



Toxicology Section - 2016

K66 Report of Increasing Acetyl Fentanyl Deaths in Allegheny County, Pennsylvania

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After attending this presentation, attendees will learn of a recently detected trend of acetyl fentanyl-related overdose deaths in Allegheny County, PA.

This presentation will impact the forensic science community by recognizing and defining a new synthetic drug, acetyl fentanyl, and illustrating its increased lethality among even seasoned opioid users.

Acetyl fentanyl, N-(1-phenethylpiperidin-4-yl)-N-phenylacetamide and the N-acetyl analog of fentanyl, is a recently developed synthetic opioid with a potency estimated to be 5 to 15 times that of heroin, roughly 16 times that of morphine, and about 3 times less than that of fentanyl. Acetyl fentanyl is currently a Schedule I controlled substance with no recognized medical uses, and is therefore not prescribed by physicians, is not Food and Drug Administration (FDA) -approved, and is not commercially available. Unfortunately, acetyl fentanyl gains access to the public when it is mixed and packaged in drugs marketed as heroin or other opioids. In 2013, the drug gained notoriety when 14 overdose deaths in Rhode Island were attributed to acetyl fentanyl. Following this sentinel report, additional acetyl fentanyl overdose fatalities were reported in Pennsylvania, Louisiana, and North Carolina, further corroborating the possibility of an emerging acetyl fentanyl epidemic. It has since become regular practice in some Pennsylvania coroner's and medical examiner's offices to screen specifically for fentanyl and acetyl fentanyl in cases of apparent opioid-related deaths. Interestingly, this practice has revealed a recently increased number of acetyl fentanyl deaths in Allegheny County, PA.

Since January 2015, the Allegheny County Medical Examiner's Office has identified eight acetyl fentanyl-related deaths. A thorough investigation of the case histories, autopsy, and toxicological findings was conducted. Drug screening was performed on postmortem blood specimens from all eight cases using an **Enzyme-Linked Immuno-Sorbent Assay (ELISA)** five-drug panel (opiates, cocaine, benzodiazepines, oxycodone, and fentanyl) and Gas Chromatography/Mass Spectrometry (GC/MS). Drug screening was also performed on postmortem urine specimens, when available, using GC/MS. Quantitation of acetyl fentanyl was performed on postmortem blood specimens using Liquid Chromatography/Tandem Mass Spectrometry (LC/MS/MS) at an outside reference laboratory.

Among the cohort of eight cases, two deaths occurred in March (11 days apart), one in April, two in May (17 days apart), and three in June (within a span of 5 days). All of the cases occurred in sporadic areas of the county with no evident geographic trend. There were a total of six men (75%) and two women (25%), with an age range of 24 years to 57 years (mean 37.8 years). All individuals were White, and seven (88%) had a history of substance abuse. Seven cases (88%) had drug paraphernalia at the scene, including stamp bags (six cases; 75%), syringes (six cases; 75%), and glass pipes (two cases; 25%). Two of the six cases with stamp bags at the scene (33%) had bags labeled with the same name. Postmortem blood specimens from all eight cases screened positive for fentanyl using the ELISA five-drug panel. Using GC/MS, postmortem blood specimens from all eight cases screened positive for acetyl fentanyl, and five (63%) of the eight cases were additionally positive for fentanyl. Postmortem urine specimens were available from seven (88%) of the eight cases. Using GC/MS, all seven urine specimens screened positive for acetyl fentanyl, and four (57%) of the seven cases were additionally positive for fentanyl. Acetyl fentanyl was further quantified using femoral blood in four cases, subclavian blood in one case, and heart blood in three cases. The range, median, mean, and standard deviation for acetyl fentanyl in these eight cases were 2.6ng/mL-2,100ng/mL, 96ng/mL, 443.9ng/mL, and 748.7ng/mL, respectively. Other drugs detected in these cases included morphine, 6-monoacetylmorphine, codeine, cocaine, ethylone, ethanol, diphenhydramine, and clonazepam.

The goals of this report are to highlight the trend of increasing overdose deaths related to acetyl fentanyl and to provide additional evidence to the potential rising epidemic of acetyl fentanyl-related fatalities. Individuals at the forefront of combating drug-related death, including healthcare workers, substance-abuse treatment centers, and forensic services, should be aware of this potent, likely lethal synthetic drug often sold under the disguise of more common street opioids.

Acetyl, Fentanyl, Overdose