## Introduction to Weakest in the Nation

### Previously published as: 2018 DUI/DUID Interim Committee Briefing Book

In 2017, Colorado passed HB17-1315 which required the State to collect, analyze and annually publish Driving Under the Influence (DUI) and Driving Under the Influence of Drugs (DUID) data from the Colorado's courts, laboratories and state agencies. This will be the first large-scale study to consider substances *causing DUI charges*, not just those *involved with fatalities* as most studies have done. Colorado will know which drugs and drug combinations are the most prevalent in DUIs, and will no longer have to guess how the conviction rate differs between DUI-alcohol cases and DUID cases.

In 2018, a bi-partisan group of 36 legislators supported a proposal that the Legislative Council convene a two-day study committee to review the HB17-1315 data and to consider appropriate legislation. The Legislative Council denied that request.

This book was originally produced as a briefing book for use by that committee during its deliberations. It incorporates a summary of scientific studies published since 2013, when Colorado's DUI law was revised to include a 5 ng/ml permissible inference level for marijuana's THC.

This re-titled book is now being published to enlist support of legislators to consider such legislation.

# Weakest in the Nation:

Colorado's DUID laws are the weakest in the nation; why and how to fix that

Ed Wood

**DUID Victim Voices** 

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# Foreword

Ed Wood has created a uniquely valuable Briefing Book for the 2018 DUI/DUID Interim Committee.

Drug-impaired driving is a serious highway safety threat on the scale of the well-recognized threat posed by alcohol-impaired driving. Despite the magnitude of the problem, the response to drug-impaired driving remains woefully inadequate. The controversies over marijuana-impaired driving not only dominate the drugged driving issue but they bring it to a screeching stop. Drug-impaired driving is much bigger than marijuana-impaired driving. Moreover, the substance-impaired driving issue is no longer dominated by the use of single drugs (e.g., alcohol or marijuana) but by the simultaneous use of multiple impairing psychoactive drugs, both legal and illegal. These largely overlooked facts are made clear in this Briefing Book.

Today Colorado is ground zero for the legalization of marijuana for the United States and also for the world. Colorado is the world's laboratory for managing the negative impacts on the roads from all drugs, not just marijuana. It is essential that the full capabilities of this great state be brought to bear to understand and to manage the problem of drug-impaired driving.

I write this as a proud 1954 graduate of East High School in the Mile High City where the girl I double-dated with in my Junior and Senior years was Madeleine Albright and where one of the graduates a year ahead of me at East was Norman Augustine. These are two of the greatest leaders to come out of Denver.

I also write this as the first director of the National Institute on Drug Abuse (NIDA) where one of the first topics taken up by the organization after its founding in 1973 was drug-impaired driving. I also served as the second White House drug chief under Presidents Nixon and Ford. The drug-impaired driving has been recognized and researched, but not adequately addressed, for 50 years.

With this long national, and even global, perspective, I assure you that Ed Wood is without peer when it comes to drug-impaired driving. He has devoted himself to reducing drug-impaired driving to honor his adult son who was killed by a drug-impaired driver who received a virtual slap on the wrist for this crime. Ed is not just passionate, although he is that. He has studied the issue for a decade. He knows the leaders in the field and finds ways to engage them in this vital public safety initiative. I am proud he includes me in his remarkable list of committed collaborators.

Use this Briefing Book. Treasure it. Most importantly, wrestle the challenge of drug-impaired driving to the ground. Lead the country. Our nation needs strong leadership on drugged driving, including but not limited to marijuana-impaired driving, from Colorado. The problem is complex. There is no silver bullet. The precedent of the 0.08 g/dL blood alcohol concentration (BAC) per se limit for alcohol is unavailable for other drugs including marijuana. This is not due

to lack of research; this exact issue has been researched for four decades. Marijuana is not the outlier; alcohol is. There are many effective steps to be taken to better assess the problem of drug-impaired driving and to significantly reduce it.

This wonderful Briefing Book is your guide for your much-needed leadership.

Robert L. DuPont, MD President, Institute for Behavior and Health, Inc. Former Director, National Institute on Drug Abuse, 1973-1978 Former White Drug Chief, 1973-1977 www.IBHinc.org www.StopDruggedDriving.org

# Preface

The National Highway Traffic Safety Administration (NHTSA) convened a "Call to Action"<sup>i</sup> March 15, 2018 to begin a national dialog on how to address the nation's growing Driving Under the Influence of Drugs (DUID) problem. This, following the publication of "Drug-Impaired Driving: A Guide to What States Can Do" by the Governors Highway Safety Association (GHSA)<sup>ii</sup> and the recent efforts of organizations like the Institute for Behavior and Health, the Heritage Foundation, SAM, DUID Victim Voices and We Save Lives suggests that the issue of DUID may be approaching a tipping point.

This Briefing Book was created to further that dialog.

Part One contains background scientific information to understand drug-impaired driving in the context of overall highway safety, as well as alcohol-impaired driving and distracted driving. It summarizes key research, and separates DUID fact from fiction. Two chapters focus on marijuana-impairment which is one of many causes of DUID. DUI is not just about alcohol and DUID is not just about marijuana. Claims that marijuana does not impair driving are debunked.

Part Two provides legal references. It contains current relevant Colorado statutes that deal with DUID and provides some state-by-state statute comparisons. Finally, it summarizes national model policy and statute recommendations from US and European agencies and organizations.

Part Three provides new data for consideration by the committee. Data published by Colorado's Division of Criminal Justice pursuant to HB 17-1315 are not included since that information is presented separately as a core component of the committee's work.

Of particular importance, Part Three presents an annotated bibliography of 73 relevant DUID reports and scientific publications published since 2013. More research is welcome, but it is even more important to learn from the research that already has been done, which is summarized here.

Part Four proposes recommendations for consideration, based upon the national model recommendations in Part Two as well as an analysis of Colorado's unique conditions.

Throughout this manual, the term THC refers *only* to Delta 9-tetrahydrocannabinol, the psychoactive cannabinoid in marijuana.

<sup>&</sup>lt;sup>i</sup> https://www.nhtsa.gov/events/drug-impaired-driving-call-action

<sup>&</sup>lt;sup>ii</sup> <u>https://www.ghsa.org/sites/default/files/2016-11/Drug-Impaired Driving- A Guide For What States Can Do-Interactive.pdf</u>

# **Executive summary**

Two facets of the Driving Under the Influence of Drugs (DUID) problem are of concern. First, DUID drivers kill and maim innocent victims. Second, DUID victims often fail to see the same kind of justice that is delivered to drunk driving victims because laws designed to deal with alcohol impairment do not work well for drug impairment.

Driving Under the Influence (DUI) is not just about alcohol, and DUID is not just about marijuana. Whereas in years past, alcohol was the only impairing substance commonly found in drivers, today's forensic laboratories report that polydrug impairment is more common than impairment by either alcohol alone or marijuana alone. Although alcohol and marijuana are the most commonly found drugs in drivers involved in fatal crashes, they are very frequently found in combination, often with narcotics, depressants, stimulants, and other drugs.

Public knowledge about drunk driving is widespread but frequently wrong. Knowledge about drugged driving is far less common and even more commonly wrong. The public in general fails to understand the DUI arrest process and the difference between DUI and DUI *per se*.

Until the last few years, driving has become increasingly safer. The average person will be involved in a fatal crash only about once every 85 lifetimes. So when drivers are warned that an activity like drinking alcohol, using drugs or texting and driving can increase the risk of a fatal crash, drivers can and do ignore such warnings. And they usually get away with it. This explains why so many messages to avoid drunk, drugged or distracted driving are ineffective.

Marijuana-impaired driving is of particular concern not because of its inherent danger, but because of its increasing prevalence and a commonly held false belief that stoned driving is not dangerous. Marijuana-impaired driving is less deadly than drunk driving, just as a .22 caliber bullet is less deadly than a .45 caliber bullet. But all four can and do kill.

Blood tests or breath tests have been used successfully to assess alcohol impairment for decades. But alcohol is the *only* drug for which there is a strong correlation between impairment and blood or breath concentrations. For marijuana's impairing delta 9-tetrahydrocannabinol (THC), virtually all scientific research has demonstrated that even though higher doses of THC impair more than lower doses of THC, there is absolutely no correlation between THC impairment and blood levels of THC.

Individuals can develop a tolerance to some of the impairing effects of drugs, including alcohol, marijuana and opioids. But tolerance to some of a drug's impairing effects does not make the individual tolerant to all impairing effects. Addicts and other heavy users of drugs can be just as impaired as novice users.

Colorado's DUID laws are considered the weakest in the nation for several reasons:

- 1. The 5 nanogram per milliliter permissible inference level for marijuana's THC ensures that most THC-impaired drivers who test below 5 ng/ml will not be convicted of DUI.
- 2. The 5 ng/ml permissible inference level does not guarantee that THC-impaired drivers who test above 5 ng/ml will be convicted of DUI.
- 3. Colorado relies upon a very stringent statutory definition of DUI that is difficult to prove in court: "the person is substantially incapable" of safe driving.
- 4. Colorado has a lower offense of Driving While Ability Impaired (DWAI): "affects the person to the slightest degree" similar to the statutory DUI definition of some other states. But although vehicular homicide due to DUI is a Class 3 felony, vehicular homicide due to DWAI is not even a misdemeanor.
- 5. Colorado tests a minority of DUI suspects and drivers involved in fatal crashes for drug presence. Therefore, the prevalence of drug impaired driving is not well understood.
- 6. Colorado provides a statutory presumption of innocence for drivers testing below a Blood Alcohol Concentration (BAC) of 0.05, which fails to recognize that a non-impairing dose of alcohol combined with a non-impairing dose of THC can impair a driver.

The following statutory changes are recommended to improve Colorado's DUID laws: *Transformative changes* 

- 1. Change the THC permissible inference law to a Tandem *per se* law. [See Chapter 12.]
- 2. Require evidentiary drug testing of any driver who tests positive for drugs on a preliminary drug test; and evidentiary drug testing of all drivers involved in fatal crashes.
- 3. Implement oral fluid testing: roadside non-quantitative preliminary oral fluid testing if the officer has reasonable grounds to believe that the driver may be impaired by drugs; evidentiary laboratory oral fluid testing as an alternative to blood testing to prove the presence of an impairing substance.

#### Improvements

- 1. Redefine DUI for drugs similar to Vermont's recent definition.
- 2. Establish zero tolerance for all psychotropic drugs in drivers under the age of 21.
- 3. Reclassify penalties and misdemeanors to criminalize vehicular homicide or assault due to DWAI; make vehicular homicide or assault due to careless driving a felony.
- 4. Impose the same requirements and sanctions for drug testing that currently apply to alcohol testing.
- 5. Eliminate the statutory presumption of innocence for a BAC below .05 if psychotropic drugs in addition to alcohol are present.
- 6. Enhance penalties for polydrug impairment.
- 7. Eliminate alcohol sanctions for drug impairment convictions.
- 8. Implement electronic warrants to reduce delays in taking blood samples.
- 9. Adopt National Safety Council forensic testing recommendations.
- 10. Include officer-collected evidence from the scene of arrest in the Division of Criminal Justice reports.

The above recommendations are offered as a menu, not as a package, since the effects of some recommendations overlap.

# Part One – Background

#### Scope of the problem

Impaired driving – the problem in perspective

Marijuana-impaired driving facts and myths

**Understanding contrary reports** 

We found SUBSTANTIAL evidence that recent marijuana use by a driver increases their risk of a motor vehicle crash.

Colorado Department of Public Health and Environment's "Monitoring Health Concerns Related to Marijuana," 2016

69% of Colorado marijuana users have driven under the influence of marijuana in the past year. 27% of users do so at least 5 times per week.

Survey of 7,698 marijuana users as of April 9, 2018 from Colorado Department of Transportation's Cannabis Conversation program

Scientific evidence on the association between cannabis use and driving impairment contrasts with public attitudes toward driving under the influence of cannabis. Regular cannabis users often admit to driving under the influence of cannabis and wrongfully believe that cannabis does not affect their driving performance or that they can compensate for cannabis-associated impairment.<sup>1</sup>

Johannes G. Ramaekers, PhD

# Chapter 1 Introduction

# Two facets of the DUID problem

Two different DUID problems concern us:

- 1. DUID drivers kill and maim innocent victims. Information in Chapters 2 and 9 supports this claim. How can we prevent this tragedy? Chapter 7 provides many suggestions.
- 2. DUID victims often fail to see the same kind of justice that is delivered to DUI-alcohol victims because laws designed to deal with alcohol impairment do not work well for drug impairment. Information in Chapters 3, 6, 8 and 10 supports this claim. How can we ensure parity of justice for DUID victims? Chapters 7, 11 and 12 provide suggestions.

Driving Under the Influence of Drugs (DUID) is a widely known yet poorly understood problem. Unfortunately, some firmly-held opinions about the subject are contrary to fact and can hinder rational discussion and resolution of the problem. So in this introductory chapter we will briefly explain the problem and try to clear up common misunderstandings.

# DUID is not just about marijuana

Drugs that can impair safe driving ability are in the following four categories:<sup>2</sup>

- Illegal drugs e.g. heroin, cocaine, methamphetamine
- Prescription drugs e.g. opioids, benzodiazepines (may be used legally or illegally)
- Legal non-medicinal drugs e.g. alcohol, marijuana in Colorado
- Over the counter medications e.g. antihistamines, anti-diarrhea drugs, anti-emetics

The National Highway Traffic Safety Administration (NHTSA) has classified nearly 1,000 impairing drugs into nine categories including the following that are the prevalent causes of impaired driving in the U.S<sup>3</sup>.

- Narcotics these include the naturally-derived opiates like heroin and morphine as well as synthetic opioids like Fentanyl, Oxycontin<sup>®</sup> (Oxycodone), and Vicodin<sup>®</sup> (Hydrocodone).
- Depressants older depressants like barbiturates have been largely replaced by a wide range of benzodiazepines such as Valium<sup>®</sup> (Diazepam) and Ativan<sup>®</sup> (Lorazepam). Sleep aides like Ambien<sup>®</sup> (Zolpidem) are also included in this category.
- Stimulants the most commonly abused stimulants are methamphetamine and cocaine.
- Cannabinoids this is the second most common drug (after alcohol) found in both drivers arrested for DUI as well as drivers in fatal crashes.

Other less commonly cited categories are inhalants, PCP, anabolic steroids and hallucinogens.

Table 1 shows the prevalence of the various NHTSA categories of drugs, as well as the estimate of the Odds Ratios (ORs) of those categories. The OR is the statistical likelihood that an outcome (e.g. crash, fatality, serious injury) will occur given a particular drug exposure, compared to the odds of the outcome occurring in the absence of that exposure. An OR of 15 for fatal crashes for a driver with a BAC of 0.10, for example, means that a driver with a BAC of 0.10 has 15 times the likelihood of being involved in a fatal crash than an identical sober driver at the same time, place and under the same conditions. An OR of 1.5 would mean a 50% greater chance of being involved in a fatal crash. The data in Table 1 were derived from NHTSA's Fatality Analysis Reporting System (FARS) which has limitations described later, but it is the best we have for this kind of analysis.

#### Table 1<sup>4</sup>

Prevalence of drugs detected and crude Odds Ratios and 95% Confidence Intervals of fatal crash involvement according to drug category, in the continental United States, selected time periods on Fridays and Saturdays, July 20 through December 1, 2007.

Drug Category	% of Cases (n=737)	% of Controls (n=7719)	Crude OR <sup>a</sup>	95% CI
Marijuana	9.8	5.6	1.83	1.39, 2.39
Narcotics	4.8	1.6	3.03	2.00, 4.48
Stimulants	9.4	2.8	3.57	2.63, 4.76
Depressants	5.2	1.1	4.83	3.18, 7.21
Polydrug <sup>b</sup>	7.1	2.2	3.41	2.43, 4.73

OR = Odds Ratio; CI = Confidence Interval;

<sup>a</sup> Drivers who tested negative for the specific drug category were used as the reference group;

<sup>b</sup> Two or more non-alcohol drugs.

Guohua Li. Accid Anal Prev. 2013

### Public beliefs

Generally, the public is very aware of the dangers of drunk driving, but somewhat less so about the dangers of driving under the influence of other drugs.

In September 2013, 78% of surveyed Coloradans believed the state's DUI laws covered impairment by marijuana. 70% of respondents agreed they could *not* drive safely after using certain prescription medications and 85% believed they could *not* drive safely under the influence of marijuana.<sup>5</sup>

However, most (55%) of Colorado's marijuana users felt they *could* drive safely under the influence of marijuana. The same thing was found in a 2016 survey.<sup>6</sup> A 2018 survey of recreational marijuana users revealed that 11% believe marijuana makes them a better driver.<sup>7</sup> This belief is more prevalent in youth than in adults.<sup>8</sup> There is clearly a great disconnect between the safety beliefs of marijuana users compared with other Coloradans, and, as we

shall see in Chapter 3, between the safety beliefs of marijuana users compared with scientific studies.

Legislators should address both impairment from drugs as well as this disconnect in beliefs about the dangers of marijuana-impaired driving. Educational programs focusing on safety is of greater importance than programs that focus on laws. Knowledge of the safety implications of marijuana can reduce DUID, whereas improving knowledge of DUID laws is less effective.<sup>9</sup>

Although good information on the issue of drugged driving is available from the scientific literature and NHTSA's Fatality Analysis Reporting System (FARS), most knowledge fueling public beliefs comes predigested by the media and reports from organizations like the Marijuana Policy Project (MPP), the Drug Policy Alliance (DPA), and the National Organization to Reform Marijuana Laws (NORML). Often, these sources have served to confuse as much as they have to illuminate as we will discuss further in Chapters 3 and 4.

### How DUIs are investigated

A common belief is that a police officer uses a breathalyzer at the roadside to prove that a driver is impaired by alcohol. This myth is created by not understanding the difference between DUI and DUI *per se*.

- DUI Colorado Revised Statute (CRS) 42-4-1301 (1)(a) A person who drives a motor vehicle or vehicle under the influence of alcohol or one or more drugs, or a combination of both alcohol and one or more drugs, commits driving under the influence.
- DUI per se CRS 42-4-1301 (2)(a) A person who drives a motor vehicle or vehicle when the person's BAC is 0.08 or more at the time of driving or within two hours after driving commits DUI per se.

To prove that a driver is guilty of DUI, the court must prove that the driver was substantially incapable of safely driving the vehicle. Refer to C.R.S. 42-4-1301 (1) (f). To prove that a driver is guilty of DUI *per se*, the court must prove that the driver had a blood alcohol content (BAC) of .08 g/dL or higher. Legal sanctions for DUI and DUI *per se* are identical. Drivers with a BAC greater than .08 are routinely charged with both DUI and DUI *per se*. So it should come as no surprise that many people view DUI and DUI *per se* interchangeably.

But the timing and the process for gathering evidence for the two charges is quite different. Police test for drug impairment just as they do for alcohol, based on driving behavior and roadside impairment assessments. Assessments are done by observations and by asking questions of the suspect. Additionally all officers are trained to perform Standardized Field Sobriety Tests (SFSTs) which enable them to document evidence of alcohol impairment based upon observations. A growing number officers receive additional training called Advanced Roadside Impaired Driving Enforcement (ARIDE). An ARIDE-trained officer can more readily identify a driver impaired by drugs than an officer who has received training only in SFSTs. A very small number of officers (less than 2% in Colorado) are trained as Drug Recognition Experts (DREs). DREs are trained to not only identify drug impaired drivers but to determine the class of drugs most likely to be causing the observed impairment.

An officer may use a breathalyzer at the roadside to guide his alcohol impairment assessment process and to confirm that there is probable cause to subject the driver to toxicology testing. A breathalyzer is considered to be a preliminary test and results are not admissible at trial.

An evidentiary breath test (EBT) may be performed as well, but that is typically done at a police station as an alternative to a blood test. EBTs are performed after an arrest has been made.

Assessments results are immediately available to an officer and are used to determine if a DUI arrest should be made. Blood toxicology results may become available days, weeks, and sometimes months after the arrest is made. Toxicology tests are used to confirm the cause of the observed impairment, to support a court case confirming DUI, and are also used to prove DUI *per se.* Toxicology results do not determine if someone is impaired or should be arrested.

### Legal limits

A BAC of .08 is commonly but inaccurately referred to as a DUI legal limit. It is indeed the lower limit that defines a DUI *per se* but a driver can be convicted of DUI even if the BAC is below .08 if there is sufficient evidence.

A puzzling fact about marijuana is that, unlike alcohol, there is no correlation between forensically-determined THC levels in blood and levels of impairment, giving rise to statements such as:

- Why can't science find a BAC .08 equivalent for marijuana?
- I'll vote for a THC *per se* limit when science tells us what it should be.

The reason "science" can't find a BAC .08 equivalent for marijuana is not because we need more research. We've done the research, and we know that such a limit does not exist for many biological and chemical reasons. The American Automobile Association Research Foundation listed 20 ways that marijuana differs from alcohol,<sup>10</sup> including the aforementioned biological and chemical differences. With such vast differences between marijuana and alcohol, it should come as no surprise that the BAC *per se* approach used successfully for alcohol doesn't work for marijuana.

"Science" didn't determine the BAC .08 limit in 49 of the US states (or Utah's BAC .05 limit). Politicians made that determination, based upon scientific facts that do not exist for marijuana. Proof that politicians, not science created the .08 level is the fact that different countries and states have different BAC *per se* levels, ranging from 0.02 to .08, all using the same scientific input.

There is no correlation between forensically-determined THC levels in blood and levels of impairment, but that is not unique to marijuana. Alcohol is the <u>only</u> drug for which there is a well-defined correlation between blood levels of alcohol and levels of impairment. This relationship was documented by Robert Borkenstein in 1964 and has since been replicated worldwide with similar, although not identical results. See Figure 1 for an example.<sup>11</sup>



Because of the high correlation between BAC and impairment, we can reliably infer alcohol impairment by understanding blood alcohol levels even though blood is never impaired by alcohol. Only the brain is impaired by alcohol.

Inference of alcohol impairment can be made from BAC because alcohol is a very small watersoluble molecule that rapidly establishes a concentration equilibrium everywhere in the body that is highly perfused with blood. Therefore, what's in the blood is in the brain, and vice versa. As the level of alcohol in the brain increases, the level of impairment increases. And by measuring alcohol level in blood, we have a very good idea of what is in the brain and how impaired someone is.

That doesn't work for most drugs, especially THC. Drugs other than alcohol are very large molecules and many of them are poorly soluble in water. THC, for example is highly fat soluble so only very small quantities can remain dissolved or suspended in blood. For smoked or vaped marijuana, THC blood levels rise very rapidly for several minutes. Then the THC is quickly soaked up by the brain and other fatty tissues that are highly perfused with blood. The redistribution from blood to brain happens so quickly that the maximum level of THC in the blood can drop an average of 73% within the first 25 minutes after beginning to smoke a joint.<sup>12</sup>

THC remains in the brain at high levels even when it cannot be detected in blood due to this rapid redistribution. Mura showed<sup>13</sup> by testing blood and brain tissue of 12 cadavers that the level of THC in the brain was higher than the level of THC in the blood of 100% of his subjects. In some cases, THC was present in the brain, even though none could be detected in the blood.

### **Cannabinoids**

Marijuana contain dozens of types of molecules in the family of cannabinoids, estimated to be at least 60, perhaps more than 100. Some are psychoactive, some have other medicinal effects with no psychoactive effects, and still others have no known activity When metabolized by the body, some of these cannabinoids turn into other molecules called metabolites that retain their cannabinoid character.

Cannabinoids of interest include:

- THC a.k.a delta 9-THC or delta 9-tetrahydrocannabinol. This is produced from THCA in the marijuana flower by heating or drying. It is psychoactive.
- Hydroxy-THC a.k.a. 11-hydroxy-THC. This is the primary metabolic by-product of THC. It is psychoactive with a very short half-life.
- Carboxy-THC a.k.a. 11 nor 9-carboxy THC or THC-COOH. This is the water soluble, non-psychoactive metabolic by-product of hydroxy-THC.
- Cannabinol a.k.a CBN. A mildly psychoactive compound that has a sedative effect, found in trace amounts in most marijuana preparations.
- Cannabidiol a.k.a CBD. A medically active, non-psychoactive component of marijuana.
- Cannabigerol a.k.a CBG. A marker of recent THC use.

Some journalists and even some laboratories refer to carboxy-THC as THC. This has created a great deal of confusion and misunderstanding. Since carboxy-THC is an inactive metabolite of THC, many people believe that all metabolites are inactive. That is not the case since hydroxy-THC is highly psychoactive.

# Chapter 2 Impaired Driving – The problem in perspective

### Public responses to drunk vs drugged driving

George Smith was the first person known to be arrested for drunk driving in London in 1897. New Jersey outlawed drunk driving in 1906 but for decades it remained difficult to prove that alcohol was the cause of a crash. Defense attorneys were successful with the claim, "But it was an accident. It could have happened to anyone. The Government can't prove that alcohol caused my client's accident."

The term *accident* for a crash caused by impaired drivers is still used by many people today. The proper term for such a crash is a *crime*, not an *accident*. Prior to proof that crime has been committed, the more neutral term *crash*, rather than *accident* should be used.

During the first half of the 20<sup>th</sup> century all states adopted one form or another of drugged driving laws, frequently adopting a "legal limit" of 0.15 grams per 100 ml of blood (also referred to as .15 gm/dL or more simply, BAC 0.15). Over the next several decades other states adopted similar laws. Drunk driving cases continued to climb. Margaret Mitchell, the author of *Gone with the Wind* was killed by a drunk driver in 1949 which raised public awareness of the growing problem, but the public outrage was fleeting.

In 1968, the US Department of Transportation issued a report saying that nearly one-half of all traffic fatalities were caused by alcohol-impaired drivers. The public reaction was muted. By the 1960s, over 25,000 people were dying as a result of drunk driving. By the 1970s the proportion of traffic fatalities due to alcohol was reported to be 60%.

Cari Lightner was 13 years old in 1980 when she was killed by a drunk driver who had three prior convictions for drunk driving, yet was still driving with a valid California license. Cari's mother Candace became the tipping point that forced the United States to address drunk driving as the serious problem that it was and remains today.

Candace Lightner formed Mothers Against Drunk Driving (MADD) and tirelessly campaigned to change the way the nation considered drunk driving and dealt with its consequences. By sheer force of personality, commitment, anger and compassion, Lightner and the MADD movement turned the tide. The minimum drinking age of 21 was established. Zero tolerance for any alcohol in drivers under the age of 21 became the norm. Administrative License Revocations for drunk drivers were put in place. The advertising slogan, "Friends don't let friends drive drunk" was launched. By 1997 all states had finally adopted DUI *per se* limits no higher than BAC 0.10.

The results of the national efforts were impressive. Traffic deaths plateaued and the proportion due to drunk drivers declined. The DUI decline continued until the "Friends don't let friends drive drunk" campaign ceased in 1999, and has hovered around the 30% range since then. See Figure 2<sup>14</sup>.



Figure 2 Total traffic fatalities and DUI fatalities 1982 - 2016

#### 2016 NHTSA FARS

Contrast this national response with the responses to the recent increase in non-alcohol related deadly traffic crashes. There has been a 14% spike in traffic deaths in the last two years. Why the recent increase? It's not driven by alcohol, which is up 'only' 9%, or even speeding, which is up 6%. Is it DUID? Distracted driving? Probably, but we don't adequately measure and report those causes.

Assuming that DUID is a major component of the increase in traffic deaths, we're not taking the common sense actions as a nation that we took for drunk driving. Instead, we're legalizing another mind impairing drug (marijuana), requiring warrants for many blood draws in cases of DUI, and protecting stoned drivers by passing 5 ng/ml (nanograms per milliliter) THC *per se* laws. There are also widespread efforts to deny the problem exists. See examples of this in Chapter 4.

### Drugged, drunk and distracted driving – combined effects

It is easy and quite common to attribute a tragedy to a single cause, rather than to several contributing causes. Doing so simplifies the message so that it can fit on a bumper sticker, and to help rally support. But doing so can distort reality.

See Figure 3,<sup>15</sup> for an example of this distortion, published by the World Health Organization.



#### Figure 3 Proportion of drug-related road traffic deaths

A Policy Brief: Drug use and road safety. WHO. 2016

There is nowhere in Figure 3 where drivers impaired by multiple drugs or by alcohol combined with drugs can be recorded even though polydrug impairment has been shown to be more common than either alcohol impairment or impairment by any single drug.<sup>16</sup>

Part of the problem is that it is easy to prove that a driver is impaired by alcohol and we often don't even try to prove that a driver is impaired by drugs. Colorado has a single citation number for DUI irrespective of cause; alcohol, drugs, or a combination of both. As a result, if there is sufficient evidence of alcohol impairment to convict, there is no incentive for law enforcement to spend the resources to prove that the driver was also impaired by drugs. It's no wonder that we don't even bother to test adequately for DUID as quantified in Chapter 8.

Distracted driving is another well-known but poorly understood problem. NHTSA estimated that in 2015 there were 3,477 deaths due to distracted driving, 476 of which were due to use of cellphones. These data come from FARS but NHTSA acknowledges that FARS only captures a portion of distracted driving incidents. Most states don't have space on their crash reports to note if a driver was found to have been texting during a crash, so none of those incidents make their way to a FARS report.<sup>17</sup>

It is easy to become distracted while driving, and the use of cellphones while driving is not the only concern. There is evidence that the classic Borkenstein curve such as Figure 1, which shows the correlation between blood alcohol content and the risk of being in a crash, has moved to the left over the last several decades, due to increased traffic, more complex road

systems and more distracting technology built into modern cars.<sup>18</sup> See also Figure 15 on page 33.

It is well-known<sup>19</sup> that marijuana affects an individual's performance in divided attention laboratory assays, and that it affects both occasional and chronic users. This is one reason why some assessments in the Standardized Field Sobriety Tests (SFSTs) that detect divided attention impairment are able to confirm impairment of marijuana-impaired drivers.<sup>20</sup> The practical effect of this is that it is easier for a drug-impaired driver to become distracted from the task at hand – driving safely. Was a crash caused by use of drugs, distraction or both? Would the driver have been distracted absent the use of drugs?

The bottom line: some drivers reported to be drunk were actually impaired by both alcohol and drugs, and are underreported in state statistics. Drug and alcohol use can exacerbate the effects of distracted driving. A drug-impaired driver can be more easily distracted than a non-impaired driver. Impairment is impairment, regardless of the cause. There is more merit to addressing all causes of unsafe driving than there is in trying to parse the exact contribution of each cause of unsafe driving.

### Polydrug use impairs more than any single substance

Colorado's marijuana legalization has shone a spotlight on THC-impaired drivers, sometimes overlooking the fact that the driver was impaired by multiple drugs, including alcohol combined with marijuana. Our term polydrug includes use of any combination of two or more drugs and may include alcohol.

DUID Victim Voices studied crashes where Colorado drivers were cited for either vehicular homicide due to DUI or vehicular assault due to DUI in 2013.<sup>21</sup> Court records were studied for evidence of the cause of the DUI citation. Not surprisingly, alcohol was the principal cause of DUI, but marijuana *alone* tied for the fifth most common cause of DUI. See Table 2:

Cause	Number	%
Alcohol	119	70.0%
Alcohol + marijuana	14	8.2%
Multiple drugs	8	4.7%
Alcohol + methamphetamine	5	2.9%
Alcohol + multiple drugs	3	1.8%
Marijuana	3	1.8%
Other drugs (meth, opiates, benzo or other)	6	3.5%
Alcohol + other drugs (opiates, cocaine, benzo or other)	6	3.5%
Drugs not identified	6	3.5%

Table 2 Causes of DUI charges in Colorado's vehicular homicide and assault cases, 2013 Causes of DUI.

Wood. J Safety Research. 2016

The weakness of the DUID Victim Voices study was the low numbers, the lack of access to forensic toxicology data, and incomplete court records. Nevertheless, it pointed out that polydrug impaired drivers may be more of a problem than drivers impaired by marijuana alone.

Washington State published its analysis of drivers involved in fatal crashes from 2008-2016.<sup>22</sup> Table 3 is constructed from data in that report. Washington reports carboxy-THC separately from THC. In the following table, carboxy-THC is considered to be benign.

0					8			
Substance		Number of drivers			Comments			
N	ot tested			2,360				
N	o drugs, no alcohol			1,358	Includes 70 cases of carboxy-THC only			
One or more intoxicant				2,003	60% of tested cases were positive, 35% of the total cases were positive. Only the former number is meaningful.			
	Single intoxicant		1,123					
	Alcohol only	759			Includes 88 cases of alcohol + carboxy-THC only. 86% of alcohol only were $\geq$ 0.08 BAC			
	THC only	118						
	Other drugs	246			Includes narcotics, depressants and stimulants			
Polydrug			880					
	Includes alcohol	492			39.3% were polydrug cases			
	Includes THC	329			73.6% were polydrug cases			
	Includes other drugs	637			71.8% were polydrug cases			

#### Table 3 Drugs involved in fatal crashes – Washington

Grondel. Washington Traffic Safety Commission. 2018

Clearly DUI is not just about alcohol and DUID is not just about marijuana. It's also clear that drug users (including marijuana users) are more inclined than drinkers to be polydrug users.

Furthermore, Washington reported that fatalities involving marijuana and other drugs are gradually rising, but polydrug fatalities are rising very rapidly (an average of 15% per year since 2012) and drunk driving (only) fatalities have dropped:



Grondel. Washington Traffic Safety Commission. 2018

The prevalence of polydrug use can pose a problem for law enforcement officers investigating a potential DUID case. Note the following to understand this.

Different drugs impact drivers differently, and present very different profiles to an officer investigating impaired driving. Table 4 shows this effect simply, if imprecisely.<sup>23</sup>

Drug class	Drug	Impairment						
		Drowsiness	Cognitive functions	Motor functions	Mood	Lateral vehicle control	Time estimation	Balance
Illicit drugs	Cannabis	•	•	•	•	•	•	•
	Cocaine	_	•	•	•	_	_	_
	Amphetamines	_	•	•	•	_	•	•
	MDMA <sup>a</sup>	_	•	_	•	_	_	•
	Hallucinogens	_	•	•	•	_	•	•
Prescription	Benzodiazepines	•	•	•	_	•	_	•
drugs	Opioids	•	•	•	•	•	_	•
	Other depressants	•	•	•	•	•	_	•
New psychoactive	Synthetic cannabinoids	•	•	•	•	•	•	•
substances	Synthetic cathinones	_	•	•	•	_	_	_

Table 4

Ways in which different drugs affect brain functioning

Source: Based upon reference (9).

•: the drug has an impairment effect.

-: the drug has no impairment effect. <sup>a</sup> Methylenedioxymethamphetamine.

For example, amphetamines, far from causing drowsiness, make someone more alert during the "up" phase of the drug's metabolism. A person on both methamphetamine and heroin may show no signs of either drowsiness or hyperactivity.

Amphetamines cause pupils to dilate, whereas opioids cause pupils to constrict. An officer investigating a driver impaired by both cannot use pupil size to determine the cause of the impairment.

In practice, usually one drug is more dominant in its effects than another, and the differences can be sorted out with a good interview.

A Policy Brief: Drug use and road safety. WHO. 2016

### Highway safety

Fortunately, highways are generally very safe and have been getting safer, at least until the last couple of years. See Figure 5<sup>24</sup>.



Figure 5

Insurance Institute for Highway Safety. Highway Loss Data Institute, FARS analysis. 2018

In 2016, the number of deaths per 100 million vehicle miles traveled ticked up to 1.18. So a person driving 20,000 miles per year from the time of receiving a license until retirement will drive about 1 million miles, and therefore might expect to be in a fatal crash once every 85 *lifetimes*.

An adult driver with a blood alcohol content of .08 gm/dl will have a 10-fold increased risk of a fatal crash<sup>25</sup>, but even that would forecast an average of 8.5 lifetimes before a fatality for an individual. This is one reason we have so many drunk drivers on the road, even though the risks are well-known. We simply have too many people playing the odds and most of them fortunately get away with it.

This poses a problem in conveying to the public the risk of both drunk and drugged driving. As we will see in the next chapter, driving stoned is statistically safer than driving drunk, which is of no consolation to victims of stoned driving. If it's been difficult to convince people to avoid driving drunk, it's that much more difficult to convince people to avoid driving while under the influence of drugs. Especially in a society that craves and believes in the legitimacy of self-"medication" and the recreational use of drugs.

Legalization of marijuana has certainly increased the number of traffic deaths, as should be expected, but because highway traffic deaths are statistically so low, legalization will not

dramatically increase any single individual's chance of being killed, thereby causing a general alarm that would otherwise rally efforts to clamp down on driving under the influence of drugs.

# Chapter 3 Marijuana-impaired driving facts and myths

### Types of evidence

Scientists rely upon two types of evidence to understand the impact of marijuana use on safe driving:<sup>26</sup>

- Experimental evidence laboratory tests, simulator tests, on-road driving
- Epidemiological evidence culpability studies, case-control studies

Laboratories use tests such as Tower of London, Stop Signal Task, Critical Tracking Task, Time-Distance Perception, Divided Attention Task, Virtual Maze and Wisconsin Card Sorting Task. Laboratory studies have been conducted for decades all over the world with similar results. There is no scientific disagreement that marijuana causes measurable impairment.<sup>27</sup> But there is disagreement on how much that impairment increases risks to motorists.

Simulator studies are not only more difficult and expensive to conduct than laboratory studies, but they have been criticized as not replicating real-world conditions. Nevertheless, the best recent studies have confirmed marijuana's impairing effects on drivers.<sup>28</sup>

On-road driving tests are not only more difficult to perform than either laboratory tests or simulator studies, but they can be more dangerous, so they have rarely been used. Nevertheless, they also confirm marijuana's impairing effects on drivers.<sup>29,30</sup>

Experimental evidence proves that marijuana impairment is real. Epidemiological evidence shows the practical effects of that impairment on highway safety, answering the question of how much marijuana's impairment increases risks to motorists.

Whereas experimental studies logistically can only be performed on a limited number of subjects, epidemiological studies encompass thousands of real-world observations. Because they encompass thousands of observations, epidemiological studies are much more difficult to control than laboratory studies.

Scientists rely upon experimental evidence and epidemiological evidence. They place little value in single observations, opinions, and most "studies" done by TV reporters.

The following March 2018 JAMA editorial by Dr. Jan Ramaekers nicely summarizes the current scientific understanding of marijuana-impaired driving based on both experimental and epidemiological evidence. It also highlights the disconnect between public perception and reality. Ramaekers is one of the top impaired-driving experts in the world.

#### VIEWPOINT

#### Johannes G.

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← Viewpoint

# Driving Under the Influence of Cannabis An Increasing Public Health Concern

Driving is a complex task that requires integrity of sensory, motor, and cognitive function. The driving task may be compromised by factors related to the vehicle, the driving environment, and the driver. Driver impairment is a major cause of motor vehicle crashes and commonly results from alcohol intoxication.<sup>1</sup> Cannabis is the most frequently detected illicit drug among drivers involved in motor vehicle crashes, often in combination with alcohol.<sup>2</sup> Evidence from experimental and epidemiological studies indicates that cannabis also impairs driving performance and increases crash risk.<sup>1,2</sup> The prevalence of cannabis use is expected to increase following recent legalization of medical and recreational use in several countries worldwide and the introduction of a legal cannabis industry.<sup>3</sup> As a result, driving under the influence of cannabis has become an increasing public health concern.

Experimental laboratory studies have repeatedly demonstrated that the primary component of cannabis (ie, of  $\Delta^9$ -tetrahydrocannabinol [THC]) impairs the motor performance (eg, reaction time, tracking) and cognitive function (eg, attention, decision making, impulse

### Various studies have shown that the combined use of cannabis and alcohol is associated with greater crash risk than the use of either alone.

control, memory) needed for safe driving in a doserelated manner.<sup>1,2</sup> Performance impairments are maximal during the first hour after smoking and decline over 2 to 4 hours after cannabis use.<sup>2</sup>

Standard deviation of lateral position (SDLP), a measure of "weaving" or road tracking control as measured in on-road driving tests in actual traffic, appeared to be one of the most sensitive measures to detect THCinduced driving impairment. A study in 18 participants showed that smoking low (100  $\mu$ g/kg of THC) and medium (200  $\mu$ g/kg of THC) doses of cannabis significantly increased SDLP in a dose-related manner. The SDLP further increased when cannabis was combined with a low alcohol dose that produced a blood alcohol concentration (BAC) of 0.04 g/dL.<sup>4</sup>

In addition, the time spent driving outside of the traffic lane increased exponentially with increasing SDLP (r = 0.94) and was maximal (1.1%, about 40 seconds during the 1-hour driving test) following combined use of cannabis and alcohol. Mean increments in SDLP associated with cannabis use were equivalent to changes in SDLP previously observed in drivers performing the on-road test with a BAC of 0.05 g/dL, the

level of legal impairment in many European countries. Blood alcohol concentrations at or above this level have been associated with a substantial increase in crash risk.<sup>1</sup> Cannabis in combination with alcohol produced a mean increase in SDLP that was equivalent to that associated with a BAC greater than 0.10 g/dL, which is greater than the level of legal impairment in the United States.

Findings from on-road studies indicating that cannabis alone and combined with alcohol impairs road tracking have been replicated in driving simulator studies,<sup>1,2</sup> supporting their validity and reliability. Onroad and driving simulator studies also have shown that cannabis produces dose-related impairments of distance keeping and reaction time that added to those of alcohol when given in combination<sup>1,2</sup> In these studies, drivers were aware of their driving impairment. Consequently, they invested more effort, drove at a greater distance from other vehicles, and slightly adjusted their speed.<sup>1</sup> Yet, drivers were unable to compensate for the adverse effects of cannabis on lateral position because road tracking performance is a highly overlearned, ha-

bitual, and automated process that operates outside of conscious control.

Other laboratory studies have explored the possibility that the impairing effects of THC might be substantially reduced after repeated use owing to tolerance but provided little empirical evidence for this assumption. Cognitive

and psychomotor impairments were blunted in (some) regular cannabis users but were nevertheless evident across multiple performance domains.<sup>5</sup> An on-road driving study involving 24 participants<sup>6</sup> demonstrated that acute administrations of dronabinol (10 mg and 20 mg), a synthetic THC prescribed to treat anorexia in wasting diseases and emesis in patients with cancer and chronic pain, increased SDLP and reaction time in occasional as well as heavy (daily and near daily) cannabis users. Increments in SDLP were comparable with impairments associated with BACs of 0.08 to 0.10 g/dL in occasional users. The magnitude of driving impairment was generally less among heavy users but still comparable with a BAC of 0.05 g/dL, particularly after the higher dose of THC.

Epidemiological findings on the role of THC in vehicle crashes show that cannabis use among drivers is associated with a moderate (about 1.2- to 2.0-fold) increase in crash risk,<sup>2</sup> less of an effect than might have been predicted from experimental research. Various studies have shown that the combined use of cannabis and alcohol is associated with greater crash risk than the use of either alone.<sup>1</sup> A significant problem with epide-

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miological studies is that (blood) samples for drug screening are often taken 3 to 4 hours after a crash. Concentrations of THC in these samples are usually very low (around 1 ng/mL) and not representative of the event because THC concentrations decline very rapidly after smoking. Moreover, low THC blood concentrations are not necessarily an indication of recent use but may also reflect past use in nonimpaired drivers. Most epidemiological studies therefore have been unable to estimate crash risk of drivers during the acute intoxication phase of cannabis use. Those that did collect blood samples closer to the crash event typically reported higher associations (odds ratios of 2-14) between cannabis use and crash risk at THC concentrations above 5 ng/mL.<sup>7</sup>

Scientific evidence on the association between cannabis use and driving impairment contrasts with public attitudes toward driving under the influence of cannabis. Regular cannabis users often admit to driving under the influence of cannabis and wrongfully believe that cannabis does not affect their driving performance or that they can compensate for cannabis-associated impairment.<sup>2</sup> Consuming cannabis with or without alcohol is a common occurrence that causes substantial risk to intoxicated drivers and road users in general. In a policy brief by the World Health Organization, driving under the influence of cannabis was estimated to be responsible for slightly more than 8700 road traffic deaths worldwide in 2013.<sup>8</sup> This is still far less than the number of deaths due to alcohol-impaired driving in the same year (slightly more than 188 000) but does underscore the importance of developing evidence-based policy and legislation to counteract the safety risks posed by driving under the influence of cannabis.

#### ARTICLE INFORMATION

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#### **CDPHE Report**

The Colorado Department of Public Health and Environment has published two "Monitoring Health Concerns Related to Marijuana" reports, the latest in 2016.<sup>31</sup> Following are the summary statements from their most recent report:

#### **Evidence statements**

Evidence statements are based on systematic scientific literature reviews performed by Colorado Department of Public Health and Environment staff with oversight and approval by the Retail Marijuana Public Health Advisory Committee. For an explanation of the classifications "Substantial," "Moderate," etc., see Chapter 7. Systematic literature review process. For details about the studies reviewed, see Appendix K.

#### Impairment and crash risk

- We found SUBSTANTIAL evidence that recent marijuana use by a driver increases their risk of motor vehicle crash.<sup>7-11</sup>(Revised<sup>\*</sup>)
- We found MODERATE evidence for a positive relationship between THC blood level and motor vehicle crash risk.<sup>12-15</sup> (Revised\*)
- We found SUBSTANTIAL evidence that for marijuana users who use less-than-weekly, there is meaningful driving impairment with a whole blood THC of 2-5 ng/mL.<sup>8,16-18</sup>
- 4. We found SUBSTANTIAL evidence that for marijuana users who use less-than-weekly, smoking more than about 10 mg THC (or part of a currently available marijuana cigarette) is likely to meaningfully impair driving ability.<sup>16,17,19:30</sup>
- 5. We found SUBSTANTIAL evidence that for marijuana users who use less-than-weekly, orally ingesting 10 mg or more of THC is likely to meaningfully impair driving ability. <sup>17,20,31,32</sup>
- 6. We found MODERATE evidence that blood THC levels of marijuana-impaired drivers are higher now than in the past.<sup>33</sup>
- 7. We found INSUFFICIENT evidence to determine whether or not motor vehicle crash risk differs for users who use less-than-weekly compared to daily or near-daily users.<sup>34-37</sup>

#### Combined marijuana and alcohol use

8. We found SUBSTANTIAL evidence that the combined use of marijuana and alcohol increases impairment and motor vehicle crash risk more than use of either substance alone.<sup>12,14,15,38-42</sup>

#### Time to wait before driving

- We found SUBSTANTIAL evidence that delaying driving for at least 6 hours after smoking less than 18 mg THC allows THC-induced impairment to resolve or nearly resolve for users who use less-thanweekly.<sup>8,16,17,19,26,43</sup>
- We found MODERATE evidence that delaying driving at least 6 hours after smoking about 35 mg THC allows THC-induced impairment to resolve or nearly resolve for users who use less-thanweekly.<sup>22,25,26</sup>
- 11. We found SUBSTANTIAL evidence that delaying driving at least 8 hours after oral ingestion of less than 18 mg THC allows THC-induced impairment to resolve or nearly resolve for users who use less-than-weekly.<sup>17,20,32,44</sup>
- 12. We found INSUFFICIENT evidence to determine the amount of time necessary to wait after smoking more than 35 mg THC to allow THC-induced impairment to resolve for users who use less-than-weekly.<sup>17,22,45</sup>
- We found INSUFFICIENT evidence to determine the amount of time necessary to delay driving to allow THC-induced impairment to resolve or nearly resolve for daily or near-daily users after using marijuana.<sup>8,21,25,29,46,47</sup>
- 14. We found **INSUFFICIENT** evidence to determine the amount of time to delay driving after other methods of marijuana use (such as vaporizing or application of dermal or mucosal preparations).
# No correlation between THC levels and impairment levels

Chapter 1's section on Legal Limits described why there is no correlation between THC levels and impairment. Following is a discussion of the published research on this topic, followed by an analysis of what this means for THC *per se* or permissible inference levels.

The level of impairment caused by marijuana is dose-dependent<sup>32</sup> somewhat like alcohol, meaning that a large dose of marijuana is more impairing than a small dose. But that cannot be demonstrated forensically because blood levels of THC tested by toxicology labs do not represent the blood levels of THC at the time of the crash. Forensic lab results cannot discern the difference between a small dose and a large dose because of the high variation in delay times between marijuana consumption and blood sampling.

Compare the two distribution/metabolism curves for alcohol and THC in Figure 6<sup>33</sup>:



Figure 6 – Alcohol and THC blood clearance mechanisms

Removed by metabolismRemoved primarily from blood by redistributionMetabolism is linearMetabolism is first order kineticMetabolism .015-.020 gm/dl-hrMetabolic half-life is ~4.1 daysCan use retrograde extrapolationRetrograde extrapolation is impossibleMeasurement within 2 hr is OKAverage 73% reduction within 25 minutes(Range of 6.6% to 89.5%)Hartman. Clinical Chemistry. 2015

This rapid redistribution of THC from the blood to the brain occurs regardless of whether or not the user is an occasional user or a chronic user. The difference between the two is that a chronic user starts at a much higher level of THC after acute exposure, and the asymptotic lower limit is higher; but the redistribution curve is identical.<sup>34</sup> See Figure 7.



Blood cannot be collected for a drug test at the instant of a crash or DUI arrest. During the blood sample delay there can be a very rapid redistribution of THC from the blood to the brain and other fatty tissues. So unlike alcohol, the level of THC in forensic tests cannot represent the level of THC at the time of the event leading to the arrest.

Even if it were possible to instantaneously collect blood from a driver at the time of an event leading to a DUI arrest, that wouldn't tell us how much THC is in the brain – the only place that matters.

Hartman reported that the typical delay between an arrest event and collecting a blood sample was 1.5 to 4 hours, depending on the type of case.<sup>35</sup> Urfer reported a typical delay time of 1.05 hour in 1,288 Colorado cases, mostly proactive stops (stop for cause, not due to crashes).<sup>36</sup> Wood reported a median delay of 2 hours in Colorado for crashes resulting in death or serious bodily injury, and 3½ hours if a warrant was required to draw blood.<sup>37</sup>

The effect of delay on the meaningfulness of forensically-determined blood levels of THC can be seen in a hypothetical case of a driver smoking marijuana at the time of a crash or arrest. Figure 8 overlays the THC elimination curves of Figure 6 and Figure 7 with the histogram of delay times reported in the Wood study of Colorado fatal/injury crashes<sup>38</sup>.



Figure 8 Impact of sample delay on THC blood level validity

The median whole blood THC level would be just over 2 ng/ml for the occasional user and slightly above 5 ng/ml for the heavy chronic user. And that's for someone smoking marijuana at the time of a crash!

This explains in part why the vast majority of blood tests of drivers arrested on suspicion of driving under the influence of marijuana test *below* Colorado's 5 ng/ml permissible inference level. See Figure 9, showing a histogram of blood THC levels taken over a 10 year period in Sweden<sup>39</sup> (90% below 5 ng/ml), Figure 10 showing a histogram of blood THC levels of 10,144 samples tested by NMS Labs in Pennsylvania (72% below 5 ng/ml)<sup>40</sup> and Figure 11 showing a histogram of blood THC levels tested by CDPHE in 2011 (70% below 5 ng/ml)<sup>41</sup>. Smaller recent studies have shown similar results ranging from 45% to 70% below 5 ng/ml.



#### Figure 11

# Histogram 300 250 200 Leduency 150 Frequency 100 50 10 11 12 13 18 19 20 21 22 23 24 25 26 27 28 30 31 32 33 37 38 84 1 Ng/ml

#### Burbach. CDPHE

The huge number of test results below 5 ng/ml is not just because of redistribution of THC between the time of arrest and blood draw. The use of edible marijuana products the other major reason. THC from marijuana edibles enters the bloodstream very slowly compared with THC from inhaled marijuana, either smoked or vaped. Therefore, THC from edibles is absorbed by the brain and other fatty tissues before a high level builds up in the bloodstream. Since THC is slowly released from the digestive system, the edibles' impairment period lasts longer than impairment from inhaled marijuana and it subsides more slowly. Vandry<sup>42</sup> published his detailed studies of this in 2017, shown in Figure 12. Blood THC levels never rise above 3 ng/ml in whole blood, and that's for someone consuming five times the standard 10 mg dose.

# Figure 10



Impact of 5ng/mL THC per se Law





Figure 12 Blood THC levels over time at three edible doses



Let's now move from biology to experimental evidence that demonstrates the lack of correlation between blood THC level and impairment. California's Orange County Crime Lab published a two-year study of nearly 5,000 drivers arrested for suspicion of driving under the influence of drugs.<sup>43</sup> The study consisted of only drivers arrested for DUI and no controls were used. Therefore, the study cannot be used to infer the success of Standardized Field Sobriety Tests to detect drug impairment. The study found no relationship between three field sobriety tests (Walk And Turn, One Leg Stand, and Finger To Nose) and the blood level of THC. Refer to Figure 13. A driver could be just as impaired at 2 ng/ml THC as at 30 ng/ml THC.



Declues. J Forensic Sci. 2016

The AAA Research Foundation published a monograph in 2016 studying the issue further, comparing 602 drivers arrested for impaired driving in which only THC was present, along with a sample of 349 drug-free controls. The roadside assessment tests were able to readily differentiate impaired drivers from drug-free controls but confirmed the Orange County results that impairment assessments did not correlate with blood THC levels. The AAA research used a battery of 16 different roadside assessments. The report concluded, **"Based on this analysis, a quantitative threshold for** *per se* **laws for THC following cannabis use cannot be scientifically supported."**<sup>44</sup>

Epidemiological evidence also cannot support a correlation between blood THC levels and risk of either fatal crashes or serious bodily injury crashes, according to the DRUID analysis performed in Germany, Belgium, Netherlands, Portugal, Italy, Denmark, Latvia, Sweden, Norway and Finland.<sup>45</sup> See Figure 14, showing that the typical Borkenstein-type relationship was duplicated for alcohol, but no relationship existed for THC. Someone was as likely to be killed by a driver with a 1 ng/ml THC blood level as by a driver with a THC blood level above 5 ng/ml. The study was a case-control experiment with 2,490 subjects and 15,832 controls.



Hels. DRUID Final Conference. 2011

# Odds ratio studies

The odds ratio is the primary outcome of most case-controlled epidemiological studies. The odds ratio, or OR is the odds that an outcome (e.g. crash, fatality, serious injury) will occur given a particular drug exposure, compared to the odds of the outcome occurring in the absence of that exposure. An OR of 15 for fatal crashes for a driver with a BAC of 0.10, for example, means that a driver with a BAC of 0.10 has 15 times the likelihood of being involved in a fatal crash than an identical sober driver at the same time, place and under the same conditions. An OR of 1.5 would mean a 50% greater chance of being involved in a fatal crash.

Published OR and Relative Risk (RR) studies of marijuana impairment are fraught with inconsistencies made necessary by the impossibility of getting perfect data. That is why studies refer to their results as OR estimates, rather than final determinations.

Conceptually, Odds Ratio (OR) and Relative Risk (RR) studies should be easy to perform by obtaining only four pieces of information:

- a = Number of crashes by impaired drivers
- b = Number of non-crashes by impaired drivers
- c = Number of crashes by non-impaired drivers
- d = Number of non-crashes by non-impaired drivers

	Drivers in crashes	Drivers not in crashes
Drug-positive (impaired) drivers	а	b
Drug-negative (sober) drivers	С	d

OR	=	<u>a/b</u>	RR	=	<u>a/(a+b)</u>
		c/d			c/(c+d)

Since traffic crashes are very rare, the difference between OR and RR is inconsequential so many papers refer to the two terms interchangeably, although strictly speaking, they are not.

It is relatively easy to obtain "a" and "c" from traffic incident reports and/or laboratory assays of drivers involved in crashes. Obtaining "b" & "d" is more problematic. Most authors rely upon surveys and prevalence reports that must then be adjusted to ensure the data pools have similar ages, genders, and many other confounding co-variates. Authors disclose their adjustment factors to ensure adjustments are legitimate and that any potential for data bias can be identified.

Because of the difficulty in obtaining unbiased data, published ORs have varied widely for marijuana impairment. Recent OR crash risk estimates for marijuana impairment have varied from Romano's 0.86<sup>46</sup> to Kuypers' 13.4<sup>47</sup>.

Odds Ratio studies for alcohol differ from those for marijuana in that alcohol studies report OR as a function of the blood alcohol level. That has rarely been done for marijuana since there is

a poor correlation between demonstrated impairment and forensically-determined THC blood levels for the reasons described above. This is in spite of the fact that Robbe<sup>48</sup> and others have shown that the degree of impairment caused by THC is a function of the amount of THC consumed.

Figure 15<sup>49</sup> and Figure 1 show examples of alcohol OR studies.



Figure 15 Odds ratio as a function of BAC

Krüger, Int'l Conf on Alcohol, Drugs & Traffic Safety

All but a mere handful of OR studies for marijuana have simply measured the odds ratio of drivers with <u>any</u> THC blood level, compared with drivers where no THC was found. The few exceptions include the Hels report shown in Fig. 14 and those shown in Table 6.

lable 6				
Author	Ref.	OR 1-2 ng/ml	OR 3-4 ng/ml	OR 5+ ng/ml
Kuypers, '12	50	7	25	14
Laumon, 05	51	2	3	3
Drummer, '04	52	3		7

There have been literally thousands of marijuana OR reports from around the world, with varying results. This has enabled researchers to perform meta-analyses, which is a way of blending the results of comparable research reports to arrive at an average result.

Mu-Chen Li published such a meta-analysis in 2011. He found 2,960 reports in the literature, some of higher quality than others. He and his team selected 9 comparable high quality studies, combined their results and arrived at an OR estimate of a 2.66 for marijuana-impaired drivers causing fatal crashes, with a 95% confidence interval between 2.07 and 3.41.<sup>53</sup> See the range of study results in Table 7.



Mark Asbridge published a similar meta-analysis one year later.<sup>54</sup> Asbridge pared 2,975 studies down to 9 that were of high quality and contained data presented such that they could be properly pooled. The combined observations from the 9 studies was 49,411 subjects. His results were similar to Li's, as shown in Table 8, showing an OR of 1.92 with a 95% confidence interval between 1.4 and 2.7.

When discussing OR estimates, it is essential to understand the reasons for inconsistencies from one study to another, and the wide confidence intervals of the published studies. Doing so also helps understand why some estimates even fall below 1.0, indicating no impact of marijuana on driving safety.

Romano published an instructive analysis<sup>55</sup> of both his marijuana OR paper<sup>56</sup> and that of Guoha Li et al.<sup>57</sup> Both authors used FARS for study subjects and the National Roadside Survey for controls, yet arrived at very different OR results (0.86 vs 1.83). Romano found that study subject selection created a bias in both cases. By choosing different study subjects to eliminate biases and recalculating ORs using each author's disclosed methods, the two studies yielded results that were no longer statistically different (1.22 vs 1.27).

Rogeberg and Elvik reviewed 28 OR estimates from 21 epidemiological studies, recalculating their results to avoid biases and achieve standardized assumptions<sup>58</sup>. They arrived at an OR of 1.36 for crash risk due to marijuana intoxication and recent use. Prompted by commentary<sup>59</sup> from Gjerde et al., Rogeberg and Elvik recalculated<sup>60</sup> this to be 1.35 but added an additional important insight.

They noted that subjects in the epidemiological studies are of three categories:

- Non-users of marijuana
- Low THC drivers (neither intoxicated nor impaired)
- High THC drivers (intoxicated and impaired)

Laumon<sup>61</sup> and Kuypers<sup>62</sup> previously found that about one-third of subjects in their studies had high levels ( $\geq$  5 ng/ml) of THC and were therefore presumably impaired and would fall into Rogeberg and Elvik's third category. Drummer, in contrast, found 84% of his subjects were  $\geq$  5 ng/ml. Assuming that one-third is representative of all 21 studies reviewed by Rogeberg and Elvik, and further assuming that the OR of non-users and low THC drivers is 1 (no increased crash risk) suggests that the high THC drivers had an OR of 2.1:

 $(0.67 \times 1) + (0.33 \times 2.1) = 1.36$ 

Rogeberg pointed out that if the two-thirds of low THC drivers had an actual OR of 1.2, perhaps due to a low level of chronic, rather than acute impairment, then simple arithmetic dictates that the remaining high THC drivers had an actual OR of 1.7, rather than 2.1.

We clearly don't have precise determinations of ORs of marijuana involved or caused crashes. But there is emerging a consensus that the OR of marijuana-impairment causing a fatal crash is about 2, and perhaps less. There is agreement among all researchers that marijuana causes impairment and deaths due to traffic collisions, and that the level of impairment and danger is less than that of alcohol.

The OR estimates vary widely, which gives cover to those who wish to deny that marijuana causes traffic deaths. See, for example, information presented to Congress by the National Cannabis Industry Association<sup>63</sup>. But it's a false cover.

Developing ORs for other drugs has been even more problematic. The lower prevalence of other drugs requires a very large number of observations (several thousand at a minimum) for a confident analysis. Nevertheless, the European DRUID multi-country study<sup>64</sup> was able to compile the following data on Table 9.

#### Table 9

# **DRUID** Fatal Crashes

Substance	Crude OR	C.I.	Adjusted OR	C.I.
Negative (ref.)	1		1	
All alcohol concentrations	37.64	29.36-48.24	34.9	27.00-45.11
0.1 g/L ≤ alcohol < 0.5 g/L	9.23	6.07-14.05	8.01	5.22-12.29
0.5 g/L ≤ alcohol < 0.8 g/L	42.94	21.99-83.86	45.93	23.02-91.66
0.8 g/L ≤alcohol < 1.2 g/L	34.81	16.02-75.65	35.69	15.68-81.22
Alcohol ≥ 1.2 g/L	450.37	224.06-905.25	500.04	238.07-inf.
All illicit drugs	3.85	2.17-6.80	3.55	1.97-6.42
Amphetamine	25.44*	10.81-59.90	24.09	9.72-59.71
Benzoylecgonine	6.87*	1.49-31.76	n.a.	
Cocaine	22.34*	3.66-136.53	n.a.	
Cannabis	1.8*	0.73-4.44	1.33	0.48-3.67
Illicit opiates	10.04*	2.04-49.32	n.a.	
All medicines	5.05	3.80-6.72	5.29	3.95-7.08
Benzodiazepines and Z-drugs	5.11	3.72-7.02	5.40	3.90-7.46
Medicinal opioids	4.82	2.61-8.88	4.82	2.60-8.93
All alcohol-drug combinations	41.22	22.59-75.24	31.52	16.83-59.05
All multiple drug combinations	16.77	9.95-28.27	18.51	10.84-31.63

\*: In the case of 0 counts in one of the categories a, b, c, d (cf. Table 12), 0.5 was added to all four cells to be able to calculate crude OR (Greenland et al., 2000). n.a.: no positive controls and/or no positive cases or (adjusted OR only) too few positive cases

Huestis. ACMT Seminars. 2015

Although some claim that marijuana-impaired driving is safer than alcohol-impaired driving, the same can be said for cocaine, amphetamines and opioids. All of these drugs, including marijuana, are more dangerous than sober driving. A person killed by a marijuana-impaired driver is just as dead as one killed by an alcohol-impaired driver. Moreover, the common combination of alcohol and marijuana is far more deadly than either drug separately.

Due to the wide confidence intervals found in the DRUID study, Europeans have found it more useful to categorize drugged driving danger as shown in Table 10.

#### Table 10 Drug danger levels

**Overall conclusion** 



Risk level	Risk	Substance group
Slightly increased risk	1-3	0.1 g/L ≤ alcohol in blood < 0.5 g/L
		Cannabis
Medium increased risk	2-10	0.5 g/L ≤ alcohol in blood < 0.8 g/L
		Benzoylecgonine
		Cocaine
		Illicit opiates
		Benzodiazepines and Z-drugs
		Medicinal opioids
Highly increased risk	5-30	0.8 g/L ≤ alcohol in blood < 1.2 g/L
		Amphetamines
		Multiple drugs
Extremely increased risk	20-200	Alcohol in blood ≥ 1.2 g/L
		Alcohol in combination with drugs

Cannabis and amphetamines: due to very different single country estimates, the risk estimate must be treated with caution (for amphetamines: see also next slide) Benzoylecgonine, cocaine and illicit opiates: due to few positive cases and controls, the risk estimates must be treated with

caution

Hels. DRUID Final Conference. 2011

## **Tolerance and addiction**

In most discussions of marijuana-impaired driving, the subject of tolerance arises. Some marijuana addicts and other heavy users claim they can drive safely after using marijuana because they have built up a tolerance to its effects. This is perplexing, because if it is true, then perhaps society would need one set of standards for a chronic user, and another for an occasional user.

Tolerance is very real, and is measured primarily by how high a dose of a drug is required to achieve a desired effect. To some extent, this is based on individual susceptibility, body size and body mass index. But even for a single individual, regular use of a drug creates a tolerance such that, with increasing use, a greater amount is needed to achieve a desired effect.

Opioids present an extreme example. A heroin addict on methadone maintenance treatment will usually require a dose of 20 - 100 mg daily to maintain performance without going into withdrawal. At that dose and in the absence of other drugs, the addict is usually not impaired, at least after an brief initial phase. But for a non-addict, a 25 mg dose can be lethal.<sup>65</sup>

Users can also become tolerant to alcohol, but to a far less extent. A heavy user may require twice the dose of alcohol to achieve the same level of impairment as a non-tolerant user as demonstrated by Paton<sup>66</sup> in Figure 16.



Paton. Brit Med J. 2005

Tolerance to marijuana is somewhere between the tolerance potential for alcohol and that for opioids as shown in Figure 17. Note that frequent users had a baseline THC blood level above zero, had a much higher THC blood level after dosing, but didn't feel as high as an occasional user. The maximum THC blood levels are consistent with what Toennes et al. showed in Figure 7 above.



The American Psychiatric Association publishes a Diagnostic and Statistical Manual for use by its members. The DSM-V version describes Substance Use Disorder, popularly known as drug addiction. A substance use disorder is, "a cluster of symptoms indicating a person continues to use despite significant substance-related problems."<sup>68</sup> Diagnostic criteria for a substance use disorder are shown in Table 11.

1	Substances taken in larger amounts or longer than intended
2	A persistent desire or unsuccessful effort to cut down or control use
3	A great deal of time is spent obtaining, using and recovering from effects
4	Cravings, strong desire or urge to use
5	Failure to fulfill major role obligations at work, school or home
6	Persistent or recurrent social/interpersonal problems caused or exacerbated by use
7	Social, occupational, or recreational activities are given up or reduced
8	Recurrent use in situations in which it is physically hazardous
9	Use is continued despite knowledge of physical or psychological problems
10	Tolerance – need for increased amounts or diminished effects
11	Withdrawal – symptoms or use to avoid symptoms

 Table 11
 Substance Use Disorder Diagnostic Criteria

0-1: no diagnosis; 2-3: mild SUD; 4-5: moderate SUD; 6-11: severe SUD

Tolerance is number 10 on the list of diagnostic criteria for a substance use disorder, including Cannabis Use Disorder. Just because someone has tolerance to some of marijuana's impairing effects does not make them an addict, since two or more criteria must be fulfilled to earn that diagnosis. A driver who regularly drives while under the influence of THC, and claiming to be tolerant to THC's effects meets criteria #8 and #10 and would therefore be diagnosed at least mildly addicted to THC.

Historically, results of research on the effect of tolerance on driving safety have been varied, with much of the early research confirming that chronic users may show fewer symptoms of impairment than occasional users. However, recent research differs from that conclusion. Let's look at four example conclusions:

Controlled cannabis smoking impaired psychomotor function, more so in occasional smokers, suggesting some tolerance to psychomotor impairment in frequent users. <sup>69</sup>(2009)

THC significantly impaired performance of occasional cannabis users on critical tracking, divided attention and the stop signal task. THC did not affect the performance of heavy cannabis users except in the stop signal task, i.e. stop reaction time increased, particularly at high THC concentrations.<sup>70</sup> (2009)

In conclusion, the present study generally confirms that heavy cannabis users develop tolerance to the impairing effects of THC on neurocognitive task performance. <sup>71</sup>(2010)

But more recent research contradicts the above:

Acute effects of cannabis and cocaine on neurocognitive performance were similar across cannabis users irrespective of their cannabis use history. Absence of tolerance implies that that frequent cannabis use and intoxication can be expected to interfere with neurocognitive performance in many daily environments such as school, work or traffic.<sup>72</sup> (2016)

# All four of the above statements regarding marijuana tolerance were from the same research team led by Dr. Jan Ramaekers, the author of the JAMA editorial copied in Chapter 1.

Dr. Ramaekers noted in his 2016 report that earlier studies used sample sizes that were too small to develop statistically robust conclusions. He also followed up on recent research showing chronic users are somewhat chronically impaired, even when they are not acutely impaired:

Sustained cannabis abstinence moderately improved critical tracking and divided attention performance in chronic, daily cannabis smokers, but impairment was still observable compared to controls after 3 weeks of abstinence.<sup>73</sup> (2013)

Ramaekers found that chronic users, like occasional users, became acutely impaired after dosing with marijuana, but since they have a higher a baseline impairment level due to chronic impairment, the increase in their level of impairment was less than that of occasional users.<sup>74</sup> So by using each subject as his or her own control in the experiment, earlier studies would arrive at the false conclusion that chronic users are less impaired by marijuana than occasional users.

Marijuana users frequently claim that their THC blood level can remain detectable for weeks. This is not true for occasional users as shown by Figures 7 and 8, but can be true for addicts and other heavy users of marijuana. Bergamashi studied 30 chronic marijuana smokers (median nine joints per day) who were kept in a restricted facility with no access to marijuana. He had access to research laboratory techniques that can detect THC down to 0.25 ng/ml, compared to a 1 ng/ml reporting limit for most US forensic laboratories. Although all subjects tested below 1 ng/ml after 7 days, THC in blood could be detected with more sensitive research techniques in some subjects for nearly a month.<sup>75</sup> See Figure 18



Human variability is one reason research on marijuana tolerance has been so difficult, and why such large numbers are required to do valid research. It has been frequently reported in the literature that some users can compensate for their known impairment by driving more slowly, avoiding merge lanes and passing, and maintaining a greater following distance. Some are even able to pass standardized field sobriety tests. As with anything in life, some are better at it than others.

In summary, tolerance to marijuana's THC is very real but users do not become tolerant to all of its effects. After all, as Chematox's Sarah Ufer asks, "If they did, why would they continue using it?"

Chronic users can either compensate for or become tolerant to some psychomotor tasks, but not to impulsivity tasks.<sup>76</sup> They may not be subject to internal clock speed impairment but they remain impaired to executive function tasks.<sup>77,78</sup> Moreover, executive function impairment is durable, lasting several weeks after consumption.<sup>79</sup>

The normal response of chronic users to subjective tolerance is to simply consume a higher dose to achieve the desired effect as shown on Figure 16. More data will likely emerge to illuminate THC tolerance and its effect on driving, but today there is no conclusive evidence to say that addicts and chronic or heavy marijuana users should be treated any differently than occasional users.

And certainly recent data convinces us that we cannot rely upon anecdotal or small sample reports for "proof" of anything about marijuana and tolerance.

## Myths and distortions

#1 "Marijuana-involved" drivers are not Impaired.

Most reports on marijuana and driving use words like "marijuana-involved" or "marijuana-related" rather than "marijuana-impaired" when describing data trends of drivers testing positive for THC.

Let's look at the facts.

The Rocky Mountain High Intensity Drug Trafficking Area (RMHIDTA) has published an annual report entitled, "The Legalization of Marijuana: The Impact."<sup>80</sup> The first area of study in those reports has been "Impaired Driving and Fatalities." Most of the data used for that portion of the reports comes from the FARS reports or from CDOT that manages the FARS data collection and reporting for Colorado, such as Figure 19.

Figure 19



# Traffic Deaths Related to Marijuana when a <u>Driver</u> Tested Positive for Marijuana



Similar information has been published by the Colorado Department of Transportation (CDOT). See Figure 20<sup>81</sup>:



Figure 20

These reports suggest marijuana-impaired crash deaths have more than doubled since legalization, but that's not what the reports actually say. Even though FARS contains toxicology data such as cannabinoid presence in drivers, both RMHIDTA and CDOT are careful to use terms such as "marijuana-related" or "marijuana-involved" when relying upon FARS data, rather than impaired, DUID, or marijuana-caused.

A common belief is they use these terms because someone can be unimpaired with a positive THC level. But there is no experimental proof that this is true. We do have evidence that standard roadside procedures (SFSTs) are only modestly successful in identifying someone impaired by marijuana.<sup>82</sup> So we can claim with confidence that some drivers in the FARS database and others who tested positive for THC perhaps could have passed SFSTs. But we have no evidence that any could have been shown to be unimpaired by laboratory impairment assessments. The scientifically valid reasons for use of "marijuana-involved" or "marijuana-related" are:

1. No data to support DUI charges are included in FARS. Most of the forensic toxicology information included in FARS comes from coroners, and none of their subjects are ever charged with DUI for obvious reasons. Although it is likely that

cannabinoid-positive drivers in FARS reports were impaired, impairment can neither be proven or disproven based solely on the data contained in FARS.

- 2. FARS reports historically have combined drivers who were positive for THC, the primary impairing substance in marijuana, with drivers who were positive only for THC's inactive metabolite, carboxy-THC. This is a convention prescribed by NHTSA, the organization responsible for managing FARS for nationwide consistency. CDOT has been reporting the number of drivers positive for only THC as shown in Figure 2, but only done so since 2016. Washington State reports also cleanly separate THC from carboxy-THC, and have done so since 2013.
- 3. FARS collects data on both the *presence* as well as the blood or breath *levels* of alcohol in drivers. For drugs, it collects data only on the presence of a long list of drugs, *not* on their blood levels. Alcohol is treated differently from all other drugs because alcohol is the only drug for which a correlation has been shown between blood levels of drug (alcohol) and the level of impairment caused by the drug (alcohol). Such a correlation does not exist for any other drug, including marijuana. One can infer the levels of impairment of an individual by measuring blood alcohol levels. That cannot be done with any other drug, including marijuana.

The above reasons and other methodological problems led NHTSA to caution against many inferences that have been made about DUID based on FARS reports.<sup>83</sup>

Nevertheless, researchers continue to rely upon FARS simply because it is a large and readily accessible data base. Also FARS provides the largest data set in the US on fatal crashes. For many studies, there are no better alternatives. As a result, many misleading studies have been published.

Fortunately, a better alternative is beginning to emerge with Colorado's HB 17-1315 reports. Rather than inferring DUI information from fatal crash data, the HB17-1315 reports are based upon DUI charges, irrespective of whether or not they resulted in crashes. Past studies that have done this have been based upon much smaller data sets.<sup>84</sup> HB47-1315 reports could be even better if they included not just laboratory results, but also evidence collected by police at the scene of the arrest.

#### #2 DUID rates are declining in Colorado

The Drug Policy Alliance made this claim, based on the fact that Colorado State Patrol (CSP) DUI citations that noted marijuana as the cause went down 33% from Q1 2016 to Q1 2017. Governor Hickenlooper and AG Coffman made this myth more widespread in their August 2017 response to AG Sessions by claiming, "In the first six months of 2017, the number of drivers the Colorado State Patrol considered impaired by marijuana dropped 21% compared to the first six months of 2016."

Cherry-picking data like the Drug Policy Alliance and Colorado politicians have done doesn't prove much, especially when they pick short-term data. Unfortunately, CSP only began collecting this information since 2014 after a six-month pilot the year before, so we have no long-term pre-legalization or pre-commercialization data to look at. All the CSP data currently available are on Table 12:<sup>85</sup>

the tranic stop form. No toxicological commution.				
	2014	2015	2016	2017
Marijuana citations	674	641	780	719
MJ as % of DUI citations	14.6%	13.4%	16.9%	14.8%

Table 12 CSP DUI citations with a marijuana notation on the traffic stop form. No toxicological confirmation

Seen graphically, there is a very slight but inconsistent upward trend to citations noting marijuana as the cause. See Figure 21:





CSP MJ Citations 2014-2017

The actual year-on-year change for calendar years 2016 and 2017 was an 8% drop, but that was after a 22% increase the year before because of an unusually high number of such citations in Q1 2016. That's far less than the 21% and 33% drop claimed by Governor Hickenlooper and the Drug Policy Alliance.

CSP has historically required all troopers to have ARIDE training before deploying to the field. They changed that policy in 2017 so that ARIDE training would be presented after the trooper had an opportunity to put other basic trooper training into practice. Of course it is not known if delayed ARIDE training affected the slight drop shown in 2017 citations.

#3 Police can't test for marijuana impairment.

Police may use a Preliminary Breath Test (PBT or PAS)) device to establish probable cause to make an arrest when alcohol is suspected, but those results are not admissible in court.

Police may also use an Evidential Breath Test (EBT or EBAT) device, usually at a police station as an alternative to an evidential blood test, but that test is done *after* an arrest has already been made. See Chapter 1, "How DUIs are investigated" for more information.

Driving patterns, such as lane weaving or running a red light form reasonable suspicion that justifies a proactive stop by police. Probable cause is established by impairment assessments which include observations, odor, listening to the driver, and perhaps performing special roadside tests, such as Standardized Field Sobriety Tests (SFSTs). The latter is a battery of three tests for Horizontal Gaze Nystagmus (HGN), Walk and Turn (WAT), and One Leg Stand (OLS). HGN is highly specific for alcohol impairment but not for marijuana impairment. Both WAT and OLS are moderately successful in determining impairment by marijuana<sup>86</sup> but when augmented by Finger To Nose (FTN) and Modified Romberg Balance (MRB) they can be very effective:

Requiring  $\geq 2/4$  of:  $\geq 3$  FTN misses, MRB eyelid tremors,  $\geq 2$  OLS clues, and/or  $\geq 2$  WAT clues produced the best results (all characteristics  $\geq 96.7\%$ )<sup>87</sup>

#### #4 Marijuana stays in blood a long time.

Not true. Marijuana can't even get into a driver's blood, much less stay there. It can't. It's a plant. Roots, stems, leaves and all. But some of marijuana's constituents can get into a driver's blood. Using imprecise language like "marijuana" instead of "THC" unfortunately serves to confuse, rather than to illuminate.

THC, otherwise known as delta 9-tetrahydrocannabinol, is the primary psychoactive chemical that does get into a marijuana user's blood stream by smoking, vaping or eating. THC slowly metabolizes to another highly psychoactive metabolite 11-OH-THC, otherwise known as hydroxy-THC. That in turn quickly metabolizes to a psycho-inactive metabolite, 11 nor-9 carboxy-THC also known as THC-COOH, or carboxy-THC. See Figure 22.



THC is not soluble in blood so it is very quickly removed from the bloodstream as it is absorbed by fatty tissues. It is gone from blood within hours in all but addicts and other heavy users.

Carboxy THC is blood-soluble so it remains in the blood for days and even weeks while the THC remaining in the body continues to be metabolized, even though THC may no longer be detectable in blood.

Huestis. J Anal Tox. 1992

Laboratory tests easily recognize the difference between THC and its inactive metabolite, carboxy-THC.

#### #5 We need more research before we act.

Research usually has value. Indecisiveness does not.

We can make greater progress by understanding the research that has been done than by waiting for more research. Check out the references in Chapter 9 for a starter.

Do those advocating for more research understand what has already been learned?

States that have no endemic drug use problem have the luxury of waiting for more research. That doesn't apply to Colorado.

Delay in taking action costs lives.

# Chapter 4 Understanding contrary reports

With the abundance of research reports being published, it should come as no surprise that some reports contradict each other. Some have already been mentioned in the discussion about marijuana tolerance, for example. Some reports are out-of-date, some are decent science that is badly reported by the media, and some are just poor science. Following are examples of each.

### Out-of-date

Robbe HWJ, O'Hanlon JF. Marijuana and Actual Driving Performance. DOT HS 808 078 – 1993

This was a NHTSA-sponsored study studying the effects of three doses of THC taken alone or combined with enough alcohol to achieve a BAC of .04. Driving was tested on instrumented cars on roads in the Netherlands with accompanying driving instructors. The doses of 100, 200, and 300  $\mu$ gm/Kg THC were produced with NHTSA-provided marijuana of 1.75% and 3.57% THC.

The authors concluded, "Drivers under the influence of marijuana retain insight in their performance and will compensate where they can, for example, by slowing down or increasing effort. As a consequence, THC's adverse effects on driving performance appear relatively small."

Hindrik WJ, Robbe HWJ, O'Hanlon JF. Marijuana Alcohol and Actual Driving Performance. NHTSA DOT HS 808 939 – 1999

Six years later the same authors repeated the study, this time with slightly higher THC content marijuana: 2.2% and 3.95%.

The authors concluded, "In a previous series of studies on the effects of THC alone we concluded that THC given in doses up to 300  $\mu$ gm/Kg has 'slight' effects on driving performance. The results of the present study now compel us to revise that conclusion. The present subjects' performance was more affected than their predecessors'."

A word about dose vs. THC content. To achieve a 300  $\mu$ gm/Kg dose, subjects had to consume 2-3 joints with the THC potency available at the time. Normal potency today is at least five times the potency available for research in 1993 and 1999.

## Badly reported by the media

Compton RP, Berning A. Drug and Alcohol Crash Risk. NHTSA Traffic Safety Facts Research Note DOT HS 812 117 – 2015



Richard P. Compton and Amy Berning

This was a NHTSA-sponsored study of 3,095 drivers in 2,682 crashes in Virginia Beach. A summary of the report was released February 2015, followed three days later by a media blitz that misquoted the research (highlight below is added):



Reason's interpretation of the study has been widely spread by the marijuana-friendly media, even by such supposedly neutral outlets like FactCheck.org as recently as December, 2017<sup>89</sup>. USA Today said, "New study shows no link between marijuana use and car accidents." The Los Angeles Times said, "Good news (?): marijuana doesn't increase the likelihood of car crashes."

The popular media coverage of the study was completely false. First of all, it's true that the study failed to find a statistically significant link between crashes and marijuana use. But a failure to find a link not the same thing as finding there is no link. Just like your failure to find your car keys does not prove that the keys no longer exist.

When you can't find your car keys, it's because you didn't look where they were. In this case, NHTSA failed to find a link because the study was not designed to find a link.

But the important point is that the study also failed to find a statistically significant link between crash risk and the use of <u>any</u> drug: cocaine, methamphetamines, opioids, or any combinations of those drugs, all of which are even more impairing than marijuana. They couldn't find significant links simply because the study was flawed for the following reasons:

- 1. The sample size was too small to find a statistically significant link for many of the drugs, because of the low baseline prevalence of use of some drugs and odds ratios for fatal crashes for drugs.
- 2. This was a case-controlled quasi-epidemiological study with a justifiably highly-regarded control selection. Unfortunately, the selection of study subjects was not of similar quality. Unlike a true epidemiological study, this did not include observations of all subjects in the study pool, but only those who volunteered to be studied. It's unclear why a subject who knew he or she was impaired would volunteer to be part of the study, and indeed, many subjects in the study chose not to volunteer to have their data collected. We cannot know what their inclusion might have done to the final statistics.
- 3. At least 413 of the test subjects were innocent victims who were involved in the crash, but did not cause the crash. All other things being equal, one might expect that the prevalence of drugs in victims would be no different than that of controls. By including the innocent victims of the crash into the test subject pool, NHTSA diluted the results of those who caused of the crash. This is material when one realizes that the OR for crash fatalities due to marijuana is only about 2. Diluting the data with innocent, unimpaired victims would lower it even further.
- 4. NHTSA earlier published strong data showing that the OR for a non-fatal crash is less than that for a fatal crash.<sup>90</sup> But in the Virginia Beach study there were only 15 fatalities, which limits the usefulness of the findings.
- 5. Virginia Beach was a convenient locale to do a study because of cooperation from the local law enforcement. But being a military town, it hardly represents drug havens across the rest of America, especially Colorado. Controls in Virginia Beach showed a 14.4% prevalence of drugs compared to a 19-22% prevalence in the 2014 NHTSA National Roadside Survey, depending upon assay and time of day.

Finally, look at the conclusion of the published study, "This study should not be interpreted to mean that it is safe for individuals who have used substances to operate a vehicle." Yet that's exactly what Reason magazine and most of the rest of the news media did back then, and many are still doing today.

## Bad science #1

Aydelotte JD, Brown LH, Luftman KM et al. Crash fatality rates after recreational marijuana legalization in Washington and Colorado. Am J Public Health (Aug 2017) 107 (8) 1329-1331

Jayson Aydelotte, a trauma surgeon at U of Texas in Austin concluded in his study published in the American Journal of Public Health, "Three years after recreational marijuana legalization, changes in motor vehicle crash fatality rates for Washington and Colorado were not statistically different from those in similar states without recreational marijuana legalization."<sup>91</sup>

This report has been widely embraced by the marijuana lobby, even though the article estimated that, using FARS data, the fatality rate *increased* in Colorado and Washington during the study periods, whereas they *dropped* in the comparison states. After adjusting the data, the authors estimated that there were 77 "excess crash fatalities" in Colorado and Washington since marijuana legalization. The authors felt this number was not significant, but admitted, "others might disagree."

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

This report has been criticized, noting that "total traffic fatalities" is a blunt tool to measure the impact of marijuana legalization.<sup>92</sup> See annotated bibliography #54 in Chapter 9 for more.

# Bad science #2

Anderson DM, Hansen B, Rees DI. Medical Marijuana Laws, Traffic Fatalities and Alcohol Consumption. – 2012

Mark Anderson and Daniel Rees used FARS and "total traffic fatalities" to arrive at the conclusion that, "The first full year after coming into effect, legalization is associated with an 8 to 11 percent decrease in traffic fatalities." The authors theorized that the availability of marijuana reduced alcohol consumption which then drove down total traffic fatalities, "We conclude that alcohol is the likely mechanism through which the legalization of medical marijuana reduces traffic fatalities."

This paper has the same basic flaw as the immediately preceding paper – it uses "total traffic fatalities" as a very blunt tool to measure the impact of marijuana legalization. There is no doubt that traffic fatalities fell in those states. During the periods studied, traffic fatalities were falling all across the country for many reasons have nothing to do with marijuana. See Figure 5 in Chapter 2. Most states had drops of traffic fatalities greater than those who legalized medical marijuana, but for reasons that had little to nothing to do with marijuana.

Contrary to the author's conjecture, the Colorado Department of Revenue reports a continuous rise in excise tax revenue from liquor sales.

This study doesn't even qualify as bad science, but is routinely quoted by marijuana supporters.

# **Part Two - References**

#### **Relevant DUI/DUID Colorado statutes**

#### State-by-state comparison of DUI laws

## Proposals of model DUID policies – the national perspective

Governors Highway Safety Association (GHSA)

Institute for Behavior and Health

European Transport Safety Council

National Highway Traffic Safety Administration

Heritage Foundation

DUID Victim Voices and We Save Lives

Driving High Means DUI coalition

# Chapter 5 Relevant DUI/DUID Colorado laws

- 42-2-126 Revocation of license ALR
- 42-4-1301 DUI, DWAI, DUI per se, definitions, penalties
- 42-4-1301.1 Expressed consent
- 42-4-1301.3 Alcohol and drugged driving safety program
- 42-4-1302 Stopping of suspect
- 42-4-1303 Records *prima facie* proof
- 42-4-1304 Biological samples CDPHE duties
- 42-4-1305 Open beverage container
- 42-4-1305.5 Open marijuana container
- 42-4-1307 Penalties alcohol and drug traffic offenses
- 42-4-1601 Crashes involving death or SBI duties
- 18-3-106 Vehicular homicide
- 18-3-205 Vehicular assault

#### § 42-2-126. Revocation of license based on administrative determination

(1) Legislative declaration. The purposes of this section are:

(a) To provide safety for all persons using the highways of this state by quickly revoking the driver's license of any person who has shown himself or herself to be a safety hazard by driving with an excessive amount of alcohol in his or her body and any person who has refused to submit to an analysis as required by section 42-4-1301.1;

(b) To guard against the potential for any erroneous deprivation of the driving privilege by providing an opportunity for a full hearing; and

(c) Following the revocation period, to prevent the relicensing of a person until the department is satisfied that the person's alcohol problem is under control and that the person no longer constitutes a safety hazard to other highway users.

(2) Definitions. As used in this section, unless the context otherwise requires:

(a) "Excess BAC" means that a person had a BAC level sufficient to subject the person to a license revocation for excess BAC 0.08, excess BAC underage, excess BAC CDL, or excess BAC underage CDL.
(b) "Excess BAC 0.08" means that a person drove a vehicle in this state when the person's BAC was 0.08 or more at the time of driving or within two hours after driving.

(c) "Excess BAC CDL" means that a person drove a commercial motor vehicle in this state when the person's BAC was 0.04 or more at the time of driving or at any time thereafter.

(d) "Excess BAC underage" means that a person was under the age of twenty-one years and the person drove a vehicle in this state when the person's BAC was in excess of 0.02 but less than 0.08 at the time of driving or within two hours after driving.

(e) "Excess BAC underage CDL" means that a person was under the age of twenty-one years and the person drove a commercial motor vehicle in this state when the person's BAC was in excess of 0.02 but less than 0.04 at the time of driving or at any time thereafter.

(f) "Hearing officer" means the executive director of the department or an authorized representative designated by the executive director.

(g) "License" includes driving privilege.

(h) "Refusal" means refusing to take or complete, or to cooperate in the completing of, a test of the person's blood, breath, saliva, or urine as required by section 18-3-106 (4) or 18-3-205 (4), C.R.S., or section 42-4-1301.1 (2).

(i) "Respondent" means a person who is the subject of a hearing under this section.

(3) Revocation of license.

(a) Excess BAC 0.08.

(I) The department shall revoke the license of a person for excess BAC 0.08 for:

(A) Nine months for a first violation committed on or after January 1, 2009; except that such a person may apply for a restricted license pursuant to the provisions of section 42-2-132.5;

(B) One year for a second violation; and

(C) Two years for a third or subsequent violation occurring on or after January 1, 2009, regardless of when the prior violations occurred; except that such a person may apply for a restricted license pursuant to the provisions of section 42-2-132.5.

(II) (Deleted by amendment, L. 2008, p. 833, § 3, effective January 1, 2009.)

(b) Excess BAC underage.

(I) The department shall revoke the license of a person for excess BAC underage for three months for a first violation, for six months for a second violation, and for one year for a third or subsequent violation.

(11)

(A) Notwithstanding the provisions of subparagraph (I) of this paragraph (b), a person whose license is revoked for a first offense under subparagraph (I) of this paragraph (b) and whose BAC was not more than 0.05 may request that, in lieu of the three-month revocation, the person's license be revoked for a period of not less than thirty days, to

be followed by a suspension period of such length that the total period of revocation and suspension equals three months. If the hearing officer approves the request, the hearing officer may grant the person a probationary license that may be used only for the reasons provided in section 42-2-127 (14)(a).

(B) The hearing to consider a request under this subparagraph (II) may be held at the same time as the hearing held under subsection (8) of this section; except that a probationary license may not become effective until at least thirty days have elapsed since the beginning of the revocation period.

(c) Refusal.

(I) Except as provided in section 42-2-132.5 (4), the department shall revoke the license of a person for refusal for one year for a first violation, two years for a second violation, and three years for a third or subsequent violation; except that the period of revocation shall be at least three years if the person was driving a commercial motor vehicle that was transporting hazardous materials as defined in section 42-2-402 (7).

(II) Notwithstanding the provisions of subparagraph (I) of this paragraph (c), such a person whose license has been revoked for two years for a second violation or for three years for a third or subsequent violation may apply for a restricted license pursuant to the provisions of section 42-2-132.5.

(d) Excess BAC CDL. The department shall revoke for the disqualification period provided in 49 CFR 383.51
the commercial driving privilege of a person who was the holder of a commercial driver's license or was driving a commercial motor vehicle for a violation of excess BAC 0.08, excess BAC CDL, or refusal.
(e) Excess BAC underage CDL. The department shall revoke the commercial driving privilege of a person for excess BAC underage CDL for three months for a first violation, six months for a second violation, and one year for a third or subsequent violation.

(4) Multiple restraints and conditions on driving privileges.

(a)

(I) Except as otherwise provided in this paragraph (a), a revocation imposed pursuant to this section for an offense committed before January 1, 2014, shall run consecutively and not concurrently with any other revocation imposed pursuant to this section.

(II) If a license is revoked for excess BAC and the person is also convicted on criminal charges arising out of the same occurrence for DUI, DUI per se, DWAI, or UDD, both the revocation under this section and any suspension, revocation, cancellation, or denial that results from the conviction shall be imposed, but the periods shall run concurrently, and the total period of revocation, suspension, cancellation, or denial shall not exceed the longer of the two periods. (III)

(A) If a license is revoked for refusal for an offense committed before January 1, 2014, the revocation shall not run concurrently, in whole or in part, with any previous or subsequent suspensions, revocations, or denials that may be provided for by law, including but not limited to any suspension, revocation, or denial that results from a conviction of criminal charges arising out of the same occurrence for a violation of section 42-4-1301.

(B) If a license is revoked for refusal for an offense committed on or after January 1, 2014, and the person is also convicted on criminal charges arising out of the same occurrence for DUI, DUI per se, DWAI, or UDD, both the revocation under this section and any suspension, revocation, cancellation, or denial that results from the conviction shall be imposed, but the periods shall run concurrently. The total period of revocation, suspension, cancellation, or denial shall not exceed the longer of the two periods.

(IV) The revocation of the commercial driving privilege under excess BAC CDL may run concurrently with another revocation pursuant to this section arising out of the same incident.(V) Any revocation for refusal shall not preclude other action that the department is required to take in the administration of this title.

(I) The periods of revocation specified in subsection (3) of this section are intended to be minimum periods of revocation for the described conduct. Except as described in section 42-2-132.5, a license shall not be restored under any circumstances, and a probationary license shall not be issued, during the revocation period.

(II) Notwithstanding the provisions of subparagraph (I) of this paragraph (b), a person whose privilege to drive a commercial motor vehicle has been revoked because of excess BAC CDL and who was twenty-one years of age or older at the time of the offense may apply for a driver's license of another class or type as long as there is no other statutory reason to deny the person a license. The department may not issue the person a probationary license that would authorize the person to operate a commercial motor vehicle.

(c) Upon the expiration of the period of revocation under this section, if a person's license is still suspended on other grounds, the person may seek a probationary license as authorized by section 42-2-127 (14) subject to the requirements of paragraph (d) of this subsection (4).

(d)

(I) Following a license revocation, the department shall not issue a new license or otherwise restore the driving privilege unless the department is satisfied, after an investigation of the character, habits, and driving ability of the person, that it will be safe to grant the privilege of driving a motor vehicle on the highways to the person; except that the department may not require a person to undergo skills or knowledge testing prior to issuance of a new license or restoration of the person's driving privilege if the person's license was revoked for a first violation of excess BAC 0.08 or excess BAC underage.

(11)

(A) If a person was driving with excess BAC and the person had a BAC that was 0.15 or more or if the person's driving record otherwise indicates a designation as a persistent drunk driver as defined in section 42-1-102 (68.5), the department shall require the person to complete a level II alcohol and drug education and treatment program certified by the office of behavioral health in the department of human services pursuant to section 42-4-1301.3 as a condition to restoring driving privileges to the person and, upon the restoration of driving privileges, shall require the person to hold a restricted license requiring the use of an ignition interlock device pursuant to section 42-2-132.5 (1)(a)(II).

(B) If a person seeking reinstatement is required to complete, but has not yet completed, a level II alcohol and drug education and treatment program, the person shall file with the department proof of current enrollment in a level II alcohol and drug education and treatment program certified by the office of behavioral health in the department of human services pursuant to section 42-4-1301.3, on a form approved by the department.

(5) Actions of law enforcement officer.

(a) If a law enforcement officer has probable cause to believe that a person should be subject to license revocation for excess BAC or refusal, the law enforcement officer shall forward to the department an affidavit containing information relevant to the legal issues and facts that shall be considered by the department to determine whether the person's license should be revoked as provided in subsection (3) of this section. The executive director of the department shall specify to law enforcement agencies the form of the affidavit to be used under this paragraph (a) and the types of information needed in the affidavit and may specify any additional documents or copies of documents needed by the department to make its determination in addition to the affidavit. The affidavit shall be dated, signed, and sworn to by the law enforcement officer under penalty of perjury, but need not be notarized or sworn to before any other person.

(b)

(I) A law enforcement officer, on behalf of the department, shall personally serve a notice of revocation on a person who is still available to the law enforcement officer if the law enforcement officer determines that, based on a refusal or on test results available to the law enforcement officer, the person's license is subject to revocation for excess BAC or refusal.

(II) When a law enforcement officer serves a notice of revocation, the law enforcement officer shall take possession of any driver's license issued by this state or any other state that the person holds. When the law enforcement officer takes possession of a valid driver's license issued by this state or any other state, the law enforcement officer, acting on behalf of the department, shall issue a temporary permit that is valid for seven days after the date of issuance.
(III) A copy of the completed notice of revocation form, a copy of any completed temporary permit form, and any driver's, minor driver's, or temporary driver's license or any instruction permit taken into possession under this section shall be forwarded to the department by the law enforcement officer along with an affidavit as described in paragraph (a) of this subsection (5) and any additional documents or copies of documents as described in said paragraph (a).
(IV) The department shall provide to law enforcement agencies forms for notice of revocation and for temporary permits and shall follow the form and provide the information for affidavits as provided by the department pursuant to paragraph (a) of this subsection (5).
(V) A law enforcement officer shall not issue a temporary permit to a person who is already

driving with a temporary permit issued pursuant to subparagraph (II) of this paragraph (b). (6) Initial determination and notice of revocation.

(a) Upon receipt of an affidavit of a law enforcement officer and the relevant documents required by paragraph (a) of subsection (5) of this section, the department shall determine whether the person's license should be revoked under subsection (3) of this section. The determination shall be based upon the information contained in the affidavit and the relevant documents submitted to the department, and the determination shall be final unless a hearing is requested and held as provided in subsection (8) of this section. The determination of these facts by the department is independent of the determination of a court of the same or similar facts in the adjudication of any criminal charges arising out of the same occurrence. The disposition of the criminal charges shall not affect any revocation under this section. (b)

(I) If the department determines that the person is subject to license revocation, the department shall issue a notice of revocation if a notice has not already been served upon the person by the law enforcement officer as provided in paragraph (b) of subsection (5) of this section. A notice of revocation shall clearly specify the reason and statutory grounds for the revocation, the effective date of the revocation, the right of the person to request a hearing, the procedure for requesting a hearing, and the date by which a request for a hearing must be made.

(II) In sending a notice of revocation, the department shall mail the notice in accordance with the provisions of section 42-2-119 (2) to the person at the last-known address shown on the department's records, if any, and to any address provided in the law enforcement officer's affidavit if that address differs from the address of record. The notice shall be deemed received three days after mailing.

(c) If the department determines that the person is not subject to license revocation, the department shall notify the person of its determination and shall rescind any order of revocation served upon the person by the law enforcement officer.

(d) A license revocation shall become effective seven days after the person has received the notice of revocation as provided in subsection (5) of this section or is deemed to have received the notice of revocation by mail as provided in paragraph (b) of this subsection (6). If the department receives a written request for a hearing pursuant to subsection (7) of this section within that same seven-day period and the department issues a temporary permit pursuant to paragraph (d) of subsection (7) of this section, the effective date of the revocation shall be stayed until a final order is issued following the hearing; except that any delay in the hearing that is caused or requested by the person or counsel representing the person shall not result in a stay of the revocation during the period of delay.

(7) Request for hearing.

(a) A person who has received a notice of revocation may make a written request for a review of the department's determination at a hearing. The request may be made on a form available at each office of the department.

(b) A person must request a hearing in writing within seven days after the day the person receives the notice of revocation as provided in subsection (5) of this section or is deemed to have received the notice by mail as provided in paragraph (b) of subsection (6) of this section. If the department does not receive the written request for a hearing within the seven-day period, the right to a hearing is waived, and the determination of the department that is based on the documents and affidavit required by subsection (5) of this section becomes final.

(c) If a person submits a written request for a hearing after expiration of the seven-day period and if the request is accompanied by the person's verified statement explaining the failure to make a timely request for a hearing, the department shall receive and consider the request. If the department finds that the person was unable to make a timely request due to lack of actual notice of the revocation or due to factors of physical incapacity such as hospitalization or incarceration, the department shall waive the period of limitation, reopen the matter, and grant the hearing request. In such a case, the department shall not grant a stay of the revocation pending issuance of the final order following the hearing. (d) At the time a person requests a hearing pursuant to this subsection (7), if it appears from the record that the person is the holder of a valid driver's or minor driver's license or of an instruction permit or of a temporary permit issued pursuant to paragraph (b) of subsection (5) of this section and that the license or permit has been surrendered, the department shall stay the effective date of the revocation and issue a temporary permit that shall be valid until the scheduled date for the hearing. If necessary, the department may later extend the temporary permit or issue an additional temporary permit in order to stay the effective date of the revocation until the final order is issued following the hearing, as required by subsection (8) of this section. If the person notifies the department in writing at the time that the hearing is requested that the person desires the law enforcement officer's presence at the hearing, the department shall issue a written notice for the law enforcement officer to appear at the hearing. A law enforcement officer who is required to appear at a hearing may, at the discretion of the hearing officer, appear in real time by telephone or other electronic means in accordance with section 42-1-218.5. (e) At the time that a person requests a hearing, the department shall provide to the person written notice advising the person:

(I) Of the right to subpoen the law enforcement officer for the hearing and that the subpoena must be served upon the law enforcement officer at least five calendar days prior to the hearing; (II) Of the person's right at that time to notify the department in writing that the person desires the law enforcement officer's presence at the hearing and that, upon receiving the notification, the department shall issue a written notice for the law enforcement officer to appear at the hearing;

(III) That, if the law enforcement officer is not required to appear at the hearing, documents and an affidavit prepared and submitted by the law enforcement officer will be used at the hearing; and

(IV) That the affidavit and documents submitted by the law enforcement officer may be reviewed by the person prior to the hearing.

(f) Any subpoena served upon a law enforcement officer for attendance at a hearing conducted pursuant to this section shall be served at least five calendar days before the day of the hearing.

(8) Hearing.

(a)

(I) The hearing shall be scheduled to be held as quickly as practicable but not more than sixty days after the date the department receives the request for a hearing; except that, if a hearing is rescheduled because of the unavailability of a law enforcement officer or the hearing officer in accordance with subsection (8)(a)(III) or (8)(a)(IV) of this section, the hearing may be rescheduled more than sixty days after the date the department receives the request for the hearing, and the department shall continue any temporary driving privileges held by the person until the date to which the hearing is rescheduled. At least ten days prior to the scheduled or rescheduled hearing, the department shall provide in the manner specified in section 42-2-119 (2) a written notice of the time and place of the hearing to the respondent unless the parties agree to waive this requirement. Notwithstanding the provisions of sections 42-1-102 and 42-2-119, the last-

known address of the respondent for purposes of notice for any hearing pursuant to this section is the address stated on the hearing request form.

(II) A law enforcement officer who submits the documents and affidavit required by subsection (5) of this section need not be present at the hearing unless the hearing officer requires that the law enforcement officer be present and the hearing officer issues a written notice for the law enforcement officer's appearance or unless the respondent or the respondent's attorney determines that the law enforcement officer in accordance with paragraph (f) of subsection (7) of this section.

(III) If a law enforcement officer, after receiving a notice or subpoena to appear from either the department or the respondent, is unable to appear at the original or rescheduled hearing date due to a reasonable conflict, including but not limited to training, vacation, or personal leave time, the law enforcement officer or the law enforcement officer's supervisor shall contact the department not less than forty-eight hours prior to the hearing and reschedule the hearing to a time when the law enforcement officer will be available. If the law enforcement officer cannot appear at the original or rescheduled hearing because of medical reasons, a law enforcement emergency, another court or administrative hearing, or any other legitimate, just cause as determined by the department, and the law enforcement officer or the law enforcement shall reschedule the hearing following consultation with the law enforcement officer or the law enforcement officer's supervisor at the earliest possible time when the law enforcement officer or the law enforcement officer's will be available.

(IV) If a hearing officer cannot appear at an original or rescheduled hearing because of medical reasons, a law enforcement emergency, another court or administrative hearing, or any other legitimate, just cause, the hearing officer or the department may reschedule the hearing at the earliest possible time when the law enforcement officer and the hearing officer will be available.

(b) The hearing shall be held in the district office nearest to where the violation occurred, unless the parties agree to a different location; except that, at the discretion of the department, all or part of the hearing may be conducted in real time, by telephone or other electronic means in accordance with section 42-1-218.5.

(c) The department shall consider all relevant evidence at the hearing, including the testimony of any law enforcement officer and the reports of any law enforcement officer that are submitted to the department. The report of a law enforcement officer shall not be required to be made under oath, but the report shall identify the law enforcement officer making the report. The department may consider evidence contained in affidavits from persons other than the respondent, so long as the affidavits include the affiant's home or work address and phone number and are dated, signed, and sworn to by the affiant under penalty of perjury. The affidavit need not be notarized or sworn to before any other person.
(d) The hearing officer shall have authority to:

(I) Administer oaths and affirmations;

(II) Compel witnesses to testify or produce books, records, or other evidence;

(III) Examine witnesses and take testimony;

(IV) Receive and consider any relevant evidence necessary to properly perform the hearing officer's duties as required by this section;

(V) Take judicial notice as defined by rule 201 of article II of the Colorado rules of evidence, subject to the provisions of section 24-4-105 (8), C.R.S., which shall include:

(A) Judicial notice of general, technical, or scientific facts within the hearing officer's knowledge;

(B) Judicial notice of appropriate and reliable scientific and medical information contained in studies, articles, books, and treatises; and

(C) Judicial notice of charts prepared by the department of public health and environment pertaining to the maximum BAC levels that people can obtain through the consumption of alcohol when the charts are based upon the maximum absorption levels possible of determined amounts of alcohol consumed in relationship to the weight and gender of the person consuming the alcohol;

- (VI) Issue subpoenas duces tecum to produce books, documents, records, or other evidence;
- (VII) Issue subpoenas for the attendance of witnesses;
- (VIII) Take depositions or cause depositions or interrogatories to be taken;
- (IX) Regulate the course and conduct of the hearing; and
- (X) Make a final ruling on the issues.
- (e) When an analysis of the respondent's BAC is considered at a hearing:

(I) If the respondent establishes, by a preponderance of the evidence, that the respondent consumed alcohol between the time that the respondent stopped driving and the time of testing, the preponderance of the evidence must also establish that the minimum required BAC was reached as a result of alcohol consumed before the respondent stopped driving; and (II) If the evidence offered by the respondent shows a disparity between the results of the analysis done on behalf of the law enforcement agency and the results of an analysis done on behalf of the law enforcement agency was properly conducted by a qualified person associated with a laboratory certified by the department of public health and environment using properly working testing devices, there shall be a presumption favoring the accuracy of the analysis done on behalf of the law enforcement agency if the analysis, the respondent shall be required to state under oath the number of analyses done in addition to the one offered as evidence and the names of the laboratories that performed the analyses and the results of all analyses.

(f) The hearing shall be recorded. The hearing officer shall render a decision in writing, and the department shall provide a copy of the decision to the respondent.

(g) If the respondent fails to appear without just cause, the right to a hearing shall be waived, and the determination of the department which is based upon the documents and affidavit required in subsection (5) of this section shall become final.

(h) Pursuant to section 42-1-228, a driver may challenge the validity of the law enforcement officer's initial contact with the driver and the driver's subsequent arrest for DUI, DUI per se, or DWAI. If a driver so challenges the validity of the law enforcement officer's initial contact, and the evidence does not establish that the initial contact or arrest was constitutionally and statutorily valid, the driver is not subject to license revocation.

#### (9) Appeal.

(a) Within thirty-five days after the department issues its final determination under this section, a person aggrieved by the determination has the right to file a petition for judicial review in the district court in the county of the person's residence.

(b) Judicial review of the department's determination shall be on the record without taking additional testimony. If the court finds that the department exceeded its constitutional or statutory authority, made an erroneous interpretation of the law, acted in an arbitrary and capricious manner, or made a determination that is unsupported by the evidence in the record, the court may reverse the department's determination.

(c) A filing of a petition for judicial review shall not result in an automatic stay of the revocation order. The court may grant a stay of the order only upon a motion and hearing and upon a finding that there is a reasonable probability that the person will prevail upon the merits.

(10) Notice to vehicle owner. If the department revokes a person's license pursuant to paragraph (a), (c), or (d) of subsection (3) of this section, the department shall mail a notice to the owner of the motor vehicle used in the violation informing the owner that:

(a) The motor vehicle was driven in an alcohol-related driving violation; and

(b) Additional alcohol-related violations involving the motor vehicle by the same driver may result in a requirement that the owner file proof of financial responsibility under the provisions of section 42-7-406 (1.5).
(11) Applicability of "State Administrative Procedure Act". The "State Administrative Procedure Act", article 4 of title 24, C.R.S., shall apply to this section to the extent it is consistent with subsections (7), (8), and (9) of this section relating to administrative hearings and judicial review.

### § 42-4-1301 Driving under the influence--driving while impaired--driving with excessive alcoholic content-definitions--penalties

(1)

(a) A person who drives a motor vehicle or vehicle under the influence of alcohol or one or more drugs, or a combination of both alcohol and one or more drugs, commits **driving under the influence**. Driving under the influence is a misdemeanor, but it is a class 4 felony if the violation occurred after three or more prior convictions, arising out of separate and distinct criminal episodes, for DUI, DUI per se, or DWAI; vehicular homicide, as described in <u>section 18-3-106(1)(b)</u>, C.R.S .; vehicular assault, as described in <u>section 18-3-205(1)(b)</u>, C.R.S .; or any combination thereof.

(b) A person who drives a motor vehicle or vehicle while impaired by alcohol or by one or more drugs, or by a combination of alcohol and one or more drugs, commits **driving while ability impaired**. Driving while ability impaired is a misdemeanor, but it is a class 4 felony if the violation occurred after three or more prior convictions, arising out of separate and distinct criminal episodes, for DUI, DUI per se, or DWAI; vehicular homicide, as described in <u>section 18-3-106(1)(b)</u>, C.R.S .; vehicular assault, as described in section 18-3-205(1)(b), C.R.S .; or any combination thereof.

(c) Repealed by Laws 2013, Ch. 331, § 1, eff. May 28, 2013.

(d) As used in this section, one or more drugs means any drug, as defined in <u>section 27-80-203(13)</u>,

<u>C.R.S</u>., any controlled substance, as defined in <u>section 18-18-102(5)</u>, <u>C.R.S</u>., and any inhaled glue, aerosol, or other toxic vapor or vapors, as defined in <u>section 18-18-412</u>, <u>C.R.S</u>.

(e) The fact that any person charged with a violation of this subsection (1) is or has been entitled to use one or more drugs under the laws of this state, including, but not limited to, the medical use of marijuana pursuant to <u>section 18-18-406.3, C.R.S</u>., shall not constitute a defense against any charge of violating this subsection (1).

(f) "Driving under the influence" means driving a motor vehicle or vehicle when a person has consumed alcohol or one or more drugs, or a combination of alcohol and one or more drugs, that affects the person to a degree that the person is substantially incapable, either mentally or physically, or both mentally and physically, to exercise clear judgment, sufficient physical control, or due care in the safe operation of a vehicle.

(g) "Driving while ability impaired" means driving a motor vehicle or vehicle when a person has consumed alcohol or one or more drugs, or a combination of both alcohol and one or more drugs, that affects the person to the slightest degree so that the person is less able than the person ordinarily would have been, either mentally or physically, or both mentally and physically, to exercise clear judgment, sufficient physical control, or due care in the safe operation of a vehicle.

(h) Pursuant to <u>section 16-2-106, C.R.S</u>., in charging the offense of DUI, it shall be sufficient to describe the offense charged as "drove a vehicle under the influence of alcohol or drugs or both".

(i) Pursuant to <u>section 16-2-106, C.R.S</u>., in charging the offense of DWAI, it shall be sufficient to describe the offense charged as "drove a vehicle while impaired by alcohol or drugs or both".

(j) For the purposes of this section, a person is deemed to have a prior conviction for DUI, DUI per se, or DWAI; vehicular homicide, as described in <u>section 18-3-106(1)(b)</u>, C.R.S .; or vehicular assault, as described in <u>section 18-3-205(1)(b)</u>, C.R.S ., if the person has been convicted under the laws of this state or under the laws of any other state, the United States, or any territory subject to the jurisdiction of the United States, of an act that, if committed within this state, would constitute any of these offenses. The prosecution shall set forth such prior convictions in the indictment or information.
 (k)

(I) If a defendant is convicted of a class 4 felony pursuant to this section, the court shall sentence the person in accordance with the provisions of section 18-1.3-401, C.R.S.

(11)

(A) Notwithstanding the provisions of subparagraph (I) of this paragraph (k), before the imposition of any sentence to the department of corrections for a felony DUI, DUI per se, or DWAI offense, at sentencing or at resentencing after a revocation of probation or a community corrections sentence, the court shall consider all the factors described in sub-subparagraph (B) of this subparagraph (II).

(B) If the court sentences the defendant to the department of corrections for a felony DUI, DUI per se, or DWAI offense, it must determine that incarceration is the most suitable option given the facts and circumstances of the case, including the defendant's willingness to participate in treatment. Additionally, the court shall consider whether all other reasonable and appropriate sanctions and responses to the violation that are available to the court have been exhausted, do not appear likely to be successful if tried, or present an unacceptable risk to public safety.

(2)

(a) A person who drives a motor vehicle or vehicle when the person's BAC is 0.08 or more at the time of driving or within two hours after driving commits DUI per se. During a trial, if the state's evidence raises the issue, or if a defendant presents some credible evidence, that the defendant consumed alcohol between the time that the defendant stopped driving and the time that testing occurred, such issue shall be an affirmative defense, and the prosecution must establish beyond a reasonable doubt that the minimum 0.08 blood or breath alcohol content required in this paragraph (a) was reached as a result of alcohol consumed by the defendant before the defendant stopped driving. DUI per se is a misdemeanor, but it is a class 4 felony if the violation occurred after three or more prior convictions, arising out of separate and distinct criminal episodes, for DUI, DUI per se, or DWAI; vehicular homicide, as described in <u>section 18-3-106(1)(b), C.R.S</u> .; vehicular assault, as described in <u>section 18-3-205(1)(b), C.R.S</u> .; or any combination thereof.

(a.5) Repealed by Laws 2015, Ch. 262, § 1, eff. Aug. 5, 2015.

(b) In any prosecution for the offense of DUI per se, the defendant shall be entitled to offer direct and circumstantial evidence to show that there is a disparity between what any tests show and other facts so that the trier of fact could infer that the tests were in some way defective or inaccurate. Such evidence may include testimony of non-expert witnesses relating to the absence of any or all of the common symptoms or signs of intoxication for the purpose of impeachment of the accuracy of the analysis of the person's blood or breath.

(c) Pursuant to <u>section 16-2-106, C.R.S</u>., in charging the offense of DUI per se, it shall be sufficient to describe the offense charged as "drove a vehicle with excessive alcohol content".
 (d)

(I) It is a class A traffic infraction for any person under twenty-one years of age to drive a motor vehicle or vehicle when the person's BAC, as shown by analysis of the person's breath, is at least 0.02 but not more than 0.05 at the time of driving or within two hours after driving. The court, upon sentencing a defendant pursuant to this subparagraph (I), may order, in addition to any penalty imposed under a class A traffic infraction, that the defendant perform up to twenty-four hours of useful public service, subject to the conditions and restrictions of <u>section 18-1.3-507</u>, <u>C.R.S</u>., and may further order that the defendant submit to and complete an alcohol evaluation or assessment, an alcohol education program, or an alcohol treatment program at such defendant's own expense.

(II) A second or subsequent violation of this paragraph (d) is a class 2 traffic misdemeanor.(3) The offenses described in subsections (1) and (2) of this section are strict liability offenses.

(4) No court shall accept a plea of guilty to a non-alcohol-related or non-drug-related traffic offense or guilty to the offense of UDD from a person charged with DUI or DUI per se; except that the court may accept a plea of guilty to a non-alcohol-related or non-drug-related traffic offense or to UDD upon a good faith representation by the prosecuting attorney that the attorney could not establish a prima facie case if the defendant were brought to trial on the original alcohol-related or drug-related offense.

(5) Notwithstanding the provisions of <u>section 18-1-408, C.R.S</u>., during a trial of any person accused of both DUI and DUI per se, the court shall not require the prosecution to elect between the two violations. The court or a jury may consider and convict the person of either DUI or DWAI, or DUI per se, or both DUI and DUI per se, or both DUI and DUI per se, or both DUI and DUI per se. If the person is convicted of more than one violation, the sentences imposed shall run concurrently.

(6)

(a) In any prosecution for DUI or DWAI, the defendant's BAC or drug content at the time of the commission of the alleged offense or within a reasonable time thereafter gives rise to the following presumptions or inferences:

(I) If at such time the defendant's BAC was 0.05 or less, it shall be presumed that the defendant was not under the influence of alcohol and that the defendant's ability to operate a motor vehicle or vehicle was not impaired by the consumption of alcohol.

(II) If at such time the defendant's BAC was in excess of 0.05 but less than 0.08, such fact gives rise to the permissible inference that the defendant's ability to operate a motor vehicle or vehicle was impaired by the consumption of alcohol, and such fact may also be considered with other competent evidence in determining whether or not the defendant was under the influence of alcohol.

(III) If at such time the defendant's BAC was 0.08 or more, such fact gives rise to the permissible inference that the defendant was under the influence of alcohol.

(IV) If at such time the driver's blood contained five nanograms or more of delta 9tetrahydrocannabinol per milliliter in whole blood, as shown by analysis of the defendant's blood, such fact gives rise to a permissible inference that the defendant was under the influence of one or more drugs.

(b) The limitations of this subsection (6) shall not be construed as limiting the introduction, reception, or consideration of any other competent evidence bearing upon the question of whether or not the defendant was under the influence of alcohol or whether or not the defendant's ability to operate a motor vehicle or vehicle was impaired by the consumption of alcohol.

(c)

(I) In all actions, suits, and judicial proceedings in any court of this state concerning alcohol-related or drug-related traffic offenses, the court shall take judicial notice of methods of testing a person's alcohol or drug level and of the design and operation of devices, as certified by the department of public health and environment, for testing a person's blood, breath, saliva, or urine to determine such person's alcohol or drug level. The department of public health and environment may, by rule, determine that, because of the reliability of the results from certain devices, the collection or preservation of a second sample of a person's blood, saliva, or urine or the collection and preservation of a delayed breath alcohol specimen is not required.
(II) Nothing in this paragraph (c) prevents the necessity of establishing during a trial that the testing devices used were working properly and were properly operated. Nothing in this

paragraph (c) precludes a defendant from offering evidence concerning the accuracy of testing devices.

(III) The database compiled by the department of public health and environment containing personal identifying information relating to the results of tests of persons' breath alcohol content, and all personal identifying information thereof, are not public information. The department of public health and environment shall disclose such information only to:

(A) The individual who is the subject of the test, or to his or her legal representative;(B) A named interested party in a civil or criminal action in which the test results are directly related, or to his or her legal representative;

(C) Any prosecuting attorney, law enforcement officer, state agency, or state and local public official legally authorized to utilize such information to carry out his or her duties; or

(D) Any party who obtains an order in a pending civil or criminal case if the court finds the party has shown good cause to have the information. In determining whether there is good cause, the court shall consider whether the materials sought exist;

whether the materials sought are evidentiary and relevant; whether the materials are not otherwise procurable reasonably in advance of the proceeding by the exercise of due diligence; whether the party cannot properly prepare for the proceeding without such production and inspection in advance of the proceeding, and the failure to obtain such inspection may tend to unreasonably delay the proceeding; and whether the request for the information is made in good faith and is not for the purposes of general discovery.

(IV) The department of public health and environment may release nonpersonal identifying information from the database in accordance with sections 24-72-101 to 24-72-402, C.R.S.

(d) If a person refuses to take or to complete, or to cooperate with the completing of, any test or tests as provided in <u>section 42-4-1301.1</u> and such person subsequently stands trial for DUI or DWAI, the refusal to take or to cooperate with the completing of, any test or tests shall be admissible into evidence at the trial, and a person may not claim the privilege against self-incrimination with regard to admission of refusal to take or to complete, or to cooperate with the completing of, any test or tests. (e) **Involuntary blood test--admissibility.** Evidence acquired through an involuntary blood test pursuant to <u>section 42-4-1301.1(3)</u> shall be admissible in any prosecution for DUI, DUI per se, DWAI, or UDD, and in any prosecution for criminally negligent homicide pursuant to <u>section 18-3-105, C.R.S</u>., vehicular homicide pursuant to <u>section 18-3-106(1)(b), C.R.S</u>., assault in the third degree pursuant to <u>section 18-3-204, C.R.S</u>.

(f) **Chemical test -- admissibility.** Strict compliance with the rules and regulations prescribed by the department of public health and environment shall not be a prerequisite to the admissibility of test results at trial unless the court finds that the extent of noncompliance with a board of health rule has so impaired the validity and reliability of the testing method and the test results as to render the evidence inadmissible. In all other circumstances, failure to strictly comply with such rules and regulations shall only be considered in the weight to be given to the test results and not to the admissibility of such test results.

(g) It shall not be a prerequisite to the admissibility of test results at trial that the prosecution present testimony concerning the composition of any kit used to obtain blood, urine, saliva, or breath specimens. A sufficient evidentiary foundation concerning the compliance of such kits with the rules and regulations of the department of public health and environment shall be established by the introduction of a copy of the manufacturer's or supplier's certificate of compliance with such rules and regulations if such certificate specifies the contents, sterility, chemical makeup, and amounts of chemicals contained in such kit.

(h) In any trial for a violation of this section, the testimony of a law enforcement officer that he or she witnessed the taking of a blood specimen by a person who the law enforcement officer reasonably believed was authorized to withdraw blood specimens shall be sufficient evidence that such person was so authorized, and testimony from the person who obtained the blood specimens concerning such person's authorization to obtain blood specimens shall not be a prerequisite to the admissibility of test results concerning the blood specimens obtained.

(i)

(I) Following the lawful contact with a person who has been driving a motor vehicle or vehicle and when a law enforcement officer reasonably suspects that a person was driving a motor vehicle or vehicle while under the influence of or while impaired by alcohol, the law enforcement officer may conduct a preliminary screening test using a device approved by the executive director of the department of public health and environment after first advising the driver that the driver may either refuse or agree to provide a sample of the driver's breath for such preliminary test; except that, if the driver is under twenty-one years of age, the law enforcement officer may, after providing such advisement to the person, conduct such preliminary screening test if the officer reasonably suspects that the person has consumed any alcohol.
(II) The results of this preliminary screening test may be used by a law enforcement officer in determining whether probable cause exists to believe such person was driving a motor vehicle or vehicle in violation of this section and whether to administer a test pursuant to <u>section 42-4-1301.1(2)</u>.

(III) Neither the results of such preliminary screening test nor the fact that the person refused such test shall be used in any court action except in a hearing outside of the presence of a jury, when such hearing is held to determine if a law enforcement officer had probable cause to believe that the driver committed a violation of this section. The results of such preliminary screening test shall be made available to the driver or the driver's attorney on request.

(j) In any trial for a violation of this section, if, at the time of the alleged offense, the person possessed a valid medical marijuana registry identification card, as defined in <u>section 25-1.5-106(2)(e)</u>, <u>C.R.S</u>., issued to himself or herself, the prosecution shall not use such fact as part of the prosecution's case in chief.
 (k) In any traffic stop, the driver's possession of a valid medical marijuana registry identification card, as defined in <u>section 25-1.5-106(2)(e)</u>, <u>C.R.S</u>., issued to himself or herself shall not, in the absence of other contributing factors, constitute probable cause for a peace officer to require the driver to submit to an analysis of his or her blood.

(7) Repealed by Laws 2010, Ch. 258, § 1, eff. July 1, 2010.

(8) A second or subsequent violation of this section committed by a person under eighteen years of age may be filed in juvenile court.

### § 42-4-1301.1 Expressed consent for the taking of blood, breath, urine, or saliva sample--testing--fund--rules-repeal

(1) Any person who drives any motor vehicle upon the streets and highways and elsewhere throughout this state shall be deemed to have expressed such person's consent to the provisions of this section.

(2)

(a)

(I) A person who drives a motor vehicle upon the streets and highways and elsewhere throughout this state shall be required to take and complete, and to cooperate in the taking and completing of, any test or tests of the person's breath or blood for the purpose of determining the alcoholic content of the person's blood or breath when so requested and directed by a law enforcement officer having probable cause to believe that the person was driving a motor vehicle in violation of the prohibitions against DUI, DUI per se, DWAI, or UDD. Except as otherwise provided in this section, if a person who is twenty-one years of age or older requests that the test be a blood test, then the test shall be of his or her blood; but, if the person requests that a specimen of his or her blood not be drawn, then a specimen of the person's breath shall be obtained and tested. A person who is under twenty-one years of age shall be entitled to request a blood test unless the alleged violation is UDD, in which case a specimen of the person's breath shall be obtained and tested, except as provided in subparagraph (II) of this paragraph (a). (II) Except as otherwise provided in paragraph (a.5) of this subsection (2), if a person elects either a blood test or a breath test, the person shall not be permitted to change the election, and, if the person fails to take and complete, and to cooperate in the completing of, the test elected, the failure shall be deemed to be a refusal to submit to testing. If the person is unable to take, or to complete, or to cooperate in the completing of a breath test because of injuries, illness, disease, physical infirmity, or physical incapacity, or if the person is receiving medical treatment at a location at which a breath testing instrument certified by the department of public health and environment is not available, the test shall be of the person's blood. (III) If a law enforcement officer requests a test under this paragraph (a), the person must cooperate with the request such that the sample of blood or breath can be obtained within two hours of the person's driving.

(a.5)

(I) If a law enforcement officer who requests a person to take a breath or blood test under paragraph (a) of this subsection (2) determines there are extraordinary circumstances that prevent the completion of the test elected by the person within the two-hour time period required by subparagraph (III) of paragraph (a) of this subsection (2), the officer shall inform the person of the extraordinary circumstances and request and direct the person to take and

complete the other test described in paragraph (a) of this subsection (2). The person shall then be required to take and complete, and to cooperate in the completing of, the other test. (II) A person who initially requests and elects to take a blood or breath test, but who is requested and directed by the law enforcement officer to take the other test because of the extraordinary circumstances described in subparagraph (I) of this paragraph (a.5), may change his or her election for the purpose of complying with the officer's request. The change in the election of which test to take shall not be deemed to be a refusal to submit to testing. (III) If the person fails to take and complete, and to cooperate in the completing of, the other test requested by the law enforcement officer pursuant to subparagraph (I) of this paragraph (a.5), the failure shall be deemed to be a refusal to submit to testing.

(IV)

(A) As used in this paragraph (a.5), "extraordinary circumstances" means circumstances beyond the control of, and not created by, the law enforcement officer who requests and directs a person to take a blood or breath test in accordance with this subsection (2) or the law enforcement authority with whom the officer is employed.
(B) "Extraordinary circumstances" includes, but shall not be limited to, weather-related delays, high call volume affecting medical personnel, power outages, malfunctioning breath test equipment, and other circumstances that preclude the timely collection and testing of a blood or breath sample by a qualified person in accordance with law.
(C) "Extraordinary circumstances" does not include inconvenience, a busy workload on the part of the law enforcement officer or law enforcement authority, minor delay that does not compromise the two-hour test period specified in subparagraph (III) of paragraph (a) of this subsection (2), or routine circumstances that are subject to the control of the law enforcement officer or law enforcement authority.

(b)

(I) Any person who drives any motor vehicle upon the streets and highways and elsewhere throughout this state shall be required to submit to and to complete, and to cooperate in the completing of, a test or tests of such person's blood, saliva, and urine for the purpose of determining the drug content within the person's system when so requested and directed by a law enforcement officer having probable cause to believe that the person was driving a motor vehicle in violation of the prohibitions against DUI or DWAI and when it is reasonable to require such testing of blood, saliva, and urine to determine whether such person was under the influence of, or impaired by, one or more drugs, or one or more controlled substances, or a combination of both alcohol and one or more drugs, or a combination of both alcohol and one or more controlled substances.

(II) If a law enforcement officer requests a test under this paragraph (b), the person must cooperate with the request such that the sample of blood, saliva, or urine can be obtained within two hours of the person's driving.

(3) Any person who is required to take and to complete, and to cooperate in the completing of, any test or tests shall cooperate with the person authorized to obtain specimens of such person's blood, breath, saliva, or urine, including the signing of any release or consent forms required by any person, hospital, clinic, or association authorized to obtain such specimens. If such person does not cooperate with the person, hospital, clinic, or association authorized to obtain such specimens, including the signing of any release or consent forms, such noncooperation shall be considered a refusal to submit to testing. No law enforcement officer shall physically restrain any person for the purpose of obtaining a specimen of such person's blood, breath, saliva, or urine for testing except when the officer has probable cause to believe that the person has committed criminally negligent homicide pursuant to <u>section 18-3-105, C.R.S</u>., vehicular homicide pursuant to <u>section 18-3-105, C.R.S</u>., vehicular homicide pursuant to <u>section 18-3-205(1)(b), C.R.S</u>., and the person is refusing to take or to complete, or to cooperate in the completing of, any test or tests, then, in such event, the law enforcement officer may require a blood test.

(4) Any driver of a commercial motor vehicle requested to submit to a test as provided in paragraph (a) or (b) of subsection (2) of this section shall be warned by the law enforcement officer requesting the test that a refusal to submit to the test shall result in an out-of-service order as defined under section 42-2-402(8) for a period of

twenty-four hours and a revocation of the privilege to operate a commercial motor vehicle for one year as provided under  $\frac{\text{section } 42-2-126}{\text{section } 42-2-126}$ .

(5) The tests shall be administered at the direction of a law enforcement officer having probable cause to believe that the person had been driving a motor vehicle in violation of <u>section 42-4-1301</u> and in accordance with rules and regulations prescribed by the department of public health and environment concerning the health of the person being tested and the accuracy of such testing.

(6)

(a) No person except a physician, a registered nurse, a paramedic, as certified in part 2 of article 3.5 of title 25, C.R.S., an emergency medical service provider, as defined in part 1 of article 3.5 of title 25, C.R.S., or a person whose normal duties include withdrawing blood samples under the supervision of a physician or registered nurse shall withdraw blood to determine the alcoholic or drug content of the blood for purposes of this section.

(b) No civil liability shall attach to any person authorized to obtain blood, breath, saliva, or urine specimens or to any hospital, clinic, or association in or for which such specimens are obtained as provided in this section as a result of the act of obtaining such specimens from any person submitting thereto if such specimens were obtained according to the rules and regulations prescribed by the department of public health and environment; except that this provision shall not relieve any such person from liability for negligence in the obtaining of any specimen sample.

(7) A preliminary screening test conducted by a law enforcement officer pursuant to <u>section 42-4-1301(6)(i)</u> shall not substitute for or qualify as the test or tests required by subsection (2) of this section.

(8) Any person who is dead or unconscious shall be tested to determine the alcohol or drug content of the person's blood or any drug content within such person's system as provided in this section. If a test cannot be administered to a person who is unconscious, hospitalized, or undergoing medical treatment because the test would endanger the person's life or health, the law enforcement agency shall be allowed to test any blood, urine, or saliva that was obtained and not utilized by a health care provider and shall have access to that portion of the analysis and results of any tests administered by such provider that shows the alcohol or drug content of the person's blood, urine, or saliva or any drug content within the person's system. Such test results shall not be considered privileged communications, and the provisions of section 13-90-107, C.R.S ., relating to the physician-patient privilege shall not apply. Any person who is dead, in addition to the tests prescribed, shall also have the person's blood checked for carbon monoxide content and for the presence of drugs, as prescribed by the department of public health and environment. Such information obtained shall be made a part of the accident report.

(9)

(a) There is created in the state treasury the evidential breath-testing cash fund, referred to in this section as the "fund", for the collection of moneys to purchase breath-testing devices for law enforcement agencies. The fund includes any moneys appropriated to the fund by the general assembly and any moneys credited to the fund pursuant to paragraph (c) of this subsection (9). The moneys in the fund are subject to annual appropriation by the general assembly to the department of public health and environment created in section 25-1-102, C.R.S., for the purposes described in this subsection (9).
(b) All interest derived from the deposit and investment of moneys in the fund must remain in the fund. Any unexpended or unencumbered moneys remaining in the fund at the end of a fiscal year must remain in the fund and not be transferred or credited to the general fund or another fund; except that any such unexpended and unencumbered moneys in excess of two million dollars must be credited to the general fund.

(c) The department of public health and environment is authorized to accept any gifts, grants, or donations from any private or public source on behalf of the state for the purposes described in this section. The department of public health and environment shall transmit all such gifts, grants, and donations to the state treasurer, who shall credit the same to the fund.

(d) The state board of health created in <u>section 25-1-103, C.R.S</u>., may promulgate rules for the administration of the fund for the purposes described in this subsection (9).

(e) This subsection (9) is repealed, effective September 1, 2024. Before repeal, the department of regulatory agencies, pursuant to 24-34-104, shall review the use of the fund by the department of public health and environment for the purposes described in this subsection (9).

### § 42-4-1301.3 Alcohol and drug driving safety program

(1)

(a) Upon conviction of a violation of <u>section 42-4-1301</u>, the court shall sentence the defendant in accordance with the provisions of this section and other applicable provisions of this part 13. The court shall consider the alcohol and drug evaluation required pursuant to this section prior to sentencing; except that the court may proceed to immediate sentencing without considering such alcohol and drug evaluation:

(I)

(A) If the defendant has no prior convictions or pending charges under this section; or(B) If the defendant has one or more prior convictions, the prosecuting attorney and the defendant have stipulated to such conviction or convictions; and

(II) If neither the defendant nor the prosecuting attorney objects.

(b) If the court proceeds to immediate sentencing, without considering an alcohol and drug evaluation, the alcohol and drug evaluation shall be conducted after sentencing, and the court shall order the defendant to complete the education and treatment program recommended in the alcohol and drug evaluation. If the defendant disagrees with the education and treatment program recommended in the alcohol and drug evaluation, the defendant may request the court to hold a hearing to determine which education and treatment program should be completed by the defendant.

(2) Deleted by Laws 2011, Ch. 267, § 1, eff. June 2, 2011.

(3)

(a) The judicial department shall administer in each judicial district an alcohol and drug driving safety program that provides presentence and postsentence alcohol and drug evaluations on all persons convicted of a violation of <u>section 42-4-1301</u>. The alcohol and drug driving safety program shall further provide supervision and monitoring of all such persons whose sentences or terms of probation require completion of a program of alcohol and drug driving safety education or treatment.

(b) The presentence and postsentence alcohol and drug evaluations shall be conducted by such persons determined by the judicial department to be qualified to provide evaluation and supervision services as described in this section.

(c)

(I) An alcohol and drug evaluation shall be conducted on all persons convicted of a violation of <u>section 42-4-1301</u>, and a copy of the report of the evaluation shall be provided to such person. The report shall be made available to and shall be considered by the court prior to sentencing unless the court proceeds to immediate sentencing pursuant to the provisions of subsection (1) of this section.

(II) The report shall contain the defendant's prior traffic record, characteristics and history of alcohol or drug problems, and amenability to rehabilitation. The report shall include a recommendation as to alcohol and drug driving safety education or treatment for the defendant. (III) The alcohol evaluation shall be conducted and the report prepared by a person who is trained and knowledgeable in the diagnosis of chemical dependency. Such person's duties may also include appearing at sentencing and probation hearings as required, referring defendants to education and treatment agencies in accordance with orders of the court, monitoring defendants in education and treatment programs, notifying the probation department and the court of any defendant failing to meet the conditions of probation or referral to education or treatment, appearing at revocation hearings as required, and providing assistance in data reporting and program evaluation.

(IV) For the purpose of this section, "alcohol and drug driving safety education or treatment" means either level I or level II education or treatment programs that are approved by the unit in the department of human services that administers behavioral health programs and services, including those related to mental health and substance abuse. Level I programs are to be short-term, didactic education programs. Level II programs are to be therapeutically oriented education, long-term outpatient, and comprehensive residential programs. Any defendant

sentenced to level I or level II programs shall be instructed by the court to meet all financial obligations of such programs. If such financial obligations are not met, the sentencing court shall be notified for the purpose of collection or review and further action on the defendant's sentence. Nothing in this section shall prohibit treatment agencies from applying to the state for funds to recover the costs of level II treatment for defendants determined to be indigent by the court.

(a) There is hereby created an alcohol and drug driving safety program fund in the office of the state treasurer to the credit of which shall be deposited all moneys as directed by this paragraph (a). The assessment in effect on July 1, 1998, shall remain in effect unless the judicial department and the unit in the department of human services that administers behavioral health programs and services, including those related to mental health and substance abuse, have provided to the general assembly a statement of the cost of the program, including costs of administration for the past and current fiscal year to include a proposed change in the assessment. The general assembly shall then consider the proposed new assessment and approve the amount to be assessed against each person during the following fiscal year in order to ensure that the alcohol and drug driving safety program established in this section shall be financially self-supporting. Any adjustment in the amount to be assessed shall be so noted in the appropriation to the judicial department and the unit in the department of human services that administers behavioral health programs and services, including those related to mental health and substance abuse, as a footnote or line item related to this program in the general appropriation bill. The state auditor shall periodically audit the costs of the programs to determine that they are reasonable and that the rate charged is accurate based on these costs. Any other fines, fees, or costs levied against such person shall not be part of the program fund. The amount assessed for the alcohol and drug evaluation shall be transmitted by the court to the state treasurer to be credited to the alcohol and drug driving safety program fund. Fees charged under sections 27-81-106(1) and 27-82-103(1), C.R.S., to approved alcohol and drug treatment facilities that provide level I and level II programs as provided in paragraph (c) of subsection (3) of this section shall be transmitted to the state treasurer, who shall credit the fees to the alcohol and drug driving safety program fund. Upon appropriation by the general assembly, these funds shall be expended by the judicial department and the unit in the department of human services that administers behavioral health programs and services, including those related to mental health and substance abuse, for the administration of the alcohol and drug driving safety program. In administering the alcohol and drug driving safety program, the judicial department is authorized to contract with any agency for such services as the judicial department deems necessary. Moneys deposited in the alcohol and drug driving safety program fund shall remain in said fund to be used for the purposes set forth in this section and shall not revert or transfer to the general fund except by further act of the general assembly. (b) The judicial department shall ensure that qualified personnel are placed in the judicial districts. The judicial department and the unit in the department of human services that administers behavioral health programs and services, including those related to mental health and substance abuse, shall jointly develop and maintain criteria for evaluation techniques, treatment referral, data reporting, and program evaluation.

(c) The alcohol and drug driving safety program shall cooperate in providing services to a defendant who resides in a judicial district other than the one in which the arrest was made. Alcohol and drug driving safety programs may cooperate in providing services to any defendant who resides at a location closer to another judicial district's program. The requirements of this section shall not apply to persons who are not residents of Colorado at the time of sentencing.

(d) Notwithstanding any provision of paragraph (a) of this subsection (4) to the contrary, on March 5, 2003, the state treasurer shall deduct one million dollars from the alcohol and drug driving safety program fund and transfer such sum to the general fund.

(5) The provisions of this section are also applicable to any defendant who receives a diversion in accordance with <u>section 18-1.3-101, C.R.S</u>., or who receives a deferred sentence in accordance with <u>section 18-1.3-102</u>, <u>C.R.S</u>., and the completion of any stipulated alcohol evaluation, level I or level II education program, or level I or level II treatment program to be completed by the defendant shall be ordered by the court in accordance with the

(4)

conditions of such deferred prosecution or deferred sentence as stipulated to by the prosecution and the defendant.

(6) An approved alcohol or drug treatment facility that provides level I or level II programs as provided in paragraph (c) of subsection (3) of this section shall not require a person to repeat any portion of an alcohol and drug driving safety education or treatment program that he or she has successfully completed while he or she was imprisoned for the current offense.

### § 42-4-1302 Stopping of suspect

A law enforcement officer may stop any person who the officer reasonably suspects is committing or has committed a violation of section 42-4-1301(1) or (2) and may require the person to give such person's name, address, and an explanation of his or her actions. The stopping shall not constitute an arrest.

#### § 42-4-1303 Records--prima facie proof

Official records of the department of public health and environment relating to certification of breath test instruments, certification of operators and operator instructors of breath test instruments, certification of standard solutions, and certification of laboratories shall be official records of the state, and copies thereof, attested by the executive director of the department of public health and environment or the director's deputy and accompanied by a certificate bearing the official seal for said department that the executive director or the director's deputy has custody of said records, shall be admissible in all courts of record and shall constitute prima facie proof of the information contained therein. The department seal required under this section may also consist of a rubber stamp producing a facsimile of the seal stamped upon the document.

# § 42-4-1304 Samples of blood or other bodily substance--duties of department of public health and environment

(1) The department of public health and environment shall establish a system for obtaining samples of blood or other bodily substance from the bodies of all pilots in command, vessel operators in command, or drivers and pedestrians fifteen years of age or older who die within four hours after involvement in a crash involving a motor vehicle, a vessel, or an aircraft. For purposes of this section, "vessel" has the meaning set forth in <u>section 33-13-102, C.R.S</u>. No person having custody of the body of the deceased shall perform any internal embalming procedure until a blood and urine specimen to be tested for alcohol, drug, and carbon monoxide concentrations has been taken by an appropriately trained person certified by the department of public health and environment. Whenever the driver of the vehicle cannot be immediately determined, the samples shall be obtained from all deceased occupants of the vehicle.

(2) All samples so collected shall be placed in containers of a type designed to preserve the integrity of a sample from the time of collection until it is subjected to analysis.

(3) All samples shall be tested and analyzed in the laboratories of the department of public health and environment, or in any other laboratory approved for this purpose by the department of public health and environment, to determine the amount of alcohol, drugs, and carbon monoxide contained in such samples or the amount of any other substance contained therein as deemed advisable by the department of public health and environment.

(4) The state board of health shall establish and promulgate such administrative regulations and procedures as are necessary to ensure that collection and testing of samples is accomplished to the fullest extent. Such regulations and procedures shall include but not be limited to the following:

(a) The certification of laboratories to ensure that the collection and testing of samples is performed in a competent manner, which may include waiving specific certification requirements for laboratories that are accredited by the American board of forensic toxicology, the international standards organization, or a successor to either organization; and

(b) The designation of responsible state and local officials who shall have authority and responsibility to collect samples for testing.

(5) All records of the results of such tests shall be compiled by the department of public health and environment and shall not be public information, but shall be disclosed on request to any interested party in any civil or criminal action arising out of the collision.

(6) All state and local public officials, including investigating law enforcement officers, have authority to and shall follow the procedures established by the department of public health and environment pursuant to this section, including the release of all information to the department of public health and environment concerning such samples and the testing thereof. The Colorado state patrol and the county coroners and their deputies shall assist the department of public health and environment in the administration and collection of such samples for the purposes of this section.

(7) The office of the highway safety coordinator, the department, and the Colorado state patrol shall have access to the results of the tests of such samples taken as a result of a traffic crash for statistical analysis. The division of parks and wildlife shall have access to the results of the tests of such samples taken as a result of a boating accident for statistical analysis.

(8) Failure to perform the required duties as prescribed by this section and by the administrative regulations and procedures resulting therefrom shall be deemed punishable under <u>section 18-8-405, C.R.S</u>.

### § 42-4-1305 Open alcoholic beverage container--motor vehicle--prohibited

(1) Definitions. As used in this section, unless the context otherwise requires:

(a) "Alcoholic beverage" means a beverage as defined in 23 CFR 1270.3(a).

(b) "Motor vehicle" means a vehicle driven or drawn by mechanical power and manufactured primarily

for use on public highways but does not include a vehicle operated exclusively on a rail or rails.

(c) "Open alcoholic beverage container" means a bottle, can, or other receptacle that contains any amount of alcoholic beverage and:

(I) That is open or has a broken seal; or

(II) The contents of which are partially removed.

(d) "Passenger area" means the area designed to seat the driver and passengers while a motor vehicle is in operation and any area that is readily accessible to the driver or a passenger while in his or her seating position, including but not limited to the glove compartment.

(2)

(a) Except as otherwise permitted in paragraph (b) of this subsection (2), a person while in the passenger area of a motor vehicle that is on a public highway of this state or the right-of-way of a public highway of this state may not knowingly:

(I) Drink an alcoholic beverage; or

(II) Have in his or her possession an open alcoholic beverage container.

(b) The provisions of this subsection (2) shall not apply to:

(I) Passengers, other than the driver or a front seat passenger, located in the passenger area of a motor vehicle designed, maintained, or used primarily for the transportation of persons for compensation;

(II) The possession by a passenger, other than the driver or a front seat passenger, of an open alcoholic beverage container in the living quarters of a house coach, house trailer, motor home, as defined in section 42-1-102(57), or trailer coach, as defined in section 42-1-102(106)(a); (III) The possession of an open alcoholic beverage container in the area behind the last upright

seat of a motor vehicle that is not equipped with a trunk; or

(IV) The possession of an open alcoholic beverage container in an area not normally occupied by the driver or a passenger in a motor vehicle that is not equipped with a trunk.

(c) A person who violates the provisions of this subsection (2) commits a class A traffic infraction and shall be punished by a fine of fifty dollars and a surcharge of sixteen dollars as provided in  $\frac{1701(4)(a)(1)(N)}{100(1)(N)}$ .

### § 42-4-1305.5 Open marijuana container--motor vehicle--prohibited

(1) **Definitions.** As used in this section, unless the context otherwise requires:

(a) "Marijuana" shall have the same meaning as in <u>section 16(2)(f) of article XVIII of the state</u> <u>constitution</u>.

(b) "Motor vehicle" means a vehicle driven or drawn by mechanical power and manufactured primarily for use on public highways but does not include a vehicle operated exclusively on a rail or rails.

(c) "Open marijuana container" means a receptacle or marijuana accessory that contains any amount of marijuana and:

(I) That is open or has a broken seal;

(II) The contents of which are partially removed; and

(III) There is evidence that marijuana has been consumed within the motor vehicle.

(d) "Passenger area" means the area designed to seat the driver and passengers, including seating behind the driver, while a motor vehicle is in operation and any area that is readily accessible to the driver or a passenger while in his or her seating position, including but not limited to the glove compartment.

(2)

(a) Except as otherwise permitted in paragraph (b) of this subsection (2), a person while in the passenger area of a motor vehicle that is on a public highway of this state or the right-of-way of a public highway of this state may not knowingly:

- (I) Use or consume marijuana; or
- (II) Have in his or her possession an open marijuana container.
- (b) The provisions of this subsection (2) shall not apply to:

(I) Passengers, other than the driver or a front seat passenger, located in the passenger area of a motor vehicle designed, maintained, or used primarily for the transportation of persons for compensation;

(II) The possession by a passenger, other than the driver or a front seat passenger, of an open marijuana container in the living quarters of a house coach, house trailer, motor home, as defined in section 42-1-102(57), or trailer coach, as defined in section 42-1-102(106)(a);

(III) The possession of an open marijuana container in the area behind the last upright seat of a motor vehicle that is not equipped with a trunk; or

(IV) The possession of an open marijuana container in an area not normally occupied by the driver or a passenger in a motor vehicle that is not equipped with a trunk.

(c) A person who violates the provisions of this subsection (2) commits a class A traffic infraction and shall be punished by a fine of fifty dollars and a surcharge of seven dollars and eighty cents as provided in this section and section 42-4-1701(4)(a)(I)(N).

(3) Nothing in this section shall be construed to preempt or limit the authority of any statutory or home rule town, city, or city and county to adopt ordinances that are no less restrictive than the provisions of this section.

### § 42-4-1307 Penalties for traffic offenses involving alcohol and drugs--legislative declaration--definitions-repeal

(1) Legislative declaration. The general assembly hereby finds and declares that, for the purposes of sentencing as described in <u>section 18-1-102.5, C.R.S</u>, each sentence for a conviction of a violation of <u>section 42-4-1301</u> shall include:

(a) A period of imprisonment, which, for a repeat offender, shall include a mandatory minimum period of imprisonment and restrictions on where and how the sentence may be served; and

(b) For a second or subsequent offender, a period of probation. The imposition of a period of probation upon the conviction of a first-time offender shall be subject to the court's discretion as described in paragraph (c) of subsection (3) and paragraph (c) of subsection (4) of this section. The purpose of probation is to help the offender change his or her behavior to reduce the risk of future violations of <u>section 42-4-1301</u>. If a court imposes imprisonment as a penalty for a violation of a condition of his or her probation, the penalty shall constitute a separate period of imprisonment that the offender shall serve in addition to the imprisonment component of his or her original sentence.

- (2) Definitions. As used in this section, unless the context otherwise requires:
  - (a) "Approved ignition interlock device" has the same meaning as set forth in section 42-2-132.5.

(b) "Conviction" means a verdict of guilty by a judge or jury or a plea of guilty or nolo contendere that is accepted by the court for an offense or adjudication for an offense that would constitute a criminal offense if committed by an adult. "Conviction" also includes having received a deferred judgment and sentence or deferred adjudication; except that a person shall not be deemed to have been convicted if the person has successfully completed a deferred sentence or deferred adjudication.

(c) "Driving under the influence" or "DUI" means driving a motor vehicle or vehicle when a person has consumed alcohol or one or more drugs, or a combination of alcohol and one or more drugs, that affects the person to a degree that the person is substantially incapable, either mentally or physically, or both mentally and physically, of exercising clear judgment, sufficient physical control, or due care in the safe operation of a vehicle.

(d) "Driving while ability impaired" or "DWAI" means driving a motor vehicle or vehicle when a person has consumed alcohol or one or more drugs, or a combination of both alcohol and one or more drugs, that affects the person to the slightest degree so that the person is less able than the person ordinarily would have been, either mentally or physically, or both mentally and physically, to exercise clear judgment, sufficient physical control, or due care in the safe operation of a vehicle.

(e) "UDD" shall have the same meaning as provided in section 42-1-102(109.7).

(3) First offenses--DUI and DUI per se.

(a) Except as otherwise provided in subsections (5) and (6) of this section, a person who is convicted of DUI or DUI per se shall be punished by:

(I) Imprisonment in the county jail for at least five days but no more than one year, the minimum period of which shall be mandatory; except that the court may suspend the mandatory minimum period if, as a condition of the suspended sentence, the offender undergoes a presentence or post sentence alcohol and drug evaluation and satisfactorily completes and meets all financial obligations of a level I or level II program as is determined to be appropriate by the alcohol and drug evaluation that is required pursuant to <u>section 42-4-1301.3</u>;
(II) A fine of at least six hundred dollars but no more than one thousand dollars, and the court shall have discretion to suspend the fine; and

(III) At least forty-eight hours but no more than ninety-six hours of useful public service, and the court shall not have discretion to suspend the mandatory minimum period of performance of such service.

(b) Notwithstanding the provisions of subparagraph (I) of paragraph (a) of this subsection (3), and except as described in paragraphs (a) and (b) of subsection (5) and paragraph (a) of subsection (6) of this section, a person who is convicted of DUI or DUI per se when the person's BAC was 0.20 or more at the time of driving or within two hours after driving shall be punished by imprisonment in the county jail for at least ten days but not more than one year; except that the court shall have the discretion to employ the sentencing alternatives described in <u>section 18-1.3-106, C.R.S</u>.

(c) In addition to any penalty described in paragraph (a) of this subsection (3), the court may impose a period of probation that shall not exceed two years, which probation may include any conditions permitted by law.

(4) First offenses--DWAI.

(a) Except as otherwise provided in subsections (5) and (6) of this section, a person who is convicted of DWAI shall be punished by:

(I) Imprisonment in the county jail for at least two days but no more than one hundred eighty days, the minimum period of which shall be mandatory; except that the court may suspend the mandatory minimum period if, as a condition of the suspended sentence, the offender undergoes a presentence or post sentence alcohol and drug evaluation and satisfactorily completes and meets all financial obligations of a level I or level II program as is determined to be appropriate by the alcohol and drug evaluation that is required pursuant to <u>section 42-4-1301.3</u>; and

(II) A fine of at least two hundred dollars but no more than five hundred dollars, and the court shall have discretion to suspend the fine; and

(III) At least twenty-four hours but no more than forty-eight hours of useful public service, and the court shall not have discretion to suspend the mandatory minimum period of performance of such service.

(b) Notwithstanding the provisions of subparagraph (I) of paragraph (a) of this subsection (4), and except as described in paragraphs (a) and (b) of subsection (5) and paragraph (a) of subsection (6) of this section, a person who is convicted of DWAI when the person's BAC was 0.20 or more at the time of driving or within two hours after driving shall be punished by imprisonment in the county jail for at least ten days but not more than one year; except that the court shall have the discretion to employ the sentencing alternatives described in <u>section 18-1.3-106, C.R.S</u>.

(c) In addition to any penalty described in paragraph (a) of this subsection (4), the court may impose a period of probation that shall not exceed two years, which probation may include any conditions permitted by law.

(5) Second offenses.

(a) Except as otherwise provided in subsection (6) of this section, a person who is convicted of DUI, DUI per se, or DWAI who, at the time of sentencing, has a prior conviction of DUI, DUI per se, DWAI, vehicular homicide pursuant to section 18-3-106(1)(b), C.R.S ., vehicular assault pursuant to section 18-3-205(1)(b), C.R.S ., aggravated driving with a revoked license pursuant to section 42-2-206(1)(b)(I)(A) or (1)(b)(I)(B) , as that crime existed before August 5, 2015, or driving while the person's driver's license was under restraint pursuant to section 42-2-138(1)(d) , shall be punished by:

(I) Imprisonment in the county jail for at least ten consecutive days but no more than one year; except that the court shall have discretion to employ the sentencing alternatives described in section 18-1.3-106, C.R.S. During the mandatory ten-day period of imprisonment, the person shall not be eligible for earned time or good time pursuant to section 17-26-109, C.R.S., or for trusty prisoner status pursuant to section 17-26-115, C.R.S.; except that the person shall receive credit for any time that he or she served in custody for the violation prior to his or her conviction.
(II) A fine of at least six hundred dollars but no more than one thousand five hundred dollars, and the court shall have discretion to suspend the fine;

(III) At least forty-eight hours but no more than one hundred twenty hours of useful public service, and the court shall not have discretion to suspend the mandatory minimum period of performance of the service; and

(IV) A period of probation of at least two years, which period shall begin immediately upon the commencement of any part of the sentence that is imposed upon the person pursuant to this section, and a suspended sentence of imprisonment in the county jail for one year, as described in subsection (7) of this section; except that the court shall not sentence the defendant to probation if the defendant is sentenced to the department of corrections but shall still sentence the defendant to the provisions of paragraph (b)of subsection (7) of this section. The defendant shall complete all court-ordered programs pursuant to paragraph (b) of subsection (7) of this section (7) of this section of his or her period of parole.

(b) If a person is convicted of DUI, DUI per se, or DWAI and the violation occurred less than five years after the date of a previous violation for which the person was convicted of DUI, DUI per se, DWAI, vehicular homicide pursuant to section 18-3-106(1)(b), C.R.S ., vehicular assault pursuant to section 18-3-205(1)(b), C.R.S ., aggravated driving with a revoked license pursuant to section 42-2-

206(1)(b)(I)(A) or (1)(b)(I)(B), as that crime existed before August 5, 2015, or driving while the person's driver's license was under restraint pursuant to section 42-2-138(1)(d), the court does not have discretion to employ any sentencing alternatives described in section 18-1.3-106, C.R.S., during the minimum period of imprisonment described in subparagraph (I) of paragraph (a) of this subsection (5); except that a court may allow the person to participate in a program pursuant to section 18-1.3-106(1)(a)(II), (1)(a)(IV), or (1)(a)(V), C.R.S., only if the program is available through the county in which the person is imprisoned and only for the purpose of:

(I) Continuing a position of employment that the person held at the time of sentencing for said violation;

(II) Continuing attendance at an educational institution at which the person was enrolled at the time of sentencing for said violation; or

(III) Participating in a court-ordered level II alcohol and drug driving safety education or treatment program, as described in section 42-4-1301.3(3)(c)(IV).

(c) Notwithstanding the provisions of <u>section 18-1.3-106(12)</u>, C.R.S ., if, pursuant to paragraph (a) or (b) of this subsection (5), a court allows a person to participate in a program pursuant to <u>section 18-1.3-106</u>, <u>C.R.S</u> ., the person shall not receive one day credit against his or her sentence for each day spent in such a program, as provided in said <u>section 18-1.3-106(12)</u>, C.R.S .

(6) Third and subsequent offenses.

(a) Except as provided in section 42-4-1301(1)(a), (1)(b), and (2)(a), a person who is convicted of DUI, DUI per se, or DWAI who, at the time of sentencing, has two or more prior convictions of DUI, DUI per se, DWAI, vehicular homicide pursuant to section 18-3-106(1)(b), C.R.S., vehicular assault pursuant to section 18-3-205(1)(b), C.R.S., aggravated driving with a revoked license pursuant to section 42-2-206(1)(b)(I)(A) or (1)(b)(I)(B), as that crime existed before August 5, 2015, or driving while the person's driver's license was under restraint pursuant to section 42-2-138(1)(d) shall be punished by:

(I) Imprisonment in the county jail for at least sixty consecutive days but no more than one year. During the mandatory sixty-day period of imprisonment, the person shall not be eligible for earned time or good time pursuant to <u>section 17-26-109, C.R.S</u>., or for trusty prisoner status pursuant to <u>section 17-26-115, C.R.S</u>.; except that a person shall receive credit for any time that he or she served in custody for the violation prior to his or her conviction. During the mandatory period of imprisonment, the court shall not have any discretion to employ any sentencing alternatives described in <u>section 18-1.3-106, C.R.S</u>.; except that the person may participate in a program pursuant to <u>section 18-1.3-106(1)(a)(II)</u>, or (1)(a)(IV), C.R.S., only if the program is available through the county in which the person is imprisoned and only for the purpose of:

(A) Continuing a position of employment that the person held at the time of sentencing for said violation;

(B) Continuing attendance at an educational institution at which the person was

enrolled at the time of sentencing for said violation; or

(C) Participating in a court-ordered level II alcohol and drug driving safety education or treatment program, as described in section 42-4-1301.3(3)(c)(IV);

(II) A fine of at least six hundred dollars but no more than one thousand five hundred dollars, and the court shall have discretion to suspend the fine;

(III) At least forty-eight hours but no more than one hundred twenty hours of useful public service, and the court shall not have discretion to suspend the mandatory minimum period of performance of the service; and

(IV) A period of probation of at least two years, which period shall begin immediately upon the commencement of any part of the sentence that is imposed upon the person pursuant to this section, and a suspended sentence of imprisonment in the county jail for one year, as described in subsection (7) of this section; except that the court shall not sentence the defendant to probation if the defendant is sentenced to the department of corrections, but shall still sentence the defendant to the provisions of paragraph (b) of subsection (7) of this section. The defendant shall complete all court-ordered programs pursuant to paragraph (b) of subsection (7) of this section (7) of this section of his or her period of parole.

(b) Notwithstanding the provisions of section 18-1.3-106(12), C.R.S., if, pursuant to paragraph (a) of this subsection (6), a court allows a person to participate in a program pursuant to section 18-1.3-106(1)(a)(II), (1)(a)(IV), or (1)(a)(V), C.R.S., the person shall not receive one day credit against his or her sentence for each day spent in such a program, as provided in said section 18-1.3-106(12), C.R.S.
(c) Notwithstanding any other provision of law, if the defendant satisfies the conditions described in subparagraphs (I) and (II) of this paragraph (c), the court may include as a condition of probation a requirement that the defendant participate in alcohol treatment. If the defendant's assessed treatment need is for residential treatment, the court may make residential alcohol treatment a condition of probation ad may place the offender in a community corrections program that can provide the appropriate level of treatment. This paragraph (c) applies only if:

(I) At the time of sentencing, the person has two prior convictions of DUI, DUI per se, DWAI, vehicular homicide pursuant to <u>section 18-3-106(1)(b)</u>, C.R.S ., or vehicular assault pursuant to <u>section 18-3-205(1)(b)</u>, C.R.S .; and

(II) The first of the person's two prior convictions was based on a violation that occurred not more than seven years before the violation for which the person is being sentenced.

(7) Probation-related penalties. When a person is sentenced to a period of probation pursuant to subparagraph (IV) of paragraph (a) of subsection (5) of this section or subparagraph (IV) of paragraph (a) of subsection (6) of this section:

(a) The court shall impose a sentence to one year of imprisonment in the county jail, which sentence shall be suspended, and against which sentence the person shall not receive credit for any period of imprisonment to which he or she is sentenced pursuant to subparagraph (I) of paragraph (a) of subsection
(5) of this section or subparagraph (I) of paragraph (a) of subsection;

(b) The court:

(I) Shall include, as a condition of the person's probation, a requirement that the person complete a level II alcohol and drug driving safety education or treatment program, as described in section 42-4-1301.3(3)(c)(IV), at the person's own expense;

(II) May impose an additional period of probation for the purpose of monitoring the person or ensuring that the person continues to receive court-ordered alcohol or substance abuse treatment, which additional period shall not exceed two years;

(III) May require that the person commence the alcohol and drug driving safety education or treatment program described in subparagraph (I) of this paragraph (b) during any period of imprisonment to which the person is sentenced;

(IV) May require the person to appear before the court at any time during the person's period of probation;

(V) May require the person to use an approved ignition interlock device during the period of probation at the person's own expense;

(VI) May require the person to submit to continuous alcohol monitoring using such technology or devices as are available to the court for such purpose; and

(VII) May impose such additional conditions of probation as may be permitted by law.

(c)

(I) The court may impose all or part of the suspended sentence described in subparagraph (IV) of paragraph (a) of subsection (5) of this section or subparagraph (IV) of paragraph (a) of subsection (6) of this section at any time during the period of probation if the person violates a condition of his or her probation. During the period of imprisonment, the person shall continue serving the probation sentence with no reduction in time for the sentence to probation. A cumulative period of imprisonment imposed pursuant to this paragraph (c) shall not exceed one year. In imposing a sentence of imprisonment pursuant to paragraph (a) of this subsection (7), the court shall consider the nature of the violation, the report or testimony of the probation department, the impact on public safety, the progress of the person in any court-ordered alcohol and drug driving safety education or treatment program, and any other information that may assist the court in promoting the person's compliance with the court pursuant to paragraph (a) of this subsection. (II) Any imprisonment imposed upon a person by the court pursuant to paragraph (a) of this subsection.

conditions of his or her probation and not merely as a punitive measure.

(d) The prosecution, the person, the person's counsel, or the person's probation officer may petition the court at any time for an early termination of the period of probation, which the court may grant upon a finding of the court that:

(I) The person has successfully completed a level II alcohol and drug driving safety education or treatment program pursuant to subparagraph (I) of paragraph (b) of this subsection (7);

(II) The person has otherwise complied with the terms and conditions of his or her probation; and

(III) Early termination of the period of probation will not endanger public safety.

(8) Ignition interlock devices. In sentencing a person pursuant to this section, courts are encouraged to require the person to use an approved ignition interlock device as a condition of bond, probation, and participation in programs pursuant to <u>section 18-1.3-106, C.R.S</u>.

(9) Previous convictions.

(a) For the purposes of subsections (5) and (6) of this section, a person is deemed to have a previous conviction for DUI, DUI per se, DWAI, vehicular homicide pursuant to <u>section 18-3-106(1)(b)</u>, C.R.S ., vehicular assault pursuant to <u>section 18-3-205(1)(b)</u>, C.R.S ., aggravated driving with a revoked license pursuant to <u>section 42-2-206(1)(b)(I)(A)</u> or (1)(b)(I)(B), as that crime existed before August 5, 2015, or driving while the person's driver's license was under restraint pursuant to <u>section 42-2-138(1)(d)</u>, if the person has been convicted under the laws of this state or under the laws of any other state, the United States, or any territory subject to the jurisdiction of the United States, of an act that, if committed within this state, would constitute the offense of DUI, DUI per se, DWAI, vehicular homicide pursuant to <u>section 18-3-106(1)(b)</u>, C.R.S ., vehicular assault pursuant to <u>section 18-3-205(1)(b)</u>, C.R.S ., aggravated driving with a revoked license pursuant to <u>section 42-2-206(1)(b)(I)(A)</u> or (1)(b)(I)(B), as that crime existed before August 5, 2015, or driving while the person's driver's license was under restraint pursuant to <u>section 18-3-205(1)(b)</u>, C.R.S ., aggravated driving with a revoked license pursuant to <u>section 42-2-206(1)(b)(I)(A)</u> or (1)(b)(I)(B), as that crime existed before August 5, 2015, or driving while the person's driver's license was under restraint pursuant to <u>section 42-2-138(1)(d)</u>.

(b)

(I) For sentencing purposes concerning convictions for second and subsequent offenses, prima facie proof of a person's previous convictions shall be established when:

(A) The prosecuting attorney and the person stipulate to the existence of the prior conviction or convictions;

(B) The prosecuting attorney presents to the court a copy of the person's driving record provided by the department of revenue or by a similar agency in another state, which record contains a reference to the previous conviction or convictions; or

(C) The prosecuting attorney presents an authenticated copy of the record of the previous conviction or judgment from a court of record of this state or from a court of any other state, the United States, or any territory subject to the jurisdiction of the United States.

(II) The court shall not proceed to immediate sentencing if the prosecuting attorney and the person have not stipulated to previous convictions or if the prosecution has requested an opportunity to obtain a driving record or a copy of a court record. The prosecuting attorney shall not be required to plead or prove any previous convictions at trial.

(10) Additional costs and surcharges. In addition to the penalties prescribed in this section:

(a) Persons convicted of DUI, DUI per se, DWAI, and UDD are subject to the costs imposed by section 24-4.1-119(1)(c), C.R.S ., relating to the crime victim compensation fund;

(b) Persons convicted of DUI, DUI per se, and DWAI are subject to a surcharge of at least one hundred dollars but no more than five hundred dollars to fund programs to reduce the number of persistent drunk drivers. The surcharge shall be mandatory, and the court shall not have discretion to suspend or waive the surcharge; except that the court may suspend or waive the surcharge if the court determines that a person is indigent. Moneys collected for the surcharge shall be transmitted to the state treasurer, who shall credit the amount collected to the persistent drunk driver cash fund created in <u>section 42-3-303</u>.
(c) Persons convicted of DUI, DUI per se, DWAI, and UDD are subject to a surcharge of twenty dollars to be transmitted to the state treasurer who shall deposit moneys collected for the surcharge in the Colorado traumatic brain injury trust fund created pursuant to <u>section 26-1-309, C.R.S</u>.;

(d)

(I) Persons convicted of DUI, DUI per se, and DWAI are subject to a surcharge of at least one dollar but no more than ten dollars for programs to fund efforts to address alcohol and substance abuse problems among persons in rural areas. The surcharge shall be mandatory, and the court shall not have discretion to suspend or waive the surcharge; except that the court may suspend or waive the surcharge if the court determines that a person is indigent. Any moneys collected for the surcharge shall be transmitted to the state treasurer, who shall credit the same to the rural alcohol and substance abuse cash fund created in section 27-80-117(3), C.R.S.

(II) This paragraph (d) is repealed, effective July 1, 2016, unless the general assembly extends the repeal 1 of the rural alcohol and substance abuse prevention and treatment program created in section 27-80-117, C.R.S.

(11) Restitution. As a condition of any sentence imposed pursuant to this section, the sentenced person shall be required to make restitution in accordance with the provisions of <u>section 18-1.3-205, C.R.S</u>.

(12) Victim impact panels.

(a) In addition to any other penalty provided by law, the court may sentence a person convicted of DUI, DUI per se, DWAI, or UDD to attend in person and pay for one appearance at a victim impact panel approved by the court, for which the fee assessed to the person shall not exceed fifty dollars.
(b) On July 1, 2017, and on each July 1 thereafter, the maximum fee established in paragraph (a) of this subsection (12) is adjusted by the annual percentage change in the United States department of labor, bureau of labor statistics, consumer price index for Denver-Boulder, all items, all urban consumers, or its successor index.

(13) Alcohol and drug evaluation and supervision costs. In addition to any fines, fees, or costs levied against a person convicted of DUI, DUI per se, DWAI, or UDD, the judge shall assess each such person for the cost of the presentence or post sentence alcohol and drug evaluation and supervision services.

(14) Public service penalty. In addition to any other penalties prescribed in this part 13, the court shall assess an amount, not to exceed one hundred twenty dollars, upon a person required to perform useful public service. (15) If a defendant is convicted of aggravated driving with a revoked license based upon the commission of DUI, DUI per se, or DWAI pursuant to section 42-2-206(1)(b)(I)(A) or (1)(b)(I)(B), as that crime existed before August 5, 2015:

(a) The court shall convict and sentence the offender for each offense separately;

(b) The court shall impose all of the penalties for the alcohol-related driving offense, as such penalties are described in this section;

(c) The provisions of <u>section 18-1-408, C.R.S</u>., shall not apply to the sentences imposed for either conviction;

(d) Any probation imposed for a conviction under <u>section 42-2-206</u> may run concurrently with any probation required by this section; and

(e) The department shall reflect both convictions on the defendant's driving record.

1 Extended to Sept. 1, 2025 by the general assembly in Laws 2016, Ch. 93, § 1, eff. April 14, 2016.

### § 42-4-1402. Careless driving - penalty

(1) A person who drives a motor vehicle, bicycle, electrical assisted bicycle, or low-power scooter in a careless and imprudent manner, without due regard for the width, grade, curves, corners, traffic, and use of the streets and highways and all other attendant circumstances, is guilty of careless driving. A person convicted of careless driving of a bicycle or electrical assisted bicycle shall not be subject to the provisions of section 42-2-127.

(2)

(a) Except as otherwise provided in paragraphs (b) and (c) of this subsection (2), any person who violates any provision of this section commits a class 2 misdemeanor traffic offense.

(b) If the person's actions are the proximate cause of bodily injury to another, such person commits a class 1 misdemeanor traffic offense.

(c) If the person's actions are the proximate cause of death to another, such person commits a class 1 misdemeanor traffic offense.

### § 42-4-1601 Accidents involving death or personal injuries--duties

(1) The driver of any vehicle directly involved in an accident resulting in injury to, serious bodily injury to, or death of any person shall immediately stop such vehicle at the scene of such accident or as close to the scene as possible or shall immediately return to the scene of the accident. The driver shall then remain at the scene of the accident until the driver has fulfilled the requirements of section 42-4-1603(1). Every such stop shall be made without obstructing traffic more than is necessary.

(1.5) It shall not be an offense under this section if a driver, after fulfilling the requirements of subsection (1) of this section and of section 42-4-1603(1), leaves the scene of the accident for the purpose of reporting the accident in accordance with the provisions of sections 42-4-1603(2) and 42-4-1606.

- (2) Any person who violates any provision of this section commits:
  - (a) A class 1 misdemeanor traffic offense if the accident resulted in injury to any person;
  - (b) A class 4 felony if the accident resulted in serious bodily injury to any person;
  - (c) A class 3 felony if the accident resulted in the death of any person.
- (3) The department shall revoke the driver's license of the person so convicted.
- (4) As used in this section and sections 42-4-1603 and 42-4-1606 :
  - (a) "Injury" means physical pain, illness, or any impairment of physical or mental condition.

(b) "Serious bodily injury" means injury that involves, either at the time of the actual injury or at a later time, a substantial risk of death, a substantial risk of serious permanent disfigurement, or a substantial risk of protracted loss or impairment of the function of any part or organ of the body, or breaks, fractures, or burns of the second or third degree.

#### § 18-3-106 Vehicular homicide

(1)

(a) If a person operates or drives a motor vehicle in a reckless manner, and such conduct is the proximate cause of the death of another, such person commits vehicular homicide.

(b)

(I) If a person operates or drives a motor vehicle while under the influence of alcohol or one or more drugs, or a combination of both alcohol and one or more drugs, and such conduct is the proximate cause of the death of another, such person commits vehicular homicide. This is a strict liability crime.

(II) For the purposes of this subsection (1), one or more drugs means any drug, as defined in section 27-80-203(13), C.R.S., any controlled substance, as defined in section 18-18-102(5), and any inhaled glue, aerosol, or other toxic vapor or vapors, as defined in section 18-18-412.
(III) The fact that any person charged with a violation of this subsection (1) is or has been entitled to use one or more drugs under the laws of this state shall not constitute a defense against any charge of violating this subsection (1).

(IV) "Driving under the influence" means driving a vehicle when a person has consumed alcohol or one or more drugs, or a combination of alcohol and one or more drugs, which alcohol alone, or one or more drugs alone, or alcohol combined with one or more drugs affect such person to a degree that such person is substantially incapable, either mentally or physically, or both mentally and physically, of exercising clear judgment, sufficient physical control, or due care in the safe operation of a vehicle.

(c) Vehicular homicide, in violation of paragraph (a) of this subsection (1), is a class 4 felony. Vehicular homicide, in violation of paragraph (b) of this subsection (1), is a class 3 felony.

(2) In any prosecution for a violation of subsection (1) of this section, the amount of alcohol in the defendant's blood or breath at the time of the commission of the alleged offense, or within a reasonable time thereafter, as shown by analysis of the defendant's blood or breath, gives rise to the following:

(a) If there was at such time 0.05 or less grams of alcohol per one hundred milliliters of blood, or if there was at such time 0.05 or less grams of alcohol per two hundred ten liters of breath, it shall be presumed that the defendant was not under the influence of alcohol.

(b) If there was at such time in excess of 0.05 but less than 0.08 grams of alcohol per one hundred milliliters of blood, or if there was at such time in excess of 0.05 but less than 0.08 grams of alcohol per two hundred ten liters of breath, such fact may be considered with other competent evidence in determining whether or not the defendant was under the influence of alcohol.

(c) If there was at such time 0.08 or more grams of alcohol per one hundred milliliters of blood, or if there was at such time 0.08 or more grams of alcohol per two hundred ten liters of breath, such fact gives rise to the permissible inference that the defendant was under the influence of alcohol.

(d) If at such time the driver's blood contained five nanograms or more of delta 9-tetrahydrocannabinol per milliliter in whole blood, as shown by analysis of the defendant's blood, such fact gives rise to a permissible inference that the defendant was under the influence of one or more drugs.

(3) The limitations of subsection (2) of this section shall not be construed as limiting the introduction, reception, or consideration of any other competent evidence bearing upon the question of whether or not the defendant was under the influence of alcohol.

(4)

(a) If a law enforcement officer has probable cause to believe that any person was driving a motor vehicle in violation of paragraph (b) of subsection (1) of this section, the person, upon the request of the law enforcement officer, shall take, and complete, and cooperate in the completing of any test or tests of the person's blood, breath, saliva, or urine for the purpose of determining the alcoholic or drug content within his or her system. The type of test or tests shall be determined by the law enforcement officer requiring the test or tests. If the person refuses to take, or to complete, or to cooperate in the completing of any test or tests, the test or tests may be performed at the direction of a law enforcement officer having probable cause, without the person's authorization or consent. If any person refuses to take or complete, or cooperate in the taking or completing of any test or tests required by this paragraph (a), the person shall be subject to license revocation pursuant to the provisions of section 42-2-126(3), C.R.S. When the test or tests show that the amount of alcohol in a person's blood was in violation of the limits provided for in section 42-2-126(3)(a), (3)(b), (3)(d), or (3)(e), C.R.S., the person shall be subject to license revocation pursuant to the provisions of section pursuant to the provision shall be subject to license revocation pursuant to the provision sof section 42-2-126(3)(a) (3)(b), (3)(d), or (3)(e), C.R.S.

(b) Any person who is required to submit to testing shall cooperate with the person authorized to obtain specimens of his blood, breath, saliva, or urine, including the signing of any release or consent forms required by any person, hospital, clinic, or association authorized to obtain such specimens. If such person does not cooperate with the person, hospital, clinic, or association authorized to obtain such obtain such specimens, including the signing of any release or consent forms, such noncooperation shall be considered a refusal to submit to testing.

(c) The tests shall be administered at the direction of a law enforcement officer having probable cause to believe that the person committed a violation of subparagraph (I) of paragraph (b) of subsection (1) of this section and in accordance with rules and regulations prescribed by the state board of health concerning the health of the person being tested and the accuracy of such testing. Strict compliance with such rules and regulations shall not be a prerequisite to the admissibility of test results at trial unless the court finds that the extent of noncompliance with a board of health rule has so impaired the validity and reliability of the testing method and the test results as to render the evidence inadmissible. In all other circumstances, failure to strictly comply with such rules and regulations shall only be considered in the weight to be given to the test results and not to the admissibility of such test results. It shall not be a prerequisite to the admissibility of test results at trial that the prosecution present testimony concerning the composition of any kit used to obtain blood, urine, saliva, or breath specimens. A sufficient evidentiary foundation concerning the compliance of such kits with the rules and regulations of the department of public health and environment shall be established by the introduction of a copy of the manufacturer's or supplier's certificate of compliance with such rules and regulations if such certificate specifies the contents, sterility, chemical makeup, and amounts of chemicals contained in such kit. (d) No person except a physician, a registered nurse, a paramedic as certified in part 2 of article 3.5 of title 25, C.R.S., an emergency medical service provider as defined in part 1 of article 3.5 of title 25, C.R.S., or a person whose normal duties include withdrawing blood samples under the supervision of a physician or registered nurse is entitled to withdraw blood for the purpose of determining the alcoholic or drug content of the blood for purposes of this section. In a trial for a violation of paragraph (b) of subsection (1) of this section, testimony of a law enforcement officer that he or she witnessed the taking of a blood specimen by a person who he or she reasonably believed was authorized to withdraw blood specimens is sufficient evidence that the person was authorized, and testimony from the person who obtained the blood specimens concerning the person's authorization to obtain blood specimens is not a prerequisite to the admissibility of test results concerning the blood specimens obtained. No civil liability shall attach to any person authorized to obtain blood, breath, saliva, or urine specimens or to any hospital, clinic, or association in or for which such specimens are obtained pursuant to this subsection (4) as a result of the act of obtaining the specimens from a person if the specimens were obtained according to the rules prescribed by the state board of health; except that such provision does not relieve the person from liability for negligence in obtaining any specimen sample.

(e) Any person who is dead or unconscious shall be tested to determine the alcohol or drug content of his blood or any drug content of his system as provided in this subsection (4). If a test cannot be administered to a person who is unconscious, hospitalized, or undergoing medical treatment because the test would endanger the person's life or health, the law enforcement agency shall be allowed to test any blood, urine, or saliva which was obtained and not utilized by a health care provider and shall have access to that portion of the analysis and results of any tests administered by such provider which shows the alcohol or drug content of the person's blood or any drug content within his system. Such test results shall not be considered privileged communications and the provisions of <u>section 13-90-107, C.R.S</u>., relating to the physician-patient privilege shall not apply. Any person who is dead, in addition to the tests prescribed, shall also have his blood checked for carbon monoxide content and for the presence of drugs, as prescribed by the department of public health and environment. Such information obtained shall be made a part of the accident report.

(f) If a person refuses to take, or to complete, or to cooperate in the completing of any test or tests as provided in this subsection (4) and such person subsequently stands trial for a violation of subsection (1)(b) of this section, the refusal to take or to complete, or to cooperate with the completing of any test or tests shall be admissible into evidence at the trial, and a person may not claim the privilege against self-incrimination with regard to the admission of his refusal to take, or to complete, or to cooperate with the completing of any test or tests.

(g) Notwithstanding any provision in section 42-4-1301.1, C.R.S ., concerning requirements which relate to the manner in which tests are administered, the test or tests taken pursuant to the provisions of this section may be used for the purposes of driver's license revocation proceedings under section 42-2-126, C.R.S ., and for the purposes of prosecutions for violations of section 42-4-1301(1) or (2), C.R.S .

(5) In all actions, suits, and judicial proceedings in any court of this state concerning alcohol-related or drugrelated traffic offenses, the court shall take judicial notice of methods of testing a person's alcohol or drug level and of the design and operation of devices, as certified by the department of public health and environment, for testing a person's blood, breath, saliva, or urine to determine his alcohol or drug level. This subsection (5) shall not prevent the necessity of establishing during a trial that the testing devices used were working properly and that such testing devices were properly operated. Nothing in this subsection (5) shall preclude a defendant from offering evidence concerning the accuracy of testing devices.

### § 18-3-205 Vehicular assault

(1)

(a) If a person operates or drives a motor vehicle in a reckless manner, and this conduct is the proximate cause of serious bodily injury to another, such person commits vehicular assault.

(b)

(I) If a person operates or drives a motor vehicle while under the influence of alcohol or one or more drugs, or a combination of both alcohol and one or more drugs, and this conduct is the proximate cause of a serious bodily injury to another, such person commits vehicular assault. This is a strict liability crime.

(II) For the purposes of this subsection (1), one or more drugs means any drug, as defined in section 27-80-203(13), C.R.S., any controlled substance, as defined in section 18-18-102(5), and any inhaled glue, aerosol, or other toxic vapor or vapors, as defined in section 18-18-412.
(III) The fact that any person charged with a violation of this subsection (1) is or has been entitled to use one or more drugs under the laws of this state shall not constitute a defense against any charge of violating this subsection (1).

(IV) "Driving under the influence" means driving a vehicle when a person has consumed alcohol or one or more drugs, or a combination of alcohol and one or more drugs, which alcohol alone, or one or more drugs alone, or alcohol combined with one or more drugs affect such person to a degree that such person is substantially incapable, either mentally or physically, or both mentally and physically, of exercising clear judgment, sufficient physical control, or due care in the safe operation of a vehicle. (c) Vehicular assault, in violation of paragraph (a) of this subsection (1), is a class 5 felony. Vehicular assault, in violation of paragraph (b) of this subsection (1), is a class 4 felony.

(2) In any prosecution for a violation of subsection (1) of this section, the amount of alcohol in the defendant's blood or breath at the time of the commission of the alleged offense, or within a reasonable time thereafter, as shown by analysis of the defendant's blood or breath, gives rise to the following:

(a) If there was at such time 0.05 or less grams of alcohol per one hundred milliliters of blood, or if there was at such time 0.05 or less grams of alcohol per two hundred ten liters of breath, it shall be presumed that the defendant was not under the influence of alcohol.

(b) If there was at such time in excess of 0.05 but less than 0.08 grams of alcohol per one hundred milliliters of blood, or if there was at such time in excess of 0.05 but less than 0.08 grams of alcohol per two hundred ten liters of breath, such fact may be considered with other competent evidence in determining whether or not the defendant was under the influence of alcohol.

(c) If there was at such time 0.08 or more grams of alcohol per one hundred milliliters of blood, or if there was at such time 0.08 or more grams of alcohol per two hundred ten liters of breath, such fact gives rise to the permissible inference that the defendant was under the influence of alcohol.

(d) If at such time the driver's blood contained five nanograms or more of delta 9-tetrahydrocannabinol per milliliter in whole blood, as shown by analysis of the defendant's blood, such fact gives rise to a permissible inference that the defendant was under the influence of one or more drugs.

(3) The limitations of subsection (2) of this section shall not be construed as limiting the introduction, reception, or consideration of any other competent evidence bearing upon the question of whether or not the defendant was under the influence of alcohol.

(4)

(a) If a law enforcement officer has probable cause to believe that any person was driving a motor vehicle in violation of paragraph (b) of subsection (1) of this section, the person, upon the request of the law enforcement officer, shall take, and complete, and cooperate in the completing of any test or tests of the person's blood, breath, saliva, or urine for the purpose of determining the alcoholic or drug content within his or her system. The type of test or tests shall be determined by the law enforcement officer requiring the test or tests. If the person refuses to take, or to complete, or to cooperate in the completing of any test or tests, the test or tests may be performed at the direction of a law enforcement officer having probable cause, without the person's authorization or consent. If any person refuses to take, or to complete, or to cooperate in the taking or completing of any test or tests required by this paragraph (a), the person shall be subject to license revocation pursuant to the provisions of section 42-2-126(3), C.R.S. When the test or tests show that the amount of alcohol in a person's blood was in violation of the limits provided for in section 42-2-126(3)(a), (3)(b), (3)(d), or (3)(e), C.R.S., the person shall be subject to license revocation pursuant to the provisions of section 42-2-126, C.R.S.
(b) Any person who is required to submit to testing shall cooperate with the person authorized to obtain specimens of his blood, breath, saliva, or urine, including the signing of any release or consent forms

required by any person, hospital, clinic, or association authorized to obtain such specimens. If such person does not cooperate with the person, hospital, clinic, or association authorized to obtain such specimens, including the signing of any release or consent forms, such noncooperation shall be considered a refusal to submit to testing.

(c) The tests shall be administered at the direction of a law enforcement officer having probable cause to believe that the person committed a violation of subparagraph (I) of paragraph (b) of subsection (1) of this section and in accordance with rules and regulations prescribed by the state board of health concerning the health of the person being tested and the accuracy of such testing. Strict compliance with such rules and regulations shall not be a prerequisite to the admissibility of test results at trial unless the court finds that the extent of noncompliance with a board of health rule has so impaired the validity and reliability of the testing method and the test results as to render the evidence inadmissible. In all other circumstances, failure to strictly comply with such rules and regulations shall only be considered in the weight to be given to the test results and not to the admissibility of such test results. It shall not be a prerequisite to the admissibility of such test results. It shall not be a prerequisite to obtain blood, urine, saliva, or breath specimens. A sufficient evidentiary foundation concerning the compliance of such kits with the rules and regulations of the

department of public health and environment shall be established by the introduction of a copy of the manufacturer's or supplier's certificate of compliance with such rules and regulations if such certificate specifies the contents, sterility, chemical makeup, and amounts of chemicals contained in such kit. (d) No person except a physician, a registered nurse, a paramedic as certified in part 2 of article 3.5 of title 25, C.R.S., an emergency medical service provider as defined in part 1 of article 3.5 of title 25, C.R.S., or a person whose normal duties include withdrawing blood samples under the supervision of a physician or registered nurse is entitled to withdraw blood to determine the alcoholic or drug content of the blood for purposes of this section. In a trial for a violation of paragraph (b) of subsection (1) of this section, testimony of a law enforcement officer that the officer witnessed the taking of a blood specimen by a person who the officer reasonably believed was authorized to withdraw blood specimens is sufficient evidence that the person was authorized, and testimony from the person who obtained the blood specimens concerning the person's authorization to obtain blood specimens is not a prerequisite to the admissibility of test results concerning the blood specimens obtained. No civil liability shall attach to a person authorized to obtain blood, breath, saliva, or urine specimens or to a hospital, clinic, or association in or for which the specimens are obtained in accordance with this subsection (4) as a result of the act of obtaining the specimens from any person if the specimens were obtained according to the rules prescribed by the state board of health; except that the provision does not relieve the person from liability for negligence in obtaining the specimen sample.

(e) Any person who is dead or unconscious shall be tested to determine the alcohol or drug content of his blood or any drug content of his system as provided in this subsection (4). If a test cannot be administered to a person who is unconscious, hospitalized, or undergoing medical treatment because the test would endanger the person's life or health, the law enforcement agency shall be allowed to test any blood, urine, or saliva which was obtained and not utilized by a health care provider and shall have access to that portion of the analysis and results of any tests administered by such provider which shows the alcohol or drug content of the person's blood or any drug content within his system. Such test results shall not be considered privileged communications, and the provisions of <u>section 13-90-107, C.R.S</u>., relating to the physician-patient privilege shall not apply. Any person who is dead, in addition to the tests prescribed, shall also have his blood checked for carbon monoxide content and for the presence of drugs, as prescribed by the department of public health and environment. Such information obtained shall be made a part of the accident report.

(f) If a person refuses to take, or to complete, or to cooperate in the completing of any test or tests as provided in this subsection (4) and such person subsequently stands trial for a violation of subsection (1)(b) of this section, the refusal to take, or to complete, or to cooperate with the completing of any test or tests shall be admissible into evidence at the trial, and a person may not claim the privilege against self-incrimination with regard to the admission of his refusal to take, or to complete, or to cooperate with the complete, or to cooperate with the completing of any test or tests.

(g) Notwithstanding any provision in <u>section 42-4-1301.1, C.R.S</u>., concerning requirements which relate to the manner in which tests are administered, the test or tests taken pursuant to the provisions of this section may be used for the purposes of driver's license revocation proceedings under <u>section 42-2-126</u>, <u>C.R.S</u>., and for the purposes of prosecutions for violations of <u>section 42-4-1301(1)</u> or (2), C.R.S.

(5) In all actions, suits, and judicial proceedings in any court of this state concerning alcohol-related or drugrelated traffic offenses, the court shall take judicial notice of methods of testing a person's alcohol or drug level and of the design and operation of devices, as certified by the department of public health and environment, for testing a person's blood, breath, saliva, or urine to determine his alcohol or drug level. This subsection (5) shall not prevent the necessity of establishing during a trial that the testing devices used were working properly and that such testing devices were properly operated. Nothing in this subsection (5) shall preclude a defendant from offering evidence concerning the accuracy of testing devices.

# Chapter 6 State-by-state comparison of DUI/DUID laws

Although the federal government establishes guidelines and some requirements for DUI statutes, states have the primary responsibility for their own DUI laws. This results in a wider variety of variances in DUI laws than some people may realize.

Further information can be found in the following resources:

- <u>www.responsibility.org</u> Interactive maps display differences among the states in 19 different categories from 24/7 programs to DUID affirmative defense.
- DOT HS 811 236 A State-by-State Analysis of Laws Dealing With Driving Under the Influence of Drugs. This document, available at <a href="https://www.ems.gov/pdf/811236.pdf">https://www.ems.gov/pdf/811236.pdf</a> was published in 2009 so parts of it are now out of date.
- <u>www.stopduid.org</u> Interactive map provides a more up-to-date version of information in the DOT HS 811 236 document.
- Drug-Impaired Driving: A Guide for What States Can Do available at <a href="https://www.ghsa.org/sites/default/files/2016-11/Drug-Impaired Driving-A Guide For What States">https://www.ghsa.org/sites/default/files/2016-11/Drug-Impaired Driving-A Guide For What States</a> <u>Can Do-Interactive.pdf</u> This is published by the Governors Highway Safety Association (GHSA) under the sponsorship of Responsibility.org

All states prohibit drugged driving. Many have specific standards for drugged driving:

Table 13	
States	Laws
AZ,GA,UT,IL	Zero tolerance for all controlled substances and their metabolites taken
	illegally. Illinois recently adopted a 5 ng/ml exception for THC
IA, RI	Zero tolerance for all controlled substances. Iowa restricts illegal use only
NC,SD	Zero tolerance for all controlled substances and their metabolites in minors.
	NC permits medical use. SD applies to minors only.
DE, IN, PA, WI	Zero tolerance for Schedule I and some or all of Schedule II or III drugs
	taken illegally
кү, МІ, ОК	Zero tolerance for Schedule I except marijuana, plus 15 other drugs
MN	Zero tolerance for Schedule I drugs except marijuana or Schedule II if taken
	illegally
NV, OH	Defined per se levels of several drugs including THC at 2 ng/ml
VA	Defined per se levels of several drugs, THC not included
WA	5 ng/ml for THC, and zero tolerance for THC in minors (ALR only)
MT	5 ng/ml for THC
CO	5 ng/ml permissible inference for THC

States define DUI in various ways including DUI, DUII, DWI, OWI, OUI, with similar meanings for all. There is no standard, but DUI is a widely understood term.

States sometimes statutorily define what DUI means. See Table 14.

Definition	Number of states
Impairment to the slightest degree	3
Impaired, less capable	16
Impaired sufficiently to cause endangerment	1
Ability substantially, materially or appreciably altered	3
Incapable of driving safely	12

Table 14 Impairment definitions

Even within these definitions there are variations. Colorado uses the most lenient (from the position of the defendant) definition of "substantially incapable" of safe driving, but has a lower offence of DWAI defined as "affects the person to the slightest degree so that the person is less able" to drive safely.

Vermont uses "impairment to the slightest degree" only for DUID.

Colorado's DWAI has penalties slightly lower than DUI with the notable exception in cases of vehicular homicide and vehicular assault. Whereas vehicular homicide due to DUI is a Class 3 felony and vehicular assault due to DUI is a Class 4 felony, neither vehicular homicide nor vehicular assault due to a DWAI are even misdemeanors.

# Colorado has the nation's weakest DUID law

In 2013, Colorado's legislature passed HB 1325 which permitted addicts to drive and established a 5 ng/ml permissible inference limit for THC in whole blood. Like a *per se* law, Colorado's limit makes successful prosecution for DUI extremely unlikely for impaired drivers who test below that limit. As noted in Chapter 3, a minority of drivers arrested for DUI due to marijuana may have a THC blood level above 5 ng/ml. But unlike a *per se* law, a permissible inference law does not guarantee a successful prosecution if the impaired driver tests above that limit.<sup>94</sup> Therefore, Colorado's law is recognized as the weakest DUID law in the nation. See Figure 23.<sup>95</sup>





National Council of State Legislatures. 2017

In part, HB 13-1325 was passed due to the lack of good data and understanding on the part of legislators. The 5 ng/ml limit included in HB 13-1325 emerged from studies in 2004 and 2005.<sup>96</sup> New and better data are now available and more are emerging, so it is incumbent upon legislators to propose and pass wise changes to Colorado's DUI statutes, especially the 5 ng/ml permissible inference limit.

Chapter 8 presents data showing that, like most states, Colorado tests a minority of DUI suspects for drug presence. Washington tests all DUI blood samples for both drugs and alcohol.

Colorado provides a statutory presumption of DUI innocence for drivers testing below BAC .05. This may be appropriate when alcohol is the only intoxicant found, but since drugs compound the effect of alcohol impairment (or perhaps vice versa), a statutory presumption of innocence for a BAC under .05 is not appropriate in cases of polydrug impairment that involve alcohol.

# Chapter 7 Model policy proposals

Several national organizations have proposed model DUID policies for states to consider. We present seven here:

- Governors Highway Safety Association
- Institute for Behavior and Health
- NHTSA
- European Traffic Safety Council
- Heritage Foundation
- DUID Victim Voices/We Save Lives
- High Means DUI

## Governors Highway Safety Association<sup>97</sup>

- 1. Add drug-impaired driving messages, especially regarding marijuana- and prescription drug-impaired driving, to their impaired driving campaigns.
- 2. Consider a campaign with physicians and pharmacists on prescription opioid warnings.
- 3. Train at least a majority of patrol officers in Advanced Roadside Impaired Driving Enforcement (ARIDE).
- 4. Seriously consider at least a test of oral fluid devices.
- 5. Closely follow the development of marijuana breath test instruments and seriously consider a pilot test if and when they become available.
- 6. Train an adequate number of Drug Recognition Experts (DREs) to address the Driving Under the Influence of Drugs (DUID) problem, consistent with law enforcement resources.
- 7. Encourage prosecutors and judges assigned to DUID cases to participate in appropriate training.
- 8. Encourage officers to investigate drug impairment even when alcohol is suspected.
- 9. Encourage prosecutors to pursue DUID charges when they are supported by the evidence.
- 10. Authorize electronic search warrants for drug tests. When authorized, law enforcement agencies should implement electronic warrants as needed.
- 11. Provide appropriate penalties for drug test refusal.
- 12. Require blood testing for drugs rather than urine testing.
- 13. Invest in forensic laboratory capabilities to provide adequate testing for drivers arrested for DUID.
- 14. Test all fatally-injured drivers, and all surviving drivers in a fatal crash who may be at fault, for drugs and alcohol.

15. Establish a separate DUID offense equivalent to DUI. Record suspected and confirmed DUID drivers in arrest and crash records.

## Institute for Behavior and Health<sup>98</sup>

- 1. All states should enact zero tolerance per se DUID legislation.
- 2. Officers should test every driver whom they suspect is under the influence for drugs, including marijuana, just as they do for alcohol. This includes drivers who test above the illegal 0.08g/dL alcohol limit.
- 3. Every driver who is involved in a crash involving serious injuries or death should undergo laboratory based (evidential) testing for alcohol and drugs.
- 4. Law enforcement officers should be permitted to use oral fluid both for data collection purposes and as evidence in legal proceedings.
- 5. Administrative License Revocation (ALR) should be used for drivers arrested for impairment who fail a drug test or who refuse to provide samples for drug testing.

## European Transport Safety Council<sup>99</sup>

- 1. Legislation
  - a. Introduce a zero tolerance system for illicit psychoactive drugs (using the lowest limit of quantification) that takes account of passive or accidental exposure.
  - b. Consider the potential ramifications of drug legalisation on drug driving.
  - c. Ensure drug driving legislation can be updated to keep track of new illicit drugs.
- 2. Enforcement
  - a. Development by the European Commission of common standards for roadside psychoactive drug driving enforcement.
  - b. Increase enforcement levels and penalties for driving under the influence of psychoactive drugs, especially in areas that currently have low levels of enforcement. But this should not be at a cost to drink driving enforcement.
  - c. Ensure police forces are properly trained in when and how to perform drug screening (e.g. preselection based on checklist, saliva test, confirmation test) field impairment tests and use of roadside screening devices.
  - d. Develop intelligence to enable targeted enforcement for high risk groups, particularly:
    - Young males;
    - Communities where drivers combine consumption of illicit drugs and alcohol and/or multiple illicit drugs;
    - Communities where controlled psychoactive medicines are used to aid driving performance.
- 3. Education and campaigns
  - a. Incorporate drug driving education into school based road safety initiatives, alongside drink driving education.
  - b. Target education and campaigns at high risk groups such as young males.

- c. Incorporate the issues relating psychoactive drugs and their effects on driving performance into professional driver education.
- 4. Rehabilitation and programmes
  - a. Integrate rehabilitation schemes in the national countermeasures system.
    - Drug offenders should be treated separately from alcohol offenders.
    - Non-addicts and addicts should be distinguished, as they may require different treatments.
  - b. Assessment and rehabilitation should be regulated and criteria based or common standards should be introduced.
  - c. Driving licence acquisition for known drug users should be regulated via the European Driving Licence Directive.
- 5. Research
  - a. Research into the effects of common psychoactive drugs on driving behaviour must continue to ensure countermeasures are fit-for-purpose and keep in line with evolving behaviours.
  - b. Research into the effects of new psychoactive substances on driving behaviours is required (e.g. synthetic cannabinoids).
  - c. Research into the effectiveness of countermeasures should be carried out.
  - d. Continue to invest in development of drug detection technology, including improved duration times and reliability, lower costs for both roadside screening and post-collision testing and laboratory based confirmatory testing.
- 6. Data collection
  - a. Encourage greater and improved monitoring of drug use in traffic to gain more insight into its prevalence, development and trends.
  - b. Standardise monitoring methods by establishing a common framework for Member States to use.
  - c. Standardise and maximise post-collision data collection.

# NHTSA 100

- Increase the use of effective and efficient methods for training law enforcement personnel, including drug recognition experts, to detect or measure the level of impairment of a motor vehicle operator who is under the influence of marijuana by the use of technology or otherwise.
- Continue research to enable development of an impairment standard for driving under the influence of marijuana, and in the meantime, maintain training and other support to enable law enforcement officers and prosecutors to pursue cases using available evidence.
   [Ed note: the poor correlation of THC level in the blood or oral fluid with impairment precludes using THC blood or oral fluid levels as proof of driver impairment.]
- 3. Encourage States to collect data regarding the prevalence of marijuana use by drivers and among those arrested for impaired driving.

• States should develop record systems that distinguish among alcohol, drugs, or both for impaired driving cases. These records should be integrated into computerized data

systems of statewide arrest records, the court record systems, and motor vehicle records. One way to accomplish this would be to have separate offenses for driving impaired by alcohol and driving impaired by drugs.

• State records systems should document which drugs are used by drug-impaired drivers.

This information would be helpful for law enforcement, toxicologists, and prosecutors. • Standard toxicological screening and confirmation procedures should be developed for drug testing laboratories to use in identifying and confirming the presence of drugs that impair driving. These methods should include standard analytic procedures and

minimum detection thresholds. There also should be training requirements for the personnel operating these tests.

• State statutes should be amended to provide separate and distinct offenses and sanctions for alcohol- and drug-impaired driving that could be applied individually or in combination to a single case. This would provide an incentive for law enforcement officers to pursue a possible drug-impaired driving charge even when a BAC equal to or above the limit of .08 g/dL has already been established.

# Heritage Foundation<sup>101</sup>

- 1. Apply to every driver under 21-years-old who tests positive for any illicit or impairing drug, including marijuana, the same zero tolerance standard specified for alcohol, the use of which in this age group is illegal.
- 2. Apply to every driver found to have been impaired by drugs, including marijuana, the same remedies that are specified for alcohol-impaired drivers, including administrative or judicial license revocation.
- 3. Test every driver involved in a crash resulting in a fatality or a major traffic crash (including injury to pedestrians) for alcohol and impairing drugs, including marijuana.
- 4. Test every driver arrested for driving under the influence of, or while impaired by, alcohol or drugs for alcohol and impairing drugs, including marijuana.
- 5. Use reliable oral fluid testing technology at the roadside for every driver arrested for impaired driving.
- 6. Develop national standardized testing, synchronize the testing with drug overdose testing, and develop a national database that collects the information for program and policy decisions.

## DUID Victim Voices/We Save Lives<sup>102</sup>

- Collect, analyze and publish DUID (Driving Under the Influence of Drugs) data: Collect, analyze and publish data to understand the prevalence, causes and consequences of drugged driving. Report the number of DUID citations and causes, and DUID convictions compared to DUI-alcohol. (Recommended by NHTSA and GHSA.)
- 2. Implement oral fluid testing (both roadside preliminary devices and evidentiary assays):

- Roadside non-quantitative oral fluid testing devices can be used by officers prior to arrest if the officer has *reasonable grounds* to believe that the driver may be impaired by drugs.
  - Results of non-quantitative oral fluid testing shall guide officers in evidence collection.
  - The roadside non-quantitative oral fluid tests results may not be considered evidentiary.
  - Available devices test for drugs including opiates, cocaine, amphetamines, and cannabis.
- Evidentiary laboratory oral fluid testing may be used in lieu of blood evidentiary testing to prove presence of an impairing substance.
- 3. Provide more DREs, ARIDE-trained officers:

Provide additional training for and use of Drug Recognition Experts (DREs) and officers trained in Advanced Roadside Impaired Driving Enforcement (ARIDE).

- 4. Implement mandatory drug testing in the following cases:
  - Preliminary breath alcohol tests <u>and</u> preliminary drug oral fluid tests for all DUI arrests.
  - Evidentiary alcohol and drug tests of all (surviving and deceased) drivers involved in crashes that result in death or serious injuries. Lack of testing ensures DUID remains under-reported.

In 2016 there were 51,914 drivers involved in fatal crashes that killed 37,461 people. Yet only 15,734 (30.3%) were tested for drugs.

5. Implement eWarrants for blood draws:

Reduce delays in collecting blood samples through the use of electronic warrants. Traditional warrants can add 1½ hour to the normal two hours required to collect a blood sample in cases of death or serious bodily injury. An average of 73% of marijuana's THC is cleared from the blood within 25 minutes after smoking, making blood test levels irrelevant after such a delay.

6. Enhance penalties for polydrug impairment:

Enhance penalties for driving under the influence of combinations of drugs or drugs plus alcohol. Combinations of drugs can be more impairing than individual drugs. Enhanced penalties can incentivize and financially support additional drug testing.

- 7. Adopt responsible DUID legislative options:
  - 1. Zero tolerance for impairing drugs for drivers under the age of 21.
  - 2. Tandem *per se* where a driver is guilty of DUID *per se* if the following sequence of events occurs:
    - An officer had probable cause, based on the driver's demeanor, behavior and observable impairment to believe that the driver was impaired; and
    - Proof that the driver had any amount of an impairing substance in blood, oral fluid or breath.

Sixteen states have zero drug tolerance for drivers, following the Department of Transportation zero drug tolerance policy for commercial drivers and other select employees. These zero tolerance laws vary widely from state-to-state but all are suitable substitutes for Tandem *per se. Per se* limits for drugs are not advised. The

impossibility of determining scientifically valid *per se* levels of all scheduled drugs becomes readily apparent when one considers the multiple thousand combinations of drugs that must also be considered.

A 5 ng/ml THC per se law or permissible inference level is NOT a responsible DUID option; most marijuana-impaired drivers test below 5 ng/ml THC in whole blood.

- Implement 24/7 sobriety programs for chronic alcohol and drug offenders: 24/7 sobriety programs have proven beneficial for chronic alcohol offenders but are far less common for chronic drug offenders.
- Impose Administrative License Revocation for drugged driving: Drivers' licenses should be revoked administratively for all drivers who either fail preliminary alcohol or drug tests or who refuse to provide biological samples for alcohol or drug testing.

## High Means DUI Coalition<sup>103</sup>

## Goal

Laws, policies and their enforcement should ensure parity in conviction rates, sentences, and treatment for cases of impaired driving irrespective of cause: alcohol, drugs, or a combination of both. This policy provides guidance to establish laws and policies that deal with the following aspects of drugged driving:

- Enforcement
- Prevention
- Treatment, monitoring, accountability
- Justice for victims

## Enforcement

- 1. Support collection and publication of data for DUID citations and convictions compared to DUIalcohol.
- 2. Oppose *per se* limits above zero (0) for THC and other drugs. Instead, the following options are supported:
  - a. Tandem *per se*: convict drivers of DUID *per se* after two sequential events:
    - i. An officer had probable cause, based on the driver's demeanor, behavior, and observable impairment to believe the driver was impaired, and;
    - ii. The driver had any amount of an impairing substance in blood, oral fluid, or breath.
  - b. Zero tolerance for drugged driving under the age of 21.
  - c. Zero tolerance for THC, illicit drugs, and controlled substances not taken in accordance with a valid prescription.
- 3. Support mandatory drug testing of blood or oral fluid in all DUI cases.
- 4. Support mandatory drug testing of all drivers (surviving and deceased) in crashes that result in serious bodily injuries or death.
- 5. Support forensic laboratories establishing minimum testing policies and capabilities compliant with those set forth in *Recommendations for Toxicological Investigation of Drug-Impaired Driving and Motor Vehicle Fatalities 2017 Update* (Logan, Lowrie, Turri, et al., Journal of Analytical Toxicology, 2017).

- 6. Support infrastructure, tools, and training for electronic search warrants to speed access to biological fluids for drug testing.
- 7. Support enhanced penalties for poly-drug impairment.
- 8. Support use of roadside preliminary oral fluid drug testing.
- 9. Support use of evidential oral fluid testing in drug cases.
- 10. Support administrative license revocation for positive roadside drug tests and/or refusal to provide a biological sample for evidential testing.
- 11. Support expedited phlebotomy programs, including DUID blood draws by local EMS or officers trained as phlebotomists.
- 12. Support defining impairment for DUID as "impairment to the slightest degree."
- 13. Support defining "drug" in traffic law as "Any substance that, when taken into the human body, can impair the ability of the person to operate the vehicle safely."
- 14. Support increased funding for DRE and ARIDE training.

## Prevention

- 1. Support remanding of drivers convicted of DUID to education programs and in addition, as needed to counselling, treatment, and rehabilitation programs.
- 2. Support State Impairment Task Forces that emphasizes DUID in addition to DUI-alcohol.

## Treatment, monitoring, accountability

• Support 24/7 programs for DUI and DUID offenders

## Justice for victims

- 1. Support training and equipping victims' advocates to service DUID victims as well as DUI-alcohol victims.
- 2. Provide crash data (including toxicology report) to DUID victims and survivors in a timely manner.
- 3. Keep victims and survivors informed about the progress of their case in a timely manner.
- 4. Do everything possible to bring DUID cases to a swift resolution.
- 5. Treat DUID cases as seriously as DUI-alcohol crashes and crimes.
## Part Three – New Data

DCJ report pursuant to HB17-1315 (See separate publication)

Prevalence of drug testing

Annotated bibliography

## Chapter 8 Prevalence of drug testing

## Proportion of samples tested for drugs

The prevalence of DUID has long been thought to have been underreported because most drivers suspected of impairment are neither assessed for drug impairment at the roadside nor tested for drug presence with laboratory tests. Quantification of this phenomenon has been provided by Jeff Groff of CDPHE, using data reported to CDPHE by forensic laboratories in Colorado for the time period July 1 2015 through June 30, 2016.

		Test samples	<u>% of DUIs</u>
Evidential Samples Tested		20,930	
Evidential Breath Alcohol Tests		9,769	45%
Evidential Blood Alcohol Tests		10,925	52%
CBI	2,302		
Chematox	7,022		
CSU	429		
Denver PD	824		
El Paso Coroner	76		
Horizon Lab	272		
Blood Drug Tests		6,333	30%
CBI	1,590		
Chematox	3,826		
CSU	632		
Denver PD	0		
El Paso Coroner	63		
Horizon Lab	272		
Urine Drug Tests		236	
Chemtox	173		
El Paso Coroner	63		

Post Mortem tests and repeat testing on prosecution samples by defendant are not included. The above numbers do not include those arrested for DUI who refused testing, typically 30%.

## Proportion of alcohol samples positive for drugs - Colorado

As noted earlier, when police have sufficient evidence to convict of DUI based upon alcohol, there is no need to test for drugs, and therefore the expense is often not undertaken.

The Colorado State Patrol requested the Colorado Bureau of Investigation to perform a drug screening test on retained samples of blood that previously had proven to be positive for alcohol but not tested for drugs. Results presented at the House Finance Committee hearing for HB 18-1258 on March 19, 2018 by Major Steve Garcia were:

Samples tested	432
Drug positive	71%
Cannabinoid positive	42%

Note: These were immunoassay screening tests, not evidential tests. Cannabinoid positive indicates presence of any cannabinoid, including inactive carboxy-THC.

Blood (or oral fluid) submitted for testing first undergoes a screening test to determine which classes of drugs may be found in the specimen. Usually the screening test is based on immunoassay technology. Immunoassay screening identifies the class of drug, such as cannabinoids or opioids, but not the specific drug like THC or morphine. Immunoassays test for a panel of drugs, usually less than a dozen, and will not detect drugs that are not included in the predetermined panel. Immunoassays provide an identification of the presence of a drug class, with without quantification of the level of the drug class found.

After a drug class presence has been identified from screening, the blood (or oral fluid) is tested again for evidentiary purposes to identify the specific drug in the selected drug class, as well as its concentration. Evidentiary testing is usually done by tandem liquid chromatography – gas chromatography - mass spectrometry (LC/GC-MS).

Proportion of alcohol samples positive for drugs – Wisconsin <sup>104</sup>	
A similar study was published in 2018 by the Wisconsin State Laboratory o	f Hygiene:

Samples tested	116
Drug positive	70%
Cannabinoid positive	52%

#### **Hypothesis**

When GHSA released its 2017 update to Drugged-Driving: A Guide to What States Can Do, many in the media reported that drugged driving had surpassed drunk driving, even though that was not the report's conclusion. The report cited only FARS data, not DUI data.

The reality is likely more complex since it appears that the vast majority of alcohol-impaired drivers were impaired by a combination of alcohol and drugs. FARS and other data already

confirm that a large proportion of drugged drivers also tested positive for alcohol, many at levels that could cause impairment.



We are likely faced with a model looking like Figure 24:

With both alcohol and drugs in a driver, one cannot state with certainty which caused the impairment. It's like asking why one likes a Snickers<sup>®</sup> Bar – is it the chocolate, the nougat, the nuts or the caramel?

It's also not even useful to try. After all, impairment is impairment.

# Chapter 9 Annotated recent bibliography (all since 2013)

A refrain heard during testimony for HB13-1325 was, "We need more research." We would benefit for example, with more research on THC tolerance, addiction, chronic impairment, high dose THC, polydrug use and vaped THC. But we have a great deal more research available now than we did five years ago. Following is an annotated bibliography of relevant research published since 2013. The bibliography includes 27 Reports and 46 Peer-Reviewed Papers and are separated by topic. Chosen reports are of high quality, even though they may not be peer-reviewed.

## Reports

#### Policy recommendations

- Hedlund J. Drug-Impaired Driving: A Guide For States, GHSA, April 2017 [380] Summarizes current state of knowledge on DUID and proposes actions that states can take to reduce drug-impaired driving.
- 2. Hedlund J. Drug-Impaired Driving: Marijuana and Opioids Raise Critical Issues for States, GHSA, May 2018 [466]

"States have a critical mission to convince drivers to drive responsibly, alertly, and unimpaired. Marijuana and opioids add different forms of impairment. They require some new tactics to detect impaired drivers, link the impairment to the drug, prosecute and adjudicate offenders, and above all educate drivers and the public. They join with and build on the familiar methods to address alcoholimpaired driving. Impaired driving program focus should not shift to marijuana and opioids but should expand to include marijuana and opioids along with alcohol." See Chapter 7 for specific recommendations.

 Berning A, Smither DD. Understanding the limitations of drug test information, reporting and testing practices in fatal crashes. NHTSA Traffic Safety Facts Research Note DOT HS 812 072 November 2014 [231]

> NHTSA cautions against making trend and state comparison DUID inferences based on FARS data due to many limitations of FARS with respect to collecting drug data.

4. Drug use and road safety: a policy brief. Geneva, Switzerland, World Health Organization, 2016. [452]

General educational pamphlet, copying Elvik [109] (See #36) data and England/Wales drug *per se* standards [257] (See #9).

5. Ramaekers JG. Driving Under the Influence of Cannabis: An Increasing Public Health Concern. JAMA. March 26, 2018 [450]

"Scientific evidence on the association between cannabis use and driving impairment contrasts with public attitudes toward driving under the influence of cannabis. Regular cannabis users often admit to driving under the influence of cannabis and wrongfully believe that cannabis does not affect their driving performance or that they can compensate for cannabis-associated impairment."

6. Borakove E, Banks R. A Guide to Implementing Electronic Warrants. Justice Management Institute. April 2018 [464]

> A "best practices" guide to implementing eWarrants, supported by the National Sheriffs Association. Electronic warrants can reduce the time delay between an arrest and collecting blood evidence.

#### Drugged driving reports

 Lacey J. Drug and Alcohol Crash Risk: A Case-Control Study, NHTSA DOT HS 812 355 (2016) [365]

This highly controlled study has been widely misrepresented. The authors studied over 3,000 crash drivers and 6,000 controls in Virginia Beach, VA. This report has frequently been cited as proof that THC causes no impairment. The correct interpretation is that the study *failed to find evidence of impairment* from THC <u>or any other drug</u>. *Failure to find evidence is not the same as finding there is no evidence,* especially in a study that was not designed to find the evidence in the first place. Study limitations are described in Chapter 4.

Richard Compton of NHTSA reported<sup>105</sup> that he is designing a new study to address the concerns that have been brought to his attention about this study.

8. Wallage R. Report on Drug *Per Se* Limits, Canadian Society of Forensic Sciences (CSFS), April, 2017 [402]

This is an excellent summary of the impairing effects of 9 different drugs, including THC, with a recommendation to the Canadian Parliament for enacting drug *per se* limits prior to legalizing marijuana in Canada. The report was prepared by a team of toxicologists.

Drug	CSFS	England/Wales	
THC	2,5*	2	
Cocaine	30	10	
Benzoylecgonine		50	
Heroin			
6-MAM	0	5	
Morphine			

Compare the CSFS recommendations for drug *per se* ng/ml limits with those of the British Expert Panel report in 2013:

Ketamine	0	20
LSD	0	1
Methamphetamine	50	10
Amphetamine		250
РСР	0	
Psilocybin	0	
GHB	10 mg/L	

\* Not recommended, but considered at the request of the Government.

The Canadian bill to amend their DUI law (Bill C-46) does not establish limits for opioids or benzodiazepines, both problems in Colorado. It establishes two limits for marijuana-impaired driving, the lower "to protect public safety" and the higher to deal with residual THC in marijuana addicts and other heavy users:

- 2 ng/ml THC in whole blood the driver is subject to a fine
- 5 ng/ml THC in whole blood the driver may be criminally prosecuted

The bill also provides for possible criminal prosecution if the driver has a blood level of THC greater than 2.5 ng/ml combined with a BAC over .05.

Canada's Department of Justice issued proposed regulations Oct 14, 2017 incorporating some CSFS recommendations, but lowered cocaine and methamphetamine limits to zero, and GHB to 5 ml/L. It confirmed the government's commitment to 2 & 5 ng/ml for THC (Canada Gazette Part 1, Vol 151, No 41). In announcing their regulations, the Canadian Department of Justice incorrectly stated that the CSFS report said that a driver testing below 5 ng/ml was not impaired. That was a fabrication by the government, not supported by CSFS.

9. 2014 No 2868 Road Traffic, England and Wales. The Drug Driving (Specified Limits) (England and Wales) Regulation 2014

DUID per se limits in English and Welch law.

- 10. Wood, E. Brief in opposition to Bill C-46 House of Commons, August, 2017 [400] This brief describes the science behind the claim that THC *per se* limits, whether they be 2 ng or 5 ng, are irrational and serve to deny justice to DUID victims. An alternative method, Tandem *per se* was proposed for consideration.
- 11. Undercounted is Underinvested. National Safety Council Report 2017 [378] The Model Minimum Universal Crash Criteria (MMUCC) was proposed to shift from "accident" reporting to crash investigation to learn how to reverse the current trend of increasing traffic fatalities.

## Data from Colorado and Washington

12. Monitoring Health Concerns Related to Marijuana in Colorado: 2016, CDPHE [245] Pages 145-156 cover Marijuana Use and Driving. This is a good survey of the topic that should be compared with the more comprehensive Hedlund paper (#1). Unfortunately, the CDPHE paper discusses only marijuana, which as noted in Chapter 1 is but a portion of the DUID problem. The authors emphasize the need to collect and monitor the measured ng/ml levels of THC in blood, even though conclusive evidence exists that forensically determined levels of THC bear no relationship to the level of impairment as noted in Chapter 3.

The DUID section of the report contains the following errors which we have requested be changed in future editions:

• "Ingesting more than about 15 mg THC is capable of yielding a whole blood THC concentration above 5 ng/ml."

This statement is not true [See discussion of the Vandry paper in Chapter 3] and ignores the real problem with orally-consumed marijuana: Blood THC levels never rise above 3 ng/ml when consuming marijuana edibles, and that is for someone consuming five times the normal 10 mg THC dose. Therefore it is unlikely that a driver impaired only by edible marijuana could be successfully prosecuted.

• "Increased risk of driving impairment at blood levels of 2-5 ng/ml."

This implies a correlation between forensically-determined THC blood levels and levels of impairment, whereas no such correlation exists as described in Chapter 3.

• "Increased risk of driving impairment at blood levels of 2-5 ng/ml applies only to less-than-weekly users."

This implies that addicts and other heavy users are not impaired by THC which is not true as described in Chapter 3.

- The Legalization of Marijuana in Colorado: The Impact, Rocky Mountain HIDTA, Oct 2017 [409]
  - Marijuana-related traffic deaths when a driver was positive for marijuana more than doubled from 55 deaths in 2013 to 123 deaths in 2016. During the same time, all traffic deaths increased 16 percent.
  - In 2009, Colorado marijuana-related traffic deaths involving operators testing positive for marijuana represented 9 percent of all traffic fatalities. By 2016, that number doubled to 20 percent.
  - The report covers only marijuana, not other drugs responsible for DUID. The data above come from NHTSA FARS reports, which is primarily from coroners' tests. Until

2013, NHTSA required that THC and carboxy-THC be categorized together, even though carboxy-THC is the inactive metabolite of THC. Furthermore, NHTSA cautions that a positive marijuana result does not necessarily mean that the driver was impaired by marijuana. None of the cadavers were cited for DUI. NHTSA has cautioned (DOT HS 812 072, November, 2014) against relying upon FARS reports for many drugged driving studies, since FARS was never designed to capture drug data as well as it captures alcohol data.

- Like the CDPHE report, "Monitoring the Health Concerns Related to Marijuana in Colorado," this report deals exclusively with marijuana which limits its usefulness in understanding the broader problem of DUID.
- 14. Berning A. Marijuana, Other Drugs and Alcohol Use by Drivers in Washington State. NHTSA DOT HS 812 299, July 2016 [347]
  - NHTSA offered to fund this study in Washington and Colorado to establish a baseline prior to implementation of marijuana legalization. Only Washington accepted the offer.
  - This was a voluntary, anonymous roadside study to assess the prevalence of drivers testing positive for alcohol and other drugs, including marijuana. Three time periods were studied: before legalization of marijuana, 6 months after legalization, and 1 year after legalization.
  - The percentage of THC-positive daytime drivers doubled after legalization.
  - Although 41.8% of Washington's marijuana users report using marijuana once a month or less, 24.6% report using marijuana five or more times per week.
- 15. Banta-Green C. Cannabis Use among Drivers Suspected of Driving Under the Influence or Involved in Collisions: Analysis of Washington State Patrol Data, AAA Foundation for Traffic Safety, May, 2016 [339]

The study examined drivers from 2005-2014 involved in collisions and/or arrested for DUI who also had blood evidence. It describes prevalence of THC alone and in combination with alcohol and other drugs, relationship between time to draw blood and THC levels. Lack of data and changes in procedures and staffing made it difficult to evaluate the effect of marijuana legalization. Nevertheless, the findings indicate that THC-involved driving is relatively common, appears to be increasing and is likely underestimated due to the protracted time between incident and the time a blood specimen is obtained to determine drug presence. For drivers arrested following a collision, 11% were positive for THC as well as other substances and an additional 4% were positive for THC only.

16. Migoya D. Traffic fatalities linked to marijuana are up sharply in Colorado: Is Legalization to blame? Denver Post August 25, 2017 [408]

In 2016, of the 115 drivers in fatal wrecks who tested positive for marijuana use, 71 were found to have Delta-9 tetrahydrocannabinol, or THC, the psychoactive ingredient in marijuana, in their blood, indicating use within hours, according to state data. Of those, 63 percent were over 5 nanograms per milliliter, the state's limit for driving.



17. Stewart K. High claims. Insurance Institute for Highway Safety Vo 52 No 4 June 22, 2017 [396]

Colorado saw the biggest estimated increase in claim frequency compared with its control states. The combined effect for the three states was smaller but still significant at 3 percent. The combinedstate analysis is a good representation of the effect of marijuana legalization overall, while the single-state analyses show how the effect can vary from state to state.

18. Grondel D, Hoff S, Doane D. Marijuana Use, Alcohol Use, and Driving in Washington State. Washington Traffic Safety Commission. April 2018 [465]

> Washington has done a commendable job collecting and publishing DUID data. They use a single toxicology lab for blood testing all DUI suspects in the state. Since January 1, 2013 the Washington State Patrol lab has been testing all blood samples for both drugs and alcohol. When reporting THC results, they report active THC separately from its inactive metabolite. As advanced as their lab is, they have no means to link test results to judicial outcomes as Colorado is now doing pursuant to HB17-1315.

> See Table 3 on page 18 for a data summary. The April 2018 update to their October 2015 WTSC report focuses on polydrug impaired drivers that are now the most prevalent type of impaired drivers involved in fatal crashes. In 2016 the number of polydrug drivers were more than double the number of alcohol-only drivers and five times higher than the number of THC-only drivers involved in fatal crashes.

The report does an excellent job analyzing the varying results from epidemiological studies and is a good complement to the analysis done in Chapter Three of this book. The report also contains an annotated bibliography that complements the one in Chapter Nine of this book.

On the down side, the report does not cover drugged driving data that does not involve marijuana.

## Cannabis reports

- 19. Logan B. An Evaluation of Data from Drivers Arrested for Driving Under the Influence in Relation to *per se* Limits for Cannabis, AAA Foundation for Traffic Safety, May, 2016 [335]
  - Results of two studies:

     a controlled study of 602 drivers arrested for impaired driving in which only THC was present, and
     THC and other drugs present in 17,612 DUI cases, 13,988 of which were cannabinoid positive. Full DRE exam reports were assessed in the former study. There were minimal DRE performance differences between subjects < 5 ng/ml THC and those ≥5 ng/ml THC.</li>
  - "Based on this analysis, a quantitative threshold for *per se* laws for THC following cannabis use cannot be scientifically supported." 58.3% of 11,328 DUI cases confirmed positive for THC had levels below 5 ng/ml.
  - Marijuana is only one component of a larger DUID problem.
- 20. Huestis M. Effects of Cannabis With & Without Alcohol on Driving, ACMT Seminar in Forensic Toxicology, Denver, CO, December, 2015 [300]
  - Fatal crash driver culpability risk (Odds Ratio, or OR): Cannabis only, 2.3; Alcohol only, 9.4; Cannabis and Alcohol, 14.1 (From Biecheler 2008 report)
  - OR for fatal crash is similar for 1-3 ng/ml, 3-5 ng/ml, or >5 ng/ml
  - 5 ng/ml limit proposal was initially based on 2004-2005 studies
  - 76.5% of Cannabinoid-positive DUI suspects test below 5 ng/ml
  - Driving simulator study Standard Deviation of Lane Position (SDLP)
    - Only 81.2% of occasional smokers were ever ≥5 ng
    - But 16.7% of frequent smokers were ≥5 ng after 30 hours
    - At 13.1 ng/ml THC driver performance was similar to drivers with BrAC > .08, but that cannot be used to determine a *per se* limit, since in the real world, THC cannot be measured simultaneously with driving.
- 21. Huestis M. Acute vs Chronic Frequent Cannabis Intake, ACMT Seminar in Forensic Toxicology, Denver, CO, December, 2015 [299]
  - Attempts have been made to determine time of dosing based upon blood test results, but with only limited success.
  - Frequent cannabis smokers can become durably impaired, even after abstinence.

22. Banta-Green C. Overview of Major Issues Regarding the Impacts of Alcohol and Marijuana on Driving, AAA Foundation for Traffic Safety, March, 2016 [325]

A tabular comparison of alcohol and THC. The differences are so great as to prevent reliance upon DUI-alcohol methods to deal with DUI-THC, such as blood concentrations to determine levels of impairment.

23. Tefft BC, Arnold LS, Grabowski JG. Prevalence of Marijuana Involvement in Fatal Crashes: Washington 2010-2014 May 2016 AAA Foundation for Traffic Safety [337] Washington adjusted FARS data by analyzing only THC-positive drivers, not those positive for carboxy-THC. An average of 11.5% of drivers whose blood was tested for drugs between 2010 and 2013 had a THC concentration of 2 ng/mL or greater (range: 10.1% - 12.5%); that proportion increased to 17.1% in 2014.

## Oral fluid

- 24. Logan B. The Science of Oral Fluid Testing and its Current Applications in Drugged Driving Investigation, Interagency Task Force on Drunk Driving, Feb, 2014 [196]
  - Evaluation of 12 roadside oral fluid testing devices, ranking for cut-off, performance, reliability/robustness
  - Three viable options: Dräger DT5000, DrugWipe5, Alere DDS2
  - Sensitivity, Specificity, Accuracy, Positive Predictive Value and Negative Predictive Value for Dräger and DrugWipe devices for all rated drug classes compared with labbased oral fluid testing
  - Per se and zero tolerance laws are ineffective and unworkable for THC in states with legal medical or recreational marijuana. Impairment has to be demonstrated and documented, along with signs that relate it to cannabinoid ingestion. Oral fluid testing fulfills that final requirement.
- 25. California vs. Salas. Superior Court, Kern County, CA, November, 2015 [352] Transcript of Kelly hearing with respect to Dräger DT 5000. Affirms that evidence from the Dräger DT 5000 roadside oral fluid testing device is sufficiently reliable to be admitted to a jury.
- 26. Anderson W. Oral Fluid Drug Testing in DUID Cases NMS, 2013 [184]
  - This duplicates much of the Logan IATFDD presentation (#20)
  - Compares Dräger sensitivity, specificity and accuracy vs. both oral fluid laboratory testing and vs blood testing
  - Reports results of Los Angeles testing of Dräger device vs. laboratory oral fluid testing, showing excellent sensitivity and specificity; results support DRE opinions but sensitivity was poor for benzodiazepines and some opiates can be missed.
- 27. Flannigan J, Talpins S, Moore C. Oral Fluid Testing for Impaired Driving Enforcement. The Police Chief. January 2017 [406]

- Article discusses Frye/Daubert requirements for admissibility and recommends use of oral fluid roadside testing devices.
- On-site oral fluid testing devices are not perfect; however, they provide a viable and cost-effective way to identify drugged drivers proximate to the traffic stop. The authors recommend that officers screen all impaired drivers for drugs using on-site devices.

## Peer reviewed papers

#### **Policy recommendations**

 Logan BK, D'Orazio AL, Mohr ALA et al. Recommendations for Toxicological Investigation of Drug-Impaired Driving and Motor Vehicle Fatalities - 2017 Update. J Anal Tox, 2018; 42:63-68 [456]

Recommended Tier I (mandatory) and Tier II (optional) forensic toxicology tests and cutoff limits for blood, urine and oral fluid, for both screening and confirmation.

### **Drugged driving studies**

29. Gjerde H, Strand MC, Mørland J. Driving Under the Influence of Non-Alcohol Drugs – An Update Part I: Epidemiological Studies, *Forensic Science Review* 27:89; 2015 90-112 [287] The authors reviewed epidemiological studies published between 1998-2015, finding statistically significant associations between drug use and crashes in the following:

Benzodiazepines	25/28 studies
Cannabis	23/36 studies
Opioids	17/25 studies
Amphetamines	8/10 studies
Cocaine	5/ 9 studies
Antidepressants	9/13 studies

Generally, studies that did not find significant associations had poor statistical power or poor study design compared to those finding such associations.

30. Strand MC, Gjerde H, Mørland J. Driving Under the Influence of Non-Alcohol Drugs – an Update Part II: Experimental Studies, *Forensic Science Review* 28:79; 2016 80-101 [468] The authors reviewed experimental studies published between 1998-2015, finding significant psychomotor impairment after using the following: Benzodiazepines Cannabis Opioids GHB

#### Ketamine

Low doses of stimulants caused inconsistent responses, improving some driving skills but deteriorating others.

- Bogstrand S. Which drugs are associated with highest risk for being arrested for driving under the influence? A case-control study, *Forensic Science International*, 240 (2014) 21-28 [210]
  - Marijuana-impaired driving is a minor component of a larger DUID problem.
  - A very practical study of 2,738 drivers arrested for DUI compared with 9,375 controls in Norway. Both groups were tested using blood or oral fluid. THC was the most prevalent drug in both groups. Amphetamine/methamphetamine was the most prevalent drug in drivers involved in crashes. Single-use substances that gave the highest odds ratio for police arrest were amphetamine/methamphetamine and benzodiazepines, most due to non-therapeutic use of medicinal drugs purchased on the illegal market. Polydrug use had higher odds ratio than single use drugs and polydrug combinations with amphetamine/methamphetamines or benzodiazepines gave the highest risk.

Bogstrand -	2014		DRUID - 2011	<u>.</u>	
Arrest risk	OR	Substance	Risk level	Risk	Substance group
Low	<15	Single use of codeine, diazepam, MDMA, methadone, THC, nitrazepam or zopiclone	Slightly increased risk	1-3	Alcohol <.05 BAC, Cannabis
Medium	15-49	Single use of morphine/heroin or oxazepam. Combinations of THC + one benzo drug.	Medium increased risk	2-10	Alcohol < .08 BAC benzoylecgonine, cocaine, illicit opiates, benzodiazepines and Z-drugs, medicinal opioids
High	50- 100	Single use of alprazolam, amphetamine, clonazepam or methamphetamine. Combination of amphetamine /methamphetamine and THC	Highly increased risk	5-30	Alcohol <.12 BAC, alcohol in combination with drugs, Amphetamines
Very high	>100	Combinations of amphetamine /methamphetamine + benzo(s). Two or more medical drugs.	Extremely increased risk	20- 200	Alcohol ≧.12 BAC, alcohol in combination with drugs

• This paper revised the risk classification estimate made in 2011 by the European DRUID conference. Both are shown below for comparison:

32. Wood E. DUID prevalence in Colorado's DUI citations, J of Safety Research, 2016 [326]

- Drugged driving was a frequent cause of 2013 DUI citations in cases charged with vehicular homicide or vehicular assault (30%);
- Polydrug use (19.3%), rather than marijuana alone (1.8%), was the most common cause of drugged driving citations in vehicular homicide and vehicular assault cases;
- Current warrant procedures render blood tests meaningless in cases of marijuanaimpairment.
- Of the 222 defendants charged with vehicular homicide or vehicular assault, 78.4% were also charged with DUI.

33. Drummer OH, Yap S. The involvement of prescribed drugs in road trauma. Forensic Sci Int'l 2016 Aug; 265: 17-21 [443]

Fatal crash study in Victoria, Australia from 2006 – 2013. Crash risk was elevated for drivers using cannabis (by presence of THC in blood at>2ng/mL) and amphetamines. These data show that drivers using medicinal drugs alone are unlikely to show significant crash risk even if drugs are potentially impairing.

34. Brady JE, Li G. Prevalence of alcohol and other drugs in fatally injured drivers. Addiction 2013 Jan; 108 (1): 104-114 [440]

FARS study 2005-2009. More than half of fatally injured drivers in the United States had been using alcohol or other drugs and approximately 20% had been using polydrugs.

35. Romano E, Pollini R. Patterns of Drug Use in Fatal Crashes. Addiction 2013 August; 108(8) 1428-1438 [442]

FARS analysis 1988-2010. Fatal single vehicle crashes involving drugs are less common than those involving alcohol and the characteristics of drug-involved crashes differ depending upon drug class and whether alcohol is present. Concerns about drug-impaired driving should not detract from the current law enforcement focus on alcohol-impaired driving.

36. Scherer M. Latent Classes of Polydrug Users as a Predictor of Crash Involvement and Alcohol Consumption [475]

This is a companion study to #7 above, and shares some of the same limitations with that study, but makes an important contribution. All polydrug users are not equally risk. The authors identified four classes: marijuana-amphetamines, benzodiazepine-antidepressants, opioid-benzodiazepines, and marijuana-cocaine. Only the opioid-benzodiazepine class were significantly more likely to be involved in a crash.

37. Elvik R. Risk of road accident associated with the use of drugs: a systematic review and meta-analysis of evidence from epidemiological studies. Accid Anal Prev 2013 Nov 60:254-67 [109]

Drug	Crash severity	Best estimate of relative risk adjusted for publication bias	95% confidence interval
Amphetamine	Fatal	5.17	(2.56, 10.42)
	Injury	6.19	(3.46, 11.06)
	Property damage	8.67	(3.23, 23.32)
Analgesics	Injury	1.02	(0.89, 1.16)
Anti-asthmatics	Injury	1.31	(1.07, 1.59)
Anti-depressives	Injury	1.35	(1.11, 1.65)
	Property damage	1.28	(0.90, 1.80)
Anti-histamines	Injury	1.12	(1.02, 1.22)
Benzodiazepines	Fatal	2.30	(1.59, 3.32)
	Injury	1.17	(1.08, 1.28)
	Property damage	1.35	(1.04, 1.76)
Cannabis	Fatal	1.26	(0.88, 1.81)
	Injury	1.10	(0.88, 1.39)
	Property damage	1.26	(1.10, 1.44)
Cocaine	Fatal	2.96	(1.18, 7.38)
	Injury	1.66	(0.91, 3.02)
	Property damage	1.44	(0.93, 2.23)
Opiates	Fatal	1.68	(1.01, 2.81)
	Injury	1.91	(1.48, 2.45)
	Property damage	4.76	(2.10, 10.80)
Penicillin	Injury	1.12	(0.91, 1.39)
Zopiclone	Fatal	2.60	(0.89, 7.56)
	Injury	1.42	(0.87, 2.31)
	Property damage	4.00	(1.31, 12.21)

See #50 for the author's revision of this paper, published comments, and a further re-analysis by the author.

38. Li, Guohua & Brady, Joanne & Chen, Qixuan. (2013). Drug use and fatal motor vehicle crashes: A case-control study. Accident; analysis and prevention. 60C. 205-210. [445] NHTSA has conducted several roadside surveys of alcohol drug use, beginning in 1973. For the first time in 2007, the survey also included studies of illegal drugs, prescription drugs and over-the-counter medicines. 10,909 drivers were randomly stopped at 300 sites across the nation for a volunteer survey. 7,719 volunteered to participate and to provide oral fluid drug testing samples. These constituted the controls in this case-control study.

The 737 study subjects were FARS fatalities in the continental US at the same times and dates as the control samples. Study subjects had drug testing done on blood samples.

Drug prevalence and Odds Ratios of drug classes were determined, as well as Odds Ratios of drug positive, alcohol positive and positive for both. Alcohol presence was rated as positive if the BAC was .01 gm/dL or higher.

Prevalence of drugs detected and crude Odds Ratios and 95% Confidence Intervals of
fatal crash involvement according to drug category, in the continental United States
selected time periods on Fridays and Saturdays, July 20 through December 1, 2007.

. . . . .

Drug Category	% of Cases (n=737)	% of Controls (n= 7719)	Crude OR <sup>a</sup>	95% CI
Marijuana	9.8	5.6	1.83	1.39, 2.39
Narcotics	4.8	1.6	3,03	2.00, 4.48
Stimulants	9,4	2,8	3,57	2.63, 4.76
Depressants	5.2	1.1	4,83	3.18,7.21
Polydrug <sup>b</sup>	7.1	2.2	3,41	2,43, 4,73

OR-Odds Ratio; CI- Confidence Interval;

<sup>a</sup> Drivers who tested negative for the specific drug category were used as the reference group;

<sup>b</sup> Two or more non-alcohol drugs.

Estimated Odds Ratios and 95% Confidence Intervals of fatal crash involvement according to alcohol and drug testing results, the continental United States, selected time periods on Fridays and Saturdays, July 20 through December 1, 2007.

Testing Result			
Alcohol	Drug	Estimated OR	95% CI
Negative Positive Negative Positive	Negative Negative Positive Positive	1.00 13.64 2.22 23.24	Reference 11.12, 16.72 1.68, 2.92 17.79, 30,28

OR-Odds Ratio; CI-Confidence Interval;

Marijuana was the most common drug found in fatal crashes, followed by stimulants (e.g. cocaine, methamphetamine), and polydrug. Depressants (e.g. benzodiazepines) had the highest odds ratio, followed by stimulants and polydrug. Marijuana's odds ratio was the lowest of the categories at 1.83.

Drivers positive for drugs and alcohol had nearly double the OR of drivers positive for alcohol alone.

#### Cannabis studies

39. Hartman R. Cannabis effects on driving lateral control with and without alcohol, *Drug and Alcohol Dependence*, (2015) [278]

This is a study of 18 occasional marijuana smokers using the high fidelity, fullmotion driving simulator in Iowa. The study found that both cannabis and alcohol increased SDLP, a measure of lane weaving. "Blood THC concentrations of 8.2 and 13.1 ng/ml ... increased SDLP similar to .05 and .08 BAC." The authors cautioned, "In authentic DUIC cases, measured THC concentrations do not reflect those present during driving," indicating that these levels cannot be used as *per se* legal limits. 40. Hartman R. Effect of Blood Collection Time on Measured Δ9-Tetrahydrocannabinol Concentrations: Implications for Driving Interpretation and Drug Policy, *Clinical Chemistry*, 62:2 367-377 (2016) [322]



This paper was written partially in response to inaccurate media reporting of the results of the above author's Iowa driving simulator study. Forensically-determined THC levels cannot indicate THC levels at the time of the incident leading to an arrest for DUI. 18 subjects were tested with both alcohol and vaporized THC. THC levels dropped an average of 73% within 25 minutes after beginning inhalation (range 3.3% - 89.5%), and 90% an hour later. Alcohol, on the other hand is cleared from blood much more slowly and retrograde extrapolation can be employed if needed. So forensically-determined alcohol levels can indicate alcohol levels at the time of the incident. This cannot be done with THC.

41. Wood E. Delays in DUI blood testing: Impact on cannabis DUI assessments, *Traffic Injury Prevention*, 2016 [269]

Average time from law enforcement dispatch to blood draw in cases of vehicular homicide and vehicular assault was 2.32 hours. With such delays, blood testing in these cases would be unlikely to confirm that drivers who are impaired have THC levels above 5 ng/ml.

- 42. Urfer S. Analysis of Δ9-tetrahydrocannabinol Driving Under the Influence of Drugs Cases in Colorado from January 2011 to February 2014, *J of Analytical Toxicology*, 2014 [223]
  - The percentage of law enforcement cases requesting cannabinoid screens increased from 28% to 35%.
  - The percent of cannabinoid screens positive for THC was 62%, with no significant change over the years.
  - The percent of positive cannabinoid screens confirmed positive at or above 2 ng/ml increased significantly from 28% to 65%.
  - The median time between traffic stop and time of draw was 1.05 hours for cases with positive cannabinoids.
- 43. Vandrey R. Pharmacokinetic Profile of Oral Cannabis in Humans: Blood and Oral Fluid Disposition and Relation to Pharmacodynamic Outcomes, *J of Analytical Toxicology*, Feb 2017 [381]

- After 10, 25 or 50 mg THC doses of marijuana edibles, THC levels in blood never reached 5 ng/ml for any of the 18 subjects tested, even though all subjects claimed the doses affected them and some were so affected by THC that two vomited and one could not complete any assessments. Two subjects completed the study with no detectable THC blood levels after 10 mg doses.
- Blood THC levels are useless to determine impairment or even presence of THC when the source of the THC was an edible.
- 44. Hartman R. Drug Recognition Expert (DRE) examination characteristics of cannabis impairment, *Accident Analysis and Prevention*, 92 (2016) 219-229 [330]
  - This is a very important study that confirmed the concern raised by Papafotiou and others in 2005 that Standardized Field Sobriety Tests (SFSTs) designed to test and confirm alcohol impairment, are only modestly successful in confirming marijuana impairment. This study was undertaken in cooperation with NIH and the International Association of Chiefs of Police to determine reliable metrics to identify cannabis-driving impairment.
  - DRE exams were done on 302 cannabis-only DUI cases from 2009-2014 from 9 states including Colorado (14 cases, including 5 with a red card), compared with 302 controls. The following combination of tests resulted in >96.7% sensitivity, specificity, positive and negative predictive value and efficiency to identify marijuana impairment: ≥2/4 of: ≥3 FTN misses, MRB eyelid tremors, ≥2 OLS clues, ≥2 WAT clues. The most common reason to pull over a driver was speeding. Only one was driving too slowly. There was no significant difference in either violations or test scores between drivers who tested above or below 5 ng/ml THC.
- 45. Declues K. A 2-Year Study of Δ 9-tetrahydrocannabinol Concentrations in Drivers: Examining Driving and Field Sobriety Test Performance, J of Forensic Sciences, Nov 2016 [367]
  - No correlation between performance on field sobriety tests (SFST) and blood THC concentration was found in the range between 2 ng/ml and 30 ng/ml.
  - Average time between first law enforcement contact and blood draw was 2.5 hours unless a DRE evaluation was required, in which case the average was 3.2 hours.
  - The most common causes for apprehending a marijuana-impaired driver were speeding and inability to maintain lane position.
- 46. Bosker W. Psychomotor Function in Chronic Daily Cannabis Smokers during Sustained Abstinence, *PLOS One*, 2013 [122]

Performance on critical tracking and divided attention was assessed in 19 chronic, daily marijuana smokers during 21 days of continuously monitored abstinence, using non-intoxicated occasional marijuana users as controls. At baseline, chronic users were significantly impaired compared to controls (p<.001). Performance improved over three weeks, but did not recover to the equivalent performance of the control group.

47. Hartman R. Controlled Vaporizer Administration: Blood and Plasma Cannabinoids with and without Alcohol, *Clinical Chemistry*, 61:6 850-869 (2015) [277]

Tested 19 subjects with both alcohol and vaporized THC, measuring THC in whole blood after dosing. After 2 hrs, only 20% of subjects exceeded 5 ng/ml, 80% exceeded both the 2 ng/ml and 1 ng/ml cutoff limits. Some subjects exceeded all cutoff limits after using only placebo.



48. Bergamashi M. Impact of Prolonged Cannabinoid Excretion in Chronic Daily Cannabis Smokers' Blood on Per Se Drugged Driving Laws, *Clinical Chemistry*, 2013 [118]

Thirty chronic daily marijuana smokers (median 9 joints per day) had daily cannabinoid blood tests while residing on a restricted facility to prevent further use of marijuana. Cannabinoids can be detected in the blood of chronic users during one month of sustained abstinence. Positive results were obtained using research laboratory methods that reported positive THC above 0.25 ng/ml, compared with 1 ng/ml for most US forensic laboratories. All subjects had THC ≤ 1 ng/ml after 7 days. THC levels can return after testing negative.



49. Couper F. The Prevalence of Marijuana in Suspected Impaired Driving Cases in Washington State., *J of Analytical Toxicology*, 2014;38:569-574 [383]

Positive THC blood tests in DUI cases increased from 19.1% to 24.9% between pre & post legalization, but before licensure of commercial recreational marijuana establishments. Since 2013, all blood samples were drug tested for amphetamines, barbiturates, benzodiazepines, cannabinoids, cocaine metabolite, methadone, opiates, phencyclidine, propoxyphene and tricyclic antidepressants, not just for alcohol. 47% of confirmed positive THC cases tested below 5 ng. 50. Davis K, Allen J, Duke J, et al. Correlates of Marijuana Drugged Driving and Openness to Driving While High: Evidence from Colorado and Washington. PLoS One v.11(1); 2016: e0146853 [455]

"Increased perceptions that driving while high is unsafe was associated with significantly lower willingness to drive after using marijuana while increased knowledge of marijuana DUI laws was not associated with these outcomes."

51. Rogeberg O, Elvik R. The effects of cannabis intoxication on motor vehicle collision revisited and revised. Addiction 111, 1348-1359 (2016); Gjerde H, Morland J. Risk for involvement in road traffic crash during acute cannabis intoxication. Addiction. 2016;111(8):1492-1495; Rogeberg O, Elvik R. Response: cannabis intoxication, recent use and road traffic crash risks Addiction. 2016;111(8):1495-1498 [423] [453] [454]

"Acute cannabis intoxication is associated with a statistically significant increase in motor vehicle crash risk." Authors recalculated estimates from 18 other studies and determined the overall OR to be 1.35 with a random-effects model.

If 2/3 of subjects in the studies were not impaired, that would imply an OR for acutely impaired drivers to be 2.1, according to Rogeberg. "We find that the average OR of acutely intoxicated drivers is unlikely to be substantially above 2."

52. Newmeyer MN, Swortwoot MJ, Barnes AJ et al. Free and Glucuronide Whole Blood Cannabinoid's Pharmocokinetics after Controlled Smoked, Vaporized, and Oral Administration in Frequent and Occasional Users: Identification of Recent Cannabis Uptake. Clinical Chemistry 62:12 1579-1592 (2016) [437]

Cannabigerol and Cannabinol are recent use cannabis markers after cannabis inhalation, but their absence does not exclude recent use.

53. Lemos NP, San Nicolas AC, Volk JA et al. Driving Under the Influence of Marijuana vs Driving and Dying Under the Influence of Marijuana: A Comparison of Blood Concentrations of Δ9 THC and Other Cannabinoids in Arrested vs Deceased Drivers. J Anal Tox 2015; 39:588-601 [434]

The analysis of variance between living and deceased drivers' cannabinoid concentrations showed that THC-OH and THC-COOH concentrations are not statistically different between the two groups, but that THC concentrations are statistically different, making it difficult to directly correlate PM with antemortem THC concentrations between living and deceased drivers.

54. Santaella-Tenorio J, Mauro CM, Wall MM et al. US Traffic Fatalities, 1985-2014, and Their Relationship to Medical Marijuana Laws. Am J Public Health (2017) 107: 336-342 [422] Analyzed FARS data from 1985-2014. "On average, MML states had lower traffic fatality rates than non-MML states. However, state-specific results showed that only 7 out of 23 states experienced post-MML reductions." "Total traffic fatalities" is a very blunt tool to measure the impact of medical marijuana laws. State variations in FARS reporting minimizes the validity of studies such as this. See Martin, #57.

55. Aydelotte JD, Brown LH, Luftman KM et al. Crash fatality rates after recreational marijuana legalization in Washington and Colorado. Am J Public Health (Aug 2017) 107 (8) 1329-1331 [421]

Compared FARS data from 2009 – 2015 for WA and CO compared to 8 states without either legal or recreational or medical marijuana. "Three years after recreational marijuana legalization, changes in motor vehicle crash fatality rates for Washington and Colorado were not statistically different from those in similar states without recreational marijuana legalization."

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

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

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

56. van Wel JHP, Kuypers KPC, Theunissen EL et al. Single doses of THC and cocaine decrease proficiency of impulse control in heavy cannabis users. Brit J of Pharmacology (2013) 170; 1410-1420 [419]

> "Heavy cannabis users display impairments in a broad range of neuropsychological domains during THC intoxication. Impairments observed in psychomotor tasks, but not in impulsivity tasks, appeared smaller in magnitude as compared with those previously reported in occasional cannabis users. The reduction in proficiency in impulse control may put drug users at increased risk of repeated drug use and addiction."

 Desrosiers NA, Ramaekers JG, Chaucchard E. Smoked Cannabis' Psychomotor and Neurocognitive Effects in Occasional and Frequent Smokers. J Anal Tox 2015; 39: 251-261 [416]

> "Occasional smokers had significantly more difficulty compensating for Critical Tracking Task tracking error compared with frequent smokers 1.5 h after

smoking. Divided attention performance declined significantly especially in occasional smokers. Cannabis smoking impaired psychomotor function, more so in occasional smokers, suggesting some tolerance to psychomotor impairment in frequent users."

58. Martin JL, Gadegbeku B, Wu D. Cannabis, alcohol and fatal road accidents. PLOS One (2017) 12(11) : e0187320. [414]

A study of 4,059 French drivers in 2011. "Drivers under the influence of cannabis multiply their risk of being responsible for causing a fatal accident by 1.65 (1.16-2.34), and the proportion of fatal accidents which would be prevented if no drivers ever drove under the influence of cannabis is estimated at 4.2% (3.7%-4.8%)."

59. Li, G. Role of alcohol and marijuana use in the initiation of fatal two-vehicle crashes, Annals of Epidemiology, 2017 [393]

> Data on 14,742 culpable and 14,742 nonculpable drivers in the same fatal twovehicle crashes were assessed for association of driver use of alcohol, marijuana or both with fatal crash initiation, adjusting for demographic variables. Marijuana *alone* had an OR of 1.62 alcohol *alone* had an OR of 5.37 and both combined had an OR of 6.39. Conclusion – both marijuana and alcohol increase the likelihood of a crash, with alcohol being much more dangerous. The combination of the two increases the OR by less than the OR of marijuana times the OR of alcohol.

60. Chihuri S, Li G, Chen Q. Interaction of marijuana and alcohol on fatal motor vehicle crash risk: a case-control study. Injury Epidemiology (2017) 4:8 [410]

Using 2006-2009 FARS for 1,944 study subjects compared to 7,719 controls from the 2007 National Roadside Survey, authors four O.R. for fatal crashes were 1.54 for cannabinoids, 16.33 for alcohol and 25.09 for both combined.

61. Bondallza P, Favrat B, Chtioui H et al. Cannabis and its effects of driving skills. Forensic Sci Int'l 268 (2016) 92-102 [386]

Swiss literature review, incorporating results from the DRUID study. "Results presented in this review show a cannabis-induced impairment of actual driving performance by increasing lane weaving and mean distance headway to the preceding vehicle. Acute and long-term dose-dependent impairments of specific cognitive functions and psychomotor abilities were also noted, extending beyond a few weeks after the cessation of use. Although the correlation between blood or oral fluid concentrations and psychoactive effects of THC needs a better understanding, blood sampling has been shown to be the most effective way to evaluate the level of impairment of drivers under the influence of cannabis. The blood tests have also shown to be useful to highlight a chronic use of cannabis that suggests an addiction and therefore a long-term unfitness to drive.

62. Wettlaufer A, Florica R, Asbridge M et al. Estimating the harms and costs of cannabisattributable collisions in the Canadian provinces. Drug and Alcohol Dependence 173 (2017) 185-9190 [372]

"Cannabis-attributable traffic collisions were estimated to have caused 75 deaths (95% CI: 0–213), 4,407 injuries (95% CI: 20–11,549) and 7,994 people (95% CI: 3107–13,086) were involved in property damage only collisions in Canada in 2012, totaling \$1,094,972,062 (95% CI: 37,069,392–2,934,108,175) with costs being highest among younger people."

 63. Sewell RA, Schnakenber A, Elander J et al. Acute effects on THC on time perception in frequent and infrequent cannabis users. Psychopharmacology (Berl) 2013 Mar 226 (2) 401-413 [351]

> A psychoactive dose of THC increases internal clock speed as indicated by time overestimation and underproduction. This effect is not dose-related, and is blunted in chronic cannabis smokers, who did not otherwise have altered baseline time perception.

64. Ramaekers JG, van Wel JH, Spronk DB. Cannabis and tolerance: acute drug impairment as a function of cannabis use history. Scientific Reports Nature 6: 26843 (2016) [344] Executive function, impulse control, attention, psychomotor function and subjective intoxication were significantly worse after cannabis administration relative to placebo. Cocaine improved psychomotor function and attention, impaired impulse control and increased feelings of intoxication. Acute effects of cannabis and cocaine on neurocognitive performance were similar across cannabis users irrespective of their cannabis use history. Absence of tolerance implies that that frequent cannabis use and intoxication can be expected to interfere with neurocognitive performance in many daily environments such as school, work or traffic.

#### Oral fluid

65. Kelly-Baker T. Comparing Drug Detection in Oral Fluid and Blood: From a National Sample of Nighttime Drivers, *Traffic Injury Prevention*, 2013 [260]

"Oral fluid can be considered a reliable alternative to blood as a matrix for drug testing." Drug concentrations are typically higher in oral fluid than in blood.

66. Hartman R. Controlled vaporized cannabis, with and without alcohol: subjective effects and oral fluid-blood cannabinoid relationships, *Drug Testing and Analysis*, 2015 [311] Tested 18 subjects with both alcohol and vaporized THC. Oral fluid THC concentrations correlated (p<0.001) with blood THC concentrations, but they were not equal. 67. Logan B. Detection and Prevalence of Drug Use in Arrested Drivers Using the Dräger Drug Test 5000 and Affiniton DrugWipe Oral Fluid Drug Screening Devices, *J of Analytical Toxicology*, 2014; 1-7 [211]

Tested 91 suspects arrested for DUI in Miami, FL using two roadside oral fluid testing devices and confirmed by oral fluid and urine laboratory confirmation. Sensitivity, specificity and accuracy were determined for both devices for all drugs tested. The most frequently detected drugs were cannabinoids (30%), benzodiazepines (11%), and cocaine (10%). Of drivers with BAC>.08, 39% were also drug positive. Both devices performed comparably, but the Dräger device was more sensitive in detecting THC. The devices were less effective detecting benzodiazepines. Sensitivities were adequate (50-60%), with very high specificity (>96%).

68. Hartman R. Cannabinoid disposition in oral fluid after controlled vaporizer administration with and without alcohol, *Forensic Toxicology*, (2015) [276]

Oral fluid tested by Dräger DT 5000 and Quantisal laboratory assay after vaporized THC (2.9% and 6.7%). Oral fluid THC content was similar with both strengths of THC preparations, indicating likely self-titration. Concurrent alcohol did not affect oral fluid concentrations or Dräger sensitivity. With a THC confirmation cutoff of 5 ng/ml, Dräger sensitivity, specificity and efficiency were 60.8, 98.2, and 82.5%.

69. Van der Linden T. Roadside drug testing: Comparison of two legal approaches in Belgium, Forensic Science International, 249 (2015) 148-155 [261]

Belgium changed its DUID laws in 2009 from relying upon roadside impairment tests and roadside urine testing to roadside tests of recent drug use and roadside oral fluid testing (DrugWipe). They also cut drug *per se* limits for all drugs. For example, THC limits are now 1 ng/ml in plasma. The changes resulted in greater efficiency in DUID assessments and lower false positives that were detected upon confirmatory testing. For example, false positives for THC dropped from 24.8% to 8.6%, even though the advertised sensitivity of the Drugwipe device in 2009 was 20 ng/ml THC in oral fluid. The DrugWipe sensitivity has since been increased.

70. Langel K, Gjerde H, Favretto D et al. Comparison of drug concentrations between whole blood and oral fluid. Drug Testing and Analysis Sept 2013 V 6 No 5 pp 461-471 [441] Studied DUI arrestees and volunteers in four countries to determine oral fluid:whole blood concentration ratios for amphetamines 19-22, opioids 1.8-11, cocaine and metabolites 1.7-17, THC 14, benzodiazepines .035-.33. For all substances, except for lorazepam (R = 0.031) and THC (R = 0.030), a correlation between the oral fluid and whole blood concentrations was observed. Due to large variations seen here, drug findings in oral fluid should not be used to estimate the corresponding concentrations in whole blood (or vice versa). However, detection of drugs in oral fluid is a sign of recent drug use.

71. Gjerde H, Clausen GB, Andreassen E et al. Evaluation of Dräger Drug Test 5000 in a Naturalistic Setting. J Anal Tox 2018; 1-7 [436]

Results of Norwegian use of DT5000 since 2015. In cases with false-positive DDT5000 results compared to blood, traces of drugs were most often found in oral fluid. The DDT5000 did not absolutely correctly identify DUID offenders due to fairly large proportions of false-positive or false-negative results compared to drug concentrations in blood. The police reported that DDT5000 was still a valuable tool in identifying possible DUID offenders, resulting in more than doubling the number of apprehended DUID offenders.

72. Beirness DJ, Smith DR. An assessment of oral fluid drug screening devices. Canadian Society of Forensic Science Journal 2016 [364]

The Alere DDS 2<sup>®</sup>, Dräger DrugTest 5000<sup>®</sup> and Securetec DrugWipe 6S<sup>®</sup> devices were evaluated. Sensitivity exceeded 0.80 for cannabis, cocaine, methamphetamine, and opioids. False positive rates for these drugs/drug categories were all between 3% and 7%. Specificity exceeded 0.90 for all drugs/drug categories. These findings indicate that oral fluid screening could prove to be a valuable tool in the detection of driver drug use in Canada.

73. Hartman RL, Anizan S, Jang M et al. Dräger DrugTest 5000 On-Site Fluid Cannabinoid Screening Performance after Cannabis Vaporization [361]

The DDT-5000 demonstrated good specificity and efficiency for OF obtained after cannabis vaporization, but sensitivity was lower than after smoking a cannabis cigarette with the same THC potency (sensitivity 90.7% at THC≥2, Desrosiers *Clin Chem* 2012). Volatilization by hot air is a different heating mechanism than combustion, altering the properties of inhaled vapor versus smoke. Dräger collection involves moving the device throughout the entire mouth, whereas Quantisal devices are held sublingually. These and other factors may contribute to the observed sensitivity differences relative to smoking.

Quantitative Confirmation Cutoffs µg/L (THC) ng/L (THCCOOH)	Sensitivity %	Specificity %	Efficiency %	Median [Range] t <sub>last</sub> (h) Low <sup>a</sup> , High <sup>b</sup>	<i>p</i> -value (Low vs. High)
THC ≥5	61.4	98.1	82.5	3.33 <sup>a,b</sup> [0.17-≥8.33]	ns
$THC \ge 2$	48.0	99.6	70.4	3.33 <sup>a,b</sup> [0.17-≥8.33]	ns
THC ≥1	41.4	99.8	61.4	3.33 <sup>a,b</sup> [0.17-≥8.33]	ns
$THC \ge 2 + THCCOOH \ge 20$	49.5	81.4	72.4	3.33 <sup>a</sup> [0.17-≥8.33] 3.83 <sup>b</sup> [1.43-≥8.33]	ns
THC ≥1+THCCOOH ≥20	45.6	80.8	70.1	3.33 <sup>a</sup> [0.17-≥8.33] 3.83 <sup>b</sup> [1.43-≥8.33]	ns

## Part Four

# **Recommended Changes**

Colorado DUID victims: the impact of Colorado's laws

Colorado recommended changes

Rationale for recommendations

# Chapter 10 Colorado DUID victims: the impact of Colorado's laws

Following are accounts of dozens of Colorado DUID victims taken from court records, the words of the victims or their next of kin. After each story are changes to Colorado DUID laws that are recommended to address the issues discussed in each story. Refer to Chapters 11 and 12 for a discussion on the meaning of "Tandem *per se.*"

#### Steve and Patty Smith

Steve and Patty Smith were driving from Denver to their home in Wyoming in 2013 when Landra Fabrizius crossed into their lane at 80 MPH, killing them instantly. Fabrizius was also injured, which is why the Drug Recognition Expert at the scene was unable to complete a DRE assessment to confirm that she had been driving under the influence of drugs. DRE assessments of Romberg balance, Walk and turn, One leg stand and Finger to nose require that a subject be able to stand.

What evidence the DRE was able to collect convinced him that Fabrizius was DUID so, after conferring with his supervisor, he ordered the collection of a vial of blood. The blood was collected 5 hours after the collision. That length of delay is not unusual in fatal collisions, and is critical, since, unlike alcohol, drugs metabolize in a rapid, geometric rate. Fabrizius was charged with two counts of vehicular homicide and DUID.

Fabrizius's blood was tested and confirmed to contain 48 ng/ml of methamphetamine at the time of collection. Who knows how high it was at the time of collision?

The judge refused to allow admission of the laboratory evidence, on the grounds that the officers at the scene had no probable cause to collect the blood. With inadequate evidence that Fabrizius was on drugs, she escaped a DUID conviction.

Fabrizius was found guilty of two counts of vehicular homicide due to reckless driving, a Class 4 felony, and sentenced May 17, 2011 in Greeley to five years per homicide. Had Fabrizius been found guilty of vehicular homicide due to DUID, a Class 3 felony, her presumed sentencing range would have been double what she received.

*Recommendation: Mandatory admissible drug testing or all drivers in all crashes that result in death or serious bodily injury. Tandem per se.* 

#### Keri Phillips

On June 20, 2014 Keri was hit head-on by a 24-year old drug impaired driver whose license had been suspended due to prior DUI charges. At the time, Keri was on her way to play flute at the ordination mass for a priest at her church in Pueblo.

Keri sustained bruises, burns from the explosive charge of the air bag, a concussion and a shattered right knee cap. The surgeon was able to reconstruct about two-thirds of the knee cap; the rest was the consistency of sand.

Concerned citizens that initially reported the driver as a suspected DUI followed him and recorded his reckless driving with a cell phone camera all the way to the collision. The driver agreed to a voluntary blood draw which confirmed the presence of marijuana and opiates including morphine.

He was charged with DUI and vehicular assault due to DUI (Class 4 felony), and other charges. The court ruled that the sheriff's deputy did not have sufficient probable cause to request a blood draw, so that evidence became inadmissible. The driver then pled guilty to vehicular assault due to reckless driving (Class 5 felony), and sentenced to probation.

Recommendation: Mandatory admissible drug testing of all drivers in crashes resulting in death or serious bodily injury. Enhanced penalties for polydrug impairment. Tandem per se.

#### Tanya and Adrian Guevarra



Tanya Guevarra, 25, and her 5 week old son Adrian were driving to pick up a prescription in their home town of Dacono, Colorado. Steven Ryan hit them head-on, killing Tanya instantly, but Adrian suffered several days before dying. As is common after a fatal collision, four hours elapsed before a blood sample was taken from Ryan. The blood was tested and confirmed at 4 ng/ml THC.

Fortunately, this crash occurred before Colorado passed its 5 ng THC permissible limit law in 2013. Ryan admitted to driving under the influence of marijuana and accepted a plea agreement for one count of vehicular homicide due to DUID, saving him from the likelihood of being found guilty of two counts. Ryan's attorney argued during the sentencing hearing

that the judge should be lenient, because Ryan wasn't even driving under the influence. After all, he was below the 5 ng THC limit that was then being considered by the legislature. The judge was having none of it, saying he could only enforce the laws that had been passed and signed into law.

Tanya's family and DUID Victim Voices testified very effectively at the sentencing hearing, which convinced the judge to levy a sentence of 10 years for the single count of vehicular

homicide due to DUI (Class 3 felony). He was released to community corrections shortly after the 5 ng law was passed.

Recommendations: Replace the 5 ng/ml permissible inference law with a Tandem per se law.

### Melissa Gallagher

Melissa was a crossing the street at the intersection of Mulberry and Peterson at night in Fort Collins when she was struck and killed by Ryan Marsini (18) in 2010. In spite of an open bottle of liquor and Marisini's admission of using marijuana earlier under Colorado's medical marijuana law, no DRE was called in and no blood tests were taken. Marsini's passengers said he had been taking antidepressants. Marsini was issued a ticket for failing to wear a seat belt. He was arrested for illegal possession of marijuana in New Jersey a year later.

*Recommendations: Provide for additional DREs. Mandatory admissible drug testing in all cases of crashes involving death or serious bodily injury. Enhanced penalties for polydrug impairment.* 

## Sharon Moore

After killing Sharon Moore in Aurora in 2011, Makia Milton, a repeat DUI offender, said to police, "Well, I had some marijuana, but I have a card for it. I was involved in a crash, so what? I'm alive, so I'm lucky." Milton's blood, drawn two hours after the crash, had 11 ng/ml THC and the DRE at the scene determined that she was sufficiently impaired by marijuana that she could not drive safely. Nevertheless, Milton was convicted in Adams County of reckless vehicular homicide (Class 4 felony) but acquitted of DUI, vehicular homicide DUI (Class 5 felony), and vehicular assault DUI.

Recommendations: Mandatory admissible drug testing in all cases of crashes involving death or serious bodily injury or death. A Tandem per se law would have ensured a conviction of the higher charge.

## John Hines

Joshua Wittig admitted to self-medicating with marijuana, Xanax (a benzodiazepine), Valium (a benzodiazepine) and Percocet (an opioid) at the time of the crash that killed Hines in 2011. He was convicted of vehicular homicide DUI.

Recommendations: Enhanced penalties for polydrug impairment.

## Peter Deutz

Deutz was on his motorcycle when he struck John Spence, doing a U turn from the right lane on Federal Blvd. Spence was convicted of reckless vehicular homicide (Class 4 felony) and sentenced to four years in 2011. His blood had 6 ng/ml THC and 108 ng/ml carboxy-THC, indicating daily use, according to the toxicologist. The judge excluded testimony about prior drug use.

Recommendations: A Tandem per se law would have increased the likelihood of a conviction of the higher charge.

#### Maria Herrera-Octavio

Breana L Garcia's blood test showed a BAC of 0.19 and a positive cannabinoid screen after injuring Maria in 2012. Breana was convicted of reckless vehicular assault in Adams County, acquitted of DUI vehicular assault and sentenced to three years of probation.

Recommendations: Mandatory admissible drug test of all drivers in crashes that result in serious bodily injury. Enhanced penalties for polydrug impairment. Tandem per se.

#### William Aplin

Justin Hodson injured William in 2012. Hodson's blood was drawn 2 hours after the crash and tested at 4 ng/ml THC. DUI charges were dismissed and Hodson pled guilty to reckless vehicular assault (Class 5 felony), driving without a license, and T1 careless injury and 2 years of probation.

Recommendations: Replace the 5 ng/ml permissible inference law with Tandem per se. Quicker biological sampling with oral fluids. Change careless injury to a Class 6 felony.

#### Sean Marino

Sean injured 25 people in a multiple car crash which he initiated in 2012. His blood was drawn 3 hours after the crash with 9 ng/ml THC plus morphine, oxycontin, Percoset and Valium. DUI charges were dropped. He pled guilty to reckless vehicular assault and received 5 years of probation.

*Recommendations:* Quicker biological sampling with oral fluids. Enhanced penalties for polydrug impairment.

#### Verna Volker

Aaron Coapland injured Verna in Boulder in 2012. Blood was drawn 2½ hours after the crash with a 0.044 BAC and 3 ng/ml THC. DUI charges were dropped. Coapland pled guilty to reckless vehicular assault and received probation.

Recommendations: Replace the 5 ng/ml permissible inference law with Tandem per se. Quicker biological sampling with oral fluids. Enhanced penalties for polydrug impairment. Eliminate the statutory presumption of innocence for a BAC under .05 if other impairing drugs are also present.

#### Cassandra Bustillos

Conner Magill's blood was drawn in Boulder more than two hours after the crash that injured Cassandra in 2012. The blood had 8 ng/ml THC and over 100 ng/ml carboxy-THC. The DUI charge was dropped. Magill pled guilty to reckless vehicular assault and received probation.

Recommendations: Replace the 5 ng/ml permissible inference law with Tandem per se. Quicker biological sampling with oral fluids.

#### James Laurel

Burkie Espinoza's blood was drawn in Conejos County 110 minutes after the crash that injured James in 2012. The blood was positive for methamphetamine and 28 ng/ml carboxy-THC. The DUI charge was dropped. Espinoza pled guilty to reckless vehicular assault and received a sentence of four years in community corrections.

Recommendations: Tandem per se. Quicker biological sampling with oral fluids. Enhanced penalties for polydrug impairment.

#### Tyler Morris

Tyler injured Douglas Snyder, Christine Brewer and Marcie Chase in Jefferson County in 2012. Morris's blood was drawn for testing at 3½ after the crash. The blood tested positive for Clonazepam (a benzodiazepine), Zoloft (antidepressant) and Trazodone (antidepressant). The DUI charge was dropped. He pled guilty to reckless vehicular assault and was sentenced to three years in community corrections, enrollment in a drug offender program and was required to wear a SCRAM (transdermal alcohol monitoring system).

Recommendations: Quicker biological sampling with oral fluids. Tandem per se. Enhanced penalties for polydrug impairment. Eliminate the requirement for alcohol monitoring devices in cases where no alcohol was present.

#### Robert Gratz

Mark Hendrixson's blood was drawn in Routt County 3 hours 20 minutes after the crash that killed Robert in 2012. The blood had 8 ng/ml THC, 88 ng/ml carboxy-THC and had a BAC of 0.046. DUI charges were dropped. Hendrixson pled guilty to a T1 traffic offense of careless driving resulting in death and was sentenced to one year in jail.

Recommendations: Quicker biological sampling with oral fluids. Tandem per se. Enhanced penalties for polydrug impairment. Eliminate the statutory presumption of innocence for a BAC under .05 if other impairing drugs are also present. Change T1 "Careless driving resulting in death" traffic offense to a Class 5 felony.

#### <u>Travis Timm</u>

Zachary LeMasters' blood was drawn in Saguache County 3 hours 20 minutes after the crash that killed Travis in 2012. The blood was only tested for alcohol and showed a BAC of 0.143. LeMasters admitted to smoking a bowl of marijuana and taking a hit of LSD before driving. The DUI charge was dropped. LeMasters pled guilty to reckless vehicular homicide in exchange for a jail sentence of six months.

Recommendations: Quicker biological sampling with oral fluids. Mandatory blood tests upon arrest for DUI. Tandem per se. Enhanced penalties for polydrug impairment. Mandatory admissible drug test of all drivers in crashes that result in death.

#### Sandra Rivas

Unises Nuñez refused a to take SFST test or a chemical test for drugs after killing Sandra in Otero County. He admitted to smoking marijuana before the crash and the arresting officer noted signs of marijuana impairment. His DUI charge was dropped in exchange for a guilty plea to criminally negligent homicide (Class 5 felony) and a two year prison sentence.

Recommendations: Enable biological testing with oral fluids. Mandatory admissible drug test of all drivers in crashes that result in death. Mandatory drug tests upon arrest for DUI. Administrative License Revocation in cases of refusal to take a drug test. Mandatory admissible drug testing in all cases of crashes involving death or serious bodily injury

#### James Rollison

Ruth Ryan refused to take SFST test or a chemical test for drugs after injuring James in Arapahoe County in 2013. Nevertheless, she was found guilty of DUI and of reckless vehicular assault and sentenced to two years of probation. Her urine sample was positive for Tramadol (an opioid), Xanax (a benzodiazepine), and oxycodone (an opioid) in a pretrial test.

Recommendations: Enable biological testing with oral fluids. Mandatory admissible drug test of all drivers in crashes that result in serious bodily injuries. Administrative License Revocation in cases of refusal to take a drug test. Mandatory drug test upon arrest for DUI. Enhanced penalties for polydrug impairment.

#### Diondra J Gallegos

James Banker, Lonnie Fransua and Breann Perez were all injured in Jefferson County in 2013 by Diodra who, when "Orange Elephant" Sativa was found in her car, admitted to sharing a bowl with her passengers before driving. She pointed out to the officer, "That's not a drug, it's legit now." She was found guilty of DUI and reckless vehicular assault and sentenced to four years of probation.

Recommendations: Enable biological testing with oral fluids. Mandatory admissible drug test of all drivers in crashes that result in serious bodily injuries. Tandem per se.

#### Joan R Graber

Joan injured 5 victims in Jefferson County in 2013. Her blood was drawn at 4½ hours after the crash. Joan admitted to using Valium, Diazepam and Morphine. The DUI charge was dropped in exchange for a guilty plea of a T1 traffic offense, careless driving resulting in injury and one year probation.

Recommendations: Enable biological testing with oral fluids. Mandatory admissible drug test of all drivers in crashes that result in serious bodily injuries. Tandem per se. Enhanced penalties for polydrug impairment. Change careless assault to a Class 6 felony.
## Nicholette Mizak

Jack Johnson's blood was drawn 3 hours after the crash that injured Nicholette in Douglas County in 2013. The blood test was positive for THC and cocaine. Johnson was found guilty of DWAI and reckless vehicular homicide. He was sentenced to two years of probation.

Recommendations: Enable biological testing with oral fluids. Mandatory admissible drug test of all drivers in crashes that result in serious bodily injuries. Tandem per se. Enhanced penalties for polydrug impairment. Make vehicular assault due to DWAI a Class 4 felony, as it is already for vehicular assault due to DUI.

#### Michael Wheelhouse

Clarine M Leyba admitted to using methamphetamine and marijuana before injuring Michael in Jefferson County in 2013. She was found not guilty of DUI but guilty of reckless vehicular assault and was sentenced to two years of probation.

Recommendations: Enable biological testing with oral fluids. Mandatory admissible drug test of all drivers in crashes that result in serious bodily injuries. Tandem per se. Enhanced penalties for polydrug impairment.

#### Peyton Knowlton



Kyle Couch's blood was drawn 2 hours after the crash that killed Peyton. Officers at the scene found signs of impairment and cited Couch for DUI vehicular homicide. The blood test revealed 1.5 ng/ml THC and an alcohol level below Colorado's legal limit.

The Class 3 felony charge was dropped when Couch pled guilty to careless driving

resulting in death (a T1 traffic offense) which resulted in a 60-day jail sentence. He also pled guilty to using a false identity for purchase of alcohol and marijuana, resulting in an additional sequential 90-day sentence. That makes a total of 150 days in jail for killing an 8-year old girl who just celebrated her 2<sup>nd</sup> grade graduation.

Recommendations: Enable biological testing with oral fluids. Mandatory admissible drug test of all drivers in crashes that result in death. Tandem per se. Enhanced penalties for polydrug impairment. Eliminate the statutory presumption of innocence for a BAC under .05 if other impairing drugs are also present. Change T1 traffic offense "Careless driving resulting in death" to a Class 5 felony.

# Chapter 11 Colorado Recommendations

Several organizations have proposed model policies for consideration. These are described in Chapter 7. The broadest were those proposed by the Governors Highway Safety Association (GHSA) and the European Traffic Safety Council (ETSC), which included both proposed policies and proposed laws.

To the policies proposed by GHSA for Education, Training, and Prosecution and Adjudication we would add consideration of a mechanism to keep skills honed for ARIDE-trained officers. There are already requirements for officers to maintain their SFST skills through periodic training, and very stringent requirements to ensure DRE officers regularly demonstrate their proficiency. In contrast, after ARIDE training is provided to an officer, there are no required refresher courses or other provisions to ensure ARIDE skills remain sharp.

To the Research policies proposed by ETSC, we would add consideration of current strains and strengths of marijuana preparations commercially used, as well as new and increasingly popular modes of administration such as vaping and edibles.

But we will focus our attention in this chapter to three sections in the GHSA 2017 recommendations:

Laws and Sanctions – 8 proposals Testing – 4 proposals Data – 1 proposal

For each of these three sections we will propose legislative actions that ought to be considered by Colorado, in light of current data and past experiences of DUID victims.

## Laws and Sanctions

1. Redefine DUI for drugs

Table 14 in Chapter Six described the wide variation in DUI definitions. Although it may be easier to convict under a "affects the person to the slightest degree" definition than under an "incapable of safe driving" definition, this is rarely an issue for alcohol impairment. Alcohol *per se* laws make the definitions somewhat moot for alcohol.

That is not the case for drugs where no scientifically recognized non-zero *per se* limits have been or can be established. Lacking scientifically valid impairment-based *per se* limits, zero-tolerance laws or a Tandem *per se* law, prosecutors must prove impairment in order to convict. In those cases, the definition of impairment or "under the influence" is extremely significant.

Recognizing this dilemma, Vermont recently amended their DUI statute to define DUID different from DUI-alcohol (23 VSA 1201):

As used in subdivision (a)(3) of this section, "under the influence of a drug" means that a person's ability to operate a motor vehicle safely is diminished or impaired in the slightest degree. This subsection shall not be construed to affect the meaning of the term "under the influence of alcohol."

Prosecutors in Colorado can work with two different definitions, one for DUI, the other for DWAI:

(f) "Driving under the influence" [DUI] means driving a motor vehicle or vehicle when a person has consumed alcohol or one or more drugs, or a combination of alcohol and one or more drugs, that affects the person to a degree that the person is substantially incapable, either mentally or physically, or both mentally and physically, to exercise clear judgment, sufficient physical control, or due care in the safe operation of a vehicle.
(g) "Driving while ability impaired" [DWAI] means driving a motor vehicle or vehicle when a person has consumed alcohol or one or more drugs, or a combination of both alcohol and one or more drugs, that affects the person to the slightest degree so that the person is less able than the person ordinarily would have been, either mentally or physically, or both mentally and physically, to exercise clear judgment, sufficient physically, to exercise clear judgment, sufficient physically or physically, or both mentally and physically, to exercise clear judgment, sufficient physically and physically, to exercise clear judgment, sufficient physical control, or due care in the safe operation of a vehicle.

In drug cases, prosecutors may seek DWAI convictions rather than DUI convictions because of these differences. DWAI Sanctions for DWAI spelled out in C.R.S. 43-4-1307 are somewhat more modest than sanctions for DUI, but they are far stronger than the lack of sanctions that would occur in the case of no conviction.

Legislators should consider changing the definition of DUI for drugs to mirror the current DWAI definition as Vermont has done to more readily enable DUID convictions.

Alternatively, legislators may be satisfied with a DWAI conviction for drug-impaired drivers, and simply accept the lower sanctions compared with DUI.

If the latter approach is taken, one further problem must be addressed. Although DUI vehicular homicide is a Class 3 felony, DWAI vehicular homicide is not even a misdemeanor. Although DUI vehicular assault is a Class 4 felony, DWAI vehicular assault is not even a

misdemeanor. This problem can be readily fixed by reclassifying certain felonies and misdemeanors as suggested in #4 below.

2. Replace the 5 ng/ml permissible inference law with a Tandem per se law

It is evident that Colorado's 5 ng/ml permissible inference law must be changed for all the reasons described in Chapter 3. Alternative replacements are listed in the order of desirability:

- a. Tandem per se
  - A driver is guilty of DUID *per se* if the following sequence of events occurs:
    - a) An officer had probable cause, based on the driver's demeanor, behavior and observable impairment to believe that the driver was impaired; and
    - b) Proof that the driver had any amount of an impairing substance in their blood, oral fluid or breath.

This is consistent with recommendations from leading scientists<sup>106</sup> as well as legislation in Norway and Belgium. See Chapter 12 for a more complete discussion of Tandem *per se.* 

b. Zero tolerance

Sixteen states have zero drug tolerance laws for drivers, following the Department of Transportation drug tolerance policy for commercial drivers and other select employees. These zero tolerance laws vary widely from state-to-state but all are suitable substitutes for Tandem *per se*. Zero tolerance laws are very difficult to pass because of three common objections:

- The term "zero tolerance" is considered to be intolerant because it is.
- The public believes the levels should be like alcohol in that they prove impairment, whereas they are actually chosen politically without proof of impairment.
- Some of the public objects to a law that punishes the mere presence of a drug without regard to whether or not the individual was impaired. This objections persists, in spite of the fact that in zero-tolerance states, officers must have probable cause to believe the driver was impaired before collecting a blood sample for testing.

Tandem *per se* was created to overcome the above objections to zero tolerance.

- c. Revert to an impairment based law with a revised definition of impairment discussed in #1, combined with a zero tolerance for impairing drugs in drivers under the age of 21 (see #3 below). This is not a preferred option, but could be an acceptable temporary option until the political will enables adoption of either Tandem *per se* or zero tolerance.
- d. Non-zero per se limits for drugs

This cannot be realistically done for all the impairing drugs currently in use. Nevertheless, this approach has been taken, albeit poorly, by Virginia, Ohio and Nevada. It has been taken more logically by Norway (20 drugs) and England and Wales (16 drugs). Yet they were unable to establish appropriate levels for opioids that create such high tolerance/addiction rates that they defy establishing reasonable limits. This is less of a problem for them since they do not have the opioid addiction rates that we have in this country. Non-zero *per se* limits do not deal well with polydrug impairment which is more common than impairment by any single drug. These laws are also currently limited to blood testing that is likely to be joined by and perhaps replaced by oral fluid testing in some circumstances.

## e. The Canadian approach

Canada is currently considering bill C-46 that would establish zero tolerance for 8 impairing illegal drugs and a two-tier approach for marijuana's THC. A blood THC level  $\geq$ 2 ng/ml would be a minor offense resulting in a fine, whereas a blood THC level  $\geq$ 5 ng/ml would be a hybrid offense that could be prosecuted as a criminal offense. This has the following drawbacks:

- It does not address impairment by legal drugs.
- The THC two-tier system is confusing, contentious and will likely not survive a constitutional challenge.
- The 5 ng/ml limit has all the drawbacks previously discussed and summarized below.

## f. 5 ng/ml per se for THC

This is only very slightly better than a 5 ng/ml THC permissible inference law. It has the following drawbacks:

- 5 ng/ml is not a scientifically valid limit for impairment.
- The majority of marijuana-impaired drivers test below that limit.
- All drivers impaired by marijuana edibles test below that limit.
- This does not address or recognize that there are other causes of DUID.
- This does not deal with polydrug impairment.
- 3. Zero tolerance for minors

Modify the current CRS 42-4-1301 zero tolerance for alcohol in minor drivers to include zero tolerance for impairing drugs. Add the underlined portion to the current statute. This may not be necessary if the state adopts either a Tandem *per se* or a zero tolerance law.

It is a class A traffic infraction for any person under twenty-one years of age to drive a motor vehicle or vehicle when the person's BAC, as shown by analysis of the person's breath, is at least 0.02 but not more than 0.05 at the time of driving or within two hours after driving. It is a class A traffic infraction for any person under twenty-one years of age to drive a motor vehicle or vehicle when the person has any detectable level of impairing drugs in their blood, breath or oral fluid at the time of driving or within two hours after driving.

Washington has an Administrative License Revocation for minors with any level of THC in their blood. Minors driving after consuming marijuana or any controlled substance in South Dakota commit a misdemeanor.

4. Reclassify certain felonies and misdemeanors

Replace Careless driving resulting in death with Vehicular homicide due to careless driving. Replace Careless driving resulting in injury with Vehicular assault due to careless driving.

Table 15 Recommended reformy and misdemeanor reclassifications					
Law	Provision	Class	Sentence range	Recommend	
18-3-106	VH – DUI	Class 3 felony	4-12 years	Кеер	
18-3-106	VH – reckless	Class 4 felony	2-6 years	Кеер	
18-3-106	VH – careless	Class 5 felony	1-3 years	New	
42-4-1402	Careless death	T1 Traffic Offense	<1 year	Repeal	
42-4-1402	Careless assault	T1 Traffic offense	<1 year	Repeal	
18-3-205	VA – careless	Class 6 felony	1 – 1½ year	New	

|--|

Assuming Colorado retains its two-tier DUI/DWAI definitions, change 18-3-106 Vehicular Homicide and 18-3-205 Vehicular Assault to include DWAI:

Law	Provision	Class	Recommend
18-3-106	VH-DUI	Class 3 felony	Кеер
18-3-106	VH-DWAI	Class 3 felony	New
18-3-205	VA-DUI	Class 4 felony	Кеер
18-3-205	VA-DWAI	Class 4 felony	New

Table 16 – Recommended felony reclassifications assuming DWAI and DUI remain

- 5. Screening test parity alcohol and drugs
  - a. 42-4-1301 provides that an officer may conduct a preliminary screening test for alcohol if the officer has a reasonable suspicion that the driver was under the influence of alcohol. Amend this to permit a preliminary screening test for drugs if the officer has a reasonable suspicion that the driver was under the influence of drugs.
  - b. 42-2-126 permits the DMV to revoke a driver's license if a driver either refuses chemical testing or if the chemical test shows a BAC in excess of .08 per 42-2-126. Amend this to permit a revocation if a driver tests positive for drugs or refuses to be tested for drugs.
- Eliminate statutory presumption of innocence for BAC <.05 42-4-1301 (6)(a)(I) provides a statutory presumption of not guilty of DUI alcohol if the blood test is below .05 gm/dl alcohol. This should be amended to be limited to cases where alcohol is the only impairing drug confirmed.

- 7. Enhance penalties for polydrug impairment
  - In cases where a person has been convicted of DUI or DWAI due to two or more drugs, including alcohol, the sentence defined in 42-4-1307 should be amended to be the same as a driver who tested above 0.2 gm/dl alcohol, plus double the amount of fine and double the amount of useful public service.
- 8. Drug-specific prevention sanctions
  - a. Eliminate the use of ignition interlocks in cases of DUI or DWAI when there is no evidence of alcohol use.
  - b. Eliminate the use of transdermal alcohol sensing devices in cases of DUI or DWAI when there is no evidence of alcohol use.

## <u>Testing</u>

- 1. Mandatory evidentiary drug testing
  - Evidentiary drug testing shall be performed on the blood or oral fluid of any driver who tests positive for drugs on a preliminary roadside screening test.
  - Evidentiary drug testing shall be performed on the blood or oral fluid of all drivers involved in any crash which results in either death, serious bodily injury, or both.

See Chapter 12 for a more complete discussion of mandatory drug testing.

- 2. Implement oral fluid testing
  - Roadside non-quantitative preliminary oral fluid testing devices may be used by officers if the officer has reasonable grounds to believe that the driver may be impaired by drugs. This shall parallel the similar provisions for preliminary breath testing.
    - Results of non-quantitative oral fluid testing shall guide officers in evidence collection.
    - Roadside non-quantitative oral fluid testing results shall not be admissible in trial.
  - Evidentiary laboratory oral fluid testing may be used in lieu of blood evidentiary testing to prove the presence of an impairing substance.

See Chapter 12 for a more complete discussion of oral fluid testing.

- Electronic warrants to reduce blood collection delays Electronic warrants are in use in Larimer County to shorten the time required to obtain a warrant used to compel a blood draw. Encourage use of this technology in all jurisdictions who have a need for it.<sup>107</sup>
- 4. Testing to be performed per National Safety Council recommendations.<sup>108</sup> The National Safety Council's Alcohol, Drugs and Impairment Division published a 2017 update to their recommended Tier I (mandatory) and Tier II (optional) drugs to be tested for in DUI and fatal crash cases, with recommended laboratory sensitivity levels for blood, oral

fluid and urine. These recommendations should be followed as a minimum by laboratories providing services to law enforcement agencies in Colorado.

## <u>Data</u>

 Incorporate evidence collected at the scene of an arrest in DCJ report GHSA recommends that states "Track DUID and DUI separately in crash, arrest, licensing, and court data to the extent possible." NHTSA further recommends "States should develop record systems that distinguish among alcohol, drugs, or both for impaired driving cases. These records should be integrated into computerized data systems of statewide arrest records, the court record systems, and motor vehicle records. One way to accomplish this would be to have separate offenses for driving impaired by alcohol and driving impaired by drugs. "

DCJ's report pursuant to HB17-1315 is a model to build upon and may become recognized as the premier such report in the nation. It is destined to improve as further drug testing is performed and recorded, and data systems can better link between relevant agencies.

But there is a glaring absence of impairment data in the DCJ report. The DCJ report relies on toxicology data. Toxicology proves what drugs were present, but does not prove impairment. None of the evidence collected at the scene of an arrest that proves impairment by alcohol, drugs or both is included in the DCJ report. NHTSA's suggestion that the state incorporate separate offenses for driving impaired by alcohol and driving impaired by drugs would be a great start to obtaining this data for analysis, but Colorado prosecutors do not favor this solution.

There should be a mechanism created to incorporate relevant evidence to support charges of impairment in the DCJ report.

# Chapter 12 Rationale for proposed transformative changes

The recommendations in Chapter 11 fall into two categories:

- 1. Transformative changes
  - Amend 5 ng/ml permissible inference law
  - Mandatory drug testing in select cases
  - Implement oral fluid testing
- 2. Improvements
  - Everything else

Following are the reasons to support the proposed transformative changes.

## Change 5 ng/ml permissible inference to Tandem per se

It is quite clear from the evidence presented in Chapter 3 and the DCJ report that the 5 ng/ml permissible inference law in Colorado is a mistake and it must be replaced with a better answer to our DUID problem. In Chapter 11, we list 6 alternatives to a 5 ng/ml permissible inference law, only two of which are recommended, and a third is described as an acceptable temporary option.

Most of the alternatives are quite familiar, but the leading alternative, Tandem *per se* is a newly coined term for a familiar concept, so a few words of explanation are in order. The concept was described in the American Automobile Association press release of May 10, 2010:<sup>109</sup>

AAA is urging states to use more comprehensive enforcement measures to improve road safety. Rather than relying on arbitrary legal limits, states should use a two-component system that requires (1) a positive test for recent marijuana use, and most importantly, (2) behavioral and physiological evidence of driver impairment. This system would rely heavily on two current law-enforcement training programs: Advanced Roadside Impaired Driving Enforcement (ARIDE) and the 50-state Drug Evaluation and Classification (DEC) program. These programs train law enforcement officers around the country to more effectively recognize drug-impaired driving.

The press release extract above summarized a more lengthy description below, also focusing only on marijuana, in the publication by the AAA Foundation for Traffic Safety:<sup>110</sup>

In the absence of a scientifically based cannabis per se law, there are several options. One is to train officers to detect the signs and symptoms of cannabis use in drivers stopped at roadside. Initial suspicion of cannabis use would lead to a field sobriety test (SFST). This

process could be coupled with rapid, on-site oral fluid screening for evidence of drug use. The technology to detect certain drugs (including cannabis) in a specimen of oral fluid quickly at roadside is improving and could be used in a manner comparable to preliminary breath testing devices currently used to test for alcohol. The suspect would then be taken for a complete drug evaluation by a DRE. This approach requires enhancing the complement of DRE officers available to conduct assessments for impairment.

The DEC approach, however, does have limitations, including the availability of DRE certified officers to attend and evaluate subjects in a timely manner. The IACP 2014 DRE Section report indicates that in 2014, there were 26,471 enforcement evaluations performed in the United States by 5,098 DRE officers representing 2,176 police agencies or locations [29]. Agency policy of when DREs respond, interagency collaborations in providing DRE officers to cover each other's' cases, and DRE availability late at night when many of these arrests are made, all may limit the availability of a DRE to respond. In addition, the DEC program requires recertification every two years, and not all officers recertify.

The most succinct version of the recommendation was published in the Santa Fe New Mexican when that state considered and then rejected adoption of a 5 ng/ml THC *per se* limit:<sup>111</sup>

We believe that a much better alternative to choosing an arbitrary drug *per se* level above zero is the Tandem *per se* approach, which requires a sequence of events to prove the crime of driving under the influence of drugs *per se*. Using this approach, a person would be guilty of driving under the influence of drugs *per se* if:

- An officer had probable cause, based on the driver's demeanor, behavior and observable impairment to believe the driver was impaired; and
- The driver had any amount of an impairing substance in his/her blood, oral fluid or breath.

The Tandem *per se* approach is similar to the zero-tolerance approach used by the 16 states which also require probable cause to test blood for drugs, except Tandem *per se* requires the probable cause to be based on driver symptoms. Tandem *per se* was devised to overcome the following common objections to zero-tolerance laws:

- The term "zero tolerance" is considered to be intolerant because it is.
- The public believes the levels should be like alcohol in that they prove impairment, whereas they are actually chosen politically without proof of impairment
- Some of the public objects to a law that punishes the mere presence of a drug without regard to whether or not the individual was impaired. This objections persists, in spite of the fact that in zero-tolerance states, officers must have probable cause to believe the driver was impaired before collecting a blood sample for testing.

## Mandatory drug testing in select cases

The need for this may be less clear than the need for replacing the 5 ng/ml permissible inference law.

Mandatory evidentiary drug testing is proposed in two situations:

• When a driver tests positive for drugs in a preliminary drug test; and

• For all drivers involved in crashes resulting in death or serious injury.

If preliminary roadside oral fluid drug tests are implemented as described below, requiring an evidentiary test in case of a positive reading is a natural logical extension. If a preliminary roadside drug test is negative for drugs, an evidentiary test may not be required unless there is evidence of impairment by drugs not included in the preliminary screen, since roadside drug screening devices cannot test for all classes of drugs.

The State of Washington has been testing all blood samples of DUI suspects for both alcohol and drugs since 2013. About 30% of DUI suspects are blood tested, the remaining are breath tested only. Orange County, California began the same policy of testing all blood samples for drugs in 2017.

There are two reasons to require mandatory drug tests in cases of crashes and serious injuries:

- To provide justice to victims. Victim stories in Chapter 10 repeatedly show the anguish caused to victims and their families when evidence to convict a driver of drugged driving was not collected, pursued, or admitted into evidence. All too often either drug tests were not performed, or if performed, they were not admissible due to lack of adequately documented probable cause to require the chemical test.
- 2. The vast majority of crashes resulting in either vehicular homicide or vehicular assault charges are due to impaired drivers. In a Colorado study of 2013 vehicular homicide and vehicular assault cases, 78.4% were also charged with DUI.<sup>112</sup> Half of the remaining drivers were charged with hit and run, frequently the result of someone trying to avoid a DUI charge.

Since the overwhelming proportion of vehicular homicide and vehicular assault cases are caused by impaired driving, mandatory chemical testing of drivers would pose little inconvenience and would have the following advantages:

- Shorten time between a crash and collecting a biological sample since time to establish and document grounds to request a sample would not be needed; and
- Reduce ambiguity about the admissibility of laboratory tests in court cases.

## Implement oral fluid testing

Although Australia published its standard for oral fluid testing for roadside DUI testing in 2005 (AS4760)<sup>113</sup>, oral fluid testing is still an emerging technology in the United States. It is being used on an evaluation basis in numerous locations around the US but so far its use has been statutorily mandated only in five counties in Michigan as a pilot program.

As a relatively new technology, the scientific literature is fairly recent and because terminology can be inconsistent, care must be exercised when interpreting published conclusions. Some refer to this technology as saliva testing or oral swab testing.

Although the terms are frequently used interchangeably, they are not identical. Saliva is the ultrafiltrate of plasma produced by the salivary glands. Oral fluid is predominantly saliva but also contains contaminants in the mouth left from eating, drinking, smoking and breathing. An oral swab is a common device used to obtain oral fluid for testing. All oral fluid tests do not rely upon swabs. The swab is not tested; the oral fluid obtained by the swab is tested.

*The Police Chief* issued a succinct recommendation on the use of oral fluids last year in an article co-authored by a DRE, a prosecutor and a toxicologist,<sup>114</sup> all highly respected in their fields of expertise:

"On-site oral fluid testing devices are not perfect; however, they provide a viable and costeffective way to identify drugged drivers proximate to the traffic stop. The authors recommend that officers screen all impaired drivers for drugs using on-site devices. It is also recommended that jurisdictions consider replacing blood and urine testing with oral fluid laboratory tests for four reasons.

First, as noted above, McNeely and Birchfield make it difficult for officers to obtain blood (and possibly urine) samples without a warrant. However, those same cases suggest that oral fluid testing doesn't carry those legal challenges.

Second, officers can collect evidentiary samples for submission to the laboratory at roadside, which minimizes the possibility that the DUI subjects will eliminate the drugs from their system.

Third, positive oral fluid test results of a parent drug indicate recent usage only, potentially correlating to the duration of drug effect, and do not indicate use from days ago.

Fourth, it appears that states may criminalize oral fluid test refusals, unlike blood tests, thus increasing test compliance rates."

This recommendation makes a clear distinction between two types of oral fluid testing:

1. Preliminary non-quantitative tests done at the roadside

These use commercially available devices from companies such as Abbott/Alere, Dräger, and SecureTec/DrugWipe. The devices screen for typically 6-8 classes of drugs and provide a positive/negative screening result in 10 minutes or less. The top devices test for most common drugs: THC (they can discriminate between THC and inactive carboxy-THC), opioids, cocaine, methamphetamine, and benzodiazepines.

2. Evidentiary tests

Oral fluid can be collected with a number of commercially available sampling devices. The oral fluid is then transferred to a forensic toxicology laboratory that can test for drug presence and concentration, just as if it were a blood sample.

Preliminary drug tests can perform the same function for drug assessment that PBTs (Preliminary Breath Tests) do for alcohol assessments. They can guide the officer in collecting

appropriate evidence for a trial. The results may not admissible at trial. However one court in California has permitted the results from a Dräger device to be admitted into evidence.<sup>115</sup>

It is important to understand that oral fluid devices neither attempt to nor claim to do any of the following:

1. Test for all drugs

See below for a summary of drugs detected with leading commercial devices.

2. Prove impairment

PBTs also don't prove alcohol impairment. Evidentiary blood tests don't prove impairment either, but they can prove violation of a DUI *per se* statute. Impairment is proven by evidence collected at the scene of an incident. Chemical tests, whether they be roadside or evidentiary laboratory tests either indicate or prove the chemical cause of the impairment that is otherwise observed and documented by police at the scene of an incident.

3. Correspond to blood test results

Drug levels are different in different body fluids and tissues. The difference in concentration of a drug between blood and oral fluids varies by drug. For example, THC levels are higher in oral fluid than in the brain, higher in the brain than in blood, and higher in blood than in urine. One cannot expect an oral fluid result to correspond to a blood test, just as a blood test does not correspond to what really matters, which is the level in the brain.

There are dozens of commercially available devices designed for roadside testing, all using similar well-established immunoassay technology, but with different design features, specifications and limitations. Table 17<sup>116</sup> shows the drugs tested by many of these devices.

Device	Drugs Screened
Dräger	Amp, mAmp, Coc, Opi, THC, Benzos, MDN
Oratect	Amp, mAmp, Coc, Opi, THC, PCP
OraScreen	Amp, mAmp, Coc, Opi, THC
DrugWipe	Amp/mAmp, Coc, Opi, THC, Benzos
iScreen	Amp, mAmp, Coc, Opi, THC, PCP
OraLine	mAmp, Coc, Opi, THC
Oral Q	mAmp, Coc, Opi, THC, Oxy, Benzos
Oral Stat	Amp, mAmp/MDMA, Coc, Opi, THC, Benzos, MDN, PCP, Barbs, PPX
ToxSure	Amp, mAmp, Coc, Opi, THC, Benzos
Alere	Amp, mAmp, Coc, Opi, THC, Benzos
Saliva Scan	Amp, mAmp, Coc, Opi, THC, Benzos, MDN, Bup
Xalex	Amp, mAmp, Coc, Opi, THC, PCP

Table 17 Drugs Tested by Roadside OF Devices

Logan. IATFDD. 2014

All devices check for the major drugs of interest in Colorado, THC, methamphetamine, opioids, benzodiazepines and cocaine. Some also check for phencyclidine, methadone, barbiturates and other drugs as well.

THC tests are specific for delta 9-THC with limited cross-reactivity to carboxy-THC.

Most scientific testing of roadside devices in the US, Canada, Australia and Europe has been done on three of the above devices that have been rated the highest for sensitivity, performance and robustness. These three are shown in Table 18 with the manufacturers' stated "cutoff" value.

Analyte	DDT 5000 Cut-offs (ng/mL)	DrugWipe Cut-offs (ng/mL)	Alere DDS2 Cut-offs (ng/mL)	NMS Labs Screen (ng/mL)
Amphetamine	50 (Amp)	60 (Amp)*	50 (Amp)	20 (Amp)
Methamphetamine	35 (mAmp)	60 (mAmp)*	50 (mAmp)	20 (Meth)
Benzodiazepines	15 (Diaz)	10 (Diaz)	20 (Temaz)	5 (Diaz)
Opiates	20 (Morphine)	10 (Morphine)	40 (Morphine)	20 (Morphine)
Cocaine	20 (Coc)	10 (Coc)	10 (BE)	20 (Cocaine)
Cannabinoids	5 (THC)	20 (THC)	25 (THC)	4 (THC)
Methadone	20 (Methadone)	-	15 (Methadone)	50 (Methadone)

Table 18 Comparison of sensitivities

The common term "cut-off" has been widely misinterpreted. For example, the Dräger DT 5000 reports a "cut-off" of 5 ng/ml THC. First of all, this does not equate to 5 ng/ml in whole blood since THC is far more highly concentrated in oral fluid than in blood. Secondly, these are all analog devices and do not have a "cut-off" sensitivity in the way we might think of it in a digital world. The devices don't count or measure molecules of the drug being assayed. They measure the brightness of a dye that attaches to the target molecule and then correlate that brightness with a specific drug concentration level. The distinction was clarified by Dr. Kristian Lettau of Dräger at a Kelly-Frye hearing in Kern County, California.<sup>117</sup>

The immunoassay is manufactured or is set in such a way that the boundary, which is called the cutoff, and at this amount of drug you have basically a probability that 50 percent that the drug is in the sample, but the further away you move from this boundary, the more sure you are that the drug is really there. We manufacture our tests at this plus or minus 50% of this cutoff concentration.

Table 19<sup>118</sup> shows typical ratios between the concentration found in oral fluid versus blood.

Logan. IATFDD. 2014

## Table 19 Oral fluid/blood ratio (dependent on various factors)

Substance	n	ratio
Amphetamine	158	16
Cocaine	40	30
Codeine	26	6.8
MDMA	54	3.3
Morphine	17	2.7
Nordiazepam	65	0.02
THC	323	16-20

For THC 1 ng/mL blood  $\approx$  16-20 ng/mL oral fluid

So 10 ng/mL oral fluid is actually (on average) < 1 ng/mL Drummer. Standards Australia Forum. 2013

Other researchers have reported different ratios of THC concentrations in oral fluid compared to whole blood from 9.4<sup>119</sup> to 14<sup>120</sup> to 44<sup>121</sup>. Figure 25<sup>122</sup> graphically shows how variable this can be with vaped marijuana with and without alcohol.





The variability between oral fluid concentrations of a drug and blood concentrations do not indicate that oral fluid testing is inaccurate. It simply reflects normal biological variability. In fact, oral fluid testing devices are remarkable accurate as indicated by Table 20.<sup>123</sup>

	Sensitivity	Miss rate	Specificity	False alarm Rate	Predictive Value	Accuracy
THC	0.869	0.131	0.955	0.045	0.922	0.923
N = 323	(0.789 - 0.918)	(0.079 - 0.207)	(0.917 - 0.973)	(0.022 - 0.086)	(0.853 - 0.961)	(0.886 - 0.948)
Cocaine	0.846	0.154	0.993	0.007	0.990	0.926
N = 256	(0.770-0.900	(0.096 - 0.235)	(0.960 - 0.999)	(0.00 - 0.045)	(0.938 - 0.999)	(0.884 - 0.953)
Amphetamine	0.771	0.229	0.964	0.036	0.923	0.895
N = 306	(0.683 - 0.839)	(0.156 - 0.322)	(0.928 - 0.983)	(0.015 - 0.075)	(0.845 - 0.966)	(0.854-0.926)
Methamphetamine	0.840	0.160	0.965	0.035	0.965	0.899
N = 306	(0.776 - 0.889)	(0.109 - 0.227)	(0.920 - 0.985)	(0.013 - 0.084)	(0.915 - 0.987)	(0.858 - 0.929)
Opioids	0.899	0.101	0.931	0.069	0.795	0.924
N = 301	(0.805 - 0.950)	(0.036 - 0.164)	(0.891 - 0.957)	(0.041 - 0.112)	(0.787 - 0.943)	(0.913-0.968)
Benzodiazepines	0.592	0.408	0.976	0.024	0.918	0.855
N = 241	(0.480-0.696)	(0.298 - 0.527)	(0.939 - 0.990)	(0.008 - 0.065)	(0.795-0.973)	(0.802-0.895)
All Drug Categories	0.874	0.126	0.932	0.068	0.965	0.892
N = 641	(0.838-0.903)	(0.097-0.162)	(0.886 - 0.961)	(0.039-0.114)	(0.940 - 0.980)	(0.865-0.915)

Table 20	Performance measures (with 95% CI) of 3 OF screening	g devices
		Positive

Bierness.CSFS Journal. 2016

When evaluating devices like this, scientists are careful to distinguish between the terms sensitivity, specificity, accuracy and positive predictive value, defined in Table 21<sup>124</sup>.

	Table 21 "Accuracy" terms	
Condition	Defined as	Calculated as
Verified positive (VP)	'True Positive'; a positive finding in the field test confirmed positive by the confirmatory test.	-
Verified negative	True Negative'; a negative finding in the field test	-
(VN) Additional finding (AF)	confirmed negative by the confirmatory test. (False Negative'; a positive finding from the confirmatory test not predicted by the field test	-
Unconfirmed	'False Positive'; a positive finding from the field	_
positive (UP) Sensitivity	test not confirmed by the confirmatory test. Proportion of subjects who subsequently test positive in a confirmatory test whose positive status was correctly predicted by the field test	VP/(VP + AF)
Specificity	Proportion of subjects who subsequently test negative in a confirmatory test whose negative status was correctly predicted by the field test	VN/(VN + UP)
Accuracy	Overall proportion of subjects whose drug status as determined by a subsequent confirmatory test was correctly predicted by the field test.	(VP + VN)/(VP + VN + AF +
PPV	Proportion of subjects whose field test correctly predicted they would test positive in the	VP/(VP + UP)
NPV	Proportion of subjects whose field test correctly predicted they would test negative in the confirmatory test.	VN/(VN + AF)
	LUgan. J Anar TUX. 2014	

Rather than accuracy, the terms of greatest interest from a policy standpoint are sensitivity and specificity. Sensitivity tells us how likely the device is to be able to detect the presence of a substance, and specificity tells us how likely that a true negative sample would be determined to be negative by the device.

Table 19 shows *pooled* results for the Dräger, Alere/Abbott and DrugWipe devices, since the objective of the published study that created Table 19 was not to compare devices but rather to determine if the core technology used in the three leading devices was "ready for prime time." Results show that the devices are not perfect, but are comparable in usefulness to PBT tests. They also are very unlikely to identify a positive drug presence in a driver that would test negative in a confirmatory laboratory test. The devices are most sensitive for THC, opioids and cocaine, and least sensitive for benzodiazepines.

Norway implemented an impairment law on DUID in 1959, requiring documentations of clinical impairment in addition to positive drug test result. They have established *per se* limits on 20 drugs, including 1.3 ng/ml THC in whole blood. Since 2015 they have been using 25 Dräger DT 5000 devices to improve their management of DUID. Gjerde reports<sup>125</sup> that the devices are a valuable tool in identifying impaired drivers, resulting in a more than doubling the number of DUID offenders.

## About the author:

Ed Wood founded DUID Victim Voices in honor of his son Brian, killed at age 33 by drug impaired drivers (two at the wheel of the same vehicle). He learned first-hand that laws designed to ensure justice in cases of alcohol-impairment don't work well in many cases of drug-impairment.

Wood has a B.S. in Chemistry from Harvey Mudd College, an MBA from University of Colorado and became the founding CEO of COBE BCT. Wood has worked with victims, prosecutors, defense attorneys, judges, clinicians, drug recognition experts, law enforcement officers, toxicologists, legislators, state officials, and an international list of researchers and other specialists in his quest to increase public knowledge about DUID. He has four peer-reviewed publications and wrote the 2017 law requiring Colorado to begin collecting and reporting data on drug-impaired driving.

DUID Victim Voices provides education and promotion of effective laws to reduce Driving Under the Influence of drugs. Wood seeks to provide a scientifically-based perspective from DUID Victims. See <u>www.duidvictimvoices.org</u> for further information.

DUID Victims who wish to have their voices heard are urged to contact Ed Wood at ed@duidvictimvoices.org.

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