

# Status Report

Insurance Institute for Highway Safety | Highway Loss Data Institute

## Legal pot

Crashes are up in states with retail sales

### ALSO IN THIS ISSUE

Vol. 53, No. 6 | October 18, 2018

- ▶ Cannabis users who drive with children don't always view it as a safety risk
- ▶ New Q&A on marijuana

**C**rashes are up by as much as 6 percent in Colorado, Nevada, Oregon and Washington, compared with neighboring states that haven't legalized marijuana for recreational use, new research from IIHS and HLDI shows. The findings come as campaigns to decriminalize marijuana gain traction with voters and legislators in the U.S., and Canada begins allowing recreational use of marijuana across all of its provinces this month.

Last year, HLDI released a groundbreaking analysis of insurance losses in Colorado, Oregon and Washington that found that legalizing recreational marijuana use in the three states was associated with a combined 2.7 percent increase in the frequency of collision claims per insured vehicle year relative to nearby control states (see *Status Report*, June 22, 2017, at [iihs.org](http://iihs.org)).

Collision coverage insures against physical damage to a driver's vehicle sustained in a crash with an object or other vehicle, generally when the driver is at fault. An insured vehicle year is one vehicle insured for one year or two vehicles insured for six months each.

**Crashes reported to insurers and to police are up in the first states to legalize retail sales of recreational marijuana, compared with control states that haven't enacted recreational marijuana laws.**

In a new report, HLDI analysts estimate that the frequency of collision claims rose a combined 6 percent following the start of retail sales of recreational marijuana in Colorado, Nevada, Oregon and Washington, compared with the control states of Idaho, Montana, Utah and Wyoming.

The new combined-state analysis adds another year of collision loss data (January 2012 through October 2017) and accounts for the 2017 start of retail marijuana sales in Nevada, which was used as a control state for Oregon in the prior report.

A separate IIHS study examined 2012–16 police-reported crashes before and after retail sales began in Colorado, Oregon and Washington. IIHS estimates that the three states combined saw a 5.2 percent increase in the rate of crashes per million vehicle registrations, compared with neighboring states that didn't legalize marijuana sales.

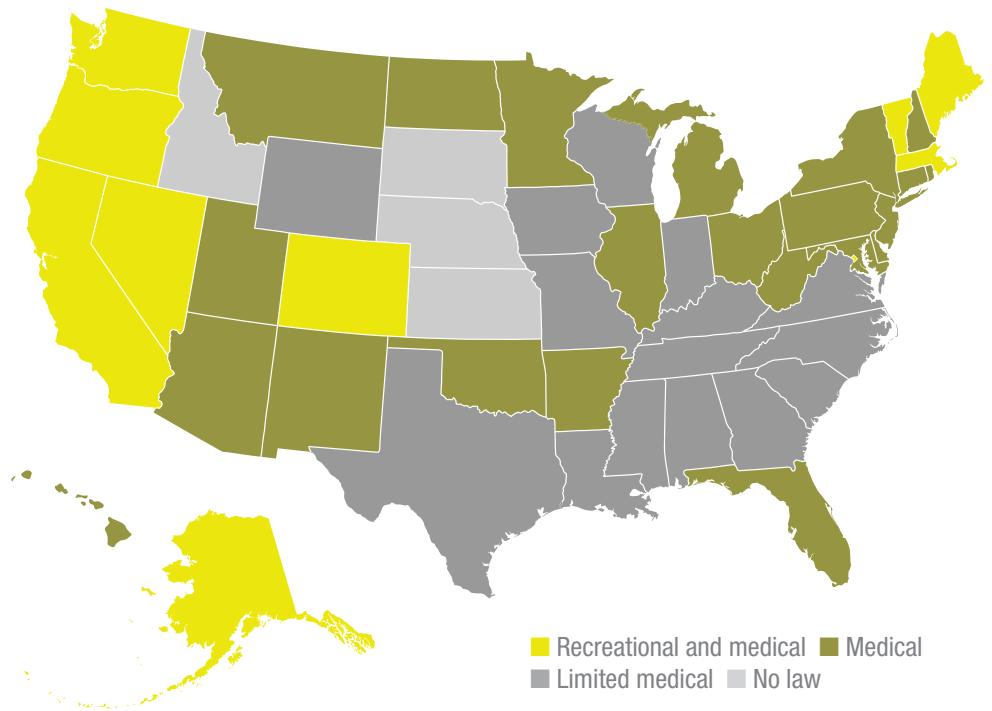
IIHS researchers compared the change in crash rate in Colorado, Oregon and





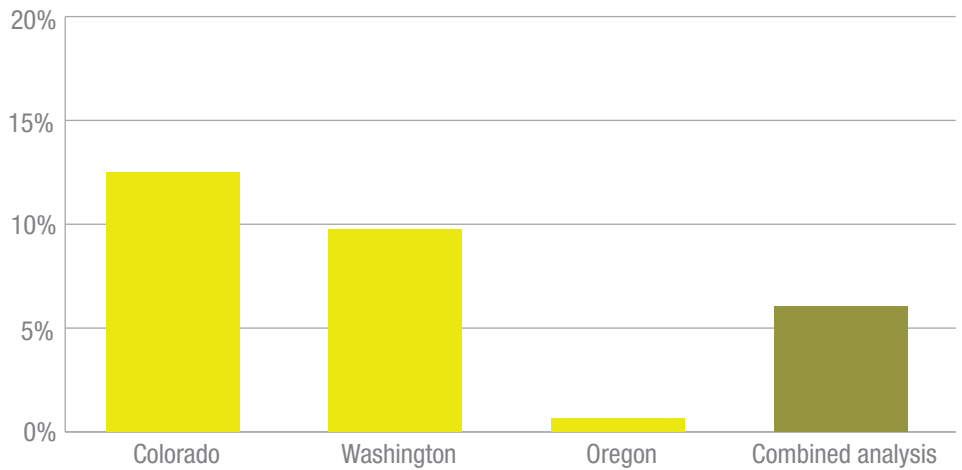
## U.S. marijuana laws

States with some form of legalized marijuana use as of October 2018



## Estimated effects of recreational marijuana sales in 3 states

Change in claim frequency for vehicles up to 33 years old, 2012–17



Washington with the change in crash rates in the neighboring states that didn't enact recreational marijuana laws. Researchers compared Colorado with Nebraska, Wyoming and Utah, and they compared Oregon and Washington with Idaho and Montana. The study controlled for differences in

California-based MedMen (left) is among the state-licensed cannabis dispensaries operating in the emerging legal-marijuana industry.

demographics, unemployment and weather in each state.

The size of the effect varied by state. Although the study controlled for several differences among the states, the models can't capture every single difference. For example, marijuana laws in Colorado, Oregon and Washington differ in terms of daily purchase limits, sales taxes and available options for home growers. These differences can influence how often consumers buy »



**The new IIHS-HLDI research indicates that legalizing marijuana for all uses is having a negative impact on the safety of U.S. roads. States exploring legalization should consider this effect on highway safety.**

(« from p. 3) marijuana, where they buy it and where they consume it.

The 5.2 percent increase in police-reported crash rates following legalization of recreational marijuana use is consistent with the 6 percent increase in insurance claim rates estimated by HLDI.

“The new IIHS-HLDI research on marijuana and crashes indicates that legalizing marijuana for all uses is having a negative impact on the safety of our roads,” says IIHS-HLDI President David Harkey. “States exploring legalizing marijuana should consider this effect on highway safety.”

Marijuana is still an illegal controlled substance under federal law.

### Law changes

Recreational use of marijuana by adults 21 and older won voter approval in November 2012 in Colorado and Washington. Retail sales began in January 2014 in Colorado and in July 2014 in Washington. Oregon voters approved recreational marijuana in November 2014, and sales started

in October 2015. Nevada voters approved recreational marijuana in November 2016, and retail sales began in July 2017.

Alaska, California, Maine, Massachusetts, Vermont and the District of Columbia also allow recreational use of marijuana for adults 21 and older and medical use of marijuana. In addition, 22 states allow medical marijuana, while 15 more states permit the use of specific cannabis products for designated medical conditions. In September, the Commonwealth of the Northern Mariana Islands, a U.S. territory, legalized recreational use of marijuana for adults.

Legalization of recreational use is pending in New Hampshire, New Jersey, New York and Pennsylvania. In November, Michigan and North Dakota will hold referendums on marijuana, and Missouri and Utah voters will decide whether to expand medical marijuana laws in their states.

### Under the influence

Impaired driving is a longstanding problem, with about a third of all fatally injured

drivers in crashes having a blood alcohol concentration (BAC) of 0.08 percent or higher (0.08 g alcohol per 100 mL blood). All 50 states and the District of Columbia have *per se* laws making it a crime to drive with a BAC at or above 0.08 percent. Effective in December, Utah will lower the threshold to 0.05 percent or above.

Driving under the influence of marijuana is illegal in all 50 states and D.C., but determining impairment is challenging. Unlike alcohol, the amount of marijuana present in a person’s body doesn’t consistently relate to impairment. THC, or Tetrahydrocannabinol, is the primary psychoactive component of cannabis. A positive test for THC and its active metabolite doesn’t mean the driver was impaired at the time of the crash. Habitual users of marijuana may have positive blood tests for THC days or weeks after using the drug.

Eleven states have zero tolerance *per se* laws for marijuana, which make it illegal to drive with any amount of THC or a metabolite in a person’s body. South Dakota has a zero-tolerance law for drivers younger than age 21. In five states, it is illegal to drive with specified amounts of marijuana in a person’s body. Of the nine states where recreational use of marijuana is already legal, only Nevada and Washington have *per se*

laws for marijuana and driving. Nevada sets the THC limit at 2 ng/mL blood, and Washington sets it at 5 ng/mL blood, according to the Governors Highway Safety Association. In Colorado, judges or juries can infer that drivers with a THC limit of 5 ng/mL blood are impaired; drivers can rebut the inference with evidence that they weren't impaired.

While driving under the influence of alcohol is taboo, attitudes about driving after using or consuming marijuana are more permissive, and more people admit to using the drug.

Self-reported marijuana use among people 12 and older within the past month rose to 9 percent in 2016 from about 6 percent between 2002 and 2008, a Center for Behavioral Health Statistics and Quality survey found. In national roadside surveys, the proportion of nighttime weekend drivers who were positive for marijuana rose from 9 percent in 2007 to 13 percent in 2013–14.

Some studies have found that consuming THC just prior to driving can increase reaction time and impair distance estimation and lane tracking in both simulator and on-road studies. A study conducted using the National Advanced Driving Simulator found that drivers under the influence of marijuana had trouble maintaining constant lane position, but they tended to drive more slowly and with more headway than drivers not under the influence (see *Status Report*, May 12, 2015). However, other studies failed to find such differences in reaction time and lane position variation.

Marijuana's role in crashes isn't as clear as the link between alcohol and crashes. Many states don't include consistent information on driver drug use in crash reports, and policies and procedures for drug testing are inconsistent. More drivers in crashes are tested for alcohol than for drugs. When drivers are tested, other drugs are often found in combination with alcohol, which makes it difficult to isolate their separate effects.

"Despite the difficulty of isolating the specific effects of marijuana impairment on crash risk, the evidence is growing that legalizing its use increases crashes," Harkey says.

For copies of "Effect of recreational marijuana sales on police-reported crashes in Colorado, Oregon and Washington" by S. Monfort and HLDI bulletin Vol. 35, No. 8, "Recreational marijuana and collision claim frequencies," email [statusreport@ihs.org](mailto:statusreport@ihs.org). ■

# Cannabis users who drive with children don't always view it as a safety risk

**P**rior research suggests that some drivers don't view using marijuana as risky for driving as imbibing alcohol, and those attitudes appear to extend to cannabis users who drive with children, a new study of Washington state drivers shows.

Drivers in the weekend roadside surveys were more likely to test positive for marijuana than alcohol, and almost none of the drivers traveling with a child were alcohol-positive. However, drivers were about equally likely to be marijuana-positive whether or not a child was present. These are the main findings of a new study by the Pacific Institute for Research and Evaluation, the Washington Traffic Safety Commission and IIHS.

The study is based on data collected on weekends in the Washington State Roadside Survey, just before and after retail sales of recreational marijuana began in the state in July 2014. Researchers surveyed drivers three times — in June 2014, November and December 2014, and June 2015. Data were collected on Fridays during the day and night and on Saturday nights.

Teams asked drivers who volunteered for the survey to provide breath, blood and saliva samples for alcohol and drug testing. Volunteers answered questions about their past and current marijuana use and shared their opinions on whether marijuana use impairs driving. Interviewers noted if children who appeared younger than 15 years old were present in the vehicles.

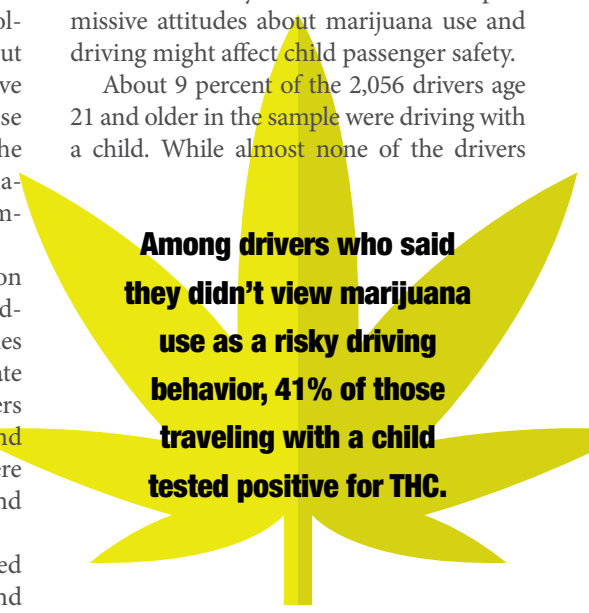
The goal of Washington's roadside survey was to measure the prevalence of THC-positive drivers, as well as drivers' use of alcohol on weekend nights in the state. Tetrahydrocannabinol, or THC, is the primary psychoactive cannabinoid found in marijuana. The roadside survey and initial analysis of the data were funded by the National Highway Traffic Safety Administration and IIHS.

In March, IIHS published a summary of the results before and after legalized retail

sales (see *Status Report*, March 29, 2018, at [ihs.org](http://ihs.org)). Drivers surveyed after retail marijuana sales began were more likely to test positive for marijuana than before, primarily due to a large increase in marijuana-positive drivers during the daytime. Drivers who tested positive for the drug were less likely to agree that marijuana impairs driving.

The latest study examines how more-permissive attitudes about marijuana use and driving might affect child passenger safety.

About 9 percent of the 2,056 drivers age 21 and older in the sample were driving with a child. While almost none of the drivers



**Among drivers who said they didn't view marijuana use as a risky driving behavior, 41% of those traveling with a child tested positive for THC.**

with child passengers tested positive for any amount of alcohol, 14 percent tested positive for cannabis.

The presence of THC or its metabolites in oral fluid or blood generally indicates recent use of marijuana, but it doesn't necessarily indicate impairment because the chemicals can be detected in the body for hours or, in the case of some frequent users, days.

When queried about their attitudes on marijuana and driving, the majority of drivers said they consider marijuana use "very likely" to impair driving. This was especially the case among drivers traveling with a child. The percent of THC-positive drivers was significantly lower among those who perceived the risk as "very likely" than other drivers. Among this group, 9 percent »

(« from p. 5) traveling with a child tested positive for THC, compared with 14 percent of drivers without kids in the car.

Among drivers who said they didn't view marijuana use as a risky driving behavior, 41 percent of those traveling with a child tested positive for THC, compared with 29 percent of those without a child in their vehicle. These differences, however, weren't statistically significant.

"The fact that few weekend drivers with children were alcohol-impaired is good news," says David Harkey, IIHS-HLDI president. "What's concerning, though, is that



photo courtesy of Pacific Institute for Research and Evaluation

**Drivers who agreed to participate in the roadside survey were asked to provide breath, blood and saliva samples for drug and alcohol testing and also answered questions about marijuana use.**

some drivers may be under the influence of marijuana and traveling with kids in the car. This points to the need to examine driving situations that put children at risk, especially given the trend toward legalizing marijuana."

For a copy of "Use of alcohol and cannabis among adults driving children in Washington state" by E. Romano, T. Kelley-Baker, S. Hoff, A. Eichelberger and A. Ramirez, email [statusreport@iihs.org](mailto:statusreport@iihs.org). ■

# Marijuana Q&A

Marijuana use can have implications for highway safety, and researchers are monitoring the impact of legalized sales of recreational cannabis. Drawing from studies by IIHS-HLDI and other groups, the Institutes tackle some frequently asked questions in a new Q&A at [iihs.org](http://iihs.org).

## What is marijuana?

Marijuana, also known as cannabis because it is derived from the cannabis plant, is a drug with recreational and medicinal uses. Marijuana contains hundreds of chemical compounds, including several types of cannabinoids, which act on cannabinoid receptors in cells throughout the brain and body. The primary psychoactive (mind-altering) cannabinoid found in marijuana is delta-9-tetrahydrocannabinol (THC). Marijuana also contains nonpsychoactive cannabinoids, such as cannabidiol (CBD).

## What proportion of drivers use marijuana?

A 2015 national phone survey by the Institute found 9 percent of U.S. drivers ages 18 and older reported using marijuana within the past year. Young drivers ages 18-29 were more likely to report past-year marijuana use (19 percent), compared with drivers ages 30-59 (8 percent) and 60 and older (4 percent). Men were more likely to report past-year marijuana use (11 percent), compared with women (6 percent).

The most recent national roadside survey of drivers found that 13 percent of nighttime, weekend drivers and 9 percent of daytime (Friday) drivers tested positive for marijuana in blood or saliva during 2013-14.

## How does marijuana affect driving performance?

Reviews of experimental studies report that recent marijuana use can reduce performance in both simulated and on-road driving, but the effects of marijuana are inconsistent. In some studies, drivers who smoked marijuana had slower reaction times and greater lane position variation, compared with drivers in placebo conditions. Other studies failed to find such differences in reaction time and lane position variation. In addition, drivers who recently smoked marijuana drove more slowly and allowed more headway when following other vehicles, compared with drivers in placebo conditions.

Combining marijuana with alcohol or other drugs may make driving worse than using marijuana alone. A recent study that examined the effects of both alcohol and marijuana found that the combined substances caused greater lane position variation, compared with either substance alone.

## Does marijuana use increase crash risk?

A meta-analysis of 26 studies reported a 32 percent increase in the odds of crash involvement among drivers who used marijuana, compared with those who did not. However, there are many challenges in conducting these studies, and estimates based on them may be biased. For example, many studies did not select crash-involved drivers and controls from equivalent sources, and many failed to control for alcohol use. The best-controlled study did not find THC-positive drivers to be at greater risk of crashing than other drivers, after controlling for alcohol, age and sex, but it is not known how many THC-positive drivers in the federal study were under the effects of marijuana. Unlike alcohol concentrations, THC levels in the body cannot reliably predict impairment, and low levels of THC can be detected for several hours after peak impairment. Therefore, estimates of crash risk from such studies could underestimate the acute effects of marijuana on crash risk.

## Is marijuana use changing in the U.S.?

Yes, marijuana use has been increasing. Nationally, self-reported past-month marijuana use among people ages 12 and older was about 6 percent from 2002 to 2008 and then gradually increased to 9 percent in 2016. However, trends differ by age. From 2002 to 2016, past-month marijuana use declined among ages 12-17 (8 percent to 6 percent) but increased among ages 18-25 (17 percent to 23 percent) and ages 26 and older (4 percent to 7 percent).

In national roadside surveys, the proportion of nighttime, weekend drivers who were positive for marijuana increased from 9 percent in 2007 to 13 percent in 2013-14.



Marijuana-infused edibles, such as these candies (above), are a growing industry in states that have legalized marijuana use for medical and recreational purposes.



### How does marijuana legalization affect use of the drug?

Marijuana use has recently increased in Washington, where recreational use of the drug is legal, though it is not clear to what extent trends in use are attributable to law changes. Washington legalized possession of marijuana in December 2012, and retail sales began in July 2014. The proportion of marijuana-positive drivers in fatal crashes changed little in the state from 2010 to late 2013, but an upward trend in marijuana-positive drivers began in late 2013, about 9 months after possession became legal. The proportion of marijuana-positive drivers involved in fatal crashes increased from 8 percent in 2013 to 17 percent in 2014.

A roadside survey of drivers who did not crash examined marijuana prevalence in drivers before and after retail sales went into effect in Washington. Among weekend, nighttime drivers, marijuana use differed little: 18 percent were marijuana-positive in June 2014 before retail marijuana sales were legal, and 22 percent were marijuana-positive one year later. However, the percentage of daytime (Friday) drivers who were marijuana-positive increased from 8 percent to 19 percent over the same period.

A study of medical marijuana laws found that these law changes were not generally associated with higher marijuana use, but a detailed analysis of specific policies found that allowing dispensaries was associated with a 2-percent-point increase in marijuana use within the past 30 days relative to states that did not allow dispensaries.

### Is it illegal to drive after using marijuana?

In all U.S. states, it is illegal to drive impaired by marijuana. Officers conduct a traffic stop when they observe inappropriate driving behavior. If a driver exhibits signs of impairment after being stopped, the officer conducts pre-arrest screening tests for alcohol and/or drug impairment.

In some instances, an officer with special training may be called to evaluate the driver. If the driver is arrested and drug impairment is suspected, the officer may gather a biological sample, such as blood or urine, to be tested for drugs.

Eleven states (Arizona, Delaware, Georgia, Indiana, Iowa, Michigan, Oklahoma, Pennsylvania, Rhode Island, Utah and Wisconsin) have zero-tolerance *per se* laws for marijuana, which make it illegal to drive with any amount of marijuana in a person's body. South Dakota has a zero-tolerance law for drivers under age 21. Five states (Illinois, Montana, Nevada, Ohio and Washington) have *per se* laws that make it illegal to drive with specified amounts of marijuana in a person's body.

Marijuana *per se* laws may apply only to THC or both THC and its metabolites. States vary in the bodily fluids permitted for testing, and *per se* limits may vary depending on specimen type. Colorado has a reasonable inference law with a THC limit of 5 ng/mL blood. In states where the law doesn't give a specified limit, prosecutors must rely exclusively on documented evidence of impairment and marijuana use for successful prosecution. ■

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**IIHS** is an independent, nonprofit scientific and educational organization dedicated to reducing the losses — deaths, injuries and property damage — from motor vehicle crashes.

**HLDI** shares and supports this mission through scientific studies of insurance data representing the human and economic losses resulting from the ownership and operation of different types of vehicles and by publishing insurance loss results by vehicle make and model.

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