

# Marijuana Use and Highway Safety

**David Randall Peterman**

Analyst in Transportation Policy

May 14, 2019

Congressional Research Service

7-....

[www.crs.gov](http://www.crs.gov)

R45719



## Marijuana Use and Highway Safety

A growing number of Americans report that they use marijuana. Most states now allow the use of marijuana for treatment of medical conditions. Ten states and the District of Columbia, representing a quarter of the U.S. population, have decriminalized the recreational use of marijuana, and other states are considering following suit.

As the opportunity for legal use of marijuana grows, there is concern about the impact of marijuana usage on highway safety. In a 2018 survey, the majority of state highway safety officers considered drugged driving an issue at least as important as driving while impaired by alcohol (which is associated with over 10,000 highway deaths each year). As of May 2019, 18 states have enacted laws declaring that a specified concentration of THC in a driver's body constitutes evidence of impairment and is inherently illegal (referred to as *per se* laws), similar to the .08% blood alcohol content (BAC) standard of alcohol impairment.

Advocates of loosening restrictions on marijuana often compare marijuana usage to drinking alcohol, which may contribute to some stakeholders viewing marijuana use and driving as similar to alcohol's impairment of driving. Research studies indicate that marijuana's effects on drivers' performance may vary from the effects of alcohol, in ways that challenge dealing with marijuana impairment and driving similarly to alcohol-impaired driving.

Alcohol is a nervous system depressant that is absorbed into the blood and metabolized by the body fairly quickly, such that there is little trace of alcohol after 24 hours. Its impairing effects have been extensively studied over many decades, and the association between levels of alcohol consumption and degrees of impairment is well-established. By contrast, marijuana is a nervous system stimulant. It contains over 500 chemical compounds, only one of which, tetrahydrocannabinol (THC), is significantly psychoactive. Its effects are felt quickly after smoking, but more slowly when consumed in other forms (e.g., in food). It is metabolized quickly, but the body can store THC in fat cells, so that traces of THC can be found up to several weeks after consumption. Its impairing effects have been the subject of limited study, due in part to its status as a controlled substance under federal law.

Although laboratory studies have shown that marijuana consumption can affect a person's response times and motor performance, studies of the impact of marijuana consumption on a driver's risk of being involved in a crash have produced conflicting results, with some studies finding little or no increased risk of a crash from marijuana usage. Levels of impairment that can be identified in laboratory settings may not have a significant impact in real world settings, where many variables affect the likelihood of a crash occurring. Research studies have been unable to consistently correlate levels of marijuana consumption, or THC in a person's body, and levels of impairment. Thus some researchers, and the National Highway Traffic Safety Administration, have observed that using a measure of THC as evidence of a driver's impairment is not supported by scientific evidence to date.

Congress, state legislatures, and other decisionmakers may address the topic of marijuana use and driver impairment through various policy options, including whether or not to support additional research on the impact of marijuana on driver performance and on measurement techniques for marijuana impairment, as well as training for law enforcement on identifying marijuana impairment. Other deliberations may address federal regulations on marijuana use and testing for transportation safety-sensitive employees.

**R45719**

May 14, 2019

**David Randall Peterman**  
Analyst in Transportation  
Policy  
-redacted-@crs.loc.gov

For a copy of the full report,  
please call 7-.... or visit  
[www.crs.gov](http://www.crs.gov).

## **Contents**

Introduction .....	1
Patterns of Marijuana Use .....	1
What Is Impaired Driving? .....	3
Detecting Impairment.....	3
Marijuana’s Impact on Driver Crash Risk.....	4
Studies of Crash Risk Associated With Marijuana Usage.....	5
Law Enforcement .....	6
Tests for Marijuana Use .....	7
State Laws Regarding Marijuana and Impaired Driving.....	8
Federal Regulations Governing Testing for Drug Use .....	9
Options for Congress.....	10

## **Tables**

Table 1. State Laws Regarding Marijuana and Impaired Driving as of February 2018 .....	8
--	---

## **Contacts**

Author Contact Information .....	11
----------------------------------	----

## Introduction

A growing number of Americans report that they use marijuana. As more states decriminalize the use of marijuana, the question of what impact marijuana usage has on the risk of a driver being involved in a motor vehicle crash has become more pertinent. In a survey, the majority of state highway safety offices rated drugged driving an issue at least as important as driving while impaired by alcohol.<sup>1</sup>

When faced with the issue of driver impairment due to marijuana, some stakeholders tend to approach the issue using the analogy of driver impairment due to alcohol. However, there are important differences between the two substances. The fact that alcohol reduces a user's ability to think clearly and to perform physical tasks has been known for decades. Extensive research has established correlations between the extent of alcohol consumption and impairment, including drivers' reaction times. Much less research has been done on marijuana. Marijuana is a more complex substance than alcohol. It is absorbed in the body differently from alcohol; it affects the body in different ways from alcohol; tests for its presence in the body produce more complicated results than tests for the presence of alcohol; and correlating its effects with its levels in the body is much more complicated than for alcohol.

That marijuana usage increases a driver's risk of crashing is not clearly established. Studies of marijuana's impact on a driver's performance have thus far found that, while marijuana usage can measurably affect a driver's performance in a laboratory setting, that effect may not translate into an increased likelihood of the driver being involved in a motor vehicle crash in a real-world setting, where many other variables affect the risk of a crash. Some studies of actual crashes have estimated a small increase in the risk of crash involvement as a result of marijuana usage, while others have estimated little or no increase in the likelihood of a crash from using marijuana.

This CRS report addresses various aspects of the issue of marijuana-impaired driving, including patterns of marijuana use, the relationship and detection of marijuana use and driver impairment, and related state law and law enforcement challenges. The report also references the congressionally required July 2017 report by the Department of Transportation's National Highway Traffic Safety Administration (NHTSA), *Marijuana-Impaired Driving: A Report to Congress*<sup>2</sup> (hereinafter referred to as NHTSA's 2017 Marijuana-Impaired Driving Report to Congress), as well as other studies and research.

## Patterns of Marijuana Use

Marijuana is a variety of the *Cannabis sativa* plant, and contains hundreds of chemical compounds. Two significant compounds found in marijuana are tetrahydrocannabinol (THC), the primary psychoactive compound, and cannabidiol (CBD); CBD is being tested for medicinal purposes, and is not itself psychoactive.

Marijuana use has been recorded for millennia. In the 20<sup>th</sup> century, the sale, possession, and use of marijuana were made illegal in most countries, including the United States. In recent years,

<sup>1</sup> Governor's Highway Safety Association, *Drug-Impaired Driving: Marijuana and Opioids Raise Critical Issues for States*, May 2018, p. 5. "Drugged driving" includes driving while under the influence of marijuana and other controlled substances as well as prescription medications.

<sup>2</sup> Richard Compton, National Highway Traffic Safety Administration, *Marijuana-Impaired Driving—A Report to Congress*, July 2017, DOT HS 812 440, <https://www.nhtsa.gov/.../812440-marijuana-impaired-driving-report-to-congress.pdf>. Required by Section 4008 of P.L. 114-94.

however, the trend appears to be moving toward acceptance of marijuana usage. In public opinion polls, the percentage of Americans favoring legalization of marijuana has increased significantly.<sup>3</sup> As of May 2019 33 states and the District of Columbia have enacted laws legalizing marijuana use under certain conditions, generally for medicinal purposes.<sup>4</sup> Since Colorado and Washington State legalized recreational marijuana in 2012, the number of states in which recreational use of marijuana is permitted has grown to 10, plus the District of Columbia.<sup>5</sup> These jurisdictions are home to one-quarter of the U.S. population. In addition to states that have legalized recreational marijuana use, another 23 states and Puerto Rico allow marijuana to be used for treating medical conditions (“medical marijuana”). Several other states are considering legalizing recreational use of marijuana.<sup>6</sup>

Since 2002, the Substance Abuse and Mental Health Services Administration in the U.S. Department of Health and Human Services has conducted an annual, nationally representative survey of substance use among individuals ages 12 and older. The percentage of individuals age 18 and older who self-report marijuana use in the previous month has grown slowly but steadily since 2008. Self-reported use is highest among young adults (ages 18-25) compared to all other age groups; it rose from 16.6% to 22.1% between 2008 and 2017.<sup>7</sup> Self-reported use among adults age 26 and older rose from 4.2% to 7.9% over the same period.<sup>8</sup> This study does not break out usage patterns by state, but other studies have found that reported usage has increased in virtually all states, both in those that have loosened restrictions on marijuana usage and those that have not. Thus, the impact of a state’s treatment of marijuana on the extent of marijuana usage is not clear. Some observers have speculated that states’ loosening of restrictions on marijuana usage might lead to increased usage. But the fact that usage by adults appears to be increasing in both states that have and those that have not loosened restrictions suggests that other factors may also be involved.

NHTSA has sponsored a periodic roadside survey of alcohol use among drivers for decades. The last two surveys (2007 and 2013-2014) also looked at drug use.<sup>9</sup> In the 2013-2014 survey, 12.7% of drivers in the nighttime sample tested positive for THC, up from 8.7% in the 2007 survey.

<sup>3</sup> For example, a 2018 Pew Research Center survey found that 62% of Americans favored legalization, up from 31% in 2000. Hannah Hartig and Abigail Geiger, *About Six-in-Ten Americans Support Marijuana Legalization*, Pew Research Center, October 8, 2018, <https://www.pewresearch.org/fact-tank/2018/10/08/americans-support-marijuana-legalization/>.

<sup>4</sup> Governors Highway Safety Association, *Marijuana-Related Laws*, [https://www.ghsa.org/sites/default/files/2019-04/marijuanalaws\\_apr2019\\_0.pdf](https://www.ghsa.org/sites/default/files/2019-04/marijuanalaws_apr2019_0.pdf).

<sup>5</sup> Marijuana is still a Schedule I drug in federal law. A Schedule I drug is defined as one with a high potential for abuse and no accepted medical use, and that is unsafe to use even under medical supervision; see 21 U.S.C. §812(b)(1).

<sup>6</sup> Also, Canada legalized the recreational use of marijuana in 2018, and Mexico’s Supreme Court has ruled that Mexico’s ban on the recreational use of marijuana is unconstitutional, leading some to speculate that the Mexican government will soon legalize the recreational use of marijuana.

<sup>7</sup> Substance Abuse and Mental Health Services Administration, *Key Substance Use and Mental Health Indicators in the United States: Results from the 2017 National Survey on Drug Use and Health*, Figure 13 Table, <https://www.samhsa.gov/data/report/2017-nsduh-annual-national-report>.

<sup>8</sup> Ibid.

<sup>9</sup> These roadside surveys are designed to question a representative sample of the general driving population at a particular time of day and day of the week. The most recent survey sampled drivers at 300 locations across the country on Fridays (during one daytime and three nighttime periods) and Saturday nights. Drivers were randomly selected and asked to provide breath, saliva, and blood samples.

NHTSA did not report concentrations of THC and did not attempt to evaluate impairment. The data do not permit state-level comparisons.<sup>10</sup>

## What Is Impaired Driving?

Driving is among the most dangerous activities the average person engages in. It involves piloting a multiton vehicle at relatively high speeds, usually surrounded by many other such vehicles, and often bicyclists and pedestrians as well. A moment's inattention can, but usually does not, result in a crash. Crashes are usually not serious: the vast majority of crashes result only in damage to the vehicles involved. But in a significant percentage of crashes, one or more people are injured (29.3%), and in a fraction of crashes, people die (0.5%).<sup>11</sup>

Because of the potential danger to the public posed by drivers, all 50 states, the District of Columbia, and Puerto Rico have laws barring driving while impaired. Impairment involves driving performance that is degraded from its "normal" level by some cause.<sup>12</sup> Many things can impair a driver's performance including alcohol, other drugs, fatigue, distraction, and emotional states such as fear or anger. Some state laws against impaired driving require that the state prove that a driver's impairment was caused by the substance or behavior at issue. Other state laws, known as *per se* laws, provide that a driver is automatically guilty of driving while impaired if specified levels of a potentially impairing substance are found in his or her body (e.g., blood alcohol content (BAC) of .08% or higher, or, in some states, THC in the blood; see **Table 1**).

## Detecting Impairment

Currently, detecting marijuana impairment through a standardized test is more complicated than detecting alcohol impairment. Evaluating impairment due to alcohol is relatively straightforward. Alcohol is a central nervous system depressant, the effects of which have been extensively observed and studied for a century. It is a liquid that enters the bloodstream quickly and is metabolized (converted into other substances) by the body fairly quickly. Alcohol in the body can be measured in a person's breath, blood, or urine. A person's BAC peaks within an hour after drinking, and declines gradually and linearly after that. The degree of impairment at various BAC levels is fairly well-established, and many studies have established that a driver's risk of being involved in a crash increases as the driver's BAC level increases.<sup>13</sup>

In the United States, congressional encouragement has led every state to legislate that a driver whose BAC is .08% or higher is too impaired to drive legally.<sup>14</sup> However, studies indicate there is

<sup>10</sup> National Highway Traffic Safety Administration, *2013-2014 National Roadside Study of Alcohol and Drug Use by Drivers: Drug Results*, DOT HS 812 411, Table 41, p. 50, [https://www.nhtsa.gov/sites/nhtsa.dot.gov/files/documents/13013-nrs\\_drug\\_092917\\_v6\\_tag.pdf](https://www.nhtsa.gov/sites/nhtsa.dot.gov/files/documents/13013-nrs_drug_092917_v6_tag.pdf).

<sup>11</sup> In 2017, 70.2% of crashes reported by police involved only property damage, 29.3% resulted in injuries, and 0.5% resulted in one or more fatalities. National Highway Traffic Safety Administration, *Police-Reported Motor Vehicle Traffic Crashes in 2017*, DOT HS 812 696, April 2019, <https://crashstats.nhtsa.dot.gov/Api/Public/ViewPublication/812696>.

<sup>12</sup> A complicating factor is that the "normal" level of driving performance varies from person to person; some people are worse drivers than others.

<sup>13</sup> For example, H. Moskowitz, M. Burns, D. Fiorentino, A. Smiley, and P. Zador, *Driver Characteristics and Impairment at Various BACs*, DOT HS 809 075, August 2000, [https://one.nhtsa.gov/people/injury/research/pub/impaired\\_driving/BAC/index.html](https://one.nhtsa.gov/people/injury/research/pub/impaired_driving/BAC/index.html).

<sup>14</sup> 23 United States Code §163(e) reduces the amount of federal transportation funding provided to states that have not adopted a law making a person driving with a BAC of .08% guilty of driving while intoxicated. As noted earlier,

some degree of impairment at far lower levels of BAC. In several European countries, driving with a BAC of .05% or higher is prohibited, and the State of Utah recently lowered its *per se* impaired BAC level to .05%. In the United States, commercial truck drivers are barred from performing safety-sensitive functions (such as driving) at a BAC of .04%.<sup>15</sup> Relatively simple tests, such as breath analysis conducted by a police officer at the roadside or analysis of blood or urine samples taken in a clinic, can determine whether an individual's BAC exceeds the legal threshold. Since every state has a law prohibiting driving with a specific BAC level, such tests can be presented as evidence of impairment in court.

Detecting impairment due to use of marijuana is more difficult. The body metabolizes marijuana differently from alcohol. The level of THC (the psychoactive ingredient of marijuana) in the body drops quickly within an hour after usage, yet traces of THC (nonpsychoactive metabolites) can still be found in the body weeks after usage of marijuana. There is as yet no scientifically demonstrated correlation between levels of THC and degrees of impairment of driver performance, and epidemiological studies disagree as to whether marijuana use by a driver results in increased crash risk.<sup>16</sup>

## Marijuana's Impact on Driver Crash Risk

Relatively few studies have been done of the effect of marijuana use on driver performance. This is due, in part, to the requirements that must be met to use marijuana in studies due to its status as a controlled substance under federal law and many state laws.<sup>17</sup> Another factor complicating studies of marijuana's effects on drivers is that the potency of THC in marijuana (i.e., the concentration of THC) can vary from one plant to another. The marijuana produced by the only approved source of marijuana for federally funded research is considered by some researchers to be low quality (potency).<sup>18</sup> Also, the way in which marijuana is processed can affect the potency of the product, and the way the user chooses to ingest marijuana may affect the level of THC in the body.

The lack of correlation between both marijuana consumption and the level of THC in a person's system and THC levels and driver impairment reduces the usefulness of rule-of-thumb guides of impairment. In contrast, many drivers use rules-of-thumb to guide their alcohol consumption. While emphasizing that even low levels of alcohol consumption can cause drivers to be impaired, tables published on the internet suggest that two drinks may place a 120-pound female in breach of the 0.08% BAC threshold and leave a 160-pound male with "driving skills significantly affected."<sup>19</sup> The National Transportation Safety Board has advised that "about 2 alcoholic drinks" within an hour will cause a 160-pound male to experience decline in visual functions and in the ability to perform two tasks at the same time.<sup>20</sup> Based on current knowledge and enforcement

---

Utah's BAC level for legal impairment was lowered to .05% as of January 2019.

<sup>15</sup> 49 C.F.R. §382.201.

<sup>16</sup> Richard Compton, National Highway Traffic Safety Administration, *Marijuana-Impaired Driving—A Report to Congress*, July 2017, DOT HS 812 440, p. 23.

<sup>17</sup> See "Federal Research Requirements for Marijuana" in CRS Report R44782, *The Marijuana Policy Gap and the Path Forward*, coordinated by Lisa N. Sacco.

<sup>18</sup> Ibid., "Marijuana Supply for Researchers."

<sup>19</sup> See, for example, the "BAC calculator" published by the University of Oklahoma Police Department, <http://www.ou.edu/police/faid/blood-alcohol-calculator>.

<sup>20</sup> National Transportation Safety Board, ".05 BAC Safety Briefing Facts," February 2017.



capabilities, it is not possible to articulate a similarly simple level or rate of marijuana consumption and a corresponding effect on driving ability.

## Studies of Crash Risk Associated With Marijuana Usage

To date, results from studies that have examined the association between marijuana use and crash risk have been inconsistent. As described in the 2017 NHTSA report to Congress, one study estimated the increased crash risk from marijuana usage at 1.83 times that of an unimpaired driver, while another study found no association between risk of being involved in a crash and marijuana use.<sup>21</sup> Other studies have estimated the increased crash risk for drivers testing positive for marijuana at between zero and three times that for unimpaired drivers, roughly comparable to the increased crash risk of having a blood alcohol content of between .01% and .05%, well below the legal *per se* impaired level of .08 BAC.<sup>22</sup> For purposes of comparison, a driver with a BAC of .08% is considered to be five to 20 times more likely to be involved in a crash than an unimpaired driver.

In NHTSA's 2017 Marijuana-Impaired Driving Report to Congress, NHTSA's survey of the research literature found differences between driving by subjects dosed with alcohol and subjects dosed with marijuana. Marijuana-dosed subjects driving in a simulator or in an instrumented vehicle on a closed course tended to drive below the speed limit, to allow a greater distance between themselves and vehicles ahead of them, and to take fewer risks than when they were not under the influence of marijuana.<sup>23</sup> The study authors hypothesized that the subjects felt effects of the marijuana and were consciously altering their driving behavior to compensate.<sup>24</sup> By contrast, subjects who were dosed with alcohol tended to drive faster than the speed limit, to follow leading cars more closely, and to generally drive in a riskier fashion than when they were not under the influence of alcohol. The NHTSA report includes the caveat that impacts on driving performance that can be measured under controlled conditions may or may not be significant under real-world conditions.<sup>25</sup> NHTSA states that while laboratory studies are useful in identifying how substances affect the performance of driving tasks, only epidemiological studies (i.e., studies that look at actual crashes and the factors involved) are useful in predicting their impact on real-world crash risk.<sup>26</sup> Relatively few epidemiological studies of marijuana usage and crash risk have been conducted, and the few that have been conducted have generally found low or no increased risk of crashes from marijuana use.<sup>27</sup>

<sup>21</sup> Richard Compton, National Highway Traffic Safety Administration, *Marijuana-Impaired Driving—A Report to Congress*, DOT HS 812440, July 2017, p. 23, <https://www.nhtsa.gov/.../812440-marijuana-impaired-driving-report-to-congress.pdf>.

<sup>22</sup> Li, G., Brady, J. E., & Chen, Q., "Drug Use and Fatal Motor Vehicle Crashes: A Case-Control Study," *Accident Analysis and Prevention*, 60 (2013), 205–210, cited in Richard Compton, National Highway Traffic Safety Administration, *Marijuana-Impaired Driving—A Report to Congress*, DOT HS 812440, July 2017, p. 23, <https://www.nhtsa.gov/.../812440-marijuana-impaired-driving-report-to-congress.pdf>.

<sup>23</sup> Hartman et al., "Cannabis Effects on Driving: Longitudinal Control With and Without Alcohol," *Drug and Alcohol Dependence* 154: 25-37 (2015), cited in Compton, NHTSA, *Marijuana-Impaired Driving—A Report to Congress*, 2017, p. 11.

<sup>24</sup> Ibid, p. 12, also cites several similar studies where similar observations were made.

<sup>25</sup> Richard Compton, National Highway Traffic Safety Administration, *Marijuana-Impaired Driving—A Report to Congress*, DOT HS 812440, July 2017, p. 12, <https://www.nhtsa.gov/.../812440-marijuana-impaired-driving-report-to-congress.pdf>.

<sup>26</sup> National Highway Traffic Safety Administration, *Traffic Safety Facts Research Note: Drug and Alcohol Crash Risk*, DOT HS 812 117, February 2015, p. 1.

<sup>27</sup> Richard Compton, National Highway Traffic Safety Administration, *Marijuana-Impaired Driving—A Report to*



In reports examining many aspects of marijuana use and its effects, the National Academy of Sciences (NAS) in a 2017 report and the National Institutes of Health in a 2018 report reference various studies on the impact of marijuana consumption on driver performance to state that cannabis use prior to driving increases the risk of being involved in a motor vehicle accident.<sup>28</sup> For example, the NAS committee that produced the 2017 report looked at systematic reviews of driving under the influence of marijuana and at recently published primary literature. The NAS committee's report concluded, "There is substantial evidence of a statistical association between cannabis use and increased risk of motor vehicle crashes."<sup>29</sup>

Several factors complicate the effort to determine what, if any, impact marijuana usage has on the likelihood of being involved in a crash. Chief among these factors is the distinction between correlation (things that occur together) and causation (one thing that causes another thing). A driver who has been involved in a crash may have used marijuana shortly before the crash; that correlation (marijuana usage and crash involvement) does not alone prove causation (that the marijuana usage was the cause of the driver being involved in a crash). For example, in the United States the population group with the highest rate of motor vehicle crashes, by far, is young male drivers (generally defined as those between the ages of 16 and 19). Young males are also the population group with the highest prevalence of marijuana use. When a young male driver is involved in a motor vehicle crash, and has recently used marijuana, it is difficult to separate the role, if any, of the effects of marijuana usage from the other factors that may contribute to the exceptionally high rate of crash involvement of young male drivers.

## Law Enforcement

An impaired driving arrest typically begins with a law enforcement officer stopping a driver for a traffic violation or observing a driver at a crash scene or a checkpoint. If the officer suspects that the driver is impaired by alcohol, based on the driver's behavior and signs such as the odor of alcohol or other evidence of its presence, the officer may administer a field sobriety test or preliminary breath test to check for alcohol impairment.<sup>30</sup> Training for the Standard Field Sobriety Test for alcohol impairment is usually included in basic police academy courses. The test includes 1) a driver heel-to-toe walk and turn test, and 2) a driver one-leg standing test.

Law enforcement officers often are not trained in recognizing impairment from marijuana or other drugs. NHTSA, with input from law enforcement organizations, has developed two training programs for law enforcement officers to recognize drug impairment in drivers during roadside stops.

Advanced Roadside Impaired Driving Enforcement (ARIDE) is a 16-hour course providing basic information on drug impairment, including indications of impairment from both marijuana and

---

Congress, DOT HS 812 440, July 2017, p. 23 (citing Elvik, 2013) and pp. 25-26.

<sup>28</sup> National Academy of Sciences (NAS), *The Health Effects of Cannabis and Cannabinoids: The Current State of Evidence and Recommendations for Research*, January 12, 2017, p. 230; National Institute on Drug Abuse, National Institutes of Health, *Does Marijuana Use Affect Driving?*, June 25, 2018, <https://www.drugabuse.gov/publications/research-reports/marijuana/does-marijuana-use-affect-driving>.

<sup>29</sup> NAS, *The Health Effects of Cannabis and Cannabinoids: The Current State of Evidence and Recommendations for Research*, January 12, 2017, pp. 228-230. On page 230, the NAS report also stated the following regarding the coconsumption of alcohol and marijuana: "In particular, confounding or effect modification with alcohol is an important driver-related factor that needs to be better taken into account."

<sup>30</sup> Governors Highway Safety Association, *Drug-Impaired Driving: Marijuana and Opioids Raise Critical Issues for States*, May 2018, p. 21.

other opioids.<sup>31</sup> From 2009 through 2015, around 8% of the nation's patrol officers received ARIDE training.<sup>32</sup> Drug Recognition Experts (DRE) are trained not only to identify impairment by drugs but also to differentiate between categories of drugs. DRE training consists of 72 hours of classroom training and 40 to 60 hours of fieldwork. This represents a considerable investment of resources on the part of the trainee's organization, since it takes the officer away from regular duties for three to four weeks. As of 2016, around 1% of the nation's patrol officers were active DREs.<sup>33</sup> In evaluating drivers suspected of impairment, DREs administer a 12-step evaluation lasting around 90 minutes. This is not a roadside test; the DRE testing protocol calls for the testing to be done in a controlled environment. Adherence to the protocol is important for the validity of the results.<sup>34</sup>

## Tests for Marijuana Use

Urine, hair follicles, blood, and saliva can be tested for evidence of THC and its metabolites. At present THC cannot be measured accurately in a person's breath.

- Blood tests are considered the gold standard in establishing the presence of marijuana for impaired driving cases. To conduct a blood test of a driver suspected of driving under the influence of marijuana, police typically must obtain a search warrant and have the blood drawn by a nurse or person licensed to draw blood (phlebotomist).<sup>35</sup>
- Testing of oral fluid can readily detect the presence of marijuana or its metabolites, and such testing is less complicated than blood testing. It may require a search warrant. Devices that can not only collect but also test oral fluids at the point of arrest (i.e., in the field) are available, but their accuracy and reliability have been questioned.<sup>36</sup> Marijuana can be found in oral fluids as a result of environmental exposure.
- Hair testing is of little reliability for drug-impaired driving enforcement, as THC can be found in hair months after usage, so a positive result cannot be used to

<sup>31</sup> Proficiency in the administration of the Standardized Field Sobriety Test is the most important component of ARIDE training (Cannabis Control Commission, Commonwealth of Massachusetts, *A Baseline Review and Assessment of Cannabis Use and Public Safety Part 1: Operating under the Influence of Cannabis: Literature Review and Preliminary Data in Massachusetts*, January 2019, p. 18, [https://mass-cannabis-control.com/wp-content/uploads/2019/01/FINAL-RR1-PS1-Cannabis-Impaired-Driving\\_2019-1-18.pdf](https://mass-cannabis-control.com/wp-content/uploads/2019/01/FINAL-RR1-PS1-Cannabis-Impaired-Driving_2019-1-18.pdf)).

<sup>32</sup> Governors Highway Safety Association, *Drug-Impaired Driving: Marijuana and Opioids Raise Critical Issues for States*, May 2018, p. 22.

<sup>33</sup> Ibid, pp. 24-25. Percentage calculated by CRS using data on total law enforcement officers and the number trained as DREs.

<sup>34</sup> In 2017, the American Civil Liberties Union sued the Cobb County, GA, Police Department on behalf of three people who had been arrested at different times for impaired driving by an officer who had received DRE training but who allegedly did not follow the DRE protocol ([https://www.acluga.org/sites/default/files/cobb\\_county\\_complaint\\_9-25-17.pdf](https://www.acluga.org/sites/default/files/cobb_county_complaint_9-25-17.pdf)). The three cases subsequently were dismissed by prosecutors. The validity of the DRE protocol itself has been upheld in many court cases; see Gregory T. Seiders, "Call in the Experts: The Drug Recognition Expert Protocol and Its Role in Effectively Prosecuting Drugged Drivers," *Widener Law Journal*, v. 26, n. 2, 2017, pp. 246-247, 253-258.

<sup>35</sup> Richard Compton, National Highway Traffic Safety Administration, *Marijuana-Impaired Driving—A Report to Congress*, DOT HS 812440, July 2017, p. 10, <https://www.nhtsa.gov/.../812440-marijuana-impaired-driving-report-to-congress.pdf>.

<sup>36</sup> Richard Compton, National Highway Traffic Safety Administration, *Marijuana-Impaired Driving—A Report to Congress*, DOT HS 812440, July 2017, p. 14, <https://www.nhtsa.gov/.../812440-marijuana-impaired-driving-report-to-congress.pdf>.

establish usage around the time of driving. THC in hair follicles can result from environmental exposure to second-hand smoke rather than direct consumption of marijuana. Also, the use of hair products can affect test results.

- Urine testing cannot be reliably used to establish drug use around the time of driving, as THC and its metabolites can be detected in urine for days, or even weeks, after usage.

The decision as to whether a driver who tests positive for marijuana should be arrested or charged with driving while impaired is not straightforward, because tests for the presence of marijuana in a driver's body are inadequate to determine impairment. The value of testing a person for the presence of alcohol lies largely in the well-established link between levels of alcohol in a person's blood and impairing effects associated with that blood alcohol content. Similar links between levels of THC in a person's body and levels of impairment have not been established.<sup>37</sup>

The concentration of THC in a person's blood rises rapidly after consumption, then drops rapidly, within an hour or two. Impairing effects appear rapidly, but may remain for some time. Consequently, tests that show the amount of THC in the subject's body are poor indicators of impairment, how recently a person has used marijuana, or whether the person used marijuana or was simply exposed to second-hand smoke. Moreover, tests can show the presence of metabolites of THC, which themselves are not impairing, for weeks after consumption. Also, studies indicate that individuals can adapt to the impairing effects of marijuana, such that a level of THC that could indicate impairment in an occasional marijuana user may not have the same impairment effect on an experienced user.

## State Laws Regarding Marijuana and Impaired Driving

Some states have "*per se*" ("in itself") laws that make it illegal for a driver to have more than a certain concentration of THC in his or her system. In some other states, it is illegal for a person to drive with any trace of marijuana ("zero tolerance") in his or her system (see **Table 1**).

**Table 1. State Laws Regarding Marijuana and Impaired Driving as of February 2018**

	Threshold for Determining Violation
9 states	Trace of THC or its metabolites (zero tolerance)
3 states	Trace of THC (zero tolerance, but no restriction on metabolites)
5 states	Specific <i>per se</i> limits for THC (varies from 1 ng to 5 ng per ml of blood)
1 state (Colorado)	Drivers with 5 ng/ml of THC can be prosecuted ("reasonable inference" of, but not <i>per se</i> , impairment)

**Source:** CRS, using February 2018 survey data from Governors Highway Safety Association, *Drug-Impaired Driving Laws*, May 2018, <https://www.ghsa.org/state-laws/issues/drug%20impaired%20driving>; and Colorado Department of Transportation, *FAQs: Cannabis and Driving*, <https://www.codot.gov/safety/alcohol-and-impaired-driving/druggeddriving/marijuana-and-driving>.

**Notes:** Ng = nanogram.

Drivers have challenged convictions under *per se* marijuana impairment laws, with differing results. Some courts, acknowledging the testimony of experts that there is, at present, no reliable test to indicate impairment from marijuana, have nevertheless supported a state's *per se* standard

<sup>37</sup> Richard Compton, U.S. Department of Transportation, *Marijuana-Impaired Driving—A Report to Congress*, DOT HS 812440, July 2017, p. 13, <https://www.nhtsa.gov/.../812440-marijuana-impaired-driving-report-to-congress.pdf>.

as a reasonable effort to combat impaired driving in the absence of effective measurements of impairment.<sup>38</sup> Other courts have overturned *per se* convictions on various grounds (e.g., that while the state legislation included all metabolites of marijuana, it was not reasonable to convict a driver of impairment when the driver tested positive for a metabolite that does not have an impairing effect).<sup>39</sup>

## Federal Regulations Governing Testing for Drug Use

Marijuana possession and usage remain illegal under federal law.<sup>40</sup> In addition, people holding certain jobs, including federal employees and transportation workers in safety-sensitive positions (such as airline pilots, aircraft maintenance personnel, railroad engineers, ship captains, commercial truck drivers, and bus drivers), are prohibited from consuming any amount of marijuana, regardless of state laws.

Federal regulations<sup>41</sup> require that transportation workers in safety-sensitive positions be tested for alcohol and certain drugs before beginning work for a new employer, if they are involved in a serious crash,<sup>42</sup> and also at random. Safety-sensitive workers who appear to be under the influence of drugs or alcohol while at work can be tested immediately. Those who test positive must be evaluated by a substance abuse professional, complete counseling or treatment as prescribed by the evaluator, undergo a follow-up evaluation, and be tested again before returning to their safety-sensitive work. Those who return to safety-sensitive work after a positive test must be tested at least six times with no advance notice in the following 12 months. The follow-up period of intensive testing can be extended an additional four years. Approximately 12 million transportation workers are subject to these rules.

In 2009, the U.S. Department of Transportation stated that it is “unacceptable for any safety-sensitive employee subject to drug testing under the Department of Transportation’s drug testing regulations to use marijuana.”<sup>43</sup> Regardless of many states having legalized more uses of marijuana, safety-sensitive employees remain subject to drug testing and may lose their jobs for marijuana use that is legal under state law.

<sup>38</sup> Robert L. DuPont, Robert B. Voas, J. Michael Walsh, Corinne Shea, Stephen K. Talpins and Mark M. Neil, “The Need for Drugged Driving Per Se Laws: A Commentary,” *Traffic Injury Prevention*, 13:31–42, 2012.

<sup>39</sup> *Arizona vs. Harris*, 346 P.3d 984, 2014. In *People v. Feezel*, 783 N.W.2d 67, 81 (Mich. 2010), the Michigan Supreme Court held that 11-carboxy-THC (produced by the body metabolizing marijuana) by itself is not a Schedule I controlled substance, and therefore its presence in a defendant’s body could not support a criminal charge.

<sup>40</sup> For a brief account of how the Department of Justice’s stance toward enforcement of federal marijuana law has shifted toward some tolerance of state legalization efforts, then back toward strict enforcement, see CRS Legal Sidebar LSB10054, *Attorney General’s Memorandum on Federal Marijuana Enforcement: Possible Impacts*, by Todd Garvey and Brian T. Yeh.

<sup>41</sup> 49 C.F.R. Part 40, developed in response to congressional directive in the Omnibus Transportation Employee Testing Act (P.L. 102-143, enacted October 28, 1991).

<sup>42</sup> They must be tested if involved in a crash in which someone is killed, or if the commercial driver is given a citation for a crash in which an injury requires immediate medical treatment away from the scene (e.g., at a hospital) or in which any motor vehicle was damaged sufficiently that it had to be towed.

<sup>43</sup> Department of Transportation, Office of Drug and Alcohol Policy and Compliance, DOT “Medical Marijuana” Notice, October 22, 2009, <http://www.transportation.gov/odapc/medical-marijuana-notice>.

## Options for Congress

There are several subjects on which better information may aid policymaking around the issue of marijuana and impairment. These include

- continued research into whether a quantitative standard can be established that correlates the level of THC in a person's body and the level of impairment, and
- better data on the prevalence of marijuana use by drivers, especially among drivers involved in crashes and drivers arrested for impaired driving.

Currently, most states do not distinguish in their records whether drivers arrested for impaired driving are impaired by alcohol or other substances.<sup>44</sup> Substance-specific impaired driving data could be of particular use in analyzing prelegalization and post-legalization data within a state and differences across states with different legal treatment of marijuana use.

Given that currently the most reliable means of detecting impairment among drivers who have used marijuana is by observation of physiological, cognitive, and psychomotor indicators by law enforcement officers, another policy option is additional support for training of law enforcement officers in detecting impairment.<sup>45</sup> To improve the handling of drug-impaired driving cases, the Governors Highway Safety Association has recommended that prosecutors and judges assigned to drug-impaired driving cases receive training in the issue.<sup>46</sup>

Among the roughly 12 million transportation workers whose safety-sensitive status subjects them to federally mandated drug testing, federal regulations provide no opportunity for legal use of marijuana, regardless of the status of marijuana under state law. As previously discussed, regulations that apply to safety-sensitive employees do provide an avenue for an employee who has tested positive to regain a safety-sensitive position. CRS could not identify any data on how many safety-sensitive transportation employees have lost their jobs as a result of positive tests for marijuana use. Considering the length of time that marijuana is detectable in the body after usage, and the uncertainty about the impairing effect of marijuana on driving performance, Congress and other federal policymakers may elect to reexamine the rationale for testing all safety-sensitive transportation workers for marijuana usage. Alternatively, Congress and federal policymakers may opt to maintain the status quo until more research results become available.

<sup>44</sup> Richard Compton, U.S. Department of Transportation, *Marijuana-Impaired Driving—A Report to Congress*, DOT HS 812440, July 2017, p. 30, <https://www.nhtsa.gov/.../812440-marijuana-impaired-driving-report-to-congress.pdf>.

<sup>45</sup> Congress provides funds to states that can be used for this purpose (and other purposes) through a highway safety formula grant program (often referred to as “Section 402” grants, so called because they are authorized at 23 U.S.C. §402), a highway safety research and development program (referred to as Section 403), and the Impaired Driving Countermeasures grant program (referred to as Section 405(d)).

<sup>46</sup> Governors Highway Safety Association, *Drug-Impaired Driving: Marijuana and Opioids Raise Critical Issues for States*, May 2018, pp. 27-33.

## **Author Contact Information**

David Randall Peterman  
Analyst in Transportation Policy  
/redacted/@crs.loc.gov , 7-....

## EveryCRSReport.com

The Congressional Research Service (CRS) is a federal legislative branch agency, housed inside the Library of Congress, charged with providing the United States Congress non-partisan advice on issues that may come before Congress.

EveryCRSReport.com republishes CRS reports that are available to all Congressional staff. The reports are not classified, and Members of Congress routinely make individual reports available to the public.

Prior to our republication, we redacted phone numbers and email addresses of analysts who produced the reports. We also added this page to the report. We have not intentionally made any other changes to any report published on EveryCRSReport.com.

CRS reports, as a work of the United States government, are not subject to copyright protection in the United States. Any CRS report may be reproduced and distributed in its entirety without permission from CRS. However, as a CRS report may include copyrighted images or material from a third party, you may need to obtain permission of the copyright holder if you wish to copy or otherwise use copyrighted material.

Information in a CRS report should not be relied upon for purposes other than public understanding of information that has been provided by CRS to members of Congress in connection with CRS' institutional role.

EveryCRSReport.com is not a government website and is not affiliated with CRS. We do not claim copyright on any CRS report we have republished.