

Impaired Driving Drug Trends and Stop Limit Testing Evaluation

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After attending this presentation, attendees will be able to describe common trends in impaired driving cases and discuss the patterns and frequency with which these drugs are found in combination. Attendees will also be able to evaluate drug positivity at commonly used blood alcohol concentration thresholds used in “stop-limit” testing.

This presentation will impact the forensic science community by highlighting the impact of the practice of stop-limit testing on the collection of accurate data and rates of drug use in impaired driving and providing a more comprehensive understanding of what drugs are being underreported in cases where stop limit testing is implemented.

DUI involving alcohol and/or drugs is a significant public health threat as reflected by increasing traffic fatalities. Novel psychoactive substances (NPS) and polysubstance use, and legalization of recreational drugs have all increased the complexity of toxicological testing in these cases. In 2021 the National Safety Council’s Alcohol, Drugs and Impairment Division (NSC-ADID) released the newest iteration of testing recommendations for Tier I and Tier II drugs (including NPS). Tier I encompasses drugs that should be routinely screened for in laboratories in DUID and motor vehicle fatality cases. In the survey conducted to inform changes to the recommendations, 45% of labs (n=65) reported using stop-limit testing, meaning once the concentration of alcohol is above a certain level, additional tests are not performed to look for other impairing substances. We performed this study to determine the rates of positivity of Tier I and Tier II drugs in DUID cases, patterns of combined drug use, and to evaluate the potential impact of stop limit testing in estimating true rates of drug positivity.

Blood samples submitted for analysis in suspected DUID cases were retested for an expansive menu of drugs, using 2 workflows performed by liquid chromatography/mass spectrometry quadrupole time-of-flight (LC-QTOF) for basic drugs and synthetic cannabinoids, respectively. Samples were analyzed for alcohol and confirmed for THC and its metabolites at a reference laboratory. The basic drug panel library contains over 1000 drugs and metabolites, and the synthetic cannabinoid panel contains over 300 drugs and metabolites. Both libraries encompass all the recommended Tier I and Tier II compounds, and are updated regularly, as new drugs are identified.

To date, 2,127 samples have been screened on the basic and synthetic cannabinoid drug panels. Positivity was assessed for Tier I, Tier II, and other NPS. The findings from Tier I include methamphetamine (n=334; 15.7%), fentanyl (n=309; 14.5%), amphetamine (n=298; 14.0%), benzoylecgonine and cocaine (n=148; 6.9%). Ethanol was found in 878 (40%) cases with a median concentration of 0.16g/100mL and range from the limit of detection (0.01

g/100mL) to 0.61 g/100mL. THC was found in 1,080 (50.7%) cases with a median concentration of 8.1 ng/mL and a range from the limit of detection (0.5ng/mL) to 96 ng/mL.

For Tier II drugs, the top three detected compounds were diphenhydramine, hydroxyzine and trazodone. Diphenhydramine was seen in 129 cases (6.0%) followed by hydroxyzine (n=83; 3.9%), and trazadone was seen in 62 cases (2.9%). When evaluating the NPS positivity, 8-aminoclonazepam (n=70; 3.2%) was seen with the highest frequency followed by fluorofentanyl (n=64; 3.0%) and etizolam (n=46; 2.1%).

Ethanol was most frequently found in combination with central nervous system (CNS) stimulants. THC was most commonly found with CNS stimulants and narcotic analgesics (fentanyl).

Drug positivity was also evaluated at common BAC levels used in stop-limit testing (>0.08, >0.10, and >0.15 g/100 mL). Tier I drugs were found in 15.4% of all cases with a BAC >0.08 g/100 mL. Positivity for Tier I, Tier II or combination of the two for cases with <0.08 g/100 mL was 3.9% (n=85). For cases >0.08 g/100 mL it was 17.7% (n=386), >0.10 g/100 mL 16.4% (n=358) and >0.15 g/100 mL 10.6% (n=231).

This study demonstrates that the current Tier I and Tier II recommendations are appropriate and align with trends in DUID cases. Finding Tier I and II drugs in cases with BAC >0.08, suggests that comprehensive testing of even high BAC cases provides insight into poly-substance impaired driving and is a best practice.