



National Institute
on Drug Abuse

DrugFacts

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Marijuana

What is marijuana?



Photo by NIDA

Marijuana refers to the dried leaves, flowers, stems, and seeds from the hemp plant, *Cannabis sativa*. The plant contains the mind-altering chemical *delta-9-tetrahydrocannabinol* (THC) and other related compounds. Extracts can also be made from the cannabis plant (see "Marijuana Extracts" on page 2).

Marijuana is the most commonly used illicit drug in the United States.¹ Its use is widespread among young people. In 2015, more than 11 million young adults ages 18 to 25 used marijuana in the past year.¹ According to the [Monitoring the Future survey](#), rates of marijuana use

among middle and high school students have dropped or levelled off in the past few years after several years of increase. However, the number of young people who believe marijuana use is risky is decreasing.²

Legalization of marijuana for medical use or adult recreational use in a growing number of states may affect these views. Read more about marijuana as medicine in our [DrugFacts: Is Marijuana Medicine?](#)

How do people use marijuana?

People smoke marijuana in hand-rolled cigarettes (*joints*) or in pipes or water pipes (*bongs*). They also smoke it in *blunts*—emptied cigars that have been partly or completely refilled with marijuana. To avoid inhaling smoke, some people are using vaporizers. These devices pull the active ingredients (including THC) from the marijuana and collect their vapor in a storage unit. A person then inhales the vapor, not the smoke. Some vaporizers use a marijuana liquid extract.



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People can mix marijuana in food (*edibles*), such as brownies, cookies, or candy, or brew it as a tea. A newly popular method of use is smoking or eating different forms of THC-rich resins (see "Marijuana Extracts" on page 2).

Marijuana Extracts

Smoking THC-rich resins extracted from the marijuana plant is on the rise. People call this practice *dabbing*. They are using various forms of these extracts, such as:

- *hash oil* or *honey oil*—a gooey liquid
- *wax* or *budder*—a soft solid with a texture like lip balm
- *shatter*—a hard, amber-colored solid

These extracts can deliver extremely large amounts of THC to the body, and their use has sent some people to the emergency room. Another danger is in preparing these extracts, which usually involves butane (lighter fluid). A number of people have caused fires and explosions and have been seriously burned from using butane to make extracts at home.

How does marijuana affect the brain?

Marijuana has both short-and long-term effects on the brain.

Short-Term Effects

When a person smokes marijuana, THC quickly passes from the lungs into the bloodstream. The blood carries the chemical to the brain and other organs throughout the body. The body absorbs THC more slowly when the person eats or drinks it. In that case, he or she generally feels the effects after 30 minutes to 1 hour.

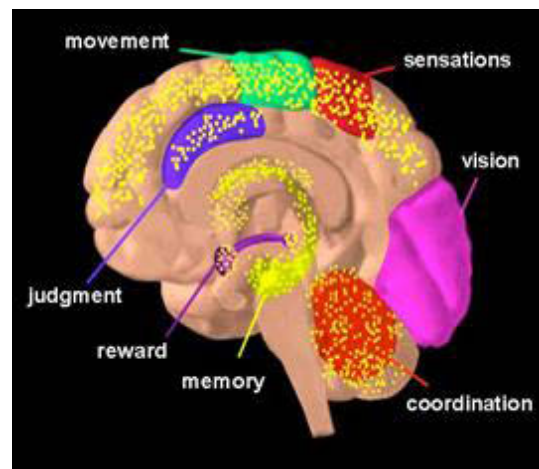
THC acts on specific brain cell receptors that ordinarily react to natural THC-like chemicals. These natural chemicals play a role in normal brain development and function.

Marijuana overactivates parts of the brain that contain the highest number of these receptors. This causes the "high" that people feel. Other effects include:

- altered senses (for example, seeing brighter colors)
- altered sense of time
- changes in mood
- impaired body movement
- difficulty with thinking and problem-solving
- impaired memory

Long-Term Effects

Marijuana also affects brain development. When people begin using marijuana as teenagers, the drug may reduce thinking, memory, and learning functions and affect how the brain builds



THC acts on numerous areas in the brain (in yellow).

Image by NIDA

connections between the areas necessary for these functions. Marijuana's effects on these abilities may last a long time or even be permanent.

For example, a study from New Zealand conducted in part by researchers at Duke University showed that people who started smoking marijuana heavily in their teens and had an ongoing marijuana use disorder lost an average of 8 IQ points between ages 13 and 38. The lost mental abilities didn't fully return in those who quit marijuana as adults. Those who started smoking marijuana as adults didn't show notable IQ declines.³ However, recent results from two studies on twins didn't support a causal relationship between marijuana use and IQ loss. Those who used marijuana did show a significant decline in verbal ability (equivalent to 4 IQ points) and in general knowledge between the preteen years and early adulthood. However, no predictable difference was found between twins when one used marijuana and one didn't. This suggests that the IQ decline may be caused by shared familial factors (e.g., genetics, family environment), and not by marijuana use itself.⁴

A Rise in Marijuana's THC Levels

The amount of THC in marijuana has been increasing steadily over the past few decades.⁵ For a person who is new to marijuana use, this may mean exposure to higher THC levels with a greater chance of a harmful reaction. Higher THC levels may explain the rise in emergency room visits involving marijuana use.

The popularity of edibles also increases the chance of harmful reactions. Edibles take longer to digest and produce a high. Therefore, people may consume more to feel the effects faster, leading to dangerous results.

Higher THC levels may mean a greater risk for addiction if people are regularly exposing themselves to high doses.

What are the other health effects of marijuana?

Marijuana use may have a wide range of effects, both physical and mental.

Physical Effects

- **Breathing problems.** Marijuana smoke irritates the lungs, and people who smoke marijuana frequently can have the same breathing problems as those who smoke tobacco. These problems include daily cough and phlegm, more frequent lung illness, and a higher risk of lung infections. Researchers still don't know whether people who smoke marijuana have a higher risk for lung cancer.
- **Increased heart rate.** Marijuana raises heart rate for up to 3 hours after smoking. This effect may increase the chance of heart attack. Older people and those with heart problems may be at higher risk.
- **Problems with child development during and after pregnancy.** Marijuana use during pregnancy is linked to lower birth weight⁶ and 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 fetus's brain. Resulting challenges for the child may include problems with attention,⁷ memory, and problem-solving.⁸ Some research also

suggests that moderate amounts of THC are excreted into the breast milk of nursing mothers.⁹ With regular use, THC can reach amounts in breast milk that could affect the baby's developing brain. More research is needed. Read our [Marijuana Research Report](#) for more information about marijuana and pregnancy.

Mental Effects

Long-term marijuana use has been linked to mental illness in some people, such as:

- temporary *hallucinations*—sensations and images that seem real though they are not
- temporary *paranoia*—extreme and unreasonable distrust of others
- worsening symptoms in patients with *schizophrenia* (a severe mental disorder with symptoms such as hallucinations, paranoia, and disorganized thinking)

Marijuana use has also been linked to other mental health problems, such as depression, anxiety, and suicidal thoughts among teens. However, study findings have been mixed.



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What are the effects of inhaling secondhand marijuana smoke?

Failing a Drug Test?

While it's possible to fail a drug test after inhaling secondhand marijuana smoke, it's unlikely. Studies show that very little THC is released in the air when a person exhales. Findings from studies suggest that, unless people are in an enclosed room, breathing in lots of smoke for hours, they aren't likely to fail a drug test.^{12,13} Even if some THC were found in the blood, it wouldn't be enough to fail a test.

Getting a Contact High?

Similarly, it's unlikely that secondhand marijuana smoke would give anyone a contact high. Studies have shown that if a person gets a contact high, it's also under extreme conditions (breathing in lots of marijuana smoke for hours in an enclosed room).¹⁴

Other Health Effects?

More research is needed to know if secondhand marijuana smoke has similar health risks as secondhand tobacco smoke. A recent study on rats suggests that secondhand marijuana smoke

How Does Marijuana Affect a Person's Life?

Compared to those who don't use marijuana, those who use heavily more often report the following:

- lower life satisfaction
- poorer mental health
- poorer physical health
- more relationship problems

People also report less academic and career success. For example, marijuana use is linked to a higher likelihood of dropping out of school.¹⁰ It is also linked to more job absences, accidents, and injuries.¹¹

can do as much damage to the heart and blood vessels as secondhand tobacco smoke.¹⁵ But researchers haven't performed that study on humans. What they do know is that the toxins and tar found in marijuana smoke could affect vulnerable people, such as children or those with asthma.

Is marijuana a gateway drug?

Some research suggests that marijuana use is likely to come before use of other drugs.¹⁶ Marijuana use is also linked to addiction to other substances, including nicotine. In addition, animal studies show that the THC in marijuana makes other drugs more pleasurable to the brain.¹⁷

Although these findings support the idea of marijuana as a "gateway drug," the majority of people who use marijuana don't go on to use other "harder" drugs. Read more about marijuana as a gateway drug in our [Marijuana Research Report](#).

Can a person overdose on marijuana?

An [overdose](#) occurs when the person uses too much of a drug and has a toxic reaction that results in serious, harmful symptoms or death. There are no reports of teens or adults fatally overdosing (dying) on marijuana alone. However, people can feel some very uncomfortable side effects, especially when using marijuana with high THC levels. There are reports of people seeking treatment in emergency rooms, reporting unease and shaking, and in rare cases, an extreme psychotic reaction (such as anxiety, paranoia, or hallucinations).

While a nonfatal overdose can happen through any method of use, emergency room responders have seen a number of cases involving marijuana edibles. Some people (especially preteens and teens) who know very little about edibles don't realize that it takes longer for the body feel the effects. So they consume more of the edible, trying to get high faster or thinking they haven't taken enough. This can lead to an overdose. In addition, some babies and toddlers have been seriously ill after ingesting marijuana or marijuana edibles left around the house.

How can a marijuana overdose be treated?

Health care providers treat a marijuana overdose by:

- checking the person's heart rate and other vital signs
- in serious cases, giving a low-dose sedative for psychotic reactions (unless the person has also consumed alcohol, which shouldn't be mixed with sedatives)
- keeping an eye on the person until the effects fade

Can marijuana lead to a substance use disorder and addiction?

Marijuana can lead to the development of problem use, known as a *substance use disorder*, which takes the form of addiction in severe cases. Research suggests that 30 percent of those who use marijuana may develop some degree of marijuana use disorder.¹⁸ People who begin using marijuana before age 18 are four to seven times more likely than adults to develop a marijuana use disorder.¹⁹

Many people who use marijuana long term and are trying to quit report withdrawal symptoms that make quitting difficult. These include:

- grouchiness
- sleeplessness
- decreased appetite
- anxiety
- cravings

How can people get treatment for marijuana addiction?

Behavioral support has been effective in treating marijuana addiction. Examples include therapy and motivational incentives (providing rewards to patients who remain drug-free). No medications are currently available to treat marijuana cravings. Some specialists might provide medicines to treat other issues, such as anxiety and depression, that can accompany addiction. Continuing research may lead to new medications that help ease withdrawal symptoms, block the effects of marijuana, and prevent relapse.

Points to Remember

- Marijuana refers to the dried leaves, flowers, stems, and seeds from the hemp plant, *Cannabis sativa*.
- The plant contains the mind-altering chemical *delta-9-tetrahydrocannabinol* (THC) and other related compounds.
- People use marijuana by smoking, eating, drinking, and inhaling it.
- Smoking THC-rich extracts from the marijuana plant (a practice called *dabbing*) is on the rise.
- THC overactivates certain brain cell receptors, resulting in effects such as:
 - altered senses
 - changes in mood
 - impaired body movement
 - difficulty with thinking and problem-solving
 - impaired memory and learning
- Marijuana use may have a wide range of effects, both physical and mental, which include:
 - breathing illnesses
 - possible harm to a fetus's brain in pregnant women
 - hallucinations and paranoia
- The amount of THC in marijuana has been increasing steadily, creating more harmful effects.
- It's unlikely that a person will fail a drug test or get a "contact high" from inhaling secondhand marijuana smoke.
- A marijuana overdose doesn't lead to death but can cause some very uncomfortable side effects, such as unease and shaking and, in rare cases, an extreme psychotic reaction.
- Marijuana can lead to a substance use disorder, which takes the form of addiction in severe cases.
- Treatment for marijuana addiction includes forms of behavioral therapy. No medications currently exist for treatment.

Learn More

For more information about marijuana and marijuana use, visit our:

- [Marijuana webpage \(drugabuse.gov/drugs-abuse/marijuana\)](http://drugabuse.gov/drugs-abuse/marijuana)
- [Drugged Driving DrugFacts](#)

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