Cannabis, Marijuana, and Hemp Public Safety Fact Sheet

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Emerging research can help policymakers distinguish among cannabis products, address intoxicating cannabinoids, improve labeling and consumer protections, and develop traffic safety policies to address cannabis-impaired driving.

Responsibility.org and the National Alliance to Stop Impaired Driving (NASID) take no position on marijuana and intoxicating hemp legalization, but we are dedicated to ensuring that marijuana and intoxicating hemp legislation includes strong provisions to prevent impaired driving and prevent underage consumption. You can find Responsibility.org's cannabis principles here. We believe these principles are critical steps to protect Americans. Below are key research findings, including new research from Johns Hopkins University (JHU) and Virginia Commonwealth University (VCU).

Key Takeaways

1. **Hemp-derived products can be intoxicating.** Hemp and marijuana are legally defined categories of cannabis, but the legal classification of the source plant does not change the chemical identity of a cannabinoid. Each particular cannabinoid is chemically and functionally identical regardless of whether it is derived from hemp or marijuana. The human body cannot distinguish whether an impairing cannabinoid originated from hemp or cannabis, and the impairment potential will be identical for the same product at the same dose regardless of where it was derived. Hemp-derived products may contain one or more intoxicating cannabinoids. For example, Δ9-Tetrahydrocannabinol (THC), the primary psychoactive compound in marijuana, can be extracted and concentrated from hemp, while the cannabidiol (CBD) in hemp can be chemically converted into Δ8-THC – a distinct, intoxicating cannabinoid.

2. **Percentage by weight is an incomplete measure of impairment potential.** A product may contain a low percentage of THC by weight while still delivering a substantial – and intoxicating – quantity of THC. For example, 0.3% of a 4-gram dry-weight product is 12 milligrams of THC, more than the maximum single serving in several states.[1] Furthermore, a Δ9-THC weight percentage does not account for other intoxicating cannabinoids, such as Δ8-THC produced from hemp-derived CBD.

3. **Product type impacts the impairment profile.** The same exact amount of THC will have a vastly different effect based on how it was consumed (for example, smoked, vaped, or consumed as an edible or beverage). Therefore, there is no standard "dose" that can be created across all product types to capture a standard expected effect. The onset of

[1] (a) Under the 2018 Farm Bill, cannabis and its derivates generally qualify as hemp if they contain no more than 0.3% Δ9-THC on a dry weight basis. Section 781 of Public Law 119-37 established a narrower definition, and subsequent legislation, Public Law 119-103, delayed the implementation of many of these changes until December 11, 2026. (b) For comparison, 10 mg is the maximum THC permitted in a single edible serving in several state-regulated markets such as California, Colorado, and Oregon.

impairment is much quicker for smoked, vaped, and consumed beverages than for other forms, such as edibles, which may take hours to produce peak impairment.[2]

4. **Blood THC concentration does not reliably indicate the presence or degree of impairment.** There is no scientifically justifiable impairment standard for cannabis that exists similarly to blood alcohol concentration for alcohol. Unlike alcohol, concentrations of THC in the blood do not meaningfully correspond to levels of impairment. For smoked cannabis, peak THC levels are reached in the blood almost immediately whereas it takes approximately 90 minutes for a person to reach peak impairment. THC levels decline exponentially, and by the same 90 minutes have already dropped by 80 – 90% from their peak. Accordingly, a person may have low impairment when their THC levels are high, and a high degree of impairment when their THC levels are low.[3] The peak THC blood concentrations for edibles remains suppressed compared to smoked or vaped cannabis and may never reach above 5 ng/mL – the per se levels set for drivers in some states such as Washington.[4]

5. **Inaccuracies in product labeling can create significant consumer and public safety risk.** Product labels may be wrong about the amount, identity, or presence of THC and other cannabinoids.
    - *Incorrect THC concentrations*: A 2026 VCU analysis found only 44% of cannabis beverage brands tested contained Δ9-THC concentrations within 20% of the labeled amount; only 11% contained CBD within 20% of the labeled amount.[5]
    - *Undisclosed THC*: Many products labeled as THC free, zero THC, or CBD only may contain THC. A VCU analysis of cannabinoid-containing e-liquids found THC in 5 of 9 products labeled as THC free.[6]
    - *Unexpected cannabinoids*: An analysis of 55 commercially available cannabinoid products found only 18.2% contained all labeled cannabinoids with no additional cannabinoids detected; additionally, measured concentrations varied by -100% to 750% the values on the label.[7]

6. **Intoxicating hemp products can create youth-access risk and accidental-exposure risks.** Hemp-derived intoxicating products are sold as gummies, candies, beverages, and other familiar foods. Some have been packaged to resemble popular snacks. Depending on state law, products sold outside regulated cannabis systems may not be subject to equivalent age-verification, testing, packaging, potency, and marketing requirements.

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[2] Schlienz, et al. (2020). Pharmacodynamic dose effect of oral cannabis ingestion in healthy adults who infrequently use cannabis. *Drug and Alcohol Dependence, 211*, 107969; Spindle, et al. (2018). Acute effects of smoked and vaporized cannabis in healthy adults who infrequently use cannabis: A crossover trial. *JAMA Network Open, 1*(7), e184841.

[3] Compton, R. (2017). *Marijuana-impaired driving – A report to Congress*. (Report No. DOT HS 812 440). National Highway Traffic Safety Administration.[4] Schlienz, et al. (2020). Pharmacodynamic dose effect of oral cannabis ingestion in healthy adults who infrequently use cannabis. *Drug and Alcohol Dependence, 211*, 107969

[4] Schlienz, et al. (2020). Pharmacodynamic dose effect of oral cannabis ingestion in healthy adults who infrequently use cannabis. *Drug and Alcohol Dependence, 211*, 107969

[5] Stone, M. B. (2026). *Analysis of cannabis drinks* [Directed research project, Virginia Commonwealth University]. VCU Scholars Compass. https://doi.org/10.25772/f3tc-cp25.

[6] Holt, A. K., Poklis, J. L., & Peace, M. R. (2021). A retrospective analysis of chemical constituents in regulated and unregulated e-cigarette liquids. *Frontiers in Chemistry, 9, 752342.*

[7] Outhous, A. E., Holt, A. K., Poklis, J. L., & Peace, M. R. (2024). Evaluation of cannabis product mislabeling: The development of a unified cannabinoid LC-MS/MS method to analyze e-liquids and edible products. *Talanta Open*, *10,* 100349.

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