E29 A Strategic Approach to Improving Forensic Science Performance: Sufficiency as an Example

Anjali R. Swienton, JD, SciLawForensics, Ltd., 25 Walnutwood Court, Germantown, MD 20874; Randall Murch, PhD, Center for Technology, Security and Policy, Virginia Polytechnic Institute, 1101 King Street, Alexandria, VA 22314; and Bruce Budowle, PhD, Forensic & Investigative Gen, University of North Texas Health Science Center, 3500 Camp Bowie Boulevard, EAD 310, Fort Worth, TX 76107*

The goal of this presentation is to begin a discussion on developing an overarching strategic plan for enhancing the forensic sciences and providing confidence in specific disciplines and the enterprise as a whole.

This presentation will impact the forensic science community by opening discussion on issues that have been addressed by the recent National Academy of Sciences (NAS) Report related to improving forensic science performance using sufficiency in latent print examinations as an example.

Most disciplines of the forensic sciences compare a profile derived from an evidence sample with that of a reference sample(s) to determine whether or not the two samples could have had the same origin. Over the last 100 years many of the original practices were based on pattern comparisons (e.g., latent prints, handwriting, hairs, tool marks). They were often developed in an *ad hoc* manner and based their validity and reliability on experiential, subjective observations, and inferences. Several factors have impacted the perceived foundations of these experiential-based disciplines: (1) today's forensic scientists are far more sophisticated than they were a century ago; (2) scientists in other fields are having greater input in the forensic sciences; (3) the legal field is more adept at challenging the admissibility of scientific evidence; (4) legal admissibility standards have been augmented; and, (5) a recent report by the NAS calling for improvements in a number of areas in the forensic sciences. The basic assumptions of the science applied and the interpretation of results, as well as the education and training of forensic scientists, are increasingly being called into question. There are some justifications for such criticisms; we all should strive to improve processes, better define attributes and limitations, and establish improvements to interpret and communicate findings. Clearly research is needed in several of the aforementioned forensic disciplines. For example, examiners analyzing friction ridge patterns employ the term "sufficiency" to describe the minimum amount of information required for applying ACE-V to a sample. There are no defined quantifiable data defined for stating that a sample meets the criterion of "sufficiency." Thus, it is difficult to ensure that a minimum acceptable performance is being practiced in the latent print examinations and comparisons and for that matter what is the minimal accepted standard. In the spirit of the recommendations of the recent NAS Report, a plan will be proposed, using friction ridge pattern analyses as an example, to move forward in an effective manner to instill education, quality, validation, and (of the utmost importance) reliability in the results obtained and decisions made from analyses, and then interpretations and opinions espoused in reports or in the courtroom. While there is likely a science component in defining sufficiency and other portions of an analysis that must be addressed, there are fundamental training requirements that all forensic scientists in the experiential-based, as well as the analytical-based, disciplines should obtain. Education (including continuing education) and training are essential components to maintaining high quality and reliable performance. The training should include: forensic ethics, statistics, quality assurance, validation, critical conduct of science, and problem solving. The training requirement should apply to all new forensic scientists as well as to all current practicing forensic scientists. There should be no grand fathering as these topics should be part of the fundamental repertoire of forensic science education and practice. This basic training will better prepare forensic scientists in their respective fields, more intelligently question current practices, and better embrace legitimately alternative viewpoints. Once imbued with these qualities, a plan of action can be prepared to address the scientific short-comings that all disciplines have. It is essential to have a well-vetted research, development, validation, and technology transfer plan in place. Otherwise, stakeholders, sponsors, and policy-makers will not take the forensic sciences seriously and support to improve will be limited. Lastly, whatever criteria are developed must be effectively communicated to the legal community and will therefore become subject to critical review, but will become part of the routine requirements for performing analyses. It is simply not acceptable to consider that if a methodology is accepted in the courtroom that it is reliable, as well as the converse that if a methodology is not accepted in the courtroom that it confers unreliability. Using sufficiency as the example, the plan we describe is a starting point for discussion. It is anticipated that this will stimulate further thought and input in developing an overarching strategic plan for enhancing the forensic sciences and providing confidence in specific disciplines and the enterprise as a whole.

Quality, Sufficiency, Validation

 ** Presenting Author*