

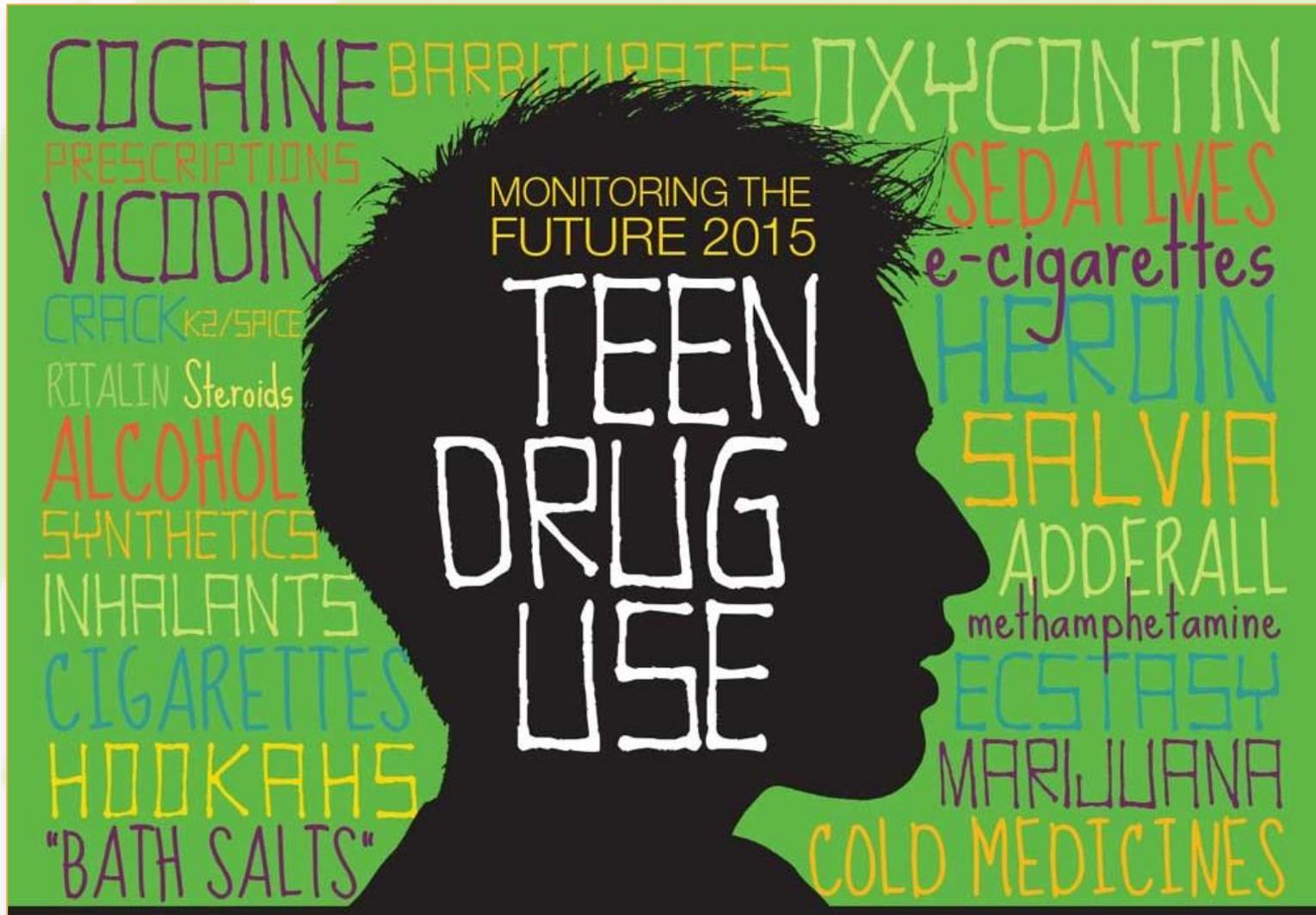
Teen Brains on Drugs (and Alcohol): Neurobiology of Substance Abuse

Presented by

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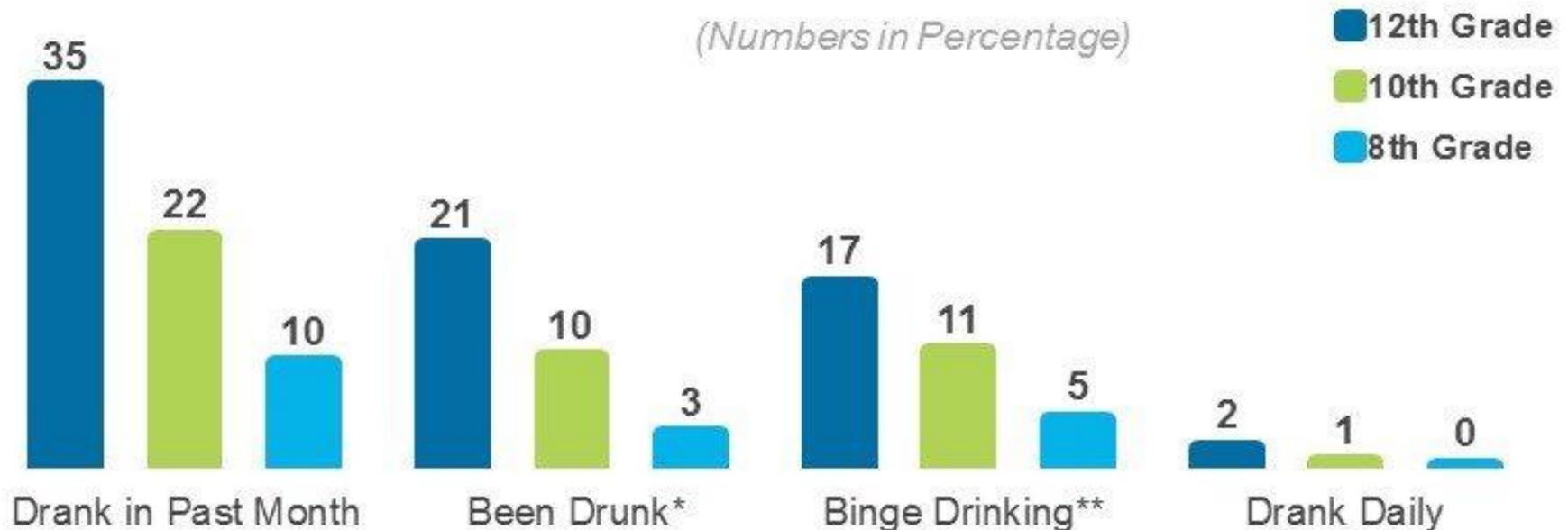




Monitoring the Future is an annual survey of 8th, 10th, and 12th graders conducted by researchers at the University of Michigan, Ann Arbor, under a grant from the National Institute on Drug Abuse, part of the National Institutes of Health. Since 1975, the survey has measured drug, alcohol, and cigarette use and related attitudes in 12th graders nationwide. Eighth and 10th graders were added to the survey in 1991.

Overall, 44,892 students from 382 public and private schools participated in the 2015 survey.

Reported Drinking Patterns Among 8th, 10th and 12th Grade Students: 2015



Source: NIDA, *National Survey Results on Drug Use from the Monitoring The Future Study*, Vol. II Johnston L., et al, U. of Michigan, 12/15

Note: Author state language on the 93/94 survey changed slightly.

* Been drunk in the previous 30 days. ** Five or more drinks in a row in the previous two weeks.

How Much is a Binge?

Binge drinking occurs when guys consume 5 or more standard drinks, and when girls consume 4 or more standard drinks, in about 2 hours.

Standard drink sizes

**12 fl oz of
regular beer**

=

**8–9 fl oz of
malt liquor**
(shown in a
12 oz glass)

=

**5 fl oz of
table wine**

=

**1.5 fl oz shot of
80-proof spirits**
("hard liquor"—
whiskey, gin, rum,
vodka, tequila, etc.)



about 5%
alcohol



about 7%
alcohol



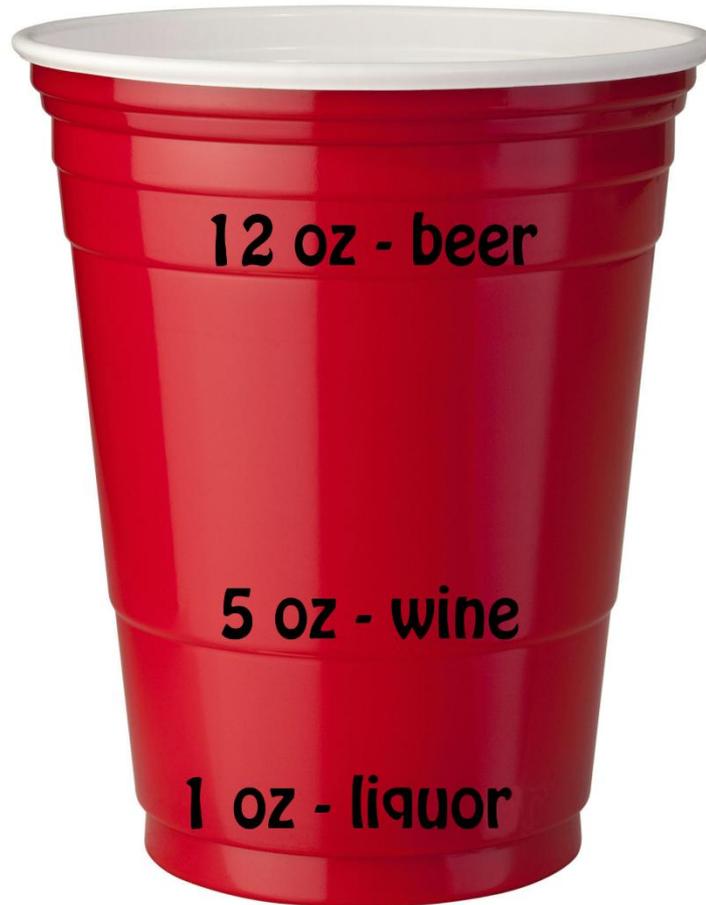
about 12%
alcohol



about 40%
alcohol

The percent of "pure" alcohol, expressed here as alcohol by volume (alc/vol), varies by beverage.

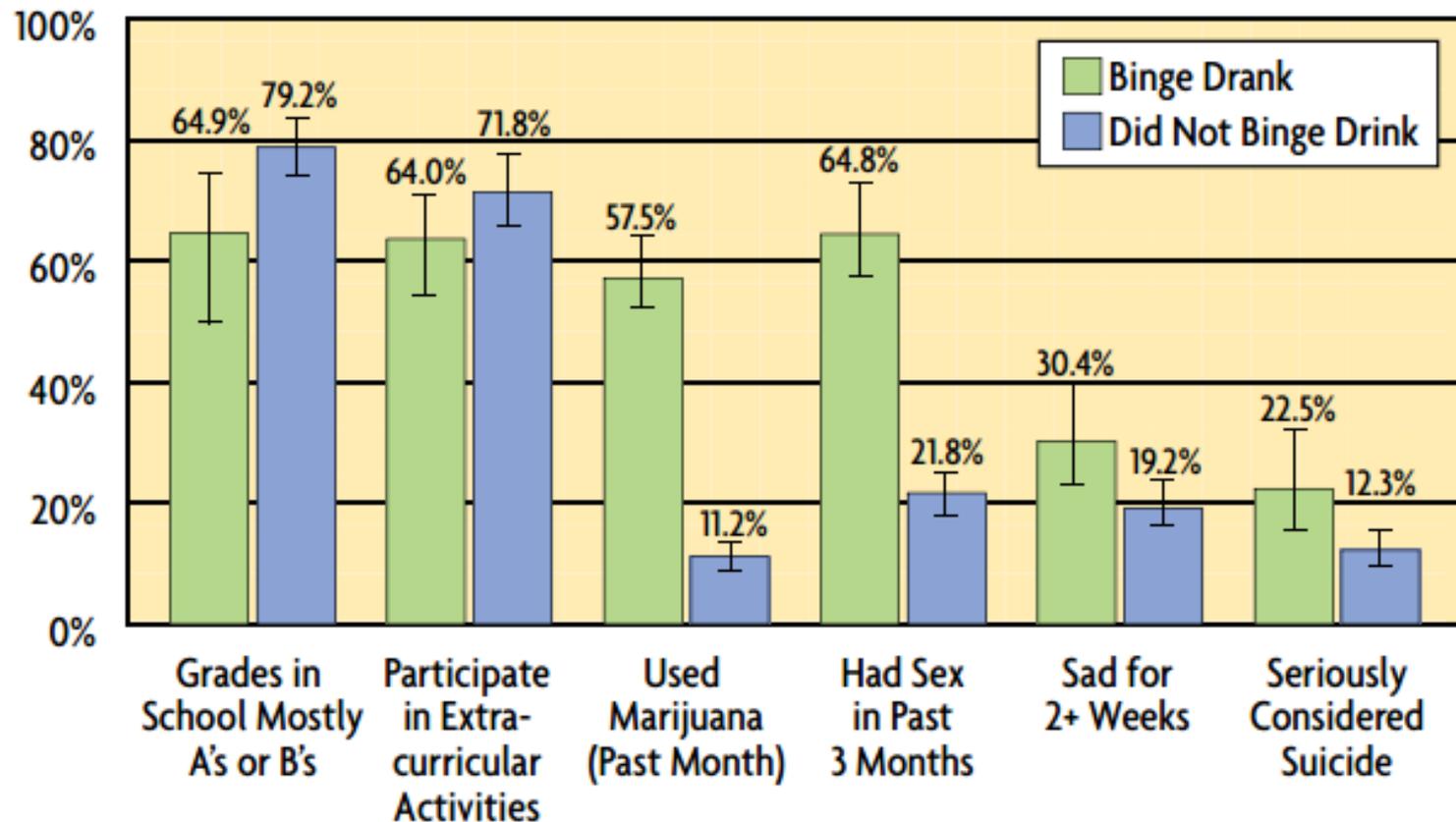
Red Solo Cup Measurements



**How much are you
REALLY drinking?**

Alcohol and Risky Behavior

Figure 40: HS Significant Associations Between Binge Drinking and School, Other Substance Use, Sexual Activity, and Mental Health



Note: In 2011, 22.3% of Colorado students reported binge drinking in the past 30 days. All comparisons above reflect statistically significant differences ($p < .05$).

ALCOHOL AND THE TEENAGE BRAIN

A child's brain



continues developing
until they are into their

EARLY 20's



ALCOHOL IS A DRUG

that can disrupt
a young person's

BRAIN
DEVELOPMENT



FRONTAL LOBES

speech, emotions,
reasoning

(including inhibition of
impulsive behaviours)

**PRE-FRONTAL
CORTEX**
rational thinking,
memory, personality,
behaviour

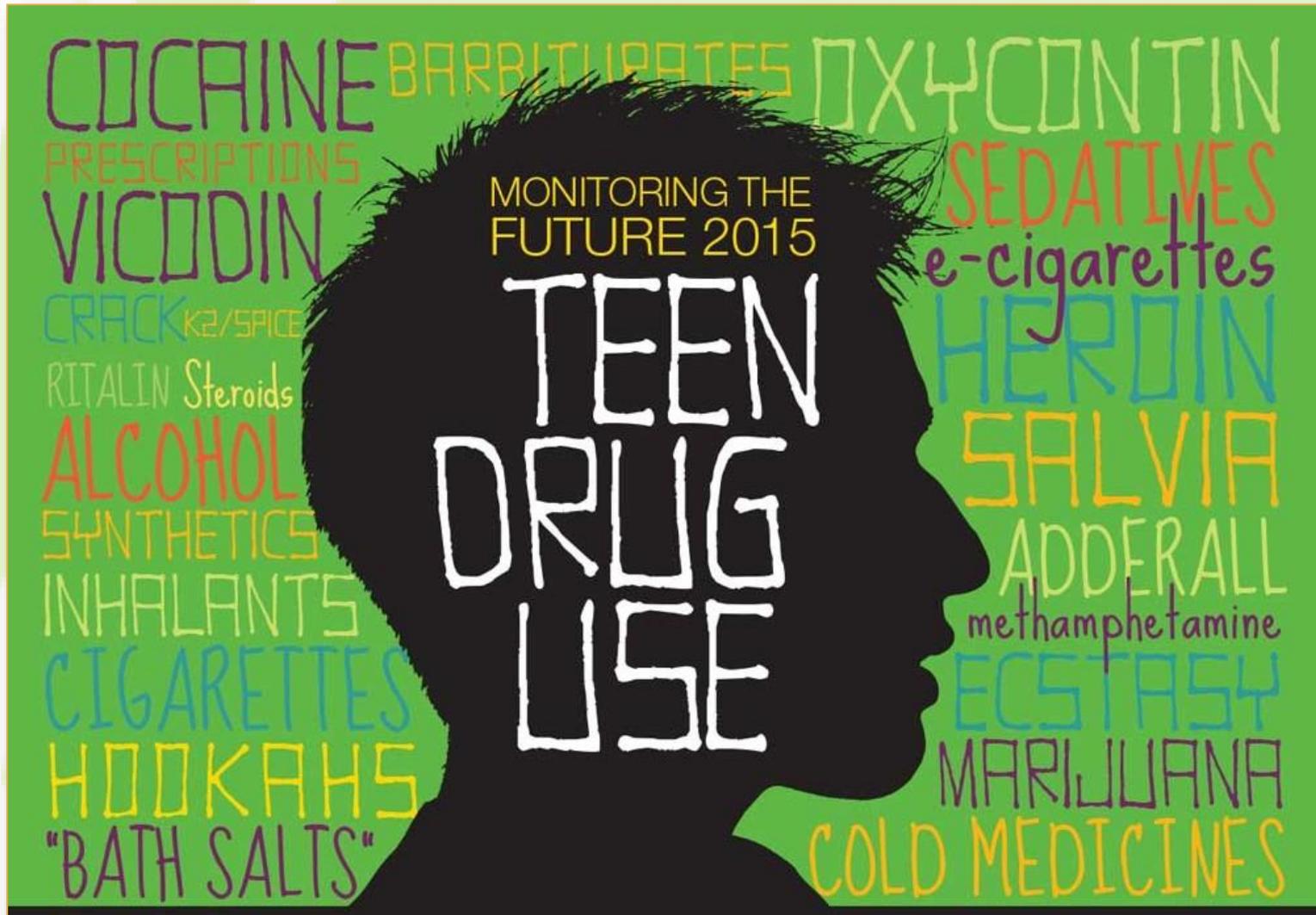


HIPPOCAMPUS
learning and
memory

TEMPORAL LOBE
interpretation of
sounds and spoken
language

CEREBELLUM
movement and
balance

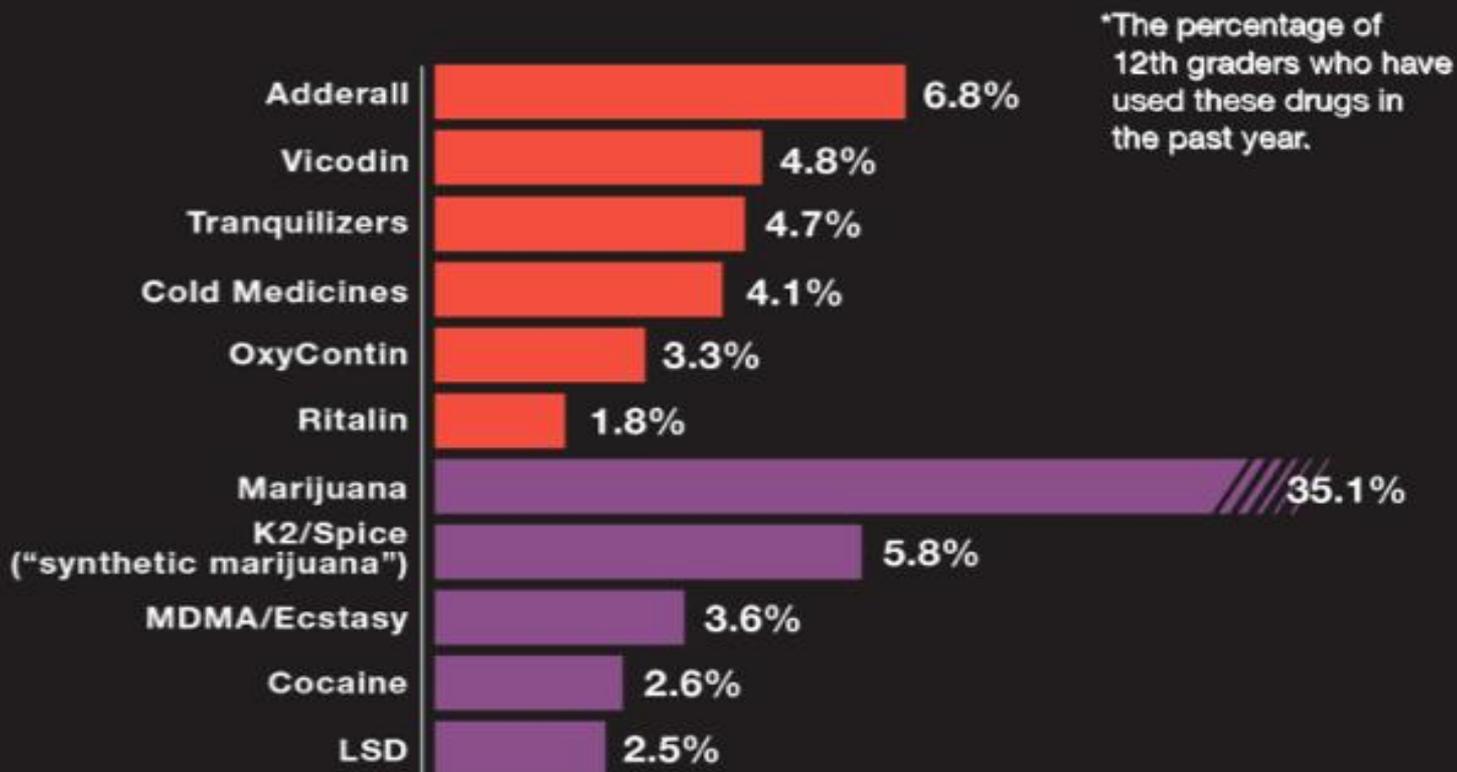




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PRESCRIPTION/OVER-THE-COUNTER VS. ILLICIT DRUGS*



PRESCRIPTION



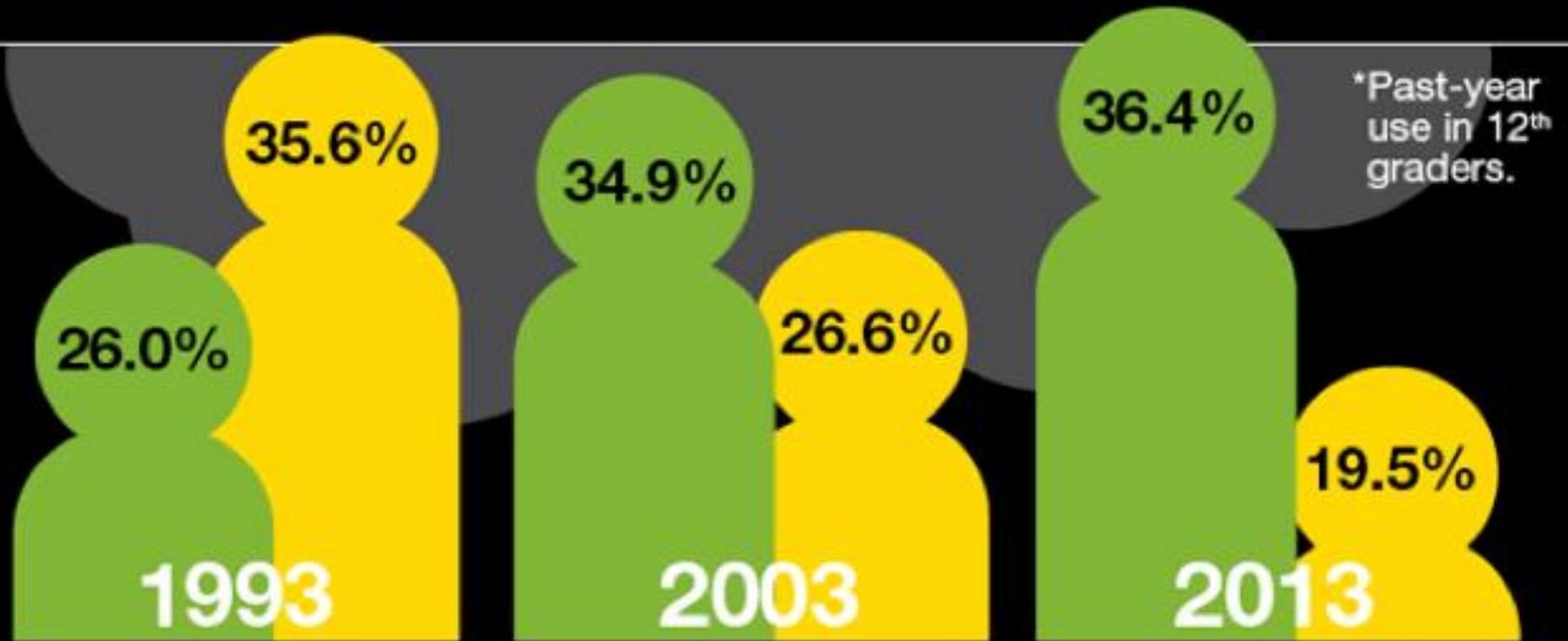
ILLICIT DRUGS



National Institute
on Drug Abuse

The National Institute on Drug Abuse is a component of the National Institutes of Health, U.S. Department of Health and Human Services. NIDA supports most of the world's research on the health aspects of drug abuse and addiction. Fact sheets on the health effects of drugs of abuse and information on NIDA research and other activities can be found at www.drugabuse.gov.

MARIJUANA: AS PERCEIVED HARM DROPS, USE GOES UP



*Past-year use in 12th graders.



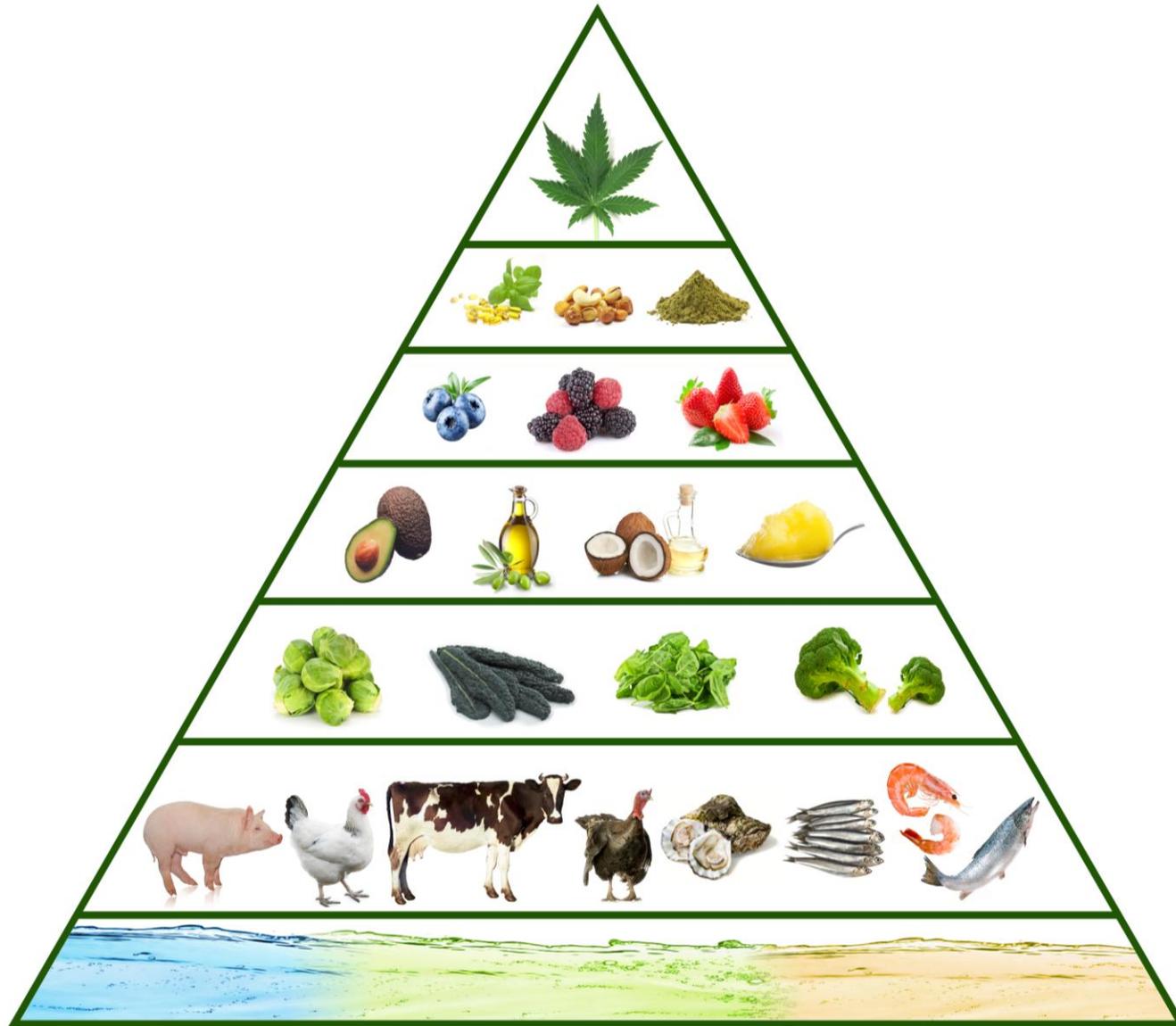
USING



PERCEIVED HARM

(saw great risk in smoking marijuana occasionally)

GreenPyramid



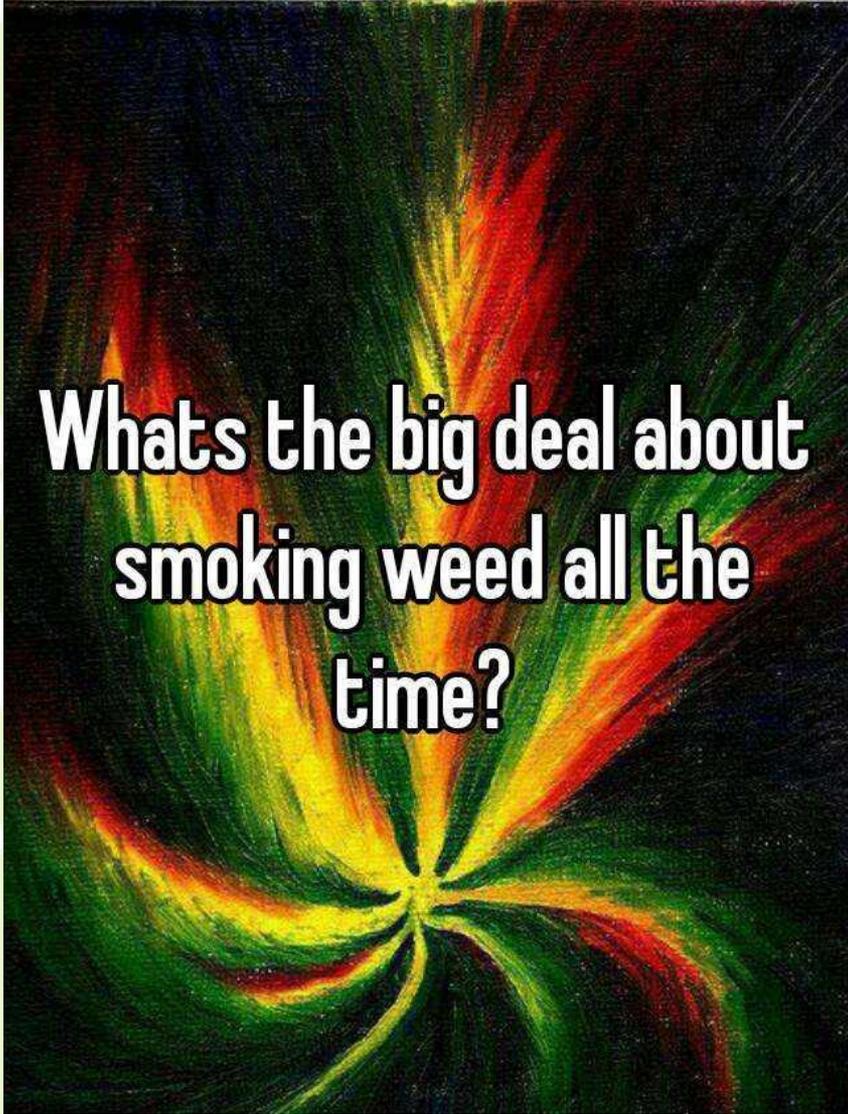


From the 1960s into the 1990s,
marijuana potency rose from
2% to 10% concentration of THC.

In the last decade, THC content in the plant forms of marijuana has increased to 30% concentration.



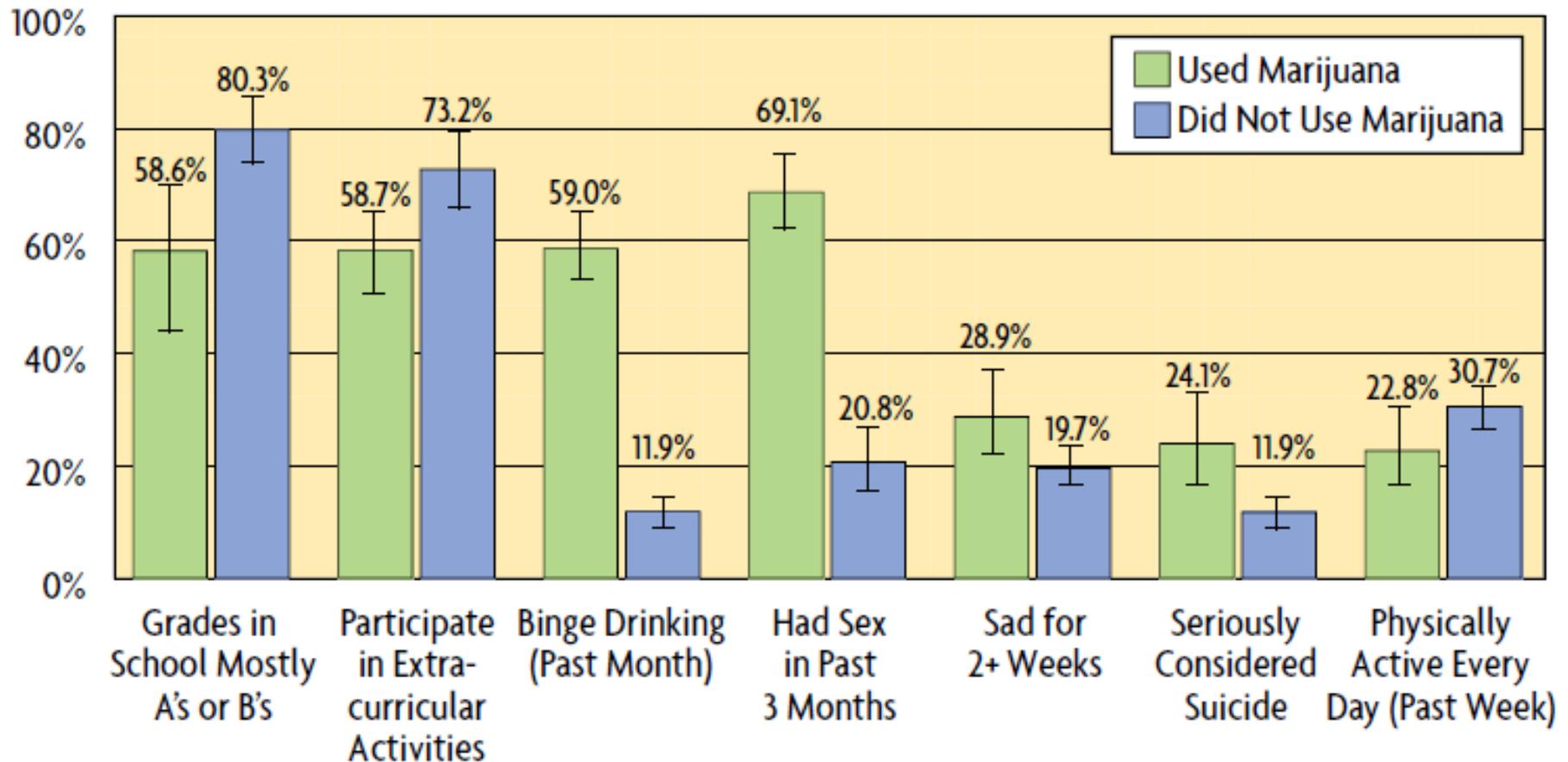
**Today's marijuana is
5-6x stronger than it was
just 20 years ago.**



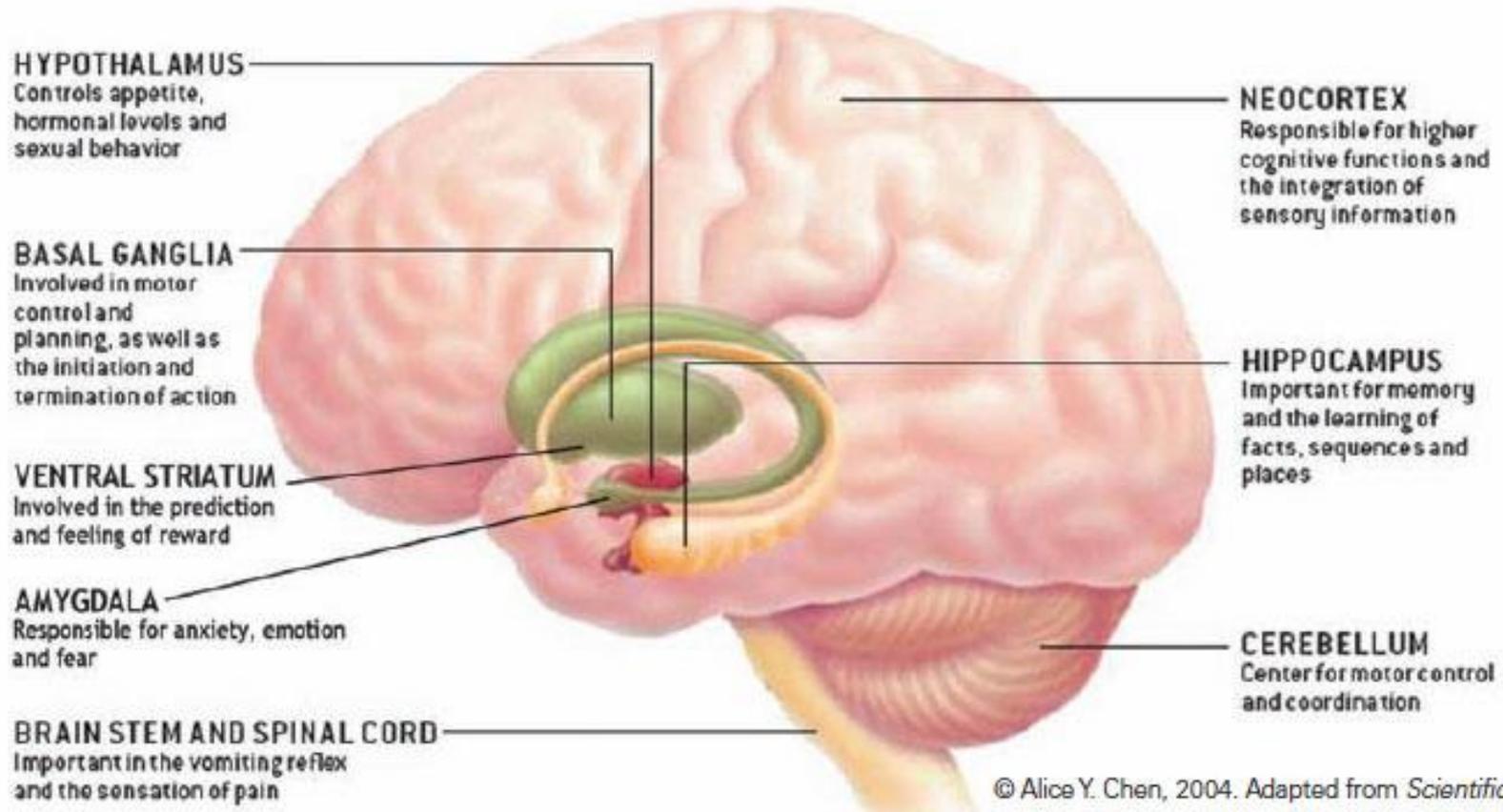
**Whats the big deal about
smoking weed all the
time?**

Marijuana and Risky Behavior

Figure 41: HS Significant Associations Between Marijuana Use and School, Other Substance Use, Sexual Activity, Mental Health, and Physical Activity



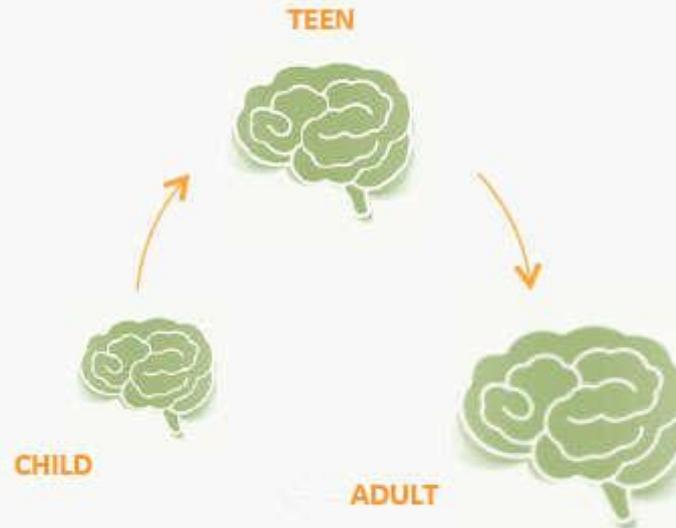
Marijuana's Effects on the Brain



When marijuana is smoked, its active ingredient, THC, travels throughout the body, including the brain, to produce its many effects. THC attaches to sites called cannabinoid receptors on nerve cells in the brain, affecting the way those cells work. Cannabinoid receptors are abundant in parts of the brain that regulate movement, coordination, learning and memory, higher cognitive functions such as judgment, and pleasure.

MARIJUANA MAY HURT THE DEVELOPING TEEN BRAIN

The teen brain is **still developing** and it is especially vulnerable to drug use.



IQ
↓

Regular heavy marijuana use by teens can lead to an IQ drop of up to **8 points**³

HEAVY MARIJUANA USE BY TEENS IS LINKED TO⁴:

Educational Outcomes



lower
grades and
exam scores



less likely
to graduate
from HS or
college



less likely
to enroll in
college

Life Outcomes



lower
satisfaction
with life

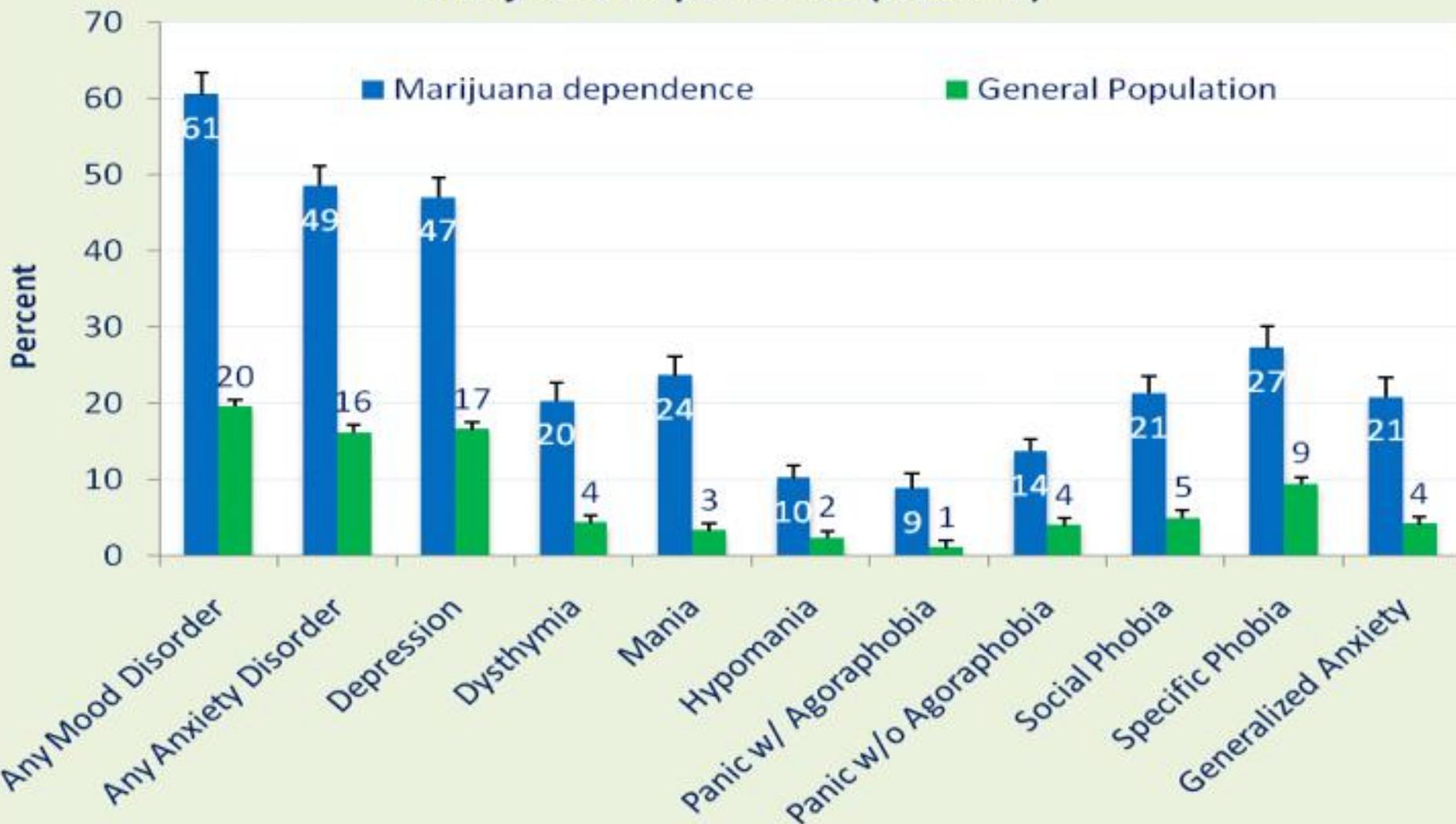


more
likely to be
unemployed



more likely to
earn a lower
income

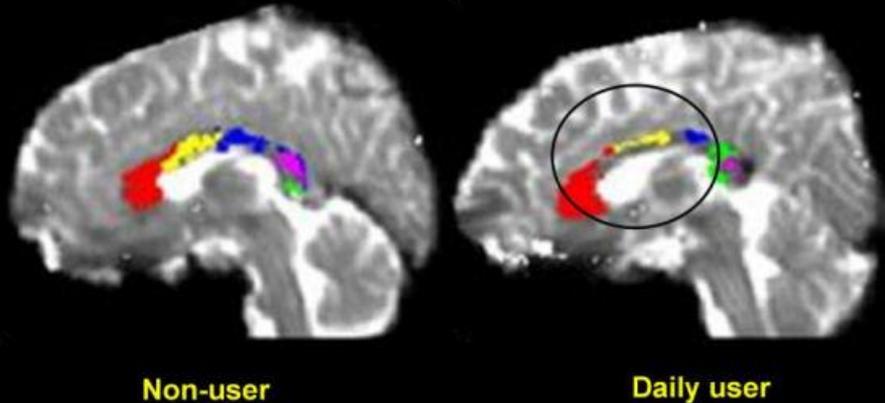
Mood & Anxiety Disorders Among Respondents with Marijuana Dependence (NESARC)



Marijuana Use: Detrimental to Youth

American College of Pediatricians – April 2016

White matter structure differences between marijuana users and non-users



Source: Arnone D, Barrick TR, Chengappa S et al. Corpus callosum damage in heavy marijuana use: Preliminary evidence from diffusion tensor tractography and tract-based spatial statistics. *NeuroImage*, 2008; 41:1067-1074

These are MRI scans of the corpus callosum, the bundle of fibers connecting the two brain hemispheres, allowing the two hemispheres to communicate and work in a coordinated way.

Young adult males who smoked marijuana daily (and started at an average age of 15 yrs) were scanned along with age-matched non-users. All had low levels of alcohol use.

Butane Hash Oil (BHO)



- BHO is also known as...
 - Dabs
 - Budder
 - Shatter
 - Wax



- Weight wise, 1/2 (g) dabs on average, is equal in strength to 3.5 (g) of high potency plant marijuana.)

Significant Risks

- BHO has 90% THC concentration
- High THC concentration leads to rapid dependency and Cannabis Withdrawal Syndrome:
 - Flu-like symptoms
 - Agitation
 - Anxiety
 - Nausea
 - Sweating
 - Body aches
- More reported cases of BHO-induced psychosis



Can you tell the difference?



Start the Conversation Early

Ask questions about the culture at school:

- Do they see drug use on campus? At parties?
- How does that affect them?
- Are they concerned about friends using?
- Have they felt pressured to use?

By the time you think you need to start talking about substance use, likely your teen already knows more than you think they know.

Have an Opinion, or Get One

Within your own family, make sure that expectations and boundaries around substance use are CLEAR and COMMUNICATED.

Understand that the rules of your house DO NOT HAVE TO be the same as the next parent or the community.

Be consistent! Teens are skillful litigators and will exploit the differing opinions about substance use between parents.

Listen to Learn

Listen to what your teen is saying when they think you aren't listening.

Make an effort to understand what is compelling them to use drugs or alcohol:

- Social Pressures

- Academic Stressors

- Self-medicating emotional issues

Using drugs and alcohol is a symptom of a larger problem. Understanding what that problem is will aid you in getting your teen the help he/she needs.

Early Intervention vs. “Hitting Bottom”

- Early Intervention often requires less intense treatment
- Address the problem rather than chasing the symptom
- Minimize more serious health/legal/social consequences
- “Hitting Bottom” is an adult perspective and isn’t geared toward the specific needs of adolescents

Thank You



Muir Wood
ADOLESCENT AND FAMILY SERVICES

www.muirwoodteen.com