



Young Forensic Scientists Forum Posters – 2021

Y10 Firearm and Toolmark Standard Operating Procedures (SOP) Assessed to Determine Variety in Forensics Laboratories

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Learning Overview: The goal of the presentation is to show there is still a need for standardization of laboratory manuals in the firearm and toolmark discipline.

Impact on the Forensic Science Community: This presentation will impact the forensic science community by showing that much variability is still prevalent between laboratories, which can in turn affect how cases are tried on a state-to-state basis.

This study collected Standard Operating Procedures (SOPs) from a small sample of labs from across the United States. This study focused on requirements of firearm and toolmark examiners and how they differ from proposed Organization of Scientific Area Committees (OSAC) standards that are currently under discussion. The 2009 National Academy of Sciences (NAS) Report *Strengthening Forensic Science in the United States: A Path Forward* called for improvement in quality assurance standards in forensic science over a decade ago, showing a need for effective SOPs in laboratories across the United States.¹ This, combined with the fact that firearm and toolmark examination has been accepted in the courts since the 1920s, suggests that practices by this time should be similar across labs.^{2,3} A total of 15 laboratories (L1–L15) were selected for the study and five areas were determined for focus in the SOPs. These areas included examination of bullets, firearms, cartridges, toolmarks, and tools. The reference used for comparison was proposed standards by OSAC for firearm examination. The research also aims to include the opinions of examiners to ensure that all standards used are ones that examiners agree to be relevant.

Bullet examination appeared to have the best overall agreement; because of the five core areas selected, it contained the most SOP information at 92% of OSAC proposed guidelines being met. L4 had an SOP with all guidelines in the proposed OSAC standards met. L9 diverged in 19 proposed OSAC guidelines, while most labs averaged nine differences overall. The 15 labs in total had 136 differences from the core requirements.

Data from the FORESIGHT project showed a wide range of financial allocation for labs from \$187 to \$1,604,830.⁴ This along with the fact that cases for some labs in the firearm discipline were as low as 12 a year, with less than one full-time employee dedicated to firearm and toolmark work alone could be why some laboratory manuals lacked detail.⁴ Standardization of lab manuals—at least for procedures that are deemed to be critically important—can help ensure that firearm and toolmark evidence is interpreted uniformly regardless of location and can provide strong support for examiners while testifying in court.⁵ The standards under discussion in the OSAC are likely to be revised and refined in months to come. Once a set of standard SOP recommendations is adopted, however, it will be possible to ensure common practice across the nation.

Reference(s):

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2. Ritter, Nancy. The Science Behind Firearm and Tool Mark Examination. *NIJ Journal*, no. 274 (2014): 20–23. <https://www.ncjrs.gov/pdffiles1/nij/247879.pdf>.
3. Dack, Jeremy R. Using Forensic Ballistics In The Courtroom. *Law Student Scholarship*, 2014. https://scholarship.shu.edu/cgi/viewcontent.cgi?article=1631&context=student_scholarship.
4. FORESIGHT. *FORESIGHT Firearms and Ballistics Marks and Impressions*.
5. Conroy, Rachel. Formulation and Evolution of Forensic Science Standards. *International Foundation for Protection Officers*, n.d. https://www.ifpo.org/wp-content/uploads/2013/08/Conroy_Forensic_Science.pdf.

Firearm, Operating Procedures, Toolmark