Marijuana Facts

- **Most commonly used illicit drug** (19.8 million past-month users) according to the 2013 National Survey on Drug Use and Health.

- Used by 81.0% of current illicit drug users (defined as having used a drug at some time in the 30 days before the survey) and the only drug used by 64.7% of them.

- In 2014: 11.7% of 8th-graders reported past-year use, and 6.5% were current users. 27.3% of 10th-graders reported past-year use, and 16.6% were current users. 35.1% of 12th-graders reported past-year use, and 21.2% were current users; 5.8% reported daily or near-daily use.

- Teens’ perceptions of the risks of marijuana use have steadily declined over the past decade, possibly related to increasing public debate about legalizing or loosening restrictions on marijuana for medicinal and recreational use.

NIH Publication Number 15-3859
Marijuana is one example of a "cannabinoid," but there are many others......

<table>
<thead>
<tr>
<th>Category</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plant (Phyto-</td>
<td>Plant leaves, flowers, stems, and seeds collected from the Cannabis sativa plant and ingested in some form (cigarettes, vapor)</td>
</tr>
<tr>
<td>cannabinoids</td>
<td></td>
</tr>
<tr>
<td>Endogenous</td>
<td>Made by the body: N-arachidonoylethanolamine or anandamide (AE) or 2-arachidonoylglycerol (2-AG).</td>
</tr>
<tr>
<td>Purified</td>
<td>Naturally occurring cannabinoids purified from plant sources: <strong>Cannabidiol (CBD)</strong>, D9-tetrahydrocannabinol (THC), and Sativex (THC/CBD mixture).</td>
</tr>
<tr>
<td>Synthetic</td>
<td>Synthesized in a laboratory: CB1 agonists (CPP-55, ACPA), CB2 agonists (JWH-133, NMP7, AM1241), CB1/CB2 nonselective agonist (CP55,940),</td>
</tr>
<tr>
<td></td>
<td>Ajulemic Acid (AJA), Nabilone, <strong>Dronabinol (Marinol)</strong>, and several other proprietary chemicals in development</td>
</tr>
</tbody>
</table>

adapted from: http://www.drugabuse.gov/drugs-abuse/marijuana/nida-research-therapeutic-benefits-cannabis-cannabinoids
Cannabinoids – Mechanism of Action

- Cannabinoid CB1 receptor
- Synaptic cleft
- Endogenous ligands: anandamide, 2-arachidonoylglycerol, palmitoylethanolamide
- Post-synaptic membrane
- Cytoplasm
- Inhibitory G-protein

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Brain's Chemical

Anandamide

Drug

THC
Marijuana’s Effects on the Brain

HYPOTHALAMUS
Controls appetite, hormonal levels and sexual behavior

BASAL GANGLIA
Involved in motor control and planning, as well as the initiation and termination of action

VENTRAL STRIATUM
Involved in the prediction and feeling of reward

AMYGDALA
Responsible for anxiety, emotion and fear

NEOCORTEX
Responsible for higher cognitive functions and the integration of sensory information

HIPPOCAMPUS
Important for memory and the learning of facts, sequences and places

CEREBELLUM
Center for motor control and coordination

BRAIN STEM AND SPINAL CORD
Important in the vomiting reflex and the sensation of pain

Research is Needed !!!!!!!!

"While the existing data show promise, **it is still too soon to tell whether and for whom CBD will be effective.** Like most medical treatments, it doesn’t seem to work for everyone. Much more research needs to be done, but it should be done quickly..... In short, CBD appears to be a safe drug with no addictive effects, and the preliminary data suggest that it may have therapeutic value for a number of medical conditions. Addressing barriers that slow clinical research with CBD would accelerate progress."

Nora Volkow, Director of the National Institute on Drug Abuse, Senate Testimony; http://www.drugabuse.gov/about-nida/noras-blog/2015/07/researching-marijuana-therapeutic-purposes-potential-promise-cannabidiol-cbd
"The recent anecdotal reports of positive effects of the marijuana derivative cannabidiol for some individuals with treatment-resistant epilepsy give reason for hope. However, we must remember that these are only anecdotal reports, and robust scientific evidence for the use of marijuana is lacking. The lack of information does not mean that marijuana is ineffective for epilepsy. It merely means that we do not know if marijuana is a safe and effective treatment for epilepsy, which is why it should be studied using the well-founded research methods that all other effective treatments for epilepsy have undergone. **Such safety concerns coupled with a lack of evidence of efficacy in controlled studies result in a risk/benefit ratio that does not support use of marijuana for treatment of seizures at this time.** Healthcare professionals, patients, and caregivers are reminded that use of marijuana for epilepsy may not be advisable due to this lack of information on safety and efficacy...."

What Products Are Available????

- Two FDA-approved drugs, **dronabinol** (synthetic THC; Marinol) and **nabilone** (a synthetic cannabinoid with a structure similar to THC; Cesamet), contain THC. They treat nausea caused by chemotherapy and increase appetite in patients with extreme weight loss caused by AIDS.

The United Kingdom, Canada, and several European countries have approved nabiximols (Sativex), a mouth spray containing THC and CBD. It treats muscle control problems caused by multiple sclerosis. The United States is conducting clinical trials.....

Although it has not yet undergone clinical trials, scientists have recently created Epidiolex, a CBD-based liquid drug to treat certain forms of childhood epilepsy. Epidiolex was developed by GW Pharmaceuticals and has been given to more than 400 children under the FDA’s expanded access (“compassionate use”) program.

http://www.drugabuse.gov/about-nida/noras-blog
**Cannabidiol (CBD)**

- One of more than 80 active cannabinoid chemicals in the marijuana plant
- Unlike THC, CBD does not produce euphoria or intoxication
- CBD has a very low affinity for cannabinoid receptors (100-fold less)
- CBD may acts on other brain signaling systems (serotonin??)
- CBD may have anti-seizure, antioxidant, neuroprotective, anti-inflammatory, analgesic, anti-tumor, anti-psychotic, anti-anxiety properties.
- NIH is currently supporting a number of studies effects as well as the health risks of cannabinoids.

http://www.drugabuse.gov/about-nida/noras-blog
BONANA
1/8 $55 1.2g $20

BIG FATTY
1/8 $55 1.2g $20

SILVER HAY
1/8 $50 1g $20
Marijuana and Increasing Potency

In the early 1990s, the average THC content in confiscated cannabis samples was roughly 3.7 percent for marijuana and 7.5 percent for sinsemilla (a higher potency marijuana from specially tended female plants).

In 2013, it was 9.6 percent for marijuana and 16 percent for sinsemilla.

Also, newly popular methods of smoking or eating THC-rich hash oil extracted from the marijuana plant (a practice called “dabbing”) may deliver very high levels of THC to the user.

The average marijuana extract contains over 50 percent THC, with some samples exceeding 80 percent. These trends raise concerns that the consequences of marijuana use could be worse than in the past, particularly among new users or in young people, whose brains are still developing.

NIH Publication Number 15-3859
MARIJUANA MAY HURT THE DEVELOPING TEEN BRAIN

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

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

HEAVY MARIJUANA USE BY TEENS IS LINKED TO:

**Educational Outcomes**
- lower grades and exam scores
- less likely to enroll in college
- less likely to graduate from HS or college

**Life Outcomes**
- lower satisfaction with life
- more likely to earn lower income
- more likely to be unemployed

NIH National Institute on Drug Abuse


Courtesy: Dr. D. Yurgelun-Todd
Marijuana and Dependence.....

It is estimated that 9 percent of people who use marijuana will become dependent on it.

The number goes up to about 17 percent in those who start using young (in their teens) and to 25 to 50 percent among daily users.

According to the 2013 NSDUH, marijuana accounted for 4.2 million of the estimated 6.9 million Americans dependent on or abusing illicit drugs.

**Marijuana addiction is linked to a mild withdrawal syndrome** (i.e., irritability, mood and sleep difficulties, decreased appetite, cravings, restlessness, and/or various forms of physical discomfort that peak within the first week after quitting and last up to 2 weeks).

NIH Publication Number 15-3859
Marijuana and Pregnancy......

Marijuana use during pregnancy is linked to increased risk of both brain and behavioral problems in babies. If a pregnant woman uses marijuana, the drug may affect certain developing parts of the brain of the unborn child. Resulting challenges for the child may include problems with attention, memory, and problem-solving.

For additional information, see NIH Publication Number 15-3859
Marijuana and Mental Illness

Several studies have linked marijuana use to increased risk for mental illnesses, including psychosis (schizophrenia), depression, and anxiety, but whether and to what extent it actually causes these conditions is not always easy to determine.

Genetic variants........

For additional information, see NIH Publication Number 15-3859
Drug Interactions
Adverse Consequences of Marijuana Use

Acute (present during intoxication)
- Impaired short-term memory
- Impaired attention, judgment, and other cognitive functions
- Impaired coordination and balance
- Increased heart rate
- Anxiety, paranoia
- Psychosis (uncommon)

Persistent (lasting longer than intoxication, but may not be permanent)
- Impaired learning and coordination
- Sleep problems

Long-term (cumulative effects of repeated use)
- Potential for addiction
- Potential loss of IQ
- Increased risk of chronic cough, bronchitis
- Increased risk of schizophrenia in vulnerable people*
- Potentially increased risk of anxiety, depression, and amotivational syndrome*

*These are often reported co-occurring symptoms/disorders with chronic marijuana use. However, research has not yet determined whether marijuana is causal or just associated with these mental problems.
Recommended Reading......

NIH Publication Number 15-3859
(http://www.drugabuse.gov/publications/research-reports/marijuana/letter-director)

http://www.drugabuse.gov/publications/research-reports/marijuana/marijuana-addictive

https://www.aesnet.org/clinical_resources/medical%20marijuana