

# Developing a roadside test for marijuana intoxication isn't as easy as it sounds

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As the movement to legalize marijuana in the United States gains momentum, researchers worry about keeping the public safe, particularly on the roads. Recent studies in which marijuana users took controlled

doses of cannabis in the lab have identified new biomarkers that can be used to estimate a person's recent cannabinoid intake. But, using those markers to judge cognitive and behavioral impairment is complex, say toxicologists in a commentary published on January 25 in a special issue of the journal *Trends in Molecular Medicine* on biomarkers of substance abuse.

"There is no one blood or oral fluid concentration that can differentiate impaired and not impaired," says Marilyn Huestis, who spent over 20 years leading cannabinoid-related research projects at the National Institute on Drug Abuse. "It's not like we need to say, 'Oh, let's do some more research and give you an answer.' We already know. We've done the research."

Alcohol can impair a user more than cannabis, and indeed, the risk of an accident while driving increases in proportion with blood alcohol concentrations. But pot is different: many variables can affect how impaired someone is at any given concentration of  $\Delta 9$ -tetrahydrocannabinol (THC), the primary psychoactive agent in cannabinoids. Whether it is inhaled or consumed, or whether the user titrates their own dose, can affect the level of impairment. And pairing cannabis with alcohol makes the high higher, and the alcohol buzz last longer.

Another problem is that THC quickly leaves the bloodstream. Previous research by Huestis has shown that while an occasional user is impaired for 6 to 8 hours, blood THC concentrations can be effectively zero after 2.5 hours. And on average in the United States, it takes from 1.4-4 hours after a crash or traffic stop to administer a blood test. "If someone is driving impaired, by the time you get their blood sample, you've lost 90% or more of the drug. So, we have to change what we do at the roadside," says Huestis.

Long-term daily cannabis users, like those who use [marijuana](#) for medical reasons, also present a challenge for developing roadside protocols. THC accumulates in the tissues of the body and then slowly releases over time, meaning that chronic users can test positive for cannabis even after 30 days of abstinence. Psychomotor impairment can be observed three weeks after the last dose. "You want people to be taking medicinal cannabinoids and now you know that their driving is going to be impacted," says Huestis. "So how do you handle that problem?"

Huestis, like most researchers, doesn't support a legal driving limit for cannabis like the one in place for blood alcohol concentrations. Instead, she advocates for well-trained police officers who can identify the behavioral signs of impairment and less invasive biological marker tests, which could be immediately performed at the roadside to confirm the presence of a cannabinoid. To that end, recent research has identified new [blood](#) and urine markers, and tests using breath and saliva markers are being developed.

The implications go beyond driving. These new markers and tests could also be used to assist in treating drug dependence, in determining appropriate therapeutic levels of medical marijuana, and for monitoring women who want to stop using cannabinoids during pregnancy.

Huestis, who also owns a toxicology consulting company with her co-author, Michael Smith, isn't opposed to legalization. But she does want to make sure that marijuana's status as a legal drug and a medicine doesn't make us complacent. "Cannabis probably is less dangerous to use than [alcohol](#)," she says. "There's less morbidity and mortality associated with it, but there's still a lot of problems. And we as a public are not recognizing this."

**More information:** *Trends in Molecular Medicine*, Huestis and Smith:

"Cannabinoid Markers in Biological Fluids and Tissues: Revealing Intake" [www.cell.com/trends/molecular- ...](http://www.cell.com/trends/molecular-...) 1471-4914(17)30229-0 , DOI: [10.1016/j.molmed.2017.12.006](https://doi.org/10.1016/j.molmed.2017.12.006)

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