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Unpacking Pot's Impact in Colorado

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During a town hall meeting, Libertarian presidential candidate Gary Johnson said “marijuana-related” traffic deaths, hospital visits and school suspensions in Colorado have “not significantly” increased since the state legalized the drug. That’s inaccurate. Statistics from various official sources show substantial increases.

But the limitations of the data make it impossible to know for sure how many of the documented incidents were directly caused by marijuana use. Unlike alcohol, for example, testing positive for marijuana doesn’t necessarily mean a person is under the influence of the drug at the time of the traffic accident.

Johnson, a former New Mexico governor who supports federal marijuana legalization, discussed the impacts of Colorado’s marijuana laws with CNN’s Anderson Cooper at a [town hall meeting in New York City](#) on Aug. 3.

In November 2000, Colorado [legalized](#) medical marijuana, which allowed qualifying patients or their caregivers to possess up to two ounces and grow six plants. In 2010, the state legalized medical dispensaries, and by 2012 [there were](#) 532 licensed dispensaries in the state and more than 108,000 registered patients.

In November 2012, the state legalized recreational marijuana, which allows any individual over age 21 to grow up to six plants and possess one ounce of marijuana. The 2012 law also permitted marijuana retail stores (in addition to medical dispensaries), the first of which received licenses in January 2014.

Cooper asked Johnson about reports of increases in “marijuana-related” fatalities and other incidents in Colorado under the new laws.

Cooper, Aug. 3: *In Colorado there were increases in marijuana-related hospital visits, apparently traffic deaths, school suspensions. ... How would you deal with other sort of follow-on effects [of legalization]?*

Johnson: *Actually, overall, Anderson, all the statistics were pointing north. Not significantly, but all the statistics were actually north. You may be pointing at some, some aberrations within that.*

Johnson was wrong – increases in these incidents were significant. Marijuana-related traffic deaths increased by 154 percent between 2006 and 2014; Colorado emergency room hospital visits that were “likely related” to marijuana increased by 77 percent from 2011 to 2014; and drug-related suspensions/expulsions increased 40 percent from school years 2008/2009 to 2013/2014, according to a [September 2015 report](#) by the Rocky Mountain High Intensity Drug Traffic Area, a collaboration of federal, state and local drug enforcement agencies.

Quantifying the impact of the legalization of marijuana in states like Colorado will be important for policymakers considering whether to legalize marijuana on a federal level. In June 2014, for example,

Democratic presidential candidate Hillary Clinton [described](#) Colorado and Washington as “laboratories of democracy,” when it comes legalizing marijuana for recreational use.

“We have at least two states that are experimenting with that right now,” Clinton said. “I want to wait and see what the evidence is.”

But, as we said, the limitations of the data make assessing the benefits and costs of legalization difficult.

To unpack Colorado’s statistics, we’ll review the numbers law enforcement and others have collected, and we’ll explain the caveats attached to these findings.

‘Marijuana-Related’ Traffic Deaths

The definition of “marijuana-related” in the Rocky Mountain High Intensity Drug Traffic Area report makes it difficult to draw conclusions from the traffic fatality data, which were drawn from the National Highway Traffic Safety Administration.

In the introduction of its report, the Rocky Mountain HIDTA states that terms such as “marijuana-related” or “tested positive for marijuana” do “not necessarily prove that marijuana was the cause of the incident.” The section on “Impaired Driving” also states that, when it comes to traffic fatalities, “marijuana-related” entails “any time marijuana shows up in the toxicology report [of drivers]. It could be marijuana only or marijuana with other drugs and/or alcohol.”

From 2009 to 2012, the “medical marijuana commercialization years,” the average yearly marijuana-related traffic deaths increased by 48 percent compared with the “early medical marijuana era” between 2006 and 2008. In the first two years after the recreational use of marijuana became legal (2013 to 2014), the average yearly marijuana-related traffic deaths increased by another 41 percent.

From 2006 to 2014 overall, marijuana-related traffic deaths increased by 154 percent, from 37 fatalities with drivers testing positive for marijuana in 2006 to 94 in 2014 — hardly an insignificant increase, as Johnson claimed. For comparison, there were 170 alcohol-related fatalities per year in Colorado between 2003 and 2012, [according to the Centers for Disease Control and Prevention](#).

The Rocky Mountain HIDTA report emphasizes that the proportion of marijuana-related traffic fatalities to traffic fatalities as a whole increased as well: In 2014, marijuana-related traffic fatalities made up 19.26 percent of all traffic deaths, up from 6.92 percent in 2006.

But the increase in the proportion of marijuana-related traffic deaths could merely mean that more people are using the drug — not necessarily that more people are under the influence of marijuana when involved in fatal traffic accidents.

In fact, a [January 2016 Rocky Mountain HIDTA update report](#), which only looked at youth and adult marijuana use, did note that 31.24 percent of college-aged adults (18 to 25) had reported using marijuana in the past month in 2013/2014, compared with 21.43 percent in 2005/2006. Likewise, 12.45 percent of adults 26-years-old and older used marijuana in the past month in 2013/2014, compared with 5.32 percent in 2005/2006.

It’s also worth noting that, according to the report, 37 percent of all drivers in 2014 who tested positive for marijuana, not just those involved in traffic fatalities, also had alcohol in their system. An additional 15 percent of all marijuana-positive drivers had other drugs in their system. And a further 15 percent of drivers had both alcohol and other drugs in their system, along with marijuana. Only 33 percent of tested drivers had only marijuana in their system.

Blood alcohol concentration of 0.08 or greater is the legal threshold for [driving while impaired](#) in all 50 states. Blood alcohol concentration levels do correspond to a person's intoxication level. However, marijuana and [other drugs](#), such as cocaine and prescription pain killers, can stay in a person's system for a few days, so the presence of the drug alone is not necessarily an indicator of intoxication.

[Other states](#) with legalized recreational marijuana also have seen similar trends in marijuana-related traffic fatalities. In May 2016, the American Automobile Association conducted an [analysis](#) of Washington's marijuana-related fatalities and found that around twice as many "fatal-crash-involved drivers" had THC in their system in 2014 compared with previous years. Recreational marijuana became legal in Washington in November 2012.

Like the Rocky Mountain HIDTA's 2015 report, the AAA report cautions that testing positive for THC doesn't mean the driver was impaired or at fault for the crash. The AAA report added that many marijuana-positive drivers also had alcohol and other drugs in their system, "which in some cases likely contributed more significantly to the crash than did the THC."

The National Institute on Drug Abuse [also states](#) that "the role played by marijuana in [traffic] accidents is often unclear, because it can remain detectable in body fluids for days or even weeks after intoxication and because users frequently combine it with alcohol." Though the NIDA adds, "The risk associated with marijuana in combination with alcohol appears to be greater than that for either drug by itself."

A [February 2015 "Drug and Alcohol Crash Risk" study](#) by the National Highway Traffic Safety Administration did find "a statistically significant increase" in crash risk (1.25 times) for drivers who tested positive for THC. But after the researchers controlled for age, gender, ethnicity and alcohol concentration level, increased crash risk associated with marijuana was no longer significant. This suggests these other variables "account for much of the increased risk associated ... with THC," write the study authors.

There's also some evidence that medical marijuana laws may contribute to *decreasing* traffic fatalities. One [study](#) published in *The Journal of Law & Economics* in 2013 reviewed traffic fatalities in the 19 states that had passed medical marijuana laws by 2010 and found that "legalization is associated with an 8–11 percent decrease in traffic fatalities" for the year after the laws took effect. The researchers from the University of Colorado, Denver and elsewhere also found that the decrease is more significant for alcohol-related fatalities at 13.2 percent.

To be clear, there is evidence that "marijuana significantly impairs judgment, motor coordination, and reaction time," [according to the NIDA](#).

There is also no doubt that marijuana intoxication alone has played a direct role in some fatal crashes. The [Rocky Mountain HIDTA 2015 report](#), for example, cites a November 2014 case in which a teenager driving under the influence of only marijuana hit and killed a 16-year-old high school student. In addition to testing positive for marijuana, the teenager also showed visible signs of intoxication, such as having trouble walking in a straight line and smelling like the drug. Passengers in the car also said the driver had smoked marijuana in the car prior to driving.

Still, the question remains as to whether Colorado's marijuana laws, or Washington's for that matter, have directly led to surges in traffic fatalities overall. At this point, the data don't conclusively prove that they have.

‘Marijuana-Related’ Hospital Visits

The [Rocky Mountain HIDTA 2015 report](#) says data on "marijuana-related" hospital visits come from "lab tests, self-admitted or some other form of validation by the physician."

But the data are not *directly* obtained from lab tests or physicians. The 2015 report primarily includes numbers crunched by the Colorado Department of Public Health and Environment, which used medical codes as a means of quantifying marijuana-related emergency room visits. Medical coding translates information from hospital charts, which could include lab test results and a physician's notes, into alphanumeric codes used for billing and insurance purposes.

In other words, the “marijuana-related” information pertaining to emergency room visits goes through at least one round of telephone before it's translated into statistics by CDPHE and other groups. As we'll explain, this is part of the reason why these codes don't “necessarily prove marijuana was the cause of the emergency admission,” as the [Rocky Mountain HIDTA report states](#).

The report breaks the data down into Colorado emergency department rates for visits that are “likely related” and “could be related” to marijuana. The former showed a 77 percent increase from 2011 to 2014; the latter a 68 percent increase.

Emergency room visits that *could be related* to marijuana included “any mention of marijuana” in the medical codes, and that was “not necessarily related to the underlying reason” for seeking medical care, [according to the Colorado Department of Public Health and Environment](#).

Emergency room visits that are *likely related* to marijuana included instances in which medical codes for poisoning by psychodysleptics are mentioned. They also included instances in which codes for cannabis abuse are listed first, second or third by medical coders.

The state health department [argues](#) that, among a group of about 15 to 30 codes filed for emergency room visits, the first three codes are more likely to be “clinically significant” than codes recorded further down the list.

A psychodysleptic is a drug that produces hallucinations, such as LSD and psilocybin (mushrooms). In large doses, marijuana can also induce hallucinations, [according to the NIDA](#). This means some cases included in CDPHE statistics may have been due to other psychodysleptics, and not marijuana.

Furthermore, [Andrew Monte](#), an emergency medicine physician and medical toxicologist at the University of Colorado, Denver, told us by email that the order in which medical codes are listed is, in his experience, “arbitrary” because they are “assigned by billers, not practitioners at the bedside.”

For this reason, Monte and his colleagues chose to look at all instances of only marijuana-related medical codes in their [recent study](#) on emergency department visits related to the drug.

Published in *The New England Journal of Medicine* in February 2016, Monte's study found that the rate of emergency department “visits possibly related to cannabis use among out-of-state residents doubled from 85 per 10,000 visits in 2013 to 168 per 10,000 visits in 2014, which was the first year of retail marijuana sales.” But for Colorado residents, “the rate of ED visits possibly related to cannabis use did not change significantly between 2013 and 2014.”

This difference between out-of-towners and residents, Monte and his colleagues reason, “may represent a learning curve during the period when marijuana was potentially available to Colorado residents for medical use ... but was largely inaccessible to out-of-state residents.”

Still, Monte told us his “study design is flawed” because “many of the included cases are not due to cannabis,” since the data comes from medical codes.

The state health department report also [states](#) that increases in emergency room visit rates in Colorado “have many potential explanations” and that without a full medical record review, it cannot “determine with certainty whether marijuana was truly a causal or contributing factor,” even in “likely related” cases. “This is a significant limitation,” the state health department report says. Monte agreed. In fact, he currently has “a group working on this but it takes months to get through these charts.”

Overall, Monte said, he has “clearly seen increased adverse effects from cannabis use,” but Colorado’s “emergency departments and hospitals are not overrun by cannabis related complaints.”

Marijuana-Related School Suspensions

The [Rocky Mountain HIDTA 2015 report](#) also says, “Drug-related suspensions/expulsions increased 40 percent from school years 2008/2009 to 2013/2014. The vast majority were for marijuana violations.” This is also a significant increase, despite Johnson’s claim.

However, it isn’t clear whether the increase was due solely to marijuana, because the Colorado Department of Education collects data on drug-related suspensions and expulsions in general, not those particular to marijuana.

The Rocky Mountain HIDTA 2015 report says that the education department lumps all drug-related suspensions and expulsions together. But, it adds, department “officials reported that most drug-related suspensions/expulsions reported since the 2008/2009 academic year have been related to marijuana.”

To support this claim, the 2015 report cites a website run by Dr. [Christian Thurstone](#), an expert in youth substance abuse at the University of Colorado, Denver. A [post](#) on Dr.Thurstone.com said that “officials with the Colorado Department of Education (CDE) say the state’s schools are reporting ‘a sharp rise’ in marijuana-related troubles for students.”

But that’s not exactly what the one state education official said. Janelle Krueger, manager of the department’s Expelled and At-Risk Student Services program, [told](#) the *Denver Post* in November 2013, “We have seen a sharp rise in drug-related disciplinary actions which, anecdotally, from credible sources, is being attributed to the changing social norms surrounding marijuana.”

So Krueger didn’t say she was speaking specifically of marijuana-related suspensions and expulsions, but, rather, “drug-related disciplinary actions,” which could include other drugs and other less severe punishments.

The Rocky Mountain HIDTA 2015 report does provide anecdotal evidence from surveys of 95 school resource officers in Colorado: 90 percent of school officers reported an increase in marijuana-related incidents since the legalization of recreational marijuana; 9 percent saw no change, and 1 percent saw a slight decrease. The predominant marijuana violation seen by the majority of school officers was the possession of marijuana.

But there are at least two reasons why these surveys cannot conclusively show how many suspensions and expulsions are due to the legalization of marijuana. First, it’s unclear whether the marijuana-related incidents cited by school officers led to suspensions or expulsions. More important, the surveys reflect the resource officers’ impressions of the impact that marijuana laws have had on students at their schools, which aren’t quantitative and objective statistics.

In fact, some education department data suggest expulsions specifically related to marijuana have decreased between the 2012/2013 and 2013/2014 school years.

In December 2014, Krueger and colleagues at the education department [reported](#) that, for students who participated in the state’s Expelled and At-Risk Student Services Program, “30.5% had been expelled for

marijuana-related code of conduct violations” during the 2013/2014 school year, compared with 32.6 percent for 2012/2013. However, for both years, marijuana-related expulsions did make up the [largest proportion](#) of all expulsions.

But are kids using pot more often since Colorado made it legal?

The [2016 Rocky Mountain HIDTA updated report](#) says yes, citing results from the National Survey on Drug Use and Health: 12.56 percent of youth ages 12 to 17 said they had used marijuana in the past month in 2013/2014 in Colorado, compared with 7.6 percent in 2005/2006.

However, according to the Department of Public Health and Environment’s [2015 Healthy Kids Colorado Survey](#), Colorado’s high school students’ marijuana habits haven’t changed much since 2009. In 2009, 25 percent of high school students said they had used marijuana in the past month, compared with 21 percent in 2015. Likewise, in 2009, 43 percent said they had tried marijuana once in their lifetime, compared with 38 percent in 2015.

Drug-related suspensions and expulsions have increased in Colorado. School officers also say they’ve seen an increase in marijuana-related incidents. But anecdotal testimony isn’t quantitative data. As for whether or not students are using marijuana more often today compared with years prior, the research has produced conflicting data.

Johnson was wrong when he claimed “marijuana-related” traffic deaths, hospital visits and school suspensions in Colorado have “not significantly” increased. All three have. What we don’t know is whether marijuana use is the cause of the increases or, if it is, to what extent.

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