

Cannabis Use in Adolescence: What Parents Need to Know

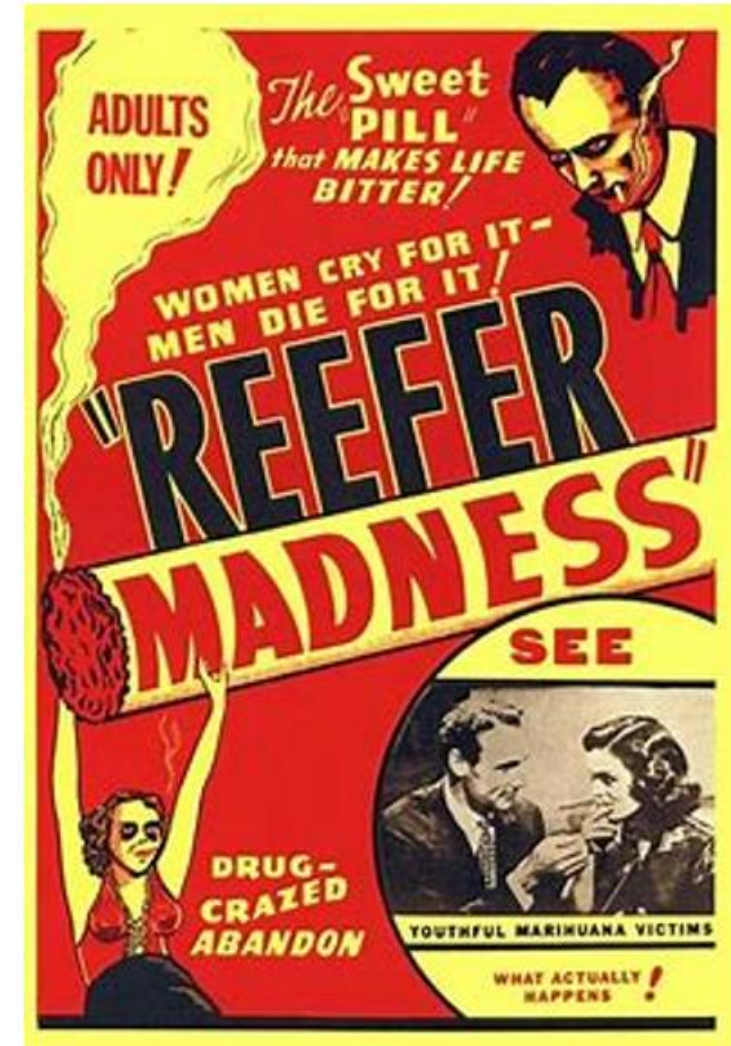
December 17, 2024

Maine Public Health Association

Amy M. Mayhew, MD, MPH

Adult, Child & Adolescent Psychiatrist

- Passage of laws in many states making both medicinal and recreational use legal
- Increase of tetrahydrocannabinol (THC) content by six or sevenfold in today's products
- Explosion of options for ingesting marijuana
- Lack of FDA oversight
- General view of the public that marijuana is safe and 'natural'
- General lack of public health information that examines marijuana usage and risks and benefits

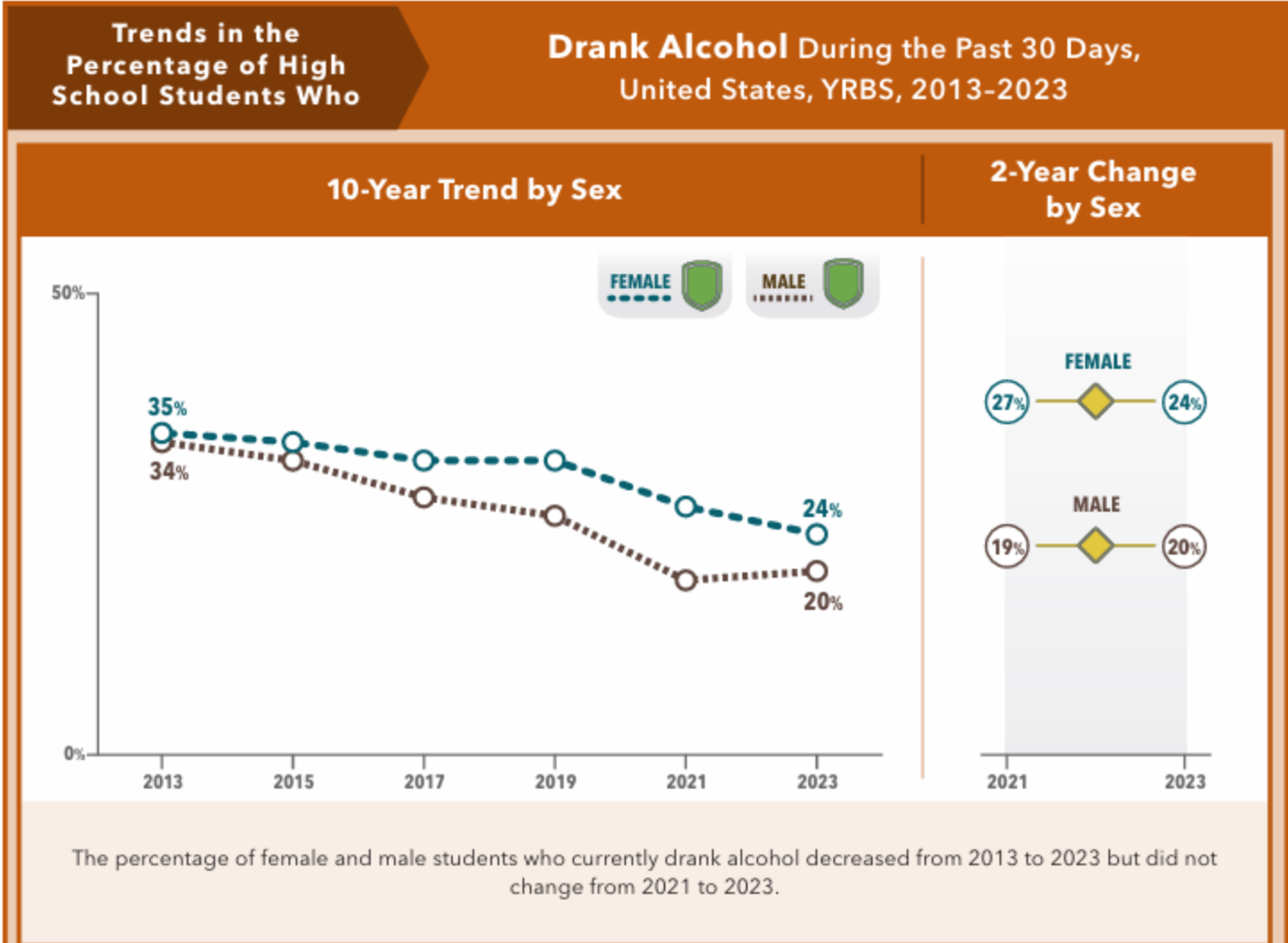


Maine and Cannabis

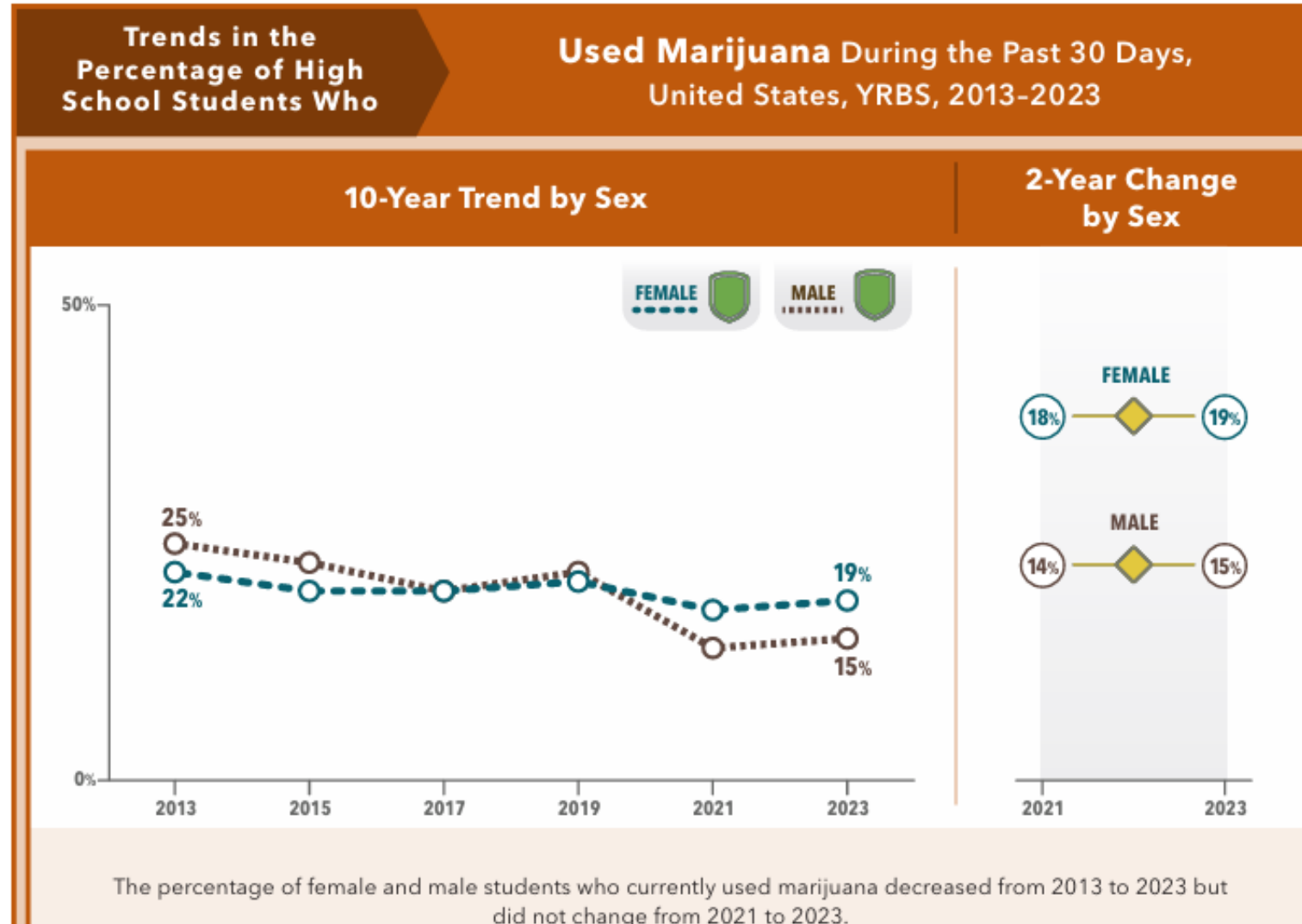
- Medicinal dispensaries first opened in 2011
- Recreational dispensaries opened in 2020
- Adults 21 years of age or older can possess up to 2.5 oz of cannabis, cannabis concentrate, or products
- Medical cardholders can enter a medical dispensary if they are 18 years old
- If they are under 18, their 21 or older caregiver can purchase on their behalf
- Cannabis can only be consumed in a private residence or on private property

- Sales of \$217 million in 2023, a 36% increase over the previous year's amount of \$159 million (Press Herald)
- The state gained \$21 million in tax revenue in 2023
- Price also decreased by 16% in 2023 from \$16.68 per gram to \$7.53 per gram

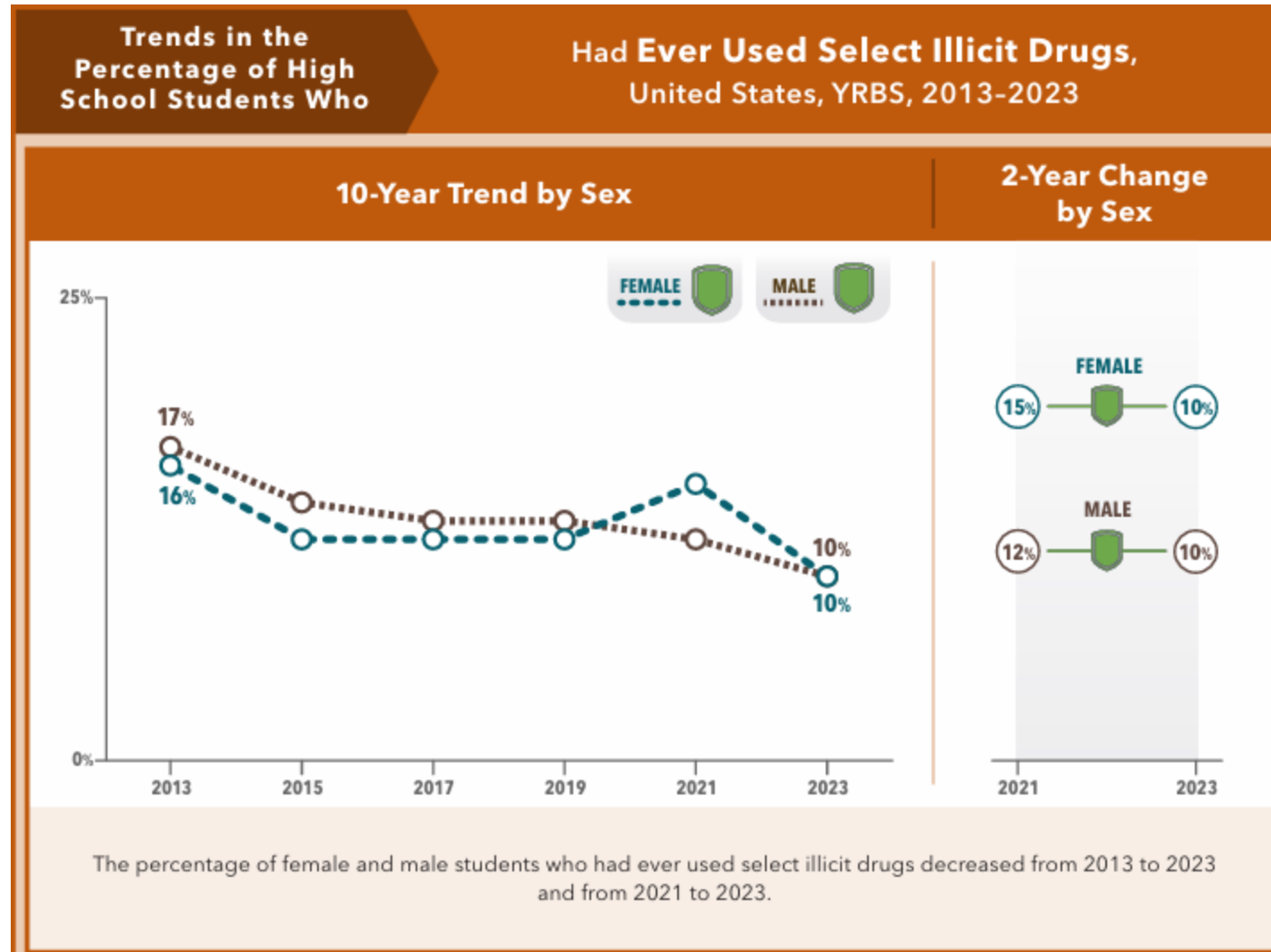
CDC Youth Risk Behavior Survey 2023



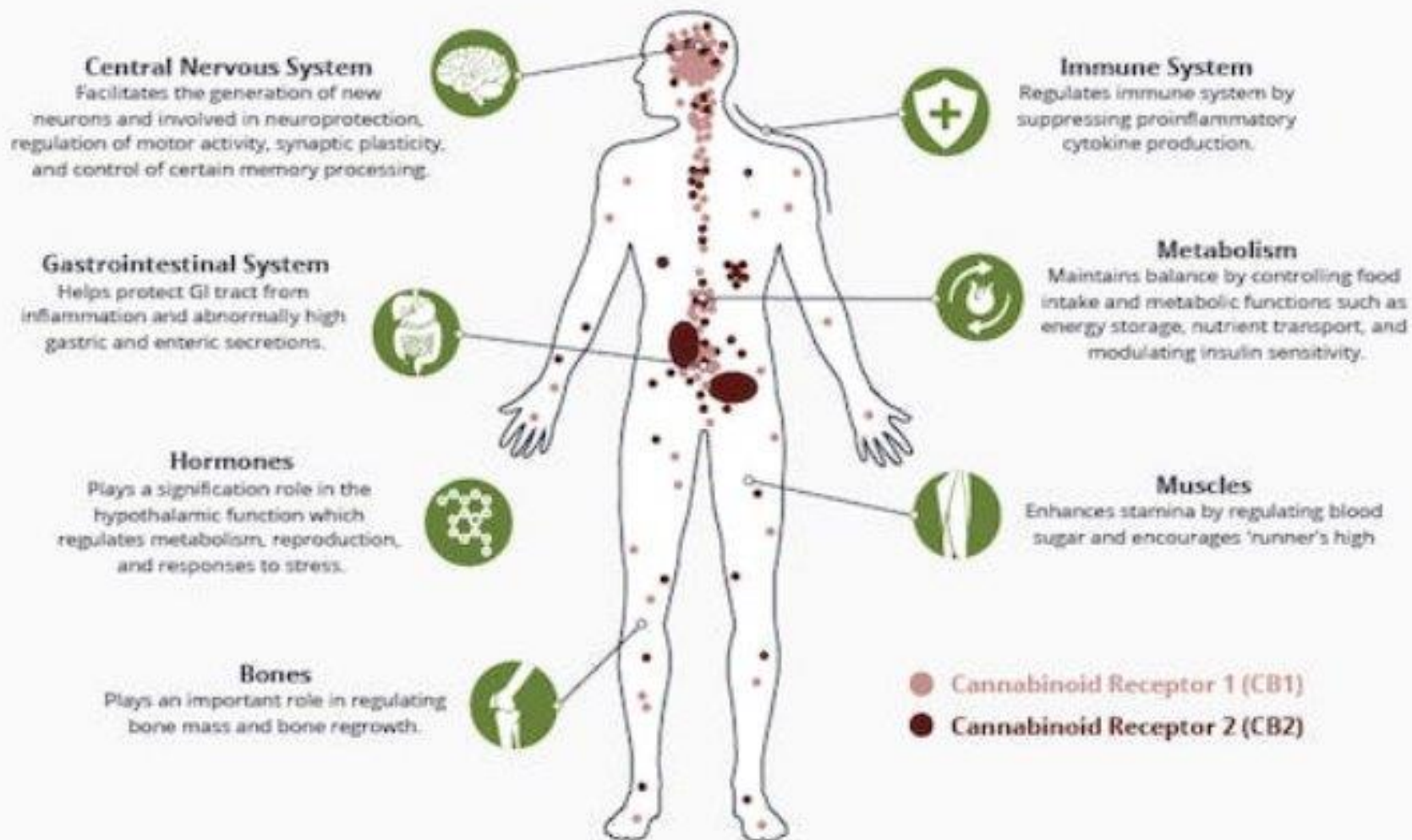
CDC Youth Risk Behavior Survey 2023



CDC Youth Risk Behavior Survey 2023



THE BODY'S ENDOCANNABINOID SYSTEM



Medical Uses of Cannabis- some data

- Lennox-Gastaut syndrome (children- 2nd line)
- Dravet syndrome (children- 2nd line)
- Chronic pain (adults)
- Anti-emetics (adults)
- Spasticity in multiple sclerosis (adults)
- Irritable bowel syndrome (adults-weak evidence)
- Social anxiety (CBD)
- Sleep and PTSD (weak evidence)
- No benefit found for depression (Sams, 2020)

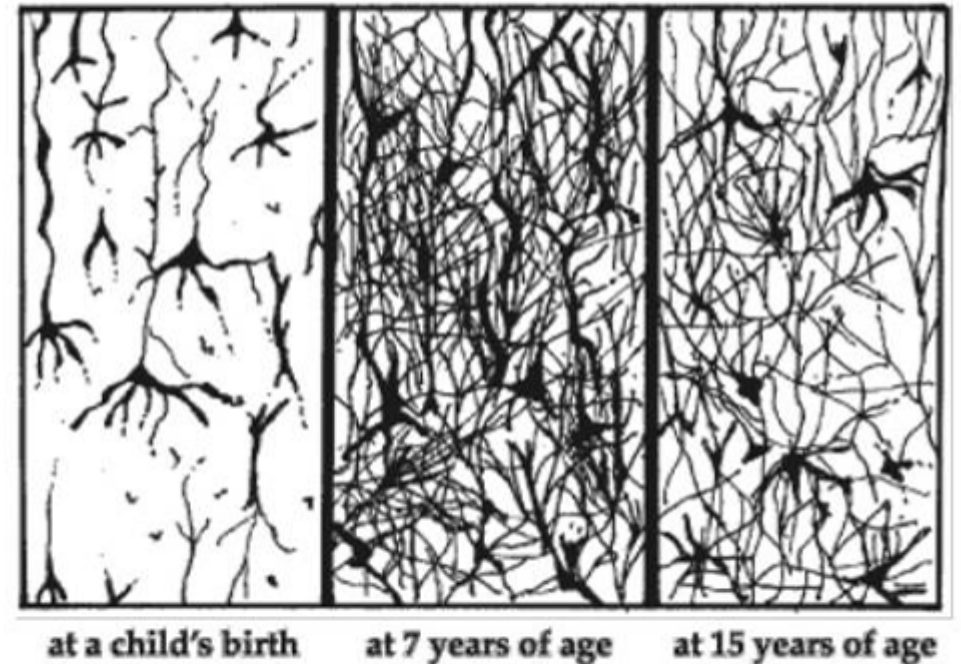


Research supporting the use of smoked cannabis for medical conditions is limited to **less than 10% THC**

- All studies of smoked medicinal cannabis showing benefit – done with less than 10% THC
Whiting PF, Wolff RF, Deshpande S et al. Cannabinoids for medical use a systematic review and meta-analysis. JAMA 2015;313:2456-2473
- No legitimate science exists to validate medicinal cannabis greater than 10% THC
- A study in healthy volunteers on cannabis effects in capsaicin-induced pain found a window of modest analgesia for smoked cannabis. Wallace M et al. Anesthesiology 2007;107:785-796
 - 2% THC provided no benefit
 - 4% THC provided significant pain decrease
 - 8% THC caused increased pain or hyperalgesia

Neurocognitive Adverse Effects

- Because of role in the prefrontal cortex and hippocampus, maturation of circuits regulating attention, executive functioning, and memory can be affected by cannabis use during adolescence (Rubino, 2009)
- Persistent neurocognitive changes and lower functioning even after abstaining from cannabis use, even after a year (Meier, 2012)
- Cannabis use was adverse effects on IQ and executive functioning and declines in neural connectivity (Camchong, 2017)
- Those who start using before 17 yo have reduced odds of high school graduation, more likely to have cannabis use disorder, more likely to use other illicit substances and tobacco, and more suicide attempts (Silins, 2014)

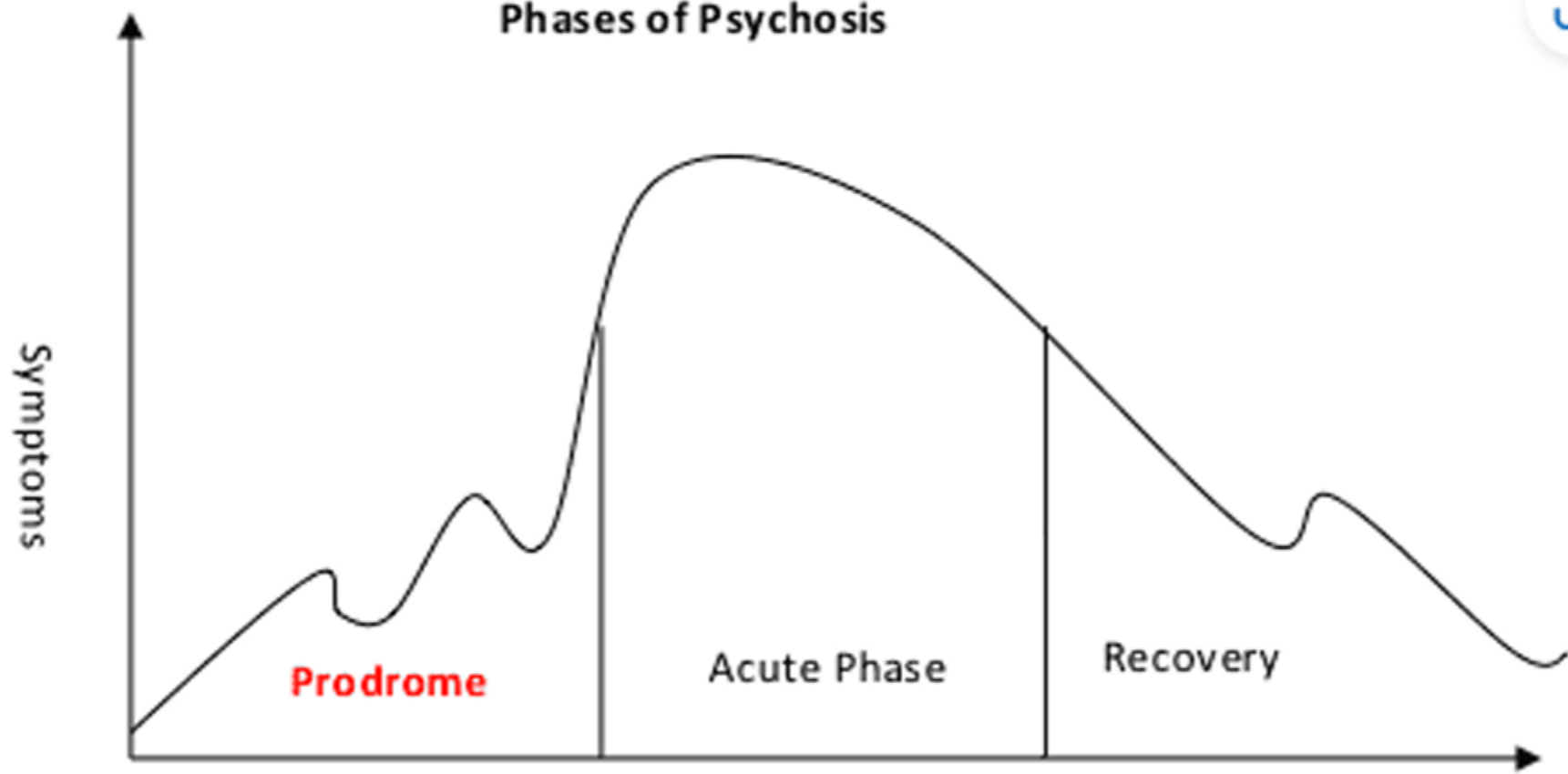


Psychosis

- A range of conditions that affect the mind in which there has been some loss of contact with reality
- Hallucinations and delusions can be very real and distressing
- Also changes to thought processes, mood, sleep, and behavior
- Majority of cases first occur between 13-30
- Use of THC in particular may trigger psychosis in certain individuals, especially with earlier use and more potent strains
- Accelerated loss of grey matter volume in those with schizophrenia



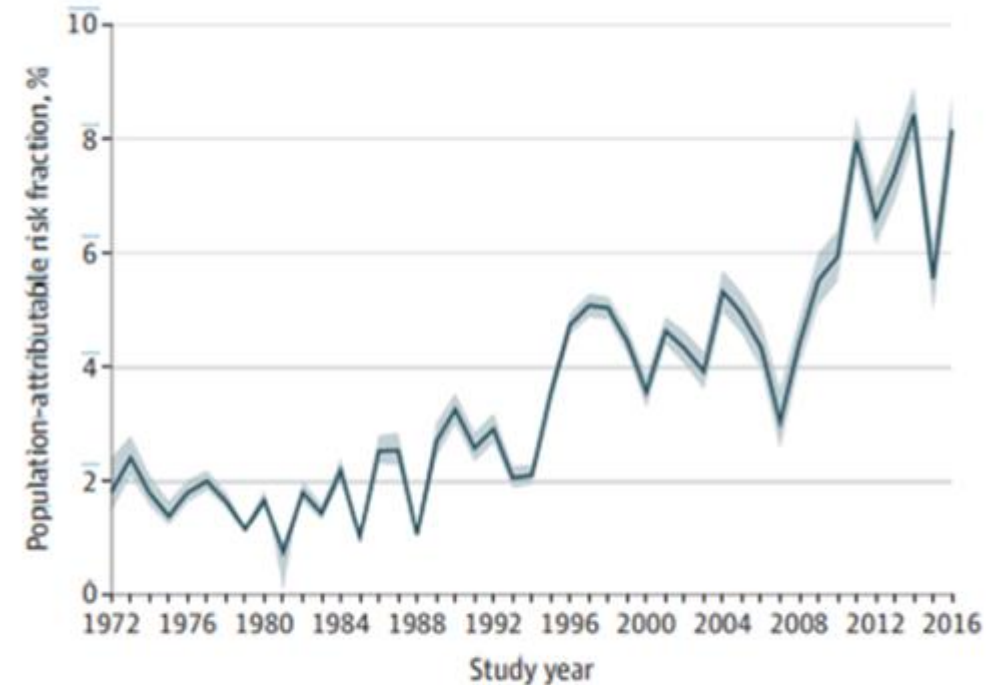
Phases of Psychosis



Increased potency in past 2 decades has resulted in a 4-fold increase in cannabis use and Schizophrenia

- Very large longitudinal population-based study of **7,186, 834 individuals** in Denmark
- The population-attributable risk fraction for cannabis use disorder in schizophrenia increased from approximately 2% in the period to 1995 to approximately 6% to 8% since 2010.
- This study challenges the often-cited argument against causality that an expected increase in cases of schizophrenia attributable to cannabis use has not been observed.
- Hjorthøj C et al. JAMA Psychiatry July 21, **2021**

Figure 2. Development of the Population-Attributable Risk Fraction (PARF) of Cannabis Use Disorder in Schizophrenia in Denmark



Shaded areas indicate 95% CIs.

Credit to Dr. Elizabeth Stuyt, MD

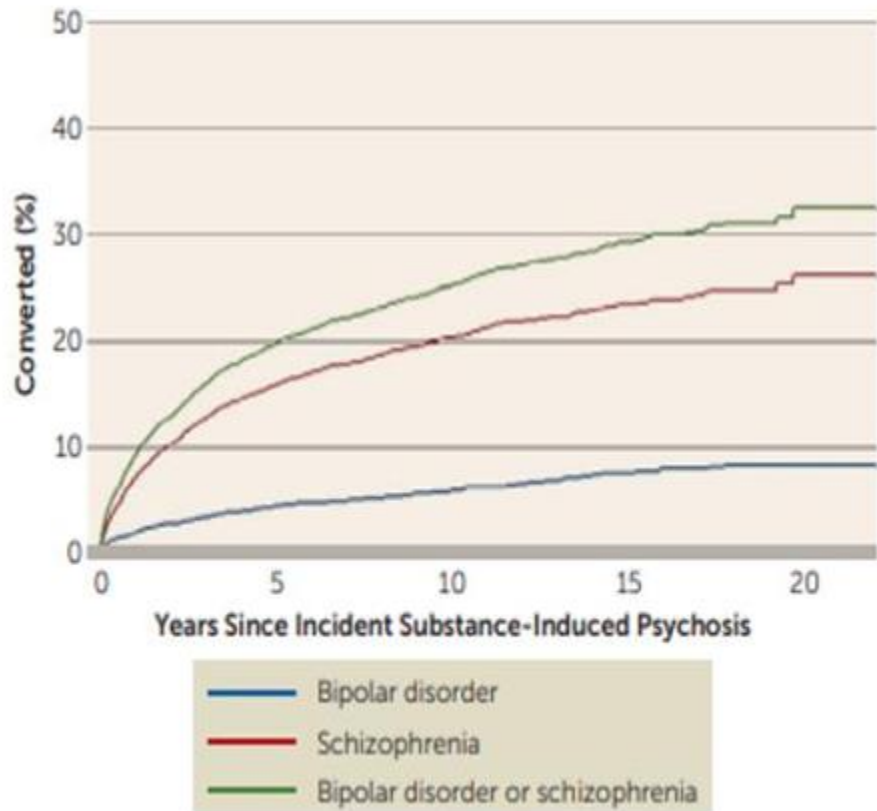
Marijuana and Psychosis

- Ten European and one Brazilian site, 901 pts c 1st episode of psychosis, 1237 healthy controls (Lancet)
- Daily marijuana use and high-potency marijuana (THC>10%) are strongest predictors of a psychotic episode
- Individuals with high potency MJ 1.6 times more likely to develop psychosis than non-users
- High potency and daily use 5 times more likely to develop psychosis than non-users
- 12.2% of episodes of 1st episode psychosis could be prevented, rising to 30.3 % in London and 50.3% in Amsterdam



Rates of conversion to schizophrenia or bipolar disorder after substance-induced psychosis

FIGURE 1. Rates of Conversion to Schizophrenia and Bipolar Disorder Following Incident Substance-Induced Psychosis in a Registry Study (N=6,788)



- 32.2% of patients with substance-induced psychosis later converted to either bipolar disorder or schizophrenia
- Highest conversion rate (47.7%) was for cannabis-induced psychosis
- Young age associated with a greater risk of conversion, risk highest in the range of 16-25 years
- Self-harm after an episode of substance-induced psychosis also linked with a greater risk of conversion to schizophrenia or bipolar disorder

Epub 2021 Feb 22.

Cannabis use in adolescence and risk of psychosis: Are there factors that moderate this relationship? A systematic review and meta-analysis

Sarah Kanana Kiburi ^{1 2}, Keneilwe Molebatsi ^{3 4}, Vuyokazi Ntlantsana ⁴, Michael T Lynskey ⁵

63 studies in narrative review, 18 studies in meta-analysis

Important factors for psychosis risk:

- age of onset of cannabis use
- frequency of cannabis use
- exposure to childhood trauma
- concurrent use of other substances
- genetic factors

Biggest risk factors with cannabis for psychosis or schizophrenia

- Using cannabis before the age of 16; best to use after brain maturation
- Dose-dependent relationship of risk
- Any cannabis use associated with a 40% increased risk of psychosis
- Higher frequency and potency increases risk and severity of psychotic symptoms
- Those with a family history of psychosis are 2.5-10 times more likely to develop a psychotic illness

Cannabis and Bipolar Disorder



- Relatively well-known association between marijuana and psychotic spectrum illnesses
- Several articles have shown that marijuana may worsen manic symptoms in those with bipolar disorder
- Cannabis may also be a causal risk factor, with an increased incidence of up to three-fold
- *Cannabis use and mania symptoms: a systematic review and meta-analysis, Gibbs, M, et al; J Affective Disord Jan 2015*

Cannabis and Depression

- Meta-analysis of 11 studies and 23.317 individuals
- OR of developing depression in MJ users vs non-users is 1.37 (95% CI 1.16-1.62)
- OR of anxiety not statistically significant 1.18 (95% CI 0.84-1.67)
- OR of suicidal ideation of 1.50 (95% CI 1.11-2.03)
- OR for suicide attempt of 3.46 (95% CI 1.53-7.84)



(Gobbi, 2019)

Cannabis and Anxiety



- Anxiety is often cited by adolescence as a reason they use cannabis
- Anxiety is one of the most common disorders
- Acute use of MJ can either mitigate or cause anxiety; CBD often cited as being more helpful
- Anxiety returns when person is no longer using, having not learned any skills
- 27 adolescent studies: 67% found a positive relationship between anxiety and MJ use, but relationship was unclear (causal or incidental)

Cannabis Use and Sequellae

- Most adolescents do not perceive MJ use as harmful or addictive
- As opposed to ETOH, drivers feel MJ is safer to use while driving, yet do not understand the effects (Keyes, 2016)
- Animal studies show MJ does prime the brain to the effects of other substances
- Those who use MJ have a 2.78 increased risk of opiate use disorder, as well as increased risk of stimulants, cocaine, and injection drugs (Olfson, 2018)
- 8-12% of MJ users will develop moderate to severe cannabis disorders
- Withdrawal is not fatal, but within a week of stopping can be linked to irritability or aggression, anxiety, decreased appetite, depressed mood, abdominal pain, tremor, fever chills and headaches

