

A Novel Oral Fluid Assay for the Detection of Fentanyl after Suspected Heroin Overdose

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Background: The adulteration of heroin with clandestine fentanyl is one suspected etiology for the striking increase in heroin-related overdose deaths. While drug testing in urine is both validated and commonplace, oral fluid testing is preferable in specific environments (e.g., methadone clinics). In this study, we compared an oral fluid swab with gold standard urine testing for the detection of fentanyl in individuals presenting after heroin overdose.

Hypothesis: We hypothesized that detection of fentanyl in oral fluid would be equivalent to validated urine drug testing methods.

Methods: Adult heroin users presenting to an urban, tertiary care ED for care after overdose were eligible for enrollment if they had received naloxone (bystander or EMS), and were able to provide verbal consent. After consent, subjects were interviewed about pharmaceutical fentanyl use, and a urine specimen was collected. Next, a Quantisal swab (Immunoanalysis; Pomona, CA) was placed in the subject's mouth until indicator change or ten minutes elapsed. Samples were kept refrigerated, then shipped to NMS Labs for analysis via Liquid Chromatography Time-Of-Flight Mass Spectrometry. This study was approved by the Institutional Review Board.

Results: Between 09/01/16 and 11/04/16, twenty adult heroin users who presented after overdose were enrolled in a convenience sample. Average age was 31, 50% participants identified as female. All 20 urine samples were identified as containing fentanyl, while 18/20 oral fluid samples were positive for fentanyl, indicating a 90% agreement rate. Acetylfentanyl was identified in 4/20 oral swab specimens, but only 2 corresponding urine specimens.

Discussion: Participants successfully tolerated the oral swabs. For the detection of fentanyl, oral fluid and urine results agreed in 90% of paired specimens. Acetylfentanyl was identified in 4/20 cases (20%) using oral swabs, but only paired 2/20 cases by urine drug testing. Time since exposure and persistence in urine might contribute to cases in which oral fluid and urine testing failed to agree. Limitations of this study include the small sample size.

Conclusion: Bedside oral fluid swabs offer a feasible and accurate method for detection of clandestine fentanyls. Further study is required to determine the sensitivity and specificity of this methodology.