

K43 Cannabis and Driving Throughout the Legalization Process: A Portrait of the Province of Québec, Canada

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Learning Overview: The goal of this study is to provide an overview of Tetrahydrocannabinol (THC) in Driving Under the Influence of Drugs (DUID) cases in the context of recreational cannabis legalization in Canada. Data on prevalence, blood concentrations, and concomitant use of other drugs will be reviewed.

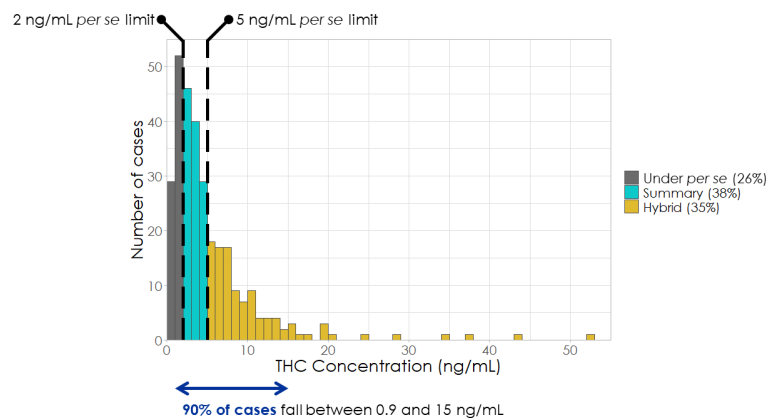
Impact on the Forensic Science Community: This presentation will impact the forensic science community by providing data on the changes that can occur in DUID casework upon legalization of cannabis and modifications to the drugs and driving legislation. Furthermore, THC blood concentrations of drug-impaired drivers will be provided, contributing to the discussion about legal thresholds for this substance.

Introduction: On October 18, 2018, Canada legalized recreational consumption of cannabis. Prior to this legalization, on June 26, 2018, new legislation modified the modalities surrounding driving under the influence offences. Notably, legal thresholds were introduced for ten drugs; for THC, these *per se* limits are established at 2ng/mL (summary offense, less serious nature) and 5 ng/mL (hybrid offense). Furthermore, legal requirements for blood collection were softened, now allowing police officers to require a blood sample by demand based on reasonable grounds instead of requiring a warrant to do so. This study reviews findings in drugged drivers where analysis of the blood sample submitted revealed the presence of THC.

Method: Blood samples were systematically analyzed for cannabinoids and more than 180 drugs and metabolites (including, for example, benzodiazepines, amphetamines, and opioids) by Liquid Chromatography coupled to Tandem Mass Spectrometry (LC/MS/MS). This targeted method, relying on a protein precipitation extraction, acted both as a screening and confirmation method. Concentration reporting limits used were 0.5ng/mL for THC and 5ng/mL for its inactive metabolite, 11-nor-9-Carboxy- Δ -9-Tetrahydrocannabinol (THC-COOH). Ethanol analysis was performed only if elements in the police investigation warranted it. For all driving under the influence cases tested by the laboratory, data related to drivers (age, gender), the arrest (date, time, location, investigative tools), the sample(s) (collection date and time, type of biological matrix), and findings (detected analytes and concentrations) were compiled using a Microsoft® Excel® database. Summary statistics and data visualization were generated using Excel®, R, and RStudio®.

Results: Between January 1, 2018, and August 1, 2020, 896 whole blood DUID samples were analyzed. THC was detected in 329 of these (37%). THC prevalence in blood casework (normalized to take into account the unequal time frames) significantly increased after legalization, going from 27% to 39% (two-proportion z-test, $p = 0.0098$). The distribution of THC concentrations is shown in the figure below (median 3.6 ng/mL) and did not change significantly over the studied period. In 76% of cases, other psychoactive drugs were detected, mainly methamphetamine (40%), cocaine (12%), Gamma-Hydroxybutyrate (GHB, 11%), and synthetic benzodiazepines (10%). Ethanol analysis was performed in 47% of cases and was found positive in 24% of these cases (median 86mg/100 mL, range 10–258).

Conclusion: Following cannabis legalization, a significant increase of THC prevalence in whole blood DUID was observed, which could be due to a variety of factors concurrent with legalization and legislation. Hypothetical causes would include, for example, an increase in the proportion of drivers under the influence of cannabis, better and more systematic use of standardized field sobriety tests and greater effectiveness in detecting cannabis users among drugged drivers. However, these conclusions cannot be directly extrapolated to cannabis and driving in general, since DUID cases with blood collection remains a small fraction of overall DUIDs in the province of Quebec, with urine following a Drug Recognition Expert (DRE) evaluation remaining the main DUID investigation tool to this day.



DUID, THC, Legalization