



K60 A Two-Year Comparative Analysis of Novel Psychoactive Substances (NPS) Detected in Blood, Urine, and/or Oral Fluid in Attendees at an Electronic Dance Music (EDM) Festival

Amanda L.A. Mohr, MSFS, Center for Forensic Science, Research & Education, 2300 Stratford Avenue, Willow Grove, PA 19090; Jillian K. Yeakel, MS, 3864 Courtney Street, Ste 150, Bethlehem, PA 18017; Melissa Friscia, MSFS, 429 Grand Avenue, Langhorne, PA 19047; Francis X. Diamond, BS, 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 assess and review trends in recreational drug use, specifically related to NPS from self-reported drug-use data and analytical results from the analysis of blood, urine, and oral fluid collected over a two-year period within an EDM population.

This presentation will impact the forensic science community by providing data on the temporal trends of NPS use within this population and evaluate the diversity and nature of emerging analytes. Attendees will also be able to evaluate the utility of blood, urine, and/or oral fluid for detecting NPS drug use.

The use of NPS at EDM festivals is widely documented by surveys with festival attendees, reflected in online discussions groups associated with EDM culture and recently has become a focus of media attention due to several hospitalizations and deaths attributed to NPS use at these events. The use of these novel and potentially toxic drugs within these venues makes EDM festivals an important site to collect information regarding recreational drug use and potentially characterize emerging analytes.

Participants were recruited during an EDM festival in Florida over a two-year period. The study received institutional review approval for human subject studies. After obtaining informed consent, each participant filled out a brief questionnaire regarding prescription medication and recreational drug use within the past week. Participants were asked to provide a blood, urine, and an oral fluid sample for laboratory-based drug screening and confirmation.

Over the course of two years, 396 EDM attendees participated in the study. The average age of the study participants was 22 years. Not all subjects provided all three biological samples. During the two-year sample collection period, 126 blood samples, 226 urine samples, and 330 oral fluid samples were provided. Blood, urine, and oral fluid samples were screened using Liquid Chromatography/quadrupole Time-Of-Flight/Mass Spectrometry (LC/qTOF/MS) via the Waters® ACQUITY® UPLC Iclass Xevo® G2-S QToF, in addition to other techniques. Specimens were also tested for alcohol. Any sample which screened positive was sent for confirmation.

When asked whether or not the individual had taken any medicinal or recreational drugs within the past week, in both 2014 and 2015, 72% percent of the participants answered “yes.” The percentage of participants who self-reported using “Molly,” MDMA, or Ecstasy within the last week was similar for both years (21% in 2014 and 14% in 2015). Twenty-five blood samples (42%) from the 2015 data set screened positive for a common drug of abuse/metabolite or NPS compared to 58% in 2014. Of the blood samples that screened positive, the detection of at least one NPS decreased from 55% in 2014 to 33% in 2015. A similar trend was seen with the urine and oral fluid samples where there was a decrease in positivity for NPS, which went from 33% in 2014 to 18% in 2015 for urine and from 32% to 18% for oral fluid samples.

During 2014, the most commonly detected NPS was α -Pyrrolidinopentiophenone (alpha-PVP), which was followed by methylone and dimethylone; however, in the 2015 data set, there was a decrease in the number and diversity of NPS drugs detected. The fact that in 2015 alpha-PVP was not detected in any of the blood samples was a surprising finding given that it was the most commonly encountered NPS in 2014 and there have been increasing reports of its prevalence within the state of Florida. Conversely, more samples (blood, urine, and oral fluid) were confirmed positive for MDMA in 2015 than in 2014.

This comparative analysis provides the first temporal data related to NPS use within the United States at EDM festivals. With respect to NPS, there was a high turnover rate in the prevalence of specific drugs from year to year. This suggests EDM festivals represent important study populations that can be used to garner drug intelligence information with respect to what emerging compounds are currently being abused, which in turn can help guide forensic professionals in providing an updated and comprehensive scope for NPS testing.

NPS, Trends, EDM Festivals