



**Cutting Through
the Smoke**

Marijuana**a**

Council on Accountability Court Judges
September 17, 2019 - Athens, GA

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Learning Objectives

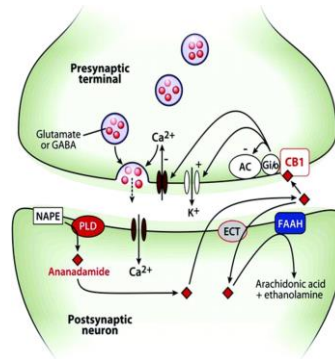
After this presentation, participants will be prepared to:

1. Separate marijuana issues of marijuana, hemp, medical, recreational, and substance specific use risks of THC, CBD, and synthetic cannabinoids (i.e. "fake weed").
2. Articulate specific, research-defined risks and negative life outcomes linked to adolescent THC use and among adults who began use at younger ages.
3. Demonstrate research-based knowledge of THC's mental and physical health risks, its role in impairment risks, including DUI, and be aware of public health concerns.

3 Types of Cannabinoids

▶ Endocannabinoids

- ▶ all mammals
- ▶ other species



▶ Phytocannabinoids

- ▶ cannabis sativa/indica
 - ▶ THC & CBD
- ▶ other plants, e.g. black pepper, black truffle, chocolate



▶ Synthetic cannabinoids

- ▶ JWH-018
- ▶ nabilone (Cesamet[®])



What Is “Marijuana”?

- The term “marijuana”—medical or recreational—is so imprecise, using it confuses communication.
- We are better served by talking about specific cannabinoids that are indwelling, plant-based, or synthetic.





It's all about the THC

- Federal law defines hemp as cannabis with $\leq 0.3\%$ THC.
- All states* follow this guideline (except WVa hemp = $< 1\%$ THC.)

- Source: National Conference of State Legislatures

<http://www.ncsl.org/research/agriculture-and-rural-development/state-industrial-hemp-statutes.aspx> (accessed 2/22/2019)

Hemp Regulations

- ▶ In 2018, Georgia created the House Study Committee on Industrial Hemp Production*.
- ▶ As of May 2019, Georgia law allows commercial hemp production for commercial and research purposes.
- ▶ Language was changed in state statutes to distinguish between “hemp and hemp products” and “marijuana”.

*<http://www.ncsl.org/research/agriculture-and-rural-development/state-industrial-hemp-statutes.aspx>

Georgia Hemp Farming Act signed into law on May 10, 2019

Georgia

Georgia [HB 213](#)
/ Ga. Code §§ 2-23-1 to 2-23-12
and § 16-13-25

- Provides for licensing requirements for growers and processors as part of a state hemp plan.
- Authorizes certain colleges and universities to conduct research on the cultivation, breeding and development of hemp.
- Excludes regulated hemp and hemp products from the definition of marijuana as a controlled substance.

<http://www.ncsl.org/research/agriculture-and-rural-development/state-industrial-hemp-statutes.aspx#ga>

Hemp Regulations



States Statutes frequently cover:

- ▶ **Licensure, Registration & Permitting**
 - ▶ Criminal background checks
 - ▶ GPS coordinates of grow sites
 - ▶ Records of sales, distribution (quantity sold and to whom)
 - ▶ Documentation showing an approved program
- ▶ **Seed Certification & Access**
 - ▶ Seeds still Schedule 1 under Federal DEA guidelines
 - ▶ Designate state offices to monitor and enforce regulations
 - ▶ Seeds produce hemp meeting legal definition
 - ▶ State licensing of valid seed distributors

Sativa vs Indica?

SATIVA

- + Tall in stature
- + Narrow leaves
- + Longer flowering cycles
- + Better suited for warm climates with a long season



Sativa

Aca
Acapulco Gold

Sativa



Pam
Panama Red

Sativa

Dp
Durban Poison

INDICA

- + Short in stature
- + Broad leaves
- + Shorter flowering cycles
- + Suitable for colder climates with shorter seasons



Indica

Hk
Hindu Kush

Indica

Mis
Mazar I Sharif

Indica

Afk
Afghan Kush

What is CBD (cannabidiol) ?

CBD - antioxidant opposing many THC effects including the “high”

Potential Benefits

- anti-inflammatory,
- anti-seizure,
- anti-psychotic, and
- anti-tumor (shrinks cancer tumors)
- Helps reduce muscle spasms and tremors in multiple sclerosis



What is CBD (cannabidiol) ?

CBD - antioxidant opposing many THC effects including the “high”

Potential Risks

- May contain THC or other contaminants
- May increase blood levels of other drugs
- May damage liver function and the liver (in large doses)





Marijuana, Weed, Bud

Recreational Use = THC

“weed” = dried bud of the female marijuana plant

sensemilla = growing process -
the female plant is not fertilized -
no seeds

smoked or heated to inhale THC
vapor

THC content 4 – 20% (avg. 12%)
CBD content 0.5 – 0.1%

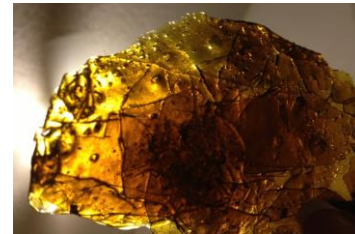


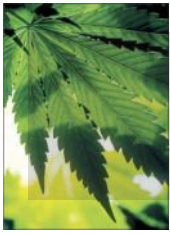


Dabs, Wax, Shatter

Recreational Use

- Butane Hash Oil (BHO) refined into “Dab” wax or shatter
- resin placed on superheated metal - resulting vapor inhaled
- Can be vaped in e-cigarettes
- THC concentration is 23 - 76%
- One study found >80% were contaminated with residual pesticides or solvents
- Raber, J. C., Elzinga, S., & Kaplan, C. (2015). Understanding dabs: contamination concerns of cannabis concentrates and cannabinoid transfer during the act of dabbing. *The Journal of toxicological sciences*, 40(6), 797-803.





Dabs, Wax, Shatter

High potency THC is a cause for additional concern

- **Increased impairment**
- **Increased health risks**
- **Increased addiction potential**



What are the risks?

Most related to THC

1. **Acute Impairment** – driving and other
2. **Cognitive deficits**
3. **Psychosis Symptoms** (more rarely a disorder)
4. **Cannabis Use Disorder/Addiction**
5. **Problems linked to adolescent use**
6. **Health Problems - rare but devastating**

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A little pharmacology

- ▶ Marijuana's **psychoactive** substance is Δ^9 -tetrahydrocannabinol (**THC**)
- ▶ It metabolizes into two substances
 1. 11-Hydroxy- Δ^9 -tetrahydrocannabinol (**hydroxy-THC**) is **psychoactive**
 2. 11-nor-9-carboxy- Δ^9 -tetrahydrocannabinol (carboxy-THC) is *non-psychoactive*, but persists in the body, blood and urine.

What DO We Know?

- ▶ Specific **THC** blood levels confer risk
 - ▶ 2 - 3 ng/ml is similar to a 0.04% BAL
 - ▶ 3.5 - 5 ng/ml is similar to a 0.08% BAL
- ▶ Likely similar for **hydroxy-THC** (no research)
- ▶ NOT likely for carboxy-THC

What DO We Know?

Marijuana impairs abilities needed for safe driving.

- ▶ Divided attention (too focused)
- ▶ Reduced peripheral vision
- ▶ Slowed information processing
- ▶ Maintaining lane position
- ▶ Impaired decision-making/increased risk-taking

What DO We Know?

- ▶ Marijuana is linked to increased risk for fatal vehicular crashes
 - ▶ French Study - 2.5x more risk
 - ▶ Australian Study - 2 to 6x more risk
 - ▶ 1st Meta-analysis - 3 to 7x more risk
- ▶ There is a dose-response effect

The Dissent

- ▶ Marijuana advocates state the relationship to fatal crashes is bogus because “marijuana stays in your system for days.”
- ▶ State Supreme Courts in Michigan and Arizona have ruled you cannot convict on DUI if only carboxy-THC is present. The state must show evidence of an impairing substance in the driver’s system.

The Dissent

- ▶ Marijuana advocates cite a study showing “no relationship” between blood *levels* of THC and outcome of Field Sobriety Test.
- ▶ That’s because virtually everyone failed the test if they had THC in their blood.
- ▶ At 2 to 7 ng/ml 87% failed standard field (roadside) sobriety test.
- ▶ At 8 ng/ml or higher 100% failed.

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What DO We Know?

- ▶ We know for *most people* neither **THC** nor **hydroxy-THC** remains in the blood for long
- ▶ Heavy users (≥ 4 times weekly) - 2 to 5 ng/ml THC present 2 to 8 hours after last use
- ▶ Light users (≤ 1 time weekly) - < 1 ng/ml THC levels present 2 to 8 hours after last use

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Conclusion

- ▶ Non-impairing carboxy-THC stays in the blood for days (maybe weeks)
- ▶ When actual **THC** is measured in blood, research finds impaired driving and increased fatal crashes.
- ▶ Prime For Life[®] and Prime For Life 420 cite only research measuring THC in blood

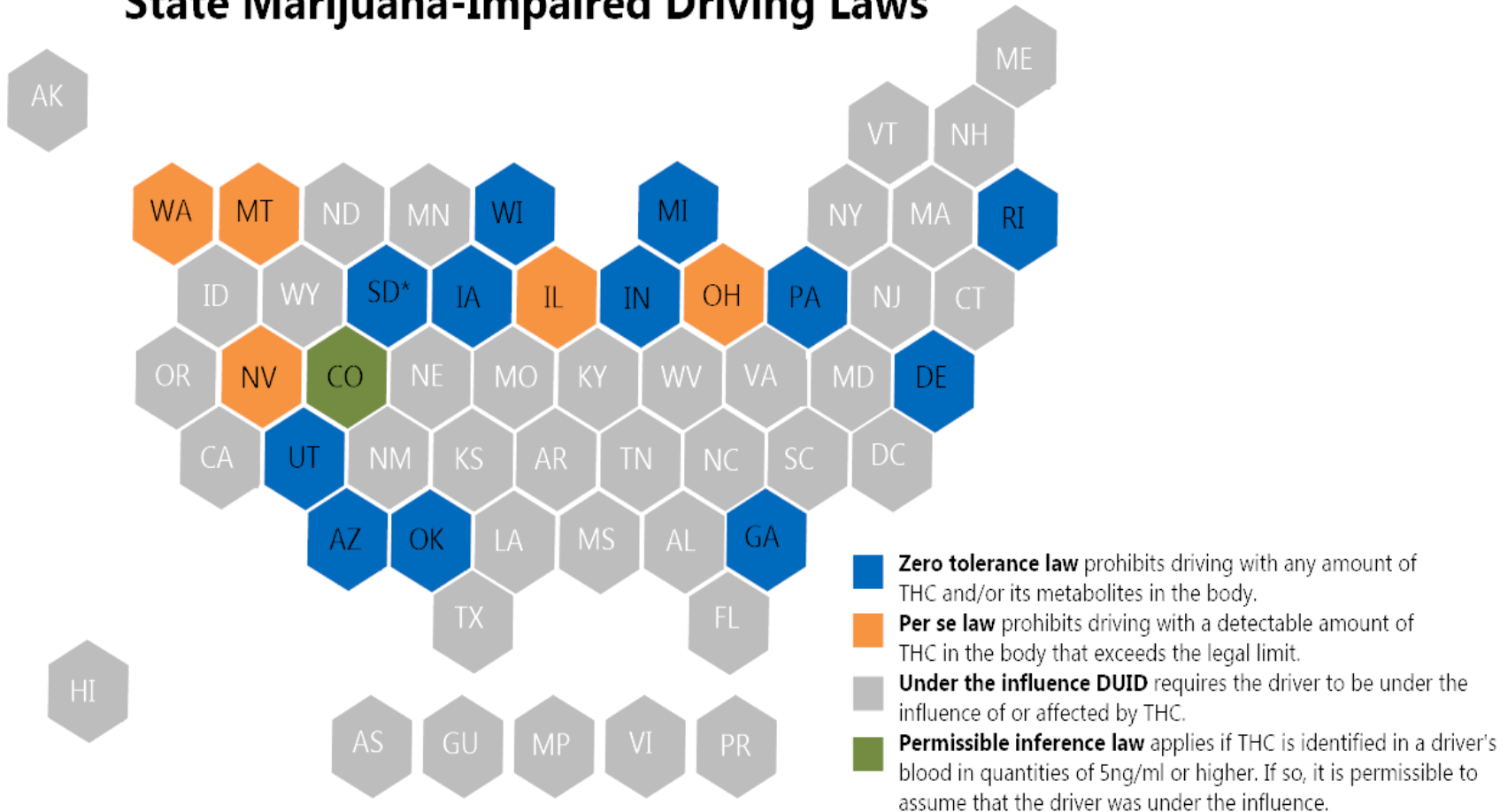
Conclusion

Based on that research:

- ▶ Several researchers now recommend a THC per se level impaired driving level of 5 to 7 ng/ml in plasma/whole blood
- ▶ Several states including Colorado and Washington have implemented a per se level of 5 ng/ml for impaired driving offenses.

DUI-C Regulations

State Marijuana-Impaired Driving Laws



* South Dakota has a zero tolerance law for drivers under the age of 21.

<http://www.ncsl.org/research/transportation/drugged-driving-overview.aspx>

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Adolescent Use

Causes for Concern

Increased Risk for Lower Education Levels

- ▶ Weekly cannabis use starting < age17
 - ▶ 1.6 - 2x greater odds of not completing high-school
 - ▶ 1.6 - 2x greater odds of not enrolling in higher education/university
 - ▶ 1.5x greater odds of not completing a degree

Adolescent Use

Causes for Concern

Increased Risk for **Lower Socioeconomic Status**

- ▶ **Cannabis use < age 17**
 - ▶ Trajectories trended downward on those smoking tobacco or marijuana from an early age
 - ▶ less employment
 - ▶ more likely to be single
- ▶ **Report lower overall life satisfaction**

Adolescent Use

Causes for Concern

Increased Risk for Loss of IQ:

- ▶ Dunedin Study cohort - birth to 38
- ▶ began use before age 18
- ▶ up to 25 yrs. ongoing, heavy use
- ▶ 3 dependence diagnoses

Adolescent Use

Causes for Concern

Increased Risk for Loss of IQ:

- ▶ Non-users gained about 1 point in I.Q. between ages 13 to 38
- ▶ Heaviest users lost about 8 points in I.Q. between ages 13 to 38
- ▶ This means 70% of their peers had higher I.Q.
- ▶ No significant IQ drop in those who began using after age 18.
- ▶ The I.Q. drop significant after controlling for education and socioeconomic levels.

Adolescent Use

Causes for Concern

Increased Risk for: Anxiety, Depression & Suicide

- ▶ Females using daily, 5.6 greater odds of depression/anxiety, using weekly, 2x greater odds
- ▶ Twins of both sexes discordant for early onset cannabis use and dependence had 3.5 greater odds of suicide attempt than non-using twin
- ▶ Starting marijuana use <15 yrs of age had 3.5 greater odds of depression/anxiety
- ▶ Evidence of a linear relationship between more use and more severe depression

Cannabis Use → Depression

Depression → Cannabis Use

Pooled data from the four groups gave strong support for cannabis use leading to depression and weaker support for depression leading to cannabis use.

Horwood, L. J., Fergusson, D. M., Coffey, C., Patton, G. C., Tait, R., Smart, D., ... & Hutchinson, D. M. (2012). Cannabis and depression: an integrative data analysis of four Australasian cohorts. *Drug and alcohol dependence*, 126 (3), 369-378.

Adolescent Use

Causes for Concern

Increased Risk for **Cannabis Dependence** (Cannabis Use Disorder)

After controlling for other factors:

- ▶ sex
- ▶ race/ethnicity
- ▶ family income
- ▶ prior drug experience

age at onset of use stayed as a significant predictor of cannabis dependence within 24 months

Adolescent Use

Causes for Concern

Increased Risk for cannabis dependence within 24 months of onset of use

Compared to those starting age ≥ 21 risk was greater in those starting at:

- ▶ **age 18-20 = 3.4 Relative Risk (RR)**
- ▶ **age 16-17 = 9.4 RR**
- ▶ **age 14-15 = 13.2 RR**
- ▶ **age 11-13 = 11.6 RR**

6. Health Problems - rare but devastating

- **Psychosis Disorders**
 - Schizotypal Personality Disorder
 - Delusional Disorder
 - Schizophreniform Disorder
 - Schizophrenia
- **Heart Attack**
- **Testicular Cancer in younger men**

Summary

The public is confused by multiple issues related to marijuana.

CBD may be significantly less risky, but needs regulation of production

THC presents multiple public health concerns including:

- Impaired driving
- Negative life outcomes in adolescent users
- Impaired cognition over time
- Cannabis use disorder
- Increased social costs



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