CANNABIS & DRIVING

International Council on Alcohol, Drugs & Traffic Safety

6: Medical Cannabis & Novel Psychoactive Substances (NPS)

Does medical cannabis differ from recreational cannabis with respect to driving?

Defining medical cannabis.

Medical cannabis can refer to a wide variety of products and methods of preparation including herbal cannabis (the 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* (varieties of the plant) 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® (an oromucosal spray containing a 1:1 ratio of THC and CBD which is used to treat spasticity associated with multiple sclerosis).

An important issue in the provision of cannabis preparations for medical use is how it is consumed. Smoking is a common route of administration (and the traditional mode of consumption for recreational consumers) because it produces a rapid onset of drug effects. Safer and more precise methods of administration are available, however, such as vaporizing below the point of combustion (*vaping*) or ingesting oils or extracts. Smoking is not recommended as a route of administration because of its adverse health effects.

Relief of Symptoms

Individuals often use cannabis medically to treat conditions (e.g., pain, anxiety, stress) that can affect driver behaviour and performance. Relief of these symptoms by medical use of cannabis may offset driving impairment caused by the condition being treated *under medically supervised conditions*.[1] A recent review[2] identified six studies exploring the acute effects of THC on driving-related cognitive skills in individuals with diverse medical conditions such as Tourette syndrome, ADHD, and diabetic neuropathy. While therapeutic effects of THC were reported (e.g., reduced hyperactivity), only one of the six studies reported a significant impairing effect of THC on driving-related skills.[3]

Tolerance

To date, most experimental studies of the effects of cannabis on driving have been conducted on healthy young drivers who use cannabis recreationally. By contrast, people who use cannabis medically typically use the drug more frequently than recreational consumers and, as a result, may develop pharmacological and behavioural tolerance to the effects of THC. In a study of occasional (less than once per week) versus heavy (primarily daily) cannabis consumers,[4] there was no difference between groups in the subjective high experienced after a 10mg and 20mg dose of synthetic, medical THC. However, driving

performance was impaired only among occasional consumers. This suggests people who use cannabis more frequently may be less susceptible to its acute impairing effects.[5] Chronic consumers may, however, consume higher doses of THC to overcome their tolerance and achieve a high, in which case cannabis-related driving impairment can occur.[6]

Results from other studies likewise suggest individuals develop tolerance to the effects of cannabis over time. For instance, when cannabis naive patients received their first dose of medical cannabis, they showed poorer performance on a range of driving-related cognitive tasks.[7,8] However, patients treated with cannabis for at least a few weeks with a stable dose showed no decline in neurocognitive performance and actually performed better in some cases than they did before commencing treatment.[9,10] A recent review showed most multiple sclerosis patients using Sativex® exhibited either no change or an improvement in driving rather than a deterioration,[11] although it is important to note that none of these studies assessed driving performance directly (i.e., by using a simulator or on-road driving).

THC content

Medical consumers may be more likely than recreational consumers to use cannabis products with lower THC content, potentially reducing their collision risk.[12] Further population-level comparison of cannabis use patterns among recreational and medical cannabis consumers is needed.

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Should patients who are prescribed medical cannabis be given a medical designation for driving?

Those who use cannabis medically 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.

Does CBD affect driving performance and can it counteract the effects of THC?

A recent on-road driving study showed CBD-dominant cannabis did not produce any driving impairment compared to placebo,[13] although at least one study suggested CBD might be associated with impairment.[14] Further, it seems that when consumed with alcohol, CBD can increase impairment and more research on this topic is needed. Cannabis containing mainly THC or a combination of THC and CBD, did cause driving impairment for up to four hours after inhalation. From this and another study,[15] it can be concluded that CBD *when consumed alone*, does not impair driving performance nor does CBD reduce the impairing effects of THC.

Do novel synthetic cannabinoids (SCs) pose a risk to traffic safety?

Yes, novel SCs potentially pose a serious traffic safety risk.

While some medical cannabinoids have been synthetically manufactured for decades, novel SCs represent a large group of new psychoactive substances with 209 identified in the European Union (EU) over the 13 years between 1 January 2008 and 31 December 2020, including 11 identified for the first time in 2020.[16] SCs are often sold as herbal smoking blends with names such as Spice, K2 and Kronic. SCs bind to the same receptors as tetrahydrocannabinol (THC) but often have far higher potency and efficacy.[17] 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.[18,19] It is expected that effects on psychomotor performance in consumers who use large amounts or overdose on SCs pose an even greater road safety risk than demonstrated in these studies.

What is the prevalence of SCs in traffic crashes?

To date, research suggests the prevalence of SCs in traffic crashes is relatively low.

A few cases of suspected impaired driving under the influence of SCs have been studied.[20,21,22] The performance impairment was similar to that typically observed with cannabis use. However, overall, the prevalence of SCs in drug-impaired driving cases is low. In a retrospective analysis of novel psychoactive substances (NPS) in blood samples of German drivers suspected of drug-impaired driving, synthetic cannabinoids were detected in only 1.4% of cases.[23] This is likely because fewer people use SCs than natural cannabis. It may also partially be explained by a large variety of SC products on the market and the analytical challenges in detecting them in biological samples. On the other hand, in a Japanese study examining a sample of vehicle collisions attributed to illicit drugs, indirect evidence suggested that 93 of 96 drivers had used SCs,[24] but SCs were identified in blood or urine only in a minority of cases, again suggesting prevalence is low.

How do the effects of synthetic cannabis differ/compare to natural cannabis?

SCs produce much stronger and more unpredictable effects than 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. As a result, SCs are often much more potent (up to 85 times more potent than THC).[17] SCs can also induce psychotomimetic (i.e., producing an effect similar to a psychotic state) more often and more strongly than natural cannabis.[25]

A major issue is that SCs have unpredictable effects on consumers.[26] There is a large variety of available SCs, and the specific type of SCs used in a mixture are not indicated on product packaging.[27] The active ingredients in SC products also change regularly, and there is a large degree of variability in the active ingredient(s) and their distribution within the products.[28] By comparison, natural cannabis produces more predictable effects and can be administered in controlled doses.

Can standard roadside tests detect SCs?

Current roadside tests have limited ability to detect SCs.

Standardized Field Sobriety Tests (SFSTs) have been developed to detect impairment caused by alcohol (see ICADTS Cannabis-Impaired Driving Detection & Toxicology). In the absence of alternative tools, SFSTs are also used in some jurisdictions to detect impairment caused by cannabinoids. Research has, however, demonstrated that SFSTs have limited sensitivity to detect the impairing effects of natural cannabis or Dronabinol (synthetic THC used to treat HIV/AIDs-related anorexia and chemotherapy-induced nausea and vomiting).[4, 29] SFSTs also appear to have limited sensitivity in detecting the impairing effects of SCs. 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.

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About ICADTS

The International Council on Alcohol, Drugs & Traffic Safety (ICADTS) is an independent not-for-profit body whose only goal is to reduce mortality and morbidity brought about by misuse of alcohol and drugs by operators of vehicles in all modes of transport.

To accomplish this goal, the Council sponsors international and regional conferences to collect, disseminate and share essential information among professionals in the fields of law, medicine, public health, economics, law enforcement, public information and education, human factors and public policy.

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