K67 Prevalence of Cocaine on Urban and Suburban Elementary Student Desks

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From this presentation, attendees will understand drug contamination in an environment previously unreported in the scientific literature, in this case elementary student desks. Forensic toxicologists, medical review officers, and other forensic investigators will understand contamination factors which may affect their interpretation of drug test results from external matrices. Concerning the learning environments of children, educators tasked with quality improvement will understand issues of drug contamination in public schools and potential problems if widespread drug testing of students were implemented.

This presentation will impact the forensic science community by demonstrating how the limited body of knowledge on which forensic investigators rely when examining surfaces in the workplace and elsewhere, then ascribing evidence of illicit drug use to such results, is supplemented by these findings.

This research tests the hypothesis that surfaces contacted by potentially unsuspecting individuals may be contaminated with significant amounts of cocaine and that this contamination may spread to other areas where drugs are not being used. These findings will supplement the limited body of knowledge on which forensic investigators rely when examining surfaces in the workplace and elsewhere and interpret the significance of the presence of drugs on these surfaces.

Two public schools in the Washington, D.C. area with differing geographic and socioeconomic profiles were chosen for this study. The prevalence of cocaine-related substances in these environments was compared. Researchers obtained permission from the school administrators to swab each student desk in three classrooms per school. Classrooms were at the first, second and fourth grade levels corresponding to student ages of approximately six, seven, and nine-years-old. The entire desk top was swabbed using disposable latex gloves and individually packaged, and sterile, isopropyl alcohol wipes. Negative control swabs were collected from latex gloves before swabbing. Pre-analysis storage temperature was -20°C. In the laboratory, other negative controls were included as additional tests for laboratory contamination. After deuterated internal standards were added to swabs, they were air dried. Analytes were removed from specimens using 0.1 N hydrochloric acid, and then the drugs were extracted using solid phase (SPE) columns. All extracts were analyzed by ion trap CI-GC/MS.

Of 115 inner-city elementary school desks, cocaine was detected on every desk (mean = 150 ng, σ = 140 ng, LOD = 12 ng). In contrast, only two suburban elementary school desks revealed cocaine levels above the LOD (n = 96, mean = 11 ng, σ = 15 ng). All results, including those below the LOD, were included in the statistics. Similarly, the most common cocaine breakdown product, benzoylecgonine, was more prevalent on urban desks (n = 115, mean = 147 ng, σ = 138 ng, LOD = 2 ng) than desks from a suburban school (n = 96, mean = 0.87 ng, σ = 3.3 ng). The ratio of BE to cocaine had no predictive value.

These data reveal quantities of cocaine substances (ng/swab extract) exceeding the limits of detection and limits of quantitation for analyses of other external surface matrices such as hair (expressed in ng/mg) and sweat (expressed in ng/mL extract), as well as inanimate objects, for which there is no mandated standard practice or cutoff for reporting a surface as “positive” for a drug. Because drug use is unlikely in the elementary school environment and by this young age group population, these results support the conclusion that drugs in a real-life environment can transfer from at least one object to human skin and then to another object a distance from the first. These results suggest caution should be exercised when ascribing drug use conclusions based on surface testing when contamination cannot be excluded. BE does not appear to be a good indicator of cocaine use because BE is a congener in street cocaine, because cocaine decomposes to BE in the environment, and because residues containing BE from the sweat of drug users can transfer repeatedly.

Cocaine, Contamination, Children

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