



15173 Willowbrook Lane  
Morrison, Colorado  
80465

(303) 478-7636  
ed.wood@alumni.hmc.edu

*Education and promoting effective laws to reduce Driving Under the Influence of Drugs (DUID) – A scientifically - based perspective from DUID Victims.*

Review of highway safety claims from “State Cannabis Laws: A progress report,” published by the Cannabis Industry Association, May 2018.

The Cannabis Industry Association (CIA) opened its one-page discussion on Highway Safety with a statement that policies should be adopted to prevent impaired driving, and that those policies should be based on science. Fair enough. Its reason for supporting at least the last half of its platitudinous statement? It’s opposition to 5 ng/ml THC *per se* laws. “Driving laws not rooted in science puts innocent people at risk for arrest and prosecution.” CIA didn’t mention that those laws also prevent conviction of most marijuana-impaired drivers, thereby further victimizing crash victims.

CIA then selected seven reports to support two points:

1. Driving impairment caused by marijuana isn’t even a problem, and
2. THC *per se* limits to determine impairment are not scientifically based.

CIA’s first point is wrong, the second point is correct. Let’s take the cited reports and quotes one-by-one in the order presented by CIA:

1. Cato Institute’s Sept 16, 2016 report, “Dose of Reality, The Effect of State Marijuana Legalizations.”

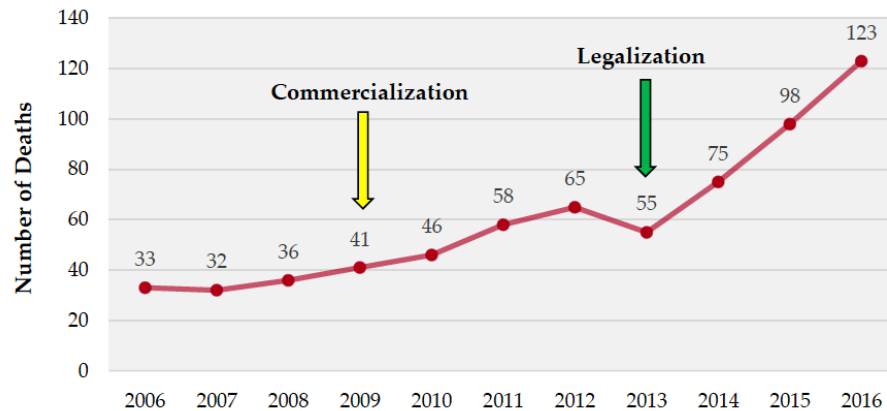
Cato measured “total traffic fatalities” to determine the highway safety effect of marijuana legalization. That is a very blunt instrument to measure marijuana’s impact because highways are generally very safe and a very small proportion highway deaths are caused by use of marijuana.

A 2017 French study [Martin, 2017] of 4,059 drivers found, “Drivers under the influence of cannabis multiply their risk of being responsible for causing a fatal accident by 1.65 (1.16-2.34), and the proportion of fatal accidents which would be prevented if no drivers ever drove under the influence of cannabis is estimated at 4.2% (3.7%-4.8%).”

With the high variation from year-to-year in any state’s traffic fatality numbers, even a doubling of fatalities due to marijuana can escape statistical significance. And

Colorado may have seen a doubling of such deaths based upon the same FARS reports used by Cato:

### Traffic Deaths Related to Marijuana when a Driver Tested Positive for Marijuana



SOURCE: National Highway Traffic Safety Administration, Fatality Analysis Reporting System (FARS), 2006-2011 and Colorado Department of Transportation 2012-2016

- Jayson Aydelotte’s Aug 2017 paper, “Crash fatality rates after recreational marijuana legalization in Washington and Colorado.”

CIA claimed this was published in the *Journal of American Medicine*, which does not exist. The paper was actually published in the *American Journal of Public Health*, which has published similar articles in the past. The following letter was sent to AJPH for publication:

Readers should avoid inferring too much from August’s Aydelotte report, since the authors did not study the impact of marijuana use on driving safety. They looked at *all* collisions, not just collisions caused by impaired drivers. A multitude of other studies have already convincingly shown that marijuana can and does cause driving impairment, crashes, and death<sup>1,2,3</sup>.

“Total fatal crashes” is a very blunt tool to measure the impact of marijuana legalization on traffic fatalities. Marijuana involvement in fatal crashes is a small portion of the total, and marijuana-only impaired drivers is an even smaller portion. For example, in Colorado the percentage of drivers in fatal crashes testing positive for cannabinoids rose from 9% in 2009 to

<sup>1</sup> <https://www.ncbi.nlm.nih.gov/pubmed/23220273>

<sup>2</sup> <https://drive.google.com/file/d/0B0tmPQ67k3NVQIFnY3VzZGVmdFk/view>

<sup>3</sup> [http://www.annalsofepidemiology.org/article/S1047-2797\(16\)30438-0/pdf](http://www.annalsofepidemiology.org/article/S1047-2797(16)30438-0/pdf)

20% in 2016 according to the same FARS database<sup>1</sup> used by Aydelotte. By measuring total fatal crashes, even a doubling in traffic fatalities caused by increased marijuana consumption would be diluted by all the other causes of traffic fatalities.

Aydelotte's study captured FARS data from 2009 through 2015, and chose 2012 as the cutoff date to define pre/post legalization. But the cutoff date is arbitrary and not particularly useful for two reasons. First, most changes in marijuana use in Colorado began in 2009 and 2010 when commercialization was enabled by the issuance of the Ogden memo<sup>2</sup>. Second, although 2012 was the date of Colorado's legalization vote, legal availability did not begin until 2014, a point the authors acknowledged.

Aydelotte et al. found that since legalization, the fatality rate change per year *rose* in Colorado and Washington by 0.3 fatalities per Billion Vehicle Miles Traveled (BVMT), whereas the rate change per year *dropped* in the comparison states by 0.8, a difference of 1.1 fatalities/BVMT. Since the comparison states weren't identical to Colorado and Washington in many respects, the authors applied 9 adjustment factors to their raw data including 3 for economic health and 3 for congestion. The effect of these adjustments was to lower the difference in fatalities/BVMT by over 80% to 0.2 fatalities/BVMT.

After factoring in their adjustments, the authors estimated Colorado and Washington had 77 excess crash fatalities over nearly 38 million person-years of exposure. They commented, "We do not view that as a clinically significant effect, but others might disagree."

Presumably the 77 "excess crash fatalities" would disagree, had they survived.

AJPH rejected the submitted letter since a response from the author would require additional research and recalculation. See CIA reference #5 for a different kind of response to a similar letter from a reputable journal.

### 3. Richard Compton's Feb 2015 report, "Drug and Alcohol Crash Risk."

It's true that the cited study failed to find a statistically significant link between crash risk and marijuana presence, but failure to find a risk is not the same as finding there is no risk. Especially with a study not designed to find such a risk in the first place.

The CIA authors did not mention that the same study failed to find a link between crash risk and the use of any drug: cocaine, methamphetamine, opioids, or any combinations of those drugs, all of which are even more impairing than marijuana. They couldn't find significant links because of the study's basic flaws documented elsewhere [DUID Victim Voices, 2015].

---

<sup>1</sup> [http://www.rmhidta.org/html/FINAL\\_2017\\_Legalization\\_of\\_Marijuana\\_in\\_Colorado\\_The\\_Impact.pdf](http://www.rmhidta.org/html/FINAL_2017_Legalization_of_Marijuana_in_Colorado_The_Impact.pdf)

<sup>2</sup> <https://www.ncbi.nlm.nih.gov/pubmed/24831752>

4. Andrew Sewell's 2009 paper, "The effect of cannabis compared with alcohol on driving."

Sewell's paper repeated an observation made more than a decade earlier that drivers under the influence of marijuana retain insight into their impairment and will compensate where they can, for example by driving more slowly.

CIA didn't bother to report Sewell's very next sentence, "Unexpected events are still difficult to handle under the influence of marijuana, however, and the combination of low-dose alcohol and low-dose cannabis causes much more impairment than either drug used alone."

Furthermore, recent studies have further debunked some of this "compensation" notion.

"Regular cannabis users often admit to driving under the influence of cannabis and wrongfully believe that cannabis does not affect their driving performance or that they can compensate for cannabis-associated impairment." [Ramaekers, 2018]

5. Ole Rogeberg's 2016 paper, "The effects of cannabis intoxication on motor vehicle collision revisited and revised."

CIA's misrepresented Rogeberg's paper. Rogeberg indeed found (based on research of others) that impairment caused by marijuana is less than the impairment caused by alcohol. The increase in risk of crashes due to marijuana is lower than the increase to due alcohol. No one questions that. But by no stretch of the truth does that mean that marijuana doesn't increase risk.

The "odds ratio," or chance of being in a fatal crash due to marijuana impairment is lower than the odds ratio for alcohol. Rogeberg reported marijuana's odds ratio for fatal crashes to be 1.2 or 1.4, depending on how it is calculated.

Gjerde criticized Rogeberg's study, claiming that his determination of odds ratio was flawed [Gjerde, 2016].

Rogeberg responded to Gjerde's criticism agreeing in part. He recalculated the odds ratio to be 1.4 and noted that drunk drivers have a much higher odds ratio. Few, if any, disagree with those findings. [Rogeberg, 2016]

6. AAA Foundation for Traffic Safety's 2016 Fact Sheet, "Cannabis Research."

CIA quoted the Fact sheet correctly, "no science showing that drivers reliably become impaired at a specific level of marijuana in the blood." This is from a very well done study by Logan et al. [Logan, 2016]

The current science agrees that blood levels of THC do not measure impairment.

7. Richard Compton's 2017 report, "Marijuana-impaired driving: A Report to Congress."

CIA quoted the NHTSA report correctly as well.

## References

DUID Victim Voices <http://www.duidvictimvoices.org/good-data-bad-statistical-inferences/>

Gjerde H, Morland J. Risk for involvement in road traffic crash during acute cannabis intoxication. *Addiction*. 2016;111(8):1492-1495

Logan BK, Kacinko SL, Beirness DJ. An evaluation of data from drivers arrested for DUI in relation to per se limits for cannabis (May 2016) AAA Foundation for Traffic Safety

Martin, JL, Gadegebeku B, Wu D. Cannabis alcohol and fatal road accidents. *PLOS One* (2017) 12(11)

Ramaekers JG. Driving Under the Influence of Cannabis: An Increasing Public Health Concern. *JAMA*. March 26, 2018

Rogeberg O, Elvik R. Response: cannabis intoxication, recent use and road traffic crash risks *Addiction*. 2016;111(8):1495-1498