Smoke Gets in Your Eyes: Myths and Facts About Medical Marijuana

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Oklahoma Center for Poison and Drug Information

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

Sources: SAMHSA 2012; Pew Charitable Trust, 2013

Why Do People Use Marijuana?

Among people who used marijuana in the past year:

- For Fun
- For Medical Reasons
- For Fun and for Medical Reasons

23%
47%
30%

Source: Pew Charitable Trust, 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

Marijuana: How Does it Work?

- Contains over 60 cannabinoids: main active chemical is Δ⁹-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
How is Marijuana Used?

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

SOURCE: University of Utah, 2013

Marijuana: Immediate Effects

<table>
<thead>
<tr>
<th>Altered Mood</th>
<th>Reduced Anxiety</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cognitive Impairment (Attention, Judgment)</td>
<td>Sedation/Drowsiness</td>
</tr>
<tr>
<td>Altered Perception</td>
<td>Sensory Intensification</td>
</tr>
<tr>
<td>Impaired coordination/balance</td>
<td>Increased heart rate</td>
</tr>
<tr>
<td>Hunger</td>
<td>Hallucinations (in large doses)</td>
</tr>
</tbody>
</table>

• Effects can vary by strains
  – Sativa: More euphoria, stress relief
  – Indica: Relaxation, physical (especially pain) relief
  – Sativa and Indica often combined

SOURCES: NIDA 2012a,b
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 mental illness — particularly among those with high risk (e.g., family history)

Sources: Ben Amar, 2006; Bostwick, 2012; NIDA, 2012a, 2012b

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

Marijuana: Why Keep Using It?

- Rely on it to alleviate mental/emotional distress
- Like it, it’s fun
- Use socially/to fit in
- Rely on it to alleviate physical pain/discomfort or sleep problems
- Habit/fear of stopping
- Most people who continue using marijuana use it for many of these reasons

Sources: Ben Amar, 2006; Bostwick, 2012; NIDA, 2012a, 2012b
Marijuana: Potential for Abuse/Dependence

- Regular and prolonged use can change the way the brain works, leading to abuse or dependence.
- Marijuana abuse/dependence most common among individuals with mental health disorders.
- In 2011, 22.9% of people in US who received addiction treatment received treatment for marijuana use disorders.
- Average adult entering treatment for marijuana abuse/dependence has used daily for ten years, tried to quit six times.

SOURCE: Compton et al., 2004; NIDA, 2012a, 2012b; SAMHSA, 2012

“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

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

SOURCES: NIDA 2012c; DEA 2013; Hallett, 2013
BHO (‘‘Wax’, ‘‘Dabs’’) Production
BHO extraction – elapsed time 3 hours
How Can Marijuana be a Medicine?

- Marijuana impacts:
  - Pleasure/relaxation
  - Memory/thinking
  - Coordination
  - Pain Control
  - Appetite
  - Vomiting Reflex

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
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 studies are done on people with multiple conditions and therefore subject to many confounding variables.


Different Kinds of Marijuana-Based Medicine

- Botanical cannabis (plant): “Medical Marijuana”
- Synthetic marijuana-derived medications available in U.S. for nausea/appetite stimulation:
  - Dronabinol (Marinol®)
  - Nabilone (Cesamet®)
- Other medication not available in U.S.:
  - Nabiximols (Sativex®) THC/cannabidiol mouth spray for pain relief, muscle spasms; currently being investigated by FDA

Medical Marijuana vs. THC Medications: Is Medical Marijuana Better?

- THC medications still have potential for psychoactive effects (making the patient “high”)
- There are chemicals in medical marijuana that moderate THC’s psychoactive effects
  - These chemicals are not present in medications
- Medical marijuana is cheaper
  - Not made/patented by pharmaceutical industry

SOURCE: Bostwick, 2012
Medical Marijuana vs. THC Medications:
Is Medical Marijuana Better?

• Smoked medical marijuana takes effect in minutes; THC medications take over an hour
  – Instant feedback allows users to take more if needed for relief
  – Due to rapid relief, may consume less if smoked
• When swallowed, THC absorption is more erratic, and less concentrated
  – THC effects more unpredictable and variable, possibly less effective

SOURCE: Bostwick, 2012

Medical Marijuana vs. THC Medications:
Are THC Medications Better?

• Medical Marijuana is not FDA approved
  – FDA approval assures that medications are effective, safe, and properly labeled
  – FDA cannot evaluate medical marijuana as a drug since it is a plant, not a standardized medical formulation
  – Medical marijuana is different everywhere, depending on how it is bred, under what conditions it is grown, etc.
  – No way to know if medical marijuana is pure. Can be contaminated by pesticides, mold, fungus.

SOURCE: Kleber, 2012

Medical Marijuana vs. THC Medications:
Are THC Medications Better?

• Difficult to approve something that is smoked as “medicine”
  – Negative effects of smoking
  – Depending on type of marijuana, can undergo different types of chemical changes when burned
  – No standard measurement of dosage (inhalations vary by the individual, unlike tablets or capsules)

SOURCES: Kleber, 2012; TRI, 2012
Medical Marijuana vs. THC Medications

Advantages of Medical Marijuana | Advantages of THC Medications
--- | ---
Chemicals that moderate THC's 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

Why do People Use Medical Marijuana?

<table>
<thead>
<tr>
<th>REASON FOR USE</th>
<th>% REPORTING REASON</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pain Relief</td>
<td>82.6%</td>
</tr>
<tr>
<td>To Sleep</td>
<td>70.6%</td>
</tr>
<tr>
<td>To Relax</td>
<td>55.6%</td>
</tr>
<tr>
<td>Muscle Spasms</td>
<td>41.3%</td>
</tr>
<tr>
<td>Anxiety</td>
<td>38.1%</td>
</tr>
<tr>
<td>To Stimulate Appetite</td>
<td>38.0%</td>
</tr>
<tr>
<td>Nausea</td>
<td>27.7%</td>
</tr>
<tr>
<td>Depression</td>
<td>26.1%</td>
</tr>
</tbody>
</table>

SOURCE: Reinarman et al., 2011

Why do People Use Medical Marijuana?

<table>
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<tr>
<th>DISORDER THAT REQUIRES TREATMENT</th>
<th>% CITING AS REASON FOR MJ USE</th>
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<tbody>
<tr>
<td>Chronic Pain</td>
<td>58.2%</td>
</tr>
<tr>
<td>Mental Health Disorders</td>
<td>22.9%</td>
</tr>
<tr>
<td>Sleep Disorders</td>
<td>21.3%</td>
</tr>
<tr>
<td>Neurological Disorders</td>
<td>16.6%</td>
</tr>
<tr>
<td>HIV</td>
<td>1.6%</td>
</tr>
<tr>
<td>Cancer</td>
<td>1.5%</td>
</tr>
<tr>
<td>Glaucoma</td>
<td>1.3%</td>
</tr>
</tbody>
</table>

SOURCE: Reinarman et al., 2011
How do People Use Medical Marijuana?

- 67% of medical marijuana patients use the drug daily
- Over 86% smoke the drug

SOURCE: Reinarman et al., 2011
Marijuana Dispensaries
Don't Harsh Our Mellow, Dude

Marianne Ihlen

The unsweetened chocolate-flavored syrup has looked so innocent, like the sky, then I found it to be a mild sipping in my hotel room in Denver. I ambled off the road and then, when nothing happened, sipped some more. I figured it was just something, a giddily much-reduced opening Colorado in January. I took a few sniffs of pot Prohibition, a small taste of legal, edible pot from a local shop.

What could go wrong with a little bit of fun?

Everything, as it turned out.

Not at first. For an hour, I felt nothing. I figured I'd order dinner from room service and return to my maverick dreams of drugs, dissonance and indifference — or demand. But then I felt a heavy, somber mood settle over my head and brain. I barely made it from the desk to the bed, where I lay curled up in a hallucinatory state for the next eight hours. I was dizzy but couldn't move to get water. The room was filled with the smell of marijuana, and my eyes and head were knocked out. I didn't answer, let alone the police and have me arrested for being unable to handle my body.

Oklahoma Gov. Mary Fallin gives support to trial use of marijuana ingredient to help children

Oklahoma Gov. Mary Fallin is supporting legalization of a nonintoxicating component of marijuana on a limited, trial basis for use in treating children with rare conditions that cause seizures and strokes.
Medical Marijuana and Federal Law

• Controlled Substances Act (1970)
  – Marijuana is a Schedule I drug: “No currently accepted medical use”
  – No legal distinction between medical and recreational use
  • Up to 1 year in federal prison, $100,000 fine for first possession offense
  • Up to 5 years in federal prison, $250,000 fine for first manufacturing offense

SOURCE: Eddy, 2010

Medical Marijuana and Federal Law

• Supreme Court ruled that medical necessity is no excuse to break federal law (2001)

• FDA affirmed smoked marijuana is not considered medicine (2006)

SOURCE: Eddy, 2010

Marijuana and its Derivatives as Medicine: Federal Law

• Investigational New Drug Program
  – Individuals could apply for marijuana from the federal government
  – Under 100 patients given marijuana in program
  – Large numbers of people with HIV/AIDS applied
  – Program shut to new enrollees in 1992 due to high demand
  – Handful of people still getting drug through program today

SOURCE: Eddy, 2010
Medical Marijuana and State Law

- 18 states and the District of Columbia allow for the use of marijuana medically
  - Through votes in state legislatures
  - Through ballot measures

- An unconventional approach to making decisions about medicine
  - Only drug approved for medical use through political process rather than scientific trials and research

SOURCES: Eddy, 2010; Reinarman et al., 2011; Borgelt et al., 2013

Federal Law vs. State Law: What Does it Mean?

- Supreme Court ruled that federal marijuana laws have precedence over state law (2005)
- Can be charged with federal marijuana violations even if obeying state regulations
  - Case would have to be brought by federal authorities
  - Rare, but can/does happen
- Supreme Court ruled that federal government cannot investigate physicians just because they recommend marijuana (2002)

SOURCE: Eddy, 2010

Effects of Medical Marijuana Legalization

- Marijuana use is more common in states that have medical marijuana laws
  - It is unclear if higher rates of use are cause or effect of medical marijuana laws
- Rates of marijuana abuse and dependence are higher in states that have medical marijuana laws
  - Higher rates of abuse/dependence due to increased rates of use
  - No increase in rate of dependence among users

SOURCE: Cerda et al., 2012
The future of marijuana sales?