Marijuana and Driving: The Two are Dangerous, Combined ... Fatal

Phillip A. Drum, Pharm. D., FCSHP
May 25, 2016
2016 Nevada Traffic Safety Summit
PS: blood THC = 3.2 ng/ml drawn 3 hr 13 minutes after incident which includes DRE evaluation time
Outline

- Drug - THC amounts, effects, metabolism, elimination, levels, physiological & psychological effects
- Marijuana products
- Driving - prevalence, symptoms, studies, impact in CO and WA, Global, DUI process, DRE evaluation examples, blood levels and draw times, MJ legal status and driving laws, McNeely, economic cost
Marijuana

- Aka: weed, pot, grass, reefer, ganja, chronic, Mary Jane
- *Cannabis sativa*
- leaves, stems, seeds, flowers
- Hash/hashish/hash oil - stronger forms
- Cannabinoid receptors - CB1
  - hippocampus, cerebellum, cerebral cortex, basal ganglia
  - influence memory, concentration, coordination, sensory and time perception
- main active chemical: delta-9-tetrahydrocannabinol (\(\Delta 9\) THC or THC)
  - Over 60 cannabinoid compounds/400 chemicals in marijuana
    - Some psychoactive (eg. THC), several *not* psychoactive (THC-COOH, CBD)
  - Smoking in 1960-70’s 0.5-3% THC, now 10-28%+ THC, e cigs 80-95% THC
MJ Metabolism/Excretion

Metabolism
- Psycho-inactive metabolite (COOH-THC) = Carboxy-THC (do not bother measuring/monitoring for DUI purpose - waste of money)
- Psycho-active metabolite (11-OH-delta-9-THC) = Hydroxy-THC
- half-life of THC is approximately 1.6 - 4 hours
  - 80-90% removed from blood in 1-2 hours
  - some storage in lipid (fat), brain and muscle tissue
  - crosses blood brain barrier

Excretion
- 30 - 60% in feces
- 40 - 70% in urine
THC, 11-OH-THC (hydroxy), THC-COOH (carboxy)

Inhaled marijuana

Oral marijuana

NOTE: Unlike alcohol which has a standard (zero-order) elimination rate - 0.015 gm%/hr, marijuana does NOT has a consistent rate of elimination

“High” feeling after IV, Inhaled, Oral - MJ

Figure 3. Time course of subjective effects following three modes of administration. Subjects rated their “high” on a 0 to 10 scale (estimated from figures of Hollister et al. 1981 and Ohlsson et al. 1980).

“High” feeling after Oral MJ compared to THC plasma levels

Figure 4. Phase plots of subjective high vs. plasma THC levels after oral ingestion of 15 mg THC in a chocolate cookie from 0 to 360 minutes (estimated from figures by Hollister et al. 1981 with some extrapolated data). The maximum THC plasma concentration (5.7 ng/mL) was reached after 60 minutes, while the maximum subjective high (compare to Figure 3) was noted 2-4 hours after ingestion.

THC in saliva

![Graph showing THC concentrations in saliva over time.]

**Figure 6.** Mean THC concentrations by GC-MS-MS in saliva samples collected simultaneously from the left and right sides of the oral cavity of 10 chronic and casual users of marijuana following smoking of a single marijuana cigarette. Error bars represent the standard error of the mean, the dotted line indicates the 0.5 ng/mL cutoff (from Niedbala et al. 2001).

## Marijuana Testing

<table>
<thead>
<tr>
<th>Test Matrix / Analyte</th>
<th>Invasiveness</th>
<th>Advantages</th>
<th>Disadvantages</th>
<th>Use for Traffic Impairment Testing</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Blood</strong></td>
<td>Highly invasive</td>
<td>Established methodology and quality control</td>
<td>Delay between detention and sample collection</td>
<td>Confirmation of impairment following positive roadside screening (e.g., saliva)</td>
</tr>
<tr>
<td>• THC</td>
<td></td>
<td>Correlation with impairment during later phase of high</td>
<td>Elevated baseline in frequent users =&gt; potential for false positives</td>
<td>Potential use in predictive models in combination with THC concentration</td>
</tr>
<tr>
<td>• THC-COOH</td>
<td></td>
<td>High analyte levels, long detection window</td>
<td>No correlation with impairment, particularly for frequent users</td>
<td>None</td>
</tr>
<tr>
<td><strong>Urine</strong></td>
<td>Intrusion of privacy</td>
<td>Established methodology and quality control, on-the-spot collection possible</td>
<td>Pharmacokinetics and analytical methods not well established</td>
<td>Potential future use for screening and/or confirmation of impairment</td>
</tr>
<tr>
<td>• THC</td>
<td></td>
<td>Apparently reasonable correlation with blood TIC and impairment</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• THC-COOH</td>
<td></td>
<td>High analyte concentrations</td>
<td>No correlation with impairment, particularly for frequent users</td>
<td>None</td>
</tr>
<tr>
<td><strong>Saliva</strong></td>
<td>Non-invasive</td>
<td>Difficult to adulate, reasonable correlation with blood levels and impairment</td>
<td>High interindividual variability, results influenced by external factors, sampling devices and immunoassay subject to inaccuracies</td>
<td>Point of collection screening method for impairment</td>
</tr>
<tr>
<td>THC</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Sweat</strong></td>
<td>Non-invasive</td>
<td>Difficult to adulate. Long window of detection</td>
<td>No correlation with impairment, large interindividual variation in sweating</td>
<td>Point of collection screening method for impairment</td>
</tr>
<tr>
<td>THC/11-OH-THC</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Hair</strong></td>
<td>Non-invasive</td>
<td>Long window of detection</td>
<td>No correlation with impairment, potential for external contamination</td>
<td>None</td>
</tr>
<tr>
<td>THC-COOH</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Marijuana - Physiologic Effects

- **Brain**
  - Slowed reaction time, increased appetite/”munchies”, HA

- **Heart**
  - Increased heart rate & blood pressure

- **Lungs**
  - Respirations (3-5x tar & carbon monoxide), 50-70% more cancer causing materials, coughing, bronchitis

- **Eyes**
  - Red eyes, lack of convergence, eyelid tremors

- **Gastrointestinal**
  - Dry mouth

- **Sexual**
  - Lowers testosterone, decrease libido, reduced fertility
Marijuana - Psychological Effects

- disoriented time, hallucinations
- paranoia, panic attacks, anxiety, aggression, euphoria
- Magical or “random” thinking, loss short term memory, depression, apathy, difficulty concentrating
- causal factor with schizophrenia
- addiction - psychological and physiological
  - Withdrawal - HA, shakiness, sweating, stomach ache, restless, decreased appetite, anger, aggression, anxiety, wt loss, tremors
  - Onset: within hours/2-3 days; Duration: days/1-2 weeks
- frequent use of high conc THC strains in adolescence/young adulthood raises risk of psychotic symptoms

Illicit Drug Use/MJ Use: in US by age 12 or older (2014 data)

- Illicit drugs: marijuana, psychotherapeutics, inhalants, hallucinogens
- Marijuana is the #1 illicit drug of use in 12 yo and older
- Marijuana accounts for 80% of all illicit drug use (19.8 million used in last month, compare to all illicit drug 24.6 million)

<table>
<thead>
<tr>
<th>Issue</th>
<th>12-17 yo</th>
<th>18-25 yo</th>
<th>26 yo +</th>
</tr>
</thead>
<tbody>
<tr>
<td>Illicit Drug Use in Past Month 2013 in US</td>
<td>8.8 %</td>
<td>21.5 %</td>
<td>7.3 %</td>
</tr>
<tr>
<td>Marijuana Use in Past Month 2014 in US</td>
<td>7.2 %</td>
<td>19.3 %</td>
<td>6.1 %</td>
</tr>
</tbody>
</table>

Source: SAMHSA, National Survey on Drug Use and Health 2014.
REAL Medical Marijuana - FDA-approved products

- **dronabinol** (Marinol®, generic) - CS III
  - \(\Delta 9\) THC
  - Use: increase appetite, nausea and vomiting associated w/ chemotherapy, HIV weight loss

- **nabilone** (Cesamet®, generic) - CS II
  - synthetic cannabinoid, mimics THC
  - Use: nausea and vomiting associated w/ chemotherapy

- Neither commonly used due to antiemetics and anti-retrovirals (anti-AIDS) medicine FDA-approved in the 1990’s

- **(Non-US approved) nabiximols** (Sativex®)
  - Oral sublingual spray
  - \(\Delta 9\) THC and cannabidiol
  - In Phase II and III studies in US: MS spasticity, cancer pain

We **DO** have approved THC products since **1985** - they are just **NOT** “marijuana”

MJ Product Availability

This is a Controlled Substance for "medical purposes"...

Where's the Child-Proof containers????
What is the Equivalence of FDA-approved THC products to one of these “medical” products?

Dank Grasshopper 420 mg THC per bar - “Extremely Potent!”

42 (10 mg) capsules = one bar

Does this seem reasonable?

Of course NOT ...
It’s for my medical condition.

(Commonly known as I-get-high-a-lot-itis)
“It’s Natural”  “It’s just a plant...”
80-95% THC concentrates

“Budder”  Butane Hash Oil (BHO)

“Green Crack” wax

“Shatter”  Hash Oil Capsules
E-Cigarettes Vaporizing Marijuana

- THC concentrates approaching 100% in the form of butane-extracted hash oil (BHO) is being placed into e-cigarettes

- E-cigarette companies are increasingly marketing to youth and adolescents (... sound familiar)

- Teen use of e-cigarettes is significantly on the rise

- M-Cigarettes (marijuana vaporizers) available on Groupon

“Focusing on the young crowd ...” The assault is on!
New marijuana - **not** like the old marijuana

- Old Marijuana - 1970’s
  - 0.5-3% THC in a joint
- New Marijuana
  - Joint using 20% THC
  - Blunt - cigarillo hollowed out and re-stuffed with marijuana
- Butane Hash Oil (BHO)
  - 1 can butane + 1 oz marijuana = 4 gm BHO
  - Shatter - 90% THC
  - Wax - 60-70% THC
  - Snake tail - dripping BHO on blunt
- Equivalence: 64 joints = 4 blunts = 1 dab 80% THC
Prevalence of Drug Involvement in Drivers who Died within 1 hr of crash by Year and Drug Category

Marijuana - the #1 drug (after alcohol) in US vehicular homicides - since 2007

Increased use leads to increased drugged driving

- "Drivers who test positive for marijuana or self-report using marijuana are more than twice as likely as other drivers to be involved in motor vehicle crashes."
- Combined with alcohol, eight times as likely to be in crash

Driving Fatalities (2013 FARS Data)

40% of fatally-injured drivers with a known test result tested positive for drugs, almost the same level as alcohol at any positive BAC.

Source: 2013 Fatality Analysis Reporting System (FARS)
Driving Fatalities (2013 FARS Data)

In 2013 nationwide, **62.6%** of the fatally-injured drivers were tested for drugs.

Of those tested:

- **30.3%** A drug in the FARS list was found
- **34.7%** Marijuana
- **9.7%** Amphetamine
- **57.3%** No drugs detected
- **4.6%** Unknown

Source: 2013 Fatality Analysis Reporting System (FARS)
Weekend Night Time Drivers (2007) - % Drug Positive

<table>
<thead>
<tr>
<th>Drug</th>
<th>% Positive</th>
</tr>
</thead>
<tbody>
<tr>
<td>OXYCODONE</td>
<td>0.82%</td>
</tr>
<tr>
<td>METHAMPHETAMINE</td>
<td>0.84%</td>
</tr>
<tr>
<td>COCAINE</td>
<td>3.92%</td>
</tr>
<tr>
<td>THC (MARIJUANA)</td>
<td>8.65%</td>
</tr>
<tr>
<td>ALL DRUGS TESTED</td>
<td>16.30%</td>
</tr>
</tbody>
</table>

Note: Drug positive by oral fluid and/or blood test. Drug positive tests do not necessarily imply impairment.

MJ Driving Effects and Consequences

- balance and coordination - unable to stay in lane (lateral travel, weaving, lane position variability)
- slower reaction time (especially combined w/ alcohol)
- impaired judgment (decreased car handling performance, impaired distance/time estimation, control decreases with increasing task complexity)
- impaired driver attentiveness (problems responding to signals and sounds, altered perception of speed)
- Blood THC 2-5 ng/ml associated with substantial driving impairment, particularly in occasional users
- effects may last 24-48 hours after use

Cannabis Effects on Driving Standard Deviations of Lateral Position (weaving) w/ and w/out Alcohol

- 18 adults cannabis smokers (> 1 time/3 mos, ≤ 3 days/wk), drank low dose alcohol, inhaled 500 mg low dose (2.9% THC) or hi-dose (6.7% THC), tested driving attributes in simulated driving system at 55 mph and measure blood THC and BAC

- BAC 0.08% and 0.05% created the same SDLP as blood THC 13.1 and 8.2 mcg/L

- BAC 0.05% + blood THC 5 mcg/L = same SDLP as BAC 0.08%

R Hartman, et al. Cannabis Effects on Driving Lateral Control with and without Alcohol. 2015
Dose related risk of motor vehicle crashes after cannabis use

- THC impairs cognition, psychomotor function and actual driving performance in a dose related manner
- doses up to 300 mcg/kg (22.5 mg in a 75 kg = 165 lbs) THC were equivalent to the impairing effect of an alcohol dose producing BAC > 0.05 g/dl
- highly automated behaviors, such as road tracking control - not weaving, were more affected by THC
- most culpability surveys established cannabis use among crashed drivers by determining presence of inactive metabolite (THC-COOH) in blood or urine - detected for days after smoking, presence is only evidence of past cannabis use
- THC in blood showed that THC positives, particularly at higher doses, are about three to seven times more likely to be responsible for their crash as compared to drivers that had not used drugs or alcohol
- combined use of THC and alcohol produced severe impairment of cognitive, psychomotor, and actual driving performance in experimental studies and sharply increased the crash risk (8 fold) in epidemiological analyses, the risk is additive, alcohol impairs THC elimination, even low levels of THC very affected by addition of alcohol

Vaporized Marijuana Blood Levels w/ and w/o Alcohol

- 19 adults cannabis smokers (> 1 time/3 mos, ≤ 3 days/wk), drank alcohol to reach BAC = 0.065 gm% 10 min before inhaling 500 mg low dose (2.9% THC) or hi-dose (6.7% THC), tested blood and plasma cannabinoids

<table>
<thead>
<tr>
<th></th>
<th>Blood THC Cmax (mcg/L)</th>
<th>Blood THC-OH Cmax (mcg/L)</th>
</tr>
</thead>
<tbody>
<tr>
<td>No Alcohol + 2.9% THC</td>
<td>32.7 (11.4 - 66.2)</td>
<td>2.8 (0 - 9.1)</td>
</tr>
<tr>
<td>No Alcohol + 6.7% THC</td>
<td>42.2 (15.2 - 137)</td>
<td>5.0 (0 - 14.2)</td>
</tr>
<tr>
<td>Alcohol + 2.9% THC</td>
<td>35.3 (13 - 71.4)</td>
<td>3.7 (1.4 - 6.0)</td>
</tr>
<tr>
<td>Alcohol + 6.7% THC</td>
<td>67.5 (18.1 - 210)</td>
<td>6.0 (0 - 23.3)</td>
</tr>
</tbody>
</table>

- **Alcohol** results in statistically significantly **ELEVATED** cannabinoid levels
- At a cutoff of ≥ 5 mcg/L: *by 2.3 hr* there were ≤ 21.1% +, only 1 at 3.3 hr
- At a cutoff of ≥ 2 mcg/L: *by 3.3 hr* there were 10-16% + after Low dose, 37-42% + after High dose

DRE Examination Characteristics of Cannabis Impairment

- 302 toxicologically-confirmed THC (> 1 ng/ml) successfully identified by DRE compared to 302 control non-impaired subjects
- For all performance characteristics to be above 96.7% prediction of cannabis impairment - need to identify **two or more** of the following:
  1. have **3 or more** failures in Finger to Nose (FTN) test
  2. **eyelid tremors** during Modified Romberg balance (MRB) test
  3. **two or more** One leg stand (OLS) clues
  4. **two or more** Walk and Turn (WAT) clues
- Other common symptoms at clinical significance: incr HR, incr SBP, dilated pupil size.
- Other common symptoms did not reach clinical significance (but favorable for THC): pupil rebound dilation and lack of convergence.

## Passenger/Light Truck Fatal Crashes from 6 pm to 6 am, Harmful Events

<table>
<thead>
<tr>
<th>First Harmful Event</th>
<th>No Alcohol</th>
<th>Drivers 08+</th>
<th>Marihuana (Drug test 1)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>#</td>
<td>%</td>
<td>#</td>
</tr>
<tr>
<td>Hit Motor Vehicle</td>
<td>1,766</td>
<td>44.3% higher</td>
<td>1,050</td>
</tr>
<tr>
<td>Hit Ped/Bike</td>
<td>694</td>
<td>17.4% higher</td>
<td>152</td>
</tr>
<tr>
<td>Rollover/Overturn</td>
<td>233</td>
<td>5.8% lower</td>
<td>422</td>
</tr>
<tr>
<td>Guardrail Barriers</td>
<td>215</td>
<td>5.4% lower</td>
<td>411</td>
</tr>
<tr>
<td>Posts</td>
<td>342</td>
<td>8.6% lower</td>
<td>787</td>
</tr>
<tr>
<td>Culvert Ditch embank</td>
<td>308</td>
<td>7.7% lower</td>
<td>554</td>
</tr>
<tr>
<td>Tree (Standing Only)</td>
<td>3558</td>
<td>98.2%</td>
<td>3376</td>
</tr>
<tr>
<td>Total of selected events</td>
<td>3,918</td>
<td>98.2%</td>
<td>4,044</td>
</tr>
<tr>
<td>Total Drivers</td>
<td>1,015</td>
<td>27.1% lower</td>
<td>1,747</td>
</tr>
</tbody>
</table>

All differences between No Alcohol and 0.08+ BAC and Marihuana drivers statistically different at p<0.05

A Crancer. NHTSA FARS Data, 2014.
Age of Fatal Crash Drivers (Passenger Vehicle/Lt Trucks) with No Alcohol, Marihuana, BAC 0.08+

<table>
<thead>
<tr>
<th>Group</th>
<th>No Alcohol</th>
<th>Marihuana</th>
<th>BAC 0.08+</th>
</tr>
</thead>
<tbody>
<tr>
<td>Median Age</td>
<td>26 years</td>
<td>26 years</td>
<td>32 years</td>
</tr>
<tr>
<td>3 highest Years</td>
<td>18 - 20</td>
<td>19 - 21</td>
<td>21 - 23</td>
</tr>
</tbody>
</table>

- No Alcohol and Marihuana fatal drivers are younger by 6 yrs (compared to alcohol fatal drivers)
- No Alcohol fatal drivers are younger, followed by Marihuana fatal drivers, then Alcohol + drivers

A Crancer. NHTSA FARS Data, 2014.
Marijuana User drives into 2 Police Vehicles 11 days after 2014 legalization in Colorado


Traffic Deaths in CO Related to Marijuana (2006 - 2014)

*Number of Fatalities Involving Operators Testing Positive for Marijuana*

National Highway Transportation Safety Administration, Fatality Analysis Reporting System (FARS), 2006-2013 and CDOT/RMHIDTA 2014
Drug Combinations for Operators Positive for Marijuana in 2014 in CO

While the total number of Colorado car crashes declined from 2007 to 2011, the number of fatal car crashes with drivers testing positive for marijuana rose sharply.
WA Impaired Driver in Motor vehicle Fatalities: Marijuana-Impaired vs All-Impaired (2011 - 2014)

Total Fatalities: MJ+ vs All Impaired by Year

54% Increase
Rec MJ dispensaries opened July 2014

Number of Total Fatalities

“Medical” & “Just to Get High” States vs “Non- Medical” Marijuana States - fatal Crashes w/ Marijuana present, 2014 NHTSA FARS Passgr Vehicle Data

- Med/JTGH MJ states have 28.5% higher incidence of MJ presence in fatalities vs Non-Med MJ states
- JTGH States
  - CO - 20%
  - WA - 30.9%
  - OR - 21.7%
  - AK - 30.5%
- CA (longest “Med” state) = 19.3%
- NV = 15.1%
- Ave Med/JTGH MJ = 17.8% (28.5% higher than non-MJ)

<table>
<thead>
<tr>
<th>Medical mj States</th>
<th>NO mj states</th>
</tr>
</thead>
<tbody>
<tr>
<td>State</td>
<td>Tot mj</td>
</tr>
<tr>
<td>Alaska</td>
<td>18</td>
</tr>
<tr>
<td>Arizona</td>
<td>26</td>
</tr>
<tr>
<td>California</td>
<td>233</td>
</tr>
<tr>
<td>Colorado</td>
<td>44</td>
</tr>
<tr>
<td>Connecticut</td>
<td>11</td>
</tr>
<tr>
<td>Delaware</td>
<td>17</td>
</tr>
<tr>
<td>D.C.</td>
<td>1</td>
</tr>
<tr>
<td>Hawaii</td>
<td>5</td>
</tr>
<tr>
<td>Illinois</td>
<td>77</td>
</tr>
<tr>
<td>Maine</td>
<td>2</td>
</tr>
<tr>
<td>Maryland</td>
<td>0</td>
</tr>
<tr>
<td>Massachusetts</td>
<td>20</td>
</tr>
<tr>
<td>Michigan</td>
<td>72</td>
</tr>
<tr>
<td>Minnesota</td>
<td>12</td>
</tr>
<tr>
<td>Montana</td>
<td>28</td>
</tr>
<tr>
<td>Nevada</td>
<td>24</td>
</tr>
<tr>
<td>New Hampshire</td>
<td>14</td>
</tr>
<tr>
<td>New Jersey</td>
<td>38</td>
</tr>
<tr>
<td>New Mexico</td>
<td>15</td>
</tr>
<tr>
<td>New York</td>
<td>52</td>
</tr>
<tr>
<td>Oregon</td>
<td>18</td>
</tr>
<tr>
<td>Rhode Island</td>
<td>4</td>
</tr>
<tr>
<td>Vermont</td>
<td>6</td>
</tr>
<tr>
<td>Washington</td>
<td>81</td>
</tr>
<tr>
<td>Total</td>
<td>839</td>
</tr>
<tr>
<td><strong>Med mj states</strong></td>
<td><strong>NO mj states</strong></td>
</tr>
<tr>
<td>USA Total</td>
<td>839</td>
</tr>
<tr>
<td><strong>Med mj states 28.5% higher</strong></td>
<td><strong>USA Total 15.3%, about 1/2 of DUI level of 31%</strong></td>
</tr>
<tr>
<td><strong>USA Total</strong></td>
<td>1172</td>
</tr>
</tbody>
</table>

States in RED are higher than their group average. WA and CO had legal sale for Rec. use in 2014.
Cannabis Intoxication & Fatal Crash in France

- 10,748 fatal crash cases from Oct 2001 - Sept 2003
- As the THC blood level increases - increase in odds ratio of responsibility for fatal crashes

<table>
<thead>
<tr>
<th>Blood THC Concentration (ng/ml)</th>
<th># Drivers</th>
<th>Unadjusted Odds Ratio (95% Confidence Interval)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Negative</td>
<td>9013</td>
<td>1.00</td>
</tr>
<tr>
<td>&lt; 1</td>
<td>78</td>
<td>2.18 (1.22 - 3.89)</td>
</tr>
<tr>
<td>1 - 2</td>
<td>298</td>
<td>2.54 (1.86 - 3.48)</td>
</tr>
<tr>
<td>3 - 4</td>
<td>143</td>
<td>3.78 (2.24 - 6.37)</td>
</tr>
<tr>
<td>&gt; 5</td>
<td>240</td>
<td>4.72 (3.04 - 7.33)</td>
</tr>
<tr>
<td>Any THC level</td>
<td>759</td>
<td>3.17 (2.56 - 3.94)</td>
</tr>
</tbody>
</table>

THC Blood Levels Following Smoking MJ

THC Blood Levels vs Blood Draws over Time

Look at how FAST the blood THC (psychoactive component) level drops …
- When did smoking stop? - assuming at time of incident (probably not true)
- When is the DRE being performed? How long does it take?
- How long will a warrant take?
- When is the blood ACTUALLY being drawn? How far from the incident?

## Time to First Phlebotomy by Charge & Responsible Agency in CO in 2012 (pre-SCOTUS MO v. McNeely)

<table>
<thead>
<tr>
<th>Issue</th>
<th>N</th>
<th>Mean (SD) hrs</th>
<th>Test Statistic</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Charge</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vehicular homicide</td>
<td>23</td>
<td>2.66 (+ 1.57)</td>
<td>t = 1.78</td>
</tr>
<tr>
<td>Vehicular assault</td>
<td>26</td>
<td>2.01 (+ 0.97)</td>
<td>p = 0.08</td>
</tr>
<tr>
<td><strong>Responsible Agency</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CO State Patrol</td>
<td>19</td>
<td>2.90 (+ 1.54)</td>
<td>t = 2.75</td>
</tr>
<tr>
<td>Local PD</td>
<td>28</td>
<td>1.91 (+ 0.97)</td>
<td>p = 0.008</td>
</tr>
</tbody>
</table>

Range: 0.83 - 8 hrs  
Median = 2 hrs  
Mean = 2.32 hrs (+ 1.31 hrs)

Driving Under Influence (DUI) Process

- Initial officer performs field sobriety tests (FST) - minutes after event
- Drug recognition expert (DRE) arrives later (minutes/hours after event)
  - At a controlled site (NOT at the road side)
  - Multiple sobriety tests (walk & turn, one leg stand, eyes: pupil size/nystagmus, Romberg test, finger to nose, muscle tone)
  - Vital signs (BP, HR, body temperature)
  - Interview (illegal and legal drug use, when taken, oral intake)
  - Search (for injection sites, oral cavity, nasal)
- Breath Test
- Blood collected (... hours later - last step in DRE process)
  - Warrant - SCOTUS 2013 decision: Missouri vs McNeely
  - Hospital/Lab (travel to site) or in Department (no travel time delay)
Drugged Recognition Expert (DRE) Form - CA

Near the end of the form...
How much time has passed between when the blood is drawn and the incident?

WHEN is this opinion occurring (needs time)?
Hours later...? How many +’s equal impairment - evaluators assessments equivalent?
Assessments/year? Weight of each test - by drug?
MAP 13. CURRENT MARIJUANA LEGAL STATUS – OCTOBER 2015

Marijuana DUI Laws

STATE BY STATE:
Marijuana Drug-Impaired Driving Laws
AS OF AUGUST 2015

1. South Dakota is a zero tolerance state only for drivers under the age of 21.
2. Pennsylvania is often classified as both a zero tolerance and per se state. A minimum threshold of 1 ng is needed for a chemical test to be admitted as evidence for prosecution purposes.
3. Illinois is currently classified as a zero tolerance state. However, legislation has been passed and is awaiting the Governor’s signature that would create a 15 ng per se limit.

Zero tolerance for THC and metabolites
Zero tolerance for THC only
THC per se
Reasonable inference THC Law
No zero tolerance or per se laws for marijuana

Excerpted from Drug-Impaired Driving: A Guide for What States Can Do

Accessed 10/19/15:
States *Per Se* Driving Laws

- **(Toughest)** Arizona, Georgia, Utah - zero tolerance all CS and their metabolites, taken illegally (w/o MD Rx)
- Illinois, Iowa, Rhode Island - zero tolerance all CS, taken illegally (Rhode Island does not even allow legal Rx)
- North Carolina, South Dakota - zero tolerance, all CS and metabolites in minors, NC allows medical use
- Delaware, Indiana, Pennsylvania, Wisconsin - zero tolerance for all CS I and some/all CS II or CS III drugs taken illegally
- Michigan - zero tolerance for CS I drugs
- Minnesota - zero tolerance for CS I (except marijuana) and CS II taken illegally
- **Nevada**, Ohio - illegal to have specified amounts of specified prohibited drugs (THC 2 ng/ml or above)
- Virginia - illegal to have specified amounts of specified prohibited drugs (THC not included)
- WA - Adults: THC 5 ng/ml *per se* w/in 2 hrs, zero tolerance THC if drawn after 2 hrs; Minors: zero tolerance for THC no matter when drawn from incident
- MT - THC 5 ng/ml *per se*
- **(Weakest)** CO - THC 5 ng/ml permissible inference

Note: 2010 National Drug Control Strategy encourage states to adopt *per se* drug impairment laws
(1) A person is guilty of driving while under the influence of intoxicating liquor, marijuana, or any drug if the person drives a vehicle within this state:

(a) And the person has, within two hours after driving, an alcohol concentration of 0.08 (gm%) or higher as shown by analysis of the person's breath or blood made under RCW 46.61.506; or

(b) The person has, within two hours after driving, a THC concentration of 5.00 (ng/ml) or higher as shown by analysis of the person's blood made under RCW 46.61.506;

4 (b) Analyses of blood samples obtained more than two hours after the alleged driving may be used as evidence that within two hours of the alleged driving, a person had a THC concentration of 5.00 (ng/ml) or more in violation of subsection (1)(b) of this section, and in any case in which the analysis shows a THC concentration above 0.00 may be used as evidence that a person was under the influence of or affected by marijuana in violation of subsection (1)(c) or (d) of this section.
From Justice Sotomayor (representing the majority decision)

“The question presented here is whether the natural metabolization of alcohol in the bloodstream presents a per se exigency that justifies an exception to the Fourth Amendment’s warrant requirement for nonconsensual blood testing in all drunk-driving cases. We conclude that it does not, and we hold, consistent with general Fourth Amendment principles, that exigency in this context must be determined case by case based on the totality of the circumstances.”

Note:
- specific only for alcohol metabolism
- only addressing if blood is being drawn without consent (nonconsensual blood testing)
- if exigency exists - no need for a warrant
- exigency exists in all marijuana cases - due to rapid elimination of THC from blood

ave blood draw time = 2.32 hours from incident in CO (measured in 2012 = pre-McNeely)
ave amount of time to perform DRE evaluation = 45 minutes (reported by King Co, WA DRE in 10/2013)
ave time to acquire a warrant = 45 minutes (reported by King Co, WA DRE in 10/2013, both post-McNeely)
+ time from incident to “DRE site” + time to get blood drawn after warrant/time to hospital

SCOTUS No 11-1425  Argued 1/9/2013  Decision 4/17/2013
Texas judge takes no refusal to new level  
May 7, 2014

- Montgomery County, TX (north of Houston): When deputies stop a suspected drunk driver and they refuse to give a breath sample, the district attorney's office responds.

- Use forfeiture funds from drug dealers and convicted drunk drivers to purchase what they call the BAT van (Specialized Prosecutions Bureau Chief in the driver's seat. A phlebotomist rides shot gun)

- Prosecutor assists with the warrant paperwork for a blood draw, sends photos to a judge. Following judge’s approval: defendant read rights, video tape phlebotomist performing blood draw.

- “So literally within minutes of the suspect being stopped for DWI, we had a blood sample and that’s really critical for us as prosecutors because it’s right after the time of driving. And that’s what the law says, we have to prove their intoxicated at the time they were driving.”

- Before the system was implemented the county was known as the deadliest county in Texas because of the great number of intoxication manslaughter charges per capita. After using the rapid response vehicles, officers are spending less time in jails and hospitals and more time on the roadway catching suspected drunk drivers.

- According to the district attorney, fatality stats have dropped 50-75% per year since 2010

- “The biggest enemy is time, the greater the time, the harder it is to prove the case.”

- “We’ve saved a lot of lives in our jurisdiction, we’ve cut down our vehicular homicide rates and it works everywhere.”

http://www.myfoxaustin.com/story/25459001/texas-judge-takes-no-refusal-to-new-level#ixzz318fRAXFY
SF taxi drug testing to exempt medical marijuana
A newly approved drug testing policy for the San Francisco Municipal Transportation Agency exempts taxi drivers who have a valid recommendation for medical marijuana. (Kevin Kelleher/Special to S.F. Examiner)
By Joe Fitzgerald Rodriguez on October 21, 2015 1:21 am

Whether taxi drivers can light up and puff marijuana on their off hours was the topic of intense discussion Tuesday for the San Francisco Municipal Transportation Agency Board of Directors. The board voted unanimously to approve drug testing for taxi drivers at the meeting. In a win for cabbies who opposed the measure, however, the board amended the resolution to exempt sanctions for taxi drivers who have a valid medical marijuana recommendation.

As the San Francisco Examiner previously reported, the drug tests would be required when taxi drivers renew their cab permits with The City, apply for a new permit, after having an accident and if there is reasonable suspicion of drug use, according to the resolution.

http://www.sfexaminer.com/sfmta-drug-testing-to-exempt-medical-marijuana/
Breath/Oral Testing for Marijuana

- **Breathalyzer**
  - Assess marijuana for a few hours after use, +/- alcohol
  - WA State University, Hound Labs (Berkeley)
  - In the field testing now

- **Oral Swabs - saliva**
  - Assess presence of multiple drugs (mj, cocaine, meth, PCP, MDMA, benzos, opiates)
  - Drager, Alere, Test Country, etc.
  - Salas case (in Bakersfield, CA) allowed + oral swab of methamphetamine “hours” after incident to be used in court case (also found in blood drawn 3 hrs after the incident methamphetamine (100 ng/ml), alcohol (0.03%), marijuana (1.1 ng/ml))
    - 22 yo two-time “non-strike” felon, rec’d 3 yr sentence for v manslaughter while intoxicated, with ordinary negligence and of driving under the influence of alcohol or drugs causing bodily injury
  - Results in 3 - 12 minutes, some +/-, some w/ values (Alere) - screen for blood draw
Economic Cost of Vehicle Accidents Resulting in Fatalities & DUI - 2010

- 32,999 fatalities, 3.9 million injured, 24 million vehicles damaged in US in 2010
- Each fatality resulted in ave discounted lifetime cost = $1.4 million
- Economic cost of all 2010 US crashes = $242 billion
  
  Property Damage - 31%  Medical - 10%  Legal - 5%
  Market Prod - 24%  Household Prod - 8%  Workplace - 2%
  Congestion - 12%  Insurance - 8%

- First driving-under-the-influence offense - est $10,270

I'm always disappointed when a liar's pants don't actually catch on fire.
Marijuana & Driving = DEATH

PLEASE DON'T DRUG AND DRIVE

SPONSORED BY THE FAMILY OF JUSTIN RELETHFORD