

Cannabis in road traffic

Why can cannabis use be dangerous for road traffic?

- Acute cannabis intoxication can impair cognitive and psychomotor skills required for safe driving behaviour (Pearlson et al., 2021; Verstraete and Legrand, 2014; Compton, 2017b; Beirness, 2017)
- Cannabis intoxication is linked with a higher likelihood of being involved in a road traffic accident (Wong et al., 2014; Asbridge et al., 2012; Li et al., 2012)
- Unclear how residual blood alcohol may affect crash risk (Compton, 2017a; EMCCDA, 2018)
- Risk of drinking and driving is much higher (Rogeberg & Elvik, 2016; EMCDDA, 2012, EMCCDA, 2018; Compton, 2017 a,b)

What drug tests and detection options are available?

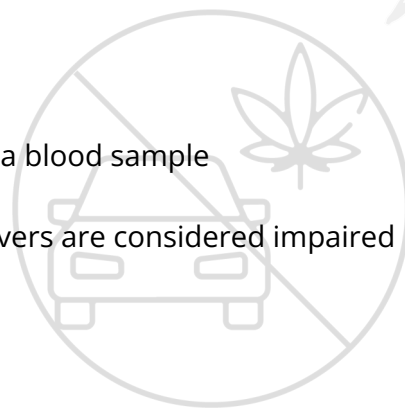
Common practice:

1. Checking the driver's behaviour
2. Saliva test to check for THC content
3. If the result of the saliva test is positive: further test with a blood sample

If the THC concentration in the blood exceeds the legal limit, drivers are considered impaired (EMCCDA, 2018)

Problems with analysis:

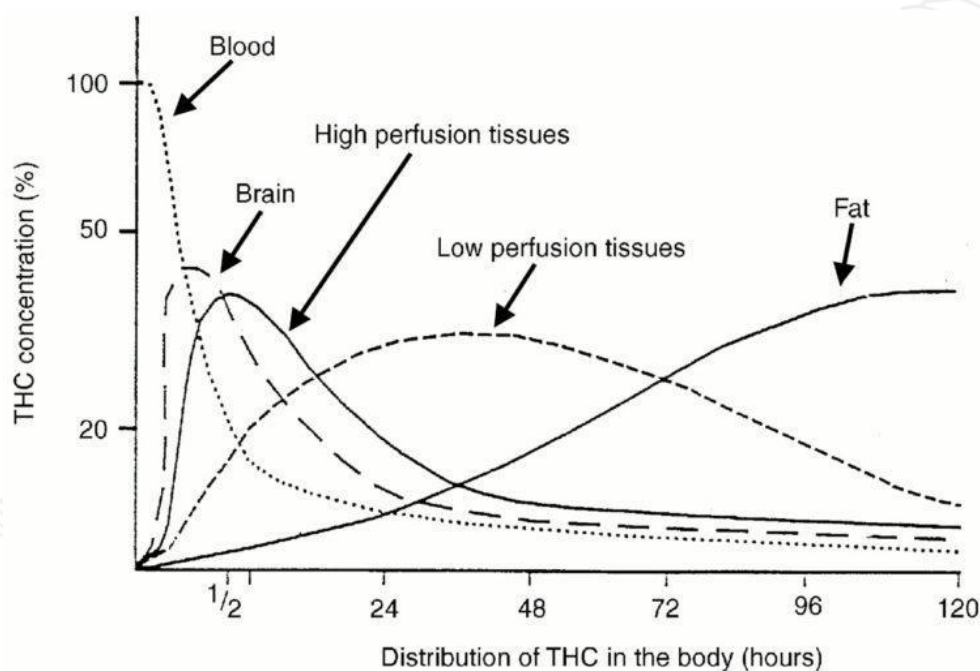
- Often results of saliva and blood tests do not match
- Presence of THC in blood does not necessarily mean that drivers were impaired by cannabis at the time of the accident (Beirness, 2017; Compton, 2017a)
- Cannabis use is tested in a way that is practical for police to implement and acceptable to the public, even if the scientific basis for doing so is weak (Hall, 2018)
- Values have a weak pharmacological and epidemiological basis (Compton, 2017a; Pearlson et al., 2021)
- Blood THC levels serve to deter cannabis use rather than protect public safety (Quilter & McNamara 2016)



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Metabolisation of THC

- After inhalation of cannabis, there is initially a very steep rise in THC concentration in the blood, then a rapid drop (Compton, 2017a)
- Peak of impairment is 20 to 40 minutes after inhalation (Sewell et al., 2009), even if the THC peak in the blood has long been passed
- Due to storage in adipose tissue, THC can be detected in the blood at very low concentrations long after impairment (EMCCDA, 2018; Heustis, 2005)



Metabolization of THC (Ashton 2001)

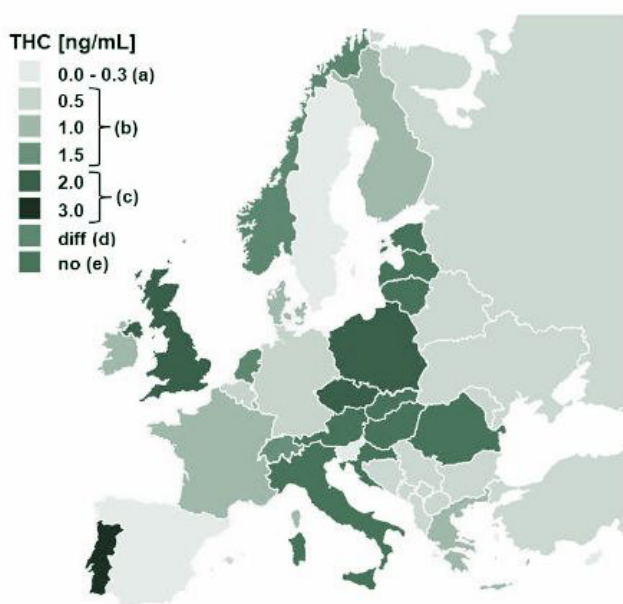
Factors influencing the impairment of driving ability

- Inhalation or oral intake
- Frequency of use
- Mixed use with e.g. alcohol (Wolff & Johnston, 2014; EMCCDA, 2018)
- Different types of cannabis can produce different subjective experiences in users, which can affect driving safety (Burt et al., 2021)

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Which limit is recommended by experts?

- Germany: Tolerance limit 1.0 ng/ml THC (zero tolerance) (StVG § 24a), but cannabis patients are allowed to participate in road traffic if they are not impaired in their driving ability due to medication
- THC concentration in the blood of 3.7 ng/ml (Berghaus et al., 2010) comparable to impairment of 0.05% (0,5 mg/ml) blood alcohol concentration
- Colorado: impairment may be present at 5 ng/ml THC (Pardo 2014)
- Expert committees have recommended concentrations of 5 ng/ml (UK) (Wolff et al., 2013) or 7 ng/ml (Ramaekers et al., 2004)
- Georg Wurth (DHV) has called for an increase to 10 ng/ml (Bundestag, 2021)



Europäische Grenzwerte für THC im Blut

Legal limit concentrations of THC in blood in some European countries (BAG, 2020)

Recommendations for regulatory adjustments

- Raise the tolerance level for recreational and medicinal cannabis
- Introduction of a drug test that determines the state of intoxication and not the residual value
- Penalties commensurate with the risk to road safety (Hughes, 2017; Ramaekers, 2017; Vindenes, 2017)
 - Graduated penalties according to the level of THC concentration in the blood
 - Higher penalties for repeated driving while impaired
 - Higher penalties for mixed use
- Referral to drug counselling or treatment (EMCCDA, 2018)

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Sources:

- Asbridge et al. (2021): Acute cannabis consumption and motor vehicle collision risk: systematic review of observational studies and meta-analysis. *BMJ* 2021; 344: 14– 7.
- Ashton (2001): Pharmacology and effects of cannabis: a brief review. *Br J Psychiatry*. 2001 Feb;178:101-6. Review. PubMed PMID: 11157422
- BAG (2020): Faktenblatt THC-Grenzwert für Cannabis im Straßenverkehr https://www.bag.admin.ch/dam/bag/de/dokumente/npp/faktenblaetter/faktenblaetter-cannabis/faktenblatt_thc-grenzwerte_strassenverkehr.pdf.download.pdf/Faktenblatt_THC-Grenzwerte_im_Straassenverkehr.pdf
- Beirness (2017): Drugs and driving: issues and developments. Third International Symposium on Drug-Impaired Driving. Lisbon, October 27: European Monitoring Centre for Drugs and Drug Addiction, 2017.
- Beirness & Porath (2017), Clearing the smoke on cannabis: cannabis use and driving — an update, Canadian Centre on Substance Use and Addiction, Ottawa, Ontario
- Berghaus et al. (2010), Meta-analysis of empirical studies concerning the effects of medicines and illegal drugs including pharmacokinetics on safe driving, DRUID Deliverable 1.1.2b, Bundesanstalt für Straßenwesen, Köln.
- Bundestag (2021): <https://www.bundestag.de/presse/hib/824290-824290>
- Burt et al. (2021): Perceived effects of cannabis and changes in driving performance under the influence of cannabis. *Traffic Injury Prevention*, Vol. 22, 2021
- Compton (2017a): Marijuana-impaired driving: a report to Congress, National Highway Safety Transport Administration, Washington
- Compton (2017b), 'Testing for cannabis impairment in drivers: chemical and/or behavioral tests', Third international symposium on drug-impaired driving, European Monitoring Centre for Drugs and Drug Addiction, Lisbon, 23 October 2017.
- Drucksache 18/11701: Antwort der Bundesregierung auf die Kleine Anfrage der Abgeordneten Frank Tempel, Ulla Jelpke, Jan Korte, Dr. Petra Sitte und der Fraktion DIE LINKE. – Drucksache 18/11485 –Cannabismedizin und Straßenverkehr
- EMCDDA (2012) Driving under the influence of drugs, alcohol and medicines in Europe: findings from the DRUID project, Thematic Papers, European Monitoring Centre for Drugs and Drug Addiction, Lisbon, https://www.emcdda.europa.eu/publications/thematic-papers/druid_en
- EMCDDA (2018): Cannabis und Führen eines Kraftfahrzeugs, Fragen und Antworten für das Finden einer politischen Entscheidung, Mai 2018, Europäische Beobachtungsstelle für Drogen und Drogensuch https://www.emcdda.europa.eu/system/files/publications/8805/20181120_TD0418132DEN_PDF.pdf
- Hall (2018). How should we respond to cannabis-impaired driving? *Drug and Alcohol Review*, 37(1), 3-5. <https://doi.org/10.1111/dar.12651>
- Heustis (2005): Pharmacokinetics and metabolism of the plant cannabinoids, delta9-tetrahydrocannabinol, cannabidiol and cannabinol. *Handb Exp Pharmacol* 2005; 168: 657– 90.
- Hughes (2017): Contemporary challenges for regulatory models: which approach to take? A conceptual overview. Third international symposium on drug-impaired driving, European Monitoring Centre for Drugs and Drug Addiction, Lisbon, 23 October 2017.
- Li et al. (2021): Marijuana use and motor vehicle crashes. *Epidemiol Rev* 2012; 34: 65– 72.
- Pardo (2014): Cannabis policy reforms in the Americas: a comparative analysis of Colorado, Washington, and Uruguay. *Int J Drug Policy* 2014; 25: 727– 35.
- Pearlson et al. (2021): Cannabis and Driving. *Frontiers in Psychiatry*, Sep. 2021, Vol. 12
- Sewell et al. (2009): The effect of cannabis compared with alcohol on driving. *Am J Addict*. (2009) 18:185–93. doi: 10.1080/10550490902786934
- Quilter & McNamara (2016): 'Zero tolerance' drug driving laws in Australia: a gap between rationale and form? *Int J Crime Justice Soc Democracy* 2016; 6: 47– 71.
- Sewell et al. (2009): The effect of cannabis compared with alcohol on driving. *Am J Addict*. 2009;18(3):185–93.
- Ramaekers et al. (2004): 'Dose related risk of motor vehicle crashes after cannabis use', *Drug and Alcohol Dependence* 73, pp. 109-119.
- Ramaekers (2017): 'Dutch policy on cannabis and driving', Third international symposium on drug- impaired driving, European Monitoring Centre for Drugs and Drug Addiction, Lisbon, 23 October 2017
- Røgeberg & Elvik (2016): The effects of cannabis intoxication on motor vehicle collision revisited and revised. *Addiction*. (2016) 111:1348–59. doi: 10.1111/add.13347
- Straßenverkehrsgesetz (StVG) § 24a
- Verstraete & Legrand (2014), Drug use, impaired driving and traffic accidents, EMCDDA Insights 16, Amt für Veröffentlichungen der Europäischen Union, Luxemburg, http://www.emcdda.europa.eu/publications/insights/2014/drugs-and-driving_en
- Vindenes (2017), 'Where should the limit be? Defining per se laws', Third international symposium on drug-impaired driving, European Monitoring Centre for Drugs and Drug Addiction, Lisbon, 23 October 2017.
- Wolff et al. (2013): Driving under the influence of drugs: making recommendations on the drugs to be covered in the new drug driving offence and the limits to be set for each drug, Report from the Expert Panel on Drug Driving, Department of Transport, London
- Wolff & Johnston (2014): 'Cannabis use: a perspective in relation to the forthcoming UK drug driving legislation. *Drug Test Analysis* 6, pp. 143-54, doi: 10.1002/dta.1588.
- Wong et al. (2014): Establishing legal limits for driving under the influence of marijuana. *Inj Epidemiol*. (2014) 1:1. doi: 10.1186/s40621-014-0026-z