# Medical Marijuana

# What Providers Need To Know

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Marijuana Messaging:
Feature Film 1936

# Understanding Marijuana

# Marijuana Use is Common

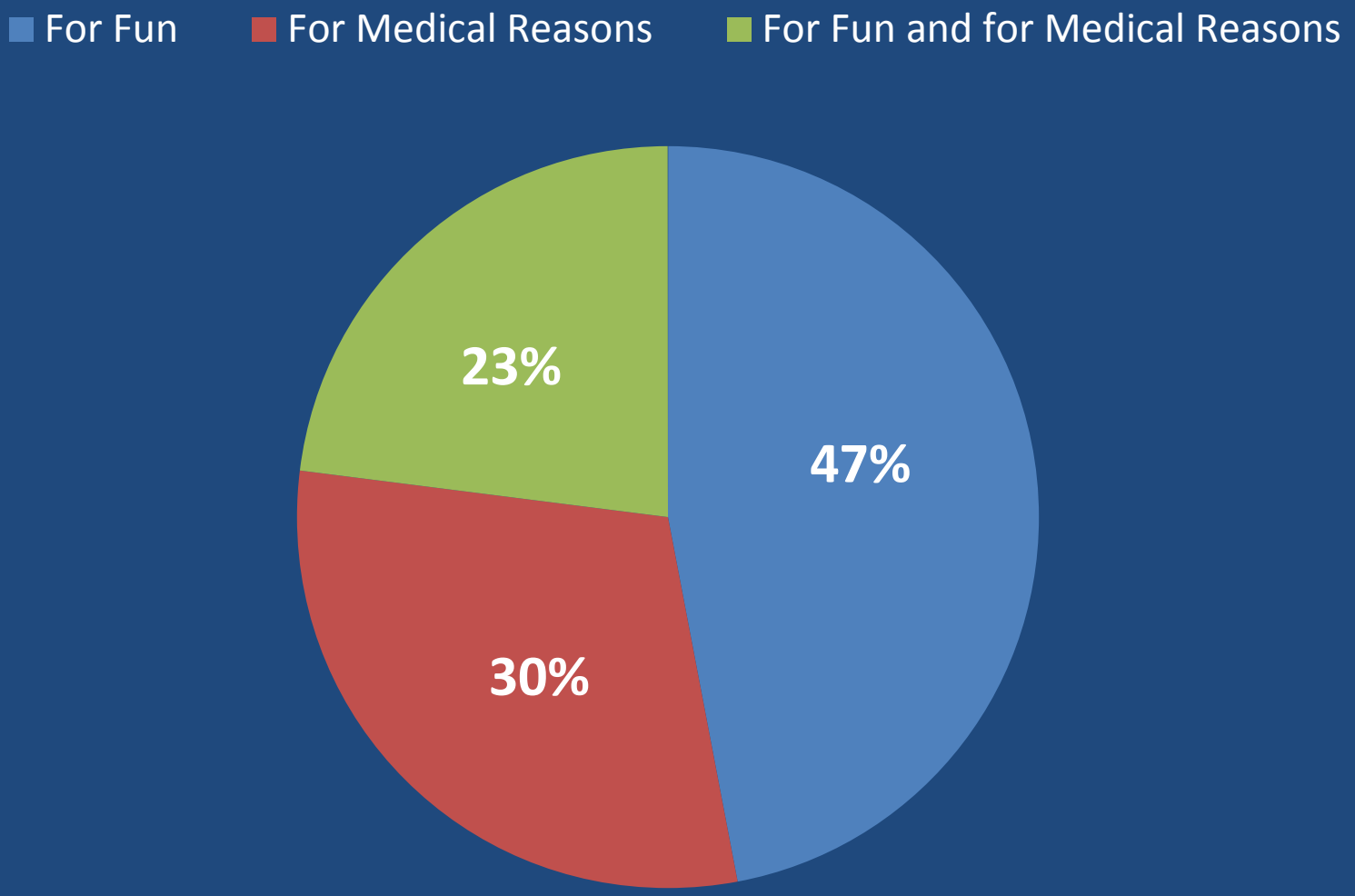
- Marijuana is the most commonly used illicit drug in the U.S.
- Any use among general population age 12+ in past month:
  - 2011: 7%
  - 2008: 5.8%
- Use is most common among people age 18-25 (19% of population)
- 48% of adults in the US report having used marijuana at some time in their life



SOURCES: SAMHSA 2012; Pew Charitable Trust, 2013 (reference list).

# Why Do People Use Marijuana?

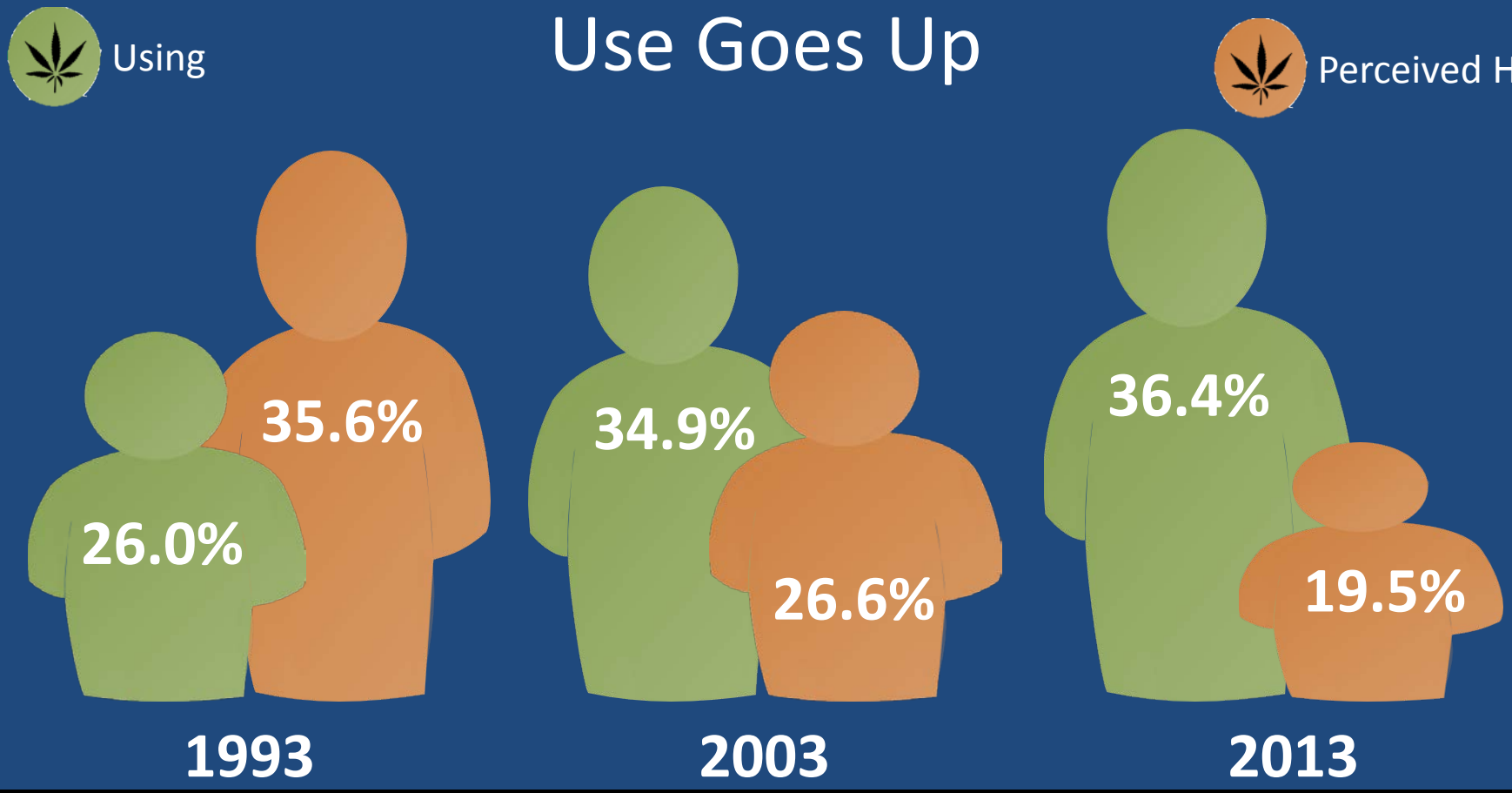
Among people who used marijuana in the past year:




SOURCE: Pew Charitable Trust, 2013 (reference list).

# Monitoring the Future 2013

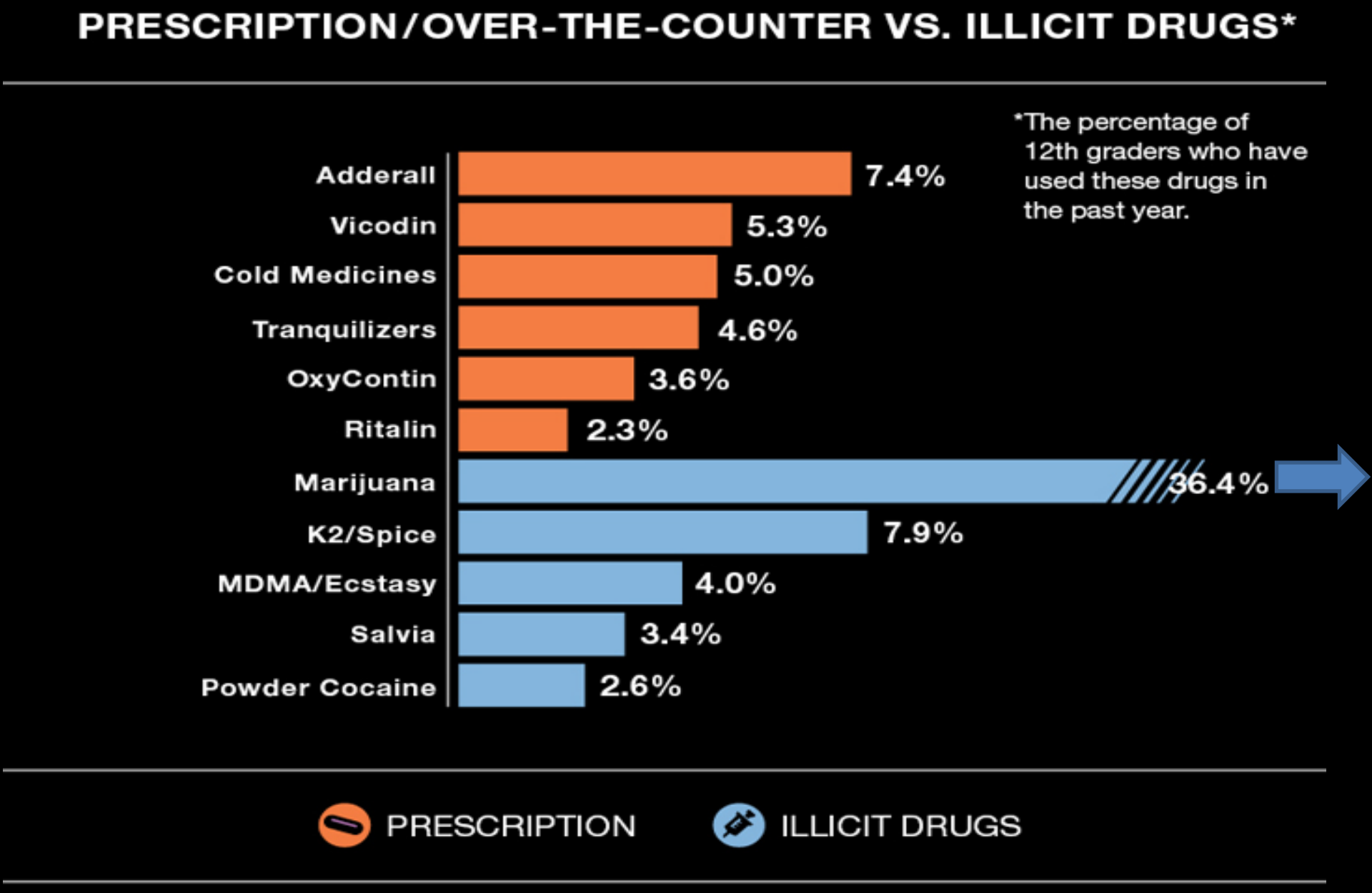
## As Perceived Harm Drops, Use Goes Up




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.

# Monitoring the Future 2013



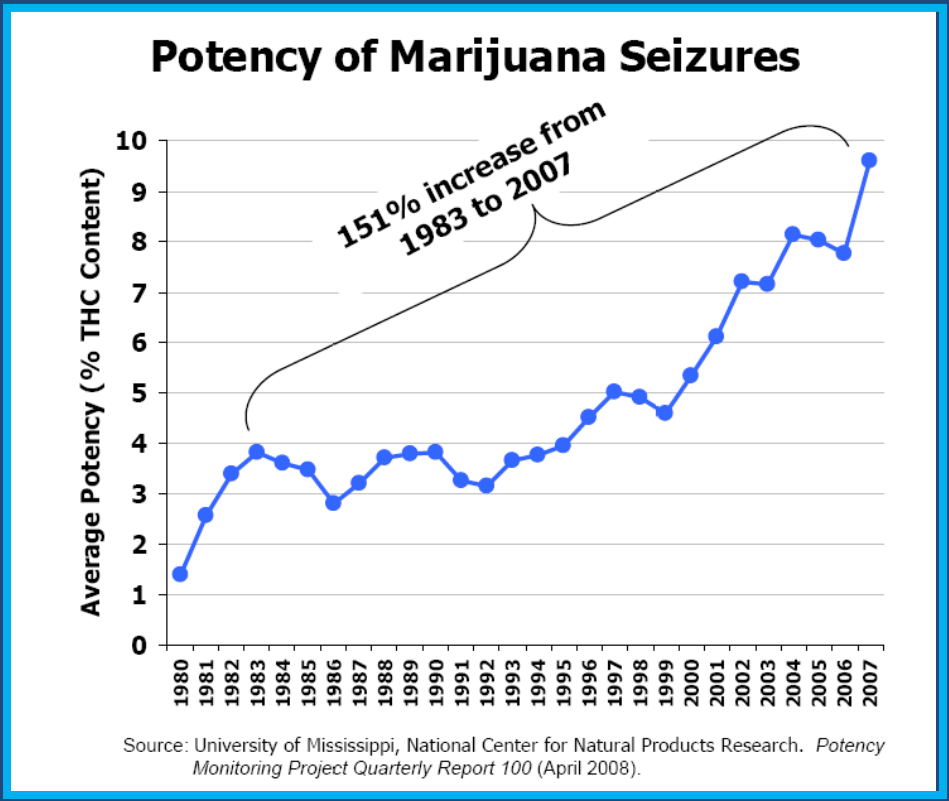
# Marijuana: What is it?

- Dry, shredded mix of leaves, flowers, stems, and seeds, usually from *Cannabis sativa* or *Cannabis indica* plant
- Both are common subspecies of the hemp plant, which is common throughout the world
- Contains over 400 chemical compounds
- Common names: grass, weed, pot, reefer, Mary Jane, ganja



SOURCE: SAMHSA, 2012 (reference list).

# *"It's not your dad's 'pot' anymore"*




- Marijuana growers have worked to make the drug as potent as possible.
- In 1960s-70s average THC concentrations were 1-2%. Today, they are as high as 20%



SOURCES: Kleber, 2012; TRI, 2012 (reference list).

# Marijuana: Immediate Effects

| | |
|---|---|
| Altered Mood | Reduced Anxiety |
| Cognitive Impairment (Attention, Judgment) | Sedation/Drowsiness |
| Altered Perception | Sensory Intensification |
| Impaired coordination/balance | Increased heart rate |
| Hunger | Hallucinations (in large doses) |

- Effects can vary by strains
  - *Sativa*: More euphoria, stress relief
  - *Indica*: Relaxation, physical (especially pain) relief
  - *Sativa* and *Indica* often combined, leading to variable effects



SOURCES: NIDA 2012a;b (reference list).

# How is Marijuana Used?

| SMOKED | VAPORIZED | EATEN/DRUNK |
|---|---|---|
| Smoked in a pipe, bowl, cigarette | Inhaled through machine that converts active compounds into inhalable form | Consumed as ingredient in baked goods, candies, sodas |
| Rapid effects | Rapid effects | Takes time to reach brain, so effects are delayed |
| Burning marijuana releases toxins that can cause pulmonary problems | Does not release toxins that cause pulmonary problems | Does not release toxins that cause pulmonary problems |



SOURCE: University of Utah, 2013 (reference list).

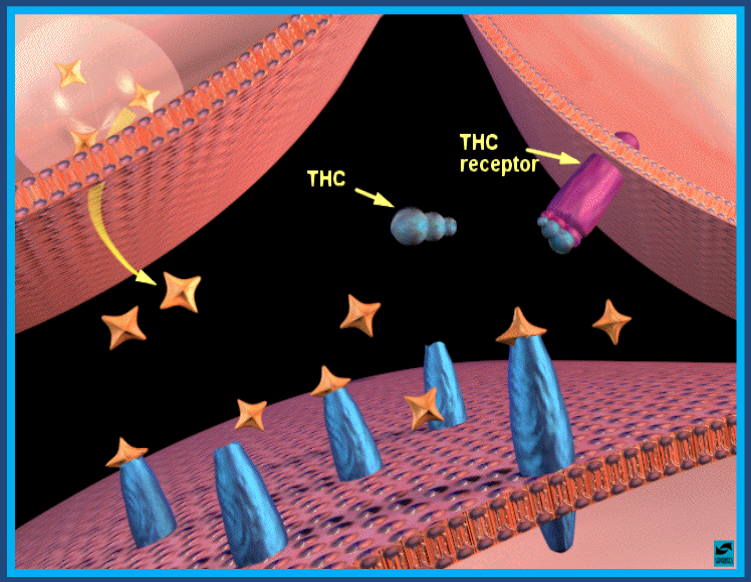
# Marijuana: Other Forms

- Hashish
  - Compressed resin of cannabis plant
  - More concentrated and potent than marijuana plant
- Hash Oil ("Wax")
  - Psychoactive chemicals extracted from cannabis plant with butane
  - Three to four times as potent as marijuana plant
- Synthetic Cannabinoids ("Spice", "K2")
  - Mimic some of the effects of marijuana, in increased severe symptoms



SOURCES: NIDA 2012c; DEA 2013; Hallett, 2013 (reference list).

# Marijuana: How Does it Work?




- Contains over 60 cannabinoids: main active chemical is Δ-9-tetrahydrocannabinol (THC)
- Stimulates "high" by triggering receptors in parts of brain that influence pleasure, memory, thinking, concentration, coordination
- THC's molecular structure is similar to that of neurotransmitters that affect cannabinoid receptors (affect pain, appetite, vomiting reflex)
- Effects generally last 1-4 hours



SOURCES: Eddy, 2010; NIDA, 2012a, 2012b (reference list).

# Marijuana and the Brain

https://www.youtube.com/watch?v=oeF6rFN9org

# Neurologic Impact of Marijuana in Adults

- Administered neuropsychological tests to **63 current heavy cannabis users** who had smoked cannabis at least 5,000 times in their lives and to **72 control subjects** who had smoked no more than 50 times in their lives.
- Differences between the groups after 7 days of supervised abstinence were reported. However, **no deficits were found after 28 days abstinence**, after adjusting for various potentially confounding variables.
- Suggest that cognitive deficits associated with long-term cannabis use are **reversible and related to recent cannabis exposure**.



*Pope HG, et al. (2001). Arch Gen Psychiatry. 2001 Oct; 58(10):909-15.*

# Neurologic Impact of Marijuana

- When cannabis users were asked to rate the effects of their own cannabis use as positive, neutral, or negative, they gave overwhelmingly negative ratings of the effects that cannabis had had on their

social life (70%):

physical health (81%) :

mental health (60%) :

cognition (91%) :

memory (91%) :

career (79%) :

*Gruber AJ, et al., (2003). Psychol Med. 33(8):1415-22.*

# Neurologic Impact of Marijuana

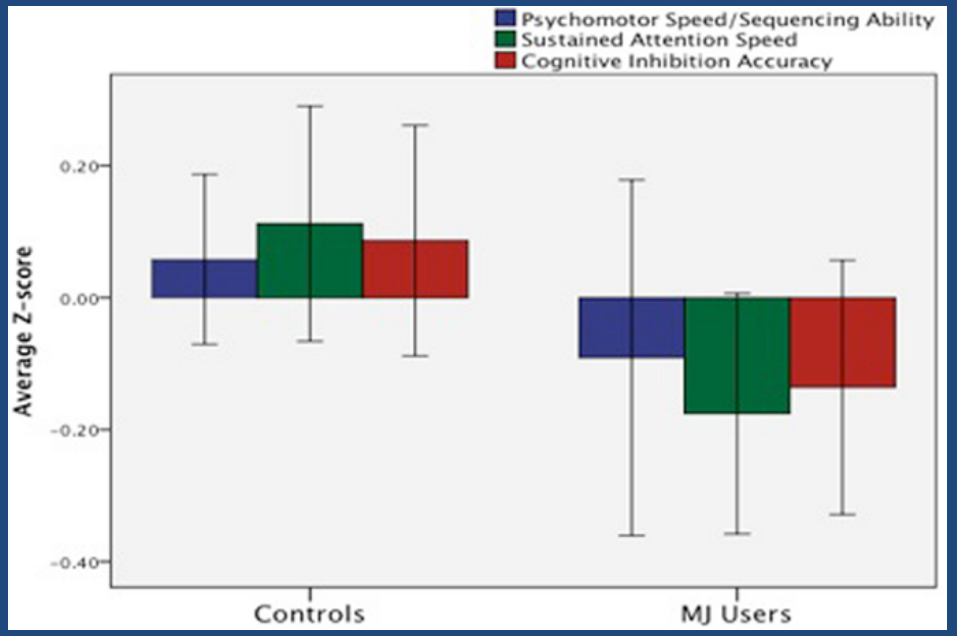
- It seems a reasonable hypothesis that the negative effects these long-term heavy cannabis users reported are due to being **acutely intoxicated every day**.
- Cannabis intoxication result in impairments in **cognitive, perceptual, and psychomotor tasks**. Tasks showing the most impairment involve **short-term memory, sustained or divided attention, complex decision-making,** and **reaction time**
- Ninety-seven percent of the heavy users reported **driving on a regular basis** while intoxicated. Studies using driving simulators show **marked impairment** during acute cannabis intoxication, and **a disproportionate number of accidents** occur in individuals intoxicated with cannabis and alcohol



*Gruber AJ, et al., (2003). Psychol Med. 33(8):1415-22.*

# Marijuana and the Adolescent Brain

- Human studies suggest early onset (prior to 16-18 yo) associated with more severe cognitive consequences.
  - Poorer attention
    (Ehrenriech et al., 1999)
  - Executive functioning (sustained attention, cognitive inhibition, abstract reasoning)
    (Fontes et al., 2011)




(Lisdahl and Price., 2012)

# Marijuana and the Adolescent Brain

- Longitudinal research demonstrates that early onset marijuana use associated with lower IQ
  - Drop from childhood "average" to adult low "average"
  - Never achieved predicted adult IQ trajectory even with sustained abstinence in adulthood (Meier et at., 2012)
- Overall studies suggest that regular adolescent MJ use may cause brain structural changes associated with
  - poor neuronal efficiency
  - poorer cognitive functioning (psychomotor speed, executive functioning, emotional control, and learning and memory) (Lisdahl et al., 2013)
- This may indelicate a large proportion of youth are experiencing cognitive difficulties that may negatively impact their performance, leading to increased school difficulty and reduced grades (Medina et al., 2007)

# Marijuana: Negative Effects on Behavior and Mental Health

- Similar to alcohol/other drugs if misused (impairment)
- Long term use has negative impact on learning and memory
- Long term use reduces motivation ("amotivational syndrome")
- Associated with mental health problems
  - Unclear if marijuana use is cause or effect
  - Heavy use is highly associated with serious mental illness – particularly among those with high risk (e.g., family history)



SOURCES: Ben Amar, 2006; Bostwick, 2012; NIDA, 2012a, 2012b (reference list).

# Marijuana: Negative Effects When Smoked

- Can lead to respiratory illness
  - One marijuana cigarette causes as many pulmonary problems as 4-10 tobacco cigarettes
  - Increased risk for bronchitis, emphysema, lung cancer
- Can cause cardiovascular complications
  - Raises blood pressure & heart rate 20-100%
  - 4.8 times risk of heart attack in hour after use



SOURCES: Ben Amar, 2006; Bostwick, 2012; NIDA, 2012a, 2012b (reference list).

# Marijuana: Negative Effects in Pregnancy

- There is increasing evidence that prenatal exposure may result in:
  - Increased risk of motor, social, and cognitive disturbances.
  - Higher rate of low birth weight infants, and childhood leukemia
- Marijuana has been found in breast milk although levels are generally considered subclinical.



SOURCE: Texas Tech University, Health Sciences Center, 2013 (reference list).

# Is Marijuana a Medicine?

# Marijuana's Medical Potential: Research Evidence

- Reduces nausea
- Stimulates appetite
- Pain relief
- Controls muscle pain, spasms
- Reduces tics (Tourette's Syndrome)
- Reduces convulsions (epilepsy)



SOURCE: Ben Amar, 2006 (reference list).

# Marijuana's Medical Potential: Ongoing Clinical Trials

- Studying potential of marijuana and marijuana-based medications to treat:
  - Multiple Sclerosis
  - High Heart Rate
  - Non-Cardiac Chest Pain
  - Chronic Obstructive Pulmonary Disease
  - Sickle Cell Disease
  - Spinal Cord Injury Pain
  - Inflammatory Bowel Disease (Crohn's disease)
  - Liver Problems
  - Cancer-Related Pain
  - Brain Tumors
  - Dementia
- Many of these trials on individuals with multiple physical and/or mental health problems



SOURCE: U.S. National Institutes of Health, 2013. *ClinicalTrials.gov*.

# Different Kinds of Marijuana-Based Medicine

- Botanical cannabis (plant): “Medical Marijuana”
- Synthetic THC medications available in U.S. for nausea/appetite stimulation:
  - Dronabinol (Marinol®) (FDA approved for HIV)
  - Nabilone (Cesamet®) (FDA approved for cancer; HIV off-label)
- Other medications not available in U.S.:
  - Nabiximols (Sativex®) THC/cannabidiol mouth spray for pain relief, muscle spasms; currently being investigated by FDA
  - Rimonabant (Accomplia®, Zimulti®) for treatment of obesity and nicotine dependence
    (selective cannabinoid receptor-1 blocker)

# THC vs CBD

| Effects of CBD |
| --- |
| Reduces nausea and vomiting |
| Suppresses seizure activity |
| Combats psychosis disorders |
| Combats inflammatory disorders |
| Combats neurodegenerative disorders |
| Combats tumor and cancer cells |
| Combats anxiety and depression disorders |

- CBD is contained in cannabis. Amounts vary by plant with some containing high CBD and almost no THC
- Non psychoactive and does not interfere with psychomotor function
- Reduces intoxicating effects of THC (e.g., memory, paranoia, drowsiness)
- Seems to produce a variety of medical effects
- Most studies have been in animals
- CDB, like all cannabinoids, is still illegal in most states
- Pharmaceutical versions are in development

# Medical Marijuana vs. THC Medications

| Advantages of Medical Marijuana | Advantages of THC Medications |
|---|---|
| Chemicals that moderate THCs psychoactive effects | FDA approved |
| Less expensive | Standardized medical formulation |
| More immediate relief | Purity |
| Instant feedback allows for moderation, possibly less consumption | Not smoked |
| Less erratic absorption than THC medications | Standardized dosing |

# Medical Marijuana and HIV: Is it always the Best Option?

| CONDITION | PERCEIVED EFFECTIVENESS OF MARIJUANA COMPARED TO CONVENTIONAL TREATMENT |
|---|---|
| Anxiety | MJ slightly more effective than antianxiety medication |
| Depression | Antidepressants slightly more effective than MJ |
| Nausea | MJ slightly more effective than medication |
| Neuropathy | MJ slightly more effective than medication |
| Diarrhea | Medication slightly more effective than MJ |
| Fatigue | Medication slightly more effective than MJ |
| All Symptoms | Marijuana slightly more effective |

- Overall slightly more people living with HIV find marijuana more effective than other treatments; many prefer traditional treatment
- There are risks associated with marijuana use for people living with HIV



SOURCE: Corless et al., 2009 (reference list).

# Summary

- Marijuana has psychogenic effects that are appealing to recreational users.
- The strength has increase 15 times from a decade ago
- Addiction, including physical dependence, is possible and should be assessed for all users

# Summary

- Research has shown that marijuana does have some impact medically for some specific conditions
- Research is ongoing to determine utility for a variety of medical issues
- Research is focusing on THC and CBD to determine where the medical effect is coming from

For more information:
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UCLA ISAP: www.uclaisap.org
Pacific Southwest ATTC: www.psattc.org
PAETC Training calendar: www.HIVtrainingCDU.org

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