



# MARIJUANA:

## Selected Effects on Brain, Body & Behavior

February, 2012



# Marijuana is the Most Commonly Used Illicit Drug In the U.S.

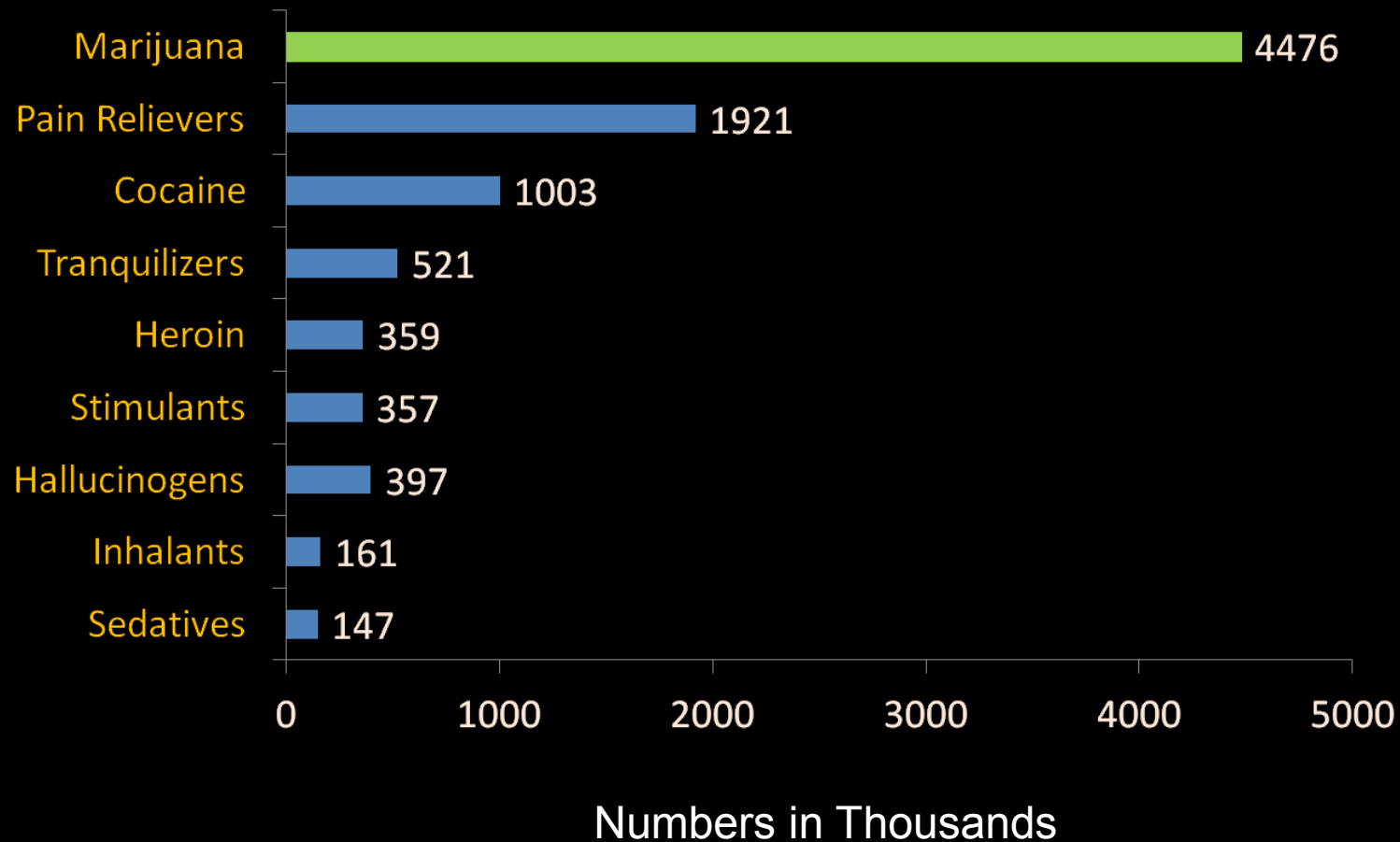


- Over 106 million Americans have tried it at least once
- An estimated 2.4 million Americans used it for the first time in 2010

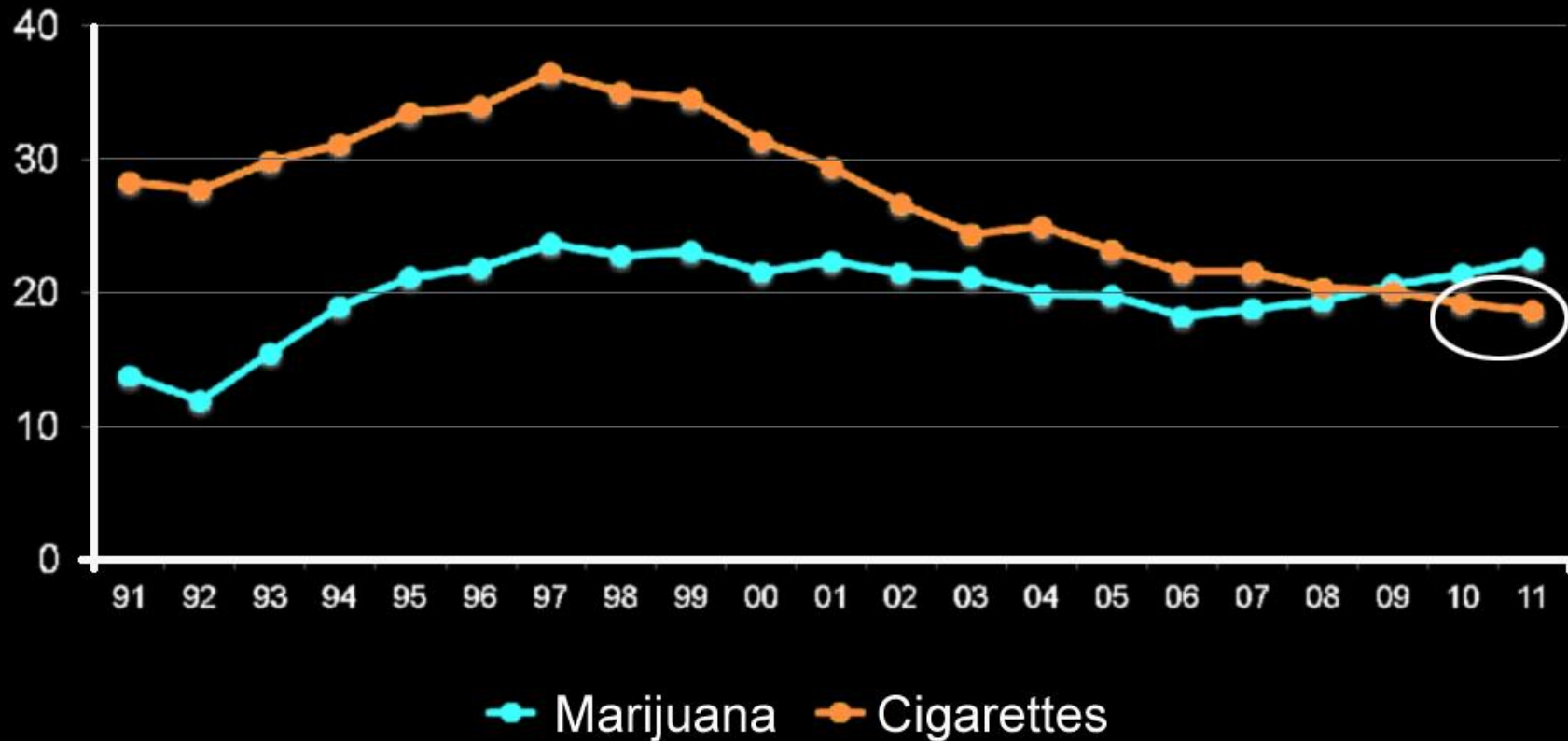


Tetrahydrocannabinol (THC)  
Active Ingredient in Marijuana

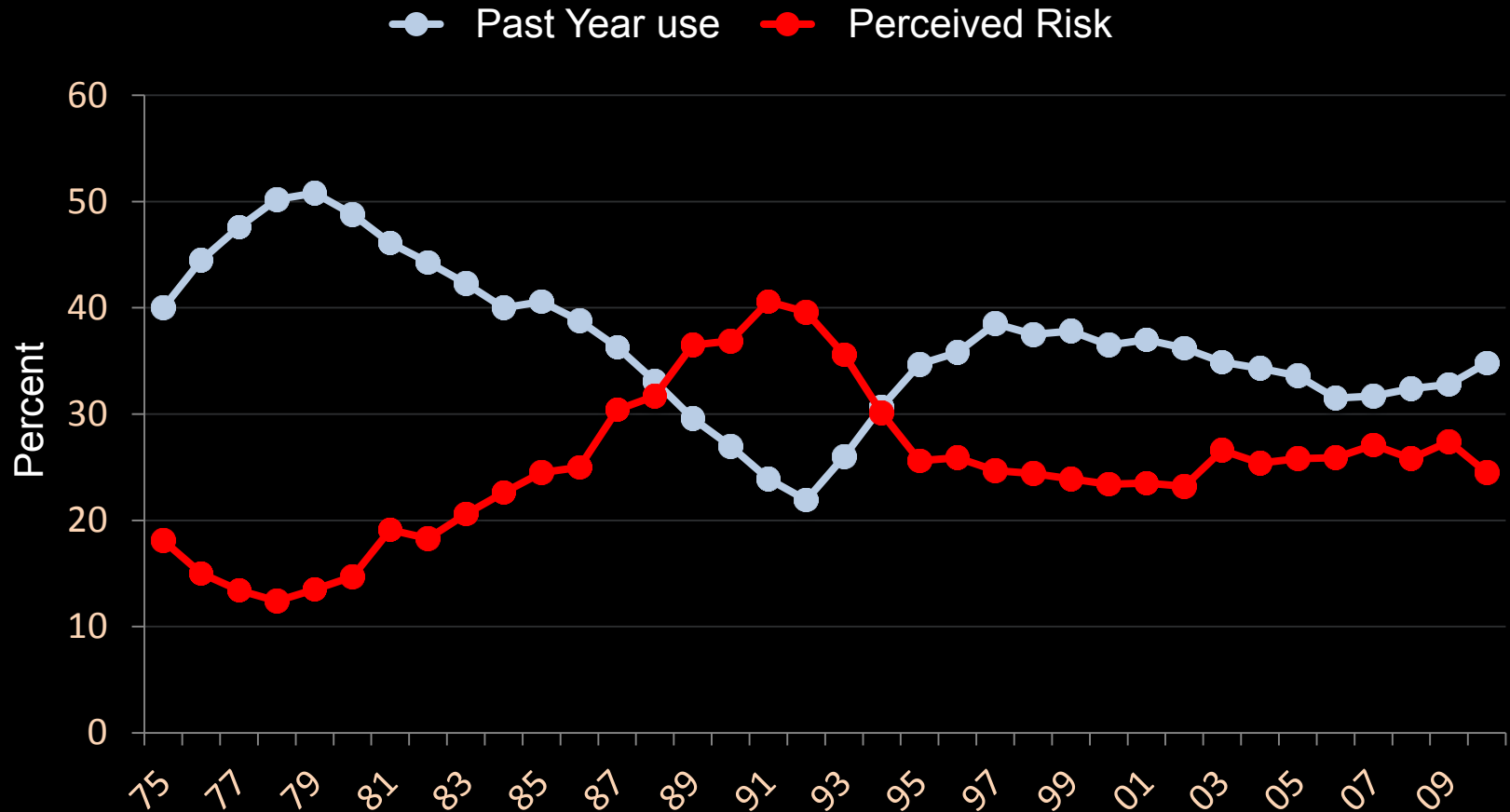
# High Rates of Past Year Dependence or Abuse on Marijuana (Comparison to other Drugs Among Persons 12 or older, 2010)



# In 2009, Reports of Past Month Use of Marijuana Among 12<sup>th</sup> Graders Exceeded that of Cigarette for the First Time in the Survey's History



# Changes in Attitude Lead to Changes in Use: Marijuana Use and Perceived Risk in 12<sup>th</sup> Graders, (1975 to 2010)



Source: The Monitoring the Future study, the University of Michigan

# Why Do People Take Drugs in The First Place?

They like what it does to their brains



To Feel Good

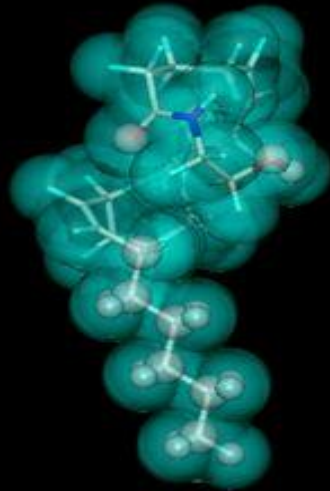


To Feel Better

# Drugs Can be Chemical Imposters

(THC mimics a natural brain chemical)

Brain's Chemical



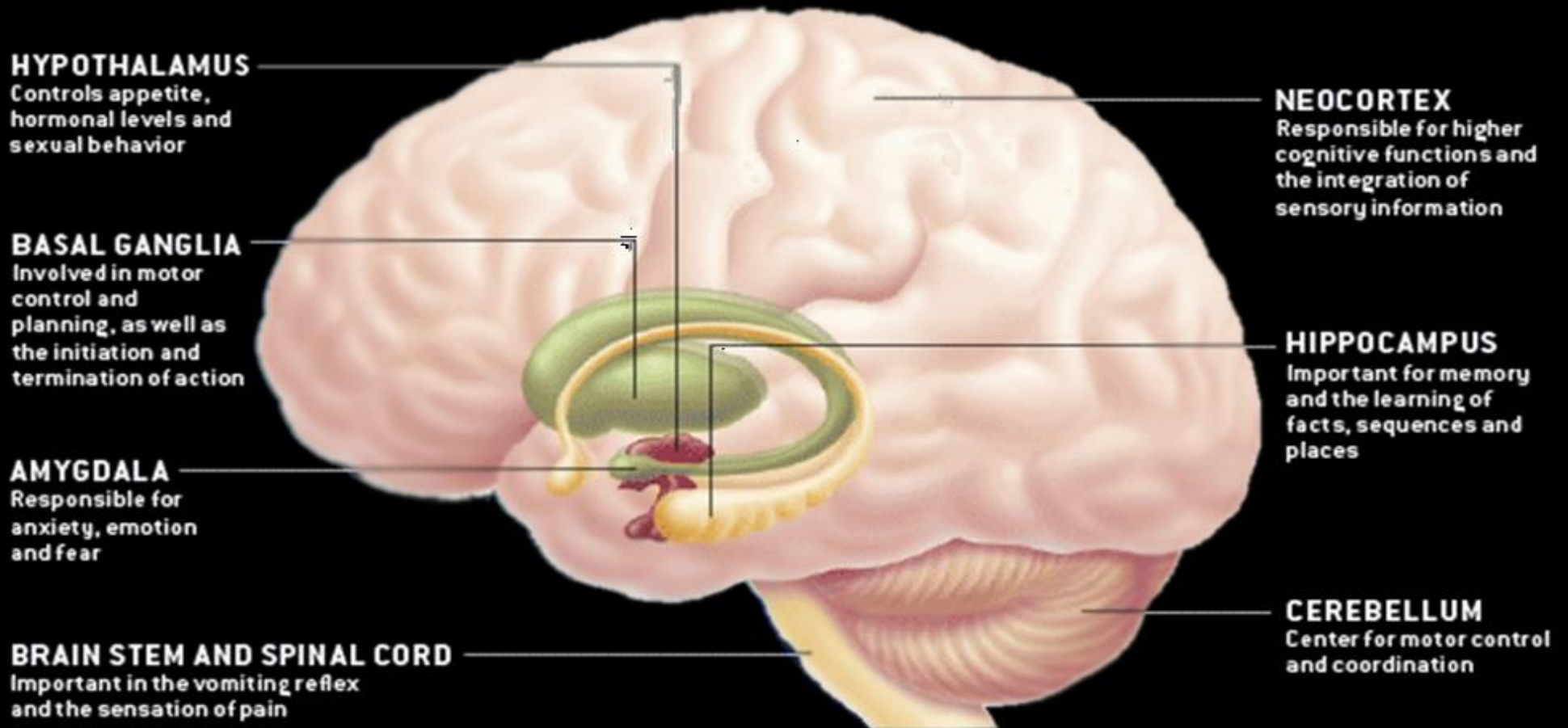
Anandamide

Drug



THC

# Marijuana Acts in Many Parts of the Human Brain





# Marijuana's Many Acute Effects (Intoxication phase)

- Euphoria
- Calmness
- Appetite stimulation
- Altered perception of time
- Impairs coordination and balance
- Acute psychosis; Panic (anxiety)
- Increased heart rate: 20 - 100%
  - Some evidence for increased risk of heart attack, may be exacerbated in vulnerable individuals (e.g., baby boomers)

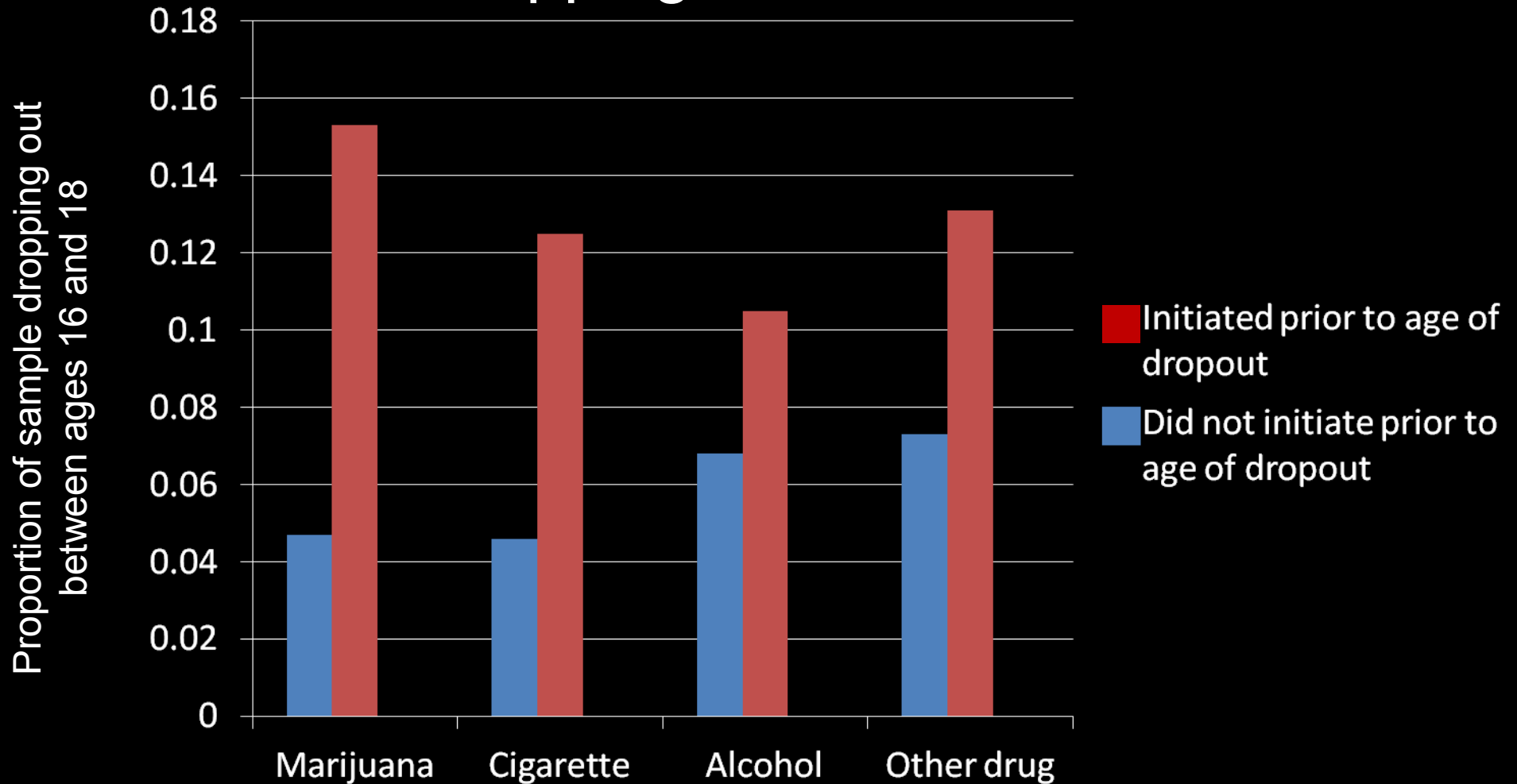
# Marijuana's Many Acute Effects (Intoxication phase)

- Cognitive Dysfunction
  - Impaired short-term memory
    - Difficulty with complex tasks
    - Difficulty learning
  - Impaired decision-making
    - Increased risky sexual behavior – HIV
- Impaired Driving
  - Increased risk of accidents
  - Increased culpability
- Acute health effects
  - In 2009, there were >375,000 Marijuana-related ED visits

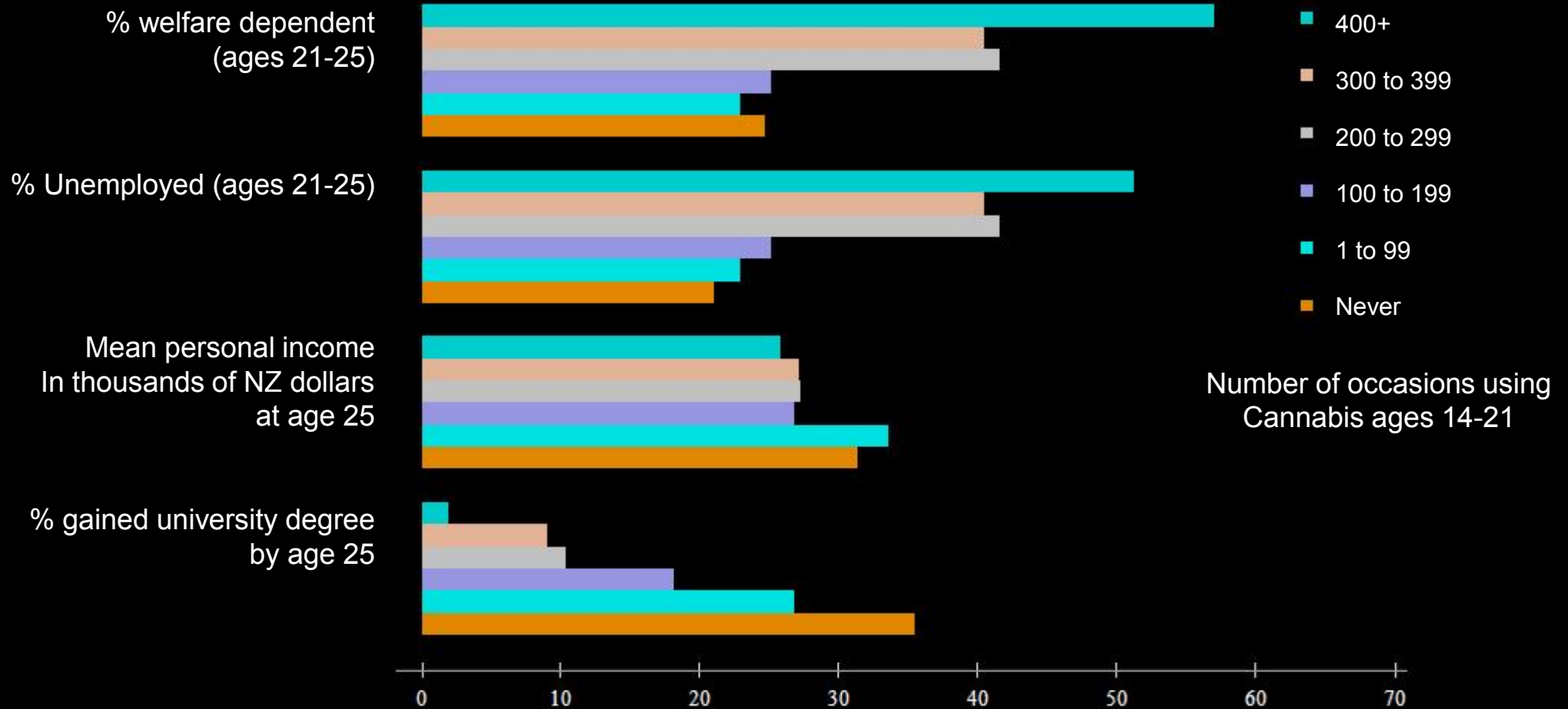
# Long Term Risks of Marijuana Use

- Academic failure and low professional achievement
- Poorer long-term life outcomes
- Mental health problems
- Addiction

# Early Marijuana (and other drug) Use Linked to Dropping Out of School

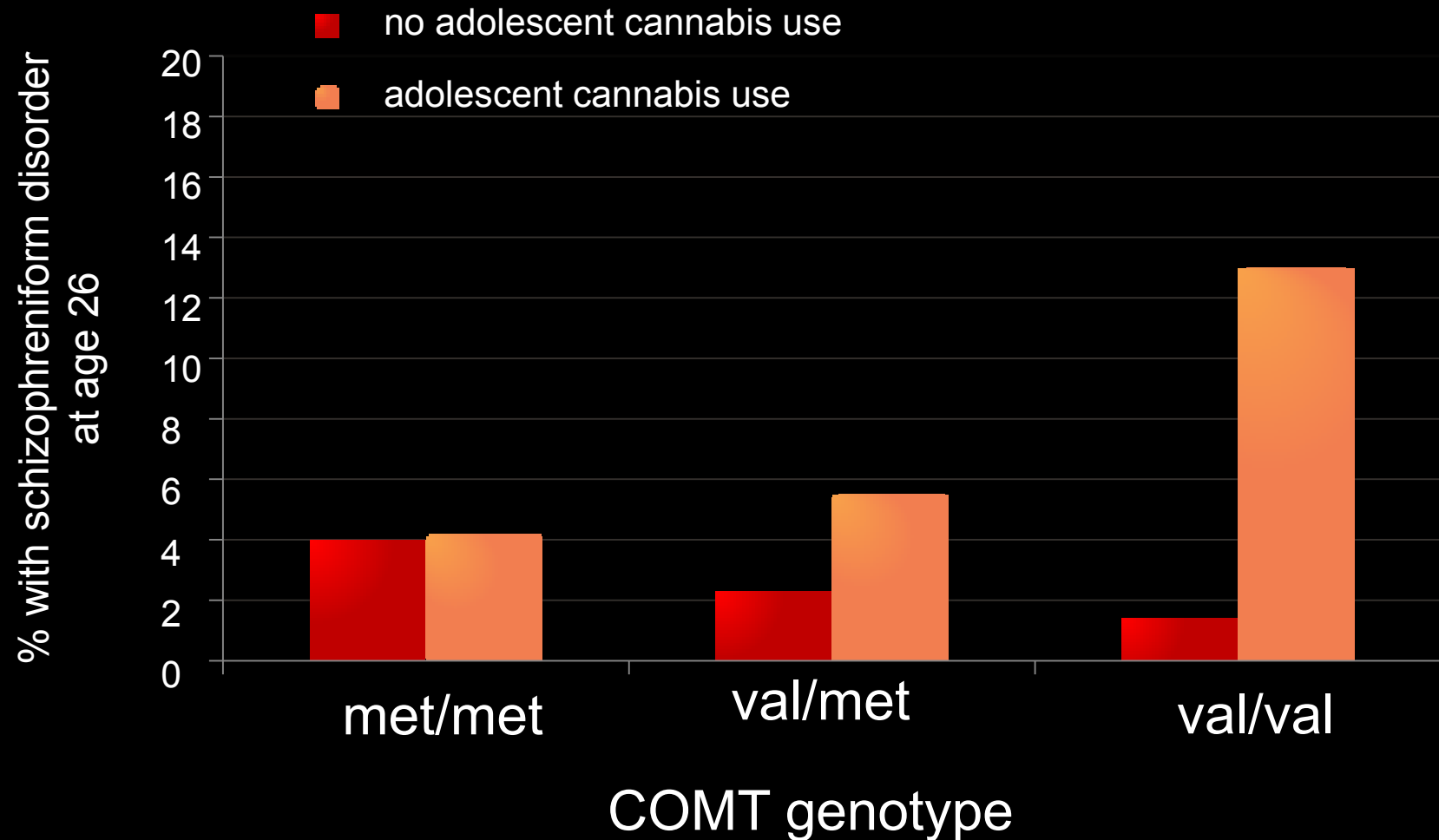


# Cannabis Use and Later Life Outcomes are Dose Dependent

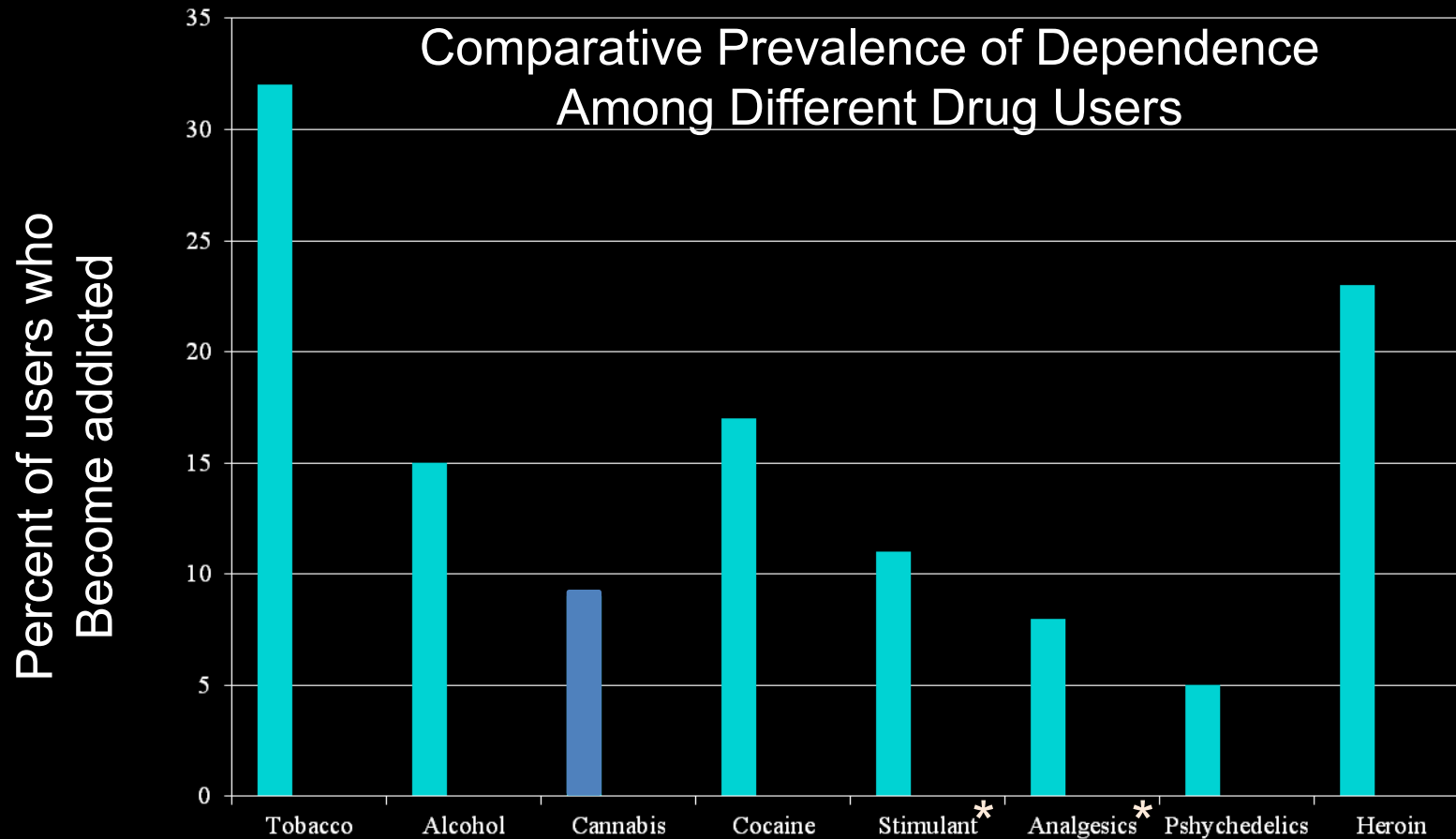


Source: Fergusson and Boden. *Addiction*, 103, pp. 969-976, 2008.

# Adolescent Cannabis Use Increases the Risk for Adult Psychosis in Genetically Vulnerable Individuals



Addiction: About 9% of cannabis users may become dependent  
1 in 6 who start use in adolescence, 25-50% of daily users



\* Nonmedical Use

Source: Anthony et al. Exp. Clin. Psychopharmacol. 2(3), pp.244-268 (1994)

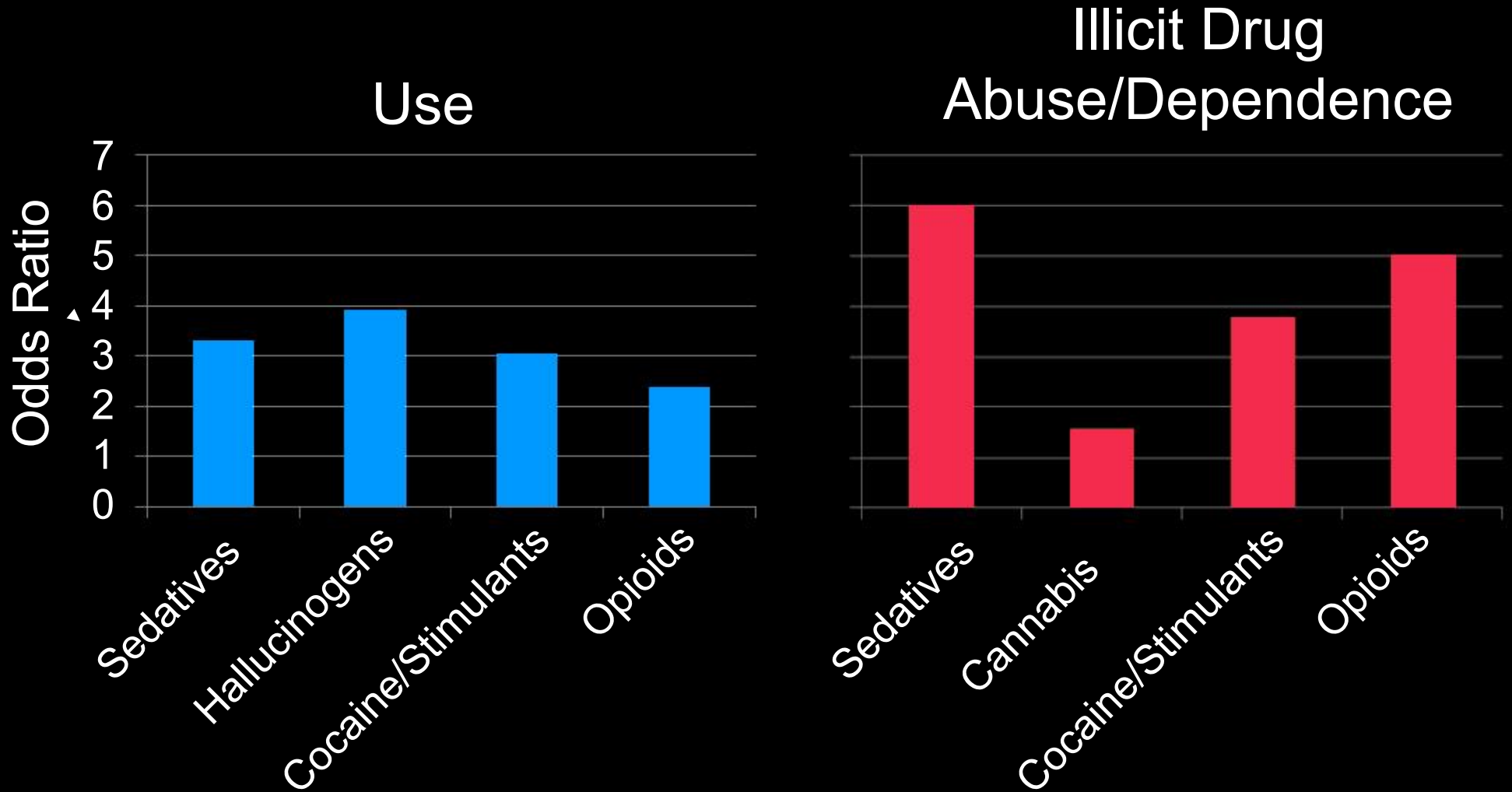
Marijuana addiction is also linked to a withdrawal syndrome that can make it hard to quit. Symptoms include:

- irritability,
- sleeping difficulties,
- craving,
- anxiety, and
- increased aggression.

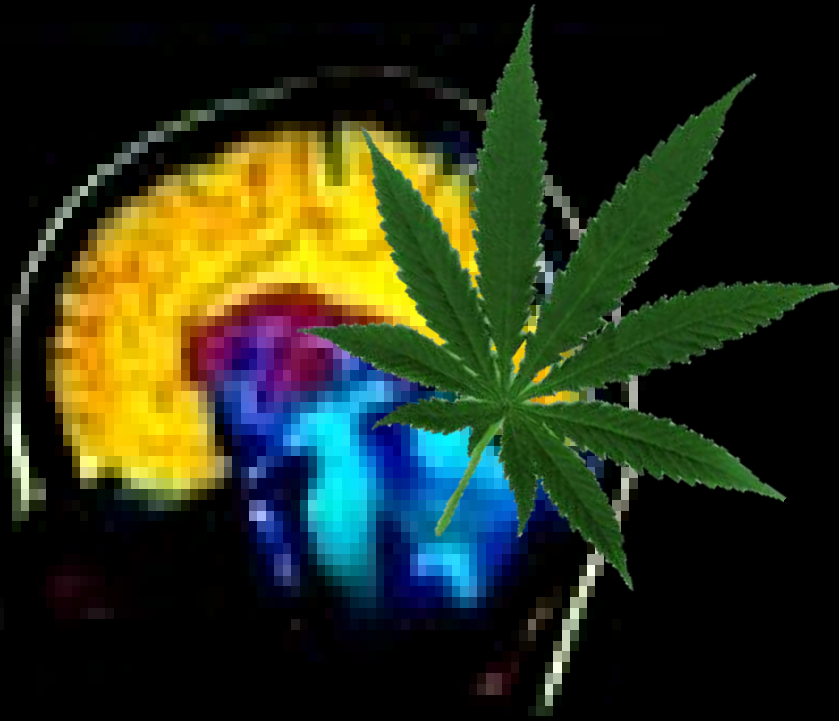




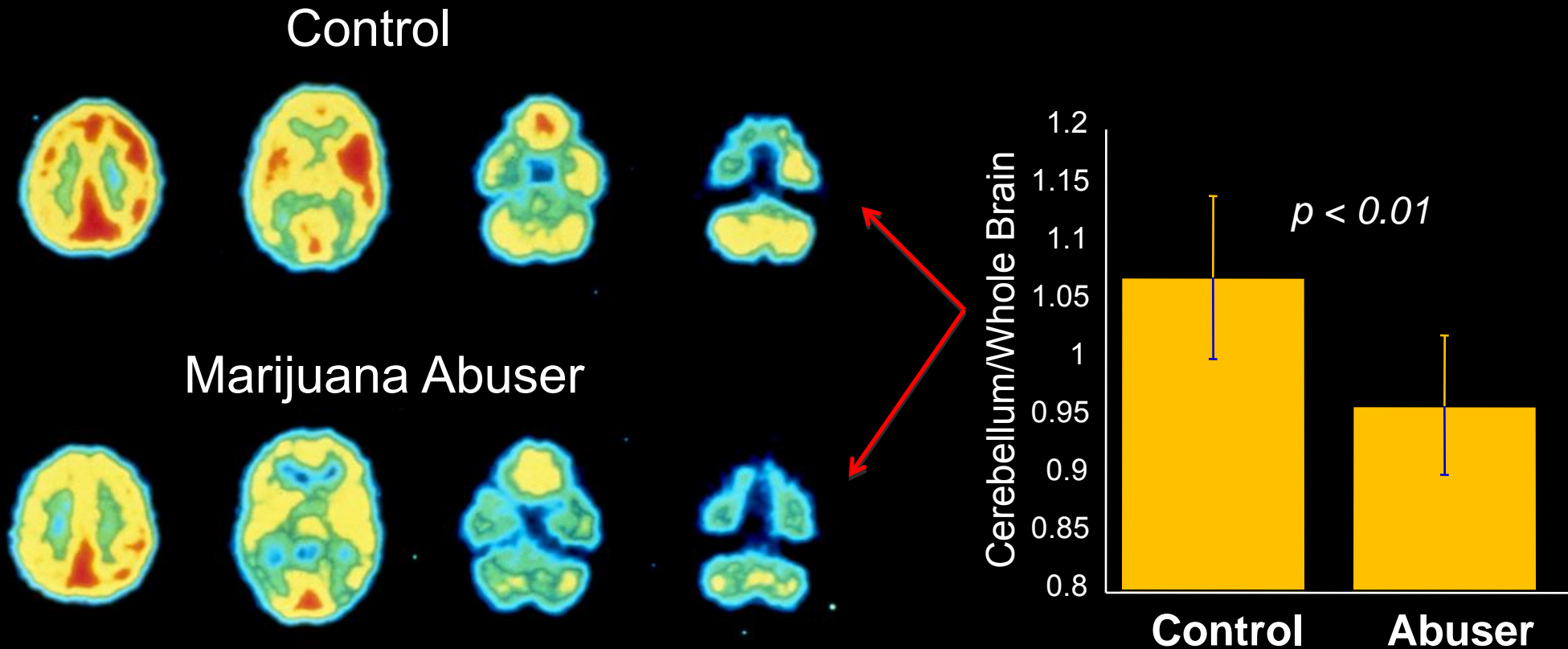
# Drug Use Outcomes in Twin Pairs (n =234) Discordant for Cannabis Use Before Age 17



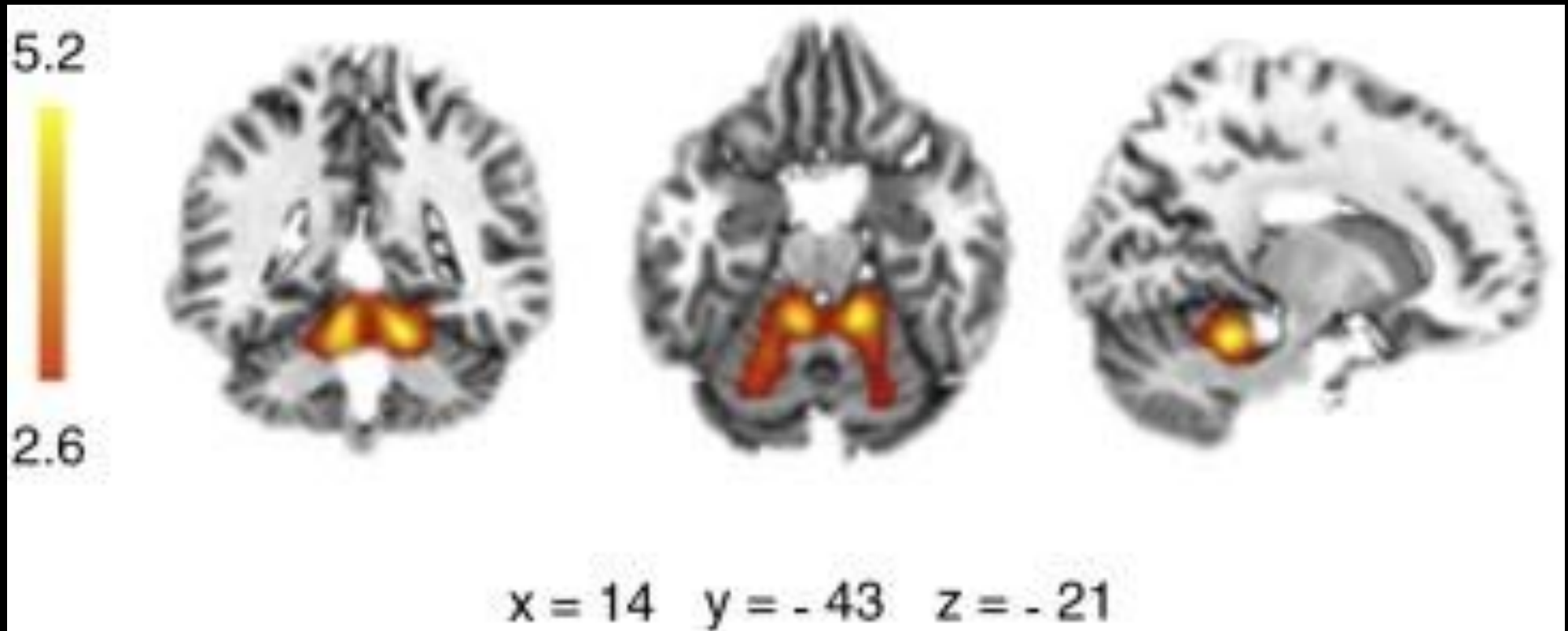
# Possible impact of chronic Marijuana use on brain structure and function



# The Lower Baseline Cerebellar Metabolism in Marijuana Abusers is likely to Result in Motor Deficits



# Heavy cannabis users display differences in cerebellar volume



To learn more about marijuana and other drugs of abuse visit NIDA's website at:  
[www.drugabuse.gov](http://www.drugabuse.gov), or NIDA's teen site at  
[www.teens.drugabuse.gov](http://www.teens.drugabuse.gov)

To order publications on these topics free of charge in English or Spanish, contact the DrugPubs Research Dissemination Center at 877-NIDA-NIH (877-643-2644; TTY/TDD: 240-645-0228) or [www.drugpubs.drugabuse.gov](http://www.drugpubs.drugabuse.gov)