STATE OF MICHIGAN
IN THE COURT OF APPEALS

PEOPLE OF THE STATE OF MICHIGAN,
Plaintiff-Appellee,

Case No. 357976
LC No. 21-044535-AR

CARA CHRISTINE BOWDEN,
Defendant-Appellant.

AMICI CURIAE BRIEF OF THE MICHIGAN ASSOCIATION OF OWI ATTORNEYS AND MICHIGAN MEDICAL MARIHUANA ASSOCIATION

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Gilbert v DaimlerChrysler Corp, 470 Mich 749, 782; 685 NW2d 391 (2004).....4

People v Berger, 217 Mich. App. 213; 551 NW2d 421 (1996) 18, 20, 22

People v Kowalski, 492 Mich 106, 131; 821 NW2d 14 (2012) 4

People v Lane, 308 Mich App 38, 52; 862 NW2d 446 (2014).....4

People v Yost, 278 Mich App. 341, 393-394; 749 NW2d 753 (2008).....4

State v Brightful, et al, (No. K-10-04-259) Circuit Court for Carroll County, MD (2012) 4, 5, 6, 25

State v Superior Court, 149 Ariz 269, 275; 718 P2d 171 (1986) 20

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Other Authorities

Adler, EV and Burns, M. (1994). *Drug Recognition Expert (DRE) Validation Study.* Arizona: Governor's Office of Highway Safety 8

Declues, Perez, and Figueroa (2016), *A 2-Year Study of D 9-tetrahydrocannabinol Concentrations in Drivers: Examining Driving and Field Sobriety Test Performance*, J Forensic Sci., Vol 61, Issue 6, p 1664-1670 ..... 26, 38

Bigelow, GE; Bickel, WE; Roache, JD; Liebson, IA; and Nowowieski, P. (1985). *Identifying types of drug intoxication: Laboratory evaluation of a subject-examination procedure.* DOT HS 806-753.

Washington, DC: National Highway Traffic Safety Administration and National Institute on Drug Abuse.....8, 10, 11

Black, F. Owen, et al. (1982). *Normal subject postural sway during the Romberg test*. American journal of Otolaryngology 3.5: 309-318.....31

Compton, RP. (1986). *Field evaluation of the Los Angeles police department drug detection program.* DOT HS 807 012. Washington, DC: National Highway Traffic Safety Administration. ...8, 11

Drug Evaluation and Classification (Preliminary School), (Revised 10/2015)..... 31, 32, 33, 34

Drug Recognition Expert Course, Instructor Guide (February 2018)17, 18, 19, 20, 23, 30, 39, 41, 42, 43, 45

Drunk Driving Def. § 5.06, *Drug (Recognition) Evaluation and Classification* (2021) 30

Hartman, Richman, Hayes, and Huestis (2016). *Drug Recognition Expert (DRE) Examination Characteristics of Cannabis Impairment*, Acc.Anal. Prev., Vol. 92, p 219-229..... 25, 27, 28, 38

Heishman SJ (1996). *Laboratory Validation Study of Drug Evaluation and Classification Program: Ethanol, Cocaine, and Marijuana*. Journal of Analytical Toxicology..... 8, 13

Heishman SJ (1998). *Laboratory Validation Study of Drug Evaluation and Classification Program: Alprazolam, d-Amphetamine, Codeine, and Marijuana***.** Journal of Analytical Toxicology...8, 14, 15

Logan, Kacinko, and Beirness. (2016). *An Evaluation of Data from Drivers Arrested for Driving Under the Influence in Relation to Per se Limits for Cannabis* 25, 28, 38, 45

Mayo Clinic, *Blood Pressure Chart: What Your Reading Means* <https://www.mayoclinic.org/diseases-conditions/high-blood-pressure/in-depth/blood-pressure/art-20050982> (accessed March 25, 2022). 40

Mayo Clinic, *What is a Normal Resting Heart Rate?* <https://www.mayoclinic.org/healthy-lifestyle/fitness/expert-answers/heart-rate/faq-20057979> (accessed March 25, 2022).....39

MedlinePlus, *Body temperature norms* <https://medlineplus.gov/ency/article/001982.htm> (accessed March 24, 2022).....40

MedlinePlus, *Normal Heart Rhythm* <https://medlineplus.gov/ency/imagepages/18032.htm> (accessed March 25, 2022).....39

MSP, *Report from the Impaired Driving Safety Commission* (March 2019).....49

NHTSA, *Drug and Alcohol Crash Risk: A Case-Control Study*.....29

NHTSA, *Horizontal Gaze Nystagmus: The Science and The Law* (February 2021), p 13, available at < https://ndaa.org/wp-content/uploads/HGN-The-Science-and-The-Law-Feb-2021.pdf> (accessed March 25, 2022).....21, 22

NHTSA, *Marijuana-Impaired Driving: A Report to Congress* (July 2017).....48, 49

NHTSA, *Psychophysical Tests for DWI Arrests* (June 1977).....37

Papafotiou, Katherine, James D. Carter, and Con Stough. (2005). *The relationship between performance on the standardised field sobriety tests, driving performance and the level of Δ9-tetrahydrocannabinol (THC) in blood*. Forensic Science International 155.2-3.....35

Porath and Beirness. (2019). *Predicting Categories of Drugs Used By Suspected Drug-Impaired Drivers Using The Drug Evaluation and Classification Program Tests*, Traffic Inj. Prev., Vol 20, 2019, p 255-263.....26, 38, 45

Porath-Waller and Beirness. (2010). *Simplifying The Process For Identifying Drug Combinations By Drug Recognition Experts*, Traffic Inj. Prev., Vol 11, p 453-459.....26, 45

Porath-Waller, Beirness, and Beasley. (2009). *Toward a More Parsimonious Approach to Drug Recognition Expert Evaluations*, Traffic Inj. Prev., Vol. 10, 2009, p 513-518.....26

Richman, McAndrew, Decker, and Mullaney. (2004). *An Evaluation of Pupil Size Standards Used by Police Officers for Detecting Drug Impairment*, Optometry, Vol 75/Issue 3, p 175-182.....42

Romberg, Moritz Heinrich. (1853). *A manual of the nervous diseases of man*. Vol. 2. Sydenham Society. 32

Shinar D. Schechtman E. (2005), *Drug Identification Performance on the Basis of Observable Signs and Symptoms*, Acc.Anal. Prev., Vol. 37, p 849 23

Shinar, D; Schechtman, E; and Compton, RP. (2000). *Signs and symptoms predictive of drug impairment.* In: *15th International Conference on Alcohol, Drugs & Traffic Safety,* May 22-26, 2000. Stockholm, Sweden. International Council on Alcohol, Drugs & Traffic Safety.....15

STATEMENT OF QUESTIONS

1. Is there is sufficient scientific evidence to support the conclusion that a properly trained and certified drug recognition evaluation officer is able to accurately determine whether an individual is impaired by the ingestion of marijuana or narcotics to a degree that makes it unsafe and unlawful for the individual to operate a motor vehicle?

Amici answer: "No"

The State of Michigan ("Appellee") answer: "Yes"

ARGUMENT

I. Statement of Interest

The Michigan Association of OWI Attorneys ("MIAOWIA") and Michigan Medical Marihuana Association ("MMMA"), by counsel and hereinafter referred to jointly as "Amici," submit that the State of Michigan has failed to meet its burden to prove that there is sufficient scientific evidence to support the conclusion that a properly trained and certified DRE officer is able to accurately determine whether an individual is impaired by the ingestion of marijuana or narcotics to a degree that makes it unsafe or unlawful for the individual to operate a motor vehicle.

In so failing, the evidence presented reveals that DRE officers are performing medical diagnostic tests and interpreting clinical signs and symptoms without sufficient training and experience. Even if the DRE officers were sufficiently trained and execute the DRE protocol exactly as directed, the limitations, practical or otherwise, of the DRE protocol for identifying drivers impaired by drugs to be unfit to safely operate a motor vehicle, under our laws or any laws, are so great as to render the State's attempts inadequate to establish scientific validity. Innumerable variables--individual tolerance, dosage, time of consumption, drug effects given dosage and active or inactive status with most people being on some prescription medication—diminish the validity and usefulness of the toxicology test and DRE protocol itself.

The true inquiry before this Court is whether the DRE protocol can identify drug-impaired unsafe drivers and rule out those not so impaired. The State has failed to clearly establish that the DRE protocol can sufficiently and reliably identify those who are impaired by drugs to the point where it is unsafe for them to drive. Furthermore, the DRE protocol cannot protect the innocent by sufficiently identifying motorists not under the influence of drugs.

Law enforcement expediency cannot justify wrongful convictions. Our criminal justice system must instill confidence that individuals will not be convicted of OWI or more serious offenses with serious penalties unless drug intoxication is proven beyond a reasonable doubt based on sound reliable evidence. The public should have the confidence that only those who are actually impaired will be taken off the roads for the safety of the motoring public.

In the interests of justice, this Court should reject the DRE protocol as it is not scientifically valid or otherwise fit for use to convict OWI or more serious offenders beyond a reasonable doubt. Drugged driving offenders were, are, and will be prosecuted and punished without the DRE protocol. Obviously intoxicated offenders will still be convicted based upon observations and video-recorded evidence. The State can still prosecute fatal accident and serious injury cases with blood samples and proper expert testimony. However, cases should be proven using only methods of the highest scientific reliability and validity which are not embodied by the DRE protocol.

II. Statement of Procedural History

Appellant Cara Bowden ("Appellant") was charged with OWI-1st Offense after a December 1, 2020 traffic stop in Ottawa County, Michigan. During the traffic stop, Appellant was subjected to the 12-step DRE protocol. Based on her performance during the evaluation, police opined that Appellant was impaired by cannabis to a degree that made it unsafe and unlawful for her to be operating a motor vehicle.

During the pendency of the case, the State filed a pre-trial motion to address the qualifications of the deputy who made the traffic stop. The motion asked the court to make a finding that the deputy was an expert witness based on his training and experience as a DRE officer. An evidentiary hearing on the motion began on February 9, 2021, and concluded on February 19, 2021. On April 20, 2021, the trial

court granted the State's motion and held that the deputy would be permitted to testify as an expert witness.

On May 14, 2021, Appellant filed an Application for Leave to Appeal the trial court's order to the 20th Circuit Court of Ottawa County. The court granted leave to appeal, and after reviewing the parties' briefs, the lower court issued a July 8, 2021 opinion and order affirming the trial court's decision to qualify the deputy as an expert witness.

On July 29, 2021, Appellant filed an Application for Leave to Appeal to this Court. On September 9, 2021, this Court granted Appellant's application and requested briefs from the parties. On February 9, 2022, on its own motion, the Court ordered that the State Attorney General, the State Appellate Defender Office ("SADO"), the American Civil Liberties Union of Michigan ("ACLU of Michigan"), and the Prosecuting Attorneys Association of Michigan ("PAAM") were each invited to file an amicus curiae brief regarding the appeal. This Court stated:

> If any of these potential amici accept the invitation their amicus curiae briefs should address whether there is sufficient scientific evidence to support the conclusion that a properly trained and certified drug recognition evaluation officer is able to accurately determine whether an individual is impaired by the ingestion of marijuana or narcotics to a degree that makes it unsafe and unlawful for the individual to operate a motor vehicle. Such discussion should include consideration of MRE 702 and *Daubert v Merrell Dow Pharmaceuticals, Inc*, 509 US 579; 113 S Ct 2786; 125 L Ed 2d 469 (1993).

On February 28, 2022, Amici filed a motion with this Court requesting permission to file the current amici curiae brief. This Court granted the motion on March 4, 2022. Amici now submit this brief jointly.

III. Statement of Facts

Amici accept the statement of facts as is contained in the Appellant's Brief on Appeal.

IV. Legal Argument and Analysis

A. Legal Standard and Overview of DRE Protocol

Michigan evidentiary law incorporates the requirements from *Daubert v Merrell Dow Pharmaceuticals, Inc*, 509 US 579; 113 S Ct. 2786 (1993), known as the "*Daubert* factors," *People v Kowalski*, 492 Mich 106, 131; 821 NW2d 14 (2012). A trial court evaluating the reliability of expert testimony under the *Daubert* factors may consider (1) whether the theory in question has been tested, (2) whether the theory has been subject to peer review and publication, (3) the theory's potential rate of error, and (4) whether the theory has gained general acceptance in the relevant community of expertise. *Kowalski*, 492 Mich at 131, citing *Daubert*, 509 US at 593-594. These factors are not exhaustive, and the inquiry is a flexible one. *Kowalski*, 492 Mich at 120.

When deciding whether to admit expert testimony, the trial court must act as a "gatekeeper" to ensure that the expert testimony is reliable under MRE 702. *People v Yost*, 278 Mich App. 341, 393-394; 749 NW2d 753 (2008). MRE 702 provides the framework for admissible expert testimony in Michigan:

> If the court determines that scientific, technical, or other specialized knowledge will assist the trier of fact to understand the evidence or to determine a fact in issue, a witness qualified as an expert by knowledge, skill, experience, training, or education may testify thereto in the form of an opinion or otherwise if (1) the testimony is based on sufficient facts or data, (2) the testimony is the product of reliable principles and methods, and (3) the witness has applied the principles and methods reliably to the facts of the case.

The rule "mandates a searching inquiry, not just of the data underlying expert testimony, but also of the manner in which the expert interprets and extrapolates from those data." *Gilbert v DaimlerChrysler Corp*, 470 Mich 749, 782; 685 NW2d 391 (2004). The purpose of this searching inquiry is to ensure that the jury is not relying on unproven and unsound scientific methods. *People v Lane*, 308 Mich App 38, 52; 862 NW2d 446 (2014). Thus, scientific reliability is a pre-condition to admissibility, which the State failed to demonstrate in the present case.

Only where a full hearing with extensive scientific expert testimony from both sides has occurred may a court adequately analyze general acceptance of the 12-step DRE protocol. Such a case was litigated in a Maryland county circuit court in 2012. In *State v Brightful, et al*, (No. K-10-04-259) Circuit

Court for Carroll County, MD (2012))[1], the court directly considered general acceptance of the DRE protocol under *Frye v United States*, 293 F 1013 (DC Cir 1923), and the admissibility of DRE expert testimony under Maryland law and its evidence Rule 702 (which is substantially similar to MRE 702). The court heard 10 days of expert testimony which included six government experts and three defense experts: Dr. Francis Gengo, a clinical pharmacologist, Dr. Neal Adams, an ophthalmologist at John Hopkins University's Wilmer Eye Institute who also testified in this case on behalf of the defense, and Dr. Jeffrey Janofsky, an associate professor of psychiatry at Johns Hopkins School of Medicine. The *Brightful* court made these findings of fact and conclusions of law:

> The DRE protocol fails to produce an accurate and reliable determination of whether a suspect is impaired by drugs and by what specific drug he is impaired.
>
> The DRE training police officers receive does not enable DREs to accurately observe the signs and symptoms of drug impairment, therefore, police officers are not able to reach accurate and reliable conclusions regarding what drug may be causing impairment.
>
> The State failed to prove by a preponderance of the evidence that the drug evaluation and classification program is not new or novel and is generally accepted within the scientific community and, therefore, it is subject to analysis under *Frye v. United States* and *Reed v. State*.
>
> The drug evaluation and classification program does not survive a *Frye*/*Reed* challenge because it is not generally accepted as valid and reliable in the relevant scientific community which includes pharmacologists, neurologists, ophthalmologists, toxicologists, behavioral research psychologists, forensic specialists and medical doctors.
>
> For the reasons set forth above, the Court hereby grants Defendants' Motion to Exclude the Drug Recognition Expert Protocol and Drug Recognition Expert Opinion. [*Id*. at 36-37.]

[1] Attached as Exhibit A. Although unpublished, the opinion is cited and attached. Amici are unaware of any unpublished opinions with full hearings to the contrary.

In sum, the State in *Brightful* failed to satisfy the preponderance of the evidence standard to prove general acceptance, validity, and reliability—which objectively is a very low standard. This Court should follow *Brightful* when making the same determination under Michigan law.

1. Brief History of DRE Program

A Drug Recognition Evaluator[2] is a police officer[3] who attended two seminars during which he or she has been trained to evaluate individuals to determine whether they are showing signs of impairment by drugs other than (or in conjunction with) alcohol. Remarkably, the DRE protocol claims to be able to determine what class of drugs is causing the impairment

The DRE program got its start with the Los Angeles Police Department in the 1970's. LAPD officers were arresting "drunks" who then tested very low or negative on breath alcohol tests. The LAPD wanted to develop a "simple, standardized procedure for recognizing drug influence and impairment," which eventually resulted in the 12-step DRE protocol that is being taught to law enforcement officers all over the country now at growing numbers. The question for the court is whether reliable science backs up the "claimed expertise."

In 1987, the National Highway Transportation Safety Administration (NHTSA) developed lesson plans for administrators, instructors and students. It continued to monitor the DRE program and then began to study ways to expand the program nationwide. NHTSA asked the International Association of Chiefs of Police (IACP) to assume the oversight and administration of the DRE Program so it could be taken nationwide. Thus, the IACP became the regulating body for the DRE Program in 1989.

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[2] Most DREs consider themselves Drug Recognition "Experts." As will be seen, the science behind this "expertise" is suspect, so they will be referred to as Drug Recognition Evaluators.

[3] Michigan is also training prosecutors, and the Michigan Association of OWI Attorneys has held DRE training where defense attorneys were certified in the DRE protocol.

The DRE Program received a huge boost in 1988, when the United States Congress passed the Omnibus Drug Act. This legislation funded a very quick and large-scale expansion of the DRE Program by providing money for training of police officers. Through this funding, the DRE Program is now expanding to all 50 states.

To become a DRE, an officer must attend training administered by IACP and NHTSA. This training requires the officer to attend a two-day DRE pre-school, followed by a seven-day intensive DRE school. Before an officer can be certified, he or she must complete twelve evaluations and successfully determine three of the seven recognized drug categories. Then the officer must pass a final exam.

In 2005, Auburn Hills became the first agency in Michigan to have a trained DRE in its police department. It added a second DRE in 2007. According to the department's web page, "the DRE protocol is a standardized and systematic method of examining a Driving Under the Influence of Drugs (DUID) suspect to determine the following: (1) whether or not the suspect is impaired; if so, (2) whether the impairment relates to drugs or a medical condition; and if drugs, (3) what category or combination of categories of drugs are the likely cause of the impairment. ***The process is systematic because it is based on a complete set of observable signs and symptoms that are known to be reliable indicators of drug impairment.***" (Emphasis added). This statement is the basis of the claimed expertise of DREs.

DREs claim that their testimony provides better evidence of Drugged Driving than a blood or urine test. While blood tests may be able to measure the amount of a drug in someone's body, unlike with alcohol, there is no agreement on what amount of a drug causes impairment and what amount is a therapeutic dose. Blood tests can reveal the amount of a drug in a person's system at that time, but not the amount of the drug ingested at the last dose. Urine tests are limited to being able to reveal the presence of a drug, but not when the drug was ingested or how much was consumed. Thus, a DRE's testimony that he or she went through a twelve-step protocol and found characteristics of impairment could be more

important than a forensic lab report - if it were actually scientific or reliable - which it is not. It could potentially be very powerful.

The DRE protocol is said to have been validated by five studies. NHTSA directly sponsored two police DRE validation studies in the mid-1980's, known as the Bigelow[4] and Compton[5] studies. In 1994, through the Arizona Department of Transportation, NHTSA funded a third study, known as the Adler[6] study. In 1996 and 1998, NHTSA funded two additional studies known as the Heishman (1996) and Heishman (1998)[7] studies.

The idea behind each of the studies was to test how well-trained DRE officers could predict and identify drug impairment and which class of drugs was causing the impairment. Since a DRE assessment culminates with the officer's opinion that the person is, or is not, impaired by a drug belonging to one of several categories, or multiple drugs belonging to multiple categories, when an officer's drug category prediction matches later toxicology results, the correctness of the drug category prediction is said to

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[4] Bigelow, GE; Bickel, WE; Roache, JD; Liebson, IA; and Nowowieski, P. (1985). *Identifying types of drug intoxication: Laboratory evaluation of a subject-examination procedure.* DOT HS 806-753. Washington, DC: National Highway Traffic Safety Administration and National Institute on Drug Abuse; http://www.decp.us/pdfs/Bigelow_1985_DRE_validation_study.pdf

[5] Compton, RP. (1986). *Field evaluation of the Los Angeles police department drug detection program.* DOT HS 807 012. Washington, DC: National Highway Traffic Safety Administration; http://www.decp.us/pdfs/Compton_1984_DRE_validation_study.pdf

[6] Adler, EV and Burns, M. (1994). *Drug Recognition Expert (DRE) Validation Study.* Arizona: Governor's Office of Highway Safety; http://www.decp.us/pdfs/Adler_1994_DRE_validation_study.pdf

[7]Heishman SJ (1996). *Laboratory Validation Study of Drug Evaluation and Classification Program: Ethanol, Cocaine, and Marijuana*. Journal of Analytical Toxicology; Heishman SJ (1998). *Laboratory Validation Study of Drug Evaluation and Classification Program: Alprazolam, d-Amphetamine, Codeine, and Marijuana***.** Journal of Analytical Toxicology; https://academic.oup.com/jat/article/22/6/503/781916

confirm the officer's opinion that the suspect was impaired by that drug. So, the validation studies attempted to analyze how well the DRE predictions matched up with the toxicology of a blood test.

To statistically evaluate a study, it is important to understand two concepts: Sensitivity and Specificity. Sensitivity asks if a condition is present, how often is the test producing an accurate result? Specificity asks if a condition not present, how often is the test for it accurate? The two taken together can determine the likelihood of the outcome, against which the actual results can be measured. In other words, each study should have an expected outcome (Likelihood Ratio). Then the study can be evaluated to determine whether that outcome has been achieved, so that the protocol can be evaluated.

Every DRE evaluation can have four possible outcomes:

	Subject given Drug	**Subject given Placebo**
DRE IDs as Positive	True Positive	False Positive
DRE IDs as Negative	False Negative	True Negative

Thus, Sensitivity can be expressed mathematically as: Sensitivity = # true positive/(# true positive + # false negative). Likewise, Specificity can be expressed mathematically as: Specificity = # true negative/(# true negative + # false positive). The Likelihood Ratio can then be calculated as: Likelihood = Sensitivity/1-Specificity. A Likelihood Ratio of 100 is perfect. A Likelihood Ratio of 1 is like flipping a coin: 50/50. A Likelihood Ratio below 1 is worse than guessing.

The idea is to measure the protocol results against the projected outcome. If the protocol is a good measure to determine intoxication and by what class of drugs, two things should be happening simultaneously. When a DRE identifies someone as impaired due to a certain class of drug, the blood test results should bear that out, so that there are not a high rate of false positives. Likewise, when a DRE identifies someone as not impaired, the blood test results should confirm that, so there are not a high number of false negatives. The Likelihood Ratio measures these two outcomes.

For example, if there are 100 subjects, half of whom are given a placebo, and the test results are as outlined in the chart below, the Likelihood ratio would be 16.[8] The higher the number, the more likely the protocol is accurate. In this example, only 4% of the drugged subjects were wrongly identified as not intoxicated, and only 6% of the non-drugged subjects were wrongly identified as intoxicated.

Total subjects = 100	**Subject given Drug**	**Subject given Placebo**
DRE IDs as Positive	True Positive - 48	False Positive - 3
DRE IDs as Negative	False Negative – 2	True Negative - 47

Each of the studies mentioned above calculated and published the Likelihood Ratio. So how did the validation studies do?

The Bigelow Study

This study used 80 healthy male subjects without a history of illicit drug abuse except marijuana. Each passed a physical and psychiatric examination. The subjects were given doses of diazepam (15mg or 30mg), d-amphetamine (15mg or 30mg), secobarbital (300mg), THC (1.3% or 2.8%), or a placebo. These doses are 3 to 6 times greater than therapeutic doses, and were given acutely to drug-naïve subjects. In addition, the officers were not completely blinded.

According to the authors of the study, the results can be summarized as follows:

- For certain drug-dose combinations, most subjects were rated as intoxicated, but for other combinations, most were not.
- Subjects rated as intoxicated had almost always received a drug and raters were quite accurate in specifying which drug had been given to the subjects they rated as intoxicated.
- Subjects who did not receive a drug were almost always rated as not intoxicated.

[8] Sensitivity = 48/(48+2) = .96. Specificity = 47/(47 + 3) = .94. Likelihood = .96/(1 - .94) = 16.

There are many critics of this study, both in its methodology and in its conclusions. First, as noted the subjects were all drug-naïve – they had no tolerance or experience with the drugs administered. In addition, the doses given were 3 and 6 times the therapeutic doses, so the impairments should have been obvious. Finally, the officers were not blinded – they had knowledge that at least some of the subjects had been given the classes of drugs identified.

But even with those huge advantages, the Bigelow Likelihood Ratio was only 2.1, which is statistically not much better than flipping a coin. The numbers were as follows:

Total subjects = 320	**Subject dosed with specific drug class - 269**	**Subject not dosed with specific drug class - 51**
DRE predicted impaired by specific drug class – 157	True Positive - 144	False Positive - 13
DRE predicted not impaired by specific drug class - 163	False Negative – 125	True Negative - 38

As can be seen from the chart, DRE Officers correctly predicted 144 subjects dosed with a specific drug class, but falsely predicted almost that many (125) as <u>not</u> having been dosed with a specific drug class, **an error rate of 46%.** That means that almost half of the time, the DRE Officers were unable to determine that a person who was impaired by a specific drug class was actually impaired. In addition, DRE Officers correctly predicted that 38 subjects had not been dosed with a specific drug class, but also falsely predicted that 13 placebo subjects were impaired by a specific drug class, an error rate of 26%. **That means that one-fourth of the time, DRE Officers falsely accused subjects of being impaired by a specific drug class when they were not.**

<u>The Compton Study</u>

The Compton Study was done by the LAPD, using data from its field testing of the DRE protocol. The study used drivers who were arrested for OWI and then evaluated by a trained DRE. The authors note that blood samples were obtained from 86% of the suspects believed to be under the influence of

drugs[9]. Significantly, no blood samples were obtained from suspects judged by the police officers to not be under the influence of drugs.

According to the authors of the study, the results showed that:

- When the police officers claimed drugs other than alcohol were present they were almost always detected in the suspect's blood (94% of the time).
- When the DREs identified a suspect as impaired by a specific drug, the drug was detected in the suspect's blood 79% of the time.
- The police officers were able to correctly identify at least one drug other than alcohol in 87% of the suspects evaluated in this study. Most of these suspects had used multiple drugs (other than alcohol).

However, the data excludes drivers who were identified by the DRE as not impaired. This lack of data precludes validation by statistical measures, as can be seen in the chart below:

	Subject impaired by specific drug class	**Subject not impaired by specific drug class**
LAPD DRE predicted impaired by specific drug class	True Positive - 169	False Positive - 46
LAPD DRE predicted not impaired by specific drug class	NOT COLLECTED	NOT COLLECTED

Since there is no data on False Negatives, there is no way to compute a Likelihood Ratio. Even if the Correct Negatives value matched the 79% Correct Positive value, the Likelihood Ratio would still be only 3.71, statistically not much better than flipping a coin. And in this study, the DRE Officers got

[9] Some people refused to give blood. However, others requested a urine test. The authors noted, "For the purposes of this study only a blood sample was useful. Most drugs may be detected in urine long after they are ingested (when they can no longer be detected in the blood and when there is no longer a behavioral effect due to the drug)."

to ask the subjects whether they had ingested any drugs. The study fails to identify how many times the subjects answered that question.

The Heishman Studies

The 1996 and 1998 Heishman Studies are the most scientific of the initial studies, and the results were published in a peer reviewed journal. In the Heishman (1996) study, using blinded DRE Officers, 18 frequent drug users were administered ethanol, cocaine or marijuana. Each subject was given a placebo and low and high doses of each drug, for a total of nine evaluations each.[10] The authors of the study concluded, "The ability of the DEC evaluation to predict the intake of ethanol, cocaine, or marijuana was optimal when using 17-28 variables from the evaluation. When DREs concluded impairment was due to drugs other than ethanol, their opinions were consistent with toxicology in 44% of cases. These findings suggest that the DEC evaluation can be used to predict accurately acute administration of ethanol, cocaine, or marijuana, and that predictions of drug use may be improved if DREs focused on a subset of variables."

The data from the study simply does not validate even these poor numbers. The DRE Officers' ability to identify impairment from any drug was only 1.39 times better than guessing.

158 evaluations	**Subject given actual drug (104)**	**Subject given placebo (54)**
DRE rated impaired by any drug	59	22
DRE rated not impaired by any drug	45	32

[10] The nine doses were: 1. ethanol 0 g (placebo); 2. ethanol 0.28g/kg; 3. ethanol 0.52g/kg; 4. cocaine 4mg/70kg; 5. cocaine 48mg/70kg; 6. cocaine 96mg/70kg; 7. marijuana 0% (placebo); 8. marijuana 1.75%; and 9. marijuana 3.55%.

This translates to a Sensitivity of .57 and a Specificity of .59, for a Likelihood Ratio of 1.39 – only slightly better than flipping a coin. **It is especially notable that 41% percent of subjects given placebo were rated by the DRE officer to be impaired.**

The numbers are even worse for DRE detection of impairment by a specific class of drugs. For cocaine, the DRE officers detected impairment by cocaine less than 50% of the time. This means that the DRE officers would have been better off flipping a coin than they were administering the DRE protocol.

54 evaluations	**Subject given cocaine (36)**	**Subject not given cocaine (18)**
DRE rated impaired by stimulant	5	3
DRE rated not impaired by stimulant	31	15

This translates to a Sensitivity of .14 and a Specificity of .17, for a Likelihood Ratio of .17. Any Likelihood Ration below 1 is less than 50/50.

The numbers for marijuana were not much better. Of 36 subjects dosed with marijuana, DRE Officers correctly predicted marijuana intoxication 19 times and incorrectly failed to predict marijuana intoxication 17 times. Of the 18 subjects not dosed with marijuana, DRE Officers correctly predicted no marijuana intoxication 12 times and incorrectly predicted marijuana intoxication 6 times. This is a correct prediction rate of 53% and a false positive rate of 33%. That translates to a Sensitivity of .53 and a Specificity of .67, meaning the likelihood ratio for identifying cannabis impairment was 1.58. Again, this is only slightly better than flipping a coin.

In the Heishman (1998), the same researchers studied 48 participants who were equally divided into four test groups depending on their drug use history. Each group received a different drug, which included a CNS depressant (alprazolam), a stimulant (d-amphetamine), a narcotic (codeine), and

marijuana. Each test subject was given each test drug twice (or a placebo) in low or high doses. The results of this test was no better than the 1996 study.

280 evaluations	**Subject given actual drug (187)**	**Subject given placebo (93)**
DRE rated impaired by <u>any</u> drug (112)	85	27
DRE rated not impaired by <u>any</u> drug (168)	102	66

With a Sensitivity of .45 and Specificity of .71, the Likelihood Ratio is 1.55, once again barely better than flipping a coin**. Indeed, nearly one-third of subjects who were given a placebo were rated under the DRE protocol to be impaired, and well over half of the subjects who were given a drug were rated by the DRE as <u>not</u> impaired.**

The DREs did not fare any better within the specific drug categories. The Likelihood Ratios for the individual drugs were 1.17 for marijuana, 2.0 for CNS depressants, 1.4 for stimulants, and 1.7 for narcotics. Each of these is statistically about the same as flipping a coin. **Indeed, for marijuana the DREs correctly rated someone as impaired by cannabis 48% of the time, while the false positive rate was 40%.**

<u>The Shinar/Schechtman Study</u>

In 2005, the International Council on Alcohol, Drugs & Traffic Safety funded a comprehensive, double-blind study which evaluated the DRE Protocol. The DRE Protocol did not fare well when held up against the light of the scientific method. The Shinar/Schechtman study[11] was the first comprehensive study where the DRE Officers were not allowed to interview the subjects about which drug they had

[11] Shinar, D; Schechtman, E; and Compton, RP. (2000). *Signs and symptoms predictive of drug impairment.* In: *15th International Conference on Alcohol, Drugs & Traffic Safety,* May 22-26, 2000. Stockholm, Sweden. International Council on Alcohol, Drugs & Traffic Safety; https://komornlaw.com/wp-content/uploads/2018/03/2000_044-Signs-and-Symptoms-Predictive-of-Drug-Impairment.pdf

taken. Their conclusions were based solely on observable signs and symptoms on systematically measured vital signs, and on standardized sobriety tests of motor coordination.

According to the authors of the study, the "Results showed that with this partial information, the officers are able to detect drug impairment at better-than-chance levels with a sensitivity (correct detection of impairments) of 72%, but with a specificity of 43% (false alarm rate of 57%)." That equates to a Likelihood Ratio of 1.67, about the same as flipping a coin. "Furthermore, the association between drug ingestion and identification of the specific impairing drug category was not very high, with sensitivities ranging from a low of 10% for amphetamine to a high of 49% for cannabis. Based on both sensitivity and specificity, drug identification was best for alprazolam impairment, noticeably poorer for cannabis and codeine impairment, and no better than chance for amphetamine impairment." Thus, it is abundantly clear that the DRE protocols have not been sufficiently validated to prove their reliability.

2. Overview of 12 Steps of DRE Protocol

The 12-step DRE protocol is a 12-part examination that DREs use to supposedly determine if a suspect is impaired, if the impairment is due to drugs or a medical condition, and, if drugs are involved, the category of drug or drugs impairing the suspect. The 12 steps are; (1) Breath Alcohol Test; (2) Interview of Arresting Officer, (3) Preliminary Examination, (4) Examination of Eyes, (5) Divided Attention Tests, (6) Examination of Vital Signs, (7) Dark Room Examinations, (8) Examination of Muscle Tone, (9) Examination of Injection Sites, (10) Subject's Statements and Other Observations, (11) Opinion of Evaluator, and (12) Toxicology Examination.

In some steps, the police officer, without formal medical or pharmacological training, is asked to perform medical tests upon the suspect and to correlate certain observations with drug use and to identify categories of drugs. The State has failed to show that the DRE protocol is sufficiently reliable to form the basis of expert testimony under the Michigan Rules of Evidence.

B. Consideration of the 12 Steps under *Daubert* and MRE 702

1. Step One: Breath Test

Step one of the drug recognition evaluation process involves an administration of a breath alcohol test. As expressed in the National Highway Traffic Safety Administration Expert Course Instructor Guide, "Obtaining an accurate measurement of BAC enables the DRE to assess whether alcohol may be the sole cause of the observable impairment or whether it is likely some other drug or drugs, or other complicating factors, are contributing to the impairment." (Exhibit B). Utilizing this blood alcohol testing, merely assists officer's in ruling out impairment by alcohol. It does not scientifically or reliably determine whether a subject is impaired and if said impairment is due to the use of marijuana or other drugs.

2. Step Two: Interview and First Pulse

The second step in this "12 step" process is to "interview the arresting officer." As the manual states, the purpose of this step is to ". . .obtain a summary of the subjects actions, behaviors, etc. that led to the arrest and suspicion that drugs other than alcohol may be involved." (Exhibit C). The instructor guide recommends numerous questions be posed - with a large majority of these questions relating to what actions and behaviors the officer observed. This step in the process seems to solely rely upon mere observations made by the arresting officer. What an individual heard or merely observed is not akin to any real scientific process. As there are no guidelines to analyze or categorize observations, it is a completely subjective analysis based on the arresting officer's story. As a result, it cannot be said that this step in the evaluation is either scientific or reliable.

3. Step 3: Preliminary Examination

Step 3 of the 12 Step Drug Recognition Evaluation (DRE) is titled the Preliminary Examination. This step purports to be the first opportunity to closely observe the subject. Interestingly, as taught in the

training, this step requires or instructs an officer to decide; subjectively, and without any reliably acceptable principles, of whether a subject is presenting signs of drug use, injury, or medical condition, or to conduct an Operating While Intoxicated (OWI) alcohol investigation.

This Preliminary Examination informally may be described as a question-and-answer exercise. Wherein the officer must assess possible injury or medical problems. The officer is trained to make observations of the subject's speech, breath, and face. They are trained to check the subject's eyes, and then an initial examination of the pulse.

Overall, this stage does not implement any specialized or scientifically acceptable methods to assist the decision maker. In fact, these conclusions are arguably only supported by using methods or at least one method in direct contradiction of reliable methods. The recommended practice in Step 3 contradicts previously acceptable standards regarding horizontal gaze nystagmus (HGN). If an officer were to follow the prescribed language of the training, it would be inconsistent with Michigan's legal principles regarding HGN in MCL 257.62a and *People v Berger,* 217 Mich App 213; 551 NW2d 421 (1996) (requiring foundation of proper training and administration for admission)

Specifically, Step 3 trains the officer to assess a "subject's tracking ability, you can also perform a preliminary assessment of whether any nystagmus is present in the subject's eyes. An initial estimation of the angle of onset can be made. The approximate angle of onset may help to determine whether the subject has consumed some drug other than alcohol." (Exhibit D).

First, in *Berger*, the Michigan Court of Appeals properly addresses that HGN has been found to acceptable method to identify alcohol if properly trained, properly conducted, and limited to the presence of versus any specific bodily alcohol content. *Berger*, 217 Mich App at 218. Further, there is no Michigan case law that supports that HGN is an acceptable method to identify the presence of substances, other than alcohol. Regardless, to even be considered reliable the test must be performed properly. *Id.*

Here, the DRE training manual notes that the HGN test in step 3 is not a 'complete' Horizontal Gaze Nystagmus. (Exhibit D). Amici submit that the inclusion of this admittedly "incomplete" test can only lead to unreliable and inadmissible results. Moreover, inclusion of such an unreliable test so early in the protocol creates an environment of collecting inaccurate information right from the start of the evaluation. In direct contradiction of proper HGN training, the DRE officer is instructed and trained to observe and note tracking ability, nystagmus, and estimation of onset, all at the same time. This clearly contradicts the accepted method for HGN,[12] and, accordingly, is arguably medically and scientifically improper. Therefore, the information collected in such a test is not based on sufficient scientific evidence to support a conclusion that a subject is impaired by drugs. Consequently, the protocol required in Step 3 of the evaluation as it relates to HGN is unreliable.

Further, according to the training, during step 3 the officer is to make the decision what direction the investigation will proceed. The decision whether it is medically related or whether a controlled substance and continue to the DRE. The training questions include:

(1) Are you sick or injured?

(2) Do you have any physical defects?

(3) Are you diabetic or epileptic?

(4) Do you take insulin?

(5) Are you under a doctor's care?

(5) Are you taking any medications or drug?

(Exhibit E). Asking the questions and receiving the answers does not amount to any reliable scientific methods, especially when considering who is asking and receiving the questions. Regardless

[12] Detailed in the next section of this brief.

of the responses, the presumption is that the Step 3 Preliminary Examination will continue to the Initial Eye Check.

The Initial Eye Check training states that it includes "several particularly important steps," (Exhibit F). however, as addressed above they include steps that invariably result in unreliable data. Even checking the pupils, with or without the pupilometer, is an inherently unreliable method. The training claims that it may indicate injury or medical condition.

Most concerning is that training associates a specific angle of onset and a specific bodily alcohol content. This training again would be in conflict with *Berger*, but also in conflict with any reliable studies on the subject. They do correctly note that Cannabis will not affect the angle of onset, but they fail to clearly state that Cannabis will not cause nystagmus.

Last, after the medical questions, the observation of the face, the smelling of the breath, the pupilometer, the checking of the eyes, a pulse will be taken to note whether it is up, down, or normal, however, this is conducted without a baseline reference. According to the matrix, Cannabis would cause the pulse rate to be up. An individual being investigated and asked to go through the steps will likely have an elevated pulse rate - regardless of the ingestion of illicit substances. Without a base rate it is unknown if this pulse rate is elevated.

Overall, Step 3, the Preliminary Examination is a combination of non-scientific methods and scientific methods that are improperly conducted, which all result in unreliable data collection.

4. Step Four: Eye Examination (HGN, VGN, LOC)

a. Horizontal Gaze Nystagmus ("HGN")

The HGN test is one of several field sobriety tests recommended by the National Highway Traffic Safety Administration to aid officers in determining whether a driver is intoxicated. *Berger*, 217

Mich App at 214. As noted by the Supreme Court of Arizona in *State v Superior Court*, 149 Ariz 269, 275; 718 P2d 171 (1986):

> Nystagmus is a well known physiological phenomenon, defined and described in such tomes as WEBSTER'S NEW COLLEGIATE DICTIONARY (1980), DORLAND'S ILLUSTRATED MEDICAL DICTIONARY (25th ed 1974), 7 ENCYCLOPAEDIA BRITANNICA, MICROPAEDIA (15th ed 1974) and STEDMAN'S MEDICAL DICTIONARY (5th Lawyer's ed 1982). That it can be caused by ingestion of alcohol is also accepted in medical literature. "Jerk nystagmus . . . is characterized by a slow drift, usually away from the direction of gaze, followed by a quick jerk of recovery in the direction of gaze. A motor disorder, it may be congenital or due to a variety of conditions affecting the brain, including ingestion of drugs such as alcohol and barbiturates, palsy of lateral or vertical gaze, disorders of the vestibular apparatus and brainstem and cerebellar dysfunction." THE MERCK MANUAL OF DIAGNOSIS AND THERAPY 1980 (14th ed 1982).

Horizontal gaze nystagmus is the inability of the eyes to maintain visual fixation as they move from left to right. *Id*. at 271. In the HGN test, the subject holds the head still and covers or closes one eye while focusing the other on an object (e.g., a pen) held at eye level. As the object is gradually moved out of the subject's field of vision toward the ear, the officer is to look for involuntary jerking of the eyeball while it tracks the object. The test is repeated with the other eye. The onset of nystagmus is the indicator for alcohol intoxication. See *id*.

When administering the HGN test, the officer looks for six "clues," three in each eye, that allegedly indicate impairment. NHTSA, *Horizontal Gaze Nystagmus: The Science and The Law* (February 2021), p 13, available at < https://ndaa.org/wp-content/uploads/HGN-The-Science-and-The-Law-Feb-2021.pdf> (accessed March 25, 2022). In order, the clues are:

> **Lack of smooth pursuit.** The officer moves the object steadily from the center of the subject's face toward the left ear, in a time of about 2 seconds within a tolerance of plus or minus 0.5 second. The officer then moves the object all the way across the subject's field of vision toward the right ear, in a time of about 4 seconds within a tolerance of plus or minus 1 second. The officer continues by moving the object at the same speed back toward the left ear, once more back toward the right ear, and finally back to the center. The speed of movement is about 30 degrees per second: about 60 degrees between the center and either side in about 2 seconds; and about 120 degrees between extreme left and right in about 4 seconds. The officer observes each eye when the object is in front of

> it. If there was no smooth pursuit movement of the eye being observed, the officer records that as a positive clue for that eye.
>
> **Distinct and sustained nystagmus at maximum deviation.** Starting again from the center of the subject's face, the officer moves the object toward the left ear, bringing the eye as far over as possible, and holds the object there for at least 4 seconds. The speed of movement is irrelevant, as long as the subject can follow the object. The officer notes the clue if there is distinct and sustained nystagmus at this point. The officer holds the object at maximum deviation for at least 4 seconds to ensure that movement of the object did not possibly cause endpoint nystagmus. The officer then checks the right eye in the same manner and rechecks both eyes.
>
> **Onset of nystagmus prior to 45 degrees.** The officer moves the object at a speed that would take about 4 seconds to reach the edge of the subject's left shoulder, or about 10 degrees per second. The officer notes this clue if the point or angle at which the eye begins to display nystagmus is before the object reaches 45 degrees from the center of the subject's face. The officer then moves the object at a similar speed toward the subject's right shoulder and rechecks both eyes. For safety reasons, officers usually use no apparatus to estimate the 45-degree angle. Forty-five degrees from center is at the same distance to the side of straight ahead as the object is from the subject's face, for example, 12 inches to the side (i.e., slightly beyond the edge of the shoulder for most adults) when the object is 12 inches from the subject's face. [*Id*. at p 13-14.]

In *Berger*, the Michigan Court of Appeals agreed with cases decided in other jurisdictions that acknowledge the HGN test is scientific evidence and recognize the general acceptance and reliability of the test has been proven in regards to alcohol. *Berger*, 217 Mich App at 217. The Court held:

> Because we agree the HGN test, when used to establish **the presence of alcohol**, has gained general acceptance in the scientific community and has satisfied the requirements of the *Davis-Frye* rule, the prosecution was not required to present expert testimony concerning the validity of the test and the trial court did not err in failing to conduct a *Davis-Frye* hearing. We conclude the only foundation necessary for the introduction of evidence regarding the HGN test in Michigan is evidence that the test was properly performed and that the officer administering the test was qualified to perform it. [*Id*. at 218 (emphasis supplied).]

However, there is not the same general acceptance in the scientific community or proven reliability of the HGN test when used to determine whether a driver is impaired by a drug.

According to NHTSA, other CNS depressant drugs, inhalants, and dissociative anesthetics can cause jerk nystagmus that is similar or identical to the distinct and sustained horizontal nystagmus at

maximum deviation and the onset of horizontal nystagmus prior to 45 degrees that can be found when a person is impaired by alcohol because "the mechanisms of action of the impairment of the neurological control of eye movements often are the same …" (*Horizontal Gaze Nystagmus: The Science and The Law*, p 7). Conversely, law enforcement officers are taught that the HGN test cannot reliably detect the use of stimulants, hallucinogens, opioids, or cannabinoids. (Exhibit G).

Nevertheless, a double-blind study conducted in 2005 found:

> [DRE] officers relied on all four psychophysical tests and horizontal gaze nystagmus to conclude that a person is impaired, regardless of the selected impairing drug category. This was deduced from the fact that the average performance scores on the nystagmus test and on all of the psychophysical tests were significantly poorer whenever any impairment was identified than when the officers concluded the subject was not impaired. This reliance was not always appropriate. For example the DECP guidelines indicate that nystagmus is characteristic only of depressants (e.g. alcohol, alprazolam) but not of the other three categories—narcotics, stimulants, and cannabis. Yet the officers occasionally noted nystagmus and still concluded that the impairment was due to one of these latter categories. In this respect, the officers often reached conclusions that were inconsistent with the DECP. [Shinar D. Schechtman E. (2005), *Drug Identification Performance on the Basis of Observable Signs and Symptoms*, Acc.Anal. Prev., Vol. 37, p 849[13] .]

The study also found:

> The analysis of the officers' sensitivity and specificity showed that the sensitivity (the detection of impairment given drug dosing) was moderate at 72%. The specificity (the ability to assess unimpairment in the placebo condition) was near chance at 43%. The complementary miss rate was 28% and the complementary false alarm rate was 57%. This high false alarm rate may be due to two reasons. First, the officers' false assumption that most subjects had ingested drugs. Second, the fact that whenever an impairing drug was noted – even when no conclusion of impairment was listed – it was listed as a positive decision of drug detection. In summary, the different analyses were all consistent in showing that the officers' ability to detect drug ingestion and differentiate between drug impaired and unimpaired subjects, although better than chance, was quite poor. [*Id.* at 847.]

[13] Shinar D. Schechtman E. (2005), *Drug Identification Performance on the Basis of Observable Signs and Symptoms*, Acc.Anal. Prev., Vol. 37;
http://duiform.weebly.com/uploads/1/2/0/1/12016444/dre_performance.pdf

Thus, according to NHTSA, only two of the three clues officers are trained to look for when performing the HGN test may be present when a person is impaired by a very specific category of drugs—which does not include cannabis—yet trained DRE officers who properly performed the test in a double-blind study had a false alarm rate of 57% and only a 43% chance of assessing unimpairment in placebo conditions. Based on this evidence, it is clear that even when officers are properly trained to perform the HGN test, it is unreliable to determine whether a person is impaired by drugs.

b. Vertical Gaze Nystagmus ("VGN")

The vertical gaze nystagmus ("VGN") test is administered after the HGN test. When administering the VGN test:

> [T]he officer checks for VGN by starting from the center of the subject's face, again at a distance of 12 to 15 inches. The subject is instructed to keep the head still or to tip the head forward slightly, bringing the chin to the chest, and to follow the object with the eyes only. The officer raises the object straight up several inches above the subject's eyes and holds the object there for at least 4 seconds. VGN is positive if the subject exhibits a vertical jerk nystagmus; if nystagmus is horizontal or rotatory, while abnormal, or if there is no nystagmus, then the VGN test is negative. [*Horizontal Gaze Nystagmus: The Science and The Law*, p 14.]

According to the NHTSA manual, VGN is a "good indicator" of a high dose of alcohol, other CNS depressant drugs, inhalants, or dissociative anesthetics. *Id*. However, VGN may be caused by neurological conditions or just be naturally occurring. *Id*. Thus, the VGN test is even more unreliable than the HGN test for determining whether a person is impaired by drugs.

c. Lack of Convergence ("LOC")

This Amicus Curiae respectfully asserts, there is virtually no evidence suggesting that lack of convergence ("LOC") testing scientifically or reliably indicates one's impairment by the use or ingestion of marijuana. Furthermore, the Amicus Curiae respectfully asserts that there is virtually no evidence concluding that LOC is caused by the use or ingestion of marijuana. This assertion is made clear based on the complete lack of any peer-reviewed scientific studies concluding that lack of convergence is

caused by marijuana use or ingestion. However, this Court need not merely rely solely on the Amicus parties assertions. Rather, a true expert has weighed in on this subject matter.

For example, in *Brightful*, Dr. Janofsky testified as to being an accomplished educator in the field of psychiatry – working at such universities as Johns Hopkins and the University of Maryland. *Brightful* at 6. Additionally, Dr. Janofsky testified as having "…authored twenty-four peer reviewed scientific journal articles that have appeared in the Journal of Academy of Psychiatry and the Law, The Journal of the American Academy of Psychiatry and the Law, as well as the Journal of the American. Psychiatric Association." *Id.* at 6. And as pointed out by the Circuit Court of Maryland, "Dr. Janofsky noted that he could find no scientific evidence literature which correlates…lack of convergence…with driving impairment while intoxicated on drugs." *Id.* at 10.

Much like Dr. Janofsky, this Amicus Curiae is also unable to locate such literature. More specifically, after vigorous research, this Amicus Curiae was unable to locate any peer-reviewed scientific studies which show that LOC testing, in and of itself, reliably and accurately indicates an individual's impairment by marijuana use or ingestion. Additionally, after vigorous research, this Amicus Curiae was unable to find any scientific peer-reviewed studies purporting to show that marijuana use actually causes an individual to exhibit a lack of convergence.

Within the realm of literature on DRE evaluations, there are six readily available pieces which may be used in an attempt to show that LOC testing can be a reliable scientific indicator of impairment by marijuana.[14] Staunch proponents of LOC testing may attempt to counter this Amicus Curiae's position

[14] Hartman, Richman, Hayes, and Huestis (2016). *Drug Recognition Expert (DRE) Examination Characteristics of Cannabis Impairment*; https://www.theiacp.org/sites/default/files/all/3-9/302-Marijuana-DRE-Evaluations-Study.pdf

Logan, Kacinko, and Beirness. (2016). *An Evaluation of Data from Drivers Arrested for Driving Under the Influence in Relation to Per se Limits for Cannabis*; https://aaafoundation.org/wp-content/uploads/2017/12/EvaluationOfDriversInRelationToPerSeReport.pdf

with one of these studies. However, these "studies" all share one detrimental commonality. That is, none of these "studies" are actual scientific studies. Rather, as the following illustrates, all of these "scientific studies" are merely statistical analyses which are riddled with improprieties flowing from their "methodology."

One of the most glaring missteps of these "studies" is their methodology. More specifically, these were not situations where individuals used, ingested, or dosed with marijuana versus placebo and then the conductors of the analysis tested to see if they exhibited a lack of convergence versus people who have not used, ingested, or have been dosed with marijuana. Rather, all of these "scientific studies" utilized pre-existing completed DRE cases. This "methodology" naturally transforms these purported "studies" into nothing more than mere "statistical analyses." Perhaps as best stated by objectives of both *Toward A More Parsimonious Approach To Drug Recognition Expert Evaluations* and *Simplifying The Process For Identifying Drug Combinations By Drug Recognition Experts*; "The purpose of this study

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Porath-Waller, Beirness, and Beasley. (2009). *Toward a More Parsimonious Approach to Drug Recognition Expert Evaluations*, Traffic Inj. Prev., Vol. 10, 2009, p 513-518; https://www.tandfonline.com/doi/abs/10.1080/15389580903191617?journalCode=gcpi20

Porath-Waller and Beirness. (2010). *Simplifying The Process For Identifying Drug Combinations By Drug Recognition Experts*, Traffic Inj. Prev., Vol 11, p 453-459; https://pubmed.ncbi.nlm.nih.gov/20872299/

Porath and Beirness. (2019). *Predicting Categories of Drugs Used By Suspected Drug-Impaired Drivers Using The Drug Evaluation and Classification Program Tests*, Traffic Inj. Prev., Vol 20, 2019, p 255-263; https://www.tandfonline.com/doi/full/10.1080/15389588.2018.1562178

Declues, Perez, and Figueroa (2016), *A 2-Year Study of D 9-tetrahydrocannabinol Concentrations in Drivers: Examining Driving and Field Sobriety Test Performance*, J Forensic Sci., Vol 61, Issue 6, p 1664-1670; https://cpb-us-e1.wpmucdn.com/wp.txstate.edu/dist/b/1881/files/2019/06/A-2-year-study-of-THC-Concentrations-in-Drivers_Examinin.pdf

is to statistically identify the set of drug-related cues from Drug Evaluation and Classification (DEC) evaluations that significantly predict the categories of drugs used by suspected drug-impaired drivers."

The flaws seen, as a result this methodology, do not merely start and stop with transforming these "studies" into statistical analyses. Rather, there are several glaring consequences of this methodology, starting with its heavy reliance on previous Officer's statements and actions. In utilizing these previous DRE cases, the conductors of these analyses were merely assuming that the Officers conducted the evaluation correctly and properly and that everything reported was true and accurate. Logically flowing from these assumptions - the natural consequences of this "methodology" – is the large possibility that the cases relied upon and analyzed were tainted by improper or false information. How can it be said that these studies are scientific or reliable when the very basis being analyzed could be tainted?

In this same vein, this particular methodology is also arguably affected by confirmation bias. Confirmation bias is defined as "bias that results from the tendency to process and analyze information in such a way that supports one's preexisting ideas and convictions."[15] In the 2015 analyses cited above, 302 cannabis DRE cases were evaluated. "In 72.3% of these cases, the officer detected a cannabis odor; 35.3% of drivers had cannabis in their possession."[16]. Only a small margin of these cases (23.3%) had neither present[17]. In other words, in almost eighty percent of the cases relied upon in this particular analyses, a concrete indicator of marijuana was present. This logically implicates issues with confirmation bias which could arguably lead to these cases relied upon being tainted by it. If an officer sees marijuana or smells its distinct odor, there is a natural tendency for these officers to then seek out

[15] Definition obtained from: https://www.dictionary.com/browse/confirmation-bias

[16] Hartman, Richman, Hayes, and Huestis (2016). *Drug Recognition Expert (DRE) Examination Characteristics of Cannabis Impairment*; https://www.theiacp.org/sites/default/files/all/3-9/302-Marijuana-DRE-Evaluations-Study.pdf

[17] *Id.*

any and all information that supports their concrete observation of marijuana presence or odor. So once again this begs the question, how can it be said that these studies are scientific or reliable when the very basis being analyzed could be tainted?

The second consequence, to this employed methodology, is that the results of these analyses may be wholly inaccurate based on what appears to be their failure to control for particular variables. For example, in the 2016 study entitled *An Evaluation of Data from Drivers Arrested for Driving Under the Influence in Relation to Per Se Limits for Cannabis*, the conductors used a group of 349 "drug free" subjects to compare with the cannabis-positive drivers. In terms of these "drug free" individuals:

> Volunteers were asked about the use of drugs and medications and were excluded if they indicated any use, but were generally not drug-tested. In some cases, an oral fluid specimen was collected and found to be free of drugs. A small number of cases involved drivers who had been arrested and were subjected to a drug influence evaluation but were deemed not to be impaired, had no measurable blood THC and were free from other drugs.[18]

As evidence by the above, this analyses failed to control in making sure that the entire "drug-free" subject group was actually drug-free. And the same failure was actually also visible in the study entitled *Drug Recognition Expert (DRE) Examination Characteristics of Cannabis Impairment.* There the analyses explained, "Although the control population was negative by self-report for impairing drugs, were under observations of police officers, and were participants in training/practice sessions, no toxicology results were available. Thus, controls may have not have been 100% free from impairing substances…"[19]

[18] Logan, Kacinko, and Beirness. (2016). *An Evaluation of Data from Drivers Arrested for Driving Under the Influence in Relation to Per se Limits for Cannabis*; https://aaafoundation.org/wp-content/uploads/2017/12/EvaluationOfDriversInRelationToPerSeReport.pdf

[19] Hartman, Richman, Hayes, and Huestis (2016). *Drug Recognition Expert (DRE) Examination Characteristics of Cannabis Impairment*; https://www.theiacp.org/sites/default/files/all/3-9/302-Marijuana-DRE-Evaluations-Study.pdf

Failure to control truly speaks to the lack of scientific support and absence of reliability that these analyses possess. After all, controlling for particular variables, which may affect an outcome, is a crucial step in obtaining fair and accurate scientific results. This need to control, in order to obtain accurate results, was not lost upon NHTSA.

For example, the National Highway Safety Administration published its 20 month study of Virginia Beach drivers.[20] "This study used a "case-control" design to estimate the risk of crashes involving drivers using drugs, alcohol or both."[21] The study found that "Drug odds ratio estimates, when unadjusted, indicated an increase in crash risk."[22] However, the study went onto further concluded that "…after statistically adjusting for gender, age, race/ethnicity, and driver alcohol concentration (AC), there was no significant contribution to crash risk from any drug."[23] This concrete example perfectly exemplifies the necessity for scientific studies to properly control and adjust for particular impactful variables. Failure to do so not only taints the results but, also takes the "study" out of the arena of scientific or reliable.

The final flaw with this employed methodology is its final results. More specifically, these "studies" purport that there is a correlation between lack of convergence and marijuana use and ingestion. However, it is important to note that correlation is NOT the same as causation. Therefore, contending that a correlation between LOC and marijuana use exists is not the same as saying that LOC is caused by marijuana use.

[20] NHTSA, *Drug and Alcohol Crash Risk: A Case-Control Study*; 812355_drugalcoholcrashrisk.pdf (nhtsa.gov)

[21] *Id.*

[22] *Id.*

[23] *Id.*

The lack of scientific support is not lost on the National Highway Traffic Safety Administration either. When a position is supported by empirical data and legitimate studies, NHTSA makes it a point to note and publish this data. However, as seen on the NHTSA Drug Recognition Expert Course Instructor Guide, there is no studied or empirical data cited - as it relates to the lack of convergence section. (Exhibit H). Rather, the Instructor Guide, makes a blanket statement that "Under the influence of certain types of drugs, the eyes may not be able to converge," without citing any support. (Exhibit H).

Finally, lack of convergence appears to be seen in numerous instances unrelated to impairment by use of marijuana. In other words, lack of convergence can be exhibited by an individual – wholly independent of any use or ingestion of marijuana. For example, lack of convergence may be cause by, "…a congenital condition or may be exhibited in those suffering from attention deficit disorder, a head injury, or something as innocuous as eyestrain…" Drunk Driving Def. § 5.06, *Drug (Recognition) Evaluation and Classification* (2021) (Exhibit I). Additionally, "…convergency insufficiency (lack of convergence) has been noted in over 60% of persons over the age of 60." *Id*.

The ability to exhibit lack of convergence, unrelated to impairment by marijuana, creates an obvious dilemma for drug evaluation officers. That is, drug recognition evaluation officers incorrectly note LOC in individuals that have not at all partaken in any type of drug or marijuana use. As a result of this obvious dilemma, the lack of convergence test is void of real reliability. After all, how can a test be a reliable indicator of impairment by marijuana if positive results are exhibited wholly independent of drug use?

5. Step Five: Divided Attention Tests (WAT, OLS, FTN, MRB)

a. Modified Romberg Balance ("MRB")

The Modified Romberg Balance is the first divided attention test that is administered during the drug influence evaluation. (*Drug Evaluation and Classification (Preliminary School)*, (Revised

10/2015), Session 3, p. 2 of 23).[24] The test requires the subject to stand with the feet together and the head tilted back slightly and with the eyes closed.[25] The test also requires that the subject attempt to estimate 30 seconds; the subject must be instructed to open the eyes and tilt the head forward and say "stop" when they think thirty seconds has elapsed[26]. The DRE must record how much time actually elapsed from the start of the test until the subject opened their eyes and said "stop."[27] If the subject continues to keep their eyes closed for 90 seconds, the DRE should stop the test and record the fact that it was terminated at 90 seconds.[28]

The major items that need to be recorded for the Modified Romberg Balance test are: The amount that the subject sways and the actual amount of time that the subject keeps the eyes closed[29]. To record swaying, the DRE must estimate how many inches the subject sways, either front-to-back, left-to-right, or circular.[30]

It should also be noted that there is no such thing in the scientific community as the "modified Romberg test," and there is no scientific consensus on how it could be modified, since it was originally designed to simply test for neurological decay. As Black, F. Owen, et al. (1982). *Normal subject postural sway during the Romberg test*. American journal of Otolaryngology 3.5: 309-318, states:

> Romberg, in 1853, introduced a test to demonstrate the effect of luetic posterior column disease upon human upright posture control. Throughout the intervening 128 years, the

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[24] *Drug Evaluation and Classification (Preliminary School)*; https://www.wsp.wa.gov/breathtest/docs/dre/manuals/pre-school_dre/2015_pre_dre/student_pre_oct2015.pdf

[25] *Id.*

[26] *Id.*

[27] *Id*. at p. 3 of 23

[28] *Id.*

[29] *Id*. at p. 7 of 23

[30] *Id.*

> Romberg test has been used with minor modifications for the clinical assessment of patients with dysequilibrium or ataxia from both sensory and motor disorders. Although many attempts have been made to record and quantify normal and abnormal human movement during performance of the Romberg test, we could not identify a quantitative study of normal subjects that could serve as a data base for clinical use.

The original Romberg test was designed by Moritz Heinrich Romberg, "the first clinical neurologist," who developed his balance test in the 1800s to test for "tabes dorsalis," which is a late-stage consequence of syphilis that degenerates balance.[31] The test has been altered and applied in various forms by medical professionals, chiropractors, and police officers. The Romberg test used by doctors differs from the test employed by chiropractors, and both of those tests are wildly different from the test used by DREs. The drunk driving test known as Romberg during the SFST 1977 research is, likewise, wildly different from the current test employed by NHTSA trained DRE officers, who refer to it as the "modified Romberg test," and NHTSA has never published any data regarding how or why it developed its so-called "modified" version of the Romberg test.

b. Walk and Turn ("WAT") and One Leg Stand ("OLS")

Walk and Turn is the second divided attention test administered during the drug influence evaluation.[32] The test has two stages: the instructions stage and the walking stage.

During the instructions stage the subject must stand heel-to-toe, with the right foot ahead of the left foot with the heel of the right foot against the toe of the left foot, and keeping the arms at the sides. DRE officers are trained to demonstrate the stance that the subject must maintain during the instructions stage. If the subject fails to maintain the starting position during the DRE officer's instructions, the DRE officer is supposed to discontinue the instructions and direct the subject back to the starting position

[31] Romberg, Moritz Heinrich. (1853). *A manual of the nervous diseases of man*. Vol. 2. Sydenham Society.
[32] Preliminary School Manual, Session 3, p. 9 of 23); https://www.wsp.wa.gov/breathtest/docs/dre/manuals/pre-school_dre/2015_pre_dre/student_pre_oct2015.pdf

before continuing. The subject is told to not start walking until told to do so. The subject must be told to take nine heel-to-toe steps on the line, to turn around keeping the front or lead foot on the line and to turn by taking a series of small steps with the other foot, and to return nine heel-to-toe steps down the line. The subject must be told to keep their arms at the sides at all times. The subject must be told to watch his or her feet while walking. The subject must be told to count the steps out loud. The subject must be told not to stop walking until the test is completed. The subject should be asked if he/she understands the instructions. Once the subject acknowledges his/her understanding of the instructions, DRE officers are supposed to instruct the subject to begin the test. If the subject stops or fails to count out loud or watch his/her feet, the DRE officer is trained to remind him/her to perform these tasks. This interruption will not affect the validity of the test and is essential for evaluating divided attention.[33]

Clues that the DRE officers are trained to look for during the instruction stage are if the subject cannot maintain balance while listening to instructions (feet break away from the heel-to-toe stance) and if the subject starts too soon (i.e., subject starts walking before told to do so).[34] During the walking stage, the DRE officers are trained to look for the following clues that could indicate impairment: stops while walking, does not touch heel-to-toe (distance ½"), steps off the line, uses arms to balance (distance 6"), improper turn, and incorrect number of steps.

One Leg Stand is the third divided attention test administered during the drug influence evaluation. For drug evaluation purposes, One Leg Stand is given twice to the subject. First, the subject is required to perform the One Leg Stand while standing on the left foot. Next, they are required to

[33] Preliminary School Manual, Session 3, p. 9-10); https://www.wsp.wa.gov/breathtest/docs/dre/manuals/pre-school_dre/2015_pre_dre/student_pre_oct2015.pdf
[34] *Id.* at p. 12.

perform the test while standing on the right foot. Otherwise, the One Leg Stand is used in the same fashion as in Standardized Field Sobriety Testing. [35]

The test has two stages, the instructions stage and the balance and counting stage. During the instructions stage, the subject must stand with the feet together, arms at the side, facing the examiner. Demonstrate the stance that the "subject" is required to maintain. The subject must be told that they will have to stand on the left foot, and raise the right foot approximately 6 inches off the ground, with the right leg held straight and the raised foot parallel to the ground. The examiner must demonstrate the one-leg stance. Emphasize that the subject must keep the foot raised throughout the test. The subject must be told that they must look at the raised foot during the test. It is emphasized during the DRE Preliminary School that the examiner should not look at his or her own foot while giving the instructions; for safety reasons, the examiner must keep the eyes on the subject at all times. The subject must be told that they will have to count out loud in the following manner: "one thousand one, one thousand two, one thousand three" and so on until told to stop. After giving the instructions, the examiner should ask the "subject" if they understand. After the subject has completed the test on the left foot, they must be told to repeat the test on the right foot.[36] Clues that the DRE officer is trained to look for during the test are whether the subject sways while balancing, uses arms to balance, hops, or puts their foot down.[37]

When subjected to scientific testing, however, both the OLS and WAT tests have not been deemed a reliable test to determine whether a subject is impaired by drugs. The WAT and OLS are not scientific tests. It is common sense that a drunk cannot walk a straight line, and a drunk cannot balance, so courts have permitted testimony regarding the WAT and OLS for consideration by a jury. If a police

[35] Preliminary School Manual, Session 3, p.16); https://www.wsp.wa.gov/breathtest/docs/dre/manuals/pre-school_dre/2015_pre_dre/student_pre_oct2015.pdf
[36] *Id.* at 17.
[37] *Id.* at 18.

officer states that he has been trained that 79% of intoxicated individuals fail the WAT with two or more clues, it is fair for the defense to cross-examine that officer and force the officer to admit that 53% of sober motorist fail the WAT according to the same study. These tests are not scientific.

Unlike alcohol, where field sobriety tests check the motorist's "balance, large muscle coordination, cognitive skills and oculomotor control," balance, large muscle coordination, and oculomotor control are not at issue when marijuana is suspected. Nonetheless, the DRE program suggests that the WAT, OLS, as well as the previously rejected FTN and MRB tests can determine whether a person is intoxicated by marijuana. Researchers, including NHTSA, have never established any statistical reliability or specificity in this area. The few attempts to establish this relationship fail miserably under *Daubert*.

When researchers studied marijuana driving impairment and the SFST battery initially in 2005, Papafotiou, et al. found that a large number of impaired subjects failed the WAT and OLS, but when low doses of THC were administered, researchers found that "only 38.5% of participants who were not impaired on the driving task were correctly identified as not impaired," and with higher doses of THC administered, "only 15.4% of participants who were not impaired on the driving task were correctly identified as not impaired."[38]

Hartman et al. studied the DRE protocols in 2016 when researchers compared prior data regarding 302 suspected marijuana drivers with confirmed THC results of 1 ng/mL to a group sober

[38] Papafotiou, Katherine, James D. Carter, and Con Stough. (2005). *The relationship between performance on the standardised field sobriety tests, driving performance and the level of Δ9-tetrahydrocannabinol (THC) in blood*. Forensic Science International 155.2-3, p. 172-178; https://cpb-us-e1.wpmucdn.com/wp.txstate.edu/dist/b/1881/files/2019/06/The-Relationship-between-performance-on-the-SFSTs-driving-performance-and-the-level-of-delta-9-THC-in-blood.pdf

police officers and volunteers.[39] In the most incredible display of observer bias, no sober subject failed the field sobriety tests in the control group. For the first time ever in the research of field sobriety testing, there were zero false alarms. The control group participants were police officers and volunteers in a DRE program. As the study states:

> Police officers and volunteers evaluated as part of DRE training programs served as a comparison group for these data. Although toxicology was not performed, all police officers reported no impairing drug use. For all controls, the DRE opinion was "not impaired."

Observer bias is any kind of systematic discrepancy from the truth during the process of observing and recording information for a study. Observer bias is a type of detection bias and can affect assessment in many kinds of study including observational studies and intervention studies such as randomized trials.

Rather than engage in blind-testing, or double-blind testing, the Hartman researchers studied data from an extremely biased group, i.e. police officers testing other police officers, and compared it to data extrapolated from police reports and DRE interviews. The Hartman data was almost flawless. Reviewing paper reports where motorists had been arrested with toxicology results of at least 1 ng/mL, the researchers compiled their data, excluding all false arrests from their data where blood results confirmed the absence of THC. By excluding all false positive arrests, the researchers attempted to compare their data to a group of sober police officers.

With this incredibly biased data set, only 2.3% of the control group failed the WAT and 3% failed the OLS. In this study, the WAT and OLS did not suffer from a high false-alarm rate. Nonetheless, nearly one out of every five police officers who were known to be completely sober (and tested by fellow police

[39] *Drug Recognition Expert (DRE) Examination Characteristics of Cannabis Impairment*; https://www.theiacp.org/sites/default/files/all/3-9/302-Marijuana-DRE-Evaluations-Study.pdf

officers) failed the newly re-invented finger-to-nose (FTN) (16.6 percent) and more than one out of ten could not cross their eyes (lack of convergence/LOC).

c. Finger to Nose ("FTN")

The "finger-to-nose" test has been ever present in the evaluation realm. So much so, that the 1977 National Highway Traffic Safety Administration tested - amongst other methods - this particular method's reliability relating to impairment by alcohol. The results of this study revealed that the "finger-to-nose" test was not amongst the reliable indicators of impairment by alcohol. In addition to this, and much like lack of convergence mentioned previously, there are no peer-reviewed scientific studies supporting the use of the finger-to-nose test to determine impairment by the use or ingestion of marijuana. This illustrates that the finger-to-nose test is neither reliable nor supported by science.

In 1977, the National Highway Traffic Safety Administration conducted a DWI study in order to "…develop an improved test battery which will facilitate the officer's identification of alcohol-impaired drivers and provide the required evidence for court proceedings." NHTSA, *Psychophysical Tests for DWI Arrests* (June 1977) (Exhibit J). Unlike any of the statistical analyses mentioned within this brief, this study actually gave participants alcohol and observers witnessed the administration of the tests. The study ultimately concluded that "Data analysis led to the recommendation of a "best" reduced battery of tests which includes examination of balance (one-leg stand), and walking (Walk-and-Turn), as well as the jerking nystagmus movement of the eyes (Alcohol Gaze Nystagmus)." *Id*. Obviously absent from this cited recommendation is the "finger-to-nose" test. This then begs the question, what about finger-to-nose in the specific context of marijuana use or ingestion?

This Amicus Curiae respectfully asserts that there are no scientific peer-reviewed studies supporting the use of the finger-to-nose test to determine impairment based on the use or ingestion of marijuana. As in the lack of convergence context, this Amicus Curiae was unable to locate any peer-

reviewed scientific studies on this matter, despite its vigorous searching. Furthermore, like the lack of convergence context, there are several statistical analyses which proponents of the examination may attempt to support an assertion contrary to this Amicus Curiae. These analyses include; *Drug Recognition Expert (DRE) Examination Characteristics of Cannabis Impairment* by Hartman, Richman, Hayes, and Huestis (2016); *An Evaluation of Data from Drivers Arrested for Driving Under the Influence in Relation to Per se Limits for Cannabis* by Logan, Kacinko, and Beirness (2016); *Predicting Categories of Drugs Used By Suspected Drug-Impaired Drivers Using The Drug Evaluation and Classification Program Tests* by Porath and Beirness (2019); *A 2-Year Study of D 9-tetrahydrocannabinol Concentrations in Drivers: Examining Driving and Field Sobriety Test Performance* by Declues, Perez, and Figueroa (2016).

If these analyses look familiar, it is because they are amongst the same ones cited above in the discussion lack of convergence. The flaws in these analyses are not cured by the fact that they would now be used in support of utilizing finger-to-nose in the evaluation. First and foremost, there is still a flawed methodology translating to these being "statistical analyses." After all, these are still the same analyses that are merely utilizing completed drug recognition evaluations.

Next, these analyses are still subject to a heavy reliance on the Officer's previous statements and actions. These analyses are essentially assuming that everything the Officer said and did as proper and true. However, there is a very real possibility that these results are actually tainted by improper or false information. Due to these assumptions and potential for tainted results, it cannot be said that these analyses are scientific nor reliable. Similarly, this particular methodology is also likely affected by confirmation bias. Once again, how can it be said that these studies are scientific or reliable when the very basis of data being analyzed could be tainted by confirmation bias?

Finally, as stated in the discussion of lack of convergence, this methodology and its statistical results may also be wholly inaccurate based on the conductors failure to control for particular variables. Controlling for particular variables, which may effect an outcome, is a necessity in order to obtain accurate scientific results. This failure to control places these analyses squarely within the realm of unscientific and unreliable.

6. Step Six: Vital Signs (Blood Pressure, Temperature, Second Pulse)

Next, without any medical training, the DRE protocol calls for DRE officers to check various vital signs, including blood pressure, temperature, and pulse. The DRE manual directs officers to measure these vital signs because certain drugs may "speed up" the body and elevate these vital signs (CNS stimulants, hallucinogens, dissociative anesthetics, inhalants, and cannabis) while others my "slow down" the body and lower vital signs (narcotic analgesics and CNS depressants). (Exhibit K). The average or expected range for pulse rate according to the DRE Manual is 60-90 beats per minute. (Exhibit L). However, multiple government and medical organizations recognize that the normal resting heart rate for adults is 60-100 beats per minute. See Mayo Clinic, *What is a Normal Resting Heart Rate?* <https://www.mayoclinic.org/healthy-lifestyle/fitness/expert-answers/heart-rate/faq-20057979> (accessed March 25, 2022); and see MedlinePlus, *Normal Heart Rhythm* <https://medlineplus.gov/ency/imagepages/18032.htm> (accessed March 25, 2022). Further, it is well-recognized that a person's heart rate can be influenced by many external factors, can differ greatly from person to person, and that someone who is athletically fit might have a normal resting heart rate closer to 40 beats per minute. (*What is a Normal Resting Heart Rate?*, supra). Thus, without knowing a person's individual normal resting heart rate, measuring that same person's pulse during a high-stress situation such as a traffic stop is an unreliable test to determine impairment.

Similarly, many factors can affect blood pressure such as the anxiety of the arrestee. The normal range for systolic blood pressure is 120 to 140. For diastolic blood pressure, 60 to 80 is a normal range. Ten percent of the population has hypertension which can be affected by anxiety, fitness, and exercise. Fit and thin people also have lower blood pressure. Mayo Clinic, *Blood Pressure Chart: What Your Reading Means* <https://www.mayoclinic.org/diseases-conditions/high-blood-pressure/in-depth/blood-pressure/art-20050982> (accessed March 25, 2022). Moreover, the examination room where blood pressure is measured must be quiet without background noise. This rarely occurs in a police station. Overall, DREs lack the experience, training, and understanding to perform and interpret this test in a way that is medically acceptable. Also, there are so many external factors that can influence a person's blood pressure that the results of the test cannot be considered a reliable way to determine impairment from drugs.

Finally, the DRE officer also takes the arrestee's body temperature during Step 6. The DRE 2018 instructor's manual guide lists the normal temperature range at 97.6 to 99.6 degrees. However, accordingly to MedlinePlus, "Normal body temperature varies by person, age, activity, and time of day. The average normal body temperature is generally accepted as 98.6°F (37°C). Some studies have shown that the "normal" body temperature can have a wide range, from 97°F (36.1°C) to 99°F (37.2°C)." MedlinePlus, *Body temperature norms* <https://medlineplus.gov/ency/article/001982.htm> (accessed March 24, 2022). Thus, some normal temperature results will be deemed abnormal by the DRE and a sign of drug impairment, increasing false positive evaluation conclusions. More importantly, however, therapeutic levels of a drug can also affect temperature, so it is an unreliable indicator of impairment.

Overall, the evidence indicates that measurements of blood pressure, pulse, and body temperature are more likely to mislead and be misunderstood than have value in determining drug impairment

associated with unsafe driving. This is again evidenced by the 2005 double-blind study. As it relates to vital signs, the authors of the study noted:

> Thus, in addition to the psychophysical tests and nystagmus, the officers typically noted only one measure that was significantly different from their 'unimpaired' judgment. For their identification of cannabis as the impairing drug, the officers noted a raised pulse rate. For identification of a depressant, they relied on a raised temperature (and possibly reduced pupil diameter under direct light). When they believed the impairment was due to a narcotic/analgesic, it was based on a lower temperature and a slightly constricted pupil under direct light. When they believed the impairment was due to a stimulant, they relied on an enlarged pupil in the dark and an increase in horizontal gaze nystagmus. Although this approach simplifies the officer's task, it is not sensitive enough to the true complexities of drug effects, and consequently, it is also likely to lead to erroneous conclusions. [*Drug Identification Performance on the Basis of Observable Signs and Symptoms*, p 849.]

Overall, the evidence shows that even in combination, the three tests are not accepted in the medical community for such a purpose, but especially not as performed by a non-medical professional like DRE officers who are likely to misinterpret the data collected.

7. Step Seven: Darkroom/Ingestion Examination

The 7th step of the DRE is the "dark room evaluation." (Exhibit M). To an extent, this step in the process is exactly what it sounds like: the examiner takes the subject to a dark room, cuts off (almost) all of the lighting and then observes the reaction from the subject's eyes after altering the lighting. The examiner also measures the size of the pupils using something called a "pupilometer."

The pupilometer used by the law enforcement officer is a piece of paper that features a series of circles or semi-circles ascending from smallest to largest in .5 millimeter increments ranging from 1.0 mm to 10.5 mm. *Id*. at 25 of 50. Figure 1 shows an exemplar:

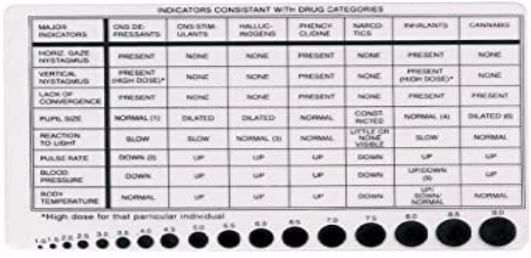

Fig 1.

It is not to be confused with a pupilometer that is used in clinical ophthalmology to assess the distance between pupils, pupil reactivity as an assessment of overall health as opposed to signs or symptoms of diabetic conditions. An illustration of a pupilometer is shown in Figure 2:

Fig. 2

The examiner is instructed to slide the paper pupilometer up and down along the outside edge of each eye and record he numeric value that corresponds to the diameter of the circle or semi-circle "that is closest in size to the pupil." (Exhibit N).

The examiner is also instructed to examine the pupil size in the following conditions:

1. Under room light
2. Under "near total darkness"
3. Under direct light.

The examiner is then to observe how the subject's eyes respond to the 3 distinct conditions and compare those responses. The DRE protocol is designed under the assumption that an unimpaired person will present a pupil size in the range of no less than 3.0 mm to not more than 6.5 mm under any of the three different conditions. However, researchers have reported that the assumption of 3.0 – 6.5 mm is "too narrow."[40]

The DRE protocol also includes in the conditions "near total darkness" without offering a definition to the evaluator for what objectively defines "near" total darkness. Step 7 of the DRE protocol

[40] Richman, McAndrew, Decker, and Mullaney. (2004). *An Evaluation of Pupil Size Standards Used by Police Officers for Detecting Drug Impairment*, Optometry, Vol 75/Issue 3, p 175-182; http://www.cjcenter.org/idi/documents/JAOAPupilSizeRichman2.pdf

appears to be without a standardized, objective means and is based on assumptions that the real experts, optometrists, advise are not accurate.

8. Step Eight: Muscle Tone Examination

Like the other steps discussed within this brief, the examination of one's muscle tone is neither scientific nor reliable in determining whether or not an individual is impaired by the ingestion or use of marijuana. First, this particular step is heavily marred by its subjectivity. Second, drug recognition evaluations officers are not actually taught the line between normality, flaccidity, and rigidity. Third, this employed examination completely fails to take into account other variables which may affect one's muscle tone. Finally, like many other steps in this process, there is a complete lack of scientific evidence linking one's muscle tone to impairment by the use or ingestion of marijuana. Rather, as discussed in more detail below, the National Highway Traffic Safety Administration (NHTSA) expressly acknowledge that cannabis use usually does not affect one's muscle tone. As a result of these aforementioned flaws, it cannot be said that examination of muscle tone is scientific or reliable in determining one's impairment based on the use or ingestion of marijuana.

As mentioned in the National Highway Traffic Safety Administration Expert Course, this examination starts with the officer examining the subject's left arm muscles. (Exhibit N). To do so, the officer must "Firmly grasp the upper arm and slowly move down to determine muscle tone." *Id*. According to the Instructor Guide, the Officer has the option of noting either "flaccid, normal, or rigid" muscle tone. (Exhibit O). The Guide also asserts that, "Certain categories of drugs can cause the user's muscles to become markedly tense and rigid. Others may cause flaccidity or "rubbery-like" muscle tone." (Exhibit P). However, especially in the context of marijuana, this assertion does not appear to hold water.

The first flaw – which removes step eight from the realm of science and reliability – is the fact that this examination is entirely subjective. Amongst the definitions offered by Merriam-Webster,

subjective is defined as "modified or affected by personal views, experience, or background."[41] In other words, subjective means that one's interpretation of something is subservient to their own viewpoint. This seems to precisely sum up the "muscle tone examination" employed by drug recognition evaluation officers.

When feeling a subject's muscles for their tone, an officer is naturally going to be guided by their own personal view of what they believe is either flaccid, normal, or rigid. This naturally translates to instances where one officer could conclude that an individual's tone is rigid and another officer could conclude that their tone is normal. This could be seen in relation to any combination of normal, flaccid, or rigid. The subjective nature of this examination and its procedure, opens the floodgates to differing conclusions. With such vulnerability to differing views – due to its subjective nature – how can this examination be considered scientific or reliable?

The next flaw, in almost the same vein as the first, is the fact that officers are not actually trained on where the line is between each of the different muscle tone states. So, once again, officers are put into potential scenarios where they could reach conclusions completely different than their counterparts. Like the flaw mentioned above, this speaks to the vulnerability of this particular step in the examination process. Once again, with such a critical flaw, this examination cannot be considered reliable nor scientific. However, the shortcomings of this step do not start and stop with its vulnerability to differing viewpoints and outcomes.

The third flaw which illustrates the unreliability and unscientific nature of the "muscle tone examination" is its failure to take into account variables, other than use or ingestion of marijuana, which could actually impact the muscle tone. For example, the examination fails to take into account one's body fat concentration. Additionally, the examination fails to take into account if a particular individual has

[41] https://www.merriam-webster.com/dictionary/subjective

recently worked out. As a result of this failure, officers are subject to reaching a positive conclusion on a subject's drug use, where they didn't use drugs at all. In other words, by failing to take into account these other variables which may impact muscle tone, officers are liable to reach a conclusion based on flawed support.

The final flaw, possessed by this particular DRE step, is perhaps the most important to this Court's consideration. That is, there is no scientific peer-reviewed evidence which contends that muscle tone is a reliable indicator of one's impairment by the use or ingestion of marijuana. Mirroring other portions of this brief, this Amicus Curiae was unable to locate any peer-reviewed scientific studies asserting that muscle tone is a reliable indicator of impairment by marijuana use or ingestion.

A proponent of the muscle tone examination may attempt to assert that the following analyses support their contention; *Simplifying The Process For Identifying Drug Combinations By Drug Recognition Experts* by Porath-Waller and Beirness (2010); *Predicting Categories of Drugs Used By Suspected Drug-Impaired Drivers Using The Drug Evaluation and Classification Program Tests* by Porath and Beirness (2019); *An Evaluation of Data from Drivers Arrested for Driving Under the Influence in Relation to Per se Limits for Cannabis* by Logan, Kacinko, and Beirness (2016). However, as previously mentioned in the lack of convergence section of this brief these are not scientific nor reliable. Rather, they are merely statistical analyses subject to various flaws which reach the heart of their unreliability. This lack of scientific support was once again, not lost on the National Highway Traffic Safety Administration.

Rather, NHTSA seems to expressly recognize that there is no scientific support to the contention that muscle tone is a reliable indicator of impairment by the use or ingestion of marijuana. As expressly stated in the National Highway Traffic Safety Administration Expert Guide materials on drug combinations, "Cannabis usually does not affect muscle tone." (Exhibit Q). Shortly thereafter the

materials go onto state, "Cannabis causes a normal muscle tone, while CNS stimulants and Hallucinogens will cause rigid muscle tone." (Exhibit R). Here, NHTSA seems to be expressly admitting that muscle tone examination is not a reliable indicator of impairment by the use or ingestion of marijuana. After all, if cannabis does in fact produce normal muscle tone and a muscle tone examination is given, a subject who used or ingested marijuana and a subject who did not would be virtually indistinguishable.

9. Step Nine: Injection Site Examination and Third Pulse

In this step officers are tasked with merely observing the arms of the subject in an attempt to find "injection sites." However, this step, like the steps prior, is neither scientific nor reliable in determining whether an individual is impaired due to the use or ingestion of marijuana. First and foremost, this particular step is wholly irrelevant when it comes to an individual suspected of marijuana use or ingestion. After all, the use or ingestion of marijuana does not require injection. Second, saying that this step is scientific or reliable leads to the absurd result that anyone who can spot injection sites is an expert on one's drug impairment. Thus, this step in the evaluation process is neither scientific nor reliable in determining whether an individual is impaired by the use or ingestion of marijuana.

10. Step Ten: Interrogation

The tenth step in the evaluation process is akin to the procedure followed during the second step of the evaluation process. That is, an officer is once again merely relying on statements and observations. This step is perhaps a bit less attenuated, as this step relies on the direct observations of the drug recognition evaluation officer. However, this removed layer does not make observations or statements anymore scientific or reliable. After all, is watching someone's conduct or asking them if they smoked or ingested marijuana truly scientific? This Amicus Curiae answers in the negative. As a result, like step two of the evaluation process, it cannot be said that this step is reliable or scientific.

11. Step Eleven: DRE Officer's Opinion

At this point in the evaluation process, the evaluator must now form an opinion. However, this basis of the formed opinion is the exact reason as to why this particular step is neither scientific nor reliable. That is, it cannot be said that a formed opinion is scientific or reliable, when it is entirely based on the unreliable and unscientific preceding steps. In other words, if the basis of the officer's opinion is based in unscientific and unreliable procedure, than the formed opinion is also unreliable and unscientific.

12. Step Twelve: Toxicological Specimen

In step twelve of the drug recognition evaluation process, drug recognition evaluation officers look to "toxicology reports" to help their "evaluation." Like the eleven steps preceding it, this step is not immune to the deficiencies seen throughout the entire DRE "evaluation" process. As a result of this steps deficiencies, it cannot be said that step twelve of the DRE evaluation is reliable or supported by scientific evidence, when testified to by a drug recognition evaluation officer.

The first major issue, which plagues this particular step in the drug recognition evaluation process, is that it is not the Officer's place to share their opinion on toxicology reports – for numerous reasons. First, Officers are not at all trained on the actual testing of the sample, Officers are not at all involved in the actual testing process, and finally allowing them to offer their opinion necessarily implicates hearsay issues. The machine which tests the bodily fluid sample generates hundreds of pages of data based on the submitted fluid sample. A lab analyst then weights through these hundreds of pages to interpret the data and form an opinion. The lab analyst then creates a report based on this interpretation and opinion, and it is important to note that these reports are merely hearsay statements. Not only is the Officer not at all involved in this reporting process but, allowing them to offer an opinion on this report generates a second level of hearsay.

Second, these reports have a glaring omission which also arguably effects an Officer's ability to offer their opinion on these reports. More specifically, these reports fail to mention their uncertainty measurement and these Officers are not at all trained on such issues. The appearance of impropriety certainly exists in this failure to include the uncertainty measurement. Perhaps most importantly, if courts permit these officers to give opinion testimony on these reports, the Officers would be doing so without any knowledge of the existing measurement uncertainty. Is allowing an Officer to offer opinion testimony, on something they do not possess all the information, on either scientific or reliable? This Amicus Curiae answers "no."

The third issue, which plagues this particular misstep in allowing a DRE Officer to offer opinion on these reports, is the existence of scientific evidence and literature concluding that there is essentially no correlation between one's THC level and impairment. Without a particular correlation, toxicology reports are not all indicative of one's actual impairment. Allowing an Officer to offer an opinion on impairment – using a report that is not actually indicative of impairment – is problematic. Therefore, the literature discussed below also tends to show that it is not the place for Officer's to offer their opinion on these toxicology reports.

The first piece of literature is the 2017 National Highway Traffic Safety Administration Report to Congress.[42] In carrying out this report, NHTSA was looking at the particular challenges and unknowns of marijuana-impaired driving. However, one constant emerged from their efforts. That is, the finding that there is a poor correlation between one's THC level (in their bodily fluid) and impairment. For example, as stated in the report, "While fewer studies have examined the relationship between THC blood levels and degree of impairment, in those studies that have been conducted the consistent finding

[42] NHTSA, *Marijuana-Impaired Driving: A Report to Congress* (July 2017); https://www.nhtsa.gov/sites/nhtsa.gov/files/documents/812440-marijuana-impaired-driving-report-to-congress.pdf

is that the level of THC in the blood and the degree of impairment do not appear to be closely related[43]. Most importantly, the study report cites, "…the poor correlation of THC level in the blood or oral fluid with impairment precludes using THC blood or oral fluid levels as an indicator of driver impairment."[44] However, the lack of correlation finding is not merely limited to the 2017 Congressional report.

Michigan's Impaired Driving Commission "…was created within the Michigan State Police (MSP)…and is required to research and recommend a scientifically supported threshold of Δ9-THC bodily content to provide evidence for per se impaired driving in the state of Michigan."[45] The Commission looked to past and present scientific peer-reviewed literature; as well as invited experts in the area to present.[46] As a result of the Commission's vigorous work, the Commission published its findings in a 2019 report. Amongst this report was several key revelations surrounding THC and one's level of impairment. But perhaps most importantly to the Amicus Curiae's position here the Commission published the following: Based on the total body of knowledge presently available, the Commission finds that there is no scientifically supported threshold of Δ9-THC bodily content that would be indicative of impaired driving due to the fact that there is a poor correlation between driving impairment and blood (plasma) levels of Δ9-THC at the time of blood collection.[47] The Commission reached this decision based on several key findings.

[43] NHTSA, *Marijuana-Impaired Driving: A Report to Congress* (July 2017); https://www.nhtsa.gov/sites/nhtsa.gov/files/documents/812440-marijuana-impaired-driving-report-to-congress.pdf
[44] *Id.*
[45] MSP, *Report from the Impaired Driving Safety Commission* (March 2019); https://www.dropbox.com/home/MIAOWIA/DRE%20Amicus/AmicusBriefExhibits?preview=Exhibit+W+-+MI+Impaired_Driving_Report.pdf
[46] *Id.*
[47] MSP, *Report from the Impaired Driving Safety Commission* (March 2019); https://www.dropbox.com/home/MIAOWIA/DRE%20Amicus/AmicusBriefExhibits?preview=Exhibit+W+-+MI+Impaired_Driving_Report.pdf

For example, the Commission determined that "Elimination of Δ9-THC undergoes a very rapid elimination over several hours with a half-life…of approximately 6 minutes followed by a long terminal elimination phase possessing a half-life of approximately 22 hours, or more."[48]. The Commission also found that "Regular users of cannabis respond differently to the same dose of Δ9-THC than occasional or infrequent users of cannabis due to a phenomenon termed "tolerance." The most important takeaway here is that "…there is a poor correlation between driving impairment and blood (plasma) of Δ9-THC at the time of blood collection."[49]

Conclusion

The process undertaken by drug recognition evaluation officers is plagued by missteps and errors. As illustrated above, the procedures employed by these DRE officers is neither scientific nor reliable. WHEREFORE, this Amicus Curiae respectfully requests that this Honorable Court find in that there is no scientific evidence to support the conclusion that a properly trained and certified drug recognition evaluation officer is able to accurately determine whether an individual is impaired by the ingestion of marijuana or narcotics to a degree that makes it unsafe and unlawful for the individual to operate a motor vehicle.

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Respectfully Submitted,

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[48] *Id.*
[49] *Id.*