

# Cannabis and Health

## Module 4

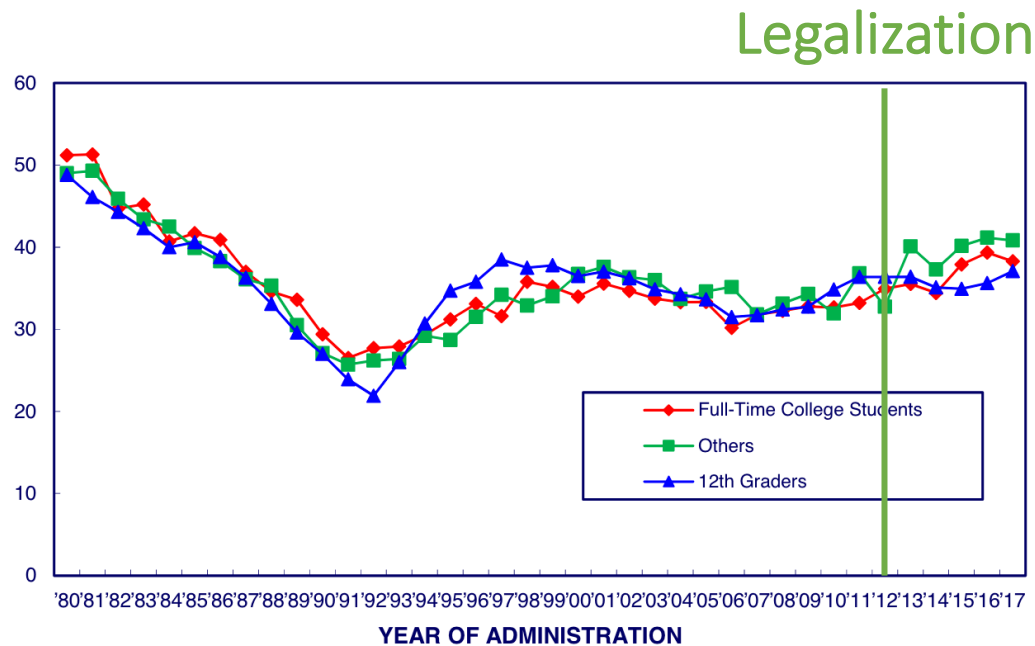
### Lecture 3: Impact of Legalization on Epidemiology

# Epidemiology

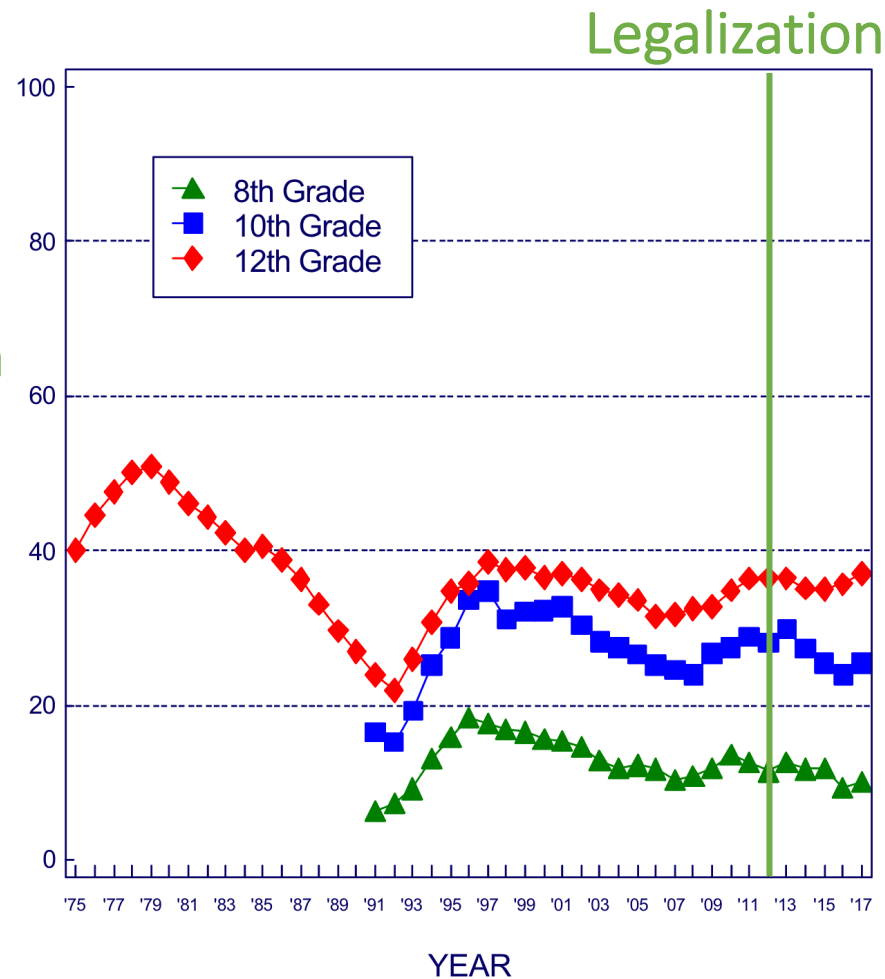
- Epidemiology is the study of the prevalence and determinants of health and disease conditions in defined populations
  - Ideal for assessing patterns at the population level
  - Example: has cannabis use increased since legalization?
- The Monitoring the Future study is a long-term epidemiological study (since 1975) of the trends in drug use/attitudes among U.S. adolescents and adults
  - 50,000 adolescents across 400 schools complete the survey annually
  - Assesses personal use, perceived risk of use, and disapproval of use

# 2017 Monitoring the Future: Past-Year Use

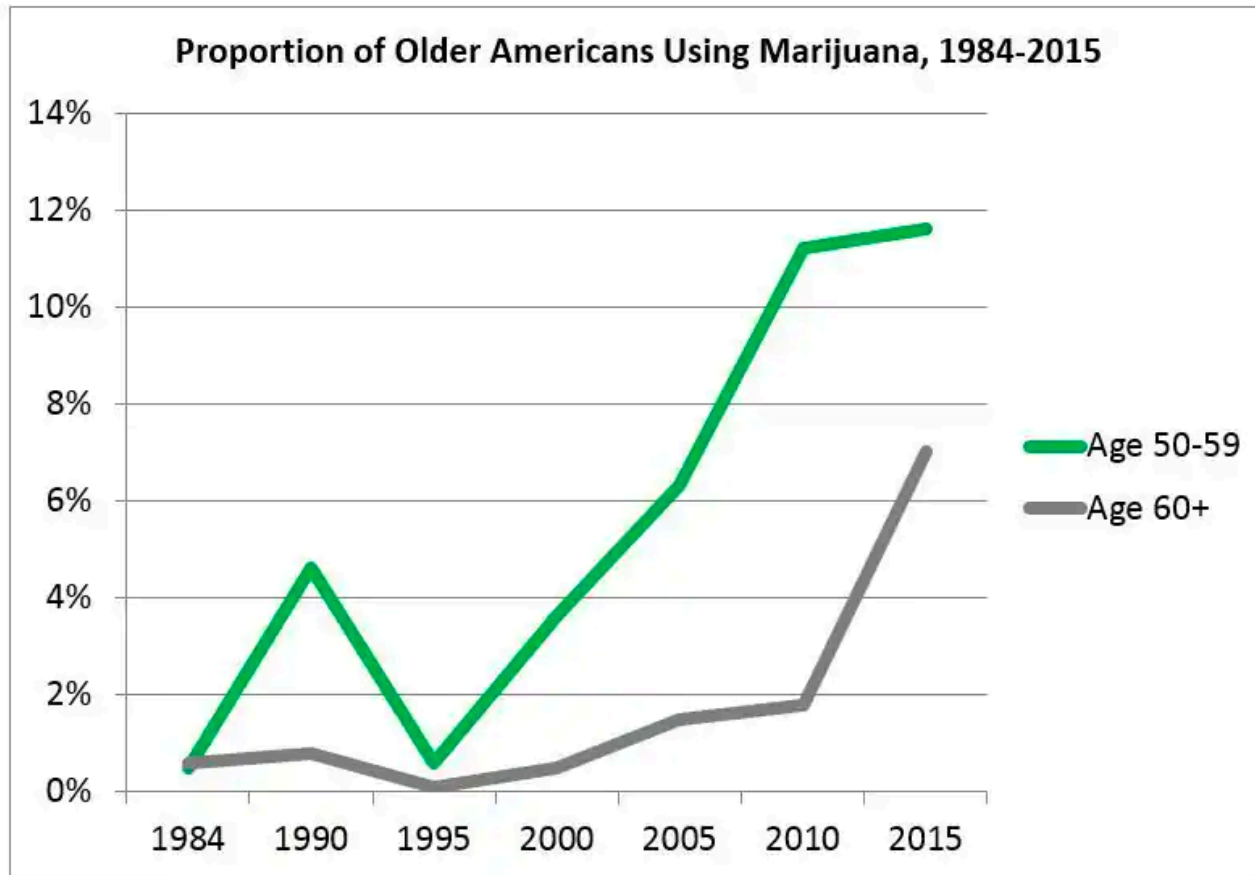
## Adults



## Adolescents



# Demographic increasing the fastest? Aging population.



Source: March 2018 issue of [Addiction](#).

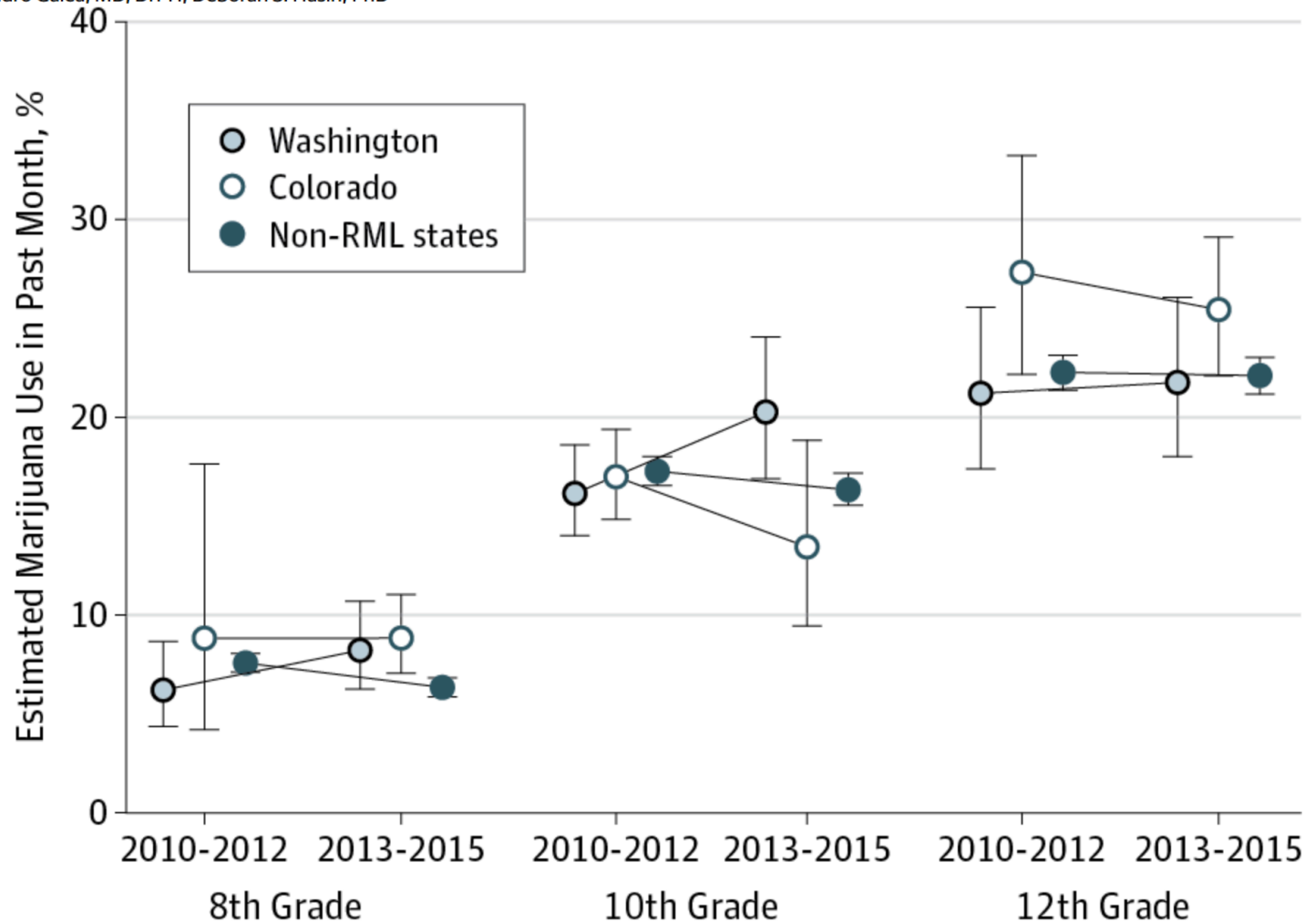
Also see Han & Palamar, 2018

# Monitoring the Future: Past-Year Use

- These findings don't differentiate states with and without legalized recreational cannabis.
  - Recent work (Cerdeira et al., 2017) used Monitoring the Future data to examine this possibility, by comparing Colorado and Washington with other states.

# Association of State Recreational Marijuana Laws With Adolescent Marijuana Use

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Aaron Sarvet, MPH; John Schulenberg, PhD; Patrick M. O'Malley, PhD; Rosalie Liccardo Pacula, PhD;  
Sandro Galea, MD, DrPH; Deborah S. Hasin, PhD

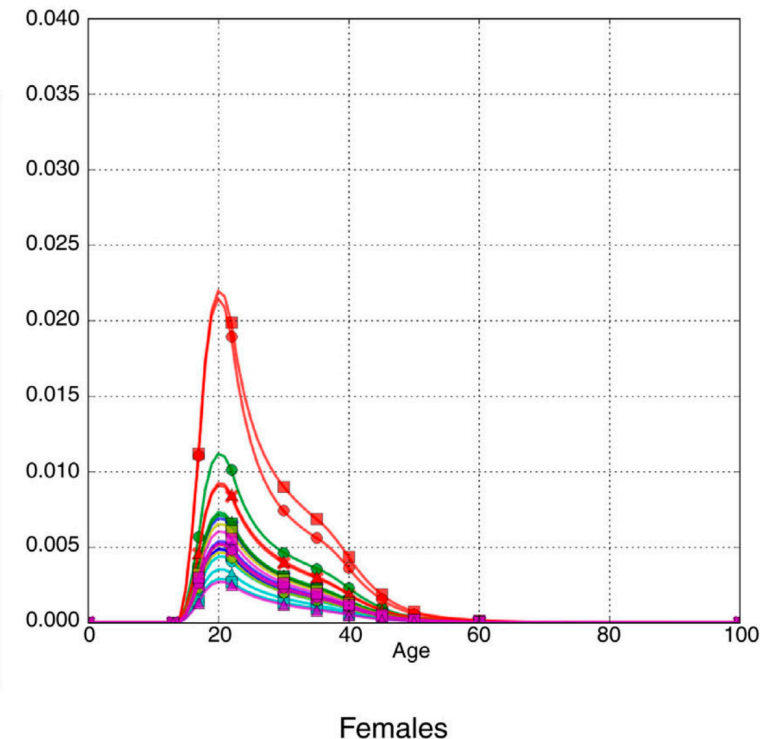
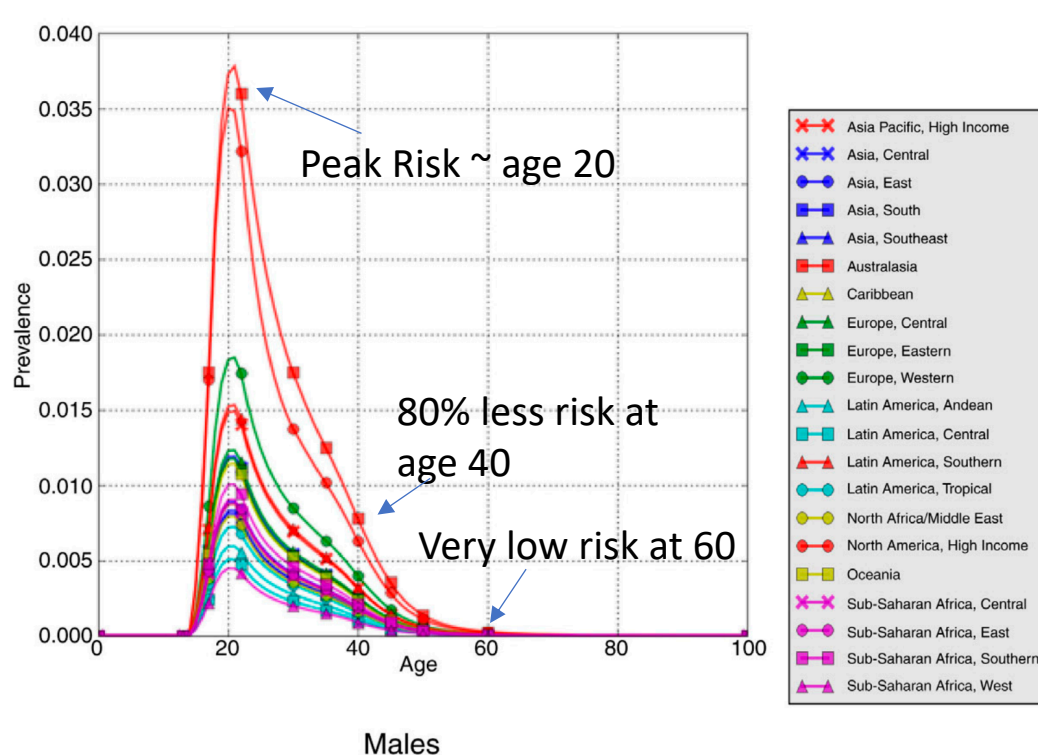


# Epidemiology: Summary

- Findings don't support a nationwide increase in cannabis use, since legalization, among adolescents
  - There may be an increase among adults
- Changes in states with legalized cannabis haven't been consistent
  - Some small increases in use in Washington
  - Some small (non-significant) decreases in Colorado
- A similar study looked at cannabis use in Oregon after legalization
  - Cannabis use increased (vs. students in other states), but only for those who reported heavy alcohol use

# Risks: Addiction

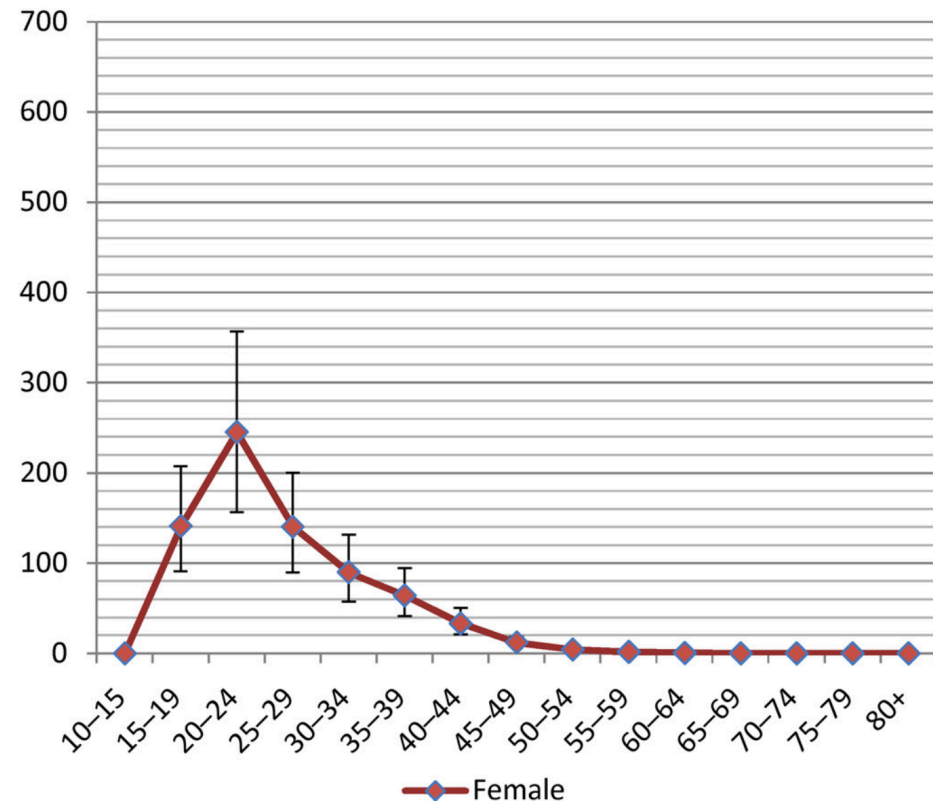
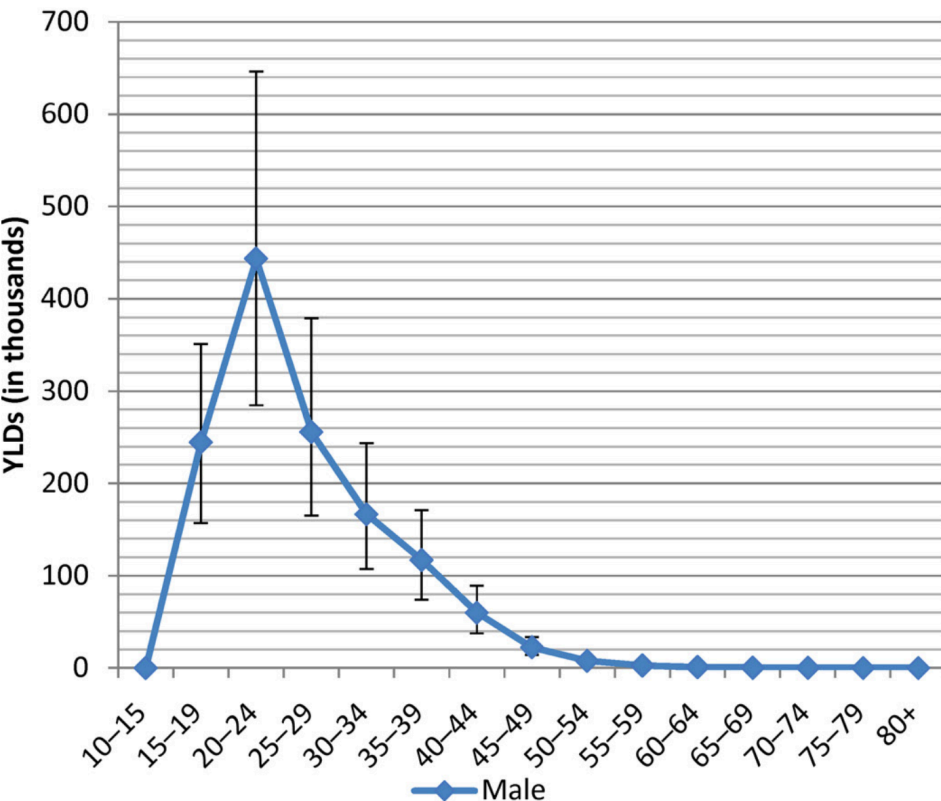
- Degenhardt et al. (2013) reviewed all studies since 1990, spanning 187 countries.
  - 13 million meet criteria for cannabis dependence.
  - Peaks in early adulthood at 2% (females) to 4% (males).





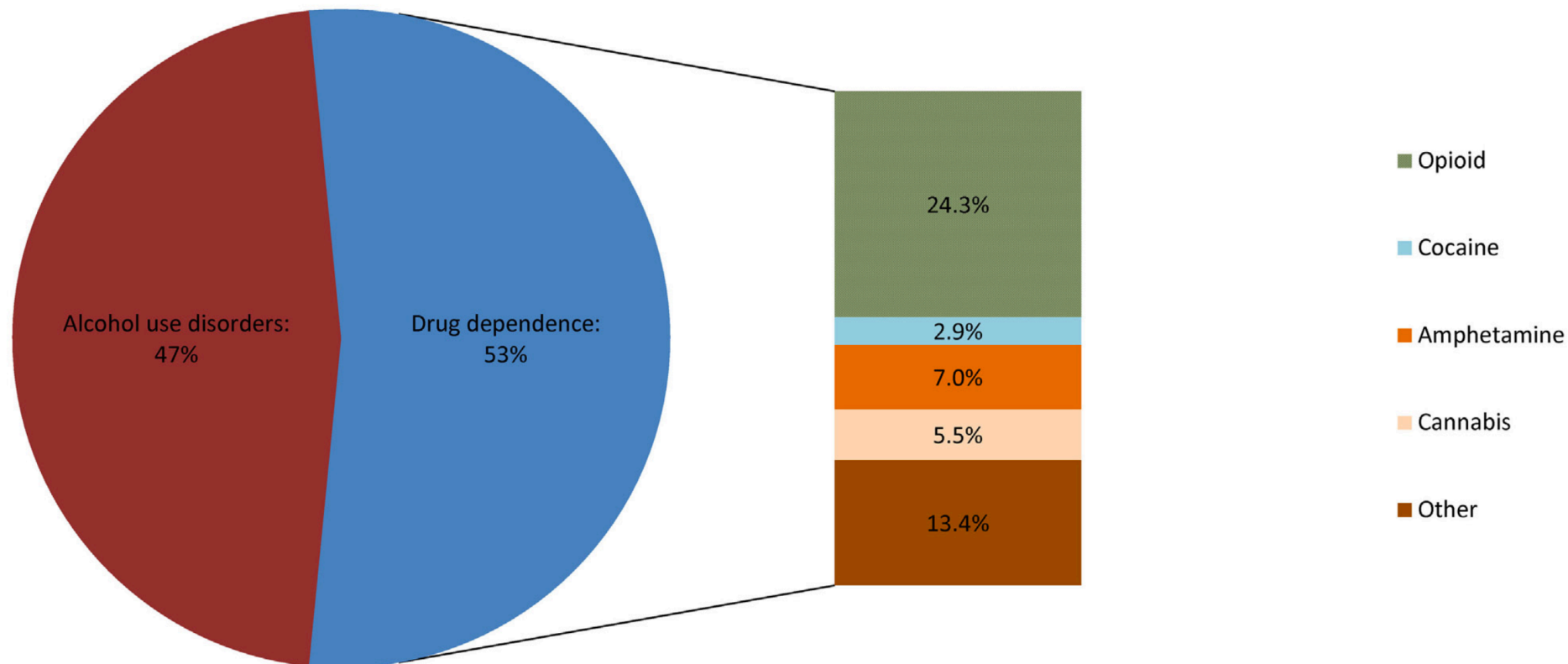
# Risks: Disability

- Additionally, increases in disability mirror increases in dependence
  - Estimated as the global “years lived with disability” (YLD)



# Risks: Disability (1990—2008)

- Compared to other drugs, cannabis accounts for a small proportion of disability (Degenhardt et al., 2013)
  - Estimated as the global “disability adjusted life year” (DALYs)



# Effects of Use: Cognition

- Many studies have focused on the cognitive effects of cannabis use
  - There is clear evidence of acute effects on cognition
  - How long the effects persist is less clear
- Meta-analyses can help make sense of the literature
  - A study of all studies in a given area
  - In JAMA, Scott and colleagues assessed evidence from 69 studies of cannabis use and cognitive functioning

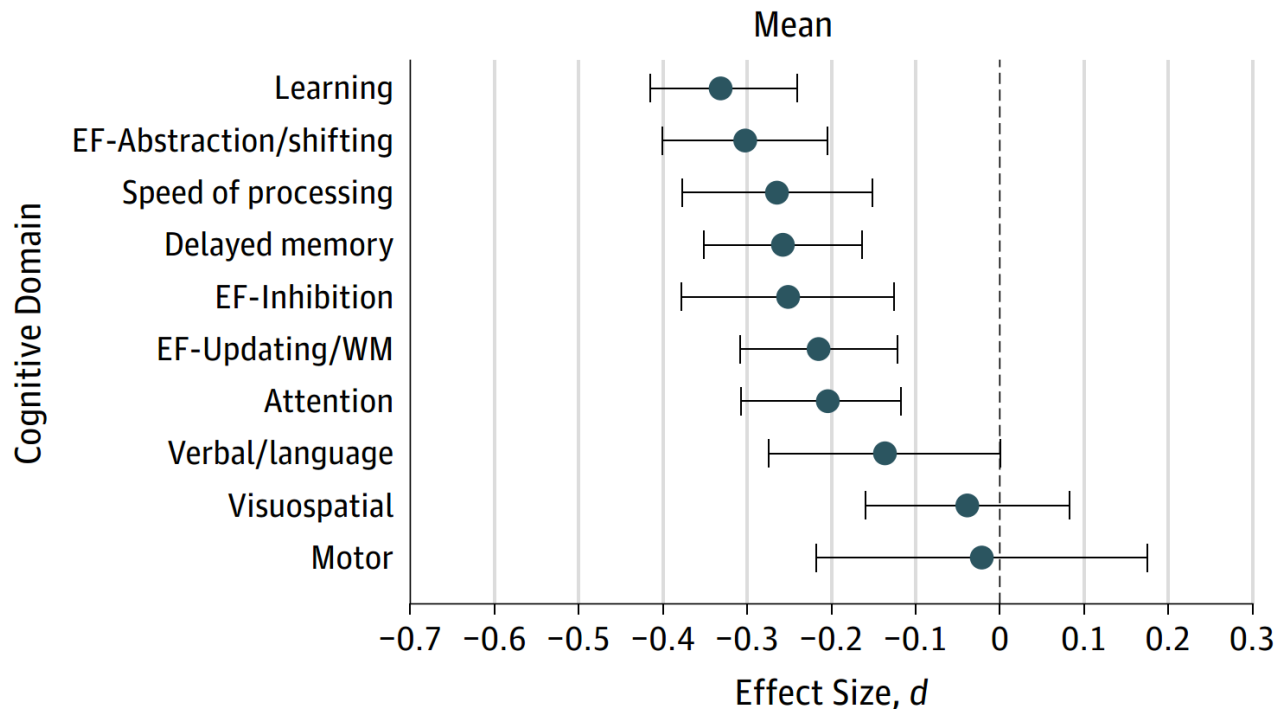
JAMA Psychiatry | [Original Investigation](#)

## **Association of Cannabis With Cognitive Functioning in Adolescents and Young Adults A Systematic Review and Meta-analysis**

J. Cobb Scott, PhD; Samantha T. Slomiak, MD; Jason D. Jones, PhD; Adon F. G. Rosen, BS; Tyler M. Moore, PhD; Ruben C. Gur, PhD

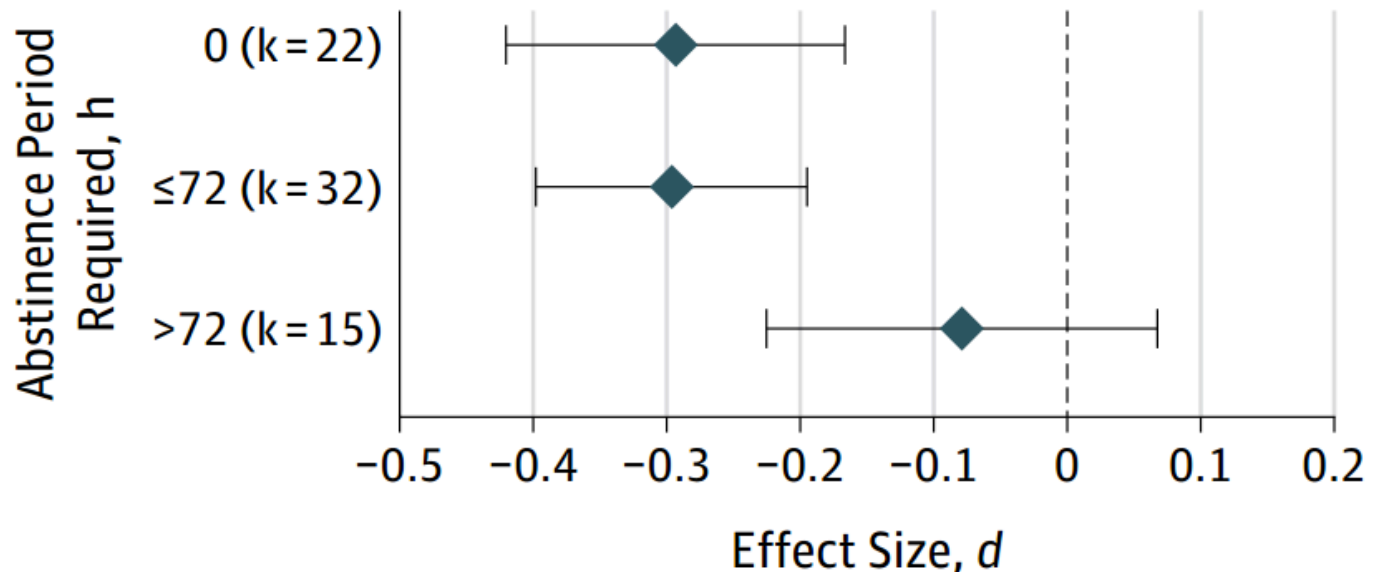
- Cannabis use is associated with decrease in performance on various cognitive tasks.
  - Largest effects on learning, abstraction, and processing.

**Figure 2. Mean Weighted Effect Sizes for Each Neurocognitive Test Domain**



- However, when grouping studies by criteria for abstaining, effects went away after 72 hours of last use.

**Figure 3. Mean Weighted Effect Sizes for Varying Abstinence Criteria**



# Risks: Education

- Cannabis use has been linked to lower levels of educational attainment (Horwood et al., 2010)

From Horwood et al., 2010	Cannabis Use		
	<b>Before 15</b>	<b>Age 15-17</b>	<b>Not Before 18</b>
HS Degree	50%	65%	74%
University Degree	9%	17%	26%

- However, these studies often don't take into account other explanations, such as pre-existing differences in cognitive functioning (e.g., due to genetic factors, etc.)
  - Twin studies have not replicated this association (Grant et al., 2012)

# The Gateway Hypothesis

- **The Gateway Hypothesis**: using cannabis directly increases risk for using other illicit drugs
- Evidence for Gateway Hypothesis?
  - Epidemiology research shows increase risk of becoming dependent on alcohol or other illicit drugs
  - Cannabis use is also linked to nicotine dependence
  - Sequence of drug use may be due more to availability than anything else
- Animal models suggest that THC exposure affects the reward centers of the brain later in life

## Risks: Developing psychopathology (see NAS report)

- Cannabis use not a risk factor for depression, ptsd, or anxiety
- May be linked with greater severity of bipolar disorder
- Early use associated with development of psychosis
  - Not clear whether causal or shared risk factor
  - Cannabinoids may help people already diagnosed with schizophrenia
- May increase risk for social anxiety disorder
- Heavy use associated with increased thoughts of suicide



# Conclusions

- Adult use may have increased some with legalization – no consistent evidence of increases among adolescents
- Age 65+ showing biggest increases
- Risk of CUD (dependence) is small but real
- Acute use has detrimental effect on learning and cognition but this effect dissipates with 72 hours after discontinuing use
- Not a lot of evidence to support Gateway Hypothesis
- Linked with psychosis, may exacerbate bipolar disorder
  - Using it is not worth the risk if you are young and have a family history of psychosis!!
- Risk of harm greater in young people and people with pre-existing mental health issues