

Independent Expert Panel on Drug Driving
Interim Advice
Proposed Blood Limits for THC and Methamphetamine
16 July 2020

Preamble

In December 2019, Cabinet agreed to establish the Independent Expert Panel on Drug Driving (the Panel) to provide recommendations on:

- blood drug concentrations to be specified in legislation that align with impairment equivalent to a blood-alcohol concentration of 80 milligrams of alcohol per 100 millilitres of blood (80 mg/100mL)
- the lower level tolerance thresholds to be applied to the detection of drugs in blood as analysed by the Institute of Environmental Science and Research (ESR)
- the cut-off thresholds to be included in oral fluid testing devices that may be used for roadside testing.

The low-level tolerance thresholds to be applied to blood analysis and oral fluid devices, are being established to avoid penalising drivers who have:

- accidental or passive exposure to drugs
- a low residual level of a drug that is unlikely to impair driving in their blood due to previous but not recent use
- consumed a prescribed dose of a prescription or over-the-counter medicine that is unlikely to impair driving.

The Panel is initially focussing on the blood drug concentrations to be specified in legislation. It has divided its work on this into three areas:

1. Determining which drugs should have statutory limits
2. Investigating the blood levels of these drugs that equate with impaired driving with a view to proposing statutory limits
3. Assessing the available analytical methodology that might be applied to the proposed statutory limits.

The Panel understands that this legislation aims to improve road safety by raising awareness of the dangers of drug impaired driving and deterring this behaviour, but not criminalising drivers whose drug use is unlikely to have impact on driving skills.

This interim report recommends blood levels for tetrahydrocannabinol (THC, the principal active constituent of cannabis) and methamphetamine. The purpose of this report is to provide initial recommendations in a high-level report to give Ministers an overview of the direction of travel. The intention is that the content in this interim report will be part of a larger report that is finalised in October 2020.

Executive summary

Roadside oral fluid testing will enhance the ability of Police to detect the use of impairing drugs by drivers. Where blood testing is carried out, the statutory limits should reflect drug use that can be linked to possible impairment based on drug concentrations in blood that align with drink driving measures of impairment, being a limit equivalent to a blood-alcohol limit of 80 mg/100mL– the level of the current drink driving criminal penalty

The Panel has initially focussed on cannabis and methamphetamine, as these are the most prevalent drugs detected in deceased, hospitalised and impaired drivers in New Zealand.

The Panel has used publications in the scientific literature, personal knowledge of the pharmacokinetics and pharmacodynamics¹ of the drugs under review, and information from studies carried out as part of police investigations of suspected drug-impaired driving by ESR to determine appropriate blood levels to reflect cannabis- and methamphetamine-impaired driving. The publications and reports the Panel used to support the recommendations can be found under Supporting Data at the end of this document.

The Panel's consideration of the above has concluded the following.

- In general, there is no simple relationship between blood drug levels and impairment.
- The greatest impairment from THC occurs about 90 minutes after inhalation when blood levels have dropped significantly.
- The use of methamphetamine increases crash risk at all blood levels determined so far.
- Many jurisdictions have set statutory blood drug limits for THC and methamphetamine, however it is acknowledged that these limits do not relate directly to impairment.
- Levels of THC and methamphetamine detected in impaired New Zealand drivers have been used to underpin recommendations for statutory limits.
 - Of the drivers that have been identified as being impaired by THC alone between 2017 and 2019, 90% had blood THC levels greater than 1 nanogram per millilitre (ng/mL).
 - Of the drivers that have been identified as being impaired by methamphetamine alone between 2017 and 2019, 90% had blood methamphetamine levels greater than 70 ng/mL.
- The recommended blood limit for THC is 1 nanogram of THC per millilitre of blood (ng/mL).
- The recommended blood limit for methamphetamine is 10 nanograms of methamphetamine per millilitre of blood (ng/mL).

¹At a high-level, pharmacokinetics relates to how drugs move through the body and pharmacodynamics relates to the body's biological response to drugs.

Introduction

Cannabis and methamphetamine are the most prevalent drugs detected in impaired drivers; i.e. drivers who have failed to satisfactorily complete a compulsory impairment test (CIT). The Land Transport (Drug Driving) Amendment Bill which will shortly be introduced in Parliament will enable Police to carry out roadside oral fluid testing of drivers for evidence of drug use. The proposed roadside testing for drugs follows a similar process to the current roadside testing for alcohol. This roadside drug testing legislation proposes to act as a deterrent, to increase the chance of being caught driving under the influence of drugs, to raise awareness of the dangers of drug impaired driving, but without criminalising drug use that is unlikely to have impact on driving skills.

The presence of a drug (or drugs) in oral fluid or blood does not mean that the person was impaired by that drug. Therefore, roadside oral fluid testing will not indicate impairment, but will determine the use of the drug by the driver. If the driver is not willing to accept the evidence of the roadside oral fluid tests, they can provide a blood sample for definitive analysis.

Decades of research have shown a strong correlation between blood alcohol (ethanol) levels and driving impairment. In contrast, for many other drugs that impair driving ability, no simple relationship between blood concentration and the level of impairment has been established.

The Panel has agreed to provide interim advice concerning statutory limits for THC and methamphetamine, as these drugs are frequently detected in deceased, hospitalised and impaired drivers in New Zealand.

Proposed statutory limits

Cannabis

Background

The dangers of driving after using cannabis are well documented, including factors such as; longer response times, reduced ability to think clearly and reduced ability to pay attention. The effects of cannabis may also include distorted perception, difficulty in problem solving, and loss of coordination.

There is no simple correlation between blood THC levels and impairment in the scientific literature.

Cannabis may be inhaled (smoked or vaped) or ingested for recreational purposes, or taken as a prescription medicine. Blood THC levels can decrease rapidly at a rate that is not consistent between individuals. There may be a significant decrease in a blood THC level between the time a driver is stopped by Police and an oral fluid screen or CIT is carried out, and the time a blood sample is taken for analysis.

When cannabis is inhaled, maximum blood THC levels occur within minutes of inhalation. The blood THC levels then drop rapidly. The greatest impairment occurs

about 90 minutes after inhalation when blood levels have dropped significantly (i.e. the maximum effect of the drug does not occur at the same time as maximum blood levels). Oral fluid THC levels are generally higher than blood THC levels for several hours after the drug has been inhaled.

When cannabis is ingested, peak blood THC levels and psychoactive effects occur two or three hours after use. Blood THC levels are lower, but the psychoactive effects are reported to be more intense than when the drug is inhaled.

Smoking or vaping cannabis can expose other people in the vicinity to THC (passive exposure). Studies have shown that the levels of THC in oral fluid or blood following passive exposure do not result in detection by roadside testing devices.

Evidence

Many countries have statutory blood limits for THC, ranging from 1 to 5 ng/mL. It is acknowledged that these limits do not relate directly to impairment but may reflect how recently the drug was used and the likelihood of impairment.

Since December 2009 the Police have carried out a CIT on drivers whom they have 'good cause' to suspect have consumed a drug or drugs. If the driver is assessed as being impaired physically and cognitively, a blood sample is taken and sent to ESR for analysis. Since the driver is assessed as impaired, the legislation does not require a determination of the level of any drug (or drugs) present. However, the analytical technique used at ESR to confirm the use of cannabis does determine a blood THC level and these data have been collected for several years.

Between 2017 and 2019, there were 452 impaired drivers who failed to satisfactorily complete the CIT, and who had used cannabis and no other drug. Their blood THC levels ranged from 0.2 to over 40 ng/mL (median 7 ng/mL, mean 10 ng/mL). Of these 452 impaired drivers, 90% had blood THC levels greater than 1 ng/mL and 80% had blood THC levels greater than 2 ng/mL.

Proposed statutory limit

Based on these findings, our reading of the scientific literature and in line with statutory limits in overseas jurisdictions, the panel proposes a statutory blood THC limit of 1 ng/mL.

Methamphetamine

Background

Methamphetamine is known to affect the ability to drive safely. Studies performed to date have found no correlation between methamphetamine blood levels and increased risk of crashing. The use of methamphetamine increases crash risk at all blood levels determined so far.

It is dangerous to drive after using psychostimulants such as methamphetamine due to drug-related overconfidence in driving skills that is not supported by actual improvement in driving ability. This might lead to risk-taking, aggressive and dangerous driving, and an impaired ability to react appropriately. In addition, a methamphetamine intoxicated driver can suddenly fall asleep as the stimulant effects wear off.

Blood methamphetamine levels depend on the route of administration, how much drug is taken, and how often the drug is taken. Methamphetamine may be smoked, snorted, injected or ingested. The onset of effects is significantly faster for the first three routes of administration compared to the oral route.

Methamphetamine blood levels do not decline quickly – the drug can be detected for 24 hours or longer after use. The stimulatory effects of methamphetamine diminish the desire to sleep; this might lead to a person who has consumed the drug being awake for an extended period. The resulting extreme tiredness can lead to the person falling asleep whilst driving even if they still have elevated blood methamphetamine levels.

Although methamphetamine is sometimes smoked, this is unlikely to result in passive exposure to those within close proximity.

Oral fluid methamphetamine levels are generally higher than levels present in the blood at the same time.

Evidence

Many countries have set statutory limits for methamphetamine, ranging from 10 to 50 ng/mL; however, these limits do not necessarily relate directly to impairment.

The CIT carried out by Police on drivers whom they have had 'good cause' to suspect of having consumed a drug or drugs, determines if a driver is impaired physically and cognitively. A blood sample taken from an impaired driver, is analysed by ESR for the presence of a drug (or drugs). The legislation does not require a level of a drug to be determined because the driver was physically assessed as impaired. However, the analytical technique used at ESR to confirm the use of methamphetamine does determine a blood methamphetamine level and these data have been collected for several years.

Between 2017 and 2019 there were 257 impaired drivers who failed to satisfactorily complete the CIT, who had used methamphetamine and no other drug. Their blood methamphetamine levels ranged from 10 to 2000 ng/mL (median 300 ng/mL, mean 300 ng/mL). Of these 257 impaired drivers, 90% had blood methamphetamine levels

greater than 70 ng/mL and 80% had blood methamphetamine levels greater than 100 ng/mL.

Proposed statutory limit

Based on these findings, our reading of the scientific literature, and in line with statutory limits in overseas jurisdictions, the panel proposes a statutory blood methamphetamine limit of 10 ng/mL.

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Appendix

THC and Methamphetamine 'per se' blood drug limits in other jurisdictions

| Country | THC (ng/mL) | Methamphetamine (ng/mL) |
|----------------|--------------------|--------------------------------|
| United Kingdom | 2 | 10 |
| Norway | 3 | 50 |
| Denmark | 1 | 20 |
| Scotland | 2 | 10 |
| Netherlands | 3 | 50 |
| Germany | 1 | x |
| USA | 1 to 5 | 100 |
| Canada | 2 to 5 | 50 |

Supporting data

Report from the Impaired Driving Safety Commission March 2019 (USA)

https://www.michigan.gov/documents/msp/Impaired_Driving_Report_650288_7.pdf

Driving under the Influence of Drugs - Report from Expert Panel on Drug Driving 2013 (UK)

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/167971/drug-driving-expert-panel-report.pdf

Report on Drug *per se* Limits – Canadian Society of Forensic Sciences Drugs and Driving Committee (2017) <https://www.csfs.ca/wp-content/uploads/2017/09/Report-on-Drug-Per-Se-Limit.pdf>

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