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Welcome

THC & Teens:
Turning Science into Smart Prevention

The Central East PTTC is housed at the Danya Institute in Silver Spring, MD

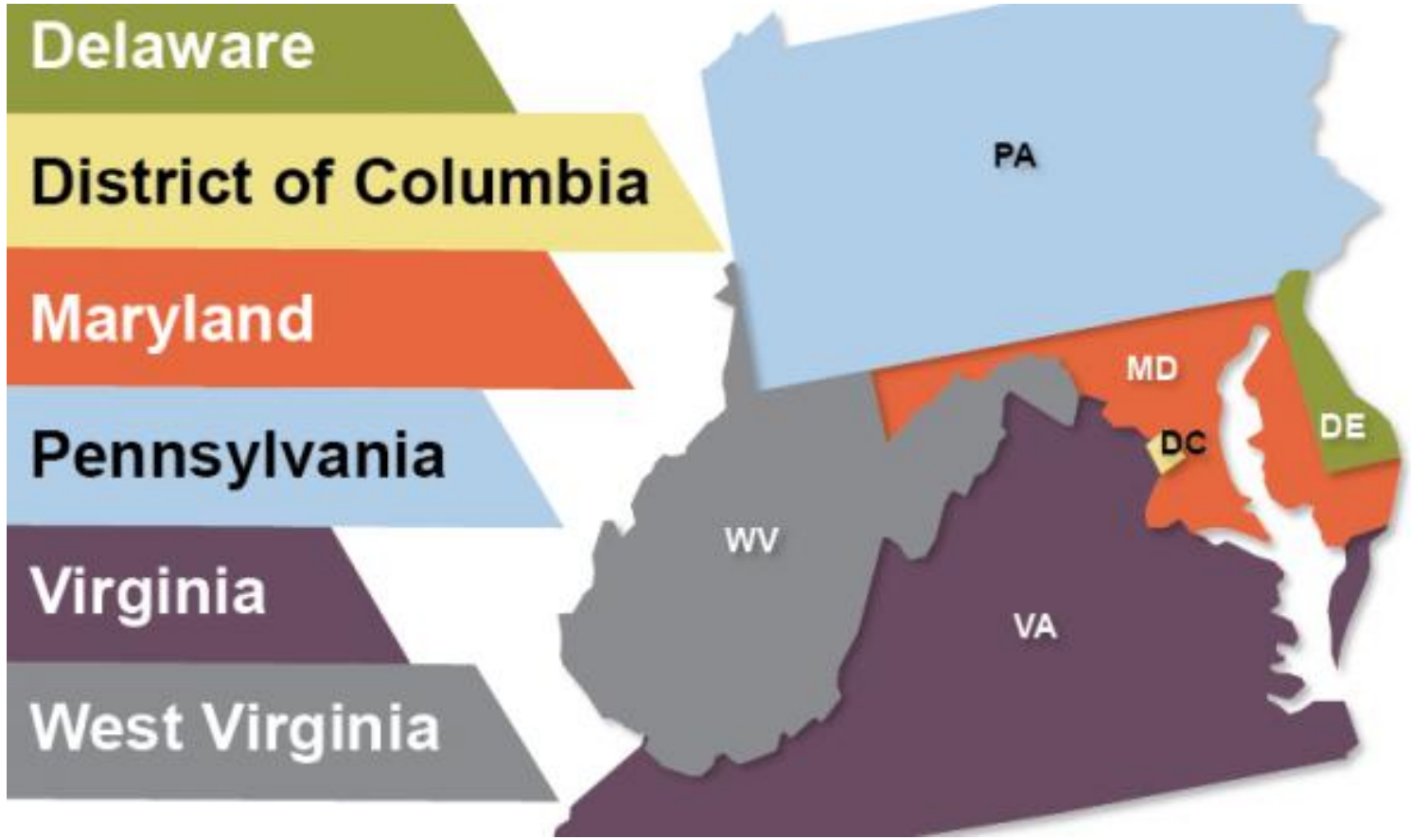
Oscar Morgan
Executive Director

Jeanne Tuono
Project Director

Central East (HHS Region 3)
PTTC

Central East Region

HHS REGION 3



Services Available

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PTTC

Other Resources in Region 3

Training and Technical Assistance Needs?

Write them in the chat

Send an email to pttc@danyainstitute.org

Central East (HHS Region 3)

PTTC Prevention Technology Transfer Center Network

Funded by Substance Abuse and Mental Health Services Administration

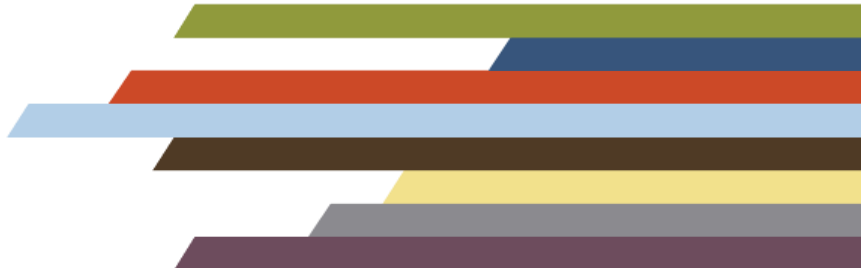
THC & Teens: Turning Science into Smart Prevention

Session 1: Cannabinoids and Health Impacts

Scott M. Gagnon, MPP, PS-C
Senior Facilitator
Presidential Consultants, LLC

December 2, 2025

THE DANYA INSTITUTE



Co-Facilitator & Learning Experience Specialist

Tammy Washington de Sencion

- 10+ years designing engaging adult learning experiences
- Certified Master Facilitator in virtual and in-person training
- Led national leadership and professional development programs
- Expert in instructional design and learner engagement strategies
- Creates dynamic, engaging learning environments that drive real results

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PTTC

What We Strengthen | How We Support | Who We Serve

What We Strengthen

Leadership at Every Level

Culture of Excellence

Wellness & Safety

Introductions

Be B.O.L.D.

To get the most
from these sessions

Lead Facilitator

Scott Gagnon

- Certified Prevention Specialist
- 20 Year Career in Prevention & Behavioral Health
- Former SAMHSA Regional Director
- Founding Director of the New England Prevention Technology Transfer Center
- 2024 IC & RC Prevention Specialist of the Year

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Course Objectives

Defining the problem and recognizing opportunities to support

Session 1 Objectives

01

Describe the impact of THC on brain development and youth health

02

Name at least four risk factors and four protective factors that impact youth use of cannabis

Session 2 Objectives

03

List at least three state, local, or organizational level policies that could prevent and reduce youth cannabis use

04

Describe a motivational interviewing framework for discussing cannabis with youth

The Law of Identification:

When Something Becomes *Personal*

It Becomes *Important*

Why are these sessions important to YOU?

What is the outcome you'd like to see after these sessions?

Cannabis Chemistry

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Intoxicating Cannabinoids

Naturally Occurring

Δ9-THC

Synthetic / Semi-Synthetic

Δ8-THC*

Δ10-THC

HHC

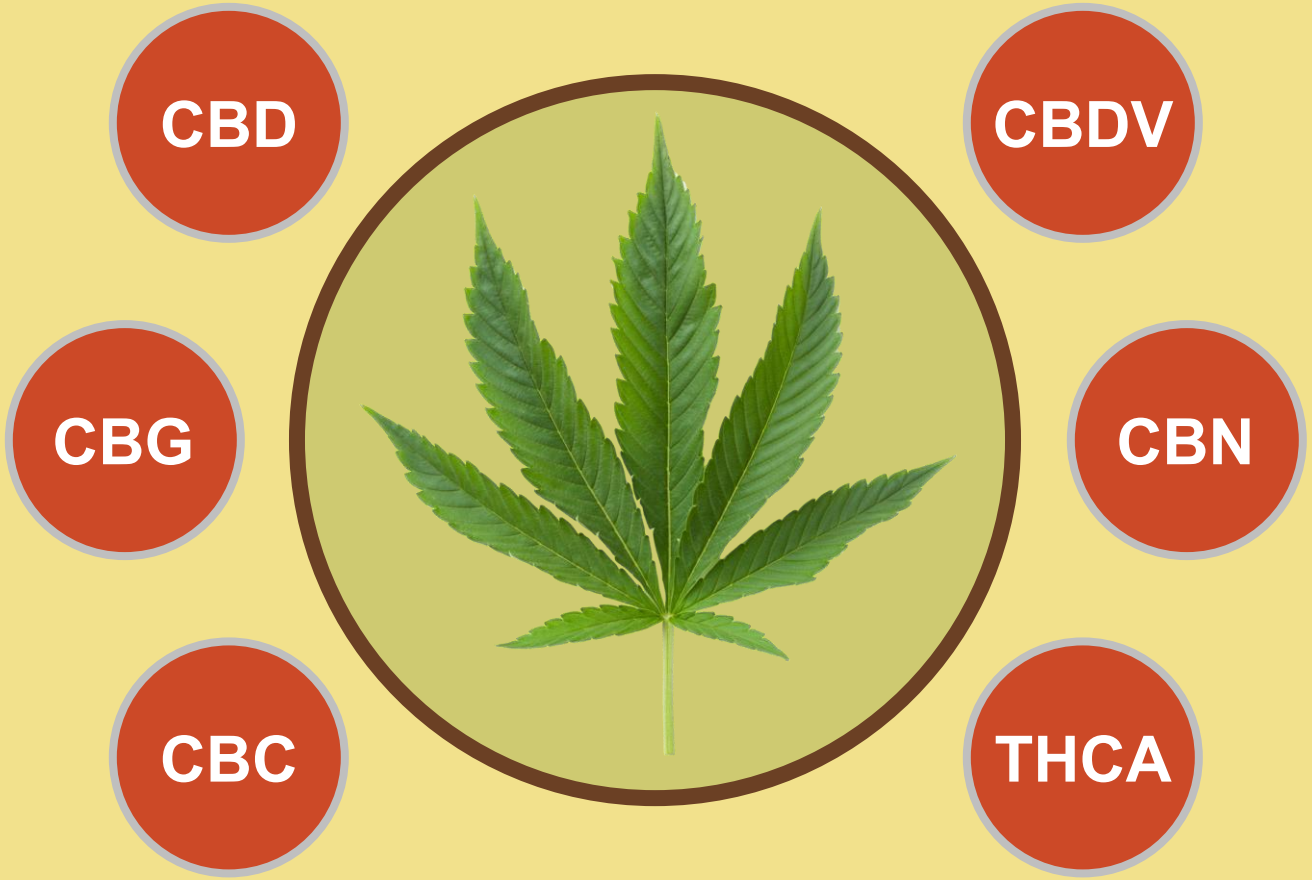
THCP **

THC-O acetate

*Delta 8 THC naturally occurs in cannabis but in trace amounts, retail Delta 8 is derived from CBD, thus semi-synthetic

** THCP naturally occurs in cannabis but in trace amounts, most retail THCP is lab-made, thus synthetic

Non-Intoxicating Cannabinoids



Legality and Regulation of Cannabinoids

State Regulated:

- THC
- CBD

Commercially Available via federal hemp regulation loophole:

- Delta 8 THC
- Delta 10 THC
- HHC
- THC-O Acetate
- Many others derived from Hemp CBD

Common Forms of Cannabis Consumption

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Common Forms of Cannabis Products

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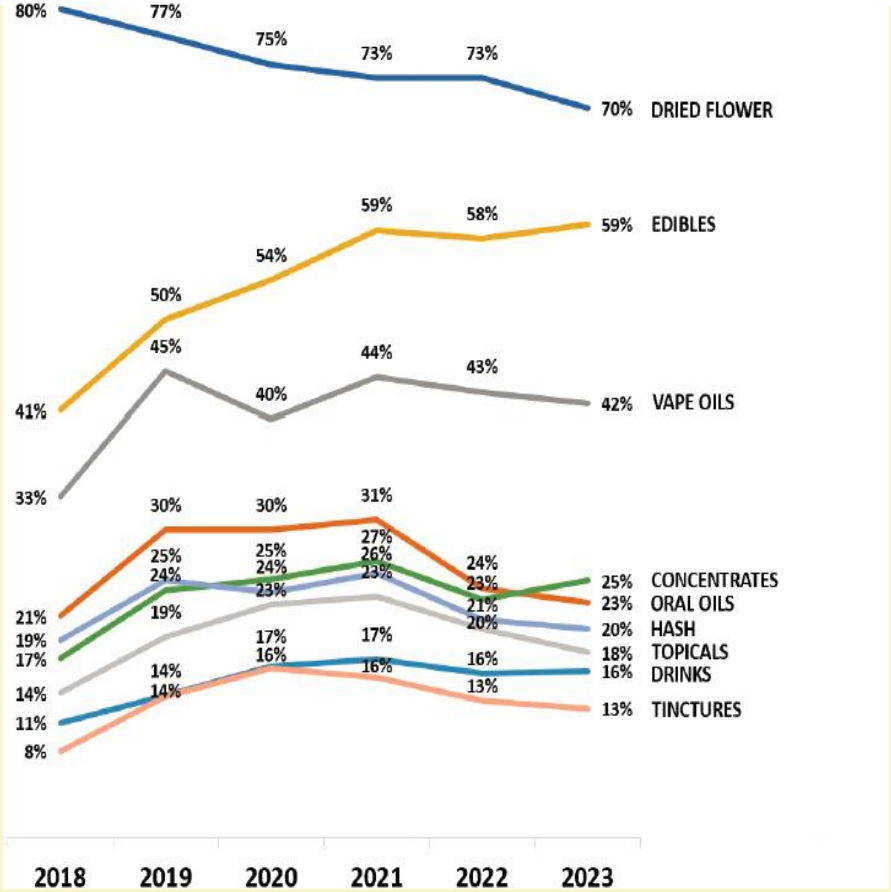
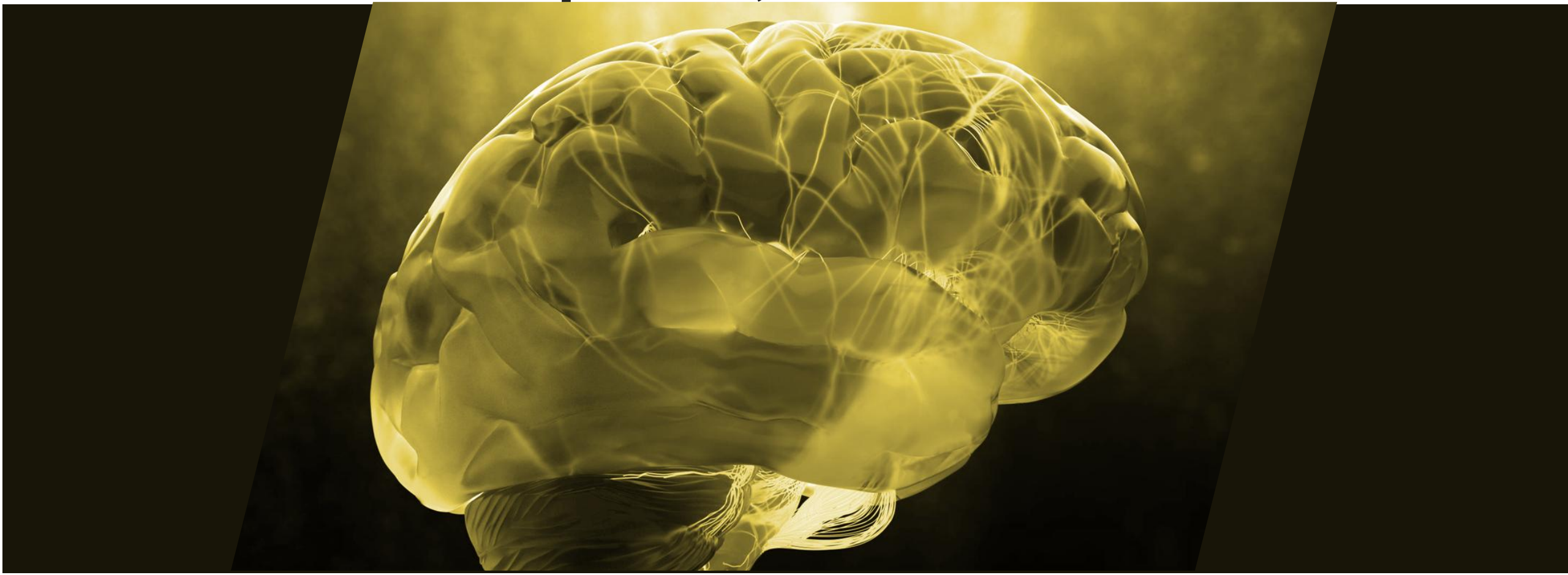
Trends in Cannabis Consumption

- Consumption of dried flower is still the most popular form of cannabis consumption
- Significant increase in popularity of edible products
- Overall rising trend in consumption of concentrate products



Source: International Cannabis Policy Study (ICPS), 2018–2021, summarized in Hammond D. High THC Cannabis Products: Consumer Use, Adverse Outcomes, and Implications for Policy (2022). University of Waterloo / ADAI.

Impacts of Cannabinoids on the Brain, Development, and Addiction



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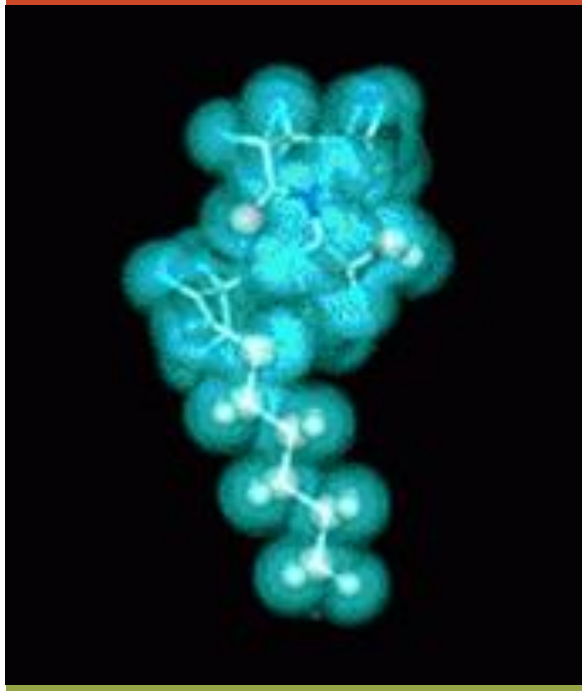
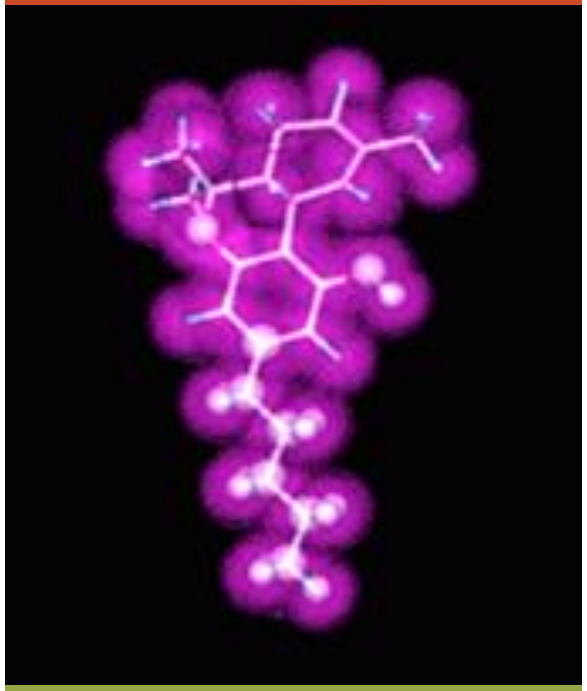
THC vs Anandamide

Brain's Chemical	Drug
	
Anandamide	THC

The Endocannabinoid System

Regulates and Controls Many Critical Body Functions:

- Learning & Memory
- Emotional Processing
- Sleep
- Temperature Control
- Pain Control
- Inflammatory & Immune Responses
- Eating

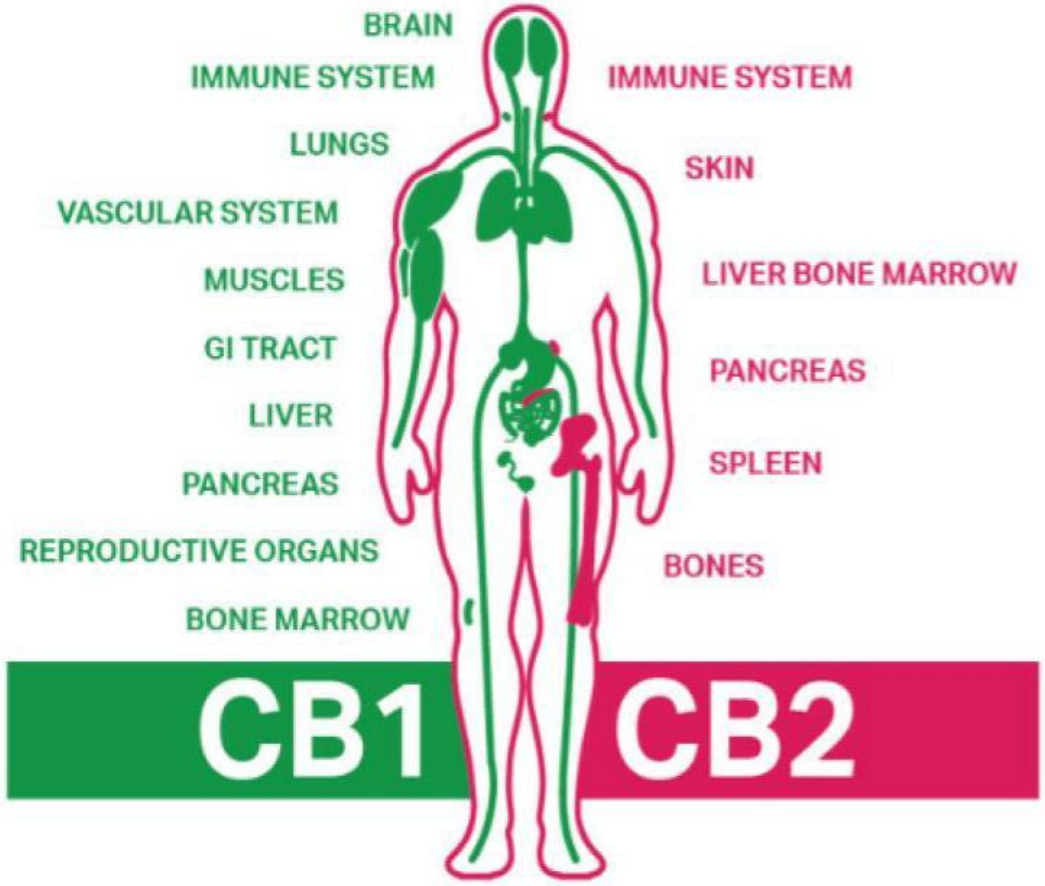


Photo Credit: Adam Abodeely, MD, FACS, FASCRS, MBA

The Endocannabinoid System Pt.2

Regulates and Controls Many Critical Body Functions:

- Endocannabinoid signaling plays a critical role in the development, maturation, and sculpting of neural circuits in adolescence
- THC binds with high affinity to the CB1 receptors, a factor in its potential for addiction with young people

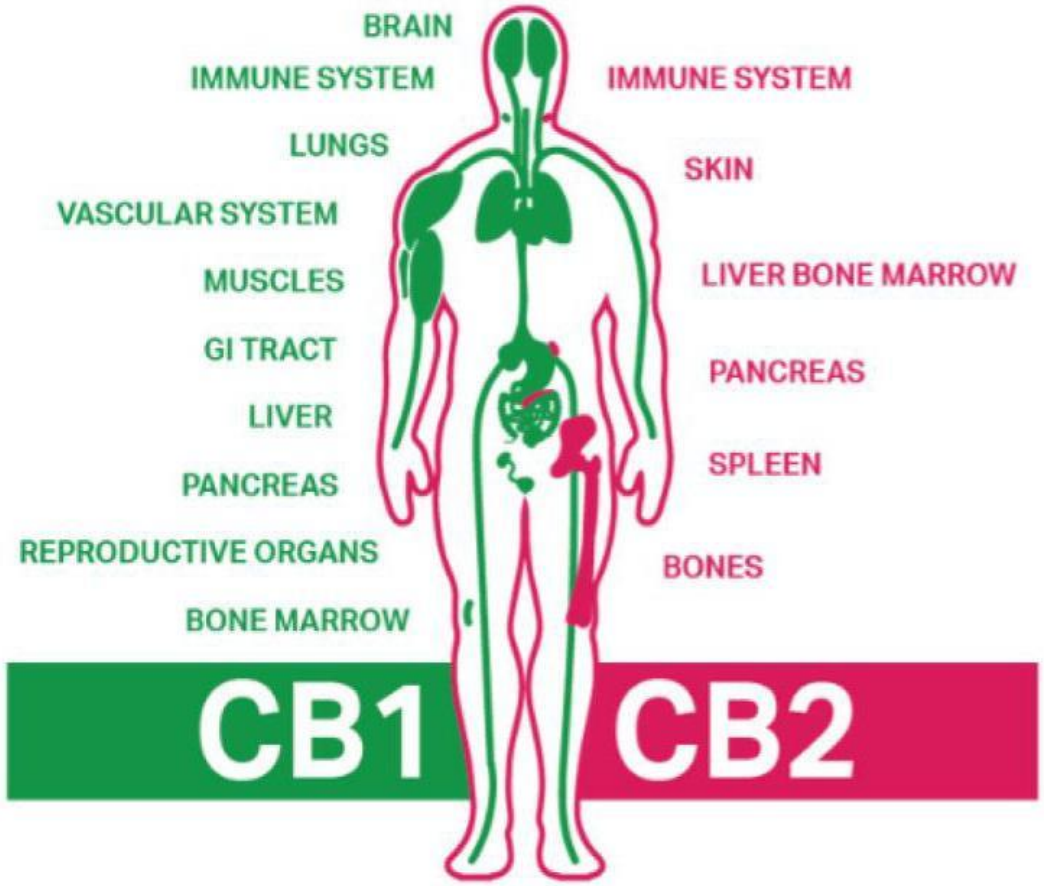
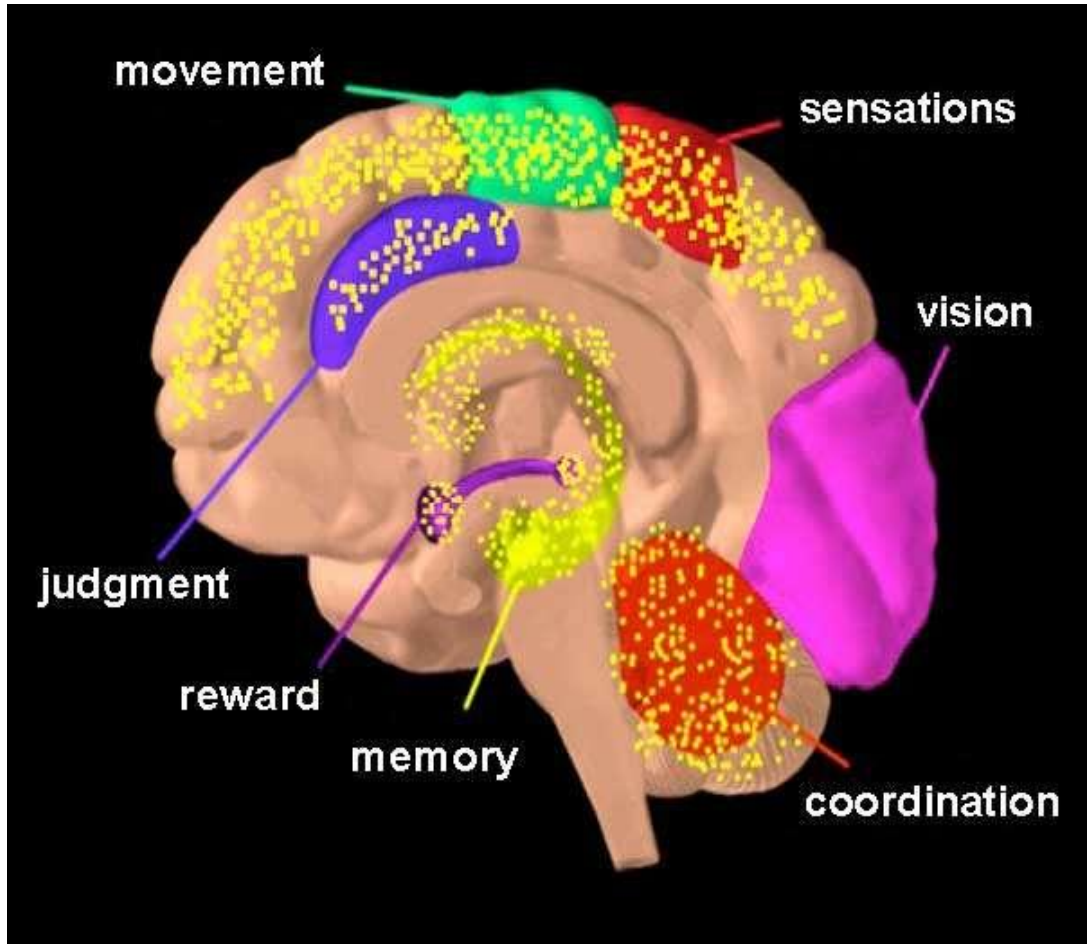


Photo Credit: Adam Abodeely, MD, FACS, FASCRS, MBA

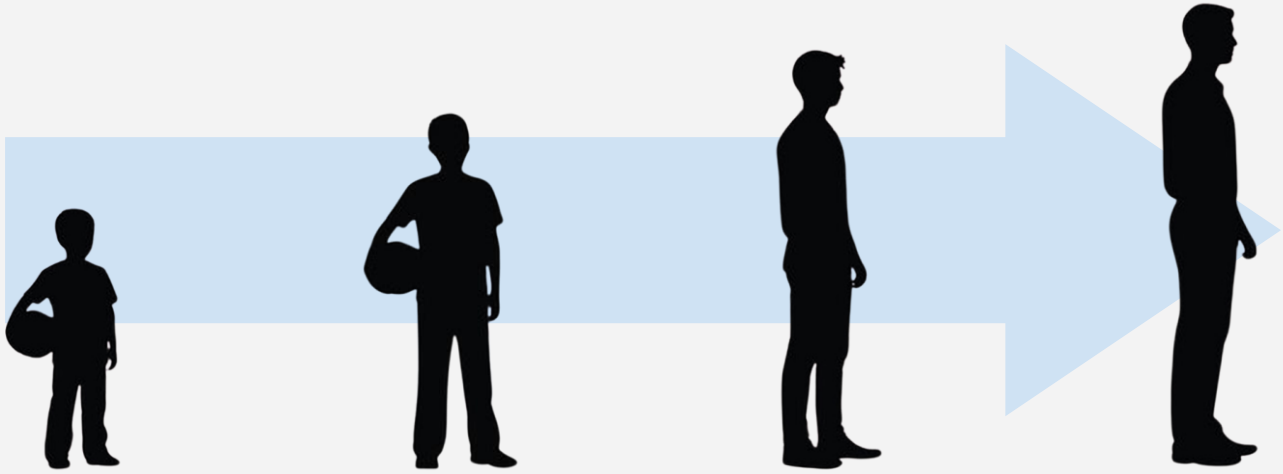
Brain Cannabinoid Receptor Sites

Brain Region	Functions
Cerebellum	Body movement, coordination
Hippocampus	Learning and memory
Cerebral Cortex	Higher cognitive functioning
Nucleus Accumbens	Reward
Basal Ganglia	Movement control



Changes in Brain Function

Toddler milestones: balance, walking, coordination	**Preschool milestones:** emotional regulation	**School age milestones:** achievement	**Adolescent milestones:** impulse control
Physical coordination, Sensory processing	**Emotion**	**Motivation**	**Planning, Organizing, Impulse control**



Cerebellum	**Amygdala**	**Nucleus Accumbens**	**Prefrontal cortex**

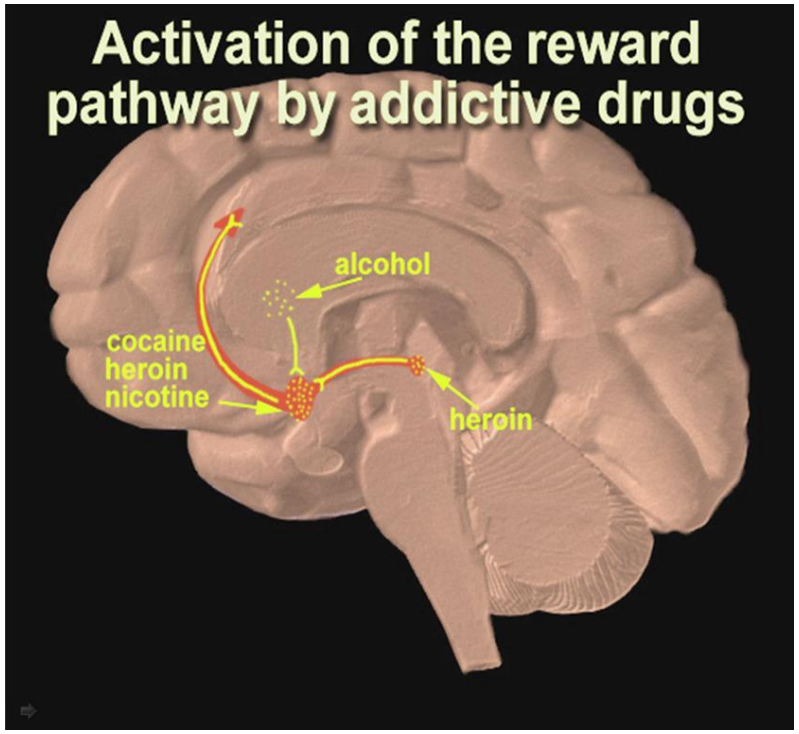
Adolescent Brain & Cognition

- Heavy/regular adolescent cannabis use can lead to **cognitive deficits**; effects are **smaller or absent after ≥72 h abstinence** (likely residual intoxication/withdrawal in many studies). JAMA Network+1

- Longitudinal cohort shows **persistent IQ decline** concentrated in **adolescent-onset** heavy users; causality debated, but risk appears highest with **early, persistent use**. PNAS+2PubMed+2

- Neuroimaging reviews: regular use linked to **smaller hippocampal/OFC volumes** and other structural differences; evidence strongest in **frequent** users.

Cannabis Addiction



National Institute on Drug Abuse (2007)

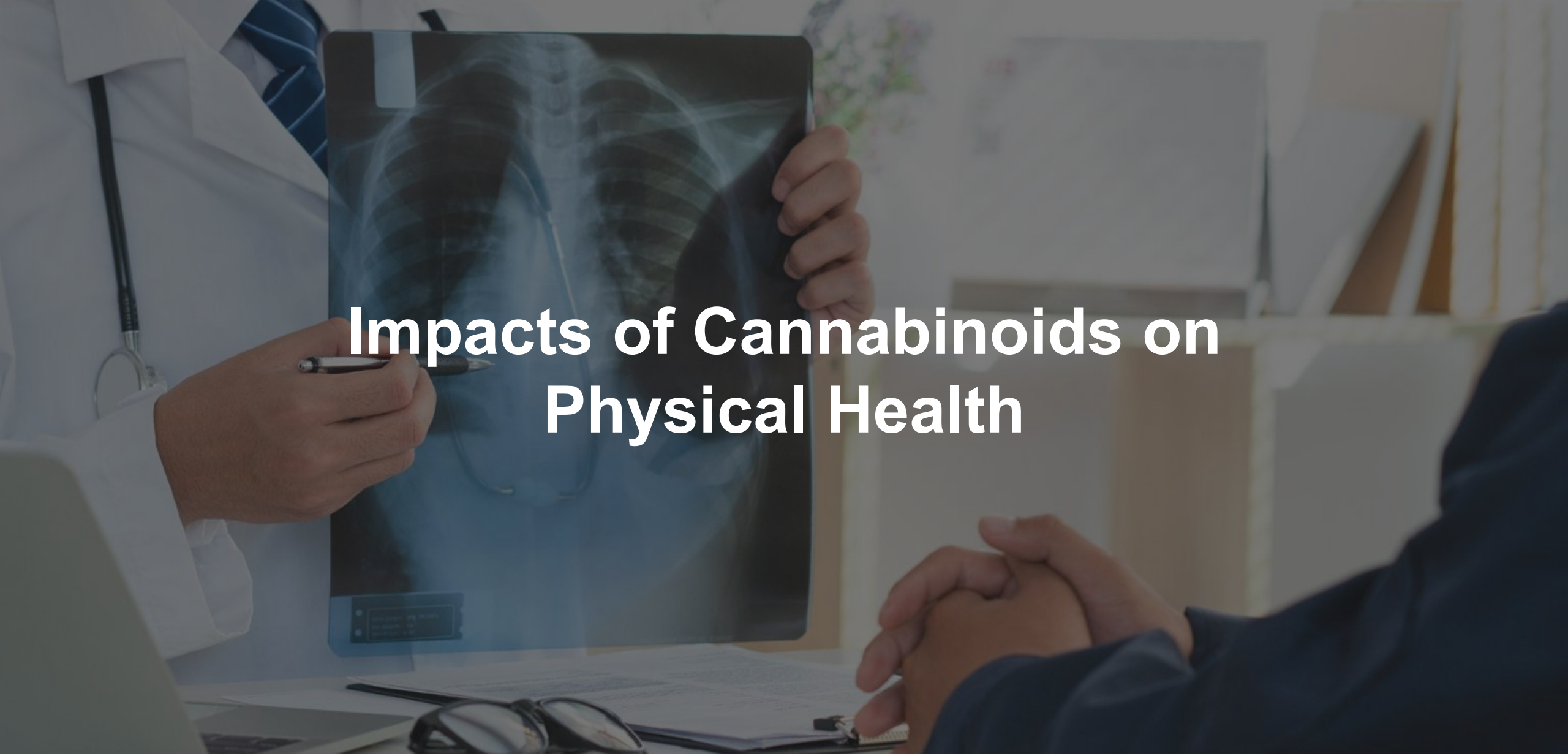
Rates of addiction by age group*:

- Adolescents (12 -17) 1 in 6
- Adults (18+) 1 in 10

Factors influencing risk of addiction:

- Age of Initiation
- Duration of Use
- Frequency of Use
- Potency

*Rate amongst those who use cannabis



Impacts of Cannabinoids on Physical Health

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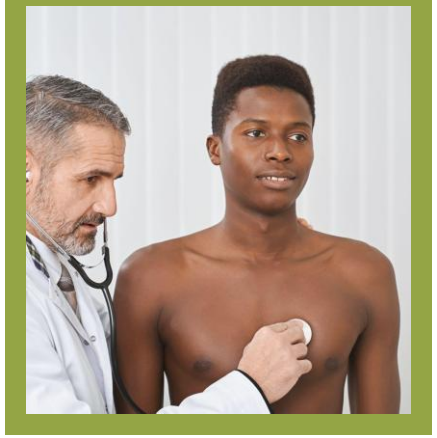
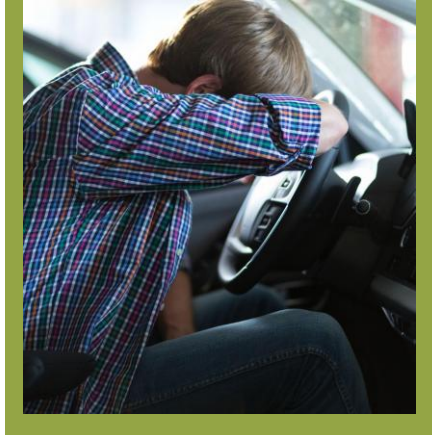
THC – Risk and Adverse Effects

Respiratory: smoking linked to **cough, sputum, wheeze, chronic bronchitis-type symptoms**; irritation reported with vaping.

Cannabinoid Hyperemesis Syndrome (CHS)



Growing evidence of **increased Cardiovascular events** (e.g. stroke), with **heavier use > higher odds.**



Driving impairment

Cannabinoid Hyperemesis Syndrome

- **What it is:** Recurrent cycles of severe **nausea, vomiting, and abdominal pain** in the setting of **chronic, heavy cannabis use**; often relieved by **hot baths/showers**. CHS is frequently misdiagnosed and overlaps with cyclic vomiting syndrome.
- **Who's affected:** Historically, recognized in long-term daily users; **ED visits are rising**, including among **adolescents**. Recent U.S. data show **increasing CHS ED presentations in youth (15–24 y)** and state-level ED trends upward post-legalization.
- **Acute management in ED:** Standard antiemetics often **ineffective**; growing evidence supports **dopamine antagonists** (e.g., **haloperidol, droperidol**) and **topical capsaicin** as symptom-relieving options. **IV fluids** and **electrolyte** correction are routine.
- **Definitive management:** **Cannabis cessation**, symptoms typically remit after sustained abstinence; **relapse** common with resumption. Some guidance suggests abstinence across **several months / cycles** to confirm resolution.

Driving After Cannabis Use

- **What lab/track studies show:** Across 57 studies, THC use led to **more lane weaving** and **slower speeds**. **Cannabis + alcohol** made things **clearly worse.**
- **How long it lasts:** After smoking or vaping, **measurable impairment can persist for a few hours**. Most people are **near baseline by ~4–4.5 hours**, but **not everyone** and people often **feel "fine" before they actually are**.
- **Real-road testing:**

  In an on-road study, **THC-dominant** and **balanced THC/CBD** products **increased lane weaving** 40–100 minutes after use and generally **wore off by ~4–5 hours**.

Driving After Cannabis Use

- **Crash risk in the real world:** Studies comparing crash-involved drivers suggest **~1.5–2× higher crash odds** after **recent cannabis use**, with **even higher risk** when **alcohol is also on board**.

- **Bottom line:** **Impairment can last for several hours** after using THC, and **alcohol worsens effects**.

CBD – Risk and Adverse Effects

- **Liver enzyme elevations (dose-related)**; most occur in first **1–2 months** and more often with **clobazam** co-therapy; monitor LFTs.
- **Common Adverse Effects:** somnolence, decreased appetite, diarrhea; notable **drug–drug interactions** that can worsen side effects (e.g., clobazam).
- **Lower-dose OTC CBD:** emerging data show **rise in liver cell irritation in some healthy adults** at consumer-level doses-evidence evolving; advise medical oversight for sustained daily use.

Impacts of Cannabinoids on Mental Health

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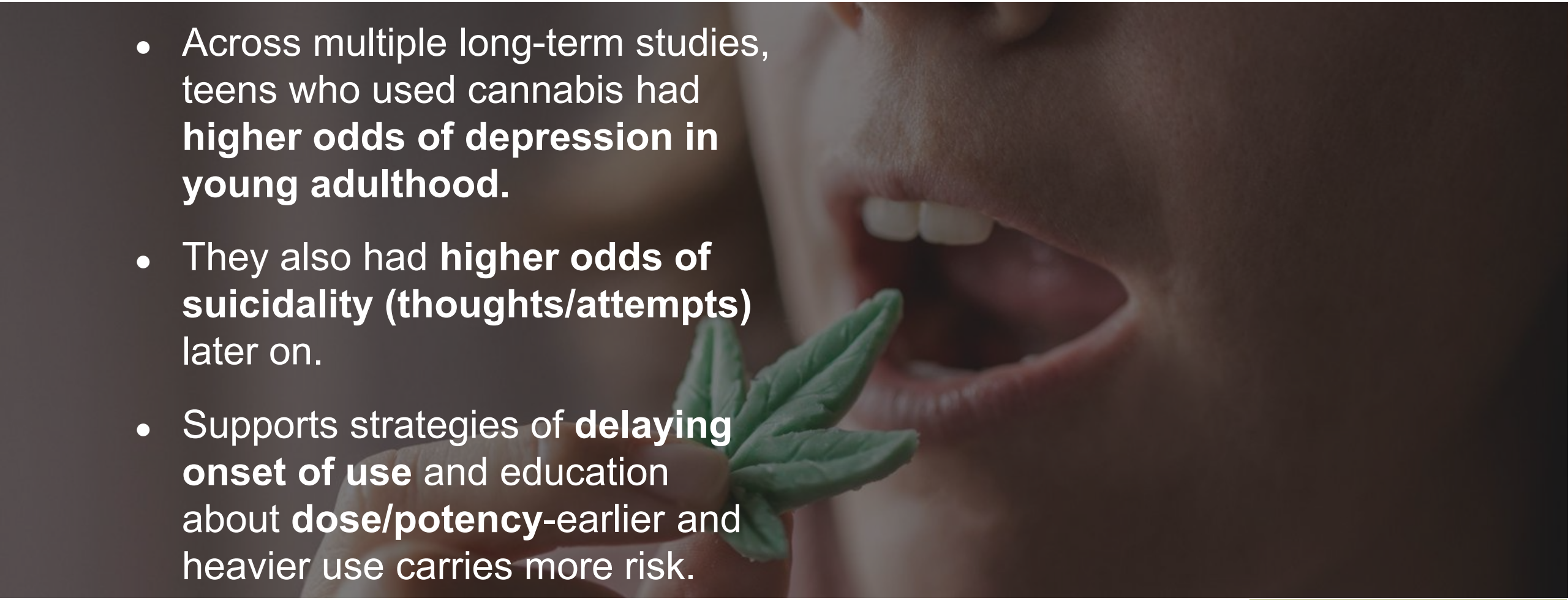
What a single dose of THC can do (short-term)

- In lab studies, a **single dose of THC** can briefly cause **paranoia, unusual thoughts or perceptions, and flattened mood/energy**-even in people without a mental-health diagnosis.
- These effects are **dose-dependent** and usually **wear off within hours**; they're strongest soon after use.
- CBD by itself did not reliably produce these psychiatric effects in experiments.

Why potency & daily use matter

- Using **higher-THC (high-potency) products** is linked with a **higher risk of psychosis** and **cannabis use disorder** compared with lower-THC products.
- In international case-control data, **daily use of high-potency cannabis** was tied to **more psychotic symptoms and higher rates of first-episode psychosis** in the community.
- Takeaway: **Potency x frequency** drives risk; daily/high-potency use is the riskiest pattern.

If teens use cannabis, later risks for mood & suicide go up



- Across multiple long-term studies, teens who used cannabis had **higher odds of depression in young adulthood.**
- They also had **higher odds of suicidality (thoughts/attempts)** later on.
- Supports strategies of **delaying onset of use** and education about **dose/potency**-earlier and heavier use carries more risk.

After psychosis starts, continuing cannabis worsens outcomes

- For people with a psychotic disorder, **continuing to use cannabis** is linked to **more relapses** and **more hospitalizations** than stopping.
- Part of this may involve **poorer medication adherence** in those who keep using cannabis.
- **Stopping cannabis** after a first episode is associated with **better symptom control** over time.

Risk and
Protective
Factors

Individual/Peer

Individual/Peer

PROTECTIVE FACTORS

- Self-efficacy to say no to substance use
- Future college aspirations
- Peer disapproval of marijuana use
- Involvement in sports and physical activity

RISK FACTORS

- Antisocial behavior
- High sensation seeking
- Aggression
- Use of marijuana may lead to using other substances
- Use of other substances is associated with higher risk of using marijuana
- Perceptions of peer marijuana use
- Low perceived harm of marijuana use
- Genetics

Source: Grisby et al., 2023, Substance Abuse: Research and Treatment

Family

Family

PROTECTIVE FACTORS

- Parental identification*
- Maternal affection
- Higher parental monitoring of child behavior
- Restrictive marijuana specific parental rules
- Perceived parental trust

RISK FACTORS

- Parental acceptance of substance use
- Parental or sibling substance use
- Family conflict
- Poor parent-youth relationships
- Parents who did not graduate high school

***Parental identification refers to a youth's desire to emulate his or her parent.**

Source: Grisby et al., 2023, Substance Abuse: Research and Treatment

School

School

PROTECTIVE FACTORS

- School belonging
- School involvement
- Authoritative school environment
- School connectedness
- Remedial approach to marijuana policy violations

RISK FACTORS

- Low policy enforcement
- Out of school suspension
- High absenteeism

Source: Grisby et al., 2023, Substance Abuse: Research and Treatment

Community

Community

PROTECTIVE FACTORS

- Prosocial opportunities (community sports, youth programs, etc.)
- Community norms that discourage youth use

RISK FACTORS

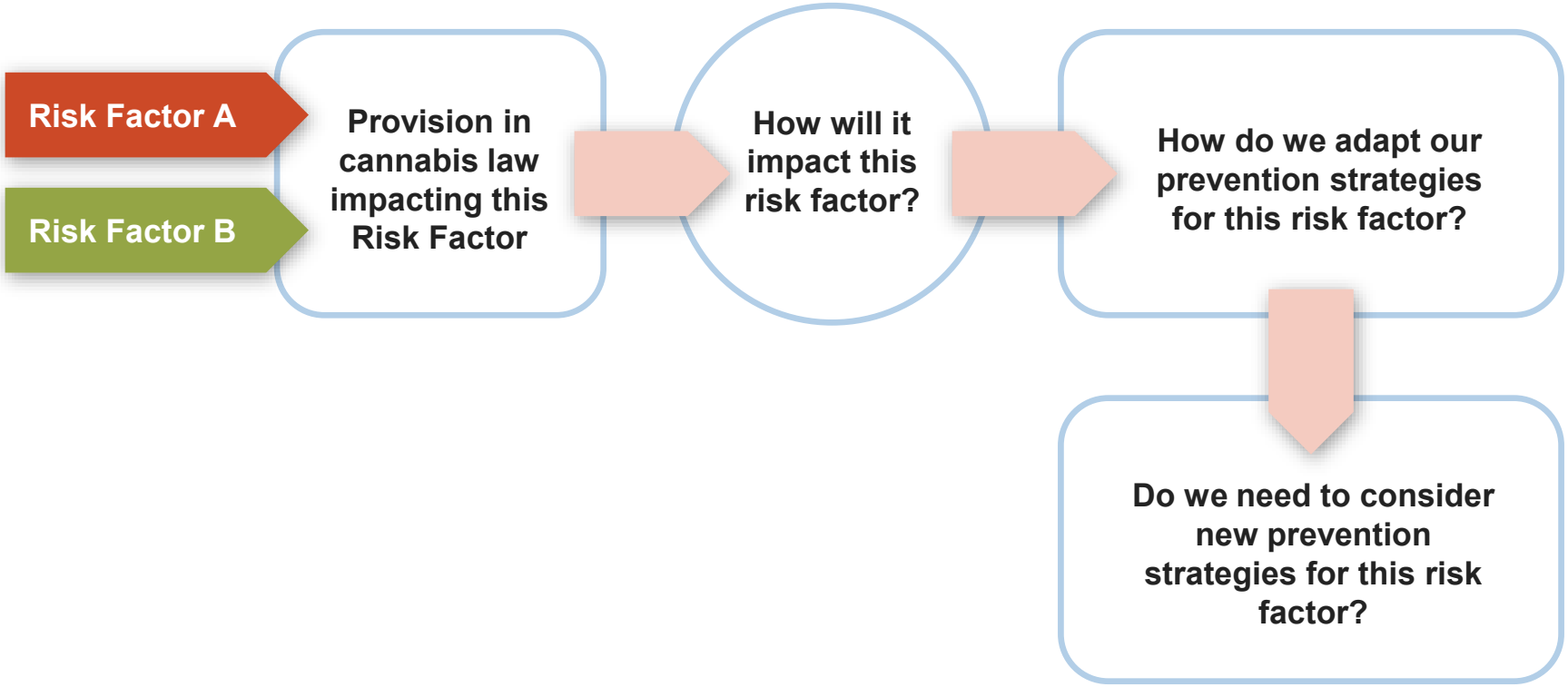
- Widespread availability of marijuana
- Greater marijuana outlet density
- More days and hours of marijuana sales
- Exposure to marijuana marketing
- Youth liking or following marijuana businesses on social media
- Owning cannabis-branded merchandise or having favorite cannabis brand
- New marijuana products that attract youth

Source: Grisby et al., 2023, Substance Abuse: Research and Treatment

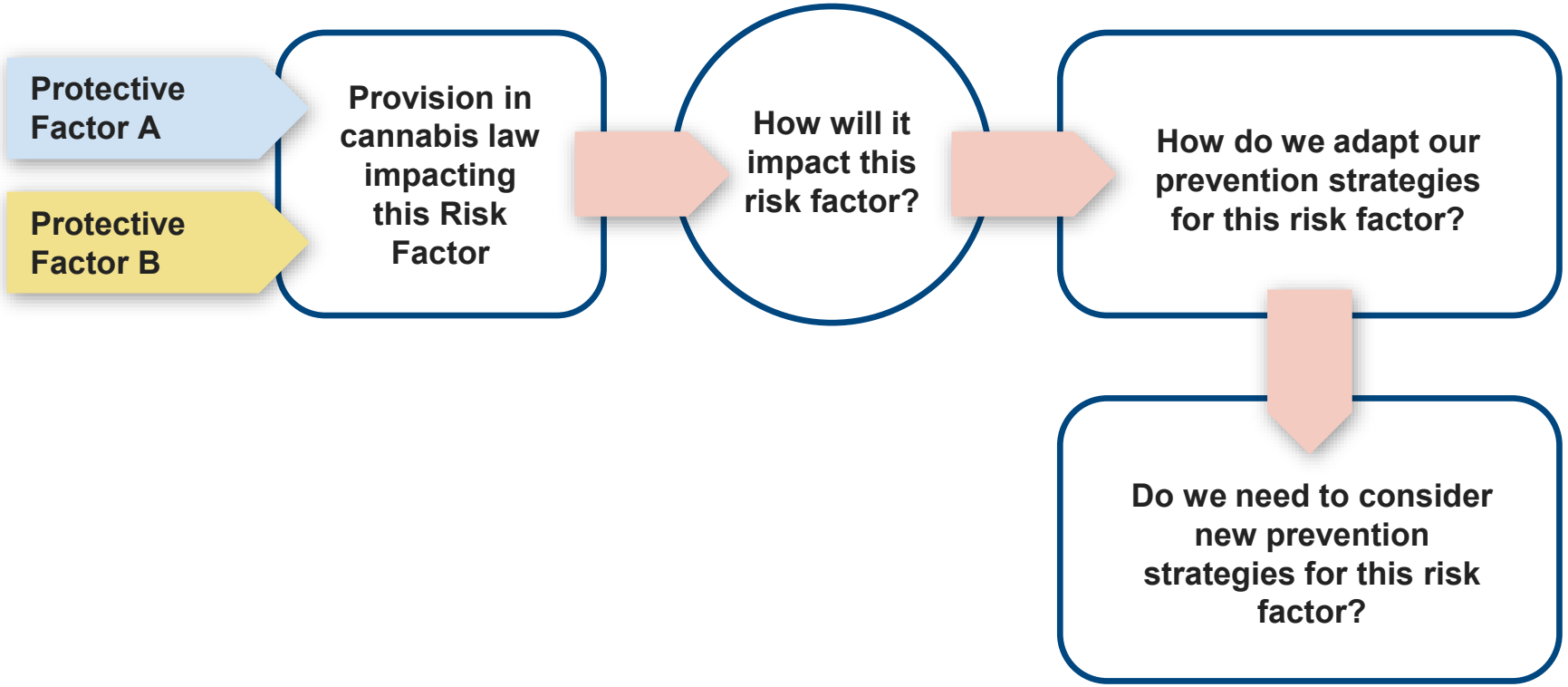
Policy Impacts Risk Factors

Low Perception of Risk/Harm	Labeling & Packaging Advertising
Retail Access	Buffer zones Dispensary Caps Density Caps Hours of operation License types allowed
Social Access	Social host laws Regulations on home grows
Pricing & Promotion	Advertising Cultivation
Policies & Enforcement	Provisions/funding for training law enforcement Structure of state regulation
Norms favorable to youth substance use	Labeling & Packaging Advertising

Risk & Protective Factor Inventory of Cannabis laws & policies



Risk & Protective Factor Inventory of Cannabis laws & policies



Creating an Inventory

Instructions:

Use the chart on the following page to conduct an inventory of state and/or local marijuana policies. Identify, list, and describe the provisions in the policy that could impact risk factors you have prioritized for your cannabis prevention initiatives. You may want to include the name of the document and a link or page number so your coalition members or other collaborators can find and review the provisions in the source material.

This inventory can be helpful in multiple ways. If in your role you are allowed to engage in outreach, this will give you a priority list to work from. The inventory can also help in implementation of **the cannabis prevention strategies** m the selection, planning, and you develop in other parts of this planner.

Description of State or Local Policy Provision (Include section number and page number)	**Risk Factor Impacted**

Key Takeaways

- There are many cannabinoids in the cannabis plant beyond THC and CBD, and many emerging synthetic and semi-synthetic cannabinoids.
- The endocannabinoid system is an important system in our body, and disruption of the natural functioning of this system in youth can impact development.
- Psychoactive cannabinoids have a variety of risks and impacts to the physical and mental health of adolescents.
- There are many risk and protective factors associated with youth cannabis use, and cannabis policies can impact these positively or negatively.

Scott Gagnon
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Central East (HHS Region 3)
PTTC

Next Session

Wednesday

DECEMBER

4th

2025

1:00 PM

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Preview Session 2

1. List at least three state, local, or organizational level policies that could prevent and reduce youth cannabis use
2. Describe a motivational interviewing framework for discussing cannabis with youth

- What's the value of today's session?
- What did you learn and what are you leaving with?

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Contact Us

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