This is Your Brain on Drugs:
Talking to adolescents and parents about marijuana in the era of legalization

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Resident Case Presentation

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Overview:

- The changing legal status of marijuana and the rise of “medical” marijuana has changed adolescent perceptions of marijuana.
- While the majority of adolescents do not use marijuana, teens are frequently exposed to drug use and talk.
- Adolescents are influenced by what trusted adults say (and do!)
- Substance abuse has increased adverse effects when initiated during adolescence.

"Adolescent substance abuse may be the most commonly missed pediatric diagnosis."

-AAP Policy Statement on Tobacco, Alcohol and Other Drugs, 2005

Today we will cover:

- Current use patterns in adolescents
- Effects of marijuana on the teenage brain
- How to talk to adolescents about marijuana and substance abuse
- Current laws and policies

Cases:

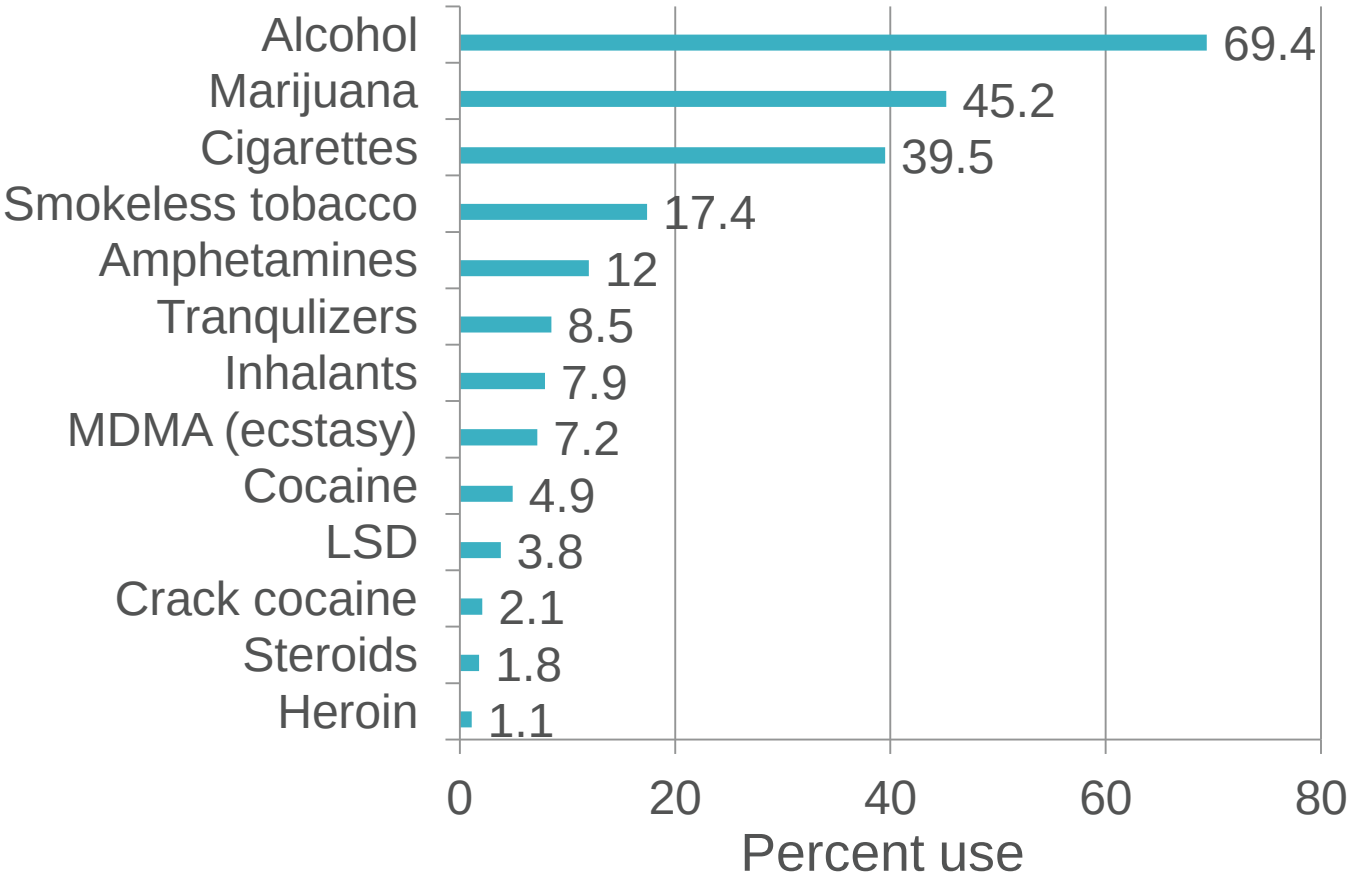
- 16 year-old girl who presents for sports physical at your continuity clinic. Has tried marijuana twice with friends on the weekend.

- 17 year-old boy who presents to ED for headache. Has been using marijuana daily to help with headaches.

- 18 year-old boy who presents to sports medicine clinic for chronic back pain. Requests medical marijuana card. Parent uses medical marijuana.

Current patterns of substance abuse in adolescents:

Monitoring the Future: 2012 lifetime use for 12th graders



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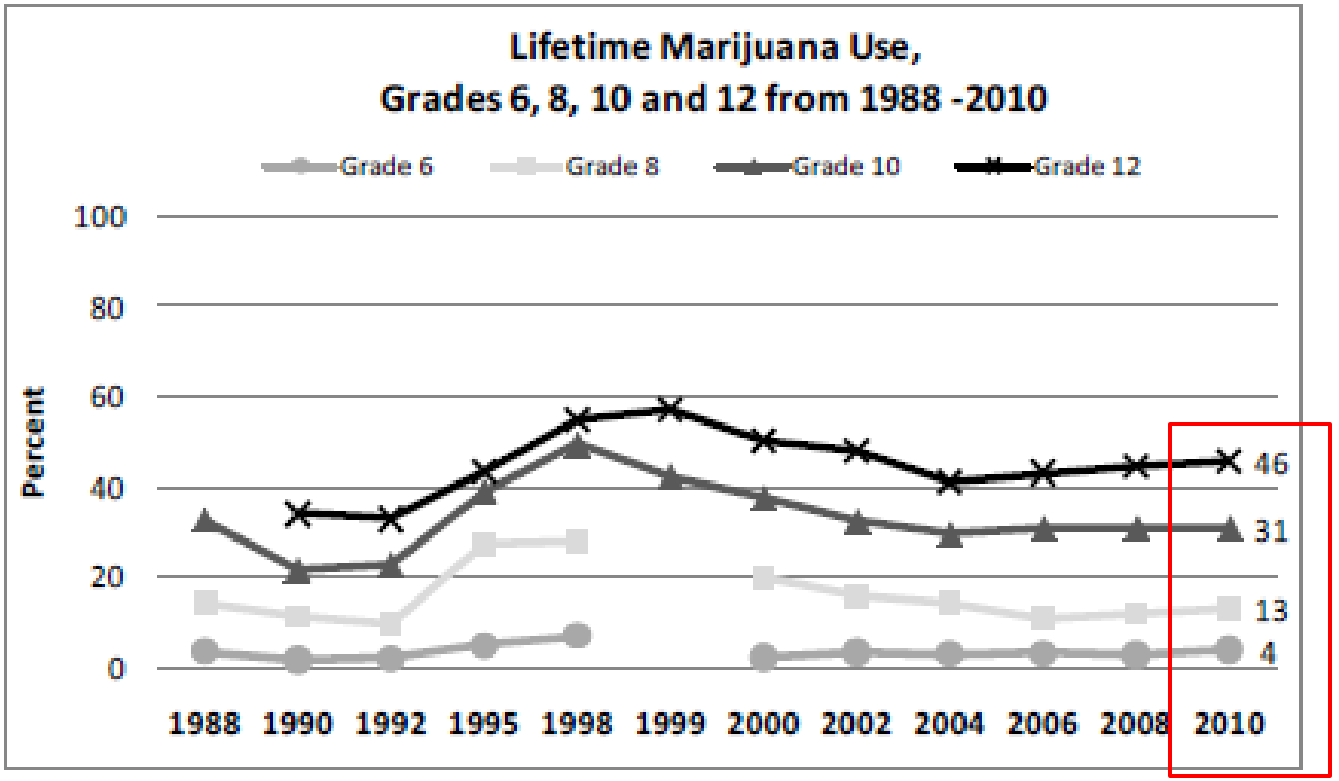
AAP Policy on Substance Use:

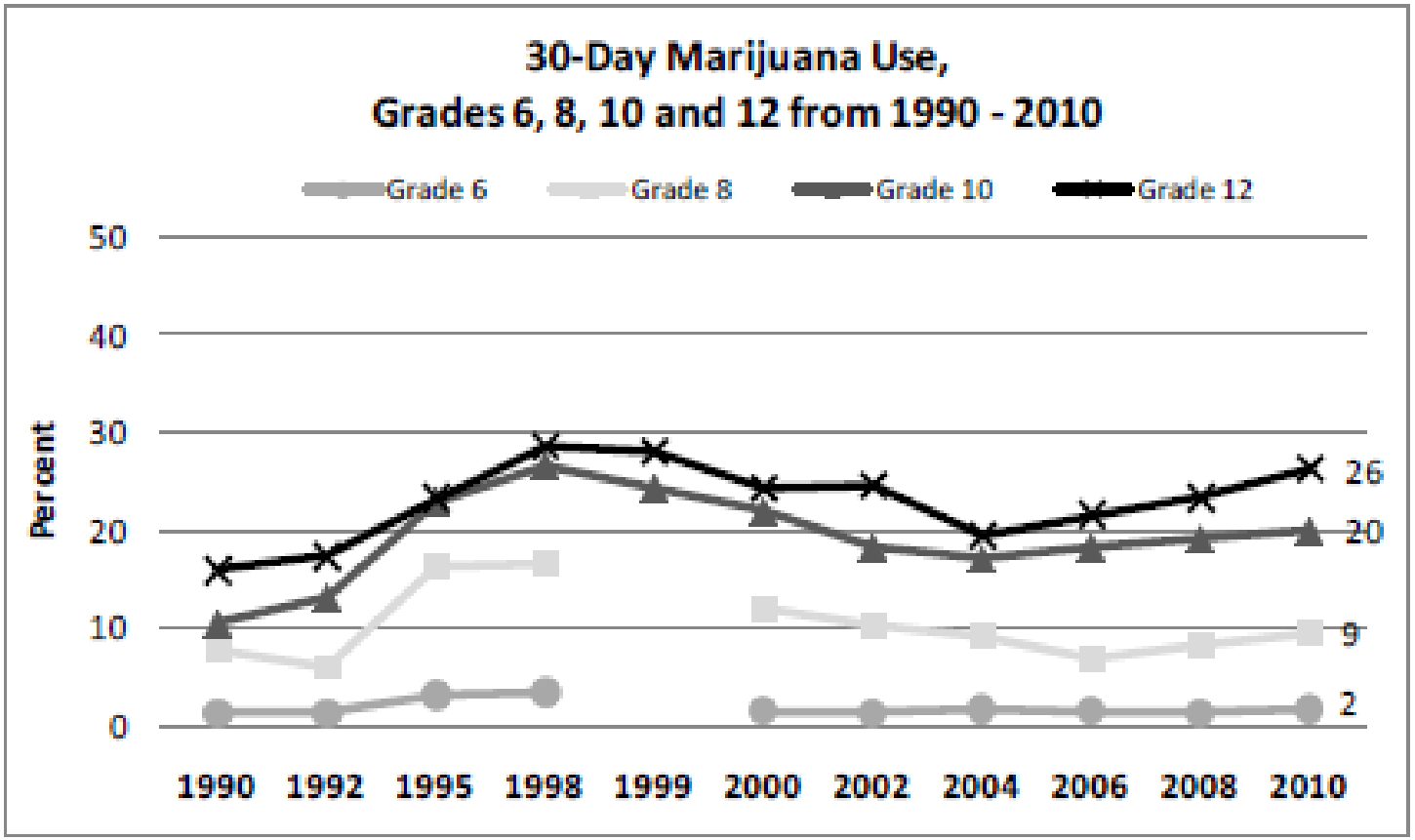
"Although it is common for adolescents and young adults to try mood-altering chemicals, including nicotine, it is important that this experimentation not be condoned, facilitated, or trivialized by adults including parents, teachers, and health care providers."

-AAP year 2011

Marijuana use in Washington state:



Marijuana use in Washington state:



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Daily marijuana use:

- **<u>2010 Monitoring the Future national survey results:</u>**
  - 1.1% 8th graders use marijuana daily
  - 3.5% 10th graders use marijuana daily
  - 6.5% 12th graders use marijuana daily

Disability

10th graders with a disability were more likely to:

Have used marijuana in the past 30 days (**23.3%** vs 15.4%)

Have binge drink within the past two weeks (**25.1%** vs 17.6%)

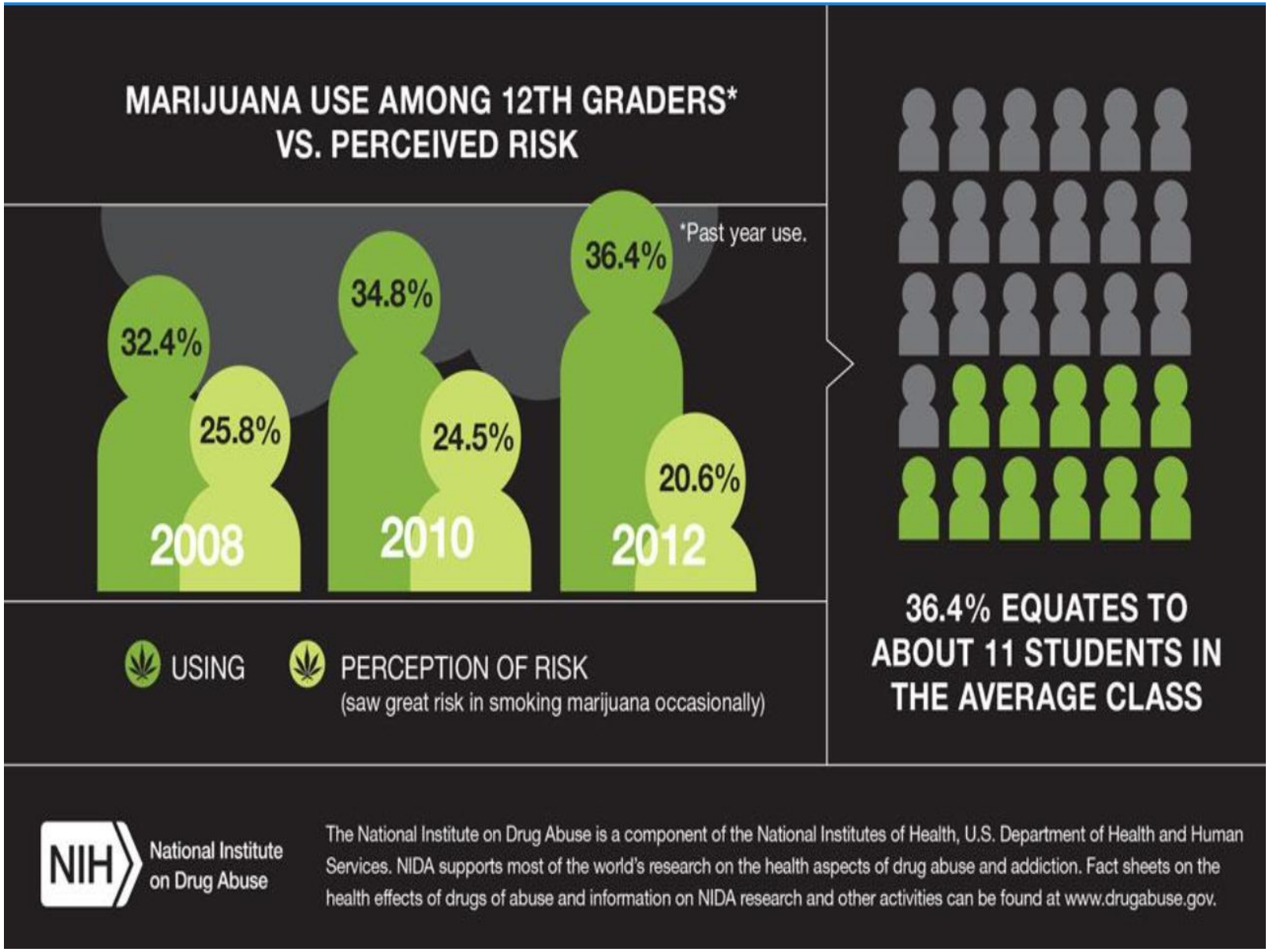
Use tobacco (**20.6%** vs 10.3%)

Washington State Department of Health. Washington State Adolescent Needs Assessment Report. Olympia, WA. 2006 February.

Slide from Cora Breuner, MD, MPH

How is marijuana obtained?

- 88% obtain from friend or relative
- 59% obtain for free
- 87% of transactions occur indoors
- **Only 6% report obtaining marijuana from a stranger**



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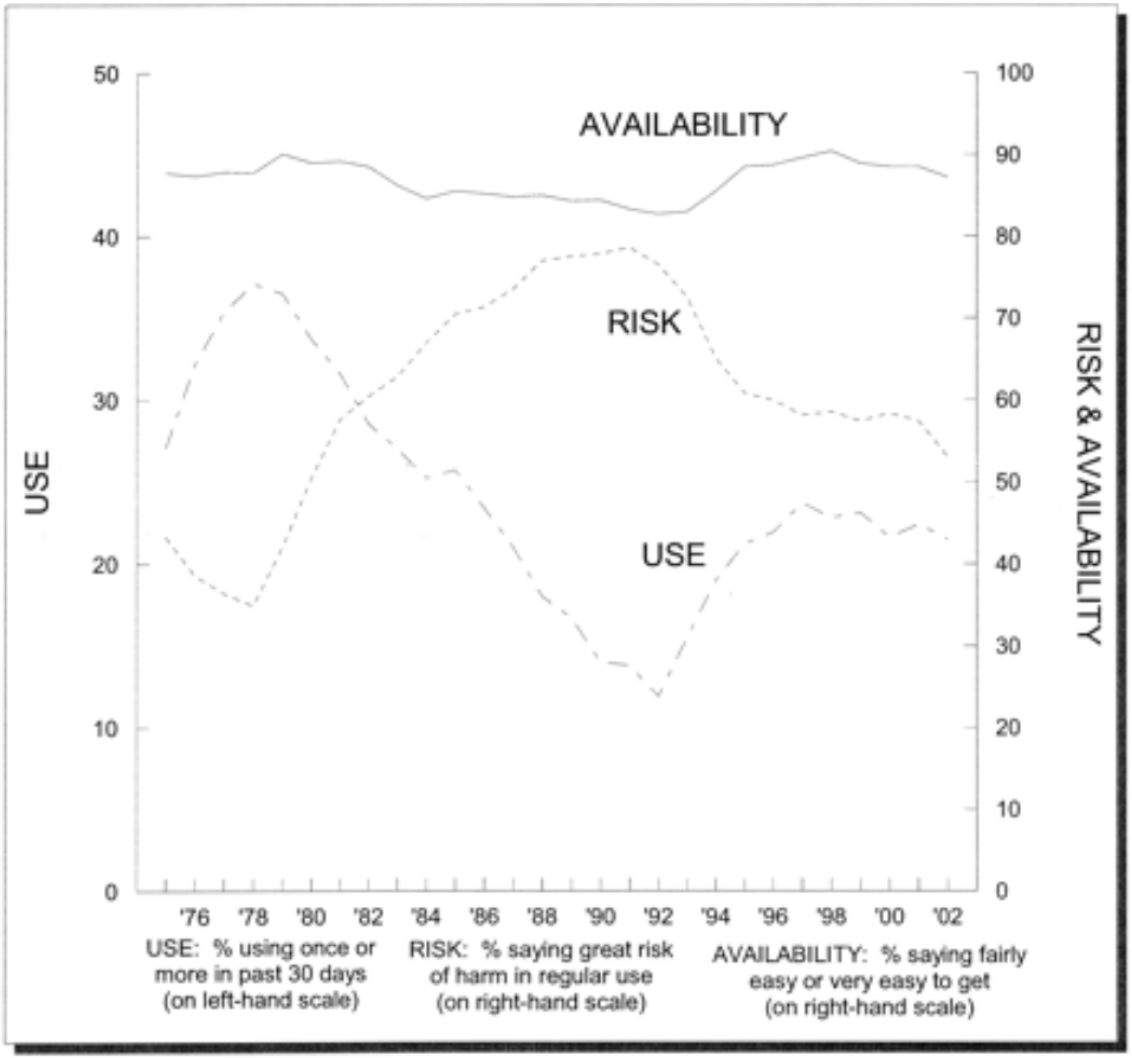
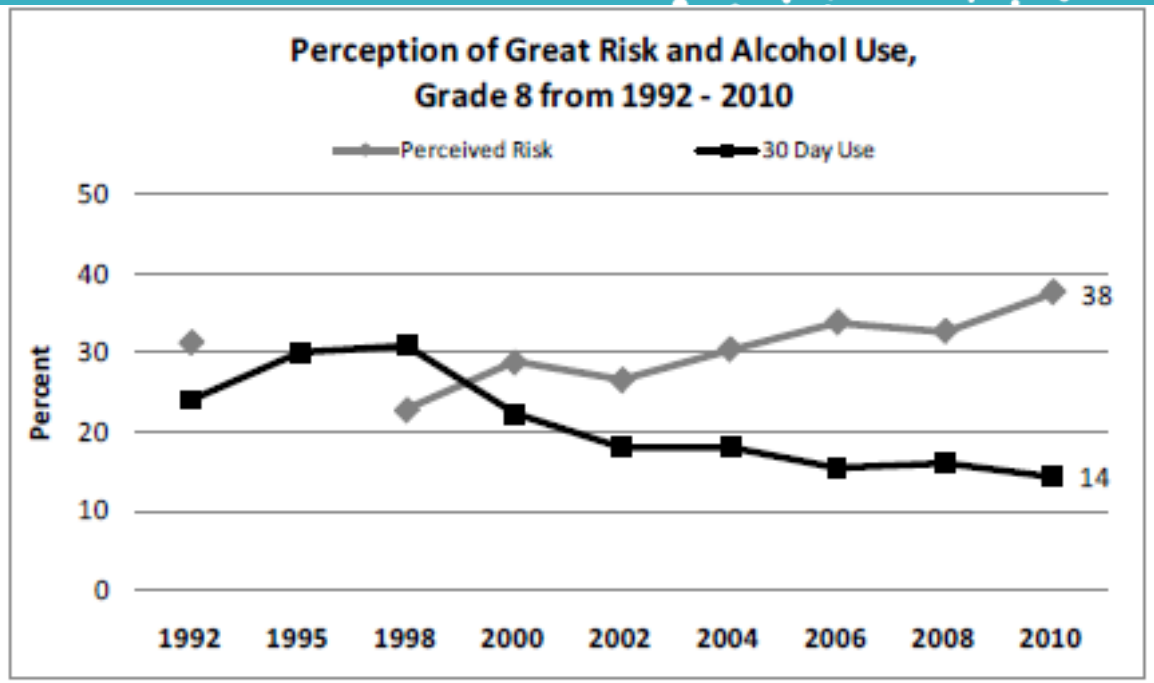


Source: Johnston LD, O'Malley PM, Bachman JG. Monitoring the Future: National Survey Results on Drug Use, 1975-2002. Vol I: Secondary School Students. Bethesda, MD: National Institute on Drug Abuse; 2003



Survey Questions:

- How much do you think people risk harming themselves if they take one or two drinks of an alcoholic beverage (wine, beer, a shot of liquor) nearly every day?
- During the past 30 days, on how many days did you: Drink a glass, can or bottle of alcohol (beer, wine, wine coolers, hard liquor)?

Notes:

- Percentages represent students who reported that there was great risk in having one or two drinks of alcoholic beverages every day and that they had used alcohol in the past 30 days.
- The question about perceived risk was not asked in 1995.

Source: WSSAHB 1992, 1995, 1998 and 2000, HYS 2002, 2004, 2006, 2008 and 2010.

Marijuana and the Teenage Brain

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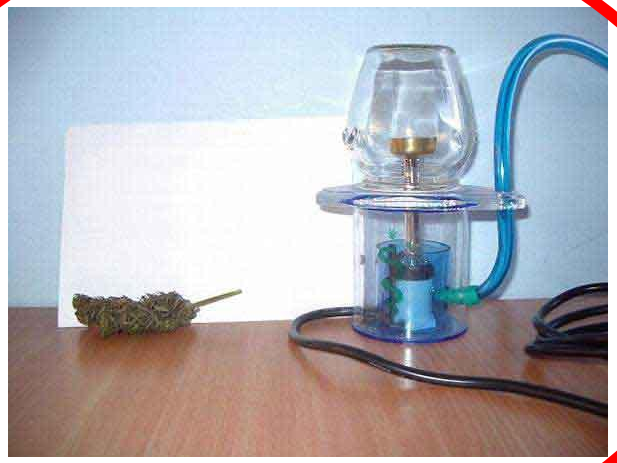
Effects of Adolescent Marijuana Use

- Immediate effects of use
- Increased dependence
- Impact on long-term neurocognitive functioning
- Psychosocial effects
- Increased accidents

Forms of inhaled marijuana:



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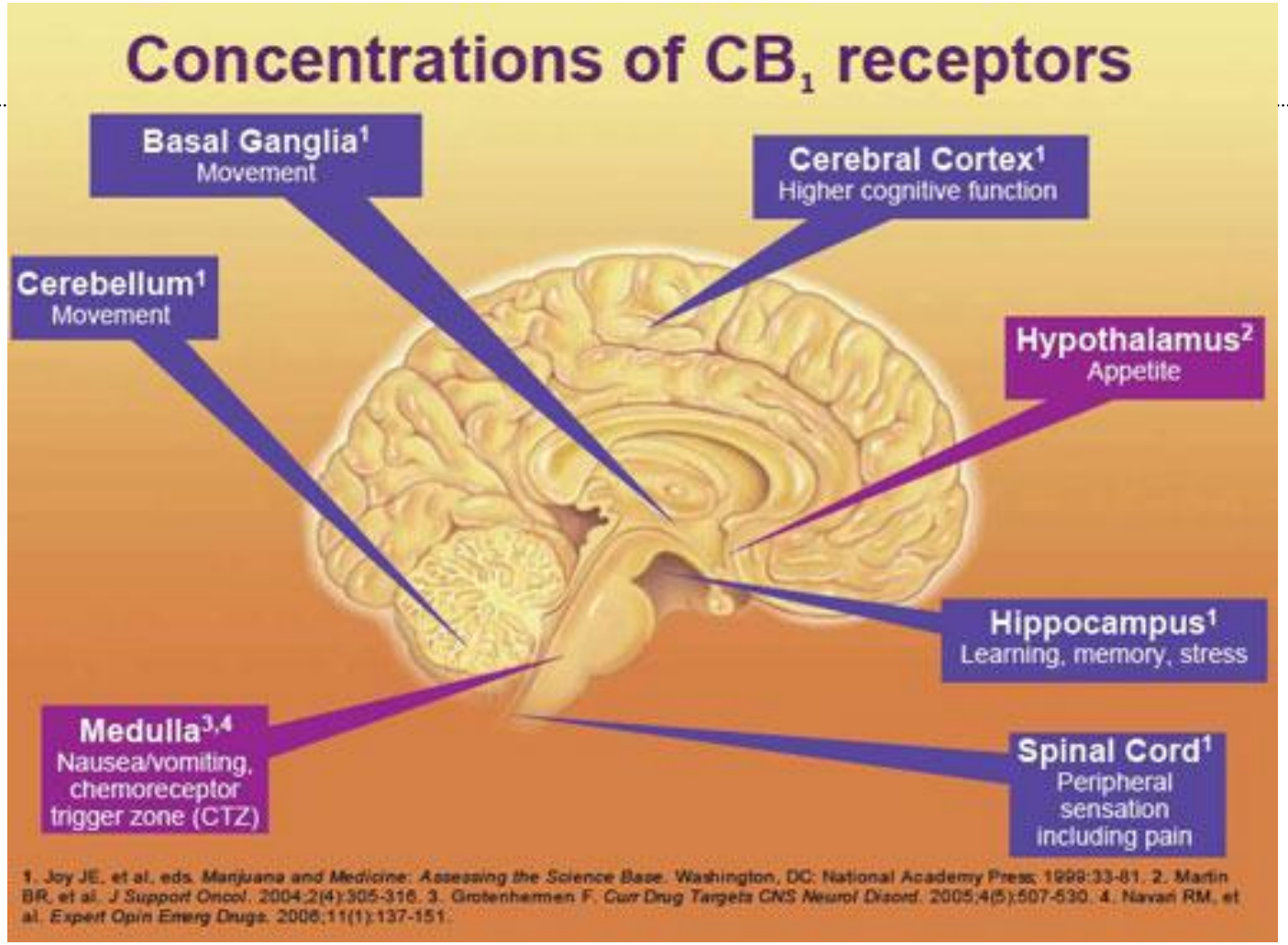
Physiology of marijuana use:

- Euphoria, relaxation, altered perception occur 15-30 minutes after inhalation or 30-90 minutes after ingestion.
- Immediate effects typically last 1-3 hours if inhaled, and up to 12 hours if ingested.
- Possible adverse initial effects include thought distortion, anxiety, panic attacks, hallucinations and paranoia.

The brain on marijuana:



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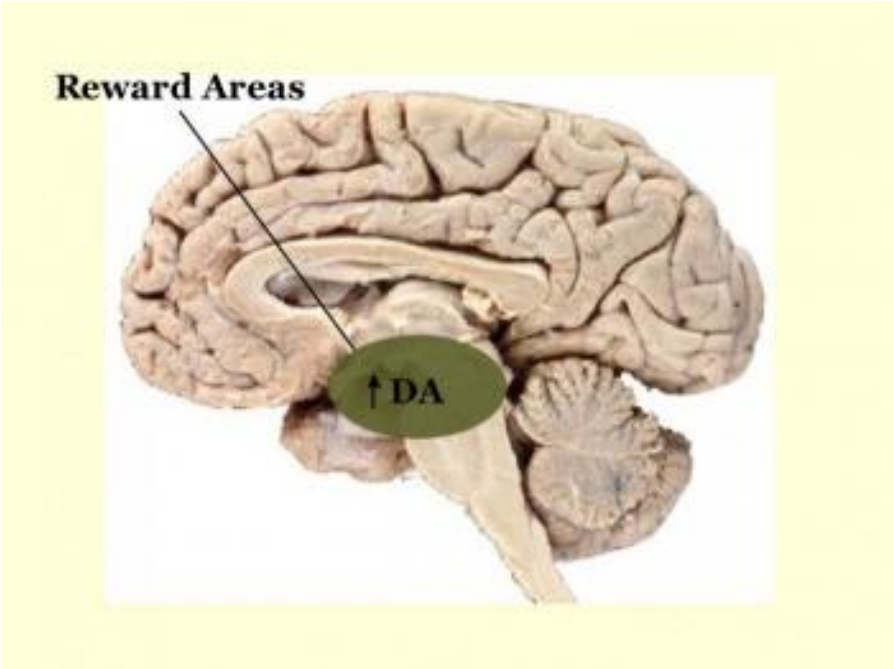
Marijuana and the dopamine center:

- Effects midbrain reward center, triggering dopamine release in prefrontal cortex.



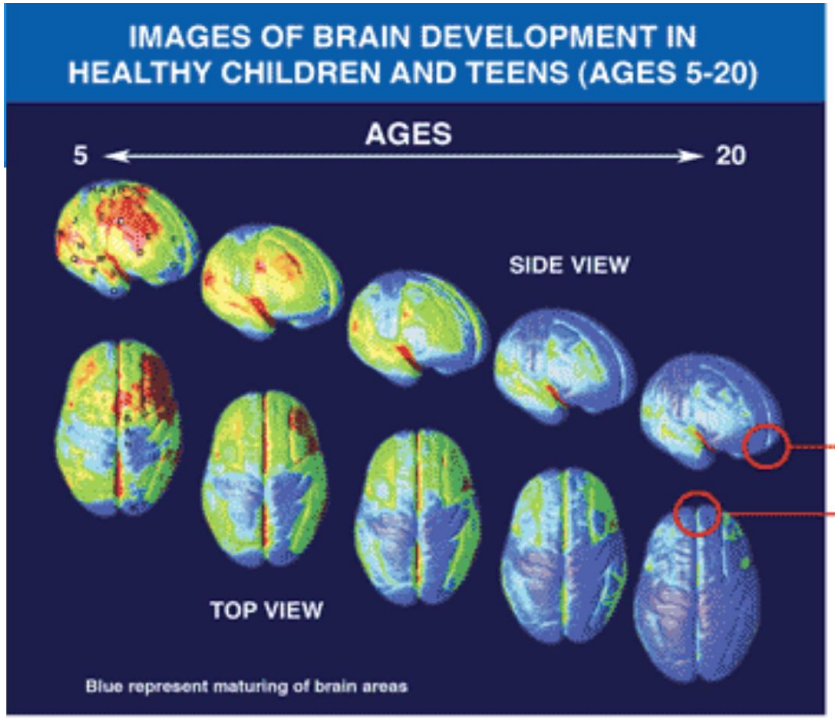
Physiology of marijuana use:

- CB1 receptors also located in GI system.
- CB2 receptors located on leukocytes, involved in humoral and cellular inflammatory responses.
- CB receptors also found in autonomic system, cardiovascular system, and reproductive system.
- Humans have endogenous cannabinoids that activate these receptors.

Physiology of Marijuana:

*"Exogenous plant-derived THC is a **sledgehammer** compared with anandamide's delicate chisel."*

The Teenage Brain:



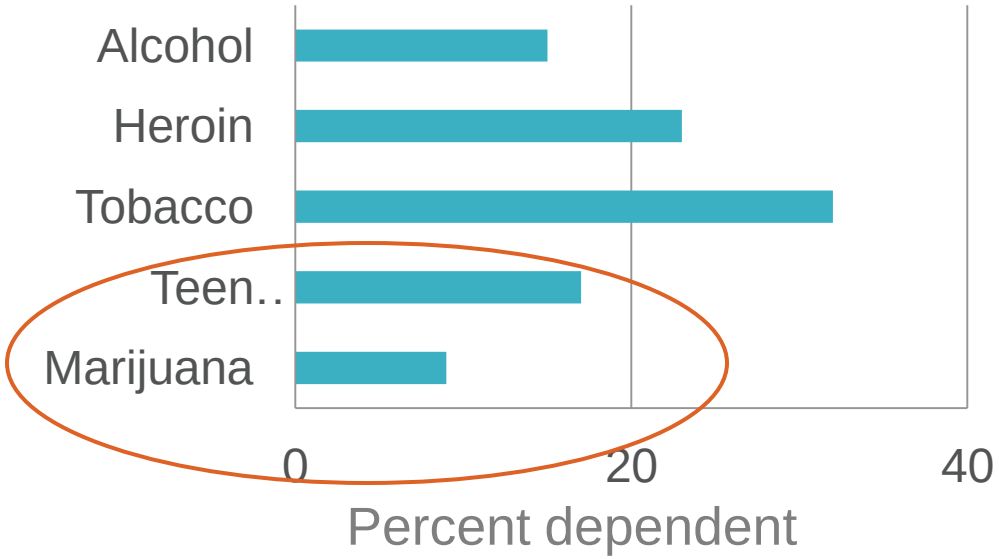
Source: Copyright PNAS :101(21):8174-9. 2004

- Increased synaptic pruning and myelination.
- Maturing of cortex on a regional basis.
- Delayed maturation of prefrontal cortex.
- Dopamine reward system altered.
- Amygdala less activated by aversive stimuli.

Substance abuse: dependence

- **Dependence**: impaired control over substance use and difficulty ceasing use despite its harms.

- Lifetime dependence in cannabis users is 9%, but **increases to 1:6 if use initiated in adolescence**.



- Other substances:
  - Heroin: 23%
  - Tobacco: 32%
  - Alcohol: 15%

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Dependence increased in younger users:

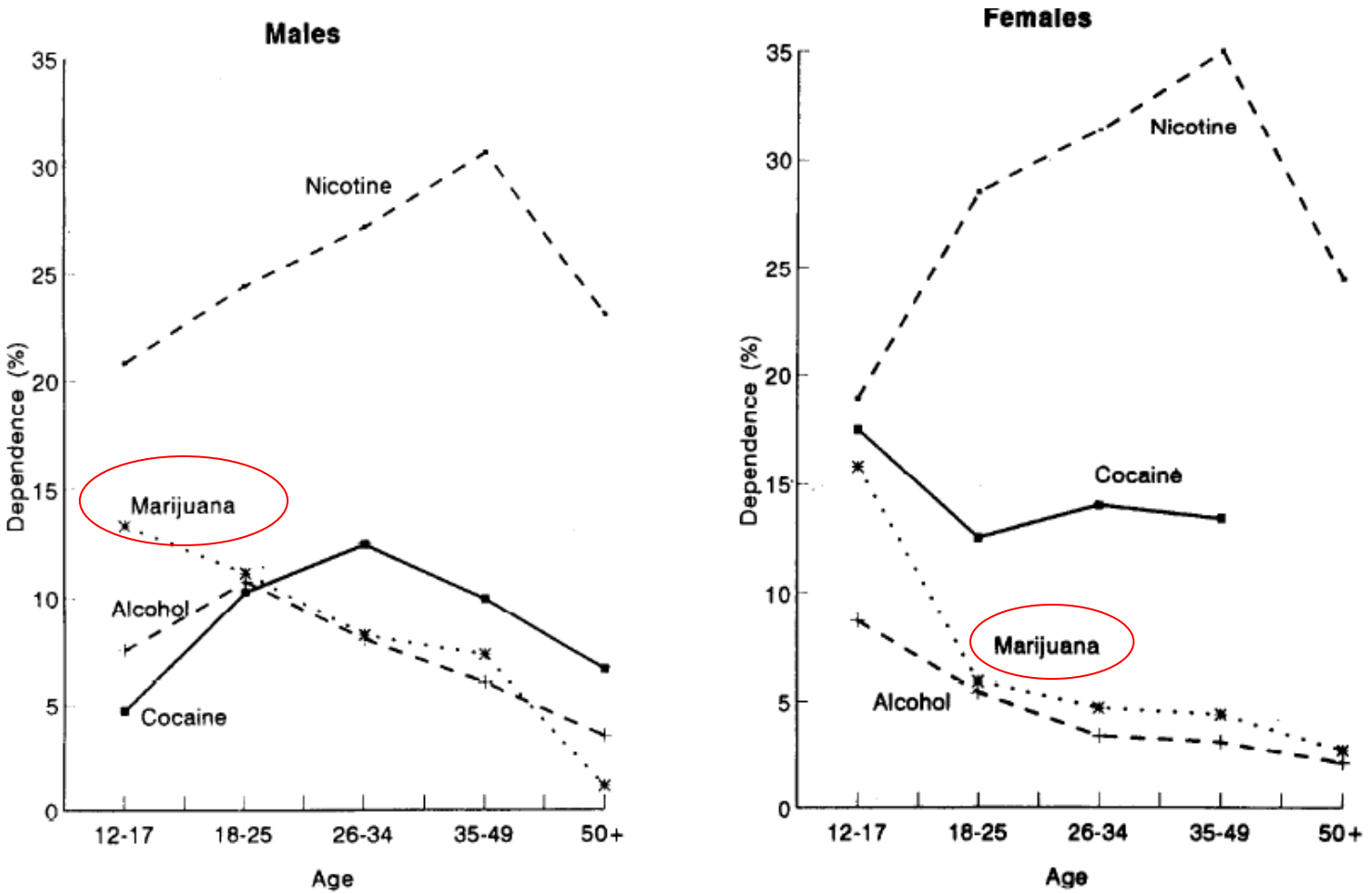

Fig. 1. Conditional prevalence of proxy measure of last year dependence among last year users of nicotine, alcohol, marijuana and cocaine in the U.S. by age and gender (NHSDA 1991–1993).

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Long term effects of adolescent marijuana use on IQ:

- IQ decline with long-term heavy marijuana use.
- Decreased attention and memory reported by “people who know users well”.
- **IQ decline only seen in those who initiated use as adolescents.**
- Cessation not associated with full recovery of neurocognitive function.

Psychosocial effects:

- Amotivational syndrome
- Association with psychosis and depression
- Worsens existing psychiatric illness
- Associated with decreased educational attainment
- Increased school absenteeism
- Increased frequency of risky sexual behaviors
- Increased encounters with the criminal justice system.

Marijuana and accidents:

- Impairs reaction time
- Worse information processing
- Worse perceptual motor concentration
- Worse motor performance
- Decreased attention and tracking ability
- Marijuana found in 11-33% of 15-30 year olds in fatal motor vehicle accidents
- Increased rates of hospital admission for all causes of injury

Is

marijuana

a gateway drug?

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Identifying substance abuse: the adolescent interview

Cases:

- 16 year-old girl who presents for sports physical at your continuity clinic. Has tried marijuana twice with friends on the weekend.

- 17 year-old boy who presents to ED for headache. Has been using marijuana daily to help with headaches.

- 18 year-old boy who presents to sports medicine clinic for chronic back pain. Requests medical marijuana card. Parent uses medical marijuana.

Universal screening of adolescents for substance abuse:

- Should be done anytime adolescents access the healthcare system
- Adolescents may be more likely to report substance abuse at acute care visits than WCC

Talking to adolescents about substance use:

- Start discussing substance use at age 9 or 10
- At least part of visit should be done with parent out of room
- Establish confidentiality
- HEADSS
- Always ask screening questions (alcohol, tobacco, marijuana, car)
- CRAFFT if yes to screening questions
- Be honest. Know your audience.

Stage	Description	Intervention Goals
Abstinence	No use	Prevent/delay initiation Positive reinforcement
Experimentation	First 1-2 uses, teen wants to know how intoxication feels	Promote patient strengths Brief, clear medical advice and educational counseling
Limited Use	Use with friends in low-risk situations, no related problems, predicted use times (weekends)	Promote patient strengths Brief, clear medical advice and educational counseling
Problematic Use	Use in high-risk situations, associated with problems, emotional use	Office visits or referral for brief intervention; close follow-up; consider breaking confidentiality
Abuse	Drug use associated with recurrent problems or interferes with functioning	Monitor closely, refer, consider breaking confidentiality
Addiction (dependence)	Loss of control or impulsive drug use	Referral to treatment, consider involving parent

Screening for adolescent substance abuse:

CRAFFT:

C Have you ever ridden in a ***car*** driven by someone (including yourself) who was "high" or had been using alcohol or drugs?

R Do you ever use alcohol or drugs to ***relax***, feel better about yourself, or fit in?

A Do you ever use alcohol or drugs while you are by yourself, or ***alone***?

Screening for adolescent substance abuse:

CRAFFT:

F Do you ever ***forget*** things you did while using alcohol or drugs?

F Do your **family or *friends*** ever tell you that you should cut down on your drinking or drug use?

T Have you ever gotten into ***trouble*** while you were using alcohol or drugs?

Two or more "yes" answers suggest that the adolescent may have a serious problem with substance abuse, and additional assessment is warranted. Knight JR, et. al. , 2002

Cases:

- 16 year-old girl who presents for sports physical at your continuity clinic. Has tried marijuana twice with friends on the weekend.

- 17 year-old boy who presents to ED for headache. Has been using marijuana daily to help with headaches.

- 18 year-old boy who presents to sports medicine clinic for chronic back pain. Requests medical marijuana card. Parent uses medical marijuana.

Now what:

- **<u>Low Risk</u>**: no to 4 screening questions.
  - Positive reinforcement
  - Discuss any possible risk factors.
- **<u>Moderate Risk</u>**: yes to at least 1 screening question, CRAFFT score 0 or 1.
  - Give brief advice and summary.
  - Praise if interested in quitting.
  - Encourage cutting back if won't quit.
  - Schedule follow-up

Brief Behavioral Intervention:

1. Summarize information provided by adolescent.
2. Repeat for emphasis problems identified by adolescent.
3. Ask about motivation to quit.

But really, now what:

- **<u>Moderate-high risk</u>**: clear signs of addiction, 14 years or younger with CRAFFT 2 or greater, CRAFFT ≥5
  - Summarize
  - Refer
  - Consider breaking confidentiality
- **<u>High Risk</u>**: concern for acute danger such as IV drug use, using and driving, alcohol and sedatives, substance-related hospitalization.
  - Refer
  - Strongly consider breaking confidentiality

Cases:

- 16 year-old girl who presents for sports physical at your continuity clinic. Has tried marijuana twice with friends on the weekend.

- 17 year-old boy who presents to ED for headache. Has been using marijuana daily to help with headaches.

- 18 year-old boy who presents to sports medicine clinic for chronic back pain. Requests medical marijuana card. Parent uses medical marijuana.

Seattle Referral Resources:

- Adolescent Substance Abuse Program at SCH (clinic)

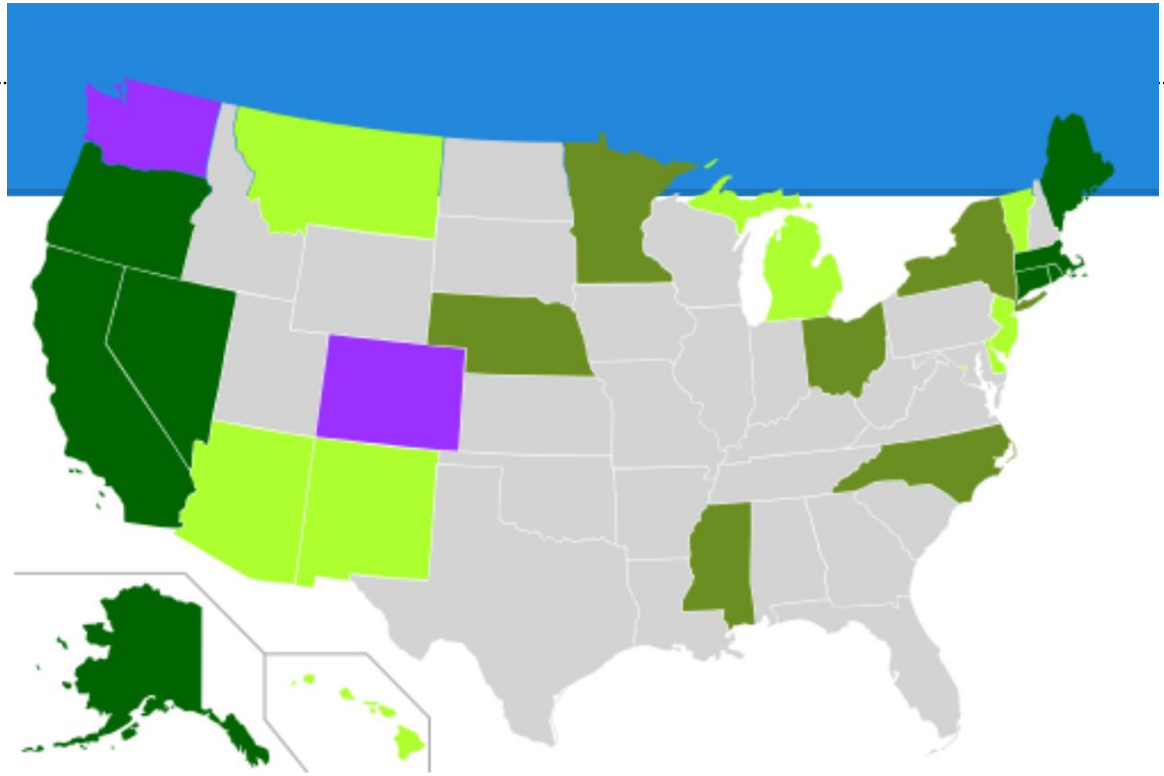
- Substance Abuse Referral Team (in-patient)

Current Marijuana Policies and Regulations

“The AAP opposes the legalization of marijuana”

-2004 AAP Policy Statement

Current marijuana policies in the US



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Current marijuana policies in Washington State:

- **Proposition 502:**
  - Prohibition for persons under 21
  - Limits of possessions and sales
  - Driving regulations
- **Medical marijuana:**
  - No age limit.
  - Recommendation, not prescription.
  - List of approved conditions.
- **Potential impacts on adolescents:**
  - Decreased perception of risk
  - Increased access

Conclusions:

- Perception of risk of harm correlates with substance use.
- Adolescent marijuana use is different from adult marijuana use.
- Adolescents have increased risks from substance use.
- Changing marijuana policies in Washington state are likely to impact the pediatric population.

Thanks to:

Cora Breuner, MD, MPH
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Annie Hoopes, MD
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The Chiefs

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Resources and references:

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2. Knight, JR. et al. Prevalence of Positive Substance Abuse Screen Results Among Adolescent Primary Care Patients. *Arch Pediatr Adolesc Med.* 2007;161(11):1035-1041.
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Resources and references:

8. Anthony JC. The epidemiology of cannabis dependence. In: Roffman RA, Stephens RS, eds. Cannabis dependence: its nature, consequences and treatment. Cambridege, UK. Cambridge University Press, 2006: 58-105.
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16. Meier, Madeline et al. Persistent cannabis users show neuropsychological decline from childhood to midlife. PNAS. 2012: accessed online 2/26/2013.

Appendix Slide A: Washington state medical use of cannabis act

- Provider must do physical exam and document **terminal or debilitating condition.**
- **<u>Qualifying conditions</u>**: cancer, HIV, MS, epilepsy or other seizure disorder, spasticity disorders, chronic renal failure, **intractable pain not relieved by other treatments**; or, diseases, including anorexia, which result in nausea, vomiting, wasting, appetite loss, cramping, seizures, muscle spasms, or spasticity, when these symptoms are unrelieved by standard treatments or medications

Appendix B:

PHYSICIAN AUTHORIZATION FOR MEDICAL MARIJUANA

Patient Name: _____ Date of Birth: _____

Patient less than 18 years of age – patient's parent or legal guardian's name: _____

I am a physician licensed in the State of Washington. I am treating the above-named patient for a terminal illness or debilitating condition as defined in RCW 69.51A.010. According to Washington state law, the benefits of medical marijuana may include treating: nausea and vomiting from cancer chemotherapy; AIDS wasting syndrome; severe muscle spasms from multiple sclerosis or other spasticity disorders; glaucoma either acute or chronic; epilepsy or other seizure disorder; intractable pain which is unrelieved by standard medical treatments and medications; Crohn's disease; hepatitis C, and any other qualifying conditions which have been approved and adopted by the Washington State Medical Quality Assurance Commission.

I have advised the above-named patient and, if the patient is less than 18 years of age, the patient's parent or legal guardian, about the potential risks and benefits of the medical use of marijuana. I have assessed the above-named patient's medical history and medical condition. It is my medical opinion that the potential benefits of the medical use of marijuana would likely outweigh the health risks for this patient. Some risks of medical marijuana may include: possible long-term effects on the brain in the areas of memory; coordination and cognition; respiratory damage including life-threatening infection of the lungs; possible lung cancer, and physical and psychological interdependence.

Consistent with the recommendations published in the Institute of Medicine Report, "Marijuana and Medicine: Assessing the Science Base" (1999), I affirm the following conditions are met:

- As appropriate, approved medications to treat the patient's symptoms have been prescribed and the medications have failed to provide the patient relief. This failure to provide relief has been documented in the patient's medical chart;
- The patient's symptoms can reasonably be expected to be relieved by rapid-onset cannabinoid drugs.

I have advised the above-named patient about the limited medical knowledge regarding the risks and benefits of marijuana usage, including: lack of conclusive scientific data regarding the health risks involved with medical marijuana usage; potential existence of impurities in the marijuana; unknown potency of marijuana; potential interactions with high-risk patient populations; potential interactions with existing psychiatric illness; potential interactions with current drug therapy; and potential unknown side effects resulting from medical marijuana usage.

I have cautioned this patient not to drive or engage in hazardous activities (such as operating machinery) while using medical marijuana.

This authorization form expires six months from today's date _____.
(Today's date)

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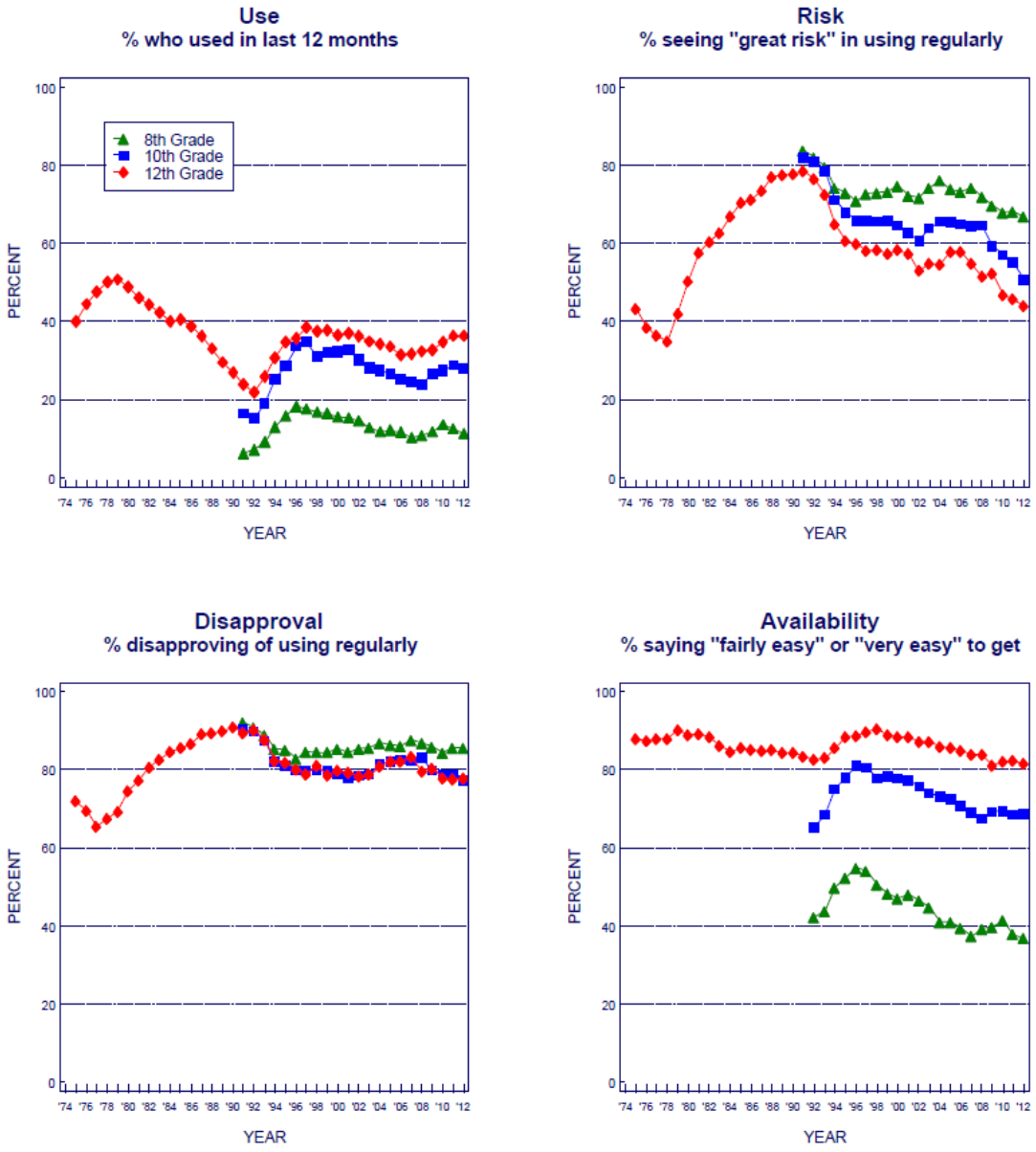
Appendix C: Synthetic Marijuana

- “spice”, “K2”
- Herbal mixtures containing designer chemicals that fall into the cannibinoid family.
- Many of the chemicals were made illegal March 2011.
- Use rates around 11% in 12th graders, unchanged by change in law.
- Low level of perceived risk (23-25%)

Marijuana: Trends in Annual Use, Risk, Disapproval, and Availability

Grades 8, 10, 12



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

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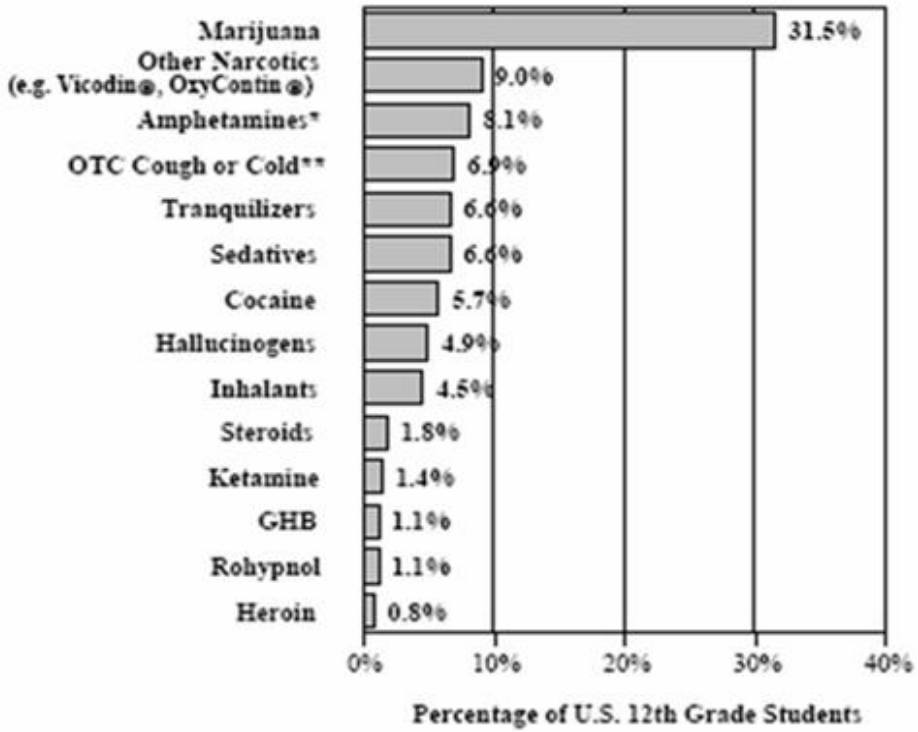
Percentage of U.S. 12th Grade Students Reporting Past Year Use of Drugs (Other Than Alcohol and Tobacco), 2006



*Amphetamines include Ritalin® (4.4%) and methamphetamine (2.5%).
**Used for the explicit purpose of getting high.

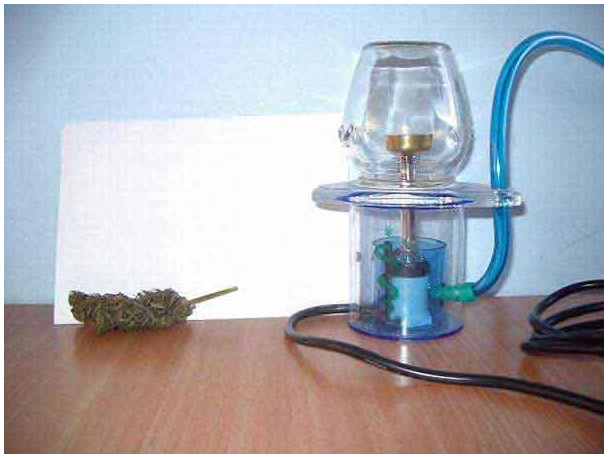
SOURCE: Adapted by CESAR from University of Michigan, "Teen Drug Use Continues Down in 2006, Particularly Among Older Teens; But Use of Prescription-Type Drugs Remains High," Monitoring the Future press release, December 21, 2006. Available online at http://www.monitoringthefuture.org.

Substance abuse: withdrawal

- Marijuana withdrawal is increasingly being recognized.
- Marijuana abusers seeking help with withdrawal report anxiety, insomnia, appetite change and depression as well as craving of drug.
- Withdrawal of marijuana not associated with significant morbidity and mortality.

Marijuana and cancer:

- Marijuana smoke has similar carcinogens to tobacco smoke
- Variably associated with cancers



Respiratory effects of marijuana smoke:

- Regular cannabis smokers report increased symptoms of chronic bronchitis
- Increased use of healthcare resources for respiratory problems
- Pulmonary function not shown to be impaired in current literature

Interviewing adolescents in the outpatient setting:

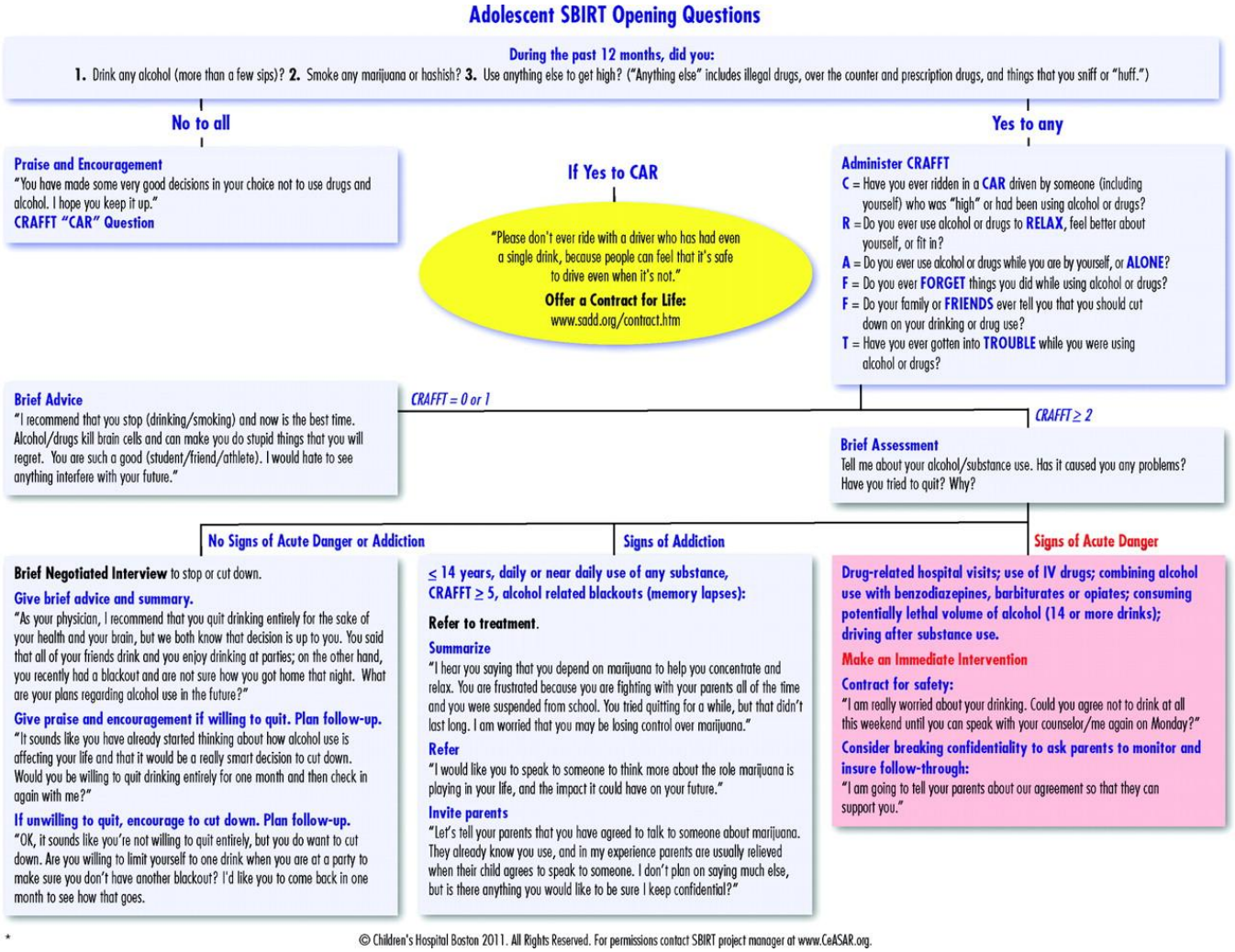
Table 3. Data for a Positive Result on the CRAFFT by Practice Type, Visit Type, and Patient Status in 2133 Patients[a]

Variable	Adjusted Odds Ratio (95% Confidence Interval)	*P* Value
Practice type		
Pediatric clinic	1 [Reference]	NA
HMO	1.51 (0.92-2.48)	.10
Adolescent clinic	1.31 (0.81-2.11)	.27
Rural FP	2.43 (1.45-4.06)	.001
School clinics	2.78 (1.45-5.34)	.002
Visit type		
Well-child care	1 [Reference]	NA
Follow-up	1.28 (0.86-1.91)	.23
Sick	1.46 (0.96-2.22)	.08
Other	1.19 (0.63-2.25)	.60
Patient status		
Established	1 [Reference]	NA
New	1.03 (0.63-1.68)	.91

Abbreviations: See Table 2.

[a] CRAFFT is a mnemonic acronym explained in detail in the "Introduction" section of the text, and a positive result on the CRAFFT is further described in the "Methods" section of the text. Age, sex, race/ethnicity, and socioeconomic status were controlled for when obtaining these data.

Adolescent SBIRT algorithm.



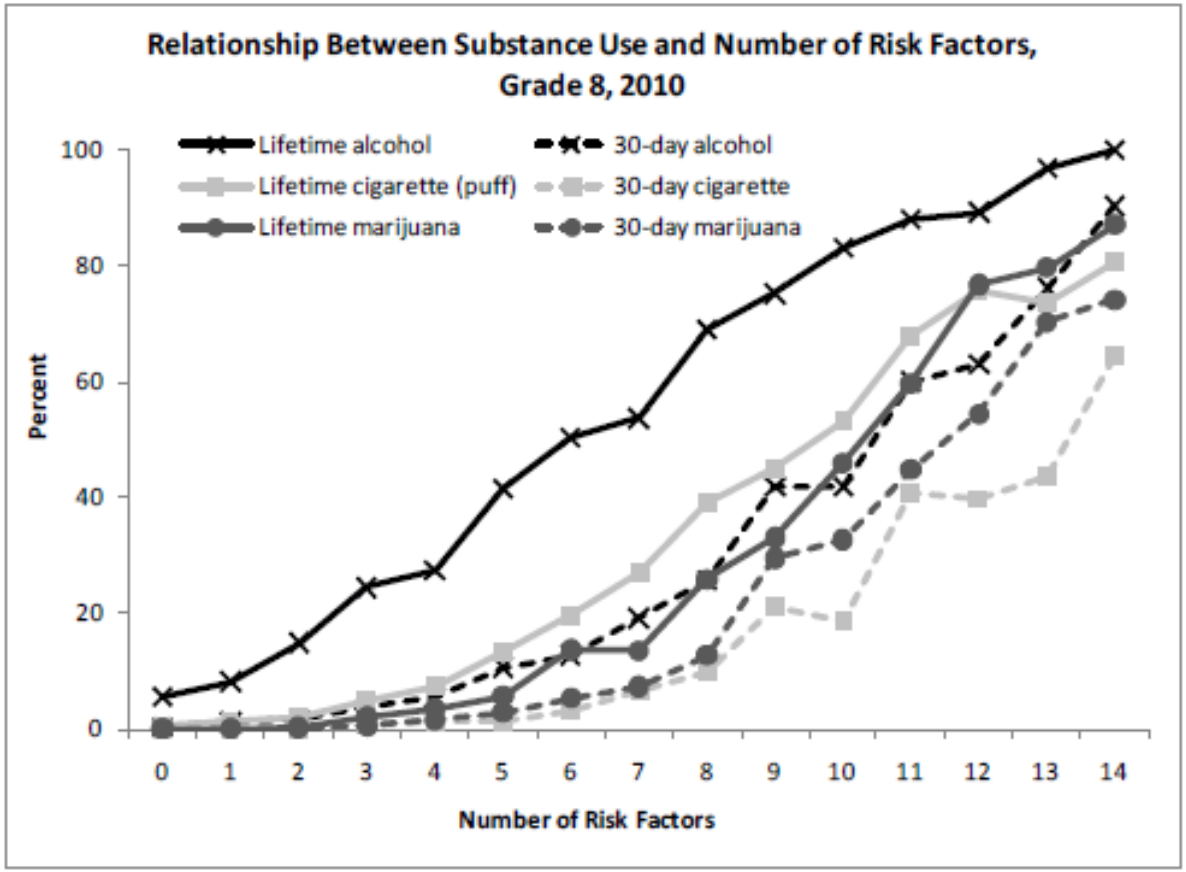
Committee on Substance Abuse Pediatrics
2011;128:e1330-e1340

Risk factors for deviant behaviors:

Table 15
Risk Factors Included in 2010

Domain	Risk Factor
Community	Laws and norms favorable toward drug use
	Perceived availability of drugs
	Perceived availability of handguns [8]
	Low neighborhood attachment [8]
School	Academic failure
	Low commitment to school
Peer-Individual	Early initiation of drug use [8]
	Early initiation of antisocial behavior [8]
	Favorable attitudes toward antisocial behavior [8]
	Favorable attitudes toward drug use
	Perceived risk of drug use
	Friends' use of drugs [8]
	Intentions to use [8]
	Interactions with antisocial peers [8]
Family	Poor family management [8†]
	Parental attitudes favorable towards drug use [8]

Risk factors for substance use:



Note: Percentages represent students who reported using alcohol, cigarettes, or marijuana in their lifetime or in the past 30 days according to each number or risk factors (0 through 14).
Source: HYS 2010.

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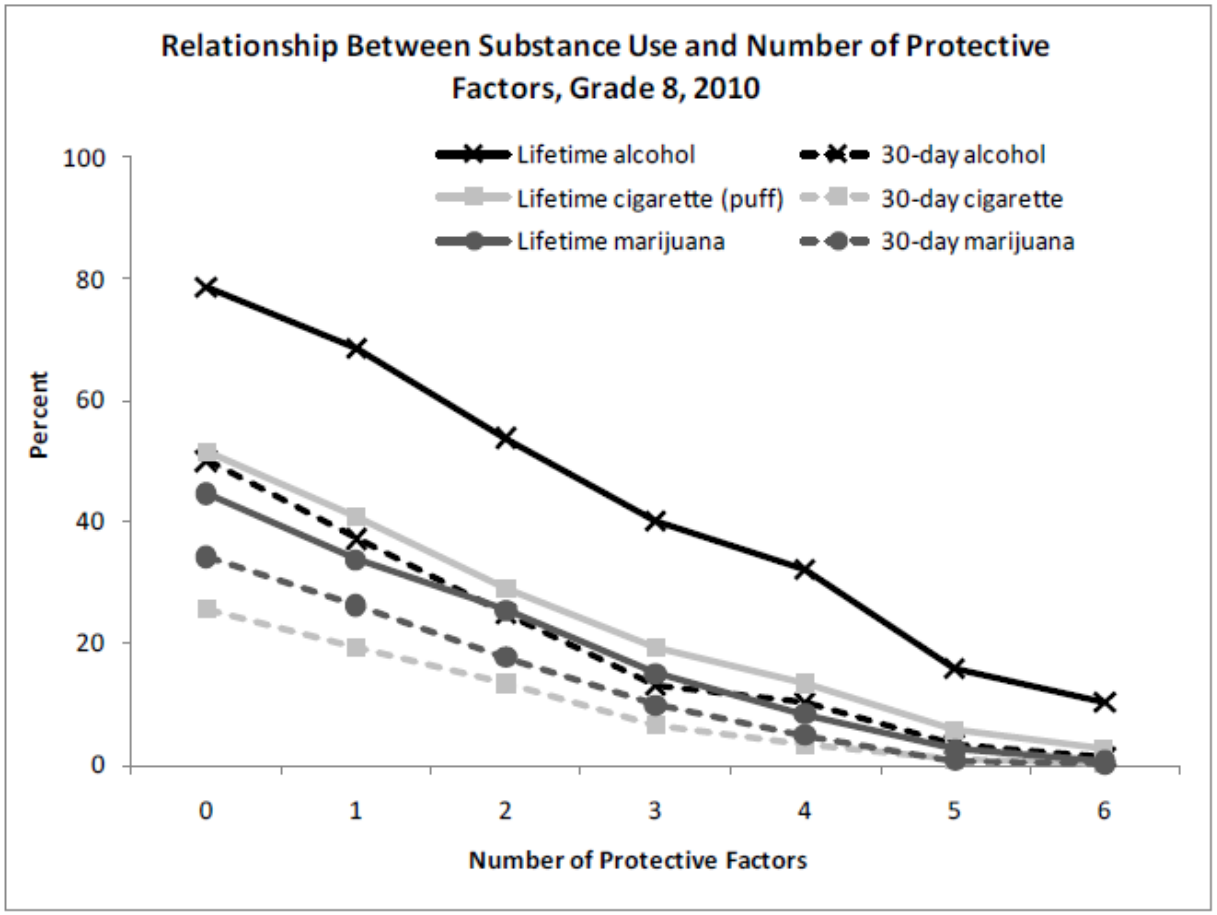
Protective factors

Table 16
Protective Factors Included in 2010

Domain	Protective Factor
Community	Opportunities for prosocial involvement [S]
	Rewards for prosocial involvement [E]
School	Opportunities for prosocial involvement
	Rewards for prosocial involvement
Peer-Individual	Social skills [S]
	Belief in the moral order [S]
	Interaction with prosocial peers [S]
	Prosocial involvement [E]
Family	Opportunities for prosocial involvement [†]
	Rewards for prosocial involvement [†]

Protective Factors:



Note: Percentages represent students who reported using alcohol, cigarettes, or marijuana in their lifetime or in the past 30 days according to each number or protective factors (0 through 6).
Source: HYS 2010.

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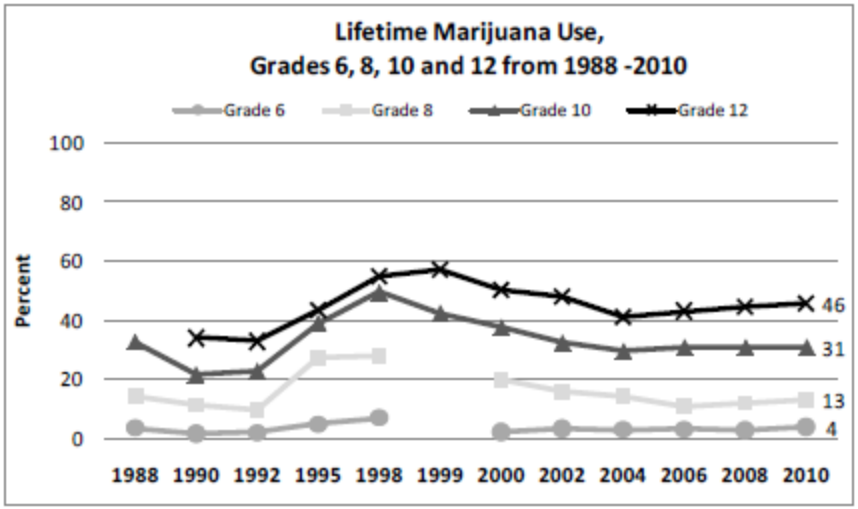
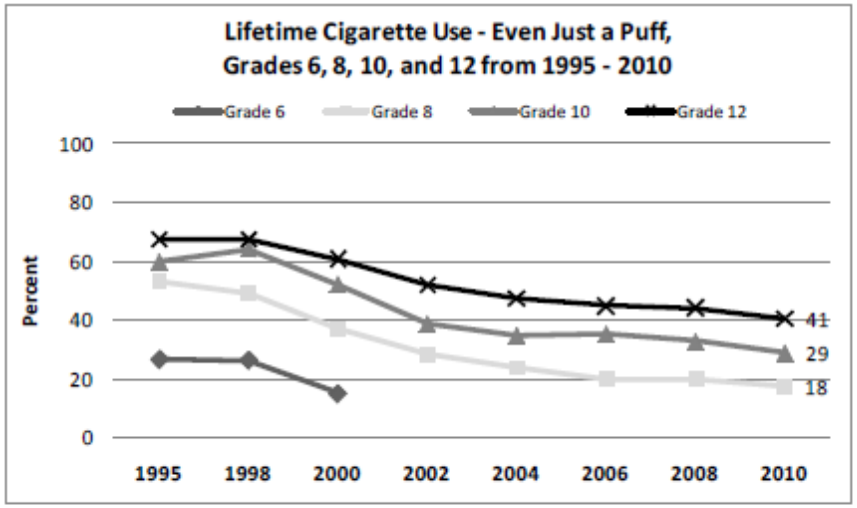
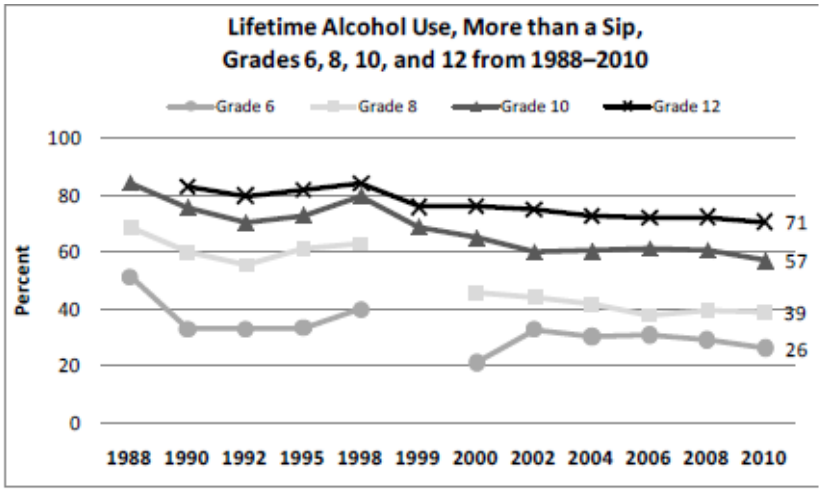
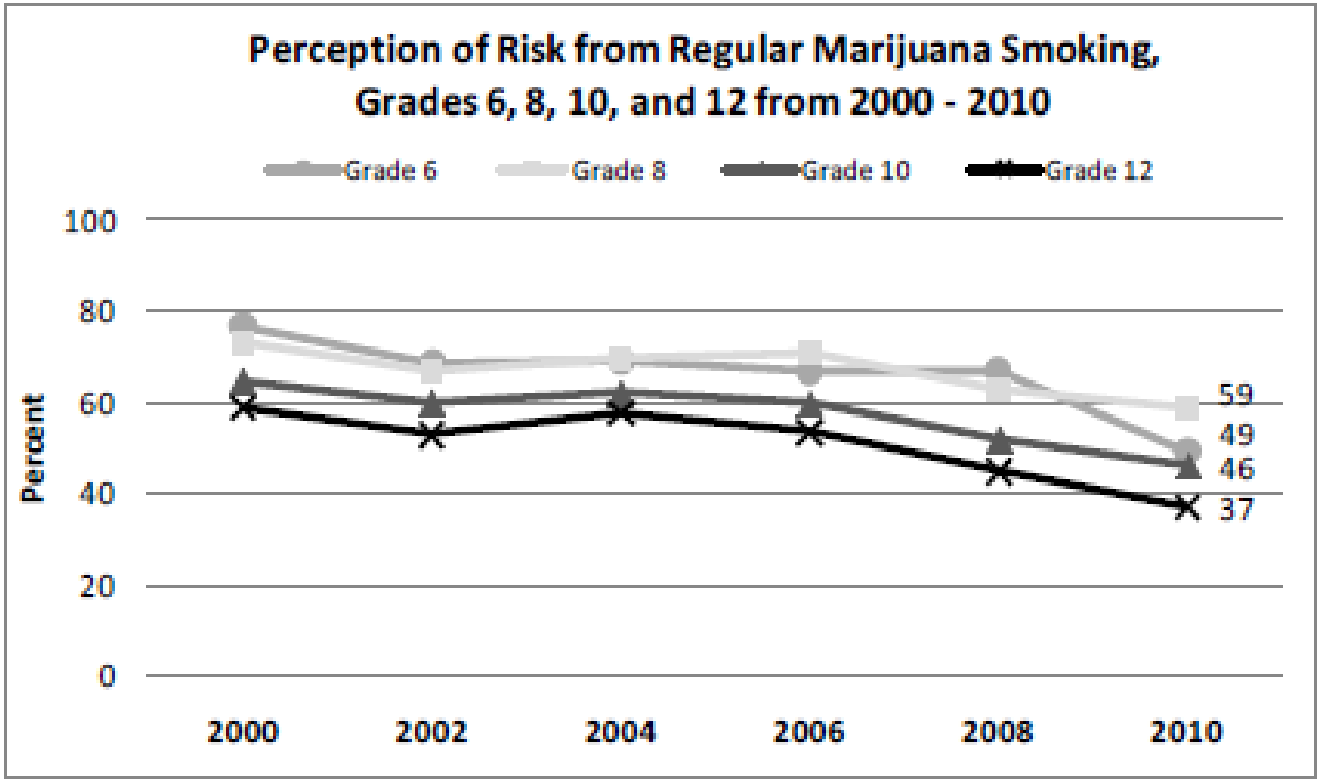






Survey Question: How old were you the first time you smoked a cigarette, even just a puff?
Note: Lifetime percentage represents students who had ever smoked a whole cigarette at any age in their life.
Source: WSSAHB 1995, 1998 and 2000, HYS 2002, 2004, 2006, 2008 and 2010.



Survey Question: How much do you think people risk harming themselves if they: Smoke marijuana regularly? (at least once or twice a week)

Note: Percentages represent students who reported there is great risk from regular marijuana use.

Source: WSSAHB 2000, HYS 2002, 2004, 2006, 2008 and 2010.