



Working to Reform Marijuana Laws

***Written Testimony of Paul Armentano,
Deputy Director of the National Organization for the Reform
of Marijuana Laws (NORML)***

My name is Paul Armentano and I am here to today to testify in support of Assembly Bill 400, which removes Nevada’s arbitrary and unscientific *per se* standards for THC and its metabolite.

For over 25 years I have worked professionally in the field of marijuana policy, with a particular emphasis on the science specific to cannabis’ effect on driving performance and traffic safety. My work on this issue has been highlighted in the peer-reviewed scientific literature and in various academic anthologies, and I have presented at numerous academic and legal symposiums on drugged driving.

I am a court certified expert on issues pertaining to cannabis and psychomotor performance, and I have attended many accredited educational forums on the topic, including those sponsored by the American Academy of Forensic Sciences (AAFS), the Society of Forensic Toxicologists (SOFT), the International Council on Alcohol, Drugs, and Traffic Safety (ICADTS), and the National Institute on Drug Abuse (NIDA). I have previously testified before Nevada legislators on this topic – having first done so before the Nevada Subcommittee on the Medical Use of Marijuana¹ in 2014.

¹ Testimony of Paul Armentano before the Nevada Subcommittee on the Medical Use of Marijuana. August 21, 2014

https://norml.org/pdf_files/testimony/NORML_Testimony_NV_Medical_Marijuana_Use.pdf



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I currently serve as the Deputy Director for the National Organization for the Reform of Marijuana Laws (NORML) – a public interest advocacy organization based in Washington, DC.

NORML’s official position on this issue is clear. We oppose the act of driving under the influence of any controlled substance, including cannabis², and we support evidence-based laws, tools, and other legal efforts to discourage this behavior and to provide law enforcement with the ability to better target these drivers and remove them from our roads.³ That said, **we adamantly oppose the imposition of *per se* limits for the presence of THC or its metabolite because such thresholds are not evidence-based and because they inadvertently prosecute non-impaired drivers as if they are a legitimate traffic safety threat.**

Leading Traffic Safety Experts Oppose *Per Se* Limits for Cannabis

It is well-established by leading experts in the field that neither *per se* limits for THC or its metabolite are consistent or appropriate predictors of driving impairment. In fact, there is no legitimate debate on this issue.

Specifically, the premiere traffic safety agency in the United States, the National Highway Traffic Safety Administration (NHTSA), acknowledges: “It is difficult to establish a relationship between a person's THC blood or plasma concentration and performance impairing effects. ... **It is inadvisable to try and predict effects based on blood**

² See NORML’s Principles of Responsible Use: II No Driving – “Responsible cannabis consumers never operate motor vehicles in an impaired condition. Public safety demands not only that impaired drivers be taken off the road, but that objective measures of impairment be developed and used, rather than chemical testing.”

<https://norml.org/principles/>

³ Armentano. 2012. Cannabis and psychomotor performance: A rational review of the evidence and implications for public policy. *Drug Testing & Analysis* 5: 52-56.

<https://analyticalsciencejournals.onlinelibrary.wiley.com/doi/abs/10.1002/dta.1404>



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THC concentrations alone, and currently impossible to predict specific effects based on THC-COOH (metabolite) concentrations.”⁴

On-road driving performance studies coordinated by NHTSA confirm this conclusion, finding, **“One of the program’s objectives was to determine whether it is possible to predict driving impairment by plasma concentrations of THC and/or its metabolite, THC-COOH, in a single sample. The answer is very clear: it is not.** Plasma of drivers showing substantial impairment in these studies contained both high and low THC concentrations; and, drivers with high-plasma concentrations showed substantial, but also no impairment, or even some improvement.”⁵

A 2016 study conducted by the American Automobile Association (AAA) also concludes, "There is no evidence from the data collected, particularly from the subjects assessed through the DRE exam, that any objective threshold exists that established impairment, based on THC concentrations.”⁶

A 2019 Congressional Research Service report, entitled *Marijuana Use and Highway Safety*, similarly determines: **“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

⁴ NHTSA. Drugs and Human Performance Fact Sheet: Cannabis/Marijuana
https://www.wsp.wa.gov/breathtest/docs/webdms/DRE_Forms/Publications/drug/Human_Performance_Drug_Fact_Sheets-NHTSA.pdf

⁵ US DOT, NHTSA Final Report: Marijuana and Actual Driving Performance, page 107.
<https://rosap.nhtl.bts.gov/view/dot/1558>

⁶ AAA. *An Evaluation of Data from Drivers Arrested for Driving Under the Influence in Relation to Per Se Limits for Cannabis*. May 2016.
<https://aaafoundation.org/wp-content/uploads/2017/12/EvaluationOfDriversInRelationToPerSeReport.pdf>



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Administration, have observed that using a measure of THC as evidence of a driver's impairment is not supported by scientific evidence to date."⁷

Two recent state-appointed task forces on drugged driving – one in Michigan and another in California – have reaffirmed this position in recent months in their recommendations to lawmakers. In California, recommendations of a task force led by the California Highway Patrol concluded: **“Drugs affect people differently depending on many variables. A *per se* limit for drugs, other than ethanol, should not be enacted at this time as current scientific research does not support it.”**⁸ In Michigan, a report from the state’s Impaired Driving Safety Commission similarly concluded: **“[B]ecause there is a poor correlation between Δ 9-THC bodily content and driving impairment, the Commission recommends against the establishment of a threshold of delta-9-THC bodily content for determining driving impairment.”**⁹

This is not a matter of “we need more study.” This issue has been studied extensively and the results are clear and consistent. This reality is best summarized by Dr. Marilyn Huestis, who spent over 25 years studying this issue at the US National Institute on Drug Abuse and is one of the leading scholars in the world on the issue of cannabis and driving performance, who said: **“There is no one blood or oral fluid concentration that can differentiate impaired and not impaired. It’s**

⁷ Congressional Research Service. *Marijuana use and Highway Safety*. May 14, 2019. <https://crsreports.congress.gov/product/pdf/R/R45719>

⁸ CHP Impaired Driving Task Force, Report to the Legislature. January 2021 <https://www.canorml.org/wp-content/uploads/2021/03/Senate-Bill-94-2017-CHP-Report-to-the-Legislature-Impaired-Driving-Task-Force-Report.pdf>

⁹ Report from the Impaired Driving Safety Commission. March 2019 https://www.michigan.gov/documents/msp/Impaired_Driving_Report_650288_7.pdf



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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.”¹⁰

Why Are *Per Se* Limits Inadvisable for Cannabis?

There are several reasons why neither the identification of THC nor its metabolite is not well correlated with either driving impairment or recency of cannabis exposure.

First, THC possesses unique pharmacokinetics (absorption patterns). For example, when inhaled, THC/blood levels rise to maximal levels almost instantly, well before the onset of acute impairment.¹¹ These levels then begin to decline precipitously during the acute impairment phase. This relationship is the exact opposite of that of alcohol, in which rising BAC levels are consistently correlated with both the level of consumption and the degree of intoxication.

By contrast, when THC is consumed orally, THC blood levels barely rise at all – despite associated (and longer lasting) intoxication.

Second, because THC is lipid soluble, trace quantities of it may remain present in blood for days after past exposure – long after any intoxication has worn off. Specifically, scientific studies have documented **the presence of residual quantities of THC in the blood of more frequent cannabis consumers at levels above Nevada’s existing standards for periods of time exceeding seven days¹² – long**

¹⁰ https://www.eurekalert.org/pub_releases/2018-01/cp-dar011818.php

¹¹ Schwope et al. 2012. Psychomotor performance, subjective and physiological effects and whole blood delta-9- tetrahydrocannabinol concentrations in heavy, chronic cannabis smokers following acute smoked cannabis. *Journal of Analytical Toxicology*: 1-8.

¹² Odell et al. 2015. Residual cannabis levels in blood, urine and oral fluid following heavy cannabis use. *Forensic Science International*: 173-180.



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after any psychomotor impairing effects have long subsided.¹³ At present, there exists no technology that can differentiate between cannabis exposure that occurred within the past several hours versus exposure that occurred within the past several days.

Three, subjects’ response to THC is much more variable than it is for alcohol. For example, experienced cannabis consumers – such as those patients legally protected under Nevada’s medical cannabis law who consume it daily, tend to display little to no change in psychomotor performance following cannabis administration,¹⁴ while more naïve may display changes in reaction time, brake latency, and in standard deviation of lateral positioning. Several papers in the scientific literature affirm this phenomenon of cannabis tolerance.¹⁵ One literature review finds, “Patients who take cannabinoids at a constant dosage over an extensive period of time often develop tolerance to the impairment of psychomotor performance, so that they can drive vehicles safely.”¹⁶ Similarly, the US Food and Drug Administration acknowledges persons acclimated to the effects of oral THC “are able to tolerate the drug and to perform such tasks safely.”¹⁷

Fourth, it should be acknowledged that Nevada’s arbitrary and unscientific THC thresholds were enacted absent any scientific input. None of the expert agencies or scientists that I cite today in my testimony participated in this legislative debate. In fact, my recollection

¹³ Ronen et al., 2008. Effects of THC on driving performance, physiological state and subjective feelings relative to alcohol. *Accident, Analysis and Prevention*: 926-934.

¹⁴ Sewell et al., 2009. The effect of cannabis compared with alcohol on driving. *American Journal of Addiction*: 185- 193.

¹⁵ Colizzi and Bhattacharyya. 2018. Cannabis use and the development of tolerance: A systematic review of human evidence. *Neuroscience & Behavioral Reviews*: 1-25.

¹⁶ Grotenhermen and Muller-Vahl. 2012. The therapeutic potential of cannabis and cannabinoids. *Duetsches Arzteblatt International*: 495-501.

¹⁷ Online at: <http://www.fda.gov/ohrms/dockets/dockets/05n0479/05N-0479-emc0004-04.pdf>



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of the debate was that the thresholds currently imposed were decided upon solely based the LLQs (lowest levels of quantification). An LLQ simply refers to the lowest amount of an analyte in a sample that can be quantified with acceptable precision and accuracy.”¹⁸

To be clear, these limits have nothing to do with either science, accurately determining impairment, or promoting public safety. **These arbitrary limits were enacted at a time when Nevada imposed a blanket prohibition on the possession and use of cannabis.** This is not the case any longer. Today, marijuana is available at retail for both state-qualified patients as well as adults over the ages of 21.

In Conclusion:

The existing *per se* thresholds are not evidence-based; they are opposed by experts in the field, and they are entirely inconsistent with separate state statutes that legally permit for the consumption of cannabis in private. Because the majority of qualified patients recommended medicinal cannabis consume the substance either daily or near-daily, it is probable that most, if not all, of this patient population is vulnerable to criminal prosecution under Nevada’s existing *per se* statute any time they operate a motor vehicle – absent any evidence of behaviorally impairment. Most adult users, including those who only consume cannabis occasionally, are also equally vulnerable to prosecution under this statute.

Accordingly, I urge lawmakers to advance Assembly Bill 400 to strike down these arbitrary, unscientific, and onerous standards.

¹⁸ <https://link.springer.com/article/10.1007/s10337-010-1869-2/tables/4>