Cannabis Impairment Assessment

EYES

Conjunctiva Tissue (looks like pink eye in both eyes), **Lack of Convergence, Dilated Pupils,** & **No HGN (**when cannabis alone).

MUSCLES

Tremors Observed in extremities, upper torso, & eyelids (closed eyes).

ODOR

Smell Burnt marijuana, additive flavor for vaping, & maybe for edibles.

OBSERVATIONS

Indica: Produces a 'stoned' feeling. Physically & mentally relaxing. Centered on the body. Enhances sensations of taste, touch, & sound. Euphoria & relaxed inhibitions.

Sativa: Produces the 'high' feeling (energetic). Less overpowering than the Indica 'stone.' Less likely to produce drowsiness. High described as: cerebral, energetic, creative, giggly & or psychedelic.

Psycho-Physical Tests: Generally slow performance; muscle tremors, especially in legs & arms.

Information processing: Likely diminished. Impaired memory & comprehension. Jumbled thought formation & lack of concentration. Likened to attention deficit disorder, cognitive impairment. Altered distance perception.

Modified Romberg: Distorted internal clock. Eyelid Tremors.

Mood Changes: Including panic & paranoia.

Mouth: Flecks of Green Vegetable Matter (GVM - marijuana) in teeth. Possible green or white coating on tongue.

Smoked: Impairment Peak: 0-30 mins

High Experience: 1-3 hours

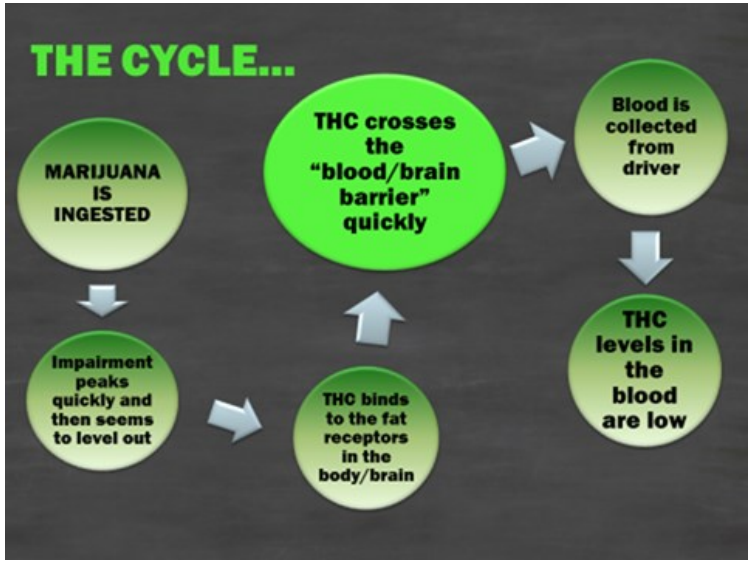
Impairment may last up to 24 hours, without awareness effects.

Oral/ Edible: Impairment Peak: 1-3 hours

High Experience: 4-8 hours

Residual effects depend on dose.

GET. BLOOD. FAST.



"The Cycle" created by Courtney Popp, WA TSRP

IMPORTANT STUDIES TO KNOW

- National Highway Traffic Safety Administration, ***Drug and Alcohol Crash Risk***, (Report No. DOT HS 812 117) Washington DC: U.S. Government Printing Office (2015). Often cited by defense- Virginia Beach Study
- Hartman, R.L., Huestis, M.A., et al., ***Cannabis Effects on Driving Lateral Control With and Without Alcohol***, *MUST KNOW* Drug and Alcohol Dependence, http://dx.doi.org/10.1016/j.drugalcdep.2015.06.015 (2015).
- * Huestis, M.A., et al., ***Estimating the Time of Last Cannabis Use from Plasma Δ^9-Tetrahydrocannabinol and 11-nor-Carboxy- Δ^9-Tetrahydrocannabinol Concentrations***, Clinical Chemistry, 51*(12),* 2289-2295, doi:10.1373/clinchem.2005.056838 (2005).
- * Hiroven, J., Huestis, M.A., et al., ***Reversible and Regionally Selective Downregulation of Brain Cannabinoid CB 1 Receptors in Chronic Daily Cannabis Smokers***, Molecular Psychiatry, 59*(3),* 642-649, doi:10.1038/mp.2011.82 (2012).
- * Bosker, W., Hiroven, J., Huestis, M.A., Ramaekers, J.S., et al., ***Psychomotor Function in Chronic Daily Cannabis Smokers During Sustained Abstinence***, PLoS ONE, 8(1), e53127, doi:10.1371/journal.pone.0053127(2013).
- Hartman, R.L., Huestis, M.A., et al., ***Effect of Blood Collection Time on Measured Δ^9-Tetrahydrocannabinol Concentrations: Implications for Driving Interpretation and Drug Policy***, Clinical Chemistry, 62:2, 367-377, doi:10.1373/clinchem.2015.248492 (2016).
- Hartman, R.L., Huestis, M.A., et al., ***Controlled Cannabis Vaporizer Administration: Blood and Plasma Cannabinoids With and Without Alcohol***, Clinical Chemistry, 61(6), 850-869, doi:10.1373/clinchem.2015.238287(2015).
- Bergamaschi, M., Hiroven, J., Huestis, M.A., et al., ***Impact of Prolonged Cannabinoid Excretion in Chronic Daily Cannabis Smokers' Blood on Per Se Drugged Driving Laws***, Clinical Chemistry, 59(3), 519-526, doi:10.1373/clinchem.2012.195503 (2013).
- Desrosiers, N., Huestis, M.A., et al., ***Phase I and II Cannabinoid Disposition in Blood and Plasma of Occasional and Frequent Smokers Following Controlled Smoked Cannabis***, Clinical Chemistry, 60(4), doi:10.1373/clinchem.2013.216507 (2014).
- DRUID, ***Analytical Evaluation of Oral Fluid Screening Devices and Preceding Selection Procedures***, (Project No. TREN-05-FP6TR-S07.61320-518404) Finland (2010).
- Grotenhermen, F., Drummer, O.H., Ramaekers, J.G., et al., ***Developing Limits for Driving Under Cannabis***, Addiction, 102, 1910-1917, doi:10.1111/j.1360-0443.2007.02009.x (2007).
- Grotenhermen, F.,Ramaekers, J.G., et al., ***Developing Science-Based Per Se Limits for Driving Under the Influence of Cannabis (DUIC): Findings and Recommendations by an Expert Panel***, DUIC Report (2005).
- Papafotiou, K., et al., ***An Evaluation of the Sensitivity of the Standardized Field Sobriety Tests (SFSTs) to Detect Impairment Due to Marijuana Intoxication***, Psychopharmacology, 180, 107-114, doi:10.1007/s00213-004-2119-9 (2005).
- Hartman, R.L., & Huestis, M.A., ***Cannabis Effects on Driving Skills***, Clinical Chemistry, 59(3), 478-492, http://dx.doi.org/10.1373/clinchem.2012.194381 (2013).
- Hartman, R.L., Huestis, M.A., et al., ***Drug Recognition Expert (DRE) Examination Characteristics of Cannabis Impairment,*** Accident Analysis & Prevention, 92, 219-229, http://dx.doi.org/10.1016/j.aap.2016.04.012 (2016).

Delta-9-THC - The main **psychoactive** substance found in marijuana. AKA: delta-9-tetrahydrocannabinol (Δ9-THC), dronabinol

11- Hydroxy-THC - The main **psychoactive** metabolite of THC formed in the body after marijuana consumption. AKA: Hydroxy THC, 11-Hydroxy-Δ9-tetrahydrocannabinol (11-Hydroxy-Δ9-THC), 11-OH-THC

11- nor-9- Carboxy-THC - The main secondary metabolite of THC formed after marijuana is consumed. It is NOT active, but indicates historical use. AKA: THC-COOH (most often seen this way), Carboxy THC, 11-nor-9-carboxy-delta-9-tetrahydrocannabinol (11-nor-9-carboxy-Δ9-THC), 11-COOH-THC

Cannabinoids - Group of active compounds found in marijuana.

Cannabidiol (CBD) - Non-psychoactive (a/k/a not impairing) cannabinoid. Found in medical strains.

Cannabinol (CBN) - THC metabolite (10% as psychoactive as THC), which may show recent or heavy use.

Chronic vs. Occasional - Terms denoting frequency of use.

- **Chronic** - Continuing for a long time or recurring frequently.
- **Occasional** - Happening infrequently and irregularly.

Psychoactive or Active - Causes euphoric and impairing effects (THC and 11-OH-THC).

Not active or inactive - Does NOT cause euphoric or impairing effects (THC-COOH).

Compensation - Behavior that develops either consciously or unconsciously to offset a deficiency.

Critical Tracking - A set of tasks used to determine impairment in a clinical setting.

Epidemiological - Is the study and analysis of the patterns, causes, and effects of health and disease conditions in defined populations.

First-order Elimination Kinetics - Elimination of a constant fraction per time unit of the drug quantity present and is proportional to the drug concentration.

Lateral Control - Control of side- to-side or sideways movement.

Limit of Detection (LOD) - Lowest quantity of a drug that can be distinguished from the absence of that drug.

Limit of Quantitation (LOQ) - Lowest amount of a drug in a sample that can be quantitatively determined.

Measurement of Uncertainty - Best estimate of how far a quantity might be from "true value." If two people measure one cup of flour, the amount will always be different even if it's not noticeable to the naked eye.

Metabolite - A chemical created in the body as part of the process of breaking down the parent compound (e.g. 11-OH-THC and THC-COOH).

Parent compound or parent drug - The drug in the original form that it is ingested (e.g. THC).

Per Se Law - Statutory assignment of a blood concentration above which is an offense to drive.

Permissible Inference - A legally specified fact that the fact finder may infer.

Pharmacokinetics - The movement of a drug into, through & out of the body - the time course of its absorption.

Plasma vs. Whole Blood

- **Plasma** - The colorless fluid part of blood, lymph, or milk, in which corpuscles or fat globules are suspended.
- **Whole Blood** - Blood drawn directly from the body from which none of the components (such as plasma or platelets) have been removed.

Titrate - Continuously measure & adjust the balance of [a substance].

Tolerance - The capacity of the body to endure or become less responsive to a substance.

INTERNET RESOURCES

www.wsp.wa.gov/breathtest/dredocs.php (NHTSA/IACP Manuals)
www.ndaajustice.org/ntlc_home.html (Nat'l Traffic Law Center)
www.nih.gov/research-training (Research)
www.decp.org (Int'l Drug Eval. & Classification Program)

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Jennifer R. Knudsen
Traffic Safety Resource Prosecutor
Colorado District Attorneys' Council
3600 S. Yosemite Street, Suite 200
Denver, CO 80237
(303) 830-9115
Jen@cdac.state.co.us

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