

# **Clinical epidemiology, characteristics, services, and outcomes for youth with cannabis use disorders: Status of the problem and expectations for the future**

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# Disclosures

Funded by ***National Institute on Drug Abuse (NIH)*** to do clinical and laboratory research related to cannabis use and use disorders

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- Consultant / Participant: ***Office of National Drug Control Policy's*** Marijuana and Kids Media Campaign (past)
- Scientific Review Board: ***Center for Medical Cannabis Research***, State of California (past)
- Consultant to GW Pharmaceuticals/Otsuka on development of Nabiximols / Sativex (past)

# Today's Plan

- 1) Present a snapshot of cannabis and cannabinoid use among teens and how it has changed over time
  - Provide perspective relative to other substance use
  - Relation to medicalization / legalization?
- 2) Review clinical epidemiology related to cannabis use
  - use disorders, treatment “seeking”, co-occurring problems, vulnerable populations
- 3) Overview of the treatment literature
  - strengths and limitations
- 4) Special Issues
  - e-cigs, vaping, edibles, potency, creative chemistry

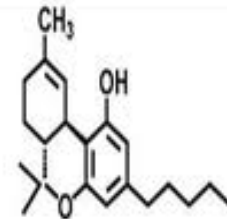
# Marijuana/Cannabis / Cannabinoids

Over 100 compounds ; over 70 phytocannabinoids

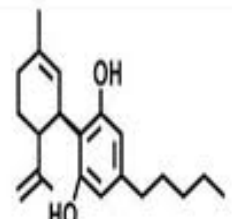
Delta-9 THC psychoactive compound

Dose related effects:

- High, euphoria, relaxation
- Cognitive impairment (memory, learning, attention, time perspective)
- Anxiety, Panic, Hallucinations, Psychosis?
- Abuse/Dependence?

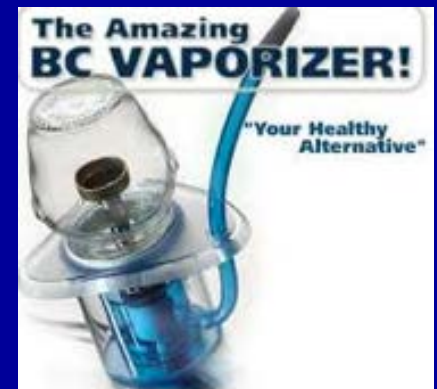


$\Delta^9$ -tetrahydrocannabinol  
(THC)



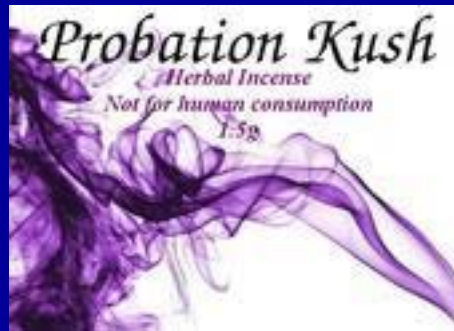
Cannabidiol  
(CBD)

# Marijuana /THC



# Synthetic “Cannabis”

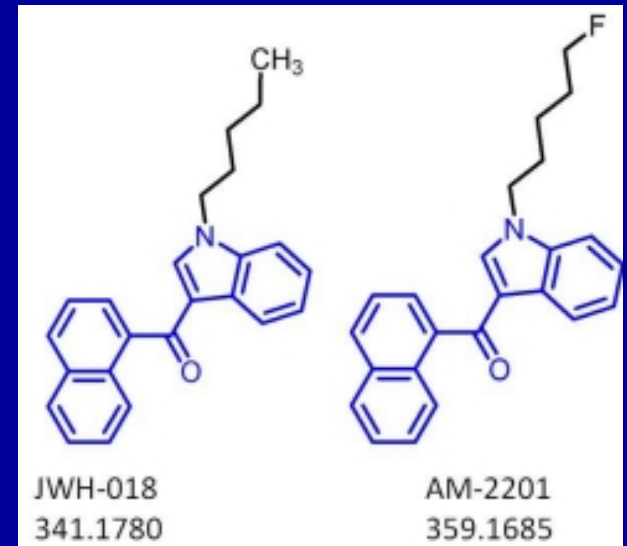
Sprayed on plant materials: potent CB1 agonists with effects similar to cannabis, but less reliable and more adverse effects...Why?



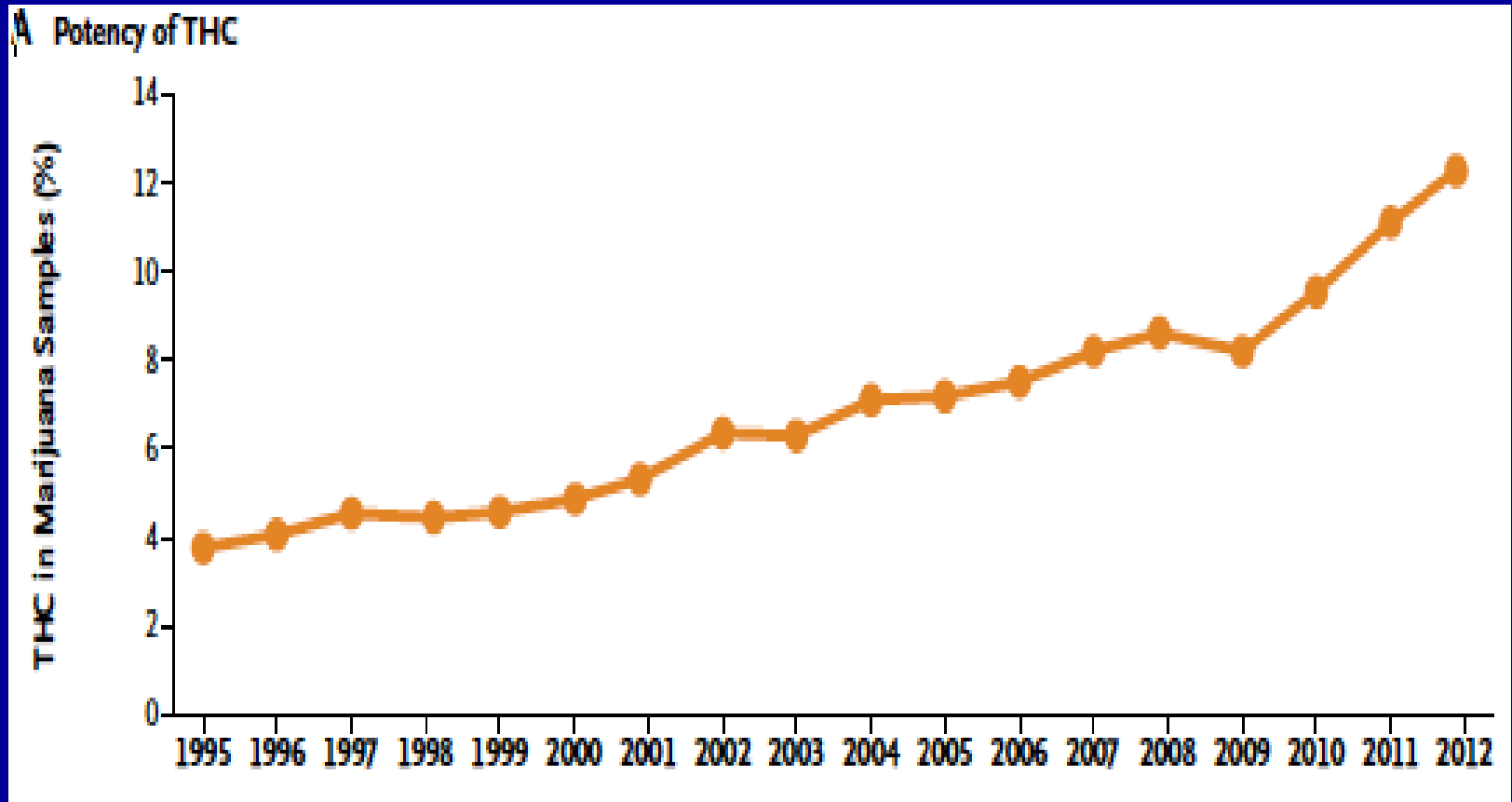


# Synthetic Cannabinoids

- Do not contain THC
- Contain synthetic cannabinoid plus ??
- Misperceived as “synthetic marijuana”
- Advertised as “natural herbs,” “harmless incense,” “not for human consumption,” or “for aromatherapy only”
- Purchase via the internet, smoke shops and even gas stations.



# DEA Cannabis Seizures (Potency)





# Legal Marijuana and Potency

Strain Name: Loud

Grade: A

Smell: very potent and natural smell

Taste: orangish taste

**Potency: 27.50% THC**

Effects: head high with a body high but it's not a hybrid

Reviewed by: Lungs n Green

Good Strain For: getting rid of stress and soreness and to feel good



**Changing the Game : much of what we know is based on smoking marijuana with much lower doses of THC**

# A Take Home Message

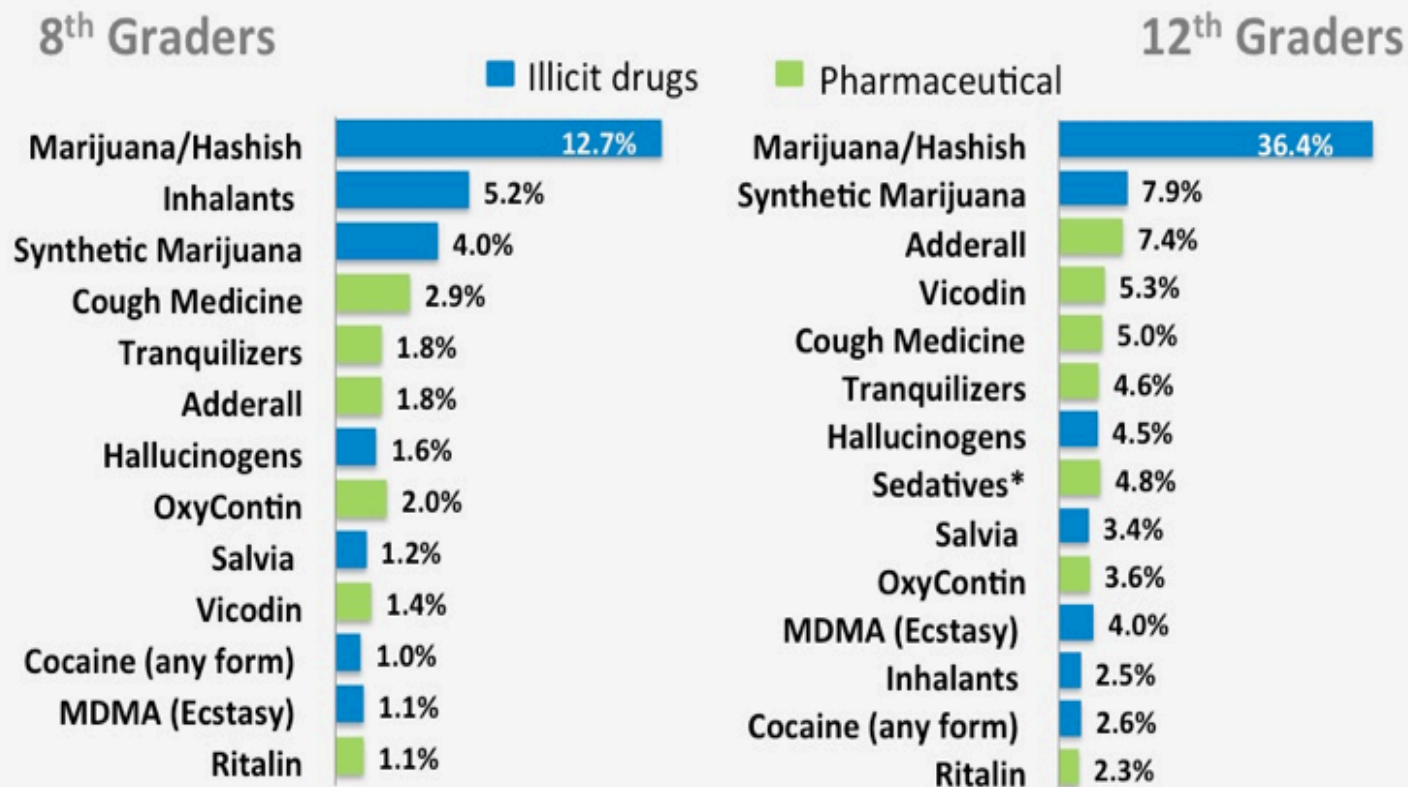
Cannabis/Marijuana  $\neq$  THC

Synthetic Cannabinoids  $\neq$  THC/Marijuana

- (a) Not all cannabinoids are the same
- (b) Dose matters (how?)

2013  
(MTF)

## Top Drugs among 8<sup>th</sup> and 12<sup>th</sup> Graders, Past Year Use

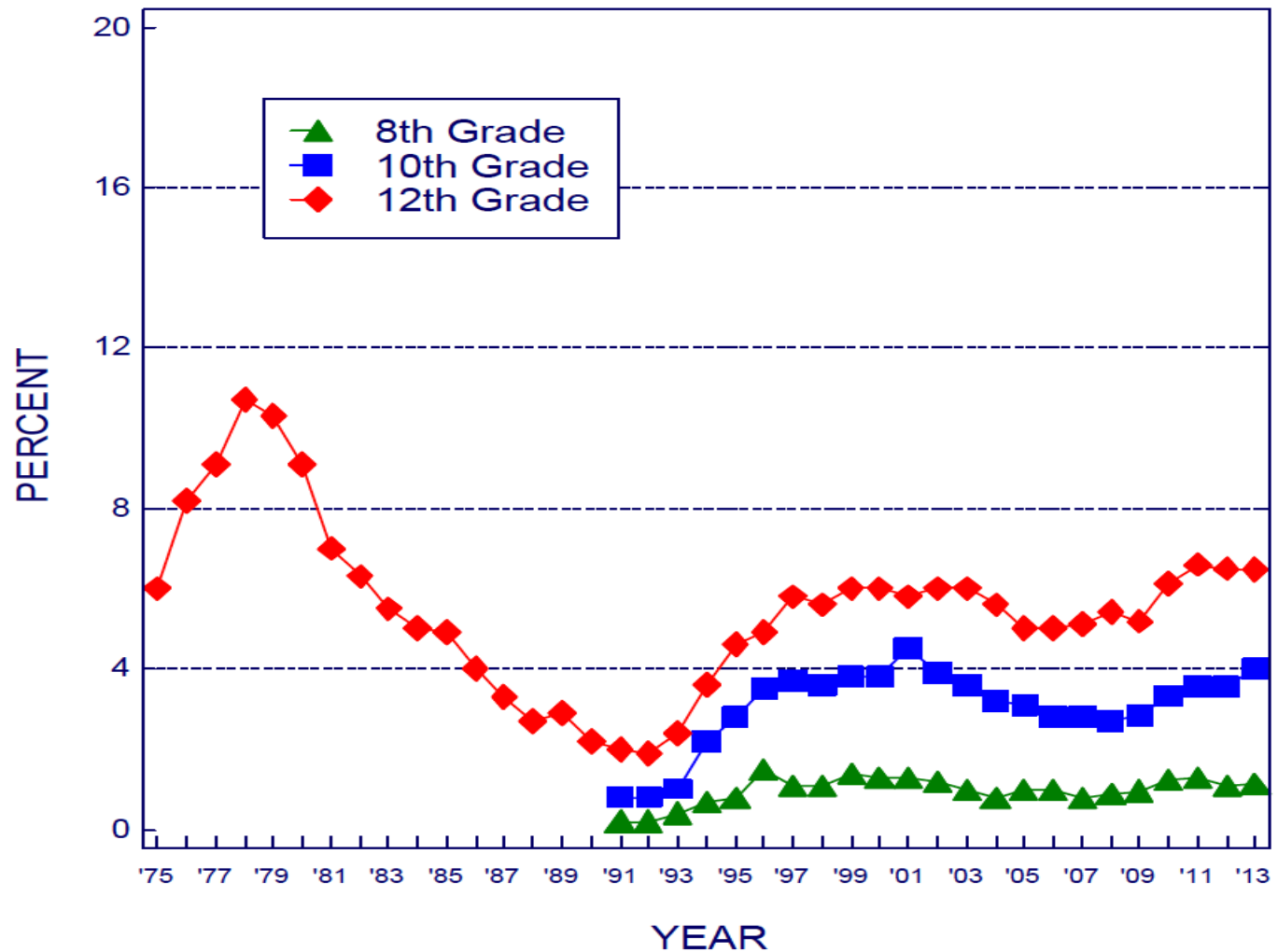


\* Only 12<sup>th</sup> graders surveyed about sedatives use

Source: University of Michigan, 2013 Monitoring the Future Study

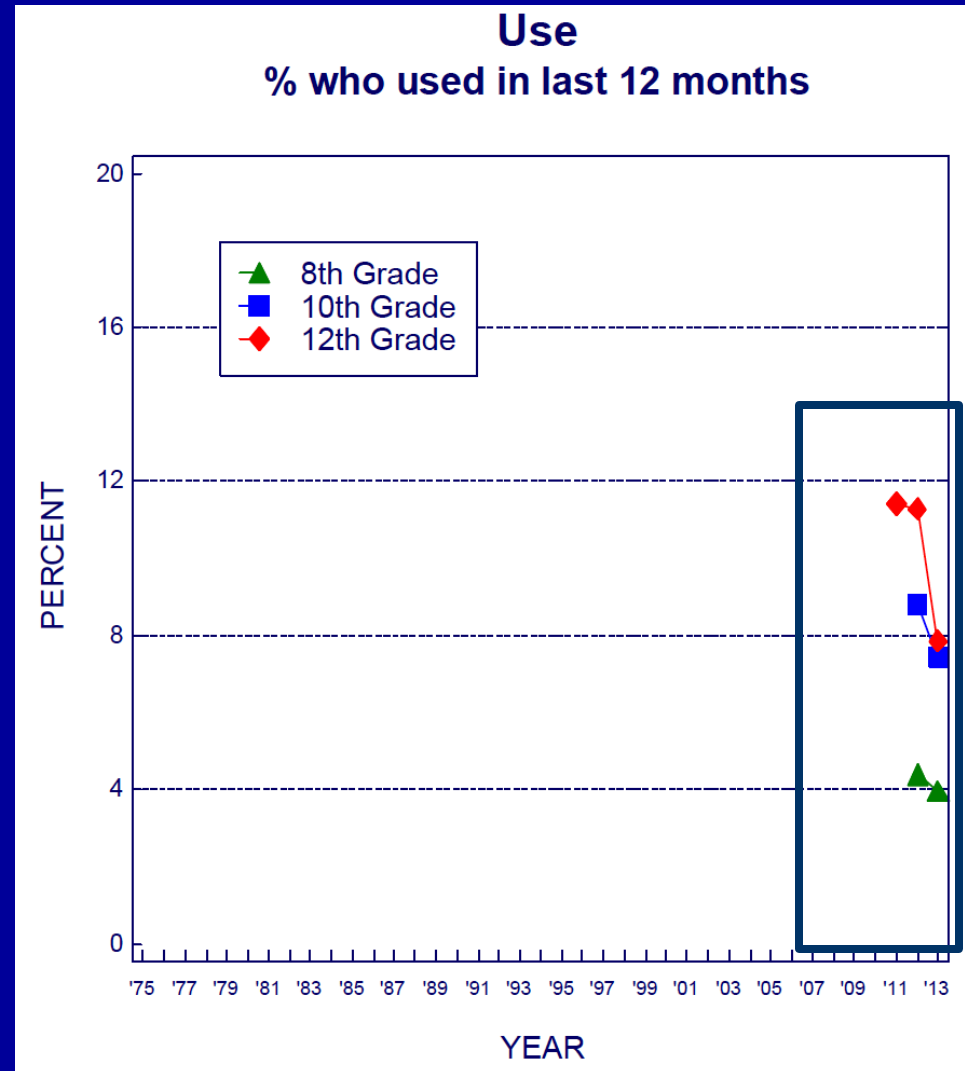
2013  
(MTF)

## Use % who used daily

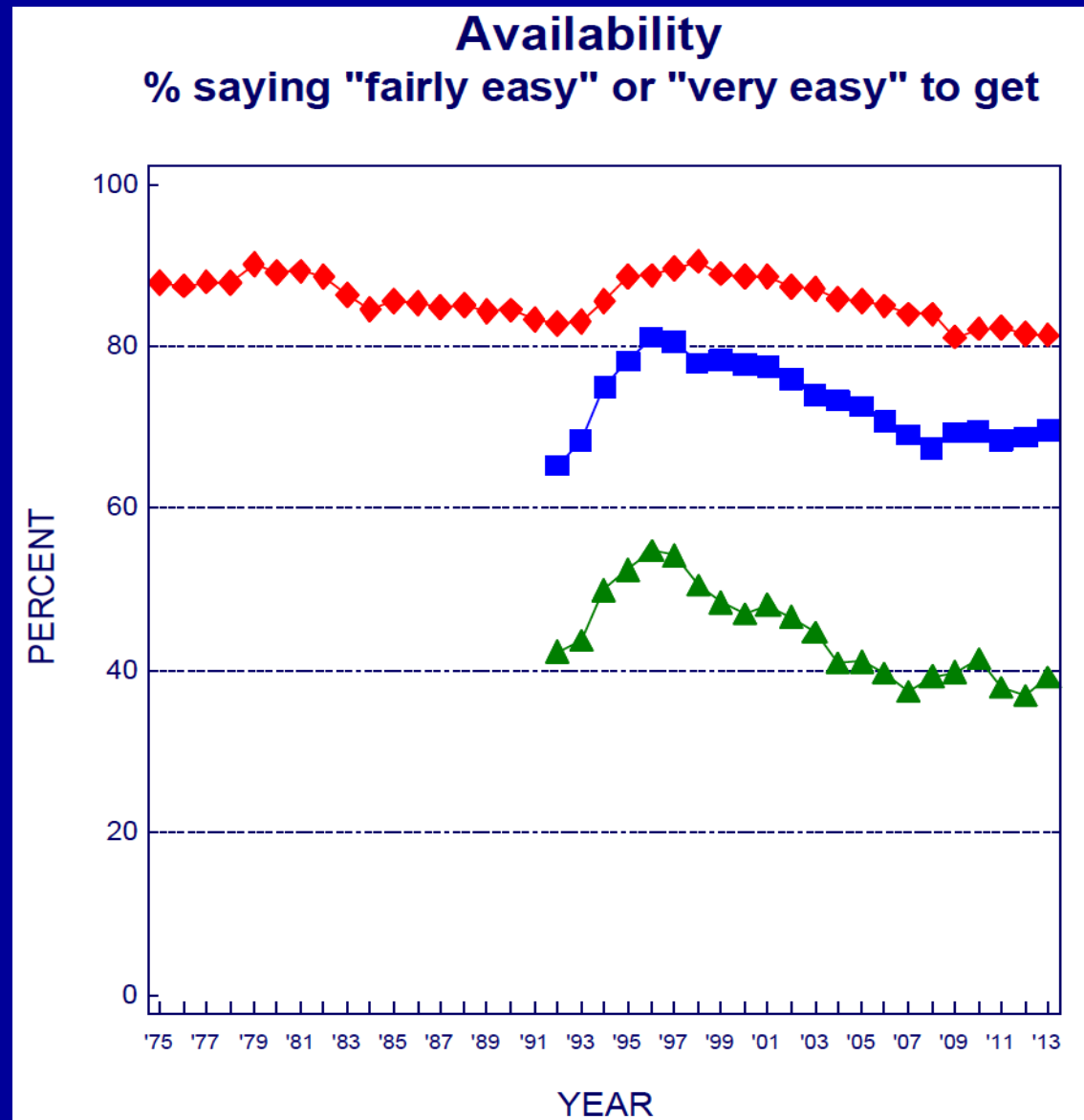


# Synthetic Cannabinoids

Use trending down!

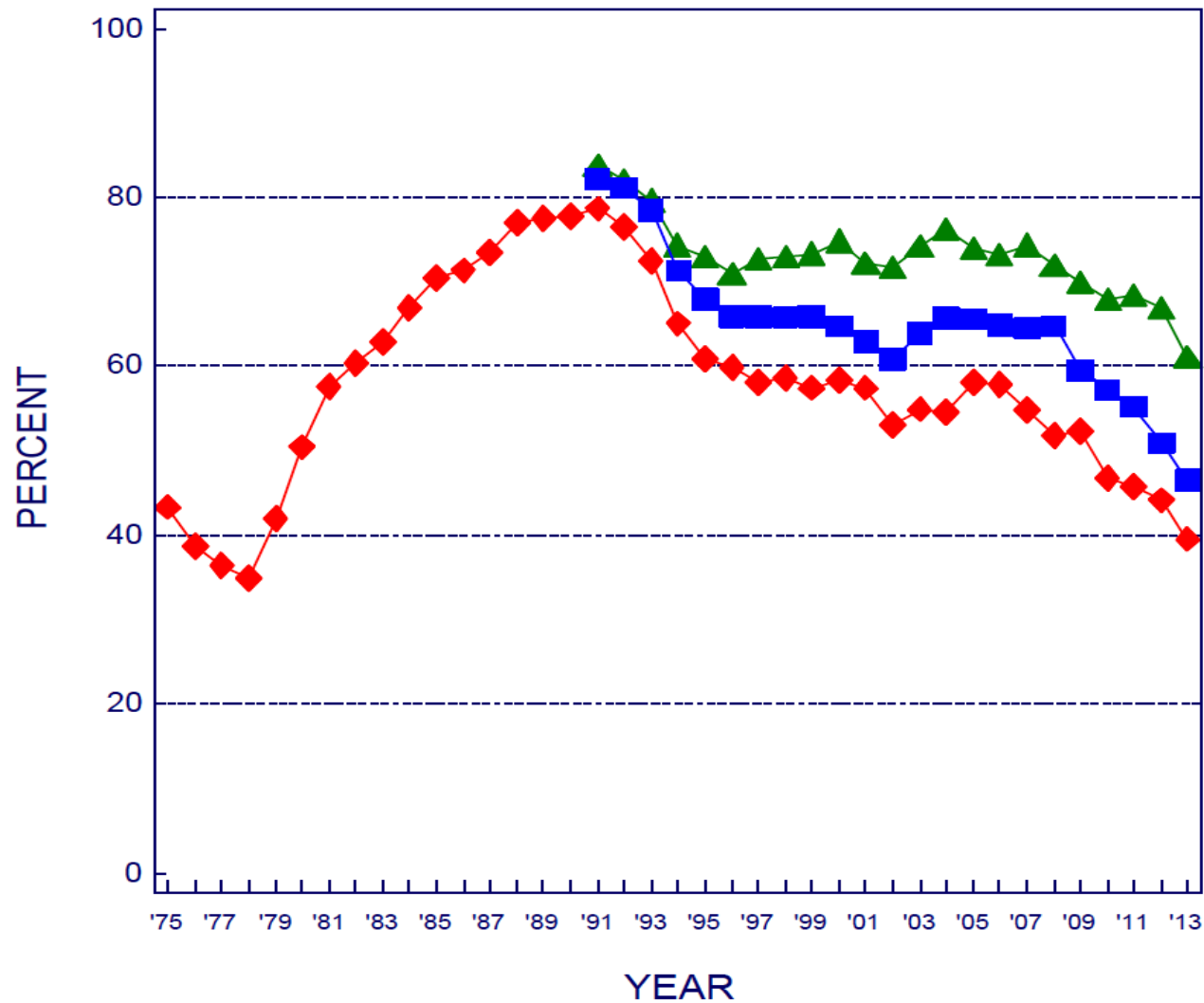


2013  
(MTF)



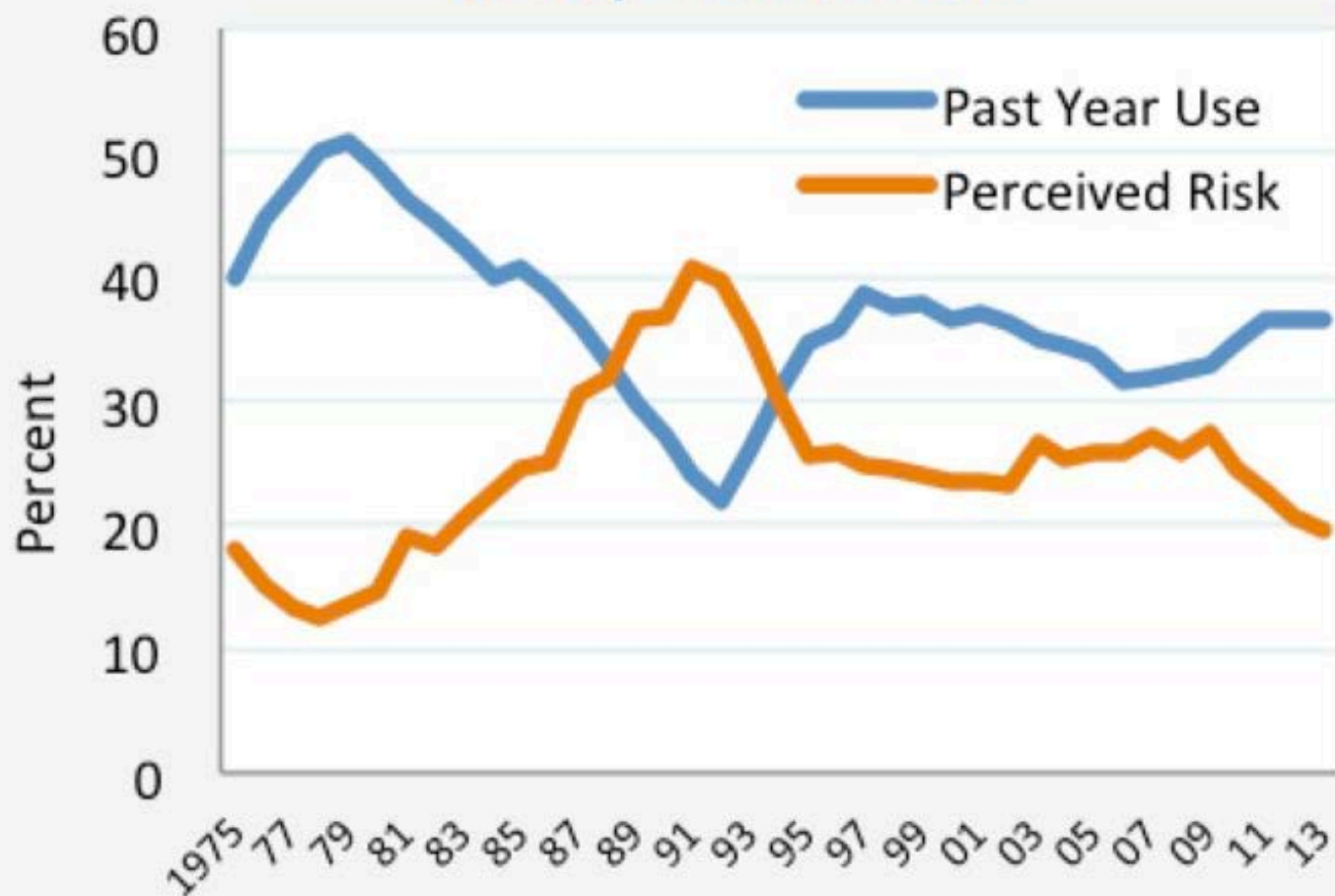
# Risk

% seeing "great risk" in using regularly





## Marijuana Perceived Risk vs. Past Year Use by 12th Graders



SOURCE: University of Michigan, 2013 Monitoring the Future Study



# Adolescent Problematic Substance Use

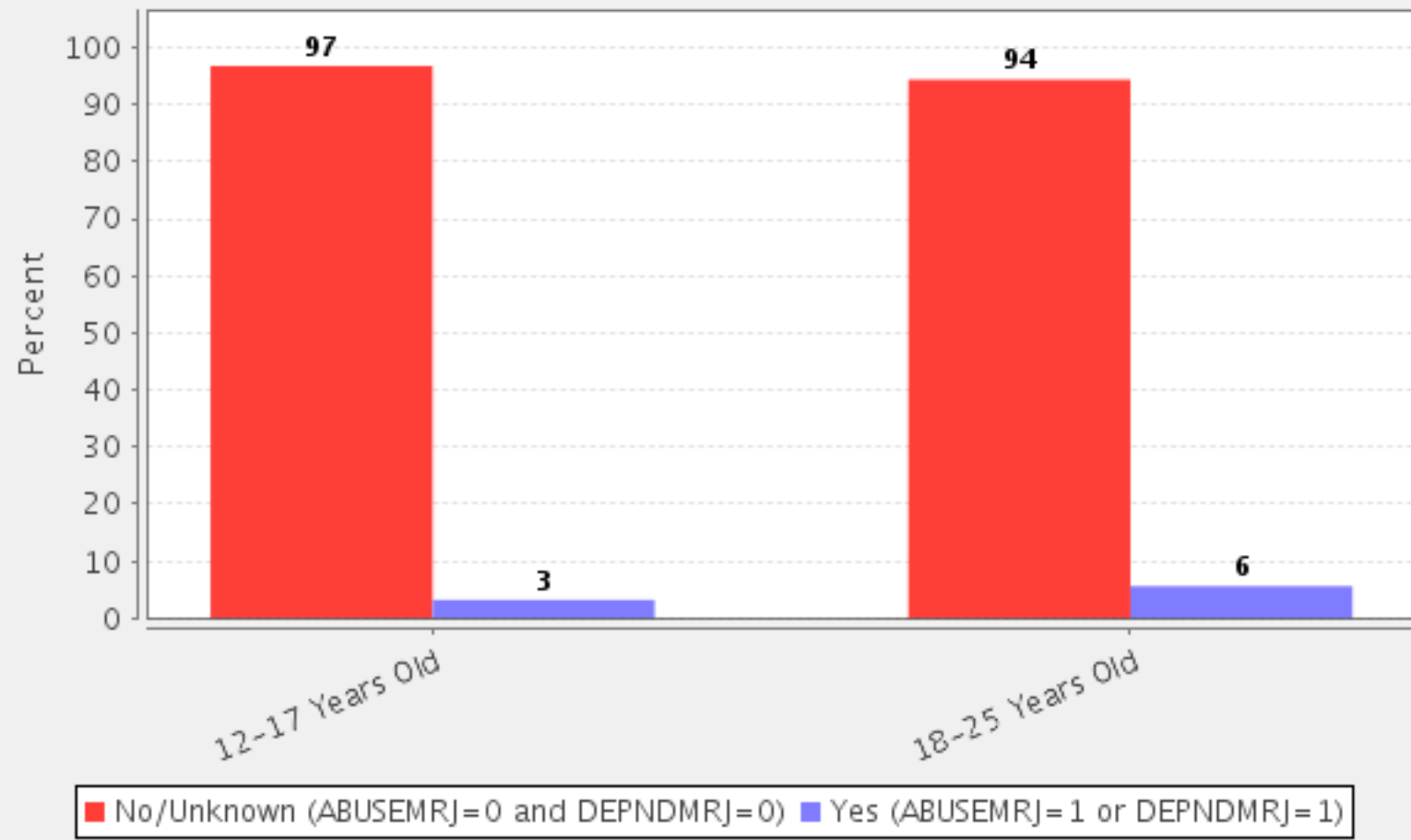
**Teen substance use / abuse is a major public health problem**

- 90% of problematic substance use is initiated prior to age 18
- Average day: 71,000 are in outpt treatment; (SAHMSA, 2013)  
10,500 are in inpatient/residential
- 60-70 have co-occurring psychiatric dx (Dennis et al. 2007)

**\*\*\* Need Better Prevention and Intervention Strategies**

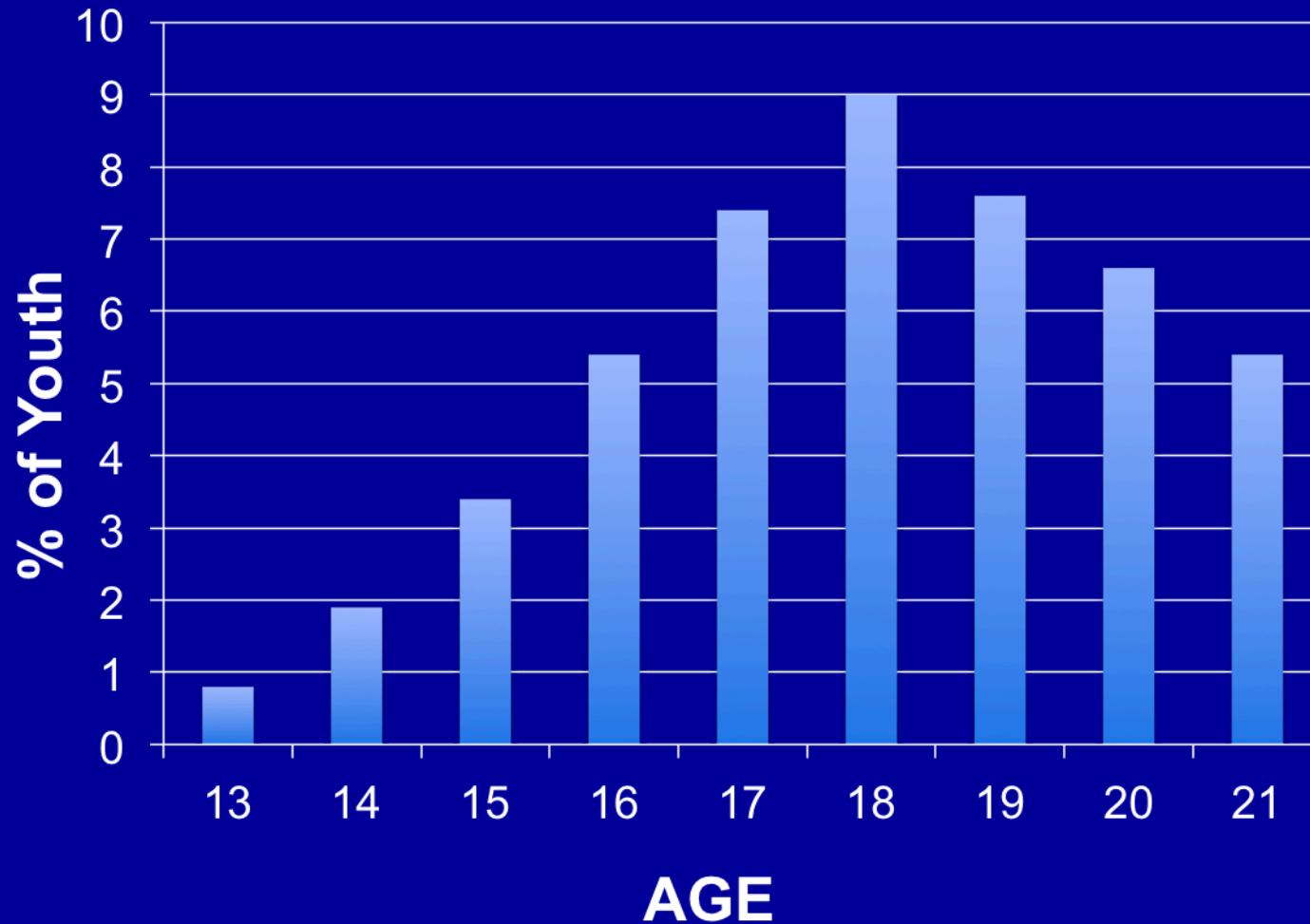
# NSDUH 2012

## MARIJUANA ABUSE OR DEPENDENCE – PAST YEAR BY AGE CATEGORY RECODE (5 LEVELS)



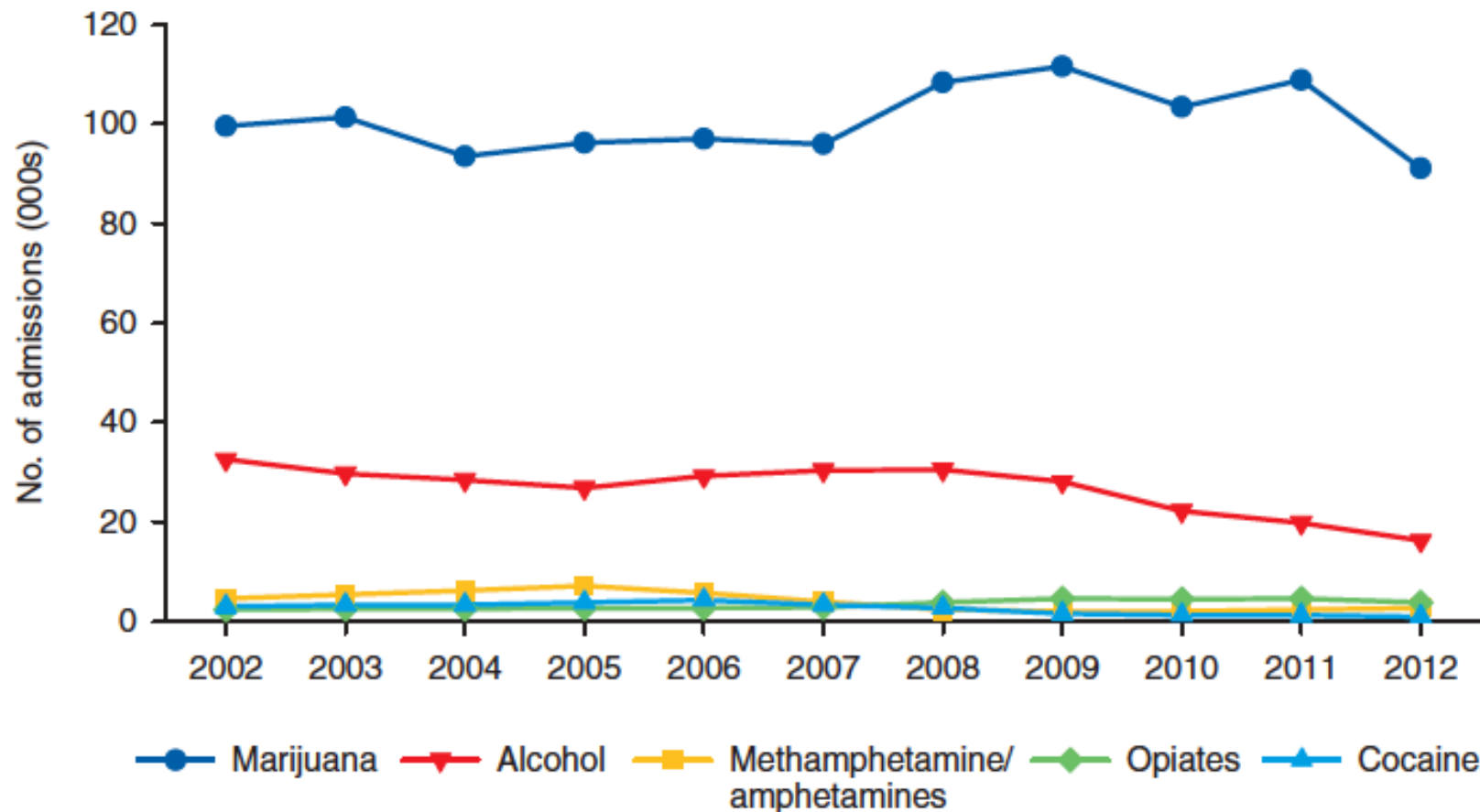
# NSDUH 2012

## Marijuana Dependence or Abuse



# Adolescent Treatment Admissions TEDS Data Set

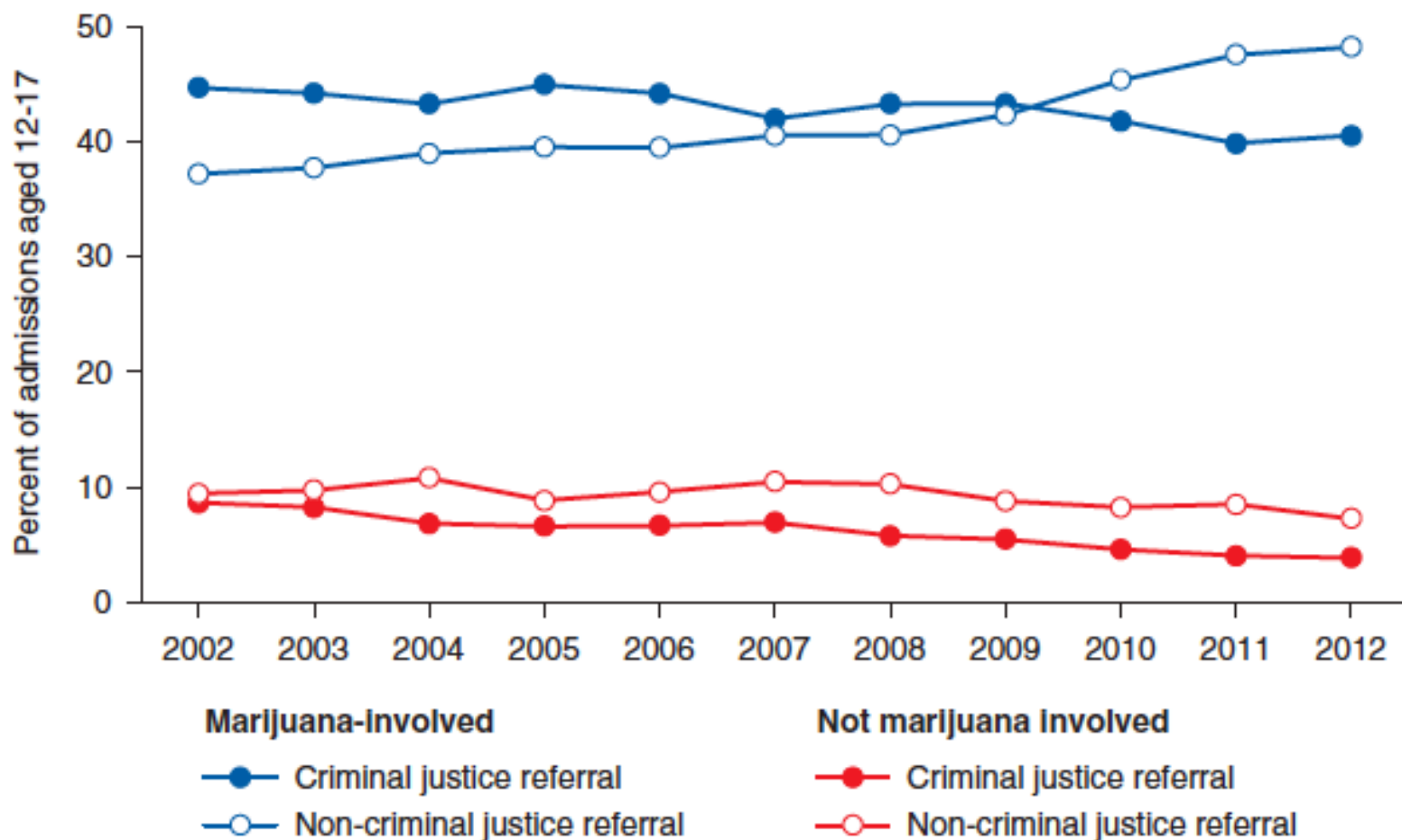
Figure 19. Adolescent admissions aged 12 to 17, by primary substance: 2002-2012



# Admissions x Criminal Justice Involvement

## TEDS Data Set

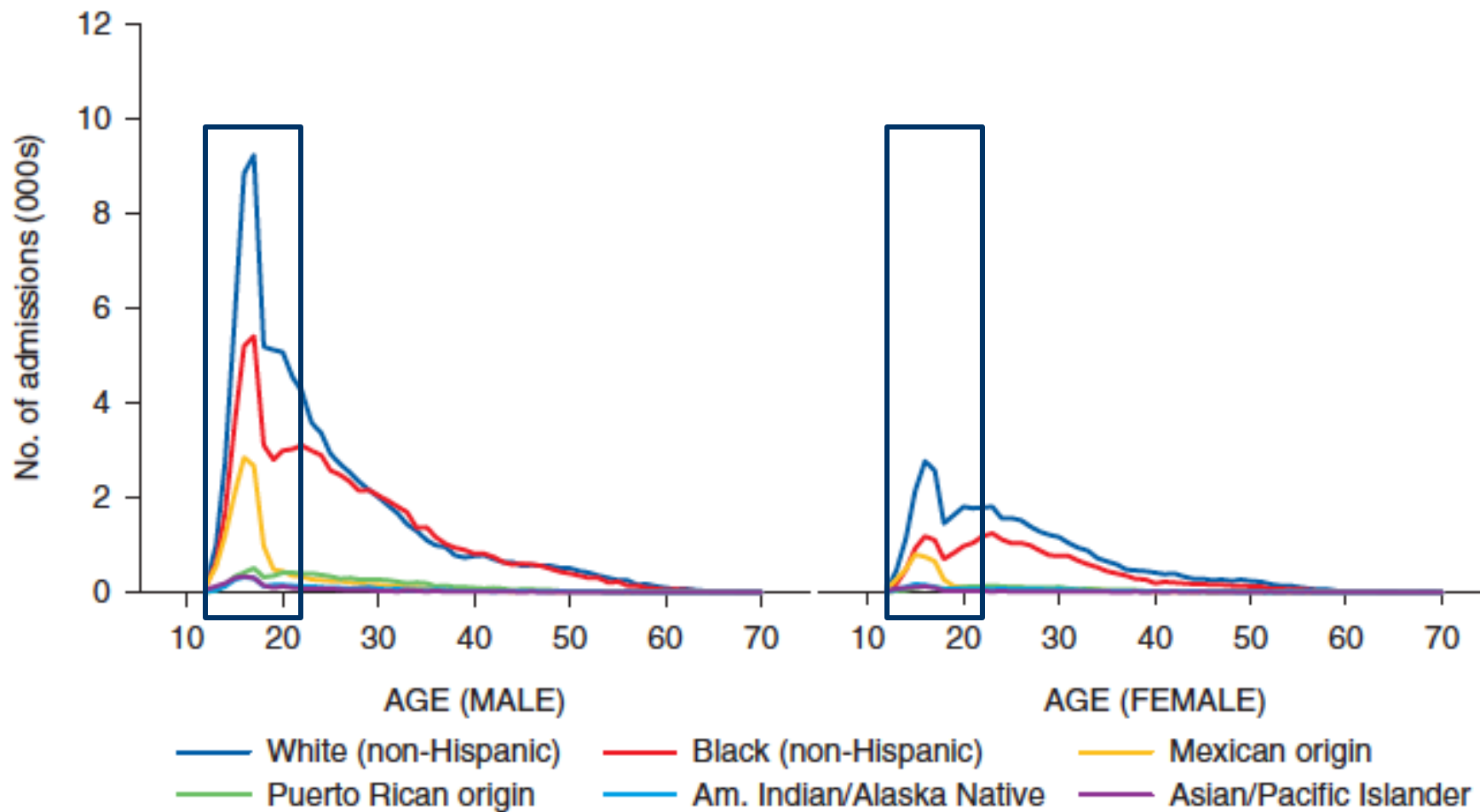
Figure 20. Adolescent admissions aged 12 to 17, by marijuana involvement and criminal justice/DUI source: 2002-2012



# Admissions x Race / Ethnicity

## TEDS Data Set

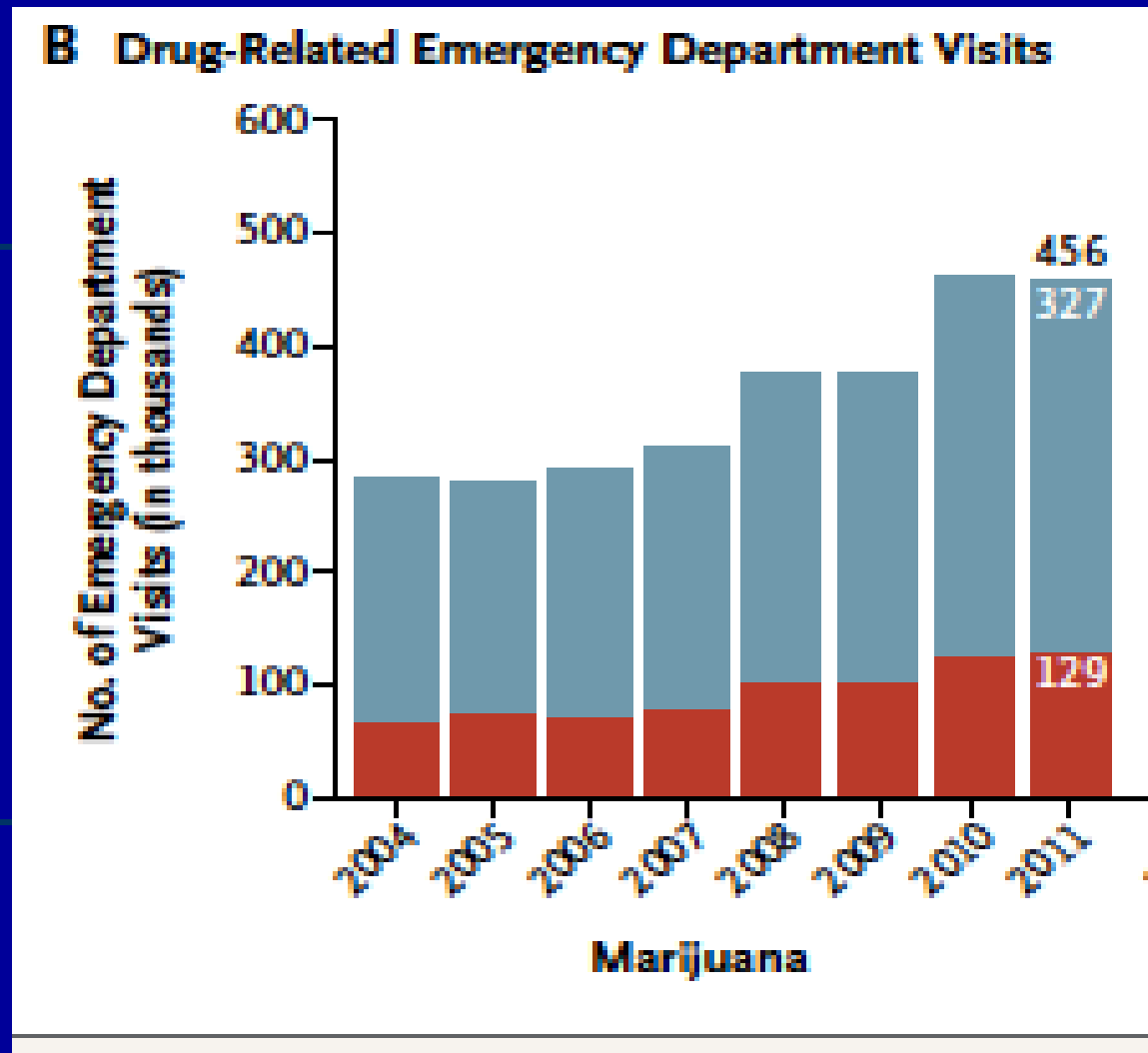
Figure 12. Marijuana/hashish admissions, by gender, age, and race/ethnicity: 2012





# ER Visits Increasing (Potency / Syntetics?)

## DAWN Data Set



# Consequences

(Volkow et al., 2014)

**Table 2.** Level of Confidence in the Evidence for Adverse Effects of Marijuana on Health and Well-Being.

Effect	Overall Level of Confidence*
Addiction to marijuana and other substances	High
Abnormal brain development	Medium
Progression to use of other drugs	Medium
Schizophrenia	Medium
Depression or anxiety	Medium
Diminished lifetime achievement	High
Motor vehicle accidents	High
Symptoms of chronic bronchitis	High
Lung cancer	Low

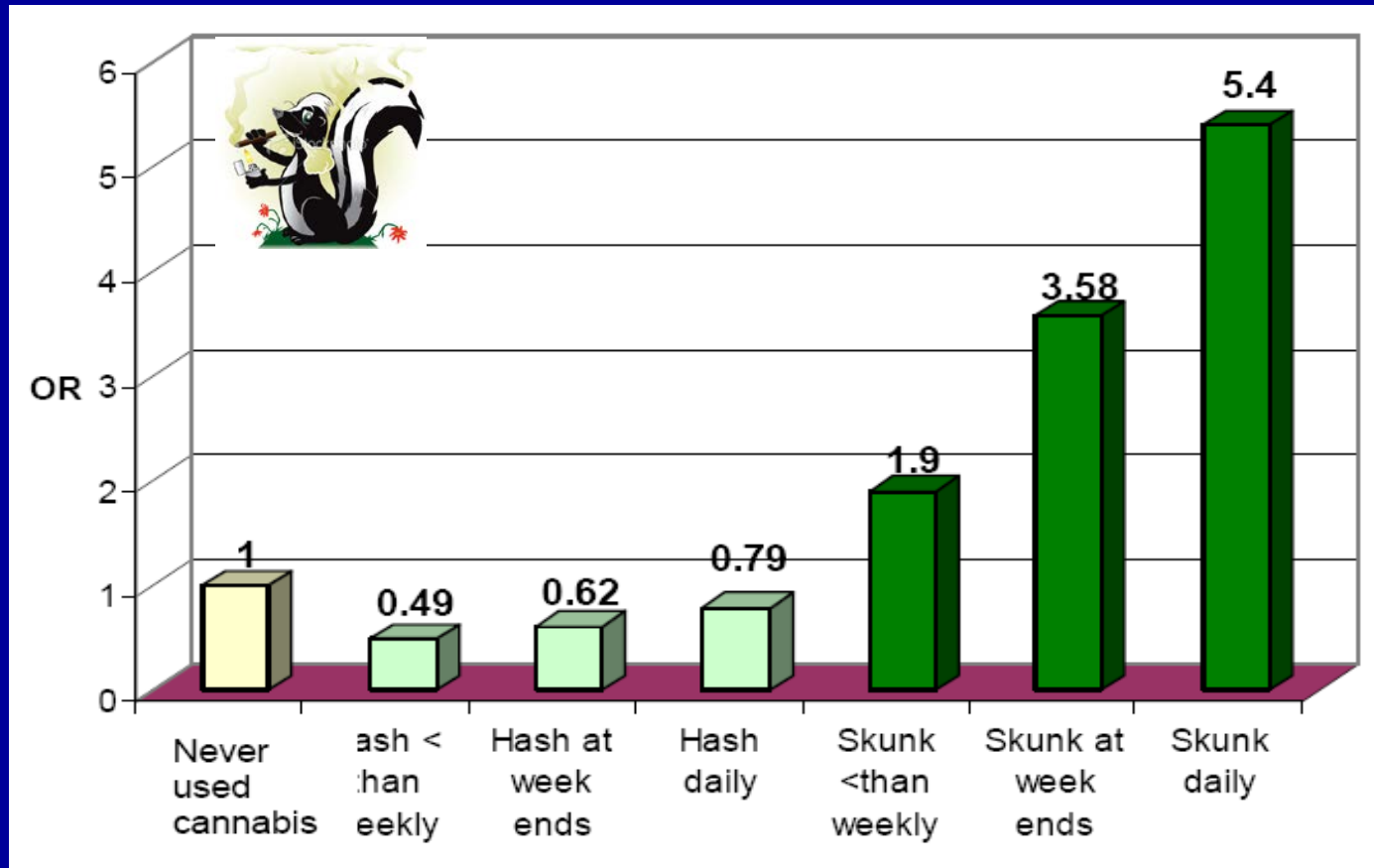


## *Teen “Consequences / Associations”*

- Poor academic performance
- Interferes with brain development
- Increased risk of accidents
- Relationship problems
- Health/mental health problems
- Delinquent behavior
- High risk sexual behavior
- Gateway / Associated with use of Multiple Substances

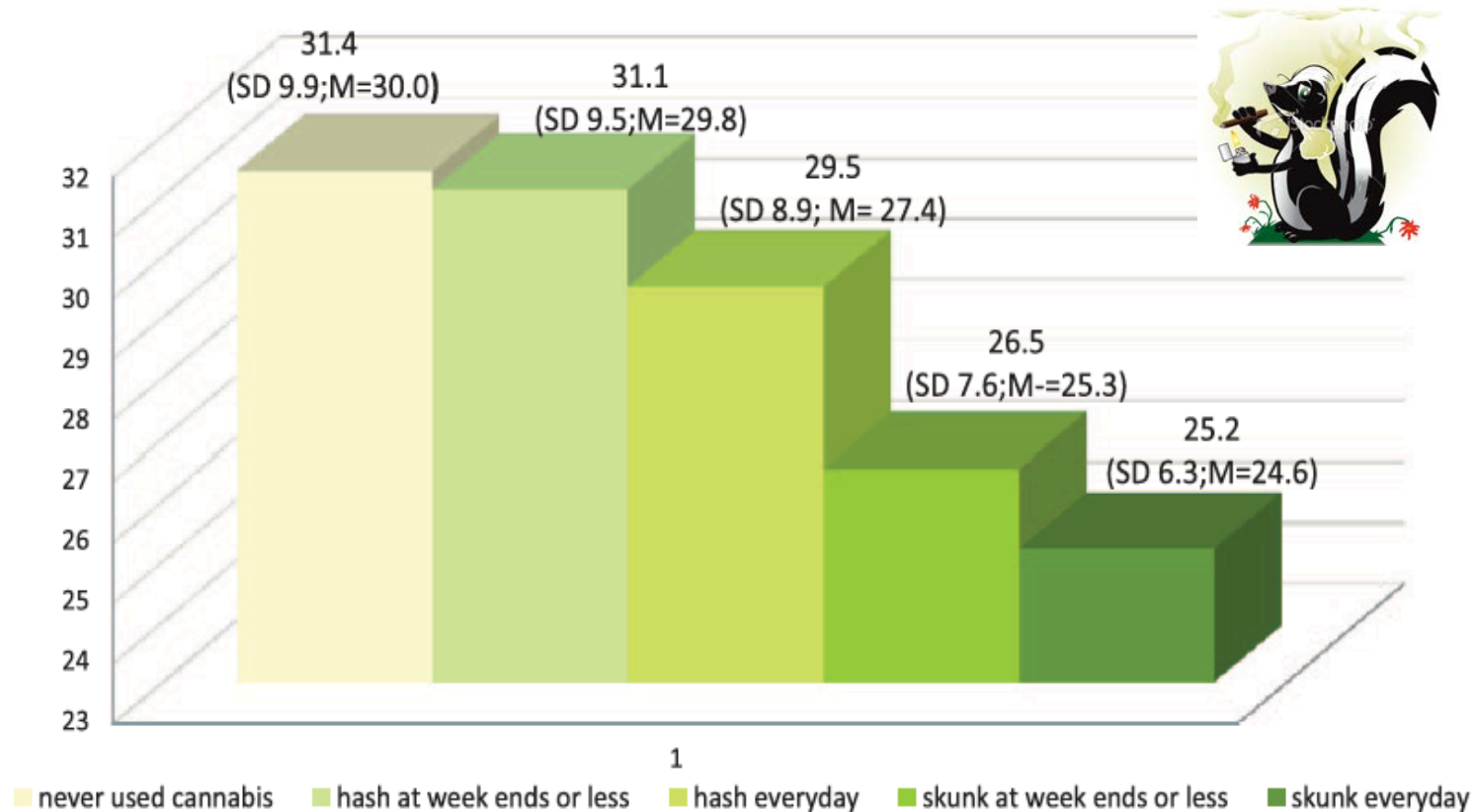
**\*\* Dose Dependent / Frequency / Acute vs. Chronic**

# Risk of being a Psychotic Case (Di Forti et al., 2014)



Frequent Use of High-Potency Cannabis, Drives the **Increased Probability** of Psychosis in Cannabis Users:  
(adjusted for gender, age, ethnicity, stimulants, level of Ed)

## Mean age (yrs) of onset of psychosis by degree of exposure to cannabis



Daily Use, Especially of High-Potency Cannabis, Drives **the Earlier Onset of Psychosis** in Cannabis Users (Di Forti et al., 2014)

# Co-Morbidities with Cannabis Use Disorders

NESARC Data (Stinson et al. 2006);

	Past Year	Lifetime
<u>Axis I</u>		
MDE	11%	21%
Any Anxiety Dis	24%	30%
Bipolar I	13%	12%
<u>Axis II</u>		
Antisocial	30%	19%
Obsessive Comp.	19%	15%
Paranoid	18%	11%

# Adolescent Co-Morbidity

CYT Study (Dennis et al. 2002)

Clinical Sample

Internalizing Disorders      33%

Anxiety, Depression, PTSD

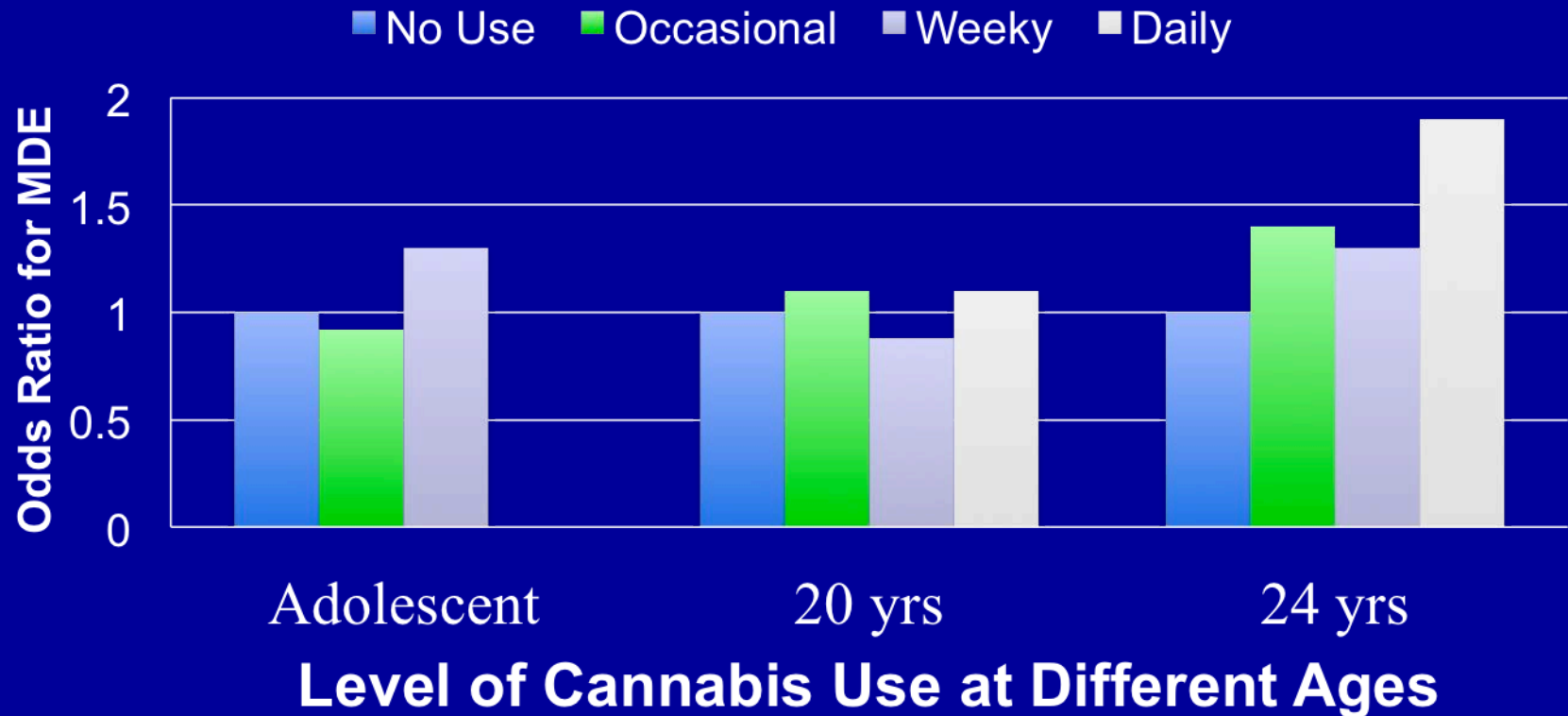
Externalizing Disorders      61%

Conduct Disorder, ODD, ADHD

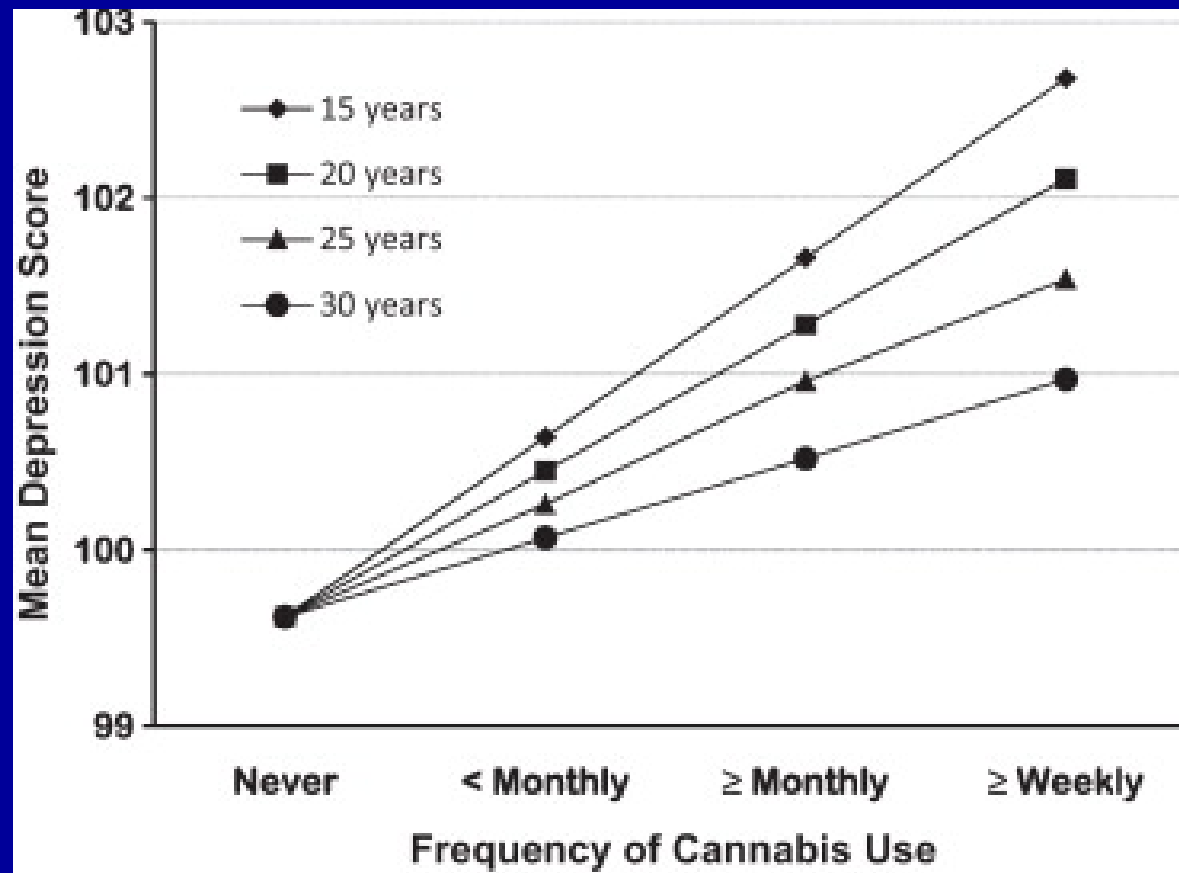


# Australian Adolescent Health Cohort Study (n=1756)

## Impact of Cannabis Use on MDE at Age 29



Degenhardt et al., 2012



Associations between frequency of cannabis use and depression scores at selected ages (15, 20, 25, 30 yrs) after adjustment for fixed sources of confounding

Horwood , et al., 2012: **An integrative data analysis of four Australasian cohorts**

# Cannabis Use and Mental Illness (MI)

Cannabis use is associated with increased levels of MI; this relationship appears to be moderated by frequency of use and potency of the substance.

Growing evidence that cannabis use may have causal impact on lowering of the age of onset of Psychotic Disorders;

- age of onset of cannabis use, frequency and potency.

Probability of occurrence is “low” in low risk samples

Cannabis use can probably be considered a risk factor for poor outcomes in functioning across mental illnesses

Data do not support the use of cannabis to treat any type of MI

AFTER HOURS OF THOUGHT ...  
OR MINUTES OF THOUGHT,  
WHICHEVER JUST OCCURRED,  
I THINK MARIJUANA IS  
NATURE'S WAY OF SAYING,  
"FORGET IT."



# ADDICTION / ADDICTIVE POTENTIAL

- = Pharmacology (only one part)
- = Availability
- = Cost
- = Genetics
- = **Intrapersonal Factors (emotional/behavioral)**
- = **Environmental Factors / Alternatives**
- = Societal Norms and Attitudes

# Adolescent Intervention Literature

**Multiple types of family-based and group / individual behavioral efficacious interventions for SUD / CUD**

Waldron et al.

FFT, CBT, combo

Liddle et al.

MDFT

Henggeler et al.

MST

Dennis et al./Godley et al.

MET/CBT, ACRA, FSN

Szapocznik et al.

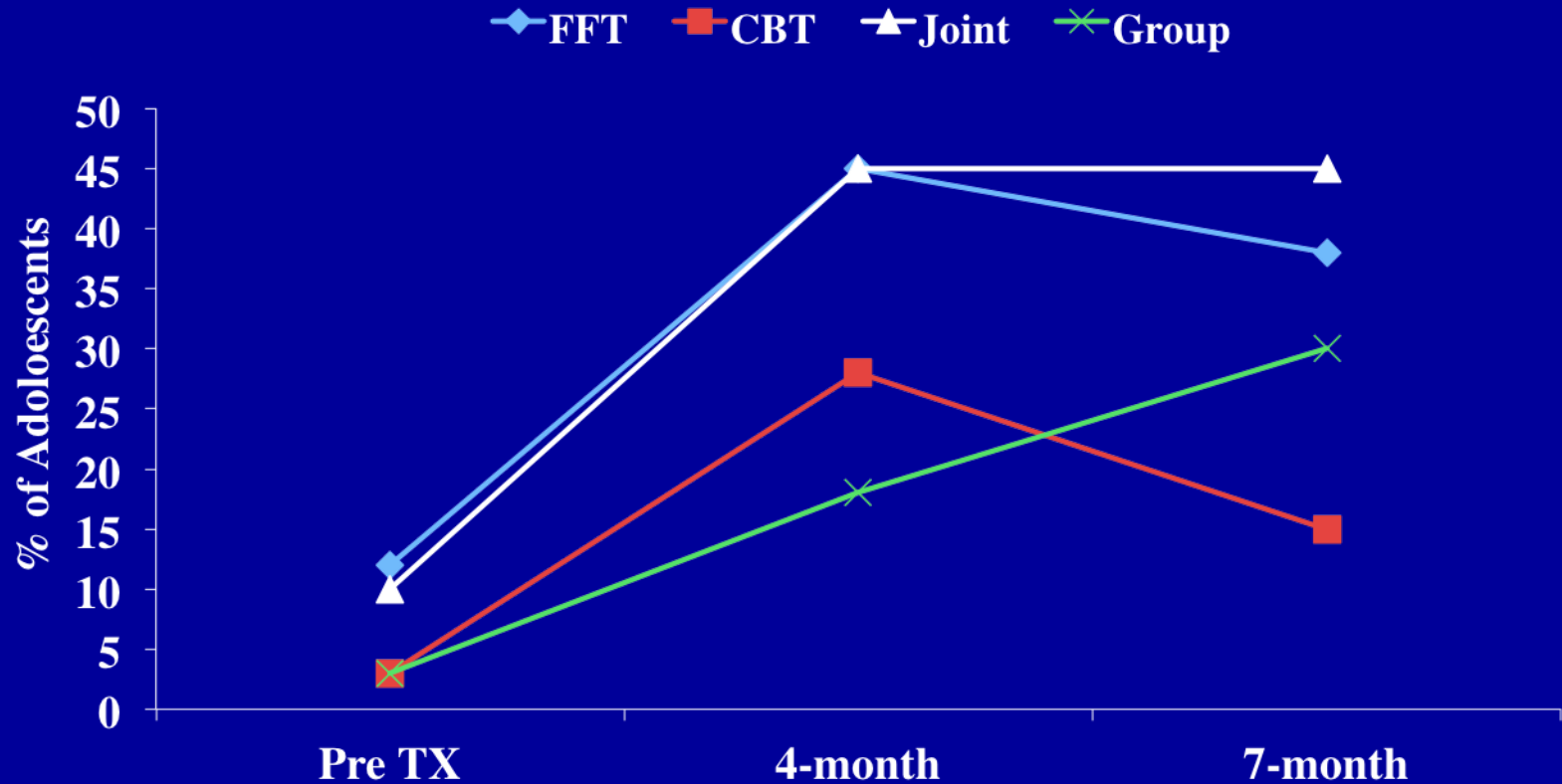
BSFT

Stanger, Budney et al.

CM

# % Using Cannabis at Minimal Levels

(Waldron et al. 2001)



% pos. drug test: 84%

81%

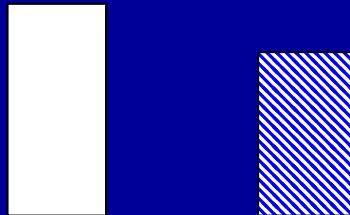
76%



# CYT Adolescent Study Abstinence at Discharge

(Dennis et al., 2004)

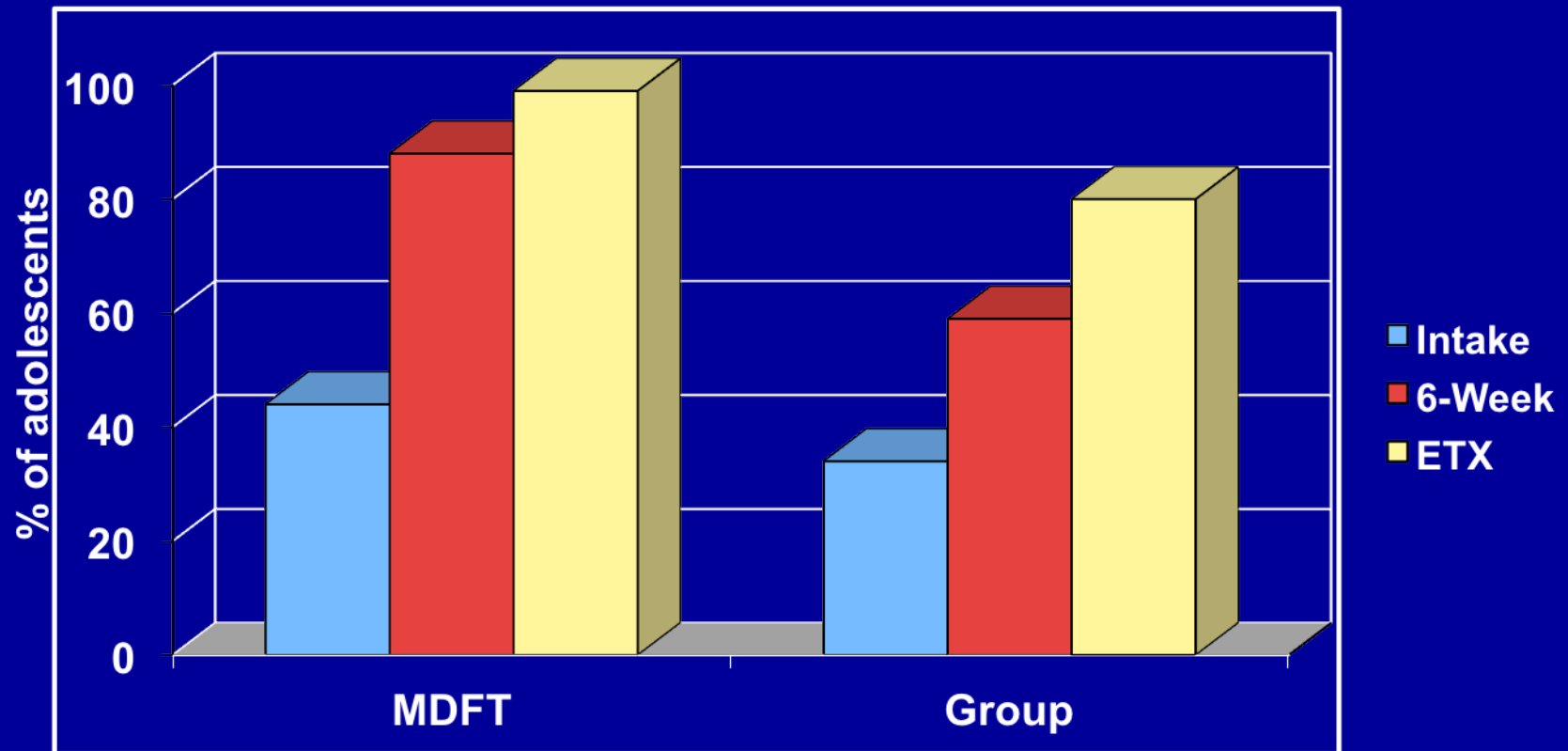
outh  
Past month



# MDFT vs. Group Treatment (CBT based)

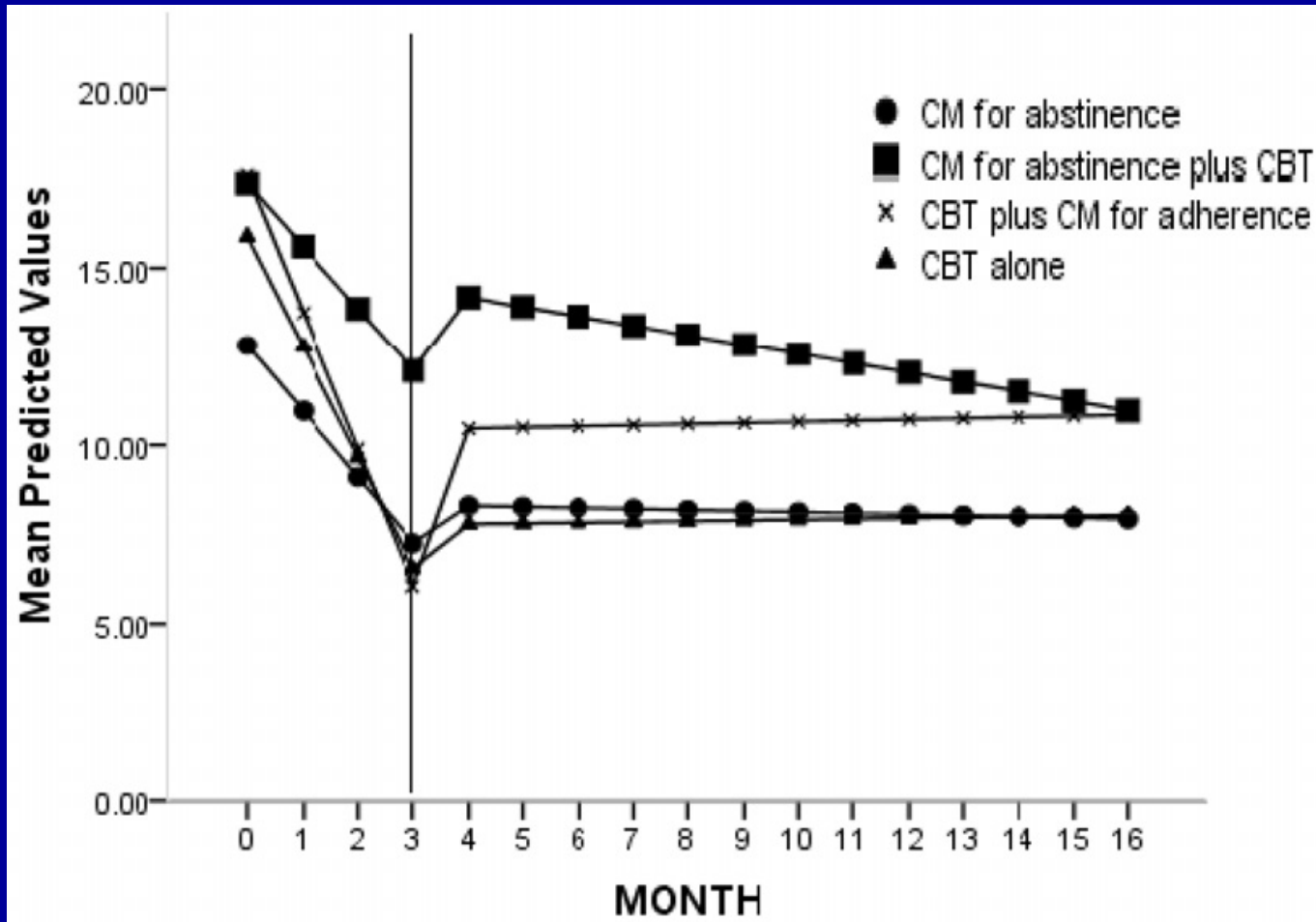
Liddle et al. (2004)

< Weekly Marijuana Use



# Days of Marijuana Use (month)

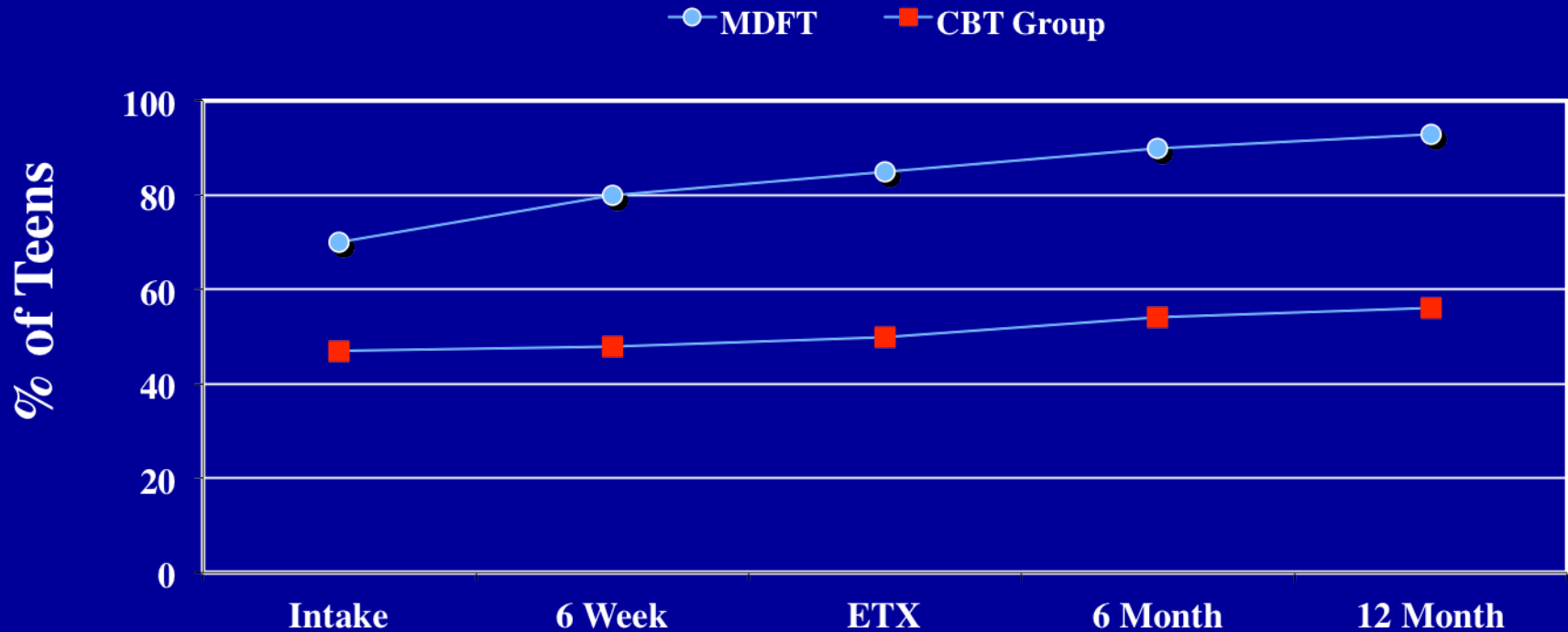
Carroll et al (2012)



# MDFT vs CBT-Group Treatment (young teens)

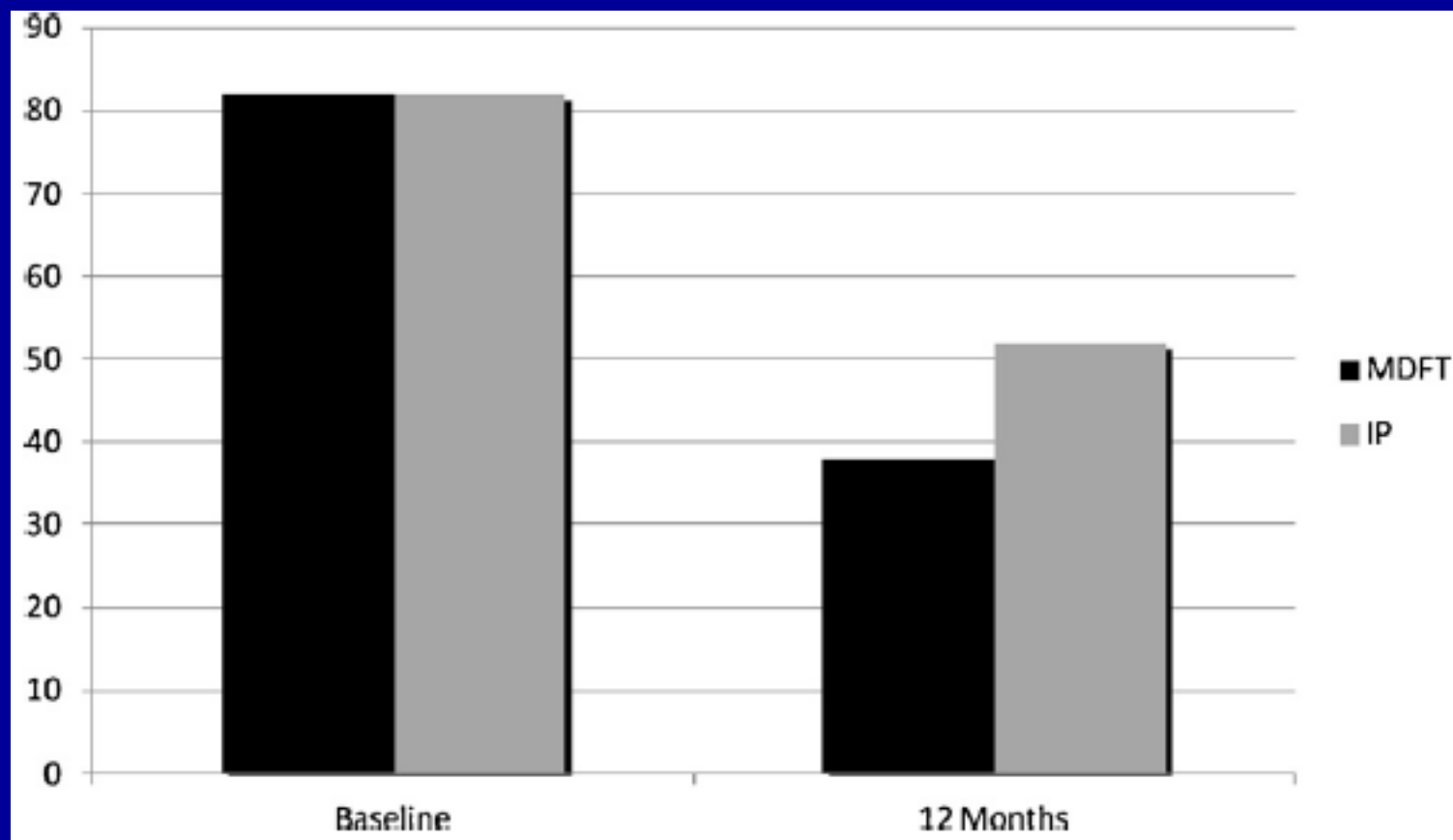
Liddle et al. (2004, 2009)

## % Abstinence

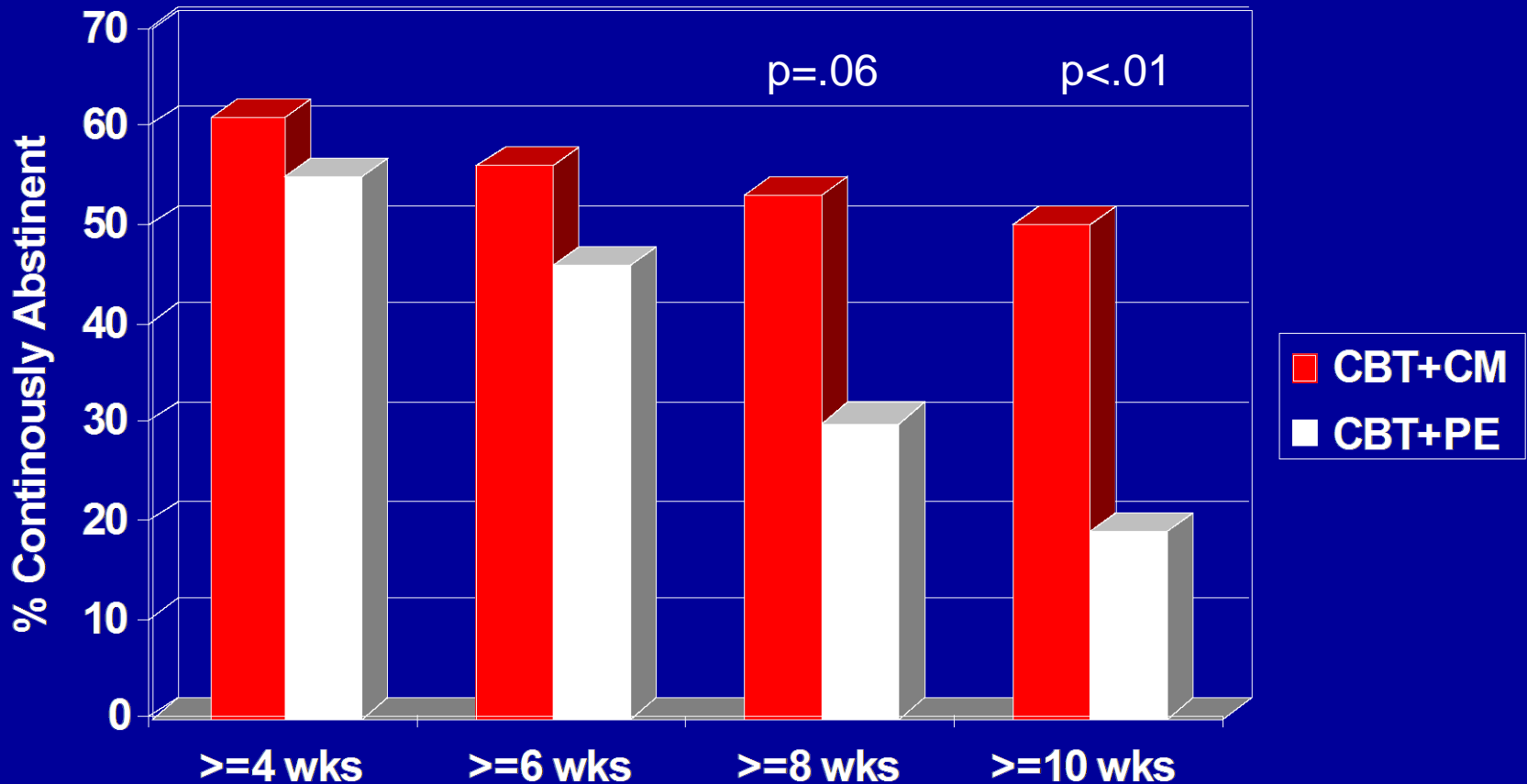


# INCANT Trial (2013)

## % Teens with Cannabis Dependence



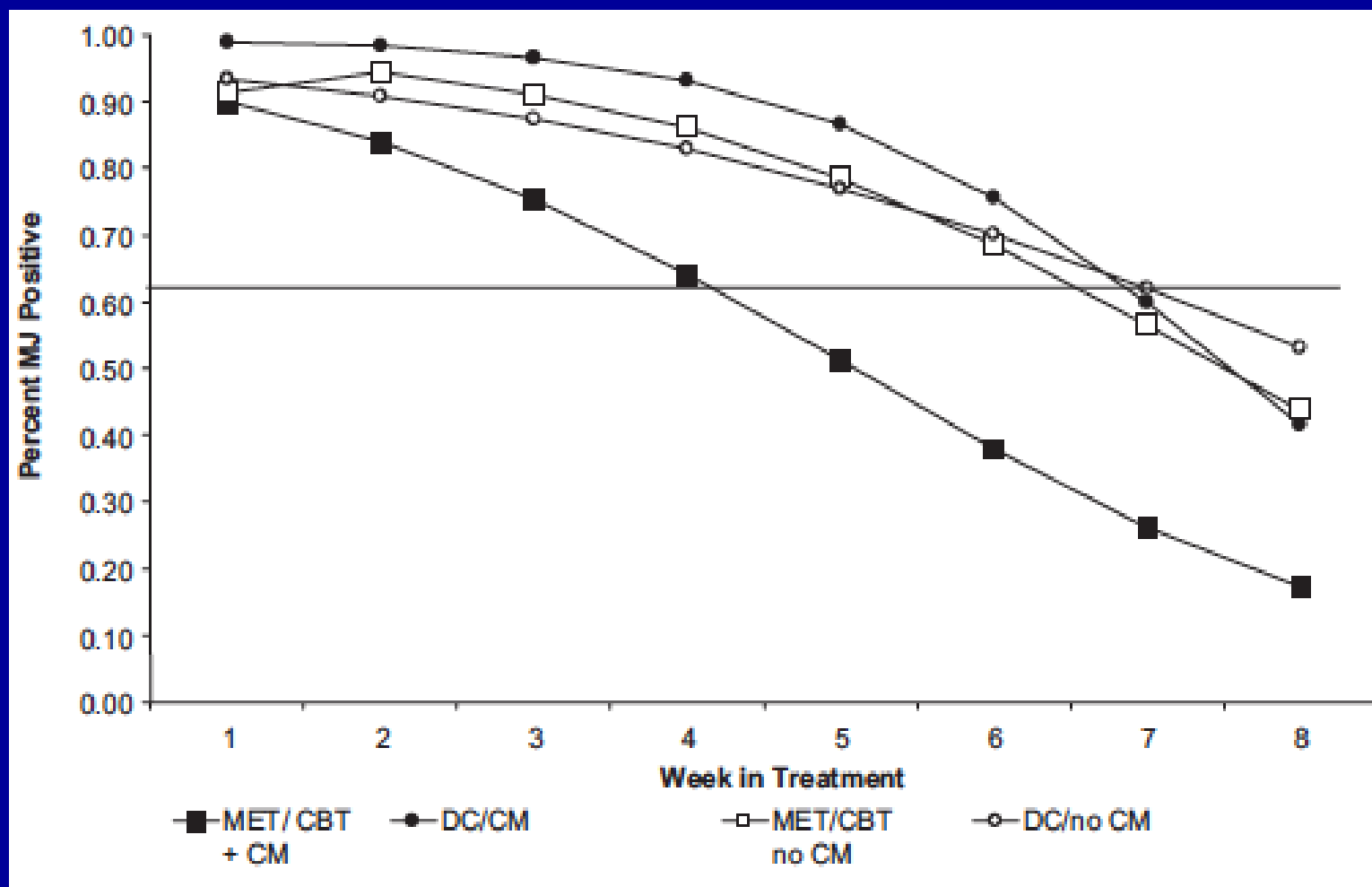
# Adding CM to CBT: Adolescent Continuous Abstinence During Treatment (n = 69)



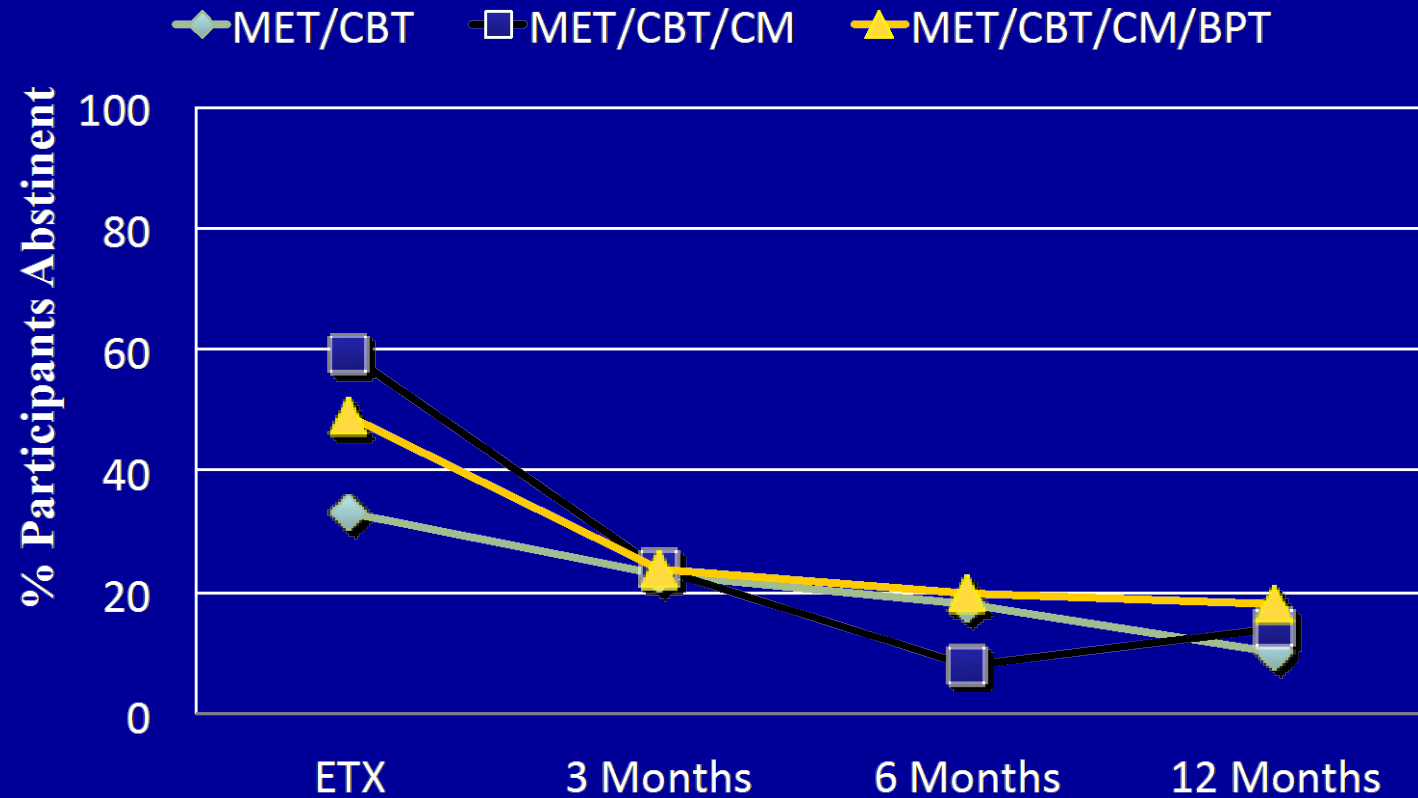
# Abstinent During Treatment

Probation-referred Youth (M=21 yrs)

Carroll et al. (2006)



# Post Treatment Abstinence





# **Brief Intervention Literature**

## **General Settings**

### **Reviews:**

**Jensen et al., (2011)**

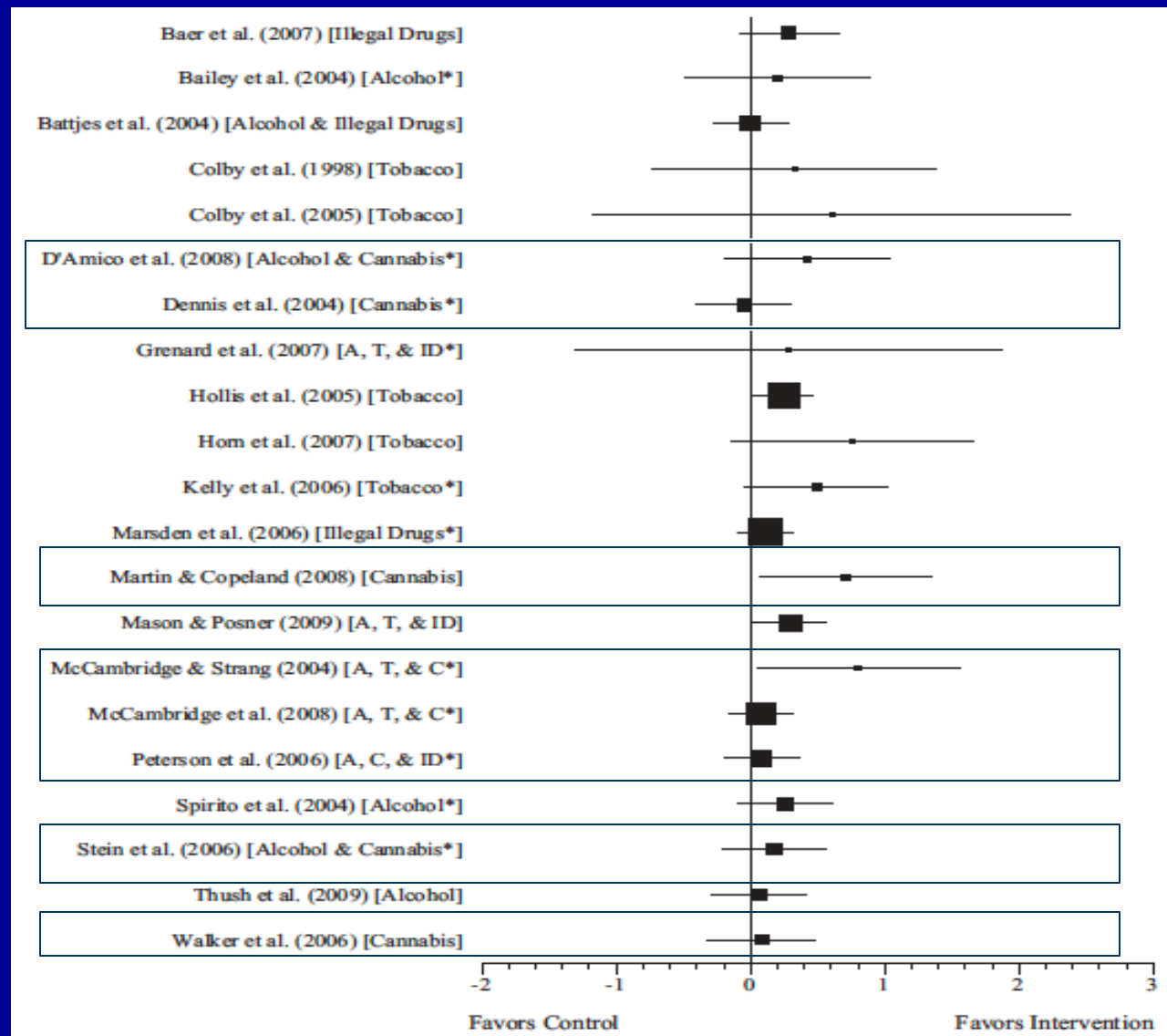
**- 21 studies**

## **School-based**

**(Carney et al., 2014) Cochrane Review**

**- 6 studies included**

# Meta analysis of BI for teens Jensen et al. (2011)



# Cochrane Review of School-based BIs

(Carney et al., 2014)

Brief intervention versus information provision,

3 studies: 732 participants

(McCambridge 2008; Walker 2011; Werch 2005)

Brief intervention versus assessment only,

3 studies: 407 participants

(McCambridge 2004; Winters 2007b; Winters 2012)

# Cochrane Review of School-based BIs

(Carney et al., 2014)

Moderate quality evidence that **school-based brief interventions** are no more effective than information provision for reducing **substance use** and other related problem behaviours

When compared to assessment only, there is low quality evidence that BI performed more favourably

Overall, BI did not seem to have a significant effect on alcohol or tobacco use; . However, **BIs seemed to reduce cannabis use in comparison to the assessment-only control condition** \*\*

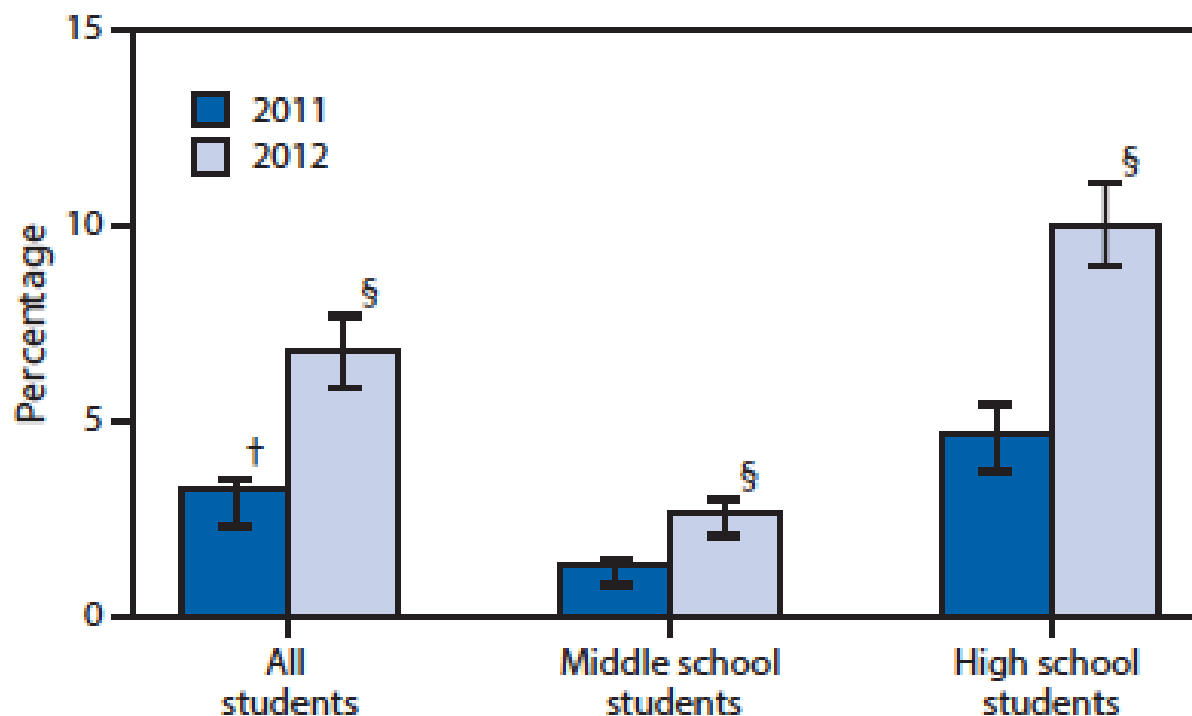
\*\* Quality of the evidence rated as low

# Making Excellent Progress, but

- 1) Cannabis Use Disorders not “easy” to treat
- 2) We have well-specified efficacious interventions that work better than others in decreasing use and engendering abstinence
- 3) Innovations in behavioral approaches continued to provide incremental increases in outcomes
- 4) We need to keep working along this path, as there remains much room for improvement in the rate of “success”
- 5) Dissemination/translation of most efficacious interventions should become a priority.

# E-cig (vaping) Use Rapidly Increasing (MMWR 2013)

**FIGURE. Ever electronic cigarette use\* among middle and high school students, by year — National Youth Tobacco Survey, United States, 2011–2012**



# Vaping of Cannabis Rapidly Increasing

## No Data!!!!

- Concerns
  - Perceived as less harmful
  - Vaping other flavors / substances may ease transition to cannabis
  - May lead to use of other forms of cannabis
  - Increase mixing of cannabis and tobacco or nicotine
  - Cool to vape / smoke?

# **Clinical Issues and Challenges in Working with Youth Marijuana Users**

## **Diverse Clinical Population**

- High Functioning
- Disadvantaged, Multiple Problems
- Co-occurring Disorders

Not much difference than other substances, particularly alcohol

Clinical “counseling” strategies are similar

“Medicinal” use somewhat unique



# Challenges

- 1) **Maintenance .... Challenge for all interventions**
  - **establish meaningful lifestyle change to compete with substance use**
- 2) Non-responders
- 3) Reduced use / Harm reduction
- 4) Individual / cultural differences impact interventions
- 5) Transportability / Dissemination

# Cannabis: Reasons for Concern

Sneaky drug with relatively subtle effects... can function under the influence

Has many seemingly positive “functions” (like other drugs)

More potent than it used to be

Kids develop dependence more quickly than adults

Adolescents like adults don’t believe it is “addictive” or “harmful”

Regular use likely impacts neurodevelopment

May increase probability of mental illnesses

Increases probability of exposure to other substances

**Cannabis is more similar than dissimilar to other substances that are considered “drugs of abuse”**

**Like other substances, it is used primarily for its positive (and negative) reinforcing effects:**

**a small subset of persons who use cannabis go on to have problems...some serious, some moderate, and some not so serious**

**like other substances, it is not legal or recommended for those under 18 (or 21)**

# Cannabis has great importance to Addiction Science and Medicine

How to define or operationalize:

- *addiction*
- *dependence (physiological and psychological)*
- *medical use (relevant to scheduling a substance)*

Think hard about Policy, Laws, Regulations, and  
Attitudes about potentially harmful substances

- Seems like **Groundhog Day...**

# Is Cannabis Use, Misuse, Abuse, Dependence a Public Health Issue?

- Consequences of Clinical Importance
- Relatively large numbers seek treatment
- Impacts a significant proportion of youth and adults
- Multiple consequences associated with abuse

# If You Answer Yes

- does not mean:
  - you can't investigate potential benefits
  - you can't explore harm reduction strategies
  - you believe it is worse than alcohol or tobacco
  - you believe it is the same as cocaine and heroin
  - you believe it should or should not be legalized or decriminalized

# Conclusions

- Cannabis / cannabinoid use increasing, likely to continue to increase among youth (legal status, price decrease, reduced perception of risk, enticing products, vaping)
- Might be on a trajectory towards becoming a more dangerous class of substances with legalization movement leading to enticing products including edibles, increased potency in those products, and surely other modifications that will increase its allure

# Conclusions

- Youth may be particularly vulnerable to development of problematic / excessive use or use disorders
- Consequences of moderate to heavy use appears substantial
- Interventions have efficacy, but are fairly weak
- Much work to be done in areas of regulation and treatment and prevention development and implementation



# THANKS!!!!

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