B133 Laboratory Gunshot Residue Contamination Study: Part II

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After attending this presentation, attendees will become familiar with the persistent nature of gunshot residue (GSR) particles, the potential for contamination of GSR particles, and the need to monitor the environment in which GSR analysis is conducted. Additionally, the results of a thorough trace evidence laboratory GSR contamination study will be presented.

This presentation will impact the forensic community and/or humanity by confirming the applicability of GSR analysis as a viable analytical tool that serves a criminal investigation, identifying the nature of GSR contamination, and establishing quality control and quality assurance procedures necessary to produce accurate and reliable results.

The continued objective of this study is to identify all potential areas of contamination in a high volume forensic laboratory environment and to further monitor and improve the effectiveness of quality control procedures currently practiced.

The use of gunshot residue analysis by scanning electron microscopy (SEM) as a forensic analytical tool is under scrutiny. Some critics assert that GSR testing is unreliable, subject to contamination. These studies indicate the transfer of GSR particles is not a frequent event and that individuals who have not been in contact with a firearm or ammunition will not be expected to have GSR on their hands.

The authors previously reported (Laboratory Gunshot Residue Contamination Study, AAFS 2006, Seattle Washington) that they were unable to find GSR contamination in the laboratory, that the hands of analysts performing these analyses were free of contamination, and both evidence technician's and law enforcement officers' hands performing duties throughout the laboratory were free of contamination. Characteristic GSR particles on exterior surfaces such as elevator buttons and exterior doors were identified. These results identified the need for continued monitoring of the trace laboratory and additional areas such as common areas.

In the present study, laboratory break rooms, office areas, rest room fixtures, and evidence rooms were also tested. The on-site Harris County Sheriff's Office Firearms Laboratory and immediate vicinity, located on a separate floor from the GSR testing area, were also tested. Within the GSR area, additional tests were done on analyst's hands and various laboratory surfaces as well as the room air. Stubs studied for contamination were handled as evidence stubs with all applicable QA/QC procedures in place. Trace analyst's hands were stubbed to accompany each GSR analysis performed. All other areas of interest were randomly stubbed without prior notice.

No particles indicative of GSR were identified in the immediate vicinity of the trace laboratory and the extended environment. As expected, GSR particles were easily recovered from the Harris County Sheriff's Office Firearms Laboratory.

In summary, the second phase of this study further confirmed that the environment of the HCMEO laboratory was free of the presence of GSR, that the QA/QC procedures being followed by the evidence section further minimized the concern, and that the HCMEO Trace Evidence Laboratory performs analyses in an environment free of contamination.

Gunshot Residue (GSR), Contamination, Scanning Electron Microscopy (SEM)

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