**Surveillance Efforts to Track Drug Market Changes in Philadelphia, PA**

Alexis D Quinter, MS1, Joshua S DeBord, PhD1, Max T Denn, MS1, Barry K Logan, PhD, F-ABFT1,2, and Alex J Krotulski, PhD1

*1Center for Forensic Science Research and Education, Fredric Rieders Family Foundation, 2300 Stratford Ave, Willow Grove, PA. 2NMS Labs, 200 Welsh Rd, Horsham, PA*

**Learning Objective:** After attending this presentation, attendees will be able to describe and implement analysis techniques used by the authors to study current trends in, and composition of the Philadelphia drug supply and will be able to evaluate important developments within the local drug supply.

**Impact Statement:** This presentation will impact the forensic community by communicating the findings of the CFSRE’s NPS Discovery drug checking program, emphasizing the value of timely monitoring of recreational drug samples for the benefit of public health and awareness.

**Keywords**: Fentanyl, NPS, Philadelphia, Overdose

**Abstract:**

The complex dynamics of today’s drug markets must be met with real-time collection, purposeful chemical analysis, and advanced data interpretation and reporting. Drug checking is a harm reduction strategy that utilizes a variety of analysis modes to provide insights into drug markets for the benefits of public health and safety agencies. Comprehensive drug market surveillance in near real-time by forensic laboratories has the opportunity to impact current and future forensic practices, especially as it relates to novel analytical workflows, scope of testing, and information sharing.

The Center for Forensic Science Research and Education (CFSRE), through its NPS Discovery drug early warning system, has been formally partnered with Philadelphia Department of Public Health (PDPH) since 2020 to provide confirmatory testing on drug materials collected within various parts of the city. Our laboratory has analyzed drug samples collected since 2019 with 47 samples analyzed that year and similarly 46 samples the next year in 2020. However, our drug checking program has grown over the past few years, with a total of 289 samples in 2021 and 505 samples in 2022. In 2023, the samples continue to grow with more than 390 samples through August 2023. For the first half of 2023, qualitative analysis showed that over half (56%) of the samples submitted contained fentanyl as the primary drug, 28% contained cocaine as the primary drug, and the remaining 16% containing other primary drugs such as methamphetamine, *para*-fluorofentanyl, PCP, *N,N*-dimethylpentylone, bromazolam, and others. For the first half of 2023, quantitative analysis showed the mean purity of fentanyl was 14.5% ± 8.2%; xylazine was 44.8% ± 15.4%; cocaine was 54.5% ± 24.8%; and methamphetamine was 63.6% ± 13.8%.

Polydrug, or polysubstance, use refers to the recreational consumption of multiple drugs, either by using a mixture of drugs concurrently (e.g., speedball, fentanyl and cocaine) or using different drugs (e.g., fentanyl and methamphetamine) within the same time frame. Either can cause drug interactions and increased risks of toxicity. Depending on the jurisdiction and its drug supply, polydrug use may be more or less common. This may increase the risk of unintentional drug overdose. In 2019, death certificates and toxicology reports showed that 50% of all drug overdose deaths involved more than one drug (O’Donnell J, Gladden RM, Matson CL, Hunter CT, Davis NL, 2020). Out of all the drug samples analyzed in 2023, only 23% were comprised of one component and 19% contained four or more components, with all analytes of interest considered as components. Drug samples containing multiple components can lead to harmful effects especially when the consumer is unaware of the purity of the drug sample, drugs present, and/or possible drug-drug interactions. Another concerning trend is the increasing positivity of xylazine combined with fentanyl. In 2019, 67.4% of fentanyl drug samples tested from Philadelphia also contain xylazine; however, in 2023, 98.9% of Philadelphia drug samples contain fentanyl and xylazine, with xylazine frequently as the principal component in the sample.

Drug checking is an important tool and resource to better understand the current drug epidemic and evolving drug markets. Collecting, analyzing, interpreting, and communicating drug checking data and trends in real-time allows for timely, informed drug user education and countermeasures to help reduce adverse effects and overdose.

**Reference:**

1. O'Donnell J, Gladden RM, Mattson CL, Hunter CT, Davis NL. Vital Signs: Characteristics of Drug Overdose Deaths Involving Opioids and Stimulants - 24 States and the District of Columbia, January-June 2019. MMWR Morb Mortal Wkly Rep. 2020 Sep 4;69(35):1189-1197.