



### **G101 Cluster of Fentanyl-Tainted Heroin Deaths in a Three-Week Period in Maryland**

*Mary G. Ripple, MS, MD\*, Barry S. Levine, PhD, and Rebecca Jufer- Phipps, PhD, Office of the Chief Medical Examiner, State of Maryland, 111 Penn Street, Baltimore, MD 21201; Erin Artigiani, Center for Drug Abuse Research, 4321 Hartwick Road, Suite 501, College Park, MD 20742; Suzanne Doyon, MD, Maryland Poison Center, 20 North Pine Street, Baltimore, MD 21201; and David R. Fowler, MD, Office of the Chief Medical Examiner, State of Maryland, 111 Penn Street, Baltimore, MD 21201*

After attending this presentation, attendees will understand the public health significance of cooperative efforts between the Office of the Chief Medical Examiner (OCME), the Maryland Drug Early Warning System (DEWS) at University of Maryland's Center for Substance Abuse Research (CESAR), the Maryland Poison Center (MPC), and the Maryland State Police (MSP) in the ability to detect a cluster of fentanyl- tainted heroin deaths in a short period of time.

This presentation will impact the forensic community and/or humanity by presenting the problems of detecting fentanyl by routine opiate screens and by emphasizing the importance of drug surveillance systems to detect emerging drug trends.

Fentanyl is a fast-acting, highly potent synthetic opioid agonist that is approximately 50-100 times more potent than morphine. Overdose effects occur rapidly and death occurs primarily from respiratory depression. Regional outbreaks of "super potent heroin" have been reported in the past. The outbreak in April and May 2006, of which this presentation is a part, included over 120 deaths in the Midwest, Northeast, and Mid-Atlantic regions. The primary markets included Chicago, IL, Detroit, MI, Philadelphia, PA, and Camden, NJ. In May 2006, authorities seized a fentanyl laboratory in Toluca, Mexico and this was the suspected source of the tainted heroin. A by-product of illicit fentanyl manufacture by the "Siegfried Method" is 4-Anilino-N-Phenethyl-Piperidine (4- ANPP).

Fentanyl is available by prescription as a transdermal patch, an oral lozenge and an injectable form. It is manufactured illicitly as powder or tablets. Fentanyl is abused in any of the prescribed or illicit forms. More creative forms of abuse include, wearing multiple patches, scraping the drug off the patches and snorting or injecting it, and chewing and/or swallowing the patches. Fentanyl is not detected using standard urine opiate immunoassays. As a result, negative tox screen results do not rule out a fentanyl overdose. Without performing a specific fentanyl immunoassay, the accepted detection methodology for the blood or urine is gas chromatography. However, detection can be problematic in that fentanyl is a late eluter and is usually present in very low concentrations. At the OCME, fentanyl was detected in the biological specimens following an alkaline extraction and analysis by gas chromatography- nitrogen phosphorus detection. Fentanyl was confirmed by full scan electron ionization gas chromatography-mass spectrometry (GC-MS). Fentanyl was quantitated by GC-MS, selected ion monitoring.

There were 15 fentanyl related deaths in the State of Maryland from 1/1/06 until the writing of this report and most were a result of the abuse of the patch. A cluster of five fentanyl-tainted heroin deaths occurred from 4/22/06 to 5/12/06. The MPC and CESAR initially reported to the OCME a series of 6-8 possible fentanyl-tainted heroin overdoses from the Eastern Shore of Maryland two days after the autopsy of the first suspected death. That individual survived for two days in the hospital where opiate confirmation was negative. Analysis of evidence from this scene by the local MSP crime lab revealed fentanyl and procaine. These results provided the first solid evidence that fentanyl was involved in this outbreak. At that time the OCME toxicology lab was alerted to look specifically for fentanyl. At a later date, the MSP crime lab also confirmed 4-ANPP in the same evidence. Thus far there are five confirmed fentanyl related deaths and three other suspected cases are currently under investigation. The age range of the deceased was 22 to 32 years old, four of five were Caucasian and four of five were male. Fentanyl concentrations ranged from 0.001 to 0.049 mg/L. One of five cases was positive for fentanyl only, three of five were positive for heroin, four of five had morphine in their system, four of five had cocaine in their system, and five of five scenes had intravenous drug paraphernalia. The areas of the state involved included Wicomico (1), Somerset (1), and Howard (1) counties, and Baltimore City (2).

Medical Examiner/Coroner's offices need to be aware of the limitations in detecting fentanyl and in cases where investigation points to a drug death and routine toxicology is negative, the toxicology lab needs to be informed of the possibility of fentanyl. A cooperative effort between the Medical Examiner/Coroner's offices and state drug surveillance systems is critical in order to detect emerging drug trends of public health significance.

#### **Fentanyl, Heroin, Tainted**