

# Cannabis Safety

Cannabis and the psychoactive cannabinoid, THC, both have an excellent safety profile. The Drug Awareness Warning Network Annual Report, published by the Substance Abuse and Mental Health Services Administration (SAMHSA), contains a statistical compilation of all drug deaths which occur in the United States. According to this report, there has never been a death recorded from the use of cannabis. Pharmacology expert and author Dr. Iverson explains the enormous doses that have been tested:

Laboratory animals (rats, mice, dogs and monkeys) can tolerate doses of up to 1000mg/kg. This would be equivalent to a 70-kg person swallowing 70g of the drug-about 5,000 times more than is required to produce a high. Despite widespread illicit use of cannabis, there are very few if any instances of people dying from an overdose.

DEA Chief Administrative Law Judge, Francis Young, in response to a petition to reschedule cannabis under federal law concluded in 1988 that, "In strict medical terms marijuana is far safer than many foods we commonly consume.... Marijuana in its natural form is one of the safest therapeutically active substances known to man. By any measure of rational analysis marijuana can be safely used within the supervised routine of medical care."

More than a decade later, Institute of Medicine investigators considered the physiological risks of using cannabis and concluded that "Marijuana is not a completely benign substance. It is a powerful drug with a variety of effects. However, except for the harms associated with smoking, the adverse effects of marijuana use are within the range of effects tolerated for other medications."

Since the IOM report, research on the long-term effects of smoking cannabis that studied thousands of users over decades has shown that smoking moderate amounts of cannabis (equivalent to a joint a day) has no negative effects on lung function, even in those who have consumed more than 10,000 joints.

## Toxicity, Risk of Overdose

Cannabis has an extraordinarily high estimated lethal dose, equivalent to smoking approximately 1,500 pounds in 15 minutes, a physical impossibility. Scientists have had to estimate the LD50, or Lethal Dose for 50% of the human population, because it has never been demonstrated. This puts cannabis in a class of its own, since even relatively safe medications such as aspirin have a lethal dose. Dr. Grinspoon had this to say in a 1995 article in the Journal of the American Medical Association:

One of marijuana's greatest advantages as a medicine is its remarkable safety. It has little effect on major physiological functions. There is no known case of a lethal overdose; on the basis of animal models, the ratio of lethal to effective dose is estimated as 40,000 to 1. By comparison, the ratio is between 3 and 50 to 1 for secobarbital and between 4 and 10 to 1 for ethanol. Marijuana is also far less addictive and far less subject to abuse than many drugs now used as muscle relaxants, hypnotics, and analgesics. The chief legitimate concern is the effect of smoking on the lungs. Cannabis smoke carries even more tars and other particulate matter than tobacco smoke. But the amount smoked is much less, especially in medical use, and once marijuana is an openly recognized medicine, solutions may be found; ultimately a technology for the inhalation of cannabinoid vapors could be developed.

That technology Dr. Grinspoon envisioned is now readily available in the form of vaporizing devices, manufactured by many companies. And, as mentioned previously, recent research on the rate of lung cancer and pulmonary diseases among even heavy cannabis smokers has revealed that they have no greater risk of lung cancer, obstructive pulmonary disease, or other adverse effects on pulmonary function than those who smoke nothing at all.

However, cannabis should not be considered a harmless substance. Cannabis has a number of physiological effects, such as rapid heart rate and dilation of the blood vessels, that in limited cases could be hazardous, particularly for those with pre-existing cardiac conditions. These adverse effects are within the range tolerated for most FDA-approved medications, and tend to dissipate with continued use.

As Dr. Grinspoon observes, “The greatest danger in medical use of marijuana is its illegality, which imposes much anxiety and expense on suffering people, forces them to bargain with illicit drug dealers, and exposes them to the threat of criminal prosecution.”

## **The Acute Effects of Cannabis**

The acute, or short-term, effects of cannabis may begin when the drug is first taken, if it is inhaled, or within an hour or more if ingested as an edible. Effects can last between one and three hours, longer if taken as edibles. Individual response varies, depending upon both the individual, the situation in which it is taken, and whether cannabis is ingested or inhaled. Short-term effects from using herbal cannabis may include: coughing or wheezing if cannabis is inhaled, euphoria, dry mouth, reddening of the eyes, increased appetite, blurred vision, dizziness, headache, delayed motor reactions, sedation, and anxiety. Many of the psychoactive effects will decrease with prolonged use. In most cases, side effects are mild, well tolerated, and can be controlled with careful titration or dose management.

In rare cases, usually as a result of consuming large doses of cannabis in food or drink, individuals may experience acute complications such as anxiety attacks, temporary psychosis, or convulsions. Referred to in medical literature as marijuana psychosis, it can be severe enough to compel admission to an emergency hospital.

## **Effects of Prolonged Use of Cannabis**

Cannabis is a psychoactive drug, and legitimate concerns have been raised about the effects of prolonged use. Although cannabis remains a prohibited substance, tightly controlled even for medical research purposes, the FDA has approved synthetic derivatives of cannabis' psychoactive cannabinoid, THC, and classified them as Schedule III drugs with less likelihood of creating dependency than many other medications.

In considering the consequences of cannabis use, the Institute of Medicine concluded in 1999 that these concerns fall into two categories: the effects of chronic smoking of cannabis and the effects of THC.

## **Side Effects of Cannabis**

Based on thousands of years of use, anecdotal reports, and extensive research, we know that cannabis is one of the safest medicines: it is impossible to consume enough to produce a fatal toxic effect in the body. However, if you are unfamiliar with its use, you should familiarize yourself with the side effects prior to use so that you can use it effectively.

## **Uneasiness**

Cannabis usually has a soothing and comforting effect on the mind, and many use it to manage anxiety. Sometimes, however, people can experience feelings of anxiety while using cannabis. If this happens to you, there are several things you can do. Try to stay in environments where you feel naturally comfortable. If you feel anxious, sit or lie down, breathe deeply, and relax. If you have loved ones with you, hold each other for a while. If you have a pet, hold or stroke it. Eating food will often quickly reduce the feeling of anxiety. Next time you use it, try reducing your dosage. Because of the social stigma related to getting high, you may have feelings of guilt. Understand that “high” or intoxicated feelings related to cannabis

consumption are a side effect of using cannabis, much like the side effects of many other pharmaceutical drugs. Know that you have a right to your medicine.

### **Hunger and Thirst**

Many patients use cannabis to stimulate appetite. If you are not using cannabis for this purpose, try to drink water or all-natural juices to avoid unnecessary weight gain. If you wish to eat, choose healthy and nourishing food rather than sweets.

### **Redness in the Eyes**

Red eyes are a normal side effect related to cannabis use. It will not hurt you. If you feel insecure, or if you must go out in public and are concerned about others' reaction to the redness, try using eye drops like Visine or wearing sunglasses.

### **Drowsiness**

If cannabis makes you sleepy, try scheduling your medicating around situations that require you to be alert. Taking a nap or relaxing may help you regain energy. As with all medicines that can produce drowsiness, don't drive or operate heavy machinery until you know how cannabis affects you.

### **Sleeplessness**

If you find that you can't sleep for a while after using cannabis, try reducing your dosage or avoid medicating right before bed. If you need to medicate before going to bed, give yourself two hours or so before you normally sleep.

### **Short-term Memory Loss**

Sometimes people have a hard time with recalling short term memories when using cannabis. Some people may find it difficult to carry on a complicated conversation, keep track of details, or perform complex tasks. If this happens to you, schedule complicated tasks and give yourself some leeway when medicating before-hand. These effects are limited to actively using cannabis.

### **Feelings of Euphoria**

When you start medicating with cannabis, you may find that events or situations that wouldn't normally seem funny become quite amusing. This is a side effect most people enjoy, however if you must deal with situations where humor would be inappropriate, avoid medicating immediately before.

### **Hazards of Smoking Cannabis**

Because cannabis smoke shares many of the same dangerous compounds found in tobacco smoke, concerns have been raised that smoking cannabis can lead to the same increased risk of lung cancer and other chronic respiratory diseases found in tobacco smokers. However, the research done to date indicates that the long term health consequences of cannabis smoking are considerably less serious, if not negligible.

Population studies have found mild lung function changes in heavy cannabis smokers and long-term heavy use may generate symptoms of bronchitis, including wheezing, production of phlegm and chronic cough. More study is required to determine any causal relationship between smoked cannabis and the development

of respiratory infections, but anyone needing large or frequent doses may benefit from choosing alternative delivery methods, especially if they smoke tobacco.

While many have historically maintained that heavy cannabis smokers are at higher risk of contracting cancer, new research casts doubt on these claims. Studies at the cellular and molecular level have suggested that chemicals in smoked cannabis may cause cancer; however, new evidence indicates that cannabinoids themselves may decrease the cancer-causing effect of the carcinogens typically inhaled from smoking cannabis, preventing cancers from developing. That prophylactic effect makes cannabis smoke inherently less dangerous than tobacco smoke, even though they contain some similar chemicals.

In 2006, the results of a five year, case-controlled investigation—the largest study of its kind—unexpectedly found that smoking cannabis, even regularly and heavily, does not lead to lung cancer or other types of head, neck or throat cancers. Lead investigator Dr. Donald Tashkin, chief of pulmonary medicine at UCLA medical school, speculated on the basis of other research that cannabis may contain key components that regulate aging cells and keep them from becoming cancerous. Dr. Tashkin's findings reaffirm the results of prior case-control studies dismissing a causal link between cannabis use and certain types of lung and upper aerodigestive tract (UAT) cancers. Other studies have found significant differences between the health effects of cannabis and tobacco smoking. Even heavy smokers of cannabis do not have an increased rate of Obstructive Pulmonary Disease, a common affliction for tobacco smokers, and the rate of head, neck and throat cancers, common problems for tobacco smokers, is considerably lower among moderate cannabis smokers than among those who smoke nothing at all.

To avoid smoke inhalation, cannabis can be used with a vaporizer, orally in baked goods and other food products, in oral sprays, or in a suppository. No data exists suggesting that orally ingested cannabis may cause cancer.

## **Effects on Cognition**

Cannabis use can temporarily impair cognition involving short-term memory, performance, attention and concentration among long-term heavy smokers. While some studies have suggested that deficits in attention and memory occur more often with heavy cannabis use, and that these deficits can extend beyond the period of intoxication, a 2003 meta-analysis of the 15 relevant studies on non-acute effects found that “there might be decrements in the ability to learn and remember new information in chronic users,” but “other cognitive abilities are unaffected.” The researchers note that, despite their expectations to the contrary, all studies done to date have “failed to demonstrate a substantial, systematic, and detrimental effect of cannabis use on neuropsychological performance.”

## **Effects on psychomotor performance**

The most common types of psychomotor functions impaired by cannabis use include body sway, hand steadiness, a test of motor skill performance involving tracking a rotating target, driving and flying simulation, divided attention, sustained attention, and the digit-symbol substitution test, which involves remembering symbols arbitrarily matched to numbers. The effects are generally short-lived and do not appear to persist over the long-term, that is when not using cannabis. Research clearly indicates that cannabis use impairs psychomotor performance, and studies have shown that those unaccustomed to cannabis use are less able to compensate for its effects. With prolonged use, many people develop ways of compensating that mitigate the effects. No one using cannabis should drive or operate dangerous machinery if they feel intoxicated.

## **Effects on the immune system**

The effects of cannabis use on the immune system are not yet fully understood. The discovery of CB-2 receptors in the various cell types of the immune system has excited interest in the interaction of

cannabinoids and immune function. Several pharmaceutical companies have expressed interest in developing CB-2-selective drugs which might have utility as immunosuppressants, or in the treatment of arthritis, multiple sclerosis and other autoimmune disorders.

People living with AIDS may experience opportunistic bacterial and fungal infections associated with exposure to pathogens from contaminated cannabis material, according to one study. Yet there is no evidence that the long-term use of cannabis renders users more susceptible to bacterial or additional viral infections. Recent studies have shown cannabis use has no adverse effect on immune function for people living with HIV/AIDS. A 2003 randomized, placebo-controlled clinical trial demonstrated that cannabis did not affect HIV RNA levels, CD4+ and CD8+ cell counts, or protease inhibitor levels. In another randomized, placebo-controlled study, the administration of oral THC or smoked cannabis did not significantly alter pharmacokinetic properties of the protease inhibitors tested and had no effect on antiretroviral efficacy.

In fact, as mentioned in the earlier section on HIV, a 2012 study found that cannabinoids can strengthen immune function. Researchers demonstrated CB2 activation has an anti-viral effect on CD4+ T cells, reducing cell-to-cell HIV infection up to 50%. The authors of that study suggest that the therapeutic use of cannabinoids may help fight the spread of the virus to uninfected T cells in late stages of HIV-1 infection. Other research has shown that cannabinoid drugs reduce viral load in an animal model of HIV.