K33 The Evaluation of Temporal Changes of Novel Psychoactive Substances (NPS) Use Within an Electronic Dance Music (EDM) Population Over a Three-Year Period

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After attending this presentation, attendees will be able to better evaluate the toxicological results of blood, urine, and oral fluid samples collected at an EDM festival. The forensic science community will be able to compare the results from this sample collection to samples collected in the past two years to evaluate changes in NPS use within this population.

This presentation will impact the forensic science community by providing information on the most recent NPS being used within this EDM population. Using these results, laboratories will be able to expand their scope of testing to include emerging NPS, if current testing does not already include these compounds.

EDM festivals have gained recent media attention due to drug-related deaths and hospitalizations. In June 2016, at the Sunset Methylenedioxymethamphetamine (MDMA). There were a further 57 hospitalizations and many arrests and citations made at the festival due to involvement with MDMA, LSD, and marijuana. This population can provide key insights into determining new trends in NPS in the recreational drug market.

This study was approved by an Institutional Review Board for the participation of human subjects. Blood, urine, and oral fluid samples were collected at an EDM festival in Miami, FL, in three successive years (2014, 2015, and 2016). Blood samples were collected by a certified phlebotomist in gray-topped collection tubes, urine samples were self-collected using sterile collection cups, and oral fluid samples were self-collected using a Quantisal™ oral fluid collection device.

In 2016, a total of 248 subjects completed the donation of blood, urine, and/or oral fluid samples. Ninety-four of those subjects also provided survey information with respect to their age, gender, and recent drug use. Of these 94 participants, 13 provided blood samples, 50 provided urine samples, and 86 provided oral fluid. The average age of participants was 23 (±4.7) years of age. Seventy-four (79%) of the subjects indicated they had used a recreational or medical substance within the past week. Alcohol was the top response (48%), followed by marijuana (31%), and Molly/MDMA/Ecstasy (15%).

Based on the 2016 blood sample (n=12) analysis, Tetrahydrocannabinol (THC) (n=3) was the most commonly encountered drug, followed by MDMA/MDA (n=2), LSD (n=1), and amphetamine (n=1). For the 2016 urine samples (n=50), carboxy-THC (n=11) was the most commonly encountered drug/metabolite, followed by amphetamine (n=4) and MDMA/MDA (n=3). One urine sample was positive for dibutylone, an emerging NPS detected for the first time in this population during this sample collection, and butylone, a possible metabolite of dibutylone and also an emerging NPS detected in samples collected in 2014. For the 2016 oral fluid samples (n=244), THC (n=79, 32%) was the most commonly encountered drug, followed by MDMA (n=28, 11%), cocaine (n=21, 9%), and amphetamine (n=16, 7%). Other NPS, including dibutylone, butylone, ethylone, and 4-FA, were also detected.

Over the three-year sample collection period, there have been significant year-to-year changes in the NPS drugs present. During the 2014 sample collection, the most commonly encountered NPS was methylone, followed by alpha-PVP, MDMA, dimethylone, ethylone, butylone, and 4-FA. During the 2015 sample collection, the only NPS detected was ethylone. During the 2016 sample collection, MDMA was the most commonly encountered drug, showing a trend back to traditional NPS. Emerging NPS, like dibutylone, were detected for the first time during analysis of 2016 samples, demonstrating that the designer drug market is continuing to evolve.

These results stress the importance of updating laboratory methods for the detection of emerging drugs, the ability to distinguish between isomeric NPS, and the usefulness of this target population for monitoring trends.

NPS, MDMA, Oral Fluid