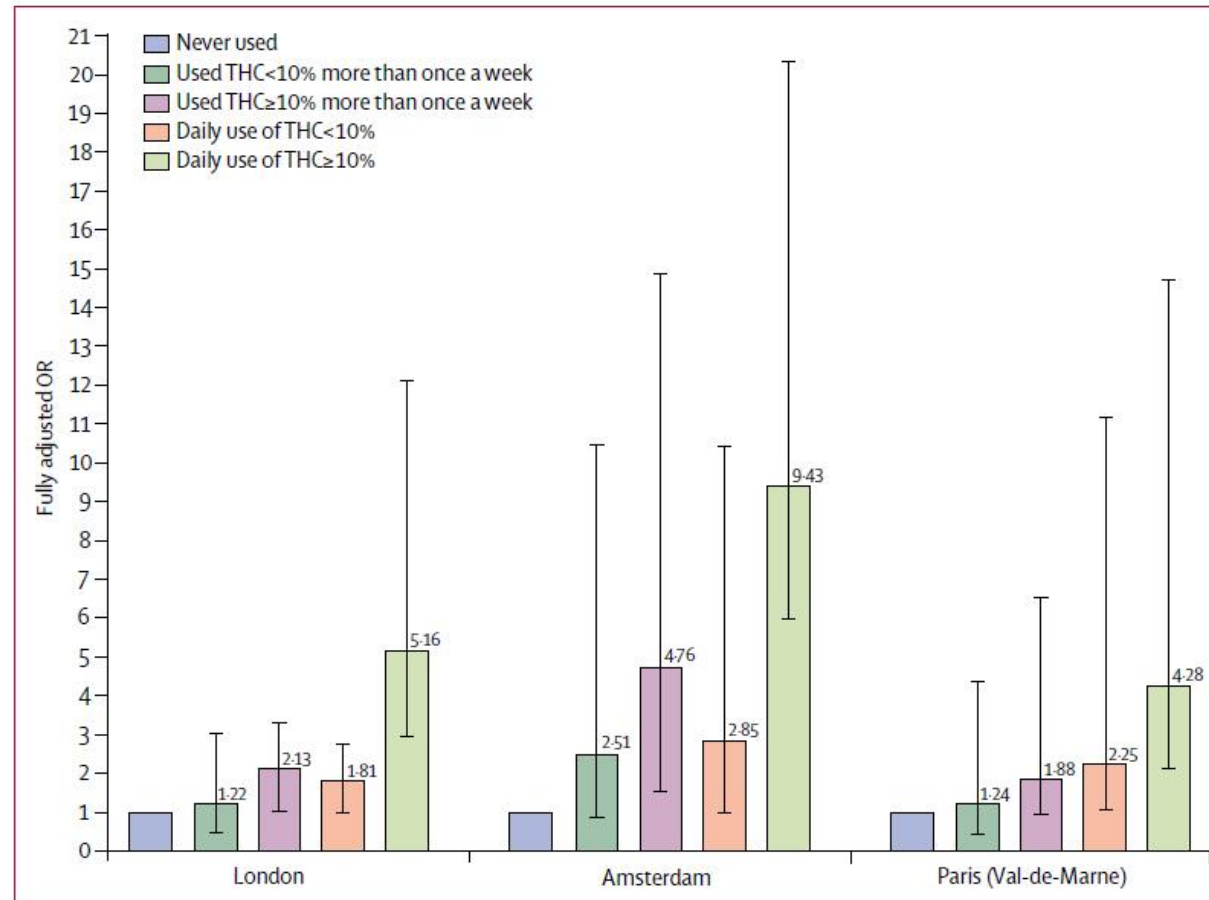


Cannabis Concentration and Psychotic Disorders

Review by Michael McDonell, PhD, Washington State University

Health Risks and Consequences

Odds of Psychotic Disorder



Fully adjusted ORs of psychotic disorders for the combined measure of frequency plus type of cannabis use in three sites. Data are shown for the three sites with the greatest consumption of cannabis: London (201 cases, 230 controls), Amsterdam (96 cases, 101 controls), and Paris (52 cases, 100 controls). Error bars represent 95% CIs. OR=odds ratio.

Health Risks and Consequences

Frequent use of high potency increases risk of a psychotic disorder

Take Away:

Daily cannabis use, particularly of high potency products, increases the risk of developing a psychotic disorder, like schizophrenia, AND earlier onset of symptoms compared to cannabis abstinence.

Daily use of cannabis, particularly high potency cannabis, is associated with increased symptoms of psychosis in people who have a psychotic disorder.

Context:

- ✓ Studies on this topic define high potency cannabis as products with 10% or more THC.
- ✓ There are no published studies investigating the association between products available in US legal market (60%-90% THC) and the onset of first episode psychosis or on increases of symptoms of in those who have a psychotic disorder.

Health Risks and Consequences



Cannabis Concentration and Adolescence

Review by Nephi Stella, PhD, University of Washington

Health Risks and Consequences

Dose-response relationship Negative impact of cannabis use during adolescence

Take Away:

Strong evidence exists on the detrimental impact of THC use during adolescence.

- This impact can be modeled in adolescent rodents, providing an opportunity to study the response of the developing brain and explore treatment approaches.
- Available evidence suggests a dose-response relationship, where negative impacts are higher with highly potent THC and/or more frequent use.

Context:

Human studies suggest that limiting the availability of high-potency cannabis may reduce the number of individuals who develop CUD and the risk of mental health disorders.

Health Risks and Consequences

Other important findings

Titration: Humans and animals can **self-titrate** their use of cannabis products, adjusting their intake to **compensate for potency**. The human study reported above was conducted with **adult regular cannabis users** and cannot be generalized for people under 21 and non-regular users.

Review by Carrie Cuttler, PhD, Washington State University

Driving: Research supports a link between cannabis consumption and driving impairment.
Driving and Potency: No consensus exists on THC concentration and impairment.

Review by Dale Willits, PhD, Washington State University

Pregnancy: Cannabis use is associated with negative health impacts for infants.

Pregnancy and potency: No evidence from human studies to determine THC potency association with poor health outcome among infants.

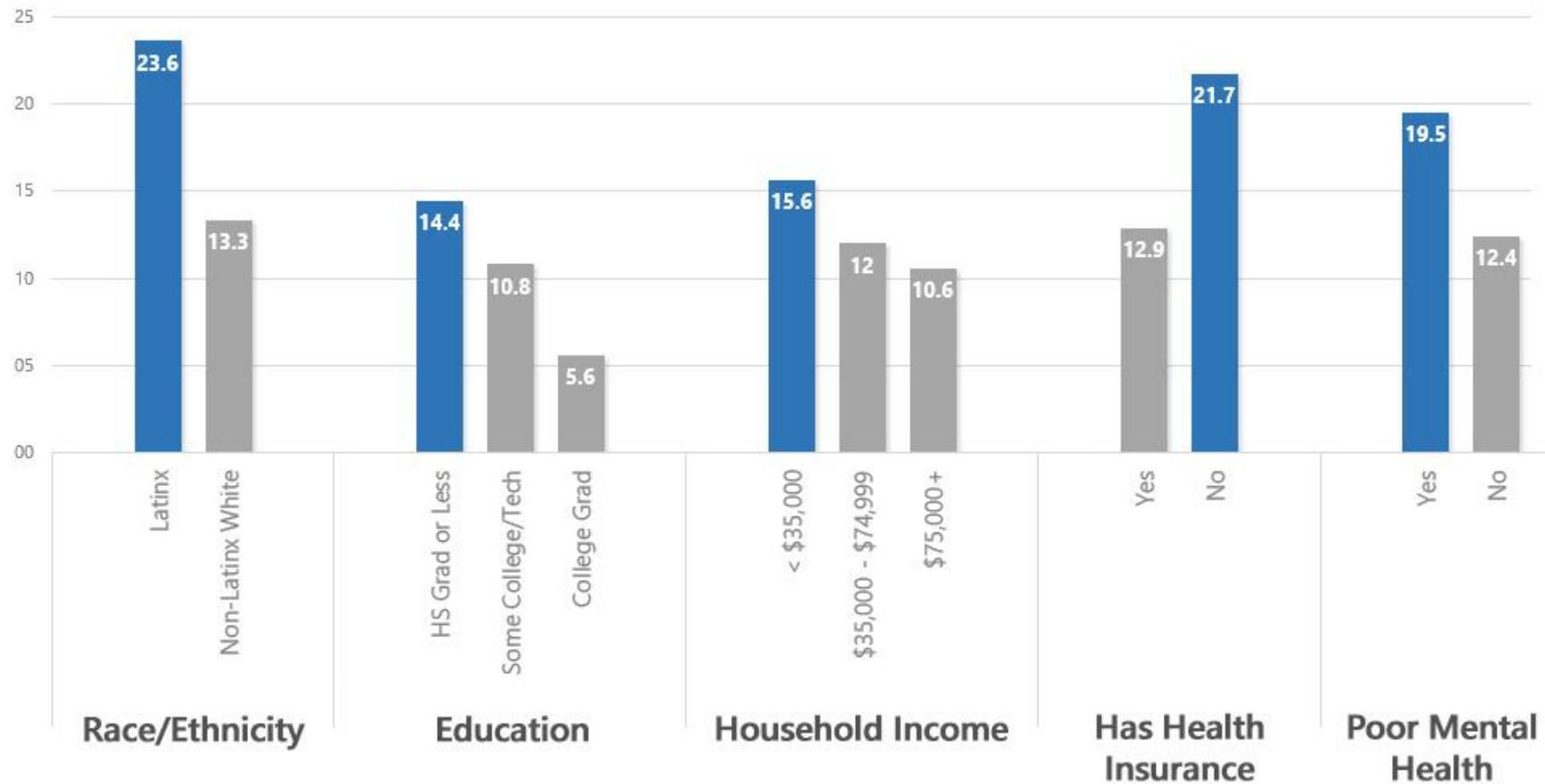
Review by Celestina Barbosa-Leiker, PhD, Washington State University



Who is Most Affected?

Who is Most Affected?

People who dabbled cannabis in the past 30 Days (%) were more likely to be Latinx, have less education, a lower household income, no health insurance, and poorer mental health



Caislin Firth, PhD, University of Washington

Data Source: 2015-2017 WA Department of Health, Behavioral Risk Factor Surveillance System (BRFSS)



**High potency cannabis disproportionately affects
marginalized and/or vulnerable populations**

Health Risks and Consequences—Take Home

THC Content in Cannabis Products Contributes to Adverse Health Effects in a Dose-Response Manner

- Increased risk imposed is particularly concerning for young users and those with certain pre-existing mental health conditions.
- Harms are likely to disproportionately affect marginalized populations (low income, minorities) who choose high potency products because of their lower costs, ease and discrete nature of use, glamorization of its use through social media and advertising, and perception of safety.

Next Steps: Research Agenda

- Epidemiology and consumers' motives
- Measurement
- Driving
- Adolescents
- Reducing research constraints imposed by federal policies



Cannabis Concentration and Health Risks

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Questions

