

# Medical Cannabis & Novel Psychoactive Substances (NPS)

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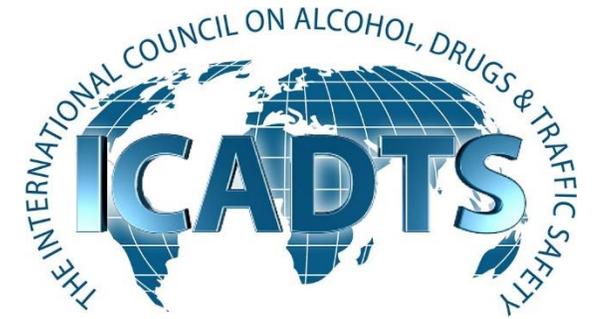


# Overview

- Medical cannabis

- Definition & use
- Relief of symptoms
- Tolerance
- Driving exemptions
- CBD & driving performance
- Synthetic cannabis risk, prevalence & detection
- Synthetic impairing effects

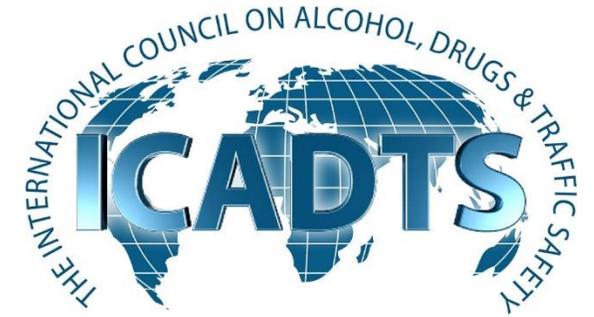




# Medical Cannabis

- Refers to a wide variety of products and methods of preparation including herbal cannabis (dried flowers of the cannabis plant) and cannabis extracts (e.g., oils, tinctures).
- In general, these products contain either THC or CBD as the primary active ingredient, or some combination of the two compounds.
- There is an ever-growing number of cannabis *strains* which can vary substantially with respect to concentrations of THC, CBD, and other plant compounds.
- There are also several medical products with market authorization such as Dronabinol and Sativex®





# Medical Cannabis

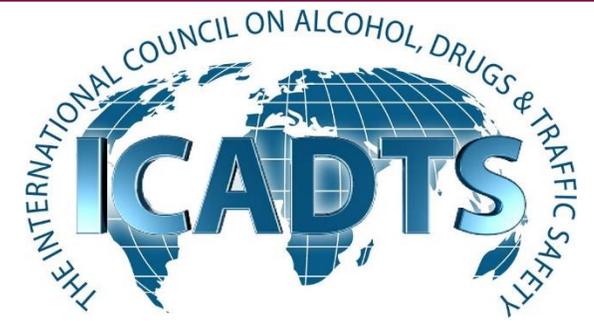
- **Use of medical cannabis:**

- Smoking is a common route of administration because of rapid onset of drug effects, but not advised due to negative health consequences.
- Safer and more precise methods of administration include vaporizing below the point of combustion (*vaping*) or ingesting oils or extracts.

- **Relief of symptoms:**

- Often used to treat conditions which can affect driver behaviour and performance and may offset driving impairment by treating conditions *under medical supervision*.
- Review identified 6 studies exploring acute effects of THC on driving-related cognitive skills in persons with diverse medical conditions (Simmons et al., 2022).
- Therapeutic effects of THC were reported, but only 1 of 6 studies noted significant impairing effect on driving-related skills (McCartney et al., 2021).

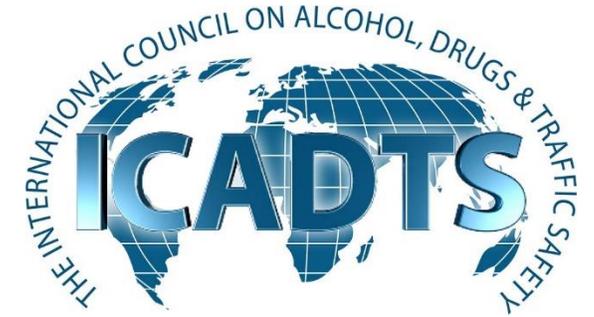




# Medical Cannabis & Tolerance

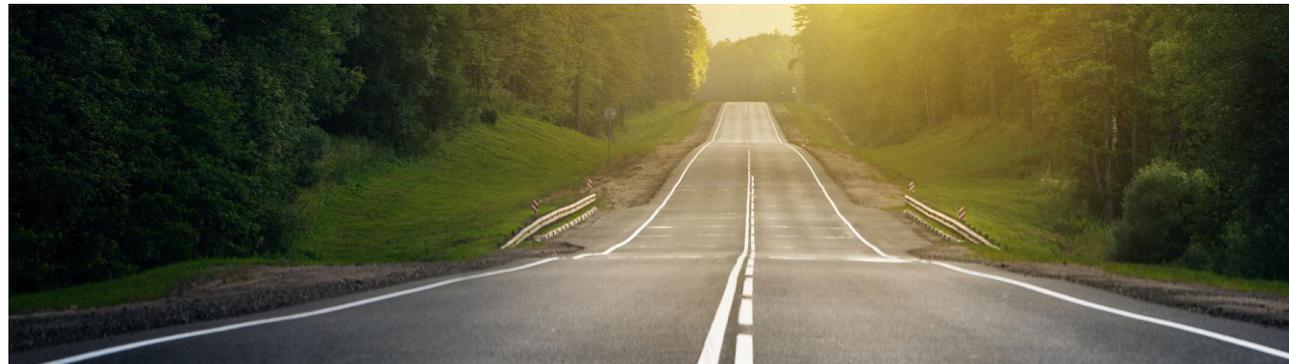
- Most experimental studies of effects of cannabis on driving have been conducted on healthy, young recreational cannabis consumers.
- People consuming medical cannabis typically use drug more frequently than recreational consumers and may develop pharmacological and behavioural tolerance to THC.
- In a study of occasional versus heavy cannabis consumers, there was no difference between groups in the subjective high experienced after a 10mg and 20mg dose of synthetic, medical THC (Bosker et al., 2012) but driving performance was impaired in occasional users.
- People who use cannabis more frequently may be less susceptible to its acute impairing effects (Perkins et al., 2021)
- Chronic consumers may consume higher doses of THC to overcome tolerance and achieve a high; cannabis-related driving impairment can occur (Marcotte et al., 2022).



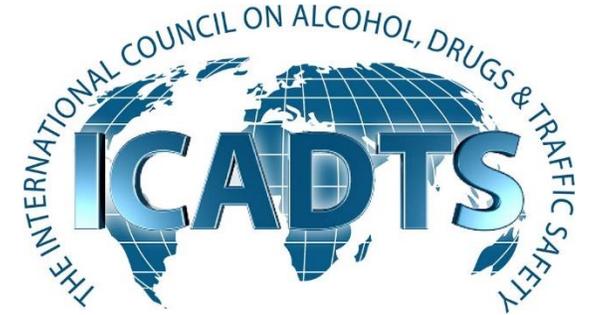


# Medical Driving Exemptions

- Medical cannabis consumers should do so under the supervision of a qualified medical professional.
- They are advised to titrate doses upward slowly as needed and as approved by a medical professional.
- They should refrain from driving in the first two weeks after initiation of cannabis use and after each increase in dose.
- They should also be made aware of legislation pertaining to medical use of cannabis in their jurisdiction.



# Synthetic Cannabinoids



- **Driving risk**

- Novel SCs represent a large group of new psychoactive substances (EMCDDA, 2021) and potentially pose a serious traffic safety risk.
- Often sold as herbal smoking blends (e.g., Spice, K2, Kronic), SCs bind to same receptors as THC but often have far higher potency and efficacy (Adams et al., 2017).
- Controlled administration laboratory studies using low doses of one of the earliest SCs (JWH-018) demonstrated acute impairment of motor coordination, attention, response speed, and memory. (Theunissen et al., 2018; 2019).
- It is expected that effects on psychomotor performance in consumers who use large amounts or overdose of SCs pose an even greater road safety risk than demonstrated in these studies.



# Synthetic Cannabinoids

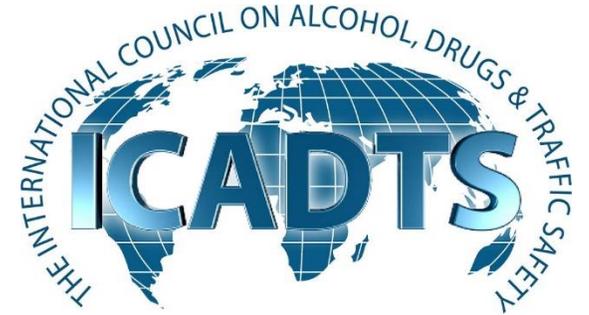


- **Prevalence in road crashes**

- Few cases of suspected impaired driving under the influence of SCs have been studied (Chase et al., 2016; Yeakel & Logan, 2013; Musshoff et al., 2014).
- Performance impairment was similar to that typically observed with cannabis use, but.....overall, the prevalence of SCs in drug-impaired driving cases is low.
- A retrospective analysis (Fels et al., 2020) of novel psychoactive substances in blood samples of German drivers suspected of drug-impaired driving detected synthetic cannabinoids in only 1.4% of cases.
- Indirect evidence in a Japanese study examining a sample of vehicle collisions attributed to illicit drugs suggested 93 of 96 drivers had used SCs but they were identified in blood or urine only in a minority of cases (Kaneko, 2017).



# Synthetic Cannabinoids

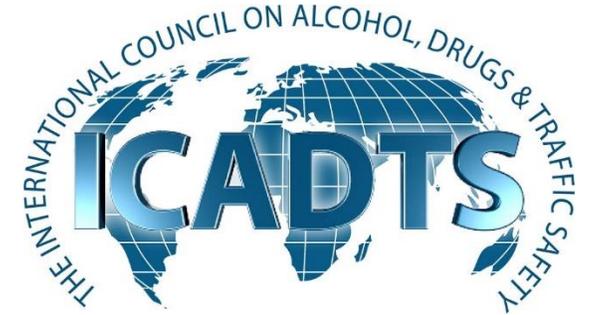


- **Detection**

- Standard Field Sobriety Tests (SFSTs) are used in some jurisdictions to detect impairment caused by cannabinoids when alternative tools are unavailable.
- But SFSTs have limited sensitivity to detect the impairing effects of natural cannabis or Dronabinol or SCs (Bosker et al., 2012; Downey et al., 2012).
- SCs are not detectable in standard drug tests because they are present in very low concentrations in blood and oral fluid.
- A very sensitive liquid chromatography-mass spectrometry (LC-MS/MS) analysis capable of detecting all SCs is required for testing purposes.



# Synthetic Cannabinoids

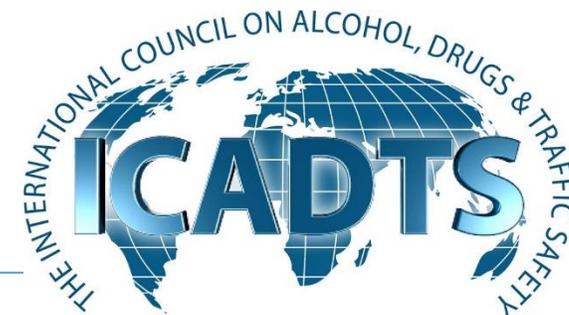


- **Impairment compared to natural cannabis:**

- Both THC and SCs bind to the same cannabinoid receptor (CB1).
- Whereas natural THC acts as a relatively weak CB1 partial agonist, most SCs are full agonists, and, as a result, SCs are often much more potent (Adams et al., 2017).
- SCs can also induce psychotomimetic more often and more strongly than natural cannabis (Fattore, 2016).
- A major issue is that SCs have unpredictable effects on consumers (Kassai et al., 2017).
- Many varieties of SCs but the specific type used in a product is not indicated on packaging (Seely et al., 2012).
- By comparison, natural cannabis produces more predictable effects and can be administered in controlled doses.



# ICADTS DUID Working Group Members



## Acknowledgements

Special thanks to ICADTS Drugged Driving Work Group Co-Chairs: Jan Ramaekers, [Maastricht University](#) (Netherlands) Robyn D. Robertson, [Traffic Injury Research Foundation](#) (Canada) & Thomas Arkell, [Swinburne University](#) (Australia) and the Members who contributed their expertise.

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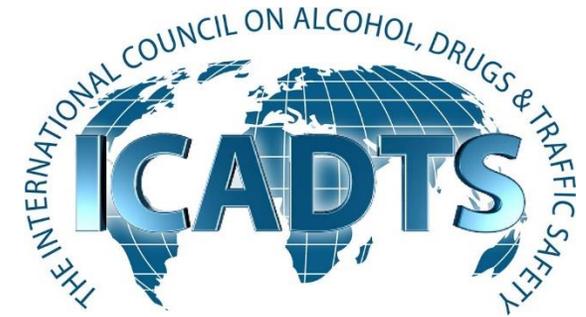
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# ICADTS DUID Working Group

- Many countries are exploring legislative strategies for cannabis legalization.
- Initiatives are more often led by health instead of transportation.
- Impaired driving receives less attention.
- Yet legislation and allocation of resources have the potential to dramatically impact impaired driving problem in the coming years.
- ICADTS work group was formed to tackle this issue and inform policymakers around the globe.



**Maastricht University**



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