



### B23 An Assessment of Drugs in Syringes From New York City Syringe Exchange Programs

*Tais R. Fiorentin, PhD\**, 210 Krewson Terrace, Willow Grove, PA 19090; *Jaclyn Blachman-Forshay*, NYC Department of Health and Mental Hygiene, 42-09 28th Street, Queens, New York City, NY 11101; *Alexandra Harocopos*, NYC Department of Health and Mental Hygiene, 42-09 28th Street, Queens, New York City, NY 11101; *Denise Paone, EdD*, NYC Department of Health and Mental Hygiene, 42-09 28th Street, Queens, New York City, NY 11101; *Zeland Schwartz, PhD*, NMS Labs, 3701 Welsh Road, Willow Grove, PA 19090; and *Barry K. Logan, PhD*, NMS Labs/CFSRE, 3701 Welsh Road, Willow Grove, PA 19090

After attending this presentation, attendees will be able to describe the number and variety of substances in syringes collected from 11 Syringe Exchange Programs (SEPs) in New York, NY.

This presentation will impact the forensic science community by providing data on the use of syringe testing as a surrogate for evaluating the cutting agents and toxic adulterants present in injected drugs through the analysis of methanolic rinses and acid/basic extracts from syringes collected from intravenous drug users between May 2017 and July 2017.

Fentanyl is driving an increase in fatal overdose in New York City, and this study was conducted to estimate the prevalence of fentanyl in the drugs used by SEP participants. An SEP is a service that provides hypodermic syringes and associated injection equipment to injecting drug users at no cost. The goal of the program is a reduction in potential harms to the users, including risks of infection from non-sterile drug injection equipment and the transmission of blood-borne pathogens, such as HIV and HCV.

In addition to their pharmacoepidemiological value as an index of patterns of drug use, drug paraphernalia is frequently submitted to forensic science laboratories for analysis. These exhibits may contain important information regarding the presence of controlled substances, helping in the investigation of crime scenes, drug deaths, and drug possession or trafficking cases in addition to helping characterize the drug abuse scenario and the cutting agents in a specific population.

Three hundred and fifty-six syringes were submitted by the New York City Department of Health and Mental Hygiene for analysis of residue or drug content. Samples were submitted to NMS Labs for an initial screening for the presence of controlled substances. The internal surfaces of the syringes were washed with methanol, and a portion of the methanol wash was used to perform an acid/base extraction to clean up and concentrate the samples. The acid/base extracts were tested by Gas Chromatography/Mass Spectrometry (GC/MS) at NMS Labs. The instrument was operated in the electron impact mode and full scan acquisition (range 40-550m/z), using a ZB35HT column, injection volume of 1µL, splitless mode, injection and detection temperature of 265°C and 300°C, respectively. Total run time was 15 minutes.

The methanol rinses and the remaining acid/base extracts were transferred to the Center for Forensic Science Research and Education (CFSRE) for further analysis by Liquid Chromatography/quadrupole Time-Of-Flight/Mass Spectrometry (LC/qTOF/MS). A reverse phase gradient was performed using ammonium formate (10mM, pH 3) and methanol/acetonitrile (50:50) for chromatographic separation on a Phenomenex® Kinetex C18 analytical column at a flow rate of 0.4mL/min for a total run time of 15.5 minutes. Precursor ions were acquired by TOF/MS scan (100-510m/z) via positive electrospray ionization. Precursor isolation was performed using SWATH™ acquisition, consisting of 27 overlapping isolation windows. Fragmentation was achieved using a rolling collision energy of 35±15eV. The acquisition total cycle time was 0.77 seconds. Data processing was performed using PeakView® with an extracted ion chromatogram (XIC) list containing 1,463 compounds, of which 382 had fragment and retention-time data, and accurate mass library containing 1,790 compounds.

Of the 356 syringes analyzed, 270 (75.8%) were positive for any substance. The most common drug identified was heroin (47%), followed by cocaine (40%), fentanyl (22%), methamphetamine (10%) and furanyl fentanyl (3.9%). Caffeine (34%) was the most common cutting agent detected, followed by quinine/quinidine (28%), lidocaine (21%), levamisole (16%), and phenacetin (12%).

The cutting agents used are constantly changing over time and may contribute to the toxic effects of the drugs on users. Levamisole and phenacetin are among the most-used cutting agents and are associated with neutropenia, agranulocytosis, skin necrosis, and nephrotoxicity. Some studies have already reported deaths as a result of complications secondary to levamisole-tainted cocaine.

Knowledge about the drugs used and cutting agents found in paraphernalia from a select drug using population can help to inform patterns of drug use and associated health risks to users, including the rates of exposure to toxic adulterants or highly risky substances, such as fentanyl. The presence of drug combinations, cutting agents, and adulterants may assist in determining common origin from drugs in the possession of different users. The analysis of drug residue in syringes from this population can contribute to a better informed public policy that helps reduce risk for people who inject drugs.

#### Syringe, GC/MS, LC/qTOF