

Cannabis & Driving Impairment

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Experimental
Data



Population
Data



ISSUES IN CANNABIS AND DRIVING IMPAIRMENT

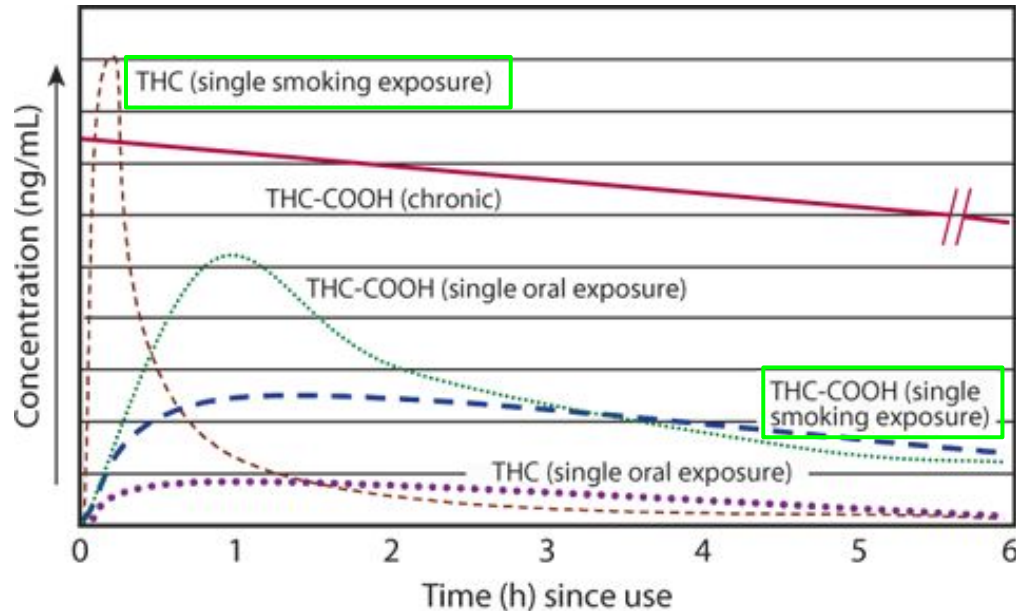
- **Occasional vs chronic use**
 - Tolerance, higher blood THC
- **Low dose vs high dose THC**
 - Use standard NIDA joints
- **THC is not alcohol**
 - Different metabolism, different effects
- **Inhaled vs oral products**

REVIEW OF CANNABIS METABOLISM

- **THC -> 11-OH THC -> THC-COOH**
- **Active: THC & 11-OH THC**
- **Inactive: THC-COOH**

REVIEW OF CANNABIS METABOLISM

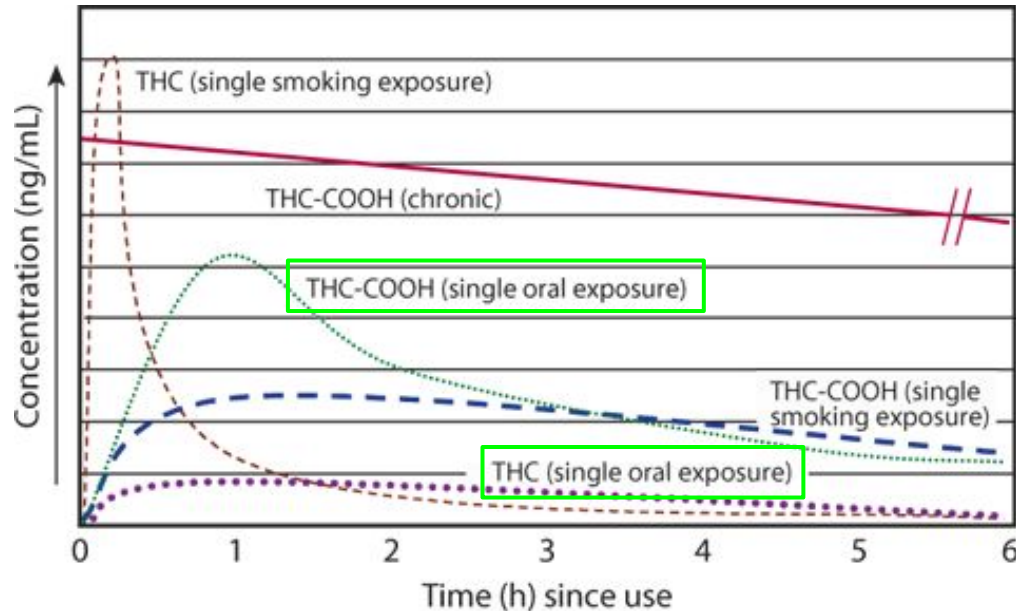
- THC \rightarrow 11-OH THC \rightarrow THC-COOH



Source: L.S. Nelson, M.A. Howland, N.A. Lewin, S.W. Smith, L.R. Goldfrank, R.S. Hoffman: Goldfrank's Toxicologic Emergencies, Eleventh Edition
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CANNABIS & DRIVING - EXPERIMENTAL

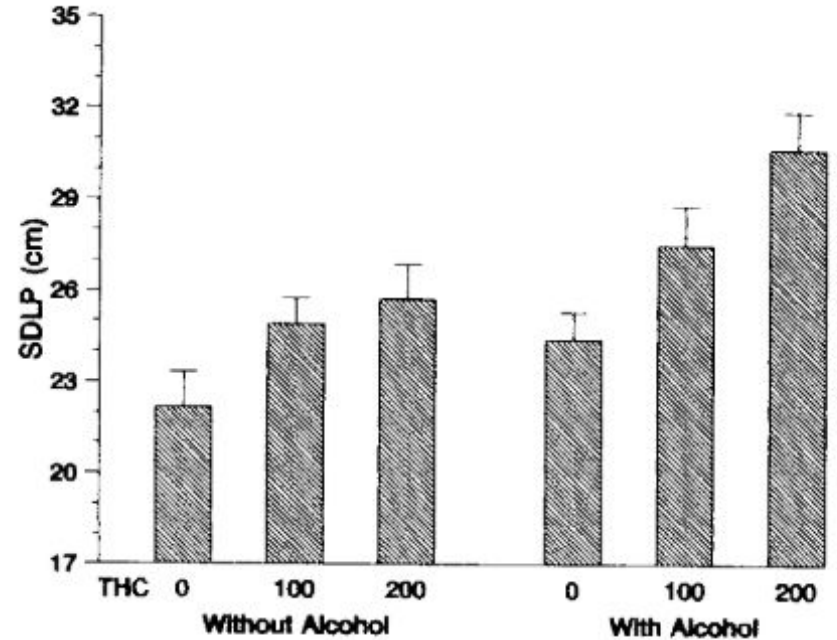
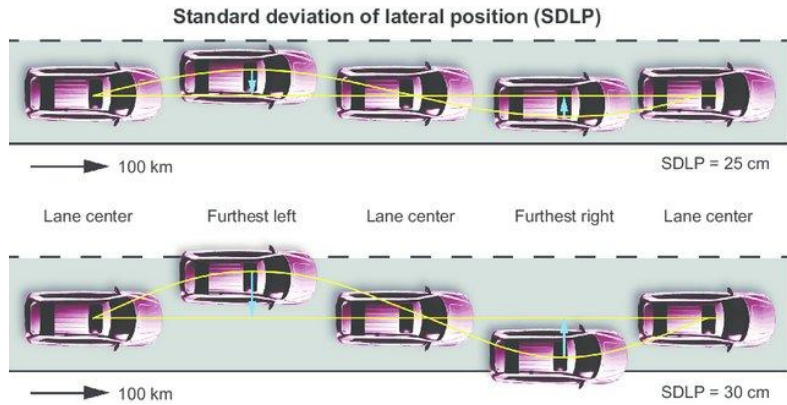


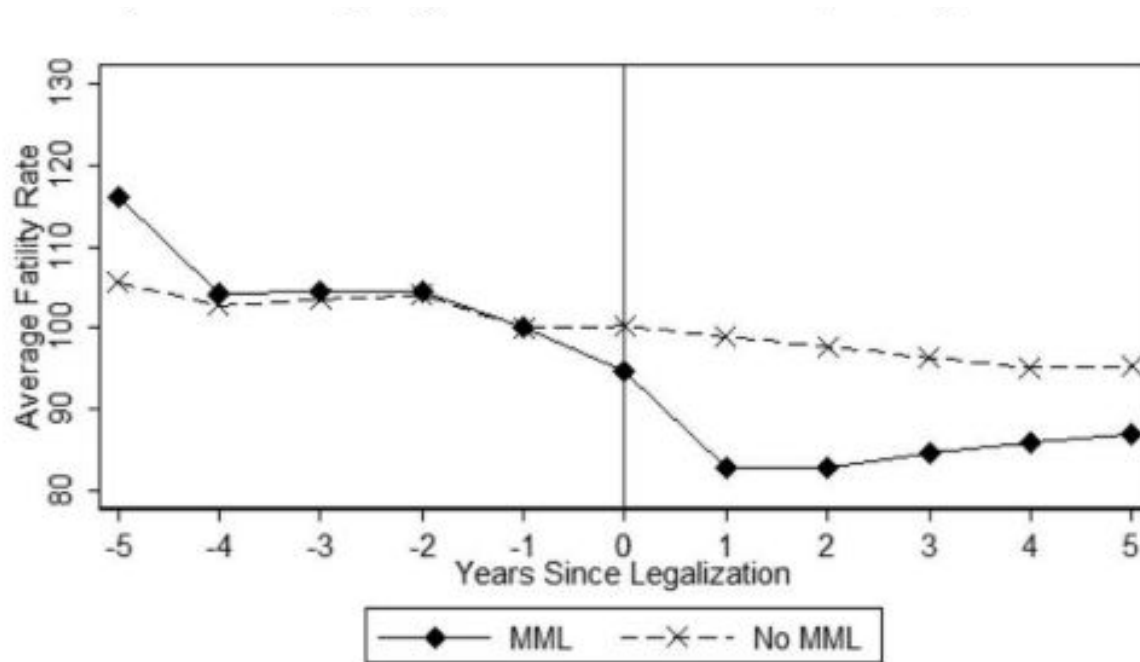
Figure 4. Mean (\pm SE) SDLP in the road-tracking test by THC dose and absence or presence of alcohol (averaged across repetitions)

CANNABIS & DRIVING - AUSTRALIA

Table 4. Statistical summary of cannabis data using logistic model

Parameter	N (percentage of population)	Point estimate (OR)	95% Confidence limits
Drug and alcohol free	1704 (50.1%)	1.0	–
All drugs ^a	907 (26.7%)	1.7 ^b	1.3–2.2
THC-only ^c	58 (1.7%)	2.7 ^b	1.02–7.0
THC-only ^c (≥ 5 ng/ml)	49 (1.4%)	6.6 ^b	1.5–28
THC plus BAC (≥ 0.01 g%) vs. BAC ^d	43 (1.3%)	2.9 ^b	1.1–7.7
THC plus BAC (≥ 0.01 g%) vs. BAC in motor cyclists ^d	33 (5.1%) ^c	2.4	0.5–12

CANNABIS & DRIVING – US NHTSA



CANNABIS, DRIVING, & IMPAIRMENT

- Alcohol – BAC 80 mg/dL (except Utah!)
- THC – no consensus
 - Zero tolerance
 - Per se laws (cutoff like alcohol)
 - “Under the influence”
 - Really complicated

CANNABIS & DRIVING

- **THC impairs driving ability**
- **Alcohol makes it worse**
- **Overall impact may be confounded**
- **Don't drive for 6-8 hours after use**

REFERENCES

1. Anderson DM, Hansen B, Rees DI. Medical Marijuana Laws, Traffic Fatalities, and Alcohol Consumption. 2013;56(2):333-69.
2. Drummer OH, Gerostamoulos J, Batziris H, Chu M, Caplehorn J, Robertson MD, et al. The involvement of drugs in drivers of motor vehicles killed in Australian road traffic crashes. *Accident Analysis & Prevention*. 2004;36(2):239-48.
3. Neavyn MJ, Blohm E, Babu KM, Bird SB. Medical marijuana and driving: a review. *Journal of medical toxicology : official journal of the American College of Medical Toxicology*. 2014;10(3):269-79.
4. Robbe H. Marijuana's impairing effects on driving are moderate when taken alone but severe when combined with alcohol. *Hum Psychopharm Clin*. 1998;13(S2):S70-S8.
5. Rebecca L Hartman, Marilyn A Huestis, Cannabis Effects on Driving Skills, *Clinical Chemistry*, Volume 59, Issue 3, 1 March 2013, Pages 478–492, <https://doi.org/10.1373/clinchem.2012.194381>