

A Judicial Perspective on Expert Testimony in Marijuana Driving Cases

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Abstract The decriminalization of marijuana and propagation of marijuana prescribed for medical reasons have resulted in an increase in driving while under the influence of marijuana. Currently, the legal definition of marijuana driving impairment varies by state across the United States. Expert witnesses such as drug recognition experts and medical toxicologists are needed during a discovery to educate attorneys and during a testimony to educate judges and juries. These proceedings provide an overview of the US case law about driving impairment, the current status of the legal thresholds used in the courts for the admission of the medical toxicologist as an expert witness in marijuana driving and related cases, and provides an understanding of evolving issues surrounding the admissibility of their scientific opinion testimony.

Keywords Drugs of abuse · Cannabinoids · Analytical and forensic toxicology · Expert testimony

Expert Toxicology Testimony in Marijuana Driving Cases

The decriminalization of marijuana along with the propagation of medical marijuana and recreational marijuana laws across the country [1] has resulted in an increase in marijuana use [2] and an increase in driving while under the influence of marijuana. It is inevitable that more marijuana driving

impairment cases will traverse the courts. The legal definition of marijuana driving impairment varies across the country, with some states having zero tolerance laws with and without the inclusion of inactive THC metabolites; some that are based on observations, circumstances, and lab results; and some setting an actual blood nanogram-based impairment level or THC blood concentration. [3] Typically, these cases will involve charges of driving while impaired by drugs as opposed to the garden variety alcohol impaired driving case. With the exception of 16 states that have separate driving under the influence of drug statutes, the majority of drugged driving laws are encompassed within the alcohol driving laws.

More than ever, expert witnesses such as drug recognition experts (DREs) [4] and medical toxicologists may be needed to educate judges and juries. Marijuana driving impairment cases are classified as criminal charges and, therefore, the burden of proof in these cases is the highest one that the court assesses: “beyond a reasonable doubt.” This is the same burden that applies to the first degree murder cases, and many factors affect the ability to meet this burden. It is probably insufficient to offer the court or jury the observations of the defendant’s aberrant driving, the proper issuance of a warrant for drug testing, failed standard field sobriety tests (SFSTs), DRE findings, the defendants’ incriminating or exculpatory statements, or physical evidence to meet that high burden. The toxicological analysis addressing the testing results that support or refute the conclusion of impairment becomes almost critical to the case.

This manuscript will address the legal thresholds used in the courts for the admission of a medical toxicologist, or any other specialist, as an *expert* in marijuana driving cases and the admissibility of their scientific opinion testimony. Evolving issues related to the applicability of the standard field sobriety tests to marijuana driving impairment will be addressed, as will the relationship of THC blood concentrations and marijuana driving

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impairment, and the influence of factors such as metabolism, tolerance, dosage, and gender. Finally, this paper will set forth the current legal status for the admissibility of toxicology reports and offer some example questions that the medical toxicologist, as an expert, may encounter in the marijuana impairment driving case.

The Legal Threshold for the Admissibility of Expert Scientific Opinion Testimony

Under typical state and federal rules of evidence, the first threshold for the admission of an *expert* is the judge's decision about whether an expert is actually needed in the case. In order to make that determination, the judge has to find that the expert has "scientific, technical, or other specialized knowledge that will help the trier of fact to understand the evidence or to determine a fact in issue." [5] A judge in a court trial and a jury in a jury trial are considered the trier of fact. Given the scientific complexity and uniqueness of marijuana impaired driving cases, this first threshold should be easily accomplished because both the judge and the jury are not typically knowledgeable about toxicology and would benefit from the expert's knowledge.

Once the toxicologist is admitted to assist the trier of fact, the next test is whether based upon their knowledge, education, skills, and experience, the toxicologist meets the standards for admissibility necessary to render an opinion specifically on marijuana driving impairment. If the toxicologist has been admitted as an expert on a marijuana driving or drugged driving cases in the past, it could greatly increase their admissibility for this purpose. With the exception of a new toxicologist who has never testified in these type of cases, this threshold is typically easily accomplished. The more problematical challenge is what the toxicologist will opine about THC blood concentrations and driving impairment and whether the scientific evidence will support the toxicological conclusions.

Assuming that the toxicologist has met the threshold of admissibility as an expert toxicologist who may render an opinion on marijuana driving impairment, the scientific opinion will be analyzed under a variety of appellate case laws and rules of evidence across the country. The initial analysis was generated from the 1923 *Frye v. United States* case. [6] In *Frye*, the D.C. Circuit considered the admissibility of testimony based on the systolic blood pressure test, a precursor of the modern polygraph. The court announced that a novel scientific technique "must be sufficiently established to have gained general acceptance in the particular field in which it belongs." [6] Under the *Frye* standard, it is not enough that a qualified individual expert, or even several experts, testify that a particular technique is valid. [6] The best way to meet the *Frye* burden is to demonstrate through peer-reviewed

literature and other scientific forums that there is a consensus in the scientific community on the science used to support the toxicologist's opinion.

In 1975, the Federal Rules of Evidence, Rule 702 (FRE 702), which was adopted by many states *vis a vis* their state rules of evidence, further addressed the admissibility of scientific opinion evidence. FRE 702 in pertinent part requires that (1) the testimony is based on sufficient facts or data; (2) the testimony is the product of reliable principles and methods; and (3) the expert has reliably applied the principles and methods to the facts of the case. [5].

In 1993, the US Supreme Court revisited the issue and set forth different criteria in the *Daubert* case. [7] The new more rigorous criteria included the following: (1) whether the methods upon which the testimony is based are centered upon a testable hypothesis; (2) the known or potential rate of error associated with the method; (3) whether the method has been subject to peer review; and (4) whether the method is generally accepted in the relevant scientific community. [7] Like *Frye*, *Daubert* required that the evidence in the case had to be accepted in the relevant scientific community. Following the promulgation of Rule 702, the legal community heavily debated whether the 702 embraced the *Frye* standard or established a new standard. [8] In *Daubert*, the Court clarified this schism by finding that evidence that satisfied *Frye* would also satisfy the requirements of FRE 702. [8].

The last in the series of cases occurred in 1999 with *Kumho Tire Co., Ltd. v. Carmichael*. [9] In this case, the US Supreme Court significantly broadened the *Daubert* test to include expert testimony based on technical and other specialized knowledge. It stated that the gatekeeping obligations imposed upon trial judges by *Daubert* applies to scientific testimony as well as to expert opinion based upon technical or other specialized knowledge. For example, neither an accident reconstructionist nor a DRE are considered scientists but may be deemed an expert under the rigors of *Kumho*. It also broadened the scope of factors that the court could consider in designating the expert, and stated that the factors identified in *Daubert* do not constitute an exhaustive checklist or a definitive litmus test. This opened the door for judicial latitude and discretion.

Some states use combinations of these cases and statutory approaches. In addition, some states have their own appellate case law analysis for the admission of scientific opinion testimony and ascribe to many of the principles set forth in *Frye* and *Daubert*. For example, Colorado uses the *Schreck* analysis; [10] California, the *Kelly* analysis; [11] Utah, the *Rimmasch* analysis; [12] and Maryland, the *Reed* analysis. [13] Most of these approaches have the common thread of scientific reliability and acceptance in the scientific community as part of their analysis. It is advisable to review or discuss with counsel the applicable admissibility laws prior to rendering expert testimony in any specific state.

The Standard Field Sobriety Test's Applicability to Marijuana Driving Impairment

In the majority of marijuana driving cases, there is a testimony from the law enforcement officer who made the initial intervention and/or the DRE who conducted a drug evaluation. The Drug Evaluation and Classification Program (DECP), developed by the National Highway Traffic Safety Administration (NHTSA), trains law enforcement in the recognition of individual who have been driving under the influence of drugs and helps them identify the type of drug causing impairment. [14] Upon completion of the initial training officers are certified as a DRE. [15].

Among observations like the condition of the eyes (e.g., dilated pupils, tremors) and whether there was slurred speech or swaying, these examinations include SFSTs. In combination, this approach is used to detect categories of or specific drug use and addresses the ultimate issue of impairment. If these tests are performed, they usually are documented in a law enforcement report. These reports not only state the physical observations by the law enforcement officer or DRE and the results of the SFSTs, but they also render an opinion as to whether they believed that the defendant was impaired at the time of driving. These reports, along with a confirmed analytical drug testing, if a sample was collected and properly handled and tested, are used to form part of the basis of the toxicologist's ultimate opinion on impairment. Suffice to say that the expert toxicologist must thoroughly review and understand the law enforcement reports and findings.

The National Highway Traffic Safety Administration (NHTSA) developed the SFSTs for law enforcement to determine alcohol driving impairment in 1975 and they were implemented in 1981. [16] The SFSTs are composed of the horizontal gaze nystagmus test (HGN), the walk and turn (W&T), and the one leg stand (OLS). There are other tests, such as the Romberg test (the subject stands erect with feet together and eyes closed-sometimes with the added feature of finger to nose), but this test has not been sanctioned by NHTSA to date. Although the science backing the use of SFSTs for alcohol impairment is reasonably strong, [17] it still remains somewhat controversial. [18] The admissibility of science related to the HGN test itself has met varying court opinions. [19] However, courts mostly admit all of the SFSTs, and certain courts take judicial notice of their scientific reliability and acceptance in the scientific community for alcohol impairment.

The general acceptance in the scientific community of the correlation between marijuana impairment and SFSTs is not as clear. Based upon some expert opinions and studies, some believe that the HGN test is inapplicable to THC impairment. [20] According to the 1993 NHTSA Manual, HGN can identify patients who have used central nervous system depressants, PCP, and inhalants because they affect the same neural centers as alcohol. Drugs that depress the CNS, such as inhalants or

phencyclidine, affect the brain's ability to properly control the eye musculature. HGN cannot reliably detect the use of stimulants, hallucinogens, opioids, or cannabinoids. Law enforcement officers seem to be aware of this information. [21].

There are other scientific studies that question the significance of *all* of the SFSTs to assess marijuana impairment. One study assessed which signs of the DEC evaluation predicted the use of various drugs (including cannabis), and, *at best*, showed that OLS contributed significantly and HGN and W&T did not. [14] Another study noted that "in general, the present data indicate that SFSTs were *mildly sensitive* to the effects of marijuana depending on dose and cannabis use history." [22] One earlier study identified a positive relationship between the dose of THC administered and impairment based on the SFSTs, [20] and an Australian study that stated that SFSTs may be "moderately accurate for marijuana." [22] NHTSA is in the process of further studying SFSTs as they relate to drugged driving in general. A recent study that compared 302 cannabis and 302 non-cannabis driving cases from 2009 to 2014 supports the use of SFSTs for marijuana detection. [23] Not surprisingly, the authors found an increase in pulse rate, blood pressure, and pupil rebound dilation. They also found that finger to nose was the best predictor with three misses, eyelid teamers, and two clues on the WAT and OLS. The remarkable finding was that there was no difference in the clues for marijuana impairment under and over 5 ng/mL of blood concentration. [23] Another recent study supports these findings regarding the SFSTs and states that "...drivers with THC concentrations below 5 ng/mL are just as likely as those with higher THC concentrations to show signs and symptoms consistent with cannabis use and impairment." [24].

THC Blood Concentration and Marijuana Driving Impairment

The more concerning issue presented in offering expert testimony in marijuana driving cases is attributing a specific THC blood concentration to marijuana driving impairment. Unlike alcohol driving laws that have a nationwide standardized blood alcohol concentration (0.08 g/dL) and allows for limited retrograde extrapolation, there is no uniform standard establishing a THC blood concentration for driving impairment nor an accepted formula for retrograde extrapolation. [25].

In states that have "zero-tolerance" drugged driving laws, THC blood concentrations are not as relevant to prove driving impairment because zero tolerance means the presence of *any* marijuana whether active THC or metabolite. The toxicologist in these type cases needs only to establish that the testing analysis found a scintilla of active THC or THC metabolite. In those states that base their marijuana driving laws on observations, circumstances, and lab results, the toxicologist

should be forewarned about equating THC blood concentrations to driving impairment.

The biggest challenge is for the toxicologist who testifies in a state that has a per se THC blood concentration that automatically equates to impairment or creates an inference of impairment. Currently, there are only five states that have such statutes in place. The per se THC blood concentrations vary by state: 1, 2 or 5 ng/mL of blood encompasses the options. [3] Some states have set THC blood concentrations for inactive metabolites as well. [3] Even with set THC blood concentrations, because of the rapid dissipation of THC in the blood, many of the blood samples fall below the 5 ng/mL standard [26].

There are several meta-analyses, individual studies, and reports from governmental agencies addressing the relationship between THC blood concentrations and driving impairment. These studies include controlled laboratory, driving simulators, and on-road experiments. There seems to be little doubt that with the increasing use of marijuana, driving skills are adversely impacted. [27, 28] The National Institute on Drug Abuse (NIDA) prepared a meta-analysis of 60 marijuana driving studies that concluded that behavioral and cognitive skills related to driving performance were impaired with increasing THC blood concentrations. [29].

This begs the question: at exactly what set THC blood concentration is someone considered marijuana driving impaired? While the scientific community is settled on the fact that there is a rapid dissipation of THC in the body, it is unsettled on a more specific answer. Among the most frequently cited studies, one from the Netherlands found that binomial tests showed an initial and significant shift toward impairment in the critical tracking task for serum THC concentrations between 2 and 5 ng/mL. [30] The authors of that study concluded that “At concentrations between 5 and 10 ng/mL, approximately 75–90 % of the observations were indicative of significant impairment in every performance test. At THC concentrations >30 ng/mL, the proportion of observations indicative of significant impairment increased to a full 100 % in every performance tests. It is concluded that serum THC concentrations between 2 and 5 ng/mL establish the lower and upper range of a THC limit for impairment.” [30].

In 2011, the *Colorado Marijuana DUI Workgroup* determined that a blood THC concentration that would assure that impairment is present is between 15 and 30 ng/mL [31]. More recently, the effects on driving with cannabis and/or alcohol combined on standard lateral deviation (weaving) and speeding equated a 0.05 and 0.08 g/dL blood alcohol content (BAC) driving performance to 8.2 and 13.1 ng/mL THC of blood driving performance. [32].

Other research espouses that there are too many variables and factors that affect marijuana-driving impairment and that THC blood concentrations alone do not necessarily establish the impairment. There are a host of individual factors: absorption, distribution, metabolism, and excretion rate of THC; the quantity of

past marijuana use; THC tolerance; [30, 33] the time when a person last used marijuana; the time since a person last ate, as well as the fat content of the meal; and individual smoking techniques. Studies demonstrate that heavy cannabis users develop tolerance to the impairing effects of THC on neurocognitive measures. [34] Chronic use not only affects tolerance but it can also affect how long the THC may have impairing effects. A study found that among chronic cannabis users, performance on driving related tasks was adversely affected for as long as 3 weeks after the drug use was stopped. [35].

Some scientists consider that there are different clinical responses to the same THC dose depending on genetics and drug metabolism, and that age, sex, weight, disease state, and drug-drug and drug-alcohol interactions can also cause differences in how an individual behaves under the influence of a drug. A 2014 study in rats speculated that cannabinoids affect males and females differently, particularly regarding drug tolerance and THC sensitivity. [36].

In 2015, NHTSA addressed the issue of the relationship between THC blood concentration and marijuana driving impairment. In a report, they noted that it is difficult to establish a relationship between a person’s THC blood or plasma concentration and performance impairing effects. Concentrations of parent drug and metabolite are very dependent on pattern of use as well as dose. They went on to state that “[I]t is inadvisable to try and predict effects based on blood THC concentrations alone.” [26] NIDA essentially stated that “in marijuana cases there is no standard relationship between blood levels of marijuana and (or metabolites) and impairment. [33] Blood concentrations rapidly rise and fall as marijuana is distributed and metabolized; however, the drug’s behavioral effects are often prolonged. Tolerance to a drug also plays a role in the level of impairment observed.” [33] The District Attorney’s Association, an association composed of prosecutors, stated in 2004 that “with the exception of ethanol, there is so far no widely accepted correlation between the drug concentration in blood and a corresponding level of driving impairment among the scientific community.” [37].

Some have suggested that setting of THC blood concentrations and impairment is not backed by science. [38] Others suggest that “everyone is looking for one number and it’s almost impossible to come up with one number. Occasional users can be very impaired at 1 ug/L, and chronic, frequent smokers will be over 1 ug/L maybe for weeks.” [39] Congruent with these propositions, one author stated that “{t}he science on this issue is clear: it is not possible to identify a valid impairment standard for marijuana or any other drug equivalent to the 0.08 g/dl limit for alcohol.” [40].

A 2016 AAA Foundation for Traffic Safety found that “drivers can have a low level of THC...in their blood and can be unsafe behind the wheel, while others with relatively high levels may not be a hazard.” [41] In fact, the legal community is exploring bringing constitutional challenges against

state constitutions and/or state statutes that set THC blood concentrations in marijuana impairment cases. The legal theory is based upon the Fifth Amendment due process clause that protects against arbitrary and capricious laws.

An area where there is a growing scientific consensus is how combining alcohol and cannabis greatly increases driving impairment. Studies have found that drinking and drugged driving are often linked behaviors. [42] According to the Alcohol & Drug Abuse Institute (ADAI) at Washington University “there is some evidence to support that having alcohol in your blood causes a faster absorption of THC.” [43] Various authors suggest that impairment increases significantly when marijuana use is combined with alcohol, [33] and that the risk of injury from driving under the influence of both alcohol and cannabis is greater than the risk of driving under the influence of either alone. [44] This information is of importance because marijuana is very often used with alcohol while driving. [44].

Admissibility of Toxicology Reports

With the toxicologist comes the toxicology report. It will undoubtedly be necessary for the toxicologist to testify in support of the admission of the toxicology report. The admission of the report may face its own objections on Sixth Amendment self-incrimination grounds. The US Supreme Court in a series of cases addressed the issue of the admission of lab reports. The *Crawford* case initially established that you cannot use out-of-court testimonial statements without producing the witness. [45] It was followed by the *Melendez-Diaz* case that held that forensic reports that certify incriminating test results are testimonial in nature and therefore subject to the sixth amendment confrontation clause examination. [46] In the *Bullcoming* case, the court stated that you may not introduce a forensic lab report containing a testimonial certification through the in-court testimony of another scientist. [47] These cases culminated in a plurality opinion that seemed to essentially overturn *Bullcoming* when it held in the *Williams v. Illinois* that the admission of expert testimony regarding the results of DNA testing performed by non-testifying analysts did not violate the confrontation clause. Based upon this case, a toxicologist who did not conduct the laboratory analysis may testify regarding a toxicology report generated by a fellow toxicologist. [48].

Regardless, toxicologists who serve as an expert in marijuana driving cases, for either the prosecution or the defense, can expect a rigorous cross examination. They will face questions such as: Can you do a retrograde analysis on THC? Is there a set THC blood concentration that equates to marijuana driving impairment? Do SFSTs apply to marijuana driving impairment? In what form was the marijuana ingested? What was the mg/kg body weight of the THC? What was the potency of the marijuana used? How do age, gender, weight, dosage, use, tolerance,

metabolism, ingested food, absorption distribution, and excretion rate of THC affect impairment? What happens when you combine all of these factors? What happens when you combine alcohol with marijuana when driving?

Conclusion

As new scientific research adds to the growing body of literature on marijuana impairment, so too a consensus will start to form about the issues regarding the correlation between SFSTs and THC blood concentrations, and marijuana driving impairment and THC blood concentrations. Perhaps in the future, there will be a uniform national approach to marijuana impairment driving laws and THC blood concentrations similar to alcohol driving impairment laws. Until then, toxicologists, judges, and juries will be left to their own devices. A medical toxicologist interested in serving as an expert in a marijuana driving case has a responsibility to educate herself and others about the emerging issues in this rapidly evolving field.

Brief Biography Judge Mary A. Celeste

Judge Mary A. Celeste (ret.) sat on the Denver County Court bench where she was the Presiding Judge in 2009 and 2010, the first woman to hold that position, and was the co-founder of the Denver County Court Sobriety Court. She is the current education co-chair for the IALGT Judges, chair-elect ABA National Conference of Specialized Courts, and faculty for the National Center for DWI Courts (NCDC) and the National Judicial College (NJC). She has served as the President of the American Judge’s Association, President of the Colorado Women’s Bar Association Foundation, and as the National Highway Traffic Safety Administration (NHTSA) Judicial Outreach Liaison. She was an adjunct Law Professor at Sturm College of Law 2000–2006.

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Compliance with Ethical Standards

Conflicts of Interest None.

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