K9 Recreational Drug Use Trends and Emerging Analytes Identified in Blood, Urine, and/or Oral Fluid From Attendees at an Electronic Dance Music (EDM) Festival

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After attending this presentation, attendees will be able to assess and review the trends of recreational drug use generated by survey data and analytical testing of biological samples and compare user accounts of what they are ingesting with toxicological results within an EDM population.

This presentation will impact the forensic science community by providing data on the extent and nature of emerging analytes. Additionally, attendees will be able to discuss trends in Novel Psychoactive Substance (NPS) use within this population, which have not previously been studied in the United States.

EDM is a popular music genre in Europe and the United States and has a strong association with various specific types of drug use, especially NPSs, which is documented by surveys with EDM attendees and is reflected in online discussion groups associated with EDM culture. EDM festivals within the United States have recently been a focus of media attention due to drug-related deaths and mass hospitalizations or medical aid calls, which have caused cancellations of the 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 in 2014. 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 last week. Participants were asked to provide a blood, urine, and two oral fluid samples for laboratory-based drug screening and confirmation. One oral fluid sample was collected for presumptive screening using the Alere® DDS2 Mobile System and the other was collected with an Immunalysis Quantisal™ collection device for subsequent laboratory-based confirmatory analysis.

A total of 145 volunteers participated in the sample collection. The average age of the study participants was 23 years old. Not all subjects provided all three biological samples. Sixty-six blood samples, 105 urine samples, 125 oral fluid samples for the Alere® DDS 2, and 136 oral fluid samples for the Quantisal™ were provided by the participants. Blood samples were screened using Liquid Chromatography/Quadrupole/Time-Of-Flight/Mass Spectrometry (LC/Q/TOF). All urine specimens were screened via several analytical techniques including Enzyme Multiplied Immunoassay Technique (EMIT), Gas Chromatography/Mass Spectrometry (GC/MS), and LC/Q/TOF. The oral fluid sample collected for the Alere® DDS 2 Mobile System was screened on-site for the presence of cannabis, cocaine, opiates, methamphetamine, amphetamine, and benzodiazepines. Alcohol was confirmed and quantitated using a headspace GC/Flame Ionization Detector (GC/FID) for all blood and urine samples. 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, 70.7% of the participants answered "yes." The most common substance participants indicated they had taken was marijuana (n=60), followed by cocaine (n=17). In terms of NPS, compounds like MDMA (3,4-methylenedioxy-N-methylamphetamine), "Molly," and/or "ecstasy" were reported to have been used within the past week by 33 participants. Forty blood samples have been screened using LC/Q/TOF. Thirty percent of the blood samples (n=40) screened positive for at least one NPS drug. Of the 104 urine samples screened, only 16% were completely negative for the presence of any drugs and/or alcohol. Twenty-one percent of the urine samples were positive for a single drug, while 35% were positive for polydrug use. Approximately 40 urine samples screened positive for an NPS drug, with more than 80% confirming positive for which there was an analytical assay available. One hundred twenty-two oral fluid samples screened positive using the Alere® DDS 2. The two most common positive results were for cannabis (22%) and cocaine (10%).

The EDM festival culture has been largely understudied in the United States; however, this population has proved to be an invaluable resource in terms of learning about patterns of recreational drug use and emerging NPS. Data on which drugs are being ingested at these events can be useful for educating users about risks associated with NPS, provide opportunities for harm reduction, and enable forensic laboratories to target testing strategies for impairment or death investigations associated with these events.

NPS, Electronic Dance Music, Drug Testing