

MARIJUANA: CULTURE VS HEALTH SCIENCE

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WHAT DEFINES & PROMOTES A “CULTURAL” SHIFT?

A **meme** (/ˈmiːm/ meem) is "an idea, behavior, or style that spreads from person to person within a culture."

- **Language**
- **Habits**
- **Media**
- **Pressures to Conform**
- **Desire for Novelty**
- **Desire for Reward/Pleasure**
- **Desire for the “Extremes” – the Potent Experience**
- **Perceptions of Risk**

THE SHIFT

- Up until Mid 1990's We viewed Marijuana use as Harmful
- Needing to be Illegal
- 2000 + = Not that Bad compared to other Illegal Substances
- Maybe has Medical Value?
- Medical Marijuana Legalized
- Marijuana Dispensaries Open
- Recreational Marijuana Legalized

However, our society does not realize or clearly understand the true implications of this shift in use and the negative consequences of the “New Marijuana”

“WEED” REVOLUTION QUIZ?

- What's the average THC potency in marijuana?
- How many states have legalized marijuana?
- What's are the differences between “Green Crack,” “Phnom Penh,” & “Bubble Hash”?
- Are Vermont Dispensaries “for profit or non profit”
- What is the amount of “medicine” a Medical Marijuana Registered patient can buy per month?
- How is “Spice” or “K2” different than “Marijuana”
- Is there a publicly traded “cannabis growing company”
- How is Marijuana similar to “Craft Beer”

“WEED” HEALTH QUIZ?

- What sector of our population uses the most?
- Who is the most vulnerable to the negative effects?
- What is the “addictive potential”?
- What’s are the known benefits of Marijuana vs other Medicines?
- What is the carcinogenic potential?
- How do the negative health effects change with increases in Potency?
- How can we help people quit using when they want to ?

INVESTING | INNOVATION | JOBS

SUNDAY, MAY 25, 2014

Sunday Business

The New York Times



DAVE CHAN FOR THE NEW YORK TIMES

When Cannabis Goes Corporate

...in 2000, but the first system fo

THE ISSUE

TREMENDOUS IMPLICATIONS & URGENCY

- **WHY:**
- Most frequently used drugs are legal – increases the willingness to use it. (50% of Americans drink alcohol)
- VTSBIRT Tobacco 23% vs. Mj 10%)
- As researchers we are just beginning to understand the negative consequences of using the “new” more potent marijuana
- Marijuana is the most frequently used illegal substance (111 million users in the U.S.)
- Marijuana use has the most new users (2.4 million) & that number will increase if Vermont legalizes
- Most frequent users are youth – adolescents and young adults
- Most negative impact of substances occurs during critical periods of human development

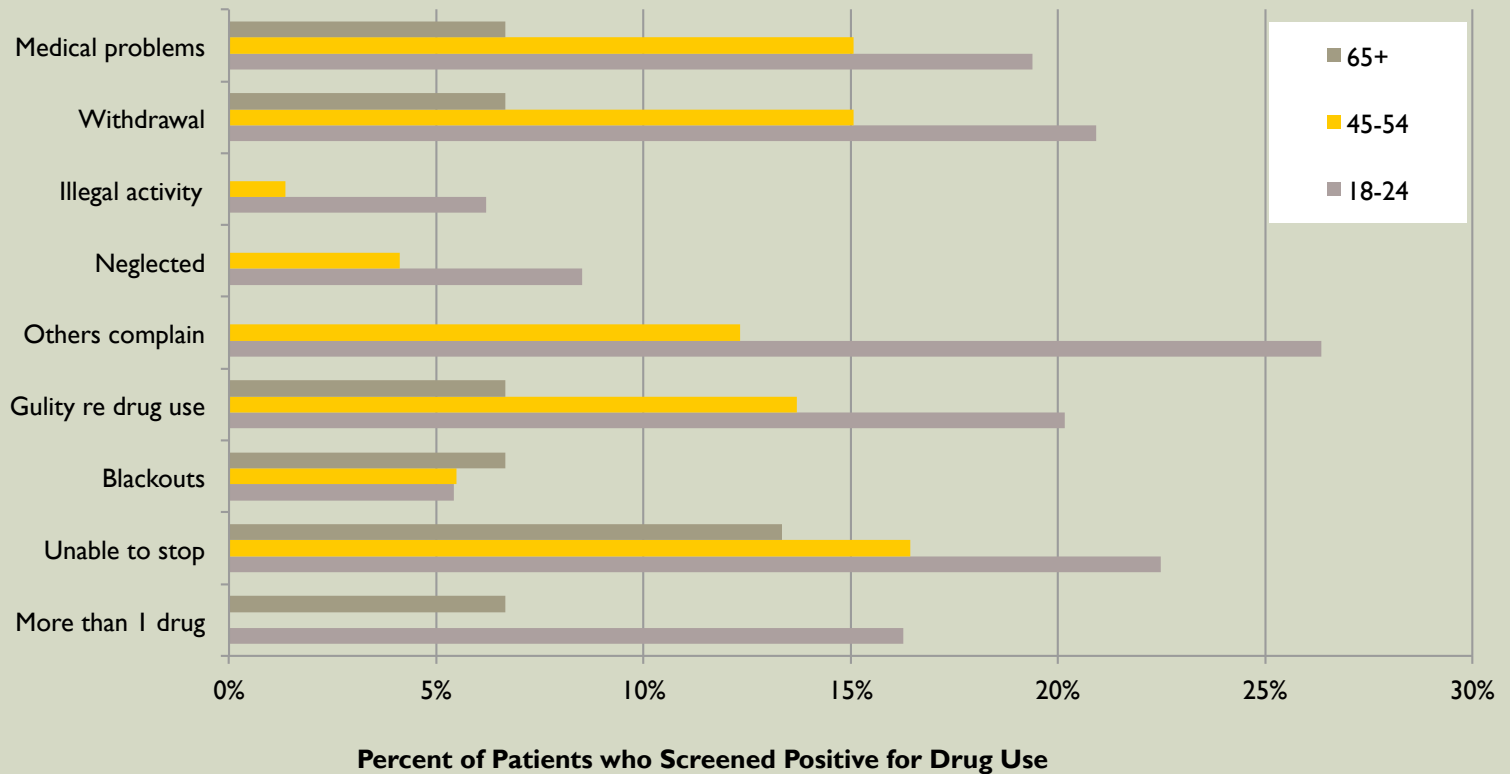
MARIJUANA USE

- Due to our: current prevention efforts & understanding of risks and negative effects of using tobacco – the frequency of use is declining
- Frequency of Regular Marijuana Use is Increasing especially in youth/young adults
- Most regular users smoke it daily
- Science has clearly demonstrated that this “regular use” is most harmful – associated with the most negative behavioral and physical health consequences
- Our VTSBIRT data demonstrate that 10% of Vermonters use marijuana regularly and 23% endorse not being able to stop – one widely used definition of addiction

VT SBIRT 2014 DATA (ALL AGES N=13,466)

28% OF 18-24, 14% OF 45-54, 3% OF 65+
REPORT MARIJUANA USE IN PAST YEAR

Symptoms Endorsed by Age



OVERVIEW

- Marijuana Basics: Cannabinoids & Potency
- Marijuana-associated risks
- The Most Critical Concern: Impact on Adolescents & Young Adults
- Vermont Use
- Impact of Legalization on Perception of Risk & Use
- What's the take home message?

MARIJUANA BASICS

- Marijuana is the dried flowers, leaves and stems of the Cannabis plant. Cannabis can be subdivided into two main subspecies sativa and indica
- The main active ingredient in marijuana is THC (delta 9 tetrahydrocannabinol).
- Marijuana can contains more than 460 active chemicals
- Eight Cannabinoids produce the most noticeable effects (THC, THC-V, THC-A, CBD, CBD-A, CBD-V, CBN, CBG, CBC).

MARIJUANA BASICS

- Research shows that THC interacts with the brain similar to the endogenous cannabinoid neurotransmitter anandamide, which is involved in the neurological processes of memory and pleasure seeking
- THC is a fat soluble substance and can remain in the lungs and brain tissue for up to 3 weeks.
- Rather than simply smoking it users have alternate delivery methods, such as oral, tinctures, and vapor forms.

CANNABIS AND CANNABINOIDS

- **The terms are not interchangeable**
- **Smoked cannabis (marijuana) contains more than 60 unique cannabinoids**
 - Many cannabinoids have dose-dependent effects
 - Cannabis (including “medical marijuana” in dispensaries) is not standardized in dose, potency, or chemical constituency
- **Some cannabinoids have been isolated and studied as oral compounds**
 - Dronabinol (Marinol) – Oral delta-9-tetrahydrocannabinol (THC)
 - Nabilone (Cesamet) – Oral synthetic cannabinoid (similar to THC)
 - Cannabidiol (CBD) – Non-psychoactive cannabinoid
 - Nabiximols (Sativex) – 1:1 THC:CBD standard-dose oral spray derived from cannabis plant

POTENCY

- Potency is a result of many variables – plant genetics, cultivation method, harvesting and processing
- **Marijuana Plant Flower = 8% – 25% THC-A**
- **Edibles (brownies, candies, chocolate) = .05 mg to 105 mg cannabinoids per serving**
- **Cannabis Concentrates (hash oils, tinctures, waxes, etc.) = often exceed 70% THC**
- **Cartridges for Vaporizers (much like e-cigarettes) = 15 - 30 % THC**

ASSOCIATED RISKS

MARIJUANA & LUNGS

- Marijuana produces a nearly threefold increase of inhaled tar compared with tobacco, according to some studies.
- Other research suggests that marijuana smokers, compared to cigarette smokers, inhale more deeply and hold their breath longer
- Marijuana smoke contains cancer-causing substances, according to the National Institute on Drug Abuse. Some research shows that marijuana smoke has up to 70% more cancer-causing substances than tobacco smoke.
- Those who keep marijuana use light do not appear to lose lung function.

HEALTH CONSEQUENCES

- National Institutes of Health:
 - Marijuana use negatively impacts executive function:
 - At school: attention, memory and problem solving
 - At work: absences and accidents

HEALTH CONSEQUENCES OF MARIJUANA USE

Data clearly demonstrate cannabis use is linked to:

- Addiction
- Cognitive impairment
- Motor skills deficiency
- Respiratory problems
- Cardiovascular problems
- Mental health issues
- Increased damage to youth

Source: United Nations Office on Drugs and Crime Vermont Department of Health

http://www.unodc.org/documents/drug-prevention-and-treatment/cannabis_review.pdf

HEALTH CONSEQUENCES OF MARIJUANA USE

- Marijuana can be addictive
 - An estimate 9% of users become addicted
 - The percent addicted increases 3-5x among those who start as teen agers (<17), and use regularly
 - Marijuana use contributes to motor vehicle crashes because it negatively impacts judgment and motor coordination

BRAIN CHANGES ASSOCIATED WITH CASUAL MARIJUANA USE IN YOUNG ADULTS

2014, the Society of Neuroscience (SfN) released a study from Northwestern University and Massachusetts General Hospital/Harvard Medical School concerning the brains of 18 to 25-year-olds.

- The study revealed that even recreational marijuana use could lead to previously-unidentified brain changes in young people.
- Previous studies on animals revealed that THC causes structural change in brain regions involving motivation, attention, learning and memory impairments.
- “This study suggests that even light to moderate recreational marijuana use can cause changes in brain anatomy.”
- Hans Brieter, MD, of Northwestern University states, “This study raises a strong challenge to the idea that casual marijuana use isn’t associated with bad consequences.”

INCREASED RISKS FOR YOUTH

YOUTH

- **“Youth are not just little adults”**
- Adolescence/Youth (12-25) is a period of critical brain development
- Rapid development of limbic structures (“the ancient brain”) and prefrontal cortex (“the executive brain”)
- Limbic development outpaces prefrontal cortex development
- During this period, risk taking surges, while impulse control is not yet optimized
 - This helps to explain behaviors (including substance use) that are specifically associated with adolescents (Casey et al., 2008)

MARIJUANA AND YOUTH

- Marijuana is the most commonly used illicit substance in adolescents
- 6.6% of high school seniors use marijuana *daily* (Johnston et al., 2011)
- Marijuana is an addictive substance, particularly in young people
- Cannabis use disorders (abuse and dependence) are present in 3.6% of adolescents and 5.9% of young adults, compared with only 0.7% of adults over age 25 (SAMHSA, 2007)

MARIJUANA AND YOUTH

- **Adolescents, in a critical stage of development, are particularly prone to lasting adverse behavioral, emotional, and cognitive, and addictive effects of marijuana use** (Chen & Anthony, 2003; Rey et al., 2004; Jager & Ramsey, 2008; Rubino & Parolaro, 2008; Jacobus et al., 2009)
- **Adolescent marijuana users are more likely than adults to develop dependence symptoms and have difficulty cutting down or quitting** (Chen & Anthony, 2003)
- **Long-term abstinence outcomes are remarkably poor with evidence-based adolescent marijuana cessation treatments** (Compton & Pringle, 2004; Dennis et al., 2004; Waldron & Turner, 2008)

COGNITION

- Early onset (before age 15) heavy marijuana users, compared with later onset users and non-users, perform more poorly on tests of
 - attention
 - impulse control
 - executive functioning (Fontes et al., 2011)
 - Cognitive deficits may persist even with abstinence (Medina et al., 2007)
- “Effects (on brain structure and cognition) of frequent cannabis use (in adolescence) may be different from and more serious than during adulthood.” (Jager & Ramsey, 2008)

SCHIZOPHRENIA

- Adolescent marijuana use (particularly heavy use) increases the risk of developing later psychotic symptoms and **schizophrenia** (Andreasson et al., 1987, 1989; Arseneault et al., 2002; van Os et al., 2002; Zammit et al., 2002; Fergusson et al., 2003; Stefanis et al., 2004; Ferdinand et al., 2005; Henquet et al., 2005)
- “There is now sufficient evidence to warn young people that using cannabis could increase their risk of developing a psychotic illness later in life” (Moore et al., 2007)

BIPOLAR DISORDER

- **Marijuana use may decrease the age of onset of bipolar disorder** (De Hert et al., 2011; Lagerberg et al., 2011)
- **Individuals with bipolar disorder are 6.8 times more likely than healthy controls to report lifetime use of marijuana** (Agrawal et al., 2011)

BIPOLAR DISORDER

- **Marijuana use is associated with worsened illness severity (rapid cycling, more frequent/severe manic episodes and psychotic symptoms) and treatment non-adherence** (Henquet et al., 2006; Strakowski et al., 2007; van Rossum et al., 2009)
- **Bipolar adolescents with cannabis use disorders have more structural brain abnormalities (in regions associated with emotional and motivational regulation) than bipolar adolescents without cannabis use disorders** (Jarvis et al., 2008)

MAJOR DEPRESSIVE DISORDER

- Major Depressive Disorder (MDD) and cannabis use disorders **commonly co-occur** (Mueser et al., 1992; Aharonovich et al., 2001)
- Despite frequent patient anecdotal reports, there is little epidemiological evidence of marijuana use onset as “self-medication” for MDD in adolescents (Degenhardt et al., 2003)

MAJOR DEPRESSIVE DISORDER

- **Several longitudinal studies have indicated that marijuana use (particularly during adolescence, and in dose dependent fashion) predicts increased odds of developing MDD at follow-up** (Bovasso, 2001; Fergusson et al., 2002; Patton et al., 2002; Epstein, 2003; Lynskey et al., 2004; Hayatbakhsh et al., 2007)
- **Marijuana use (particularly during adolescence) is also associated with increased risk for suicidal ideation and behavior** (Patton et al., 1997; Beautrais et al., 1999; Fergusson et al., 2002; Wilcox & Anthony, 2004; van Laar et al., 2007)

ANXIETY DISORDERS

- **Several epidemiological studies indicate that chronic marijuana use is associated with increased risk of subsequently developing anxiety disorders (e.g. panic disorder, social anxiety disorder, generalized anxiety disorder)** (Brooks et al., 1998; McGee et al., 2000; Bovasso, 2001; Fergusson et al., 2002; Patton et al., 2002; Hayatbakhsh et al., 2007)
- **Cannabis dependence is associated with earlier onset of panic attacks** (Zvolensky et al., 2006)
- **The one anxiety disorder that appears to predict subsequent development of cannabis dependence is social anxiety disorder** (Buckner et al., 2007)

ANXIETY DISORDERS

- **Could marijuana be considered as a treatment?**
 - **There is no current evidence to support smoked marijuana as an anxiolytic treatment**
 - **Marijuana exerts biphasic and bidirectional effects, depending on dose, individual, situation, etc., and thus may at times be acutely anxiolytic or anxiogenic** (Hollister, 1996; Ashton et al., 2005; Viveros et al., 2005)

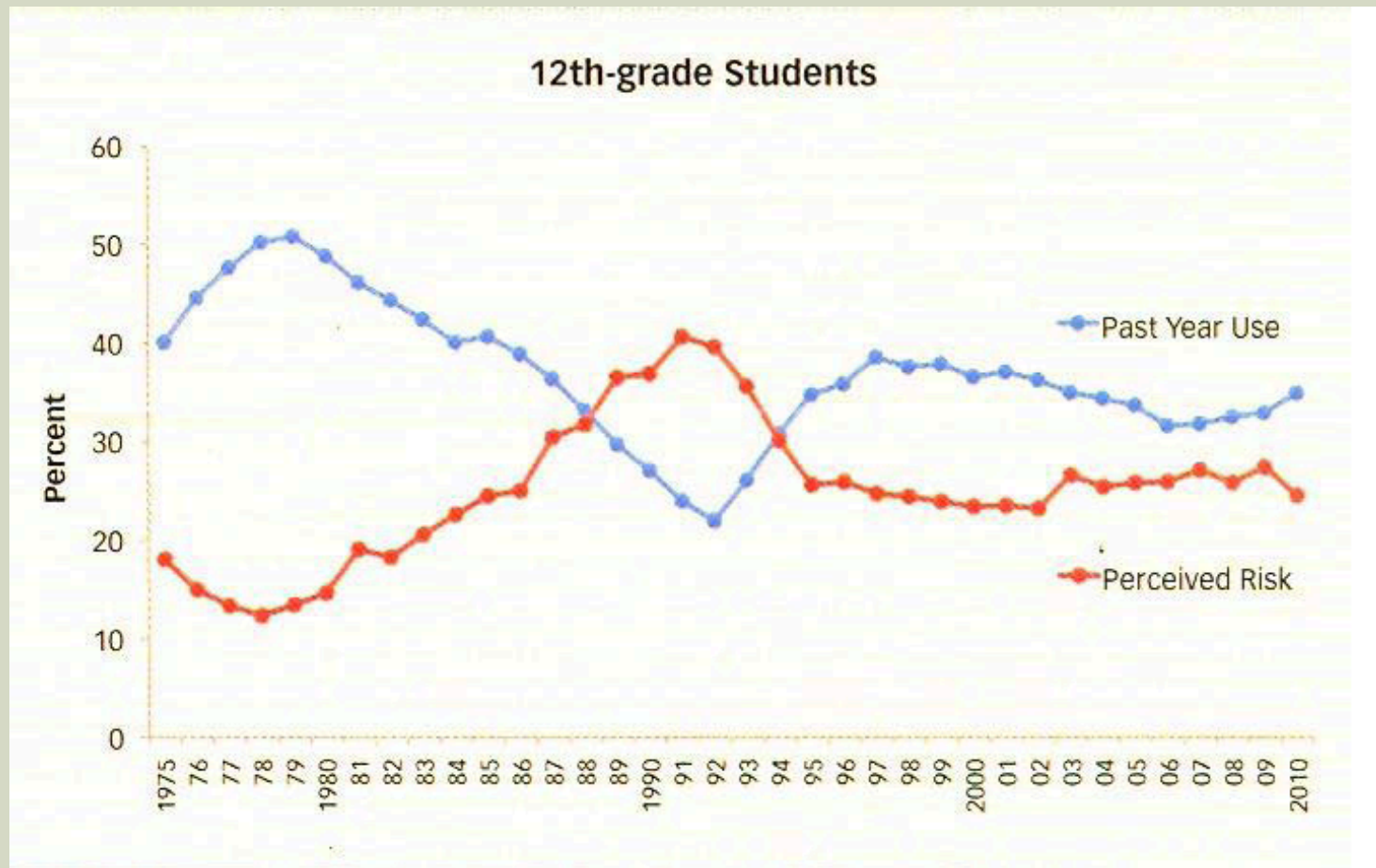
MEDICAL? OR LEGAL?

THE AMERICAN ACADEMY OF CHILD AND ADOLESCENT PSYCHIATRY

Legalization of marijuana for medicinal or recreational purposes, even if restricted to adults, is likely to be associated with

- (a)** decreased adolescent perceptions of marijuana's harmful effects,
- (b)** increased marijuana use among parents and caretakers, and
- (c)** increased adolescent access to marijuana, all of which reliably predict increased rates of adolescent marijuana use and associated problems.

DANGERS OF THE “MESSAGE”



Monitoring the Future Survey (Johnston et al., 2011)

BRACKETOLOGY: TOP & BOTTOM STATES FOR PAST MONTH MARIJUANA USE: COLLEGE-AGE (18 TO 25 YEARS), 2012

Medical Marijuana States

1. Vermont - 33.18%
2. Rhode Island - 30.16%
3. Colorado - 26.81%
4. Montana - 26.51%
5. New Hampshire - 26.37%
6. Oregon - 25.81%
7. Massachusetts - 25.77%
8. Alaska - 24.77%
9. Connecticut - 23.66%
10. Washington - 23.44%

■ **National Rate = 18.89%**

Non Medical Marijuana States

41. North Dakota - 14.44%
42. Alabama - 14.34%
43. Oklahoma - 14.14%
44. South Dakota - 13.95%
45. Texas - 13.76%
46. Idaho - 13.09%
47. Wyoming - 13.06%
48. Louisiana - 13.0%
49. Kansas - 11.34%
50. Utah - 9.83%

IMPACT OF LEGALIZING USE IN CO. & VT?

- Colorado Medicinal to Legal 2006 - 2012
- From 2011 to 2013 there was a **57 percent** increase in emergency room visits related to marijuana.¹
- Comparing current use of marijuana for those ages 12 and older from 2004-2006 to 2008-2010: The Denver area and Colorado both increased over **50 percent**; whereas the national increase was only **8.8 percent**
- From 2011 to 2013 there was a **57 percent** increase in emergency room visits related to marijuana

IMPACT OF LEGALIZING USE IN CO. & VT?

- Comparing 2004-2006 to 2008-2010: Colorado use increased over 50 percent; whereas the national increase was only 8.8 percent
- In 2006, Colorado was ranked 14th in the nation for past month marijuana usage among youth Youth (ages 12 to 17 years) But, in 2012 Colorado average was 39 percent higher than the national average & ranked 4th in the nation
- There was a 26 percent increase in youth (ages 12 to 17 years) monthly marijuana use in the three years after medical marijuana was commercialized (2009) compared to the three years prior to commercialization.

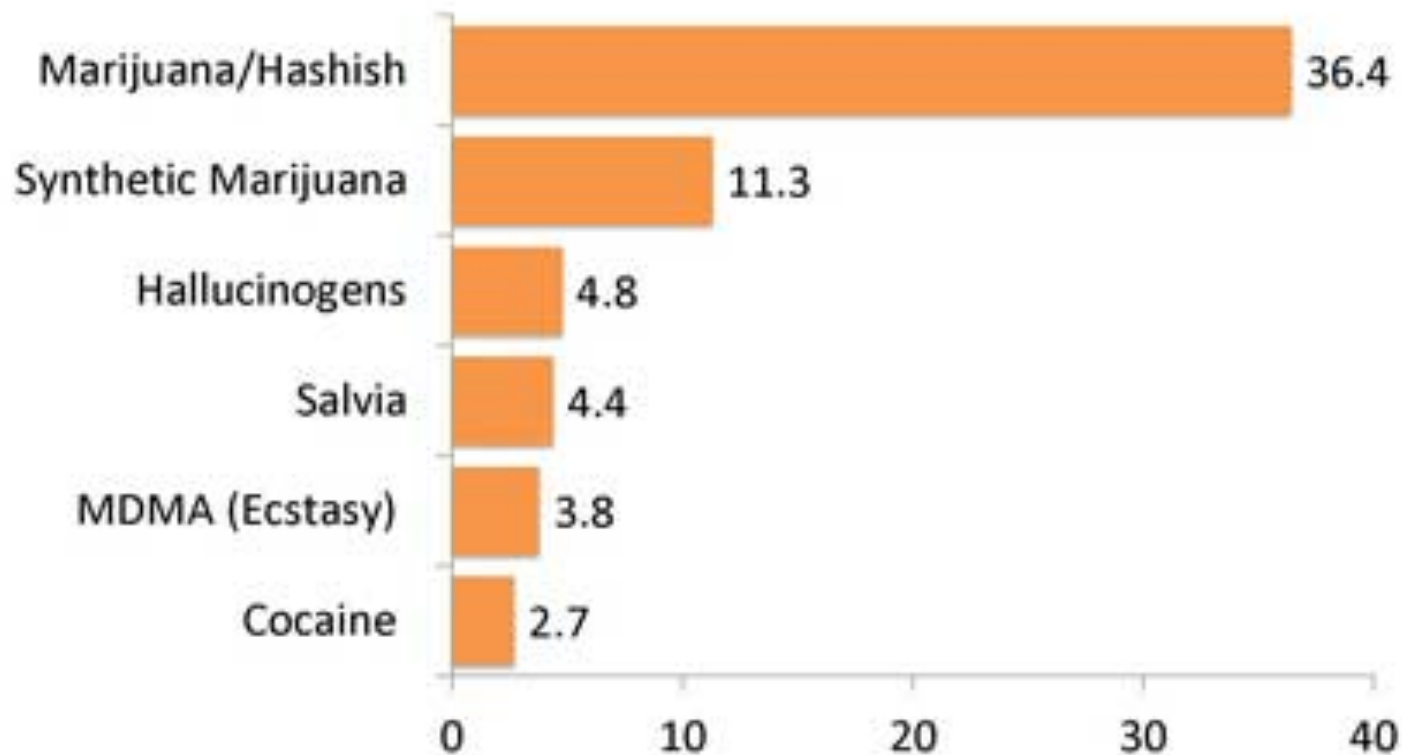
IMPACT OF LEGALIZING USE IN CO. & VT?

- There was a **32 percent** increase in drug-related suspensions and expulsions in Colorado for academic school years 2008/2009 to 2012/2013.⁴
- Most students obtain their marijuana from a friend who gets it legally, or their parents

What were the most predominant marijuana violations on campus?

- **51 percent** reported possession of marijuana
- **37 percent** reported being under the influence during school hours
- **6 percent** reported possession of marijuana-infused edibles
- **4 percent** reported sharing marijuana with other students
- **2 percent** reported selling marijuana to other students

Past-Year Use of Illicit Drugs by High School Seniors (percent)



Source: University of Michigan, 2012 Monitoring the Future Study

TEENS' DECREASING PERCEPTION OF POT BEING HARMFUL

- More than 12 percent of eighth graders and 36 percent of seniors at public and private schools around the country said they had smoked marijuana in the past year.
- About 60 percent of high school seniors said they did not view regular marijuana use as harmful, up from about 55 percent last year.
- “There is no way to properly ‘regulate’ marijuana without allowing an entire industry to encourage use at a young age, to cast doubt on the science, and make their products attractive – just like Big Tobacco did for 50 years. Today’s Big Marijuana is no different.”

Dr. Kevin Sabet, director, Smart Approaches to Marijuana

CONCERN ABOUT MARIJUANA EDIBLES AND YOUTH

Manufacturers are adding marijuana to everything from cookies to chocolate bars, sodas and candies; strength and serving size vary widely.

On January 1, 2014, Colorado permitted stores to sell marijuana to adults but retained a legal ban on possession of pot by minors.

That hasn't stopped them getting hold of it: Twelve students were suspended last month after they ate marijuana-infused candies at their suburban Denver middle school. The two students who supplied the candies were being expelled.

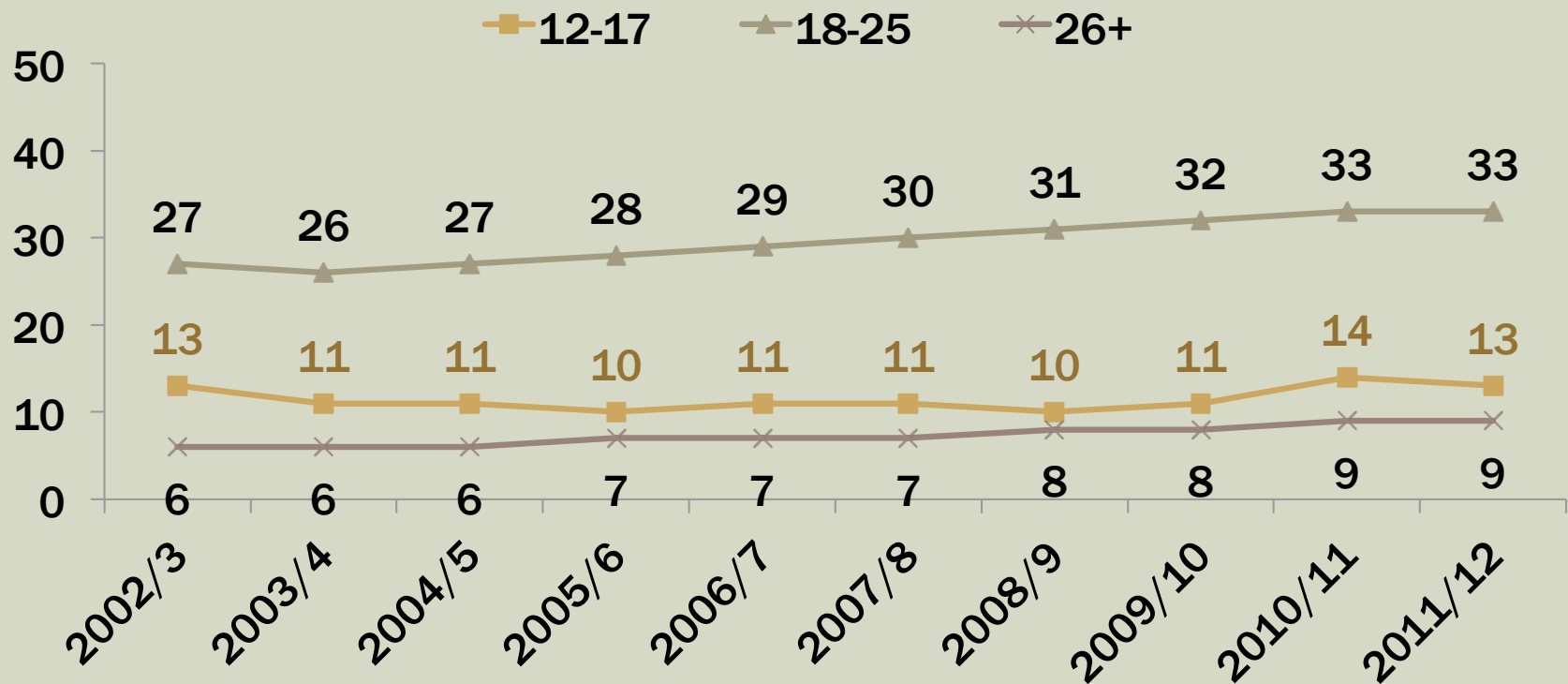


MARIJUANA USE IN VERMONT

February 2013

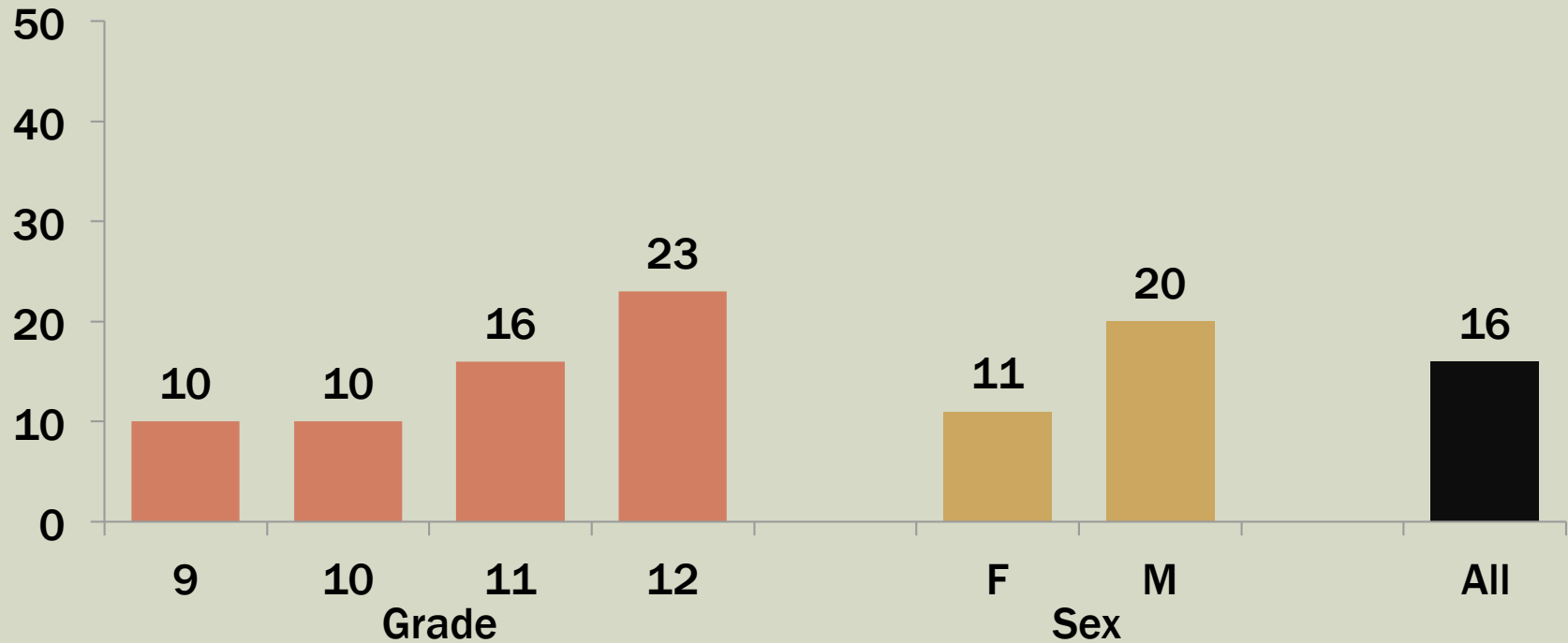
NSDUH – MARIJUANA USE BY AGE

Percent of Vermonters reporting past 30 day marijuana use by age category and year



YRBS – DRIVING AFTER MARIJUANA USE BY GRADE AND SEX

Percent of Vermonters (grade 9-12) reporting driving a car or other vehicle while using marijuana past 30 days by grade and sex, 2011



Note: More students drove after using marijuana (16%) than drove after using alcohol (8%) in 2013.

CONCLUSIONS

- Given neurodevelopmental context, adolescents are already uniquely vulnerable to substance misuse and associated adverse consequences
- The promotion of “Medical & Legal Marijuana” lead to reduced perception of marijuana-associated harm among youth
- Vermont ranks No. 1 in use of Marijuana – Medical Card & Dispensaries
- Colorado is a case in point for the negative consequences associated with legalization
- In recent years perception of harm has gone down, while rates of use have gone up

WHAT'S THE TAKE HOME FOR PROVIDERS?

- To counter this and to help protect adolescents from harm, clinicians must use evidence and facts
 - Cannabis ≠ cannabinoids
 - Marijuana ≠ medicine
 - Adolescents ≠ adults
 - Clear evidence of adverse consequences of adolescent marijuana use
 - No evidence of ANY benefit of adolescent marijuana use
- There is ample evidence that cannabis exerts adverse effects in youth (particularly in our clinical populations)
- Smoked marijuana contains hundreds of chemicals and dozens of cannabinoids without standardized dosing, and is not FDA indicated for the treatment of any disorder
- The problem with legalization is that youth & young adults will be the most affected
- Youth are the least prepared to make health based decisions that can affect them for a lifetime

REFERENCES

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- Roland Lamarine, HSD, professor of public health, California State University, Chico.
- Lamarine, R. *Journal of Drug Education*, January 2012.
- Pletcher, J. *Journal of the American Medical Association*, Jan. 11, 2012.
- National Institute on Drug Abuse: "Drug Facts: Marijuana."
- Sewell, R. *The American Journal on Addictions*, May-June 2009.
- Rocky Mountain High Intensity Drug Trafficking Area Investigative Support Center Denver, Colorado
- www.rmhidta.org/reports
- (2012 *Journal of the American Medical Association*)

RESOURCES

■ List of resource available at Vermont Department of Health

[marijuana information page:](#)

- Youth Risk Behavior Survey
- Behavioral Risk Factor Surveillance System
- Pregnancy Risk Assessment Monitoring System
- Department of Health Treatment System Data

<http://healthvermont.gov/adap/drugs/marijuana.aspx>

■ External Resources:

- [National Institutes of Health, National Institute on Drug Abuse](#)
- [Office of National Drug Control](#)

- [National Association of State Alcohol and Drug Abuse Directors](#)