



Marijuana Policy Project
236 Massachusetts Ave. NE, Suite 400
Washington, DC 20002
p: (202) 462-5747 • f: (202) 232-0442
info@mpp.org • www.mpp.org

"We change laws."

Marijuana and DUI Laws: How Can We Best Guard Against Impaired Driving?

How do laws against driving under the influence of marijuana work?

Blood testing seems to be the only reliable method to determine the actual level of THC in the body, since urine tests cannot show that a person has recently used marijuana. Depending on quantity and strength, a single dose of THC produces metabolites in urine that last for at least 12 days — long after the psychoactive effects of the substance have worn off.¹ However, the key is not necessarily to know the exact level of THC in a driver's bloodstream, but whether or not the driver is impaired and thus incapable of safely operating a motor vehicle.

What is the threshold for considering a driver to be impaired by marijuana?

It is unclear what blood level of THC (the main psychoactive ingredient in marijuana) constitutes actual impairment. Most credible scientists working on the issue acknowledge the difficulty of pegging THC impairment to a number (in a way similar to drunk driving laws), and epidemiological evidence on the risk of accidents associated with marijuana is much less conclusive than data regarding alcohol.

The most meaningful recent study measuring driver "culpability" (i.e., who is at fault) in 3,400 crashes over a 10-year period indicated that drivers with THC concentrations of less than five ng/mL in their blood have a crash risk no higher than that of drug-free users.² The crash risk begins to rise above the risk for sober drivers when a marijuana user's THC concentrations in whole blood³ reach five to 10 ng/mL.

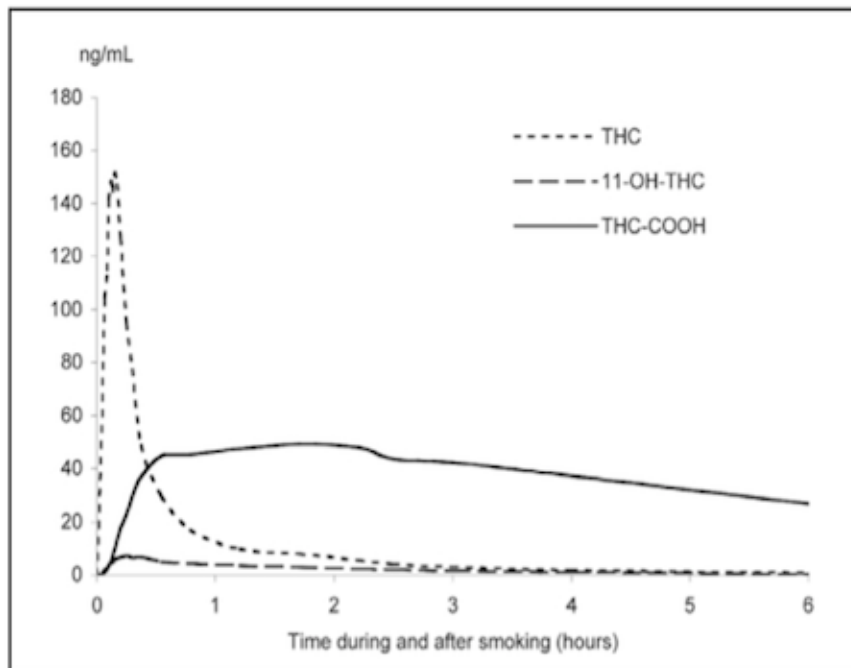
How long does it take for the psychoactive effects of marijuana to wear off?

Because smoked THC is rapidly transferred into the blood stream, THC levels in the blood rise quickly immediately after inhalation. Depending on the dose, THC typically reaches peak concentrations of more than 100 ng/mL five to 10 minutes after inhalation and then rapidly decreases to between one and four ng/mL within three to four hours.

However, heavy marijuana users' blood can contain detectable amounts of THC even after periods of abstinence. In one controlled study, six of 25 participants tested positive for active levels of THC after a full seven days of abstinence, with the highest concentration detected being three ng/mL of whole blood.⁴ In addition, the blood serum of heavy to moderate users may contain more than two ng/mL of THC at 24 or even 48 hours after smoking a single joint, a level that studies have shown does not produce impairment.⁵

This is a particular concern for medical marijuana patients who are using marijuana in compliance with state laws and their doctors' advice, but who would likely test positive for marijuana while sober. While the Colorado Legislature debated a *per se* THC limit of five ng/ml, *Denver News'* medical marijuana reviewer (and medical marijuana patient), William Breathes, subjected himself to blood draws to test his THC levels. After a 15-hour period of abstinence, Mr. Breathes' THC levels were still 13.5 ng/ml. According to his physician, Mr. Breathes was in "no way incapacitated" at the time.⁶ This first-person account demonstrates the very real possibility that medical marijuana patients and other heavy marijuana users could face criminal charges under a *per se* system even if they are not actually impaired.

The graphic below shows the mean plasma levels of THC and its metabolites (11-OH-THC and THCCOOH) for six subjects smoking a marijuana cigarette containing 34 mg of THC, following several days of abstinence (which would reflect an occasional user's pattern of usage).⁷



Additionally, several studies show that exposure to secondhand marijuana smoke (which could result from being in the same room with a person who is using marijuana) may cause a non-user to show THC concentrations in blood serum of several nanograms per milliliter.⁸

Does this mean that some DUID laws may actually criminalize sober drivers?

Yes, if they set a *per se* limit for THC. Furthermore, arresting and convicting motorists who only have marijuana metabolites in their systems (from having used marijuana days or weeks before) will certainly cause people who are completely sober to be arrested and wrongly convicted of driving under the influence of drugs.

The standard for scientists is to test blood and urine, but what about other bodily fluids, like saliva, or performance-based tests?

Because of the invasiveness of blood tests and the inadequacy of urine tests in determining impairment on the roadside (i.e., actual THC levels), police officials hope to institute roadside saliva testing in the near future. However, the technology for reliably testing saliva is still unavailable, and there are no national standards for testing saliva, as there are with blood and urine.

Significant work is being done to develop and implement modified field sobriety tests, which measure the behavior of drivers (reaction time, for example), rather than their bodily fluids.

MPP recommends a policy similar to most state laws on driving under the influence of alcohol: A driver who fails a roadside sobriety test should be required to submit to a blood test by a trained medical professional — or risk criminal and administrative sanctions. However, given the length of time after impairment THC can stay in a person's system, no conviction for driving under the influence of marijuana should be based on a *per se* limit.

¹ B. Law, et al., "Forensic aspects of the metabolism and excretion of cannabinoids following oral ingestion of cannabis resin," *Journal of Pharmacy and Pharmacology*, 1984, 36(5), pp. 289-94.

² O.H. Drummer, et al., "The involvement of drugs in drivers of motor vehicles killed in Australian road traffic crashes," *Accident Analysis and Prevention*, 2004, 36, pp. 239-48.

³ "When reporting THC levels in blood or adopting legal limits one must always specify the reference fluid ... For THC, concentrations measured in whole blood are typically 1.6-2.2 times lower than those measured in blood or plasma. For example, 5 ng/mL of THC in whole blood correspond to about 10 ng/mL in serum or plasma." (F. Grotenhermen, et al., "Testing for Impairment by Cannabis," 2004.)

⁴ Erin L. Karschner et al., "Do Δ^9 -Tetrahydrocannabinol Concentrations Indicate Recent Use in Chronic Cannabis Users?," *Addiction*, 2009, 104(12), pp. 2041-2048.

⁵ G. Skopp, et al., "Serum cannabinoid levels 24 to 48 hours after cannabis smoking," *Archiv für Kriminologie* [German publication], 2003, 212(3-4), pp. 83-95.

⁶ William Breathes, "THC blood test: Pot critic William Breathes nearly 3 times over proposed limit when sober," *Denver News*, April 18, 2011.

⁷ Huestis, et al., "Absorption of THC and formation of 11-OH-THC and THC-COOH during and after smoking marijuana," *Journal of Analytical Toxicology*, 1992, 16, pp. 276-82.

⁸ E.J. Cone, et al., "Contact highs and urinary cannabinoid excretion after passive exposure to marijuana smoke," *Clinical Pharmacology and Therapeutics*, 1986, 40, pp. 247-256.