K29 Pennsylvania Driving Under the Influence of Drugs (DUID) Trends: 2010–2020

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Learning Overview: After attending this presentation, attendees will better understand how DUID testing and trends have changed in Pennsylvania since 2010.

Impact on the Forensic Science Community: This presentation will impact the forensic science community by detailing drug trends in Pennsylvania's DUID population over the past ten years.

The drug market has transformed dramatically over the past ten years with the introduction of novel designer drugs and a surge in popularity for fentanyl, a potent opioid. As a result, the scope of DUID testing and drug positivity has also changed. The National Safety Council's Alcohol, Drugs and Impairment Division (NSC ADID) has published two updates to its Recommendations for Toxicological Investigations of Drug-Impaired Driving and Motor Vehicle Fatalities since 2010 to account for these changes. This work documents the changes in testing scope and drug positivity over the past ten years in Pennsylvania DUID blood cases.

Method: Antemortem blood specimens submitted for drug analysis, during DUID investigations in Pennsylvania, between January 2010 and July 2020 were reviewed. Cases were screened by Enzyme-Linked Immuno-Sorbent Assay (ELISA), alone or in combination with Liquid Chromatography/Time Of Flight/Mass Spectrometry (LC/TOF/MS) beginning in 2014. Prior to 2014, Gas Chromatography/Mass Spectrometry (GC/MS) was used in place of the LC/TOF/MS. Submissions where some or all testing was not performed were excluded. Percent positivity for drug or drug classes was calculated based on the total number of routine DUID submissions received.

Results: The total number of DUID panels ordered by Pennsylvania clients increased approximately ten-fold from 1,593 in 2010 to 16,513 in 2019. Testing scopes for the routine ELISA screen have increased from an 8-panel test in 2010 to a 15-panel test in 2020. Drugs such as buprenorphine, tramadol, and fentanyl were added in January 2018 to align with the NSC ADID recommendations. Furthermore, the LC/TOF/MS panel is routinely updated to include an ever-growing library of novel psychoactive substances, including designer opioids and designer benzodiazepines. Cannabis was the most identified drug across all ten years with percent positivity approximately 50% or above each year. Drugs such as fentanyl, methamphetamine/amphetamine, mitragynine, and xylazine all experienced increases in positivity during the evaluation period, while opiates, oxycodone, and prescription benzodiazepines experienced steady positivity declines. The most prominent increases occurred in the fentanyl and methamphetamine assays where percent positivity increased approximately 14% for both drug classes. Positivity increases continue to be observed into 2020 for these two compounds. Between 2019 and the first half of 2020, fentanyl positivity increased approximately 3%, while the methamphetamine positivity increased 5%. Additionally, opiate and oxycodone assays have recently experienced decreases in positivity after each achieving maximum positivity in 2015 of 16% and 8%, respectively. Percent positivity of 6% for opiates and 3% for oxycodone were observed during the first half of 2020. Recent decreases in benzodiazepine positivity have been observed with the lowest positivity rates in ten years occurring between 2018 and 2020. This coincided with an increased positivity for designer benzodiazepines, such as etizolam and clonazolam.

Conclusion: DUID testing has changed dramatically over the past ten years. Testing scopes have expanded to include new and prevalent drugs capable of causing impairment. At the same time, submissions increased ten-fold. The popularity of drugs such as fentanyl, methamphetamine, and designer benzodiazepines has increased while others such as opiates, oxycodone, and prescription benzodiazepines have seen recent decreases. In order to best serve the forensic science community, DUID testing laboratories should adapt to changing drug trends.

DUID, Driving, Trends

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