



Population Study: Prevalence of Gunshot Residue on Police Officer Hands

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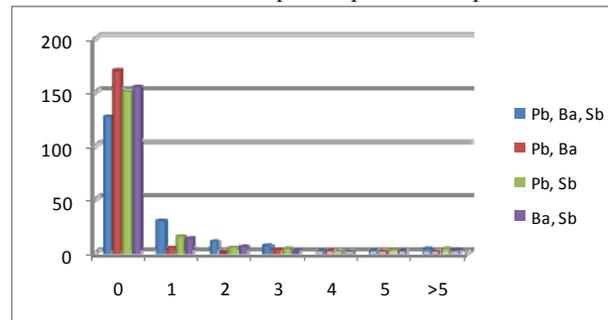
Background

When a firearm is discharged the firing pin of the weapon springs forward striking the primer on the base of the cartridge case. This causes a small explosion of the primer that ignites the gunpowder which creates a buildup of hot gases. These gases push the bullet from the cartridge case and expel it from the weapon. The gases escape from the muzzle as well as from all the cracks and crevices of the weapon. When these hot gases hit the cooler ambient air they condense into small, round, molten particles and land on anything in the vicinity. These round, molten particles are known as gunshot residue.



Out of the 176 police officers sampled 54 were positive for the presence of GSR while the remaining 122 samples were determined to be negative. Of the 54 positive samples 29 of them had only one Pb,Ba,Sb particle. Twenty-nine police officers with positive results filled out a questionnaire sheet indicating when they last touched a weapon and last washed their hands. Of these 29 samples 22 of them had touched a weapon within 5 hours prior to sampling. Also of these 29 samples all 29 indicated they had washed their hands within 5 hours prior to sampling.

Number of 3 and 2 component particles on police hands



Most police officers had no GSR on their hands.

Introduction

Defense lawyers often ask if gunshot residue (GSR) could be transferred from the arresting officer to the suspect prior to sampling. The possibility of GSR particle transfer could lead to a false positive result. Over 176 police officer's hands were sampled during GSR training classes over several years. Most of the officers completed a questionnaire indicating the last time a weapon was handled or fired and their hands were washed. The GSR lifters were pressed to the officer's hands then analyzed by SEM-EDS.



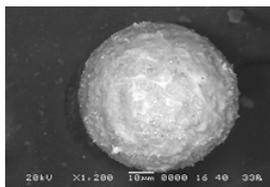
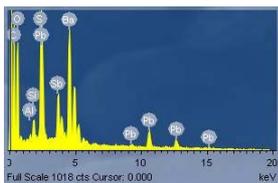
Conclusion

The great majority of police officers had little to no GSR present. Officers wash their hands more often than they handle or fire a weapon resulting in a lack of GSR. With this knowledge GSR experts can testify that contamination from a police officer is unlikely, therefore giving a positive result more significance in court.



Results

Positive samples were manually confirmed for elemental composition and morphology of the particle. Positive samples had 3 component particles (containing PbBaSb) and/or 2 component particles (PbBa; PbSb; BaSb) with molten, spheroid morphology.



Acknowledgements

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