



H136 Trends in Novel Opioid Use in the United States From January 2014 Through April 2018 in Medicolegal Death Investigations (MDIs) and Strategies to Improve Early Identification, Detection, and Interpretation

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Learning Overview: After attending this presentation, attendees will be able to describe the trends in novel opioids involved in MDI cases between 2014 and 2018, and the structural modifications made to the fentanyl molecule and its implications for toxicity. Attendees will be able to verify that the testing protocols being used in MDI investigations are appropriate and fit for purpose.

Impact on the Forensic Science Community: This presentation will impact the forensic science community by educating death investigation professionals, coroners, and medical examiners about how to ensure that appropriate toxicology is being performed on their casework and that current and emergent drugs will be detected to assist with the appropriate certification of death and the collection of accurate death statistics.

The current opioid epidemic had its roots in the overprescribing of prescription semi-synthetic opioids in the 1990s and 2000s. Subsequent reductions in the legal availability of these drugs contributed to a demand for illicit opioids, including more easily imported illicit fentanyl. Once the infrastructure was in place to manufacture illicit fentanyl, it was an easy step for the clandestine manufacturers to make different variants with both greater and lesser potency. The same infrastructure allowed for the manufacture of completely novel opioids from the pharma back catalog also.

The impact of this has created a significant challenge for toxicology laboratories in creating and maintaining a relevant scope of analysis, including challenges of what to test for, the appropriate technology to use, the regulatory/accreditation environment, new drug trend intelligence, and availability of standard reference materials.

The early trends in novel opioids included the appearance of acetylfentanyl in 2014, followed by U47700 and furanylfentanyl in 2015, carfentanil in late 2015 and through 2016, then a plethora of boutique fentanyl analogs in 2016 and 2017, some of which persist at lower frequency today. Laboratory trend analysis indicates that while there is no end in sight for opioid abuse-related deaths, in the first half of 2018, it appears that death rates of cases involving opioid abuse have plateaued.

This presentation will review the relative frequency of novel opioid detection in death investigation casework and the concentrations and estimates of the toxicity of the various analogs detected. This presentation will discuss the meaning of cases with the presence of apparent fentanyl metabolite (4-ANPP) but no fentanyl and the need to perform further testing in these cases. This presentation will review the current trends toward toxicities associated with combinations of drug classes, including opioids and benzodiazepines, opioids and stimulants, and opioids and synthetic cannabinoids.

The application of high-resolution time-of-flight mass spectrometry has enabled toxicology laboratories to look retrospectively at the presence of newly discovered drugs in older casework without having to retest the samples and the use of data archiving as a tool for understanding the pharmacoepidemiology of emerging drug toxicity outbreaks.

This presentation will conclude with the description of a model of integrating data from seized drug investigations, MDI casework, and investigations of drug toxicity outbreaks in emergency room populations to support a system for early identification of new substances, notification of stakeholders in public health and public safety, and an early warning system to alert death investigators and toxicology laboratories to emerging trends.

Drug Early-Warning System, Opioids, Drug-Related Death