



NATIONAL COMMISSION ON FORENSIC SCIENCE

NIST
National Institute of
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Views of the Commission Validation of Forensic Science Methodology

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Views of the Commission

Forensic data, results, interpretations, and conclusions have life-changing consequences for individuals and society. It is vital that the analytical data be generated through reliable methods and practices built upon valid core scientific principles and methodology. In the American system of criminal justice, the judge is responsible for determining admissibility of scientific evidence; however, advances relevant to forensic science analysis, from data generation to interpretation, are dynamic. Consequently, legal precedent can be issued even when scientific advances may have exposed foundational weaknesses in the forensic test method. Developments in science and technology must be impartially evaluated and communicated in a way that allows courts to make sound decisions regarding admissibility of forensic evidence.

The Organization of Scientific Area Committees (OSAC) is making significant and laudable progress in establishing documentary standards. It is critical that the forensic science community, the Commission and the criminal justice system have confidence in the validity of the science underlying these standards.

Therefore, it is the view of the National Commission on Forensic Science that:

- 1) All forensic test methods should be shown to be fundamentally valid¹.

¹ This refers to developmental validation, defined by the FBI QAS manual as “a process by which a procedure is evaluated to determine its efficacy and reliability for forensic analysis.”

- 2) The National Institute of Standards and Technology (NIST) should assume the role of scientific gatekeeper within the justice system for this purpose.
- 3) Additional resources should be made available to support this new capacity.

Overview and Background

The publication of the 2009 National Academy of Sciences (NAS) report, “Strengthening Forensic Science in the United States: A Path Forward,” has catalyzed a change in the forensic science community. Since then, the Department of Justice (DOJ) and NIST intensified their investments in foundational and applied research in forensic science. These developments signal an evolution in the expectations for forensic evidence. While training and experience are a critical component of a forensic scientist’s expertise, the underlying foundation of the discipline and associated testimony must be supported by sound research that meets the requirements of forensic practitioners, academic researchers, measurement scientists, and statisticians. The report also found “substantial evidence indicating that the level of scientific development and evaluation varies substantially among the forensic science disciplines” and “[a]body of research is required to establish the limits and measures of performance and to address the impact of sources of variability and potential bias.” Therefore there is a clear and compelling need to address the foundational validity of forensic science and forensic medicine practices.

“Validation” as used in this document refers to developmental validation, the process that ensures the effectiveness of forensic tests. As defined by the FBI QAS manual, developmental validation is “a process by which a procedure is evaluated to determine its efficacy and reliability for forensic analysis.” This usage should not be confused with performance checks (sometime called “Internal Validations”) designed to adhere to ISO 17025 Clause 5.3, Accommodation and environmental conditions: “The laboratory shall ensure that the environmental conditions do not invalidate the results or adversely affect the required quality of any measurement.” The performance checks do not take the place of true Validation studies. Developmental validation differs from internal validation conducted by individual forensic science service providers and forensic medicine service providers in that it comes first and includes but is not limited to the acquisition of data on precision, accuracy, the characterization of features, specificity, sensitivity, stability, reproducibility, testing on case-type samples, evaluation in population studies, and the determination of conditions and limitations of a test method for use on forensic and/or casework reference samples. Internal validation is defined by the FBI QAS as “the accumulation of test data within the laboratory to demonstrate that established methods and procedures perform as expected in the laboratory.”

The evaluation of validity must be respected by all stakeholders if they are to be utilized by the legal and scientific communities. The Commission believes that NIST has, or has access to, the resources needed to fairly and impartially evaluate the merit of the science underlying forensic procedures and practice. Further, the Memorandum of Understanding Between the Department of Justice and the National Institute of Standards and Technology in Support of the National Commission on Forensic Science outlines two important roles for NIST: “a) conduct research supporting the development and dissemination of methods, standards, and technical guidance for forensic science measurements, and b) test and validate select existing forensic science practices and standards as appropriate.” NIST has a long and distinguished history as an internationally

recognized and trusted scientific, technical, and metrological laboratory. The Commission believes that reviews by NIST, supported by this pedigree, can bridge the gap between scientific validity and decisions regarding admissibility.

The Commission acknowledges the deep commitment and hard work of members of the OSAC Subcommittees and their involvement in developing documentary standards and guidance with Scientific Working Groups (SWGs) and standards development organizations such as ASTM. The OSAC Registries of Standards and Guidelines are intended to ensure that a “standard or guideline that is posted on either Registry demonstrates that the methods it contains have been *assessed to be valid* by forensic practitioners, academic researchers, measurement scientists, and statisticians through a consensus development process that allows participation and comment from all relevant stakeholders.” A NIST assessment of developmental validation should precede the formation of documentary standards to be placed on the Organization of Scientific Area Committees (OSAC) Registry of Approved Standards.

Requiring an evaluation of developmental validity may delay the population of the OSAC Registries. However, the delay should not impact or influence a court’s decision on whether to admit a forensic test method unless and until NIST issues its evaluation. Moreover, because ninety-seven percent of federal convictions and ninety-four percent of state convictions are the result of guilty pleas,² a judicial determination of admissibility will not be essential to the resolution of the vast majority of criminal cases in the United States.

For some OSAC Subcommittees, this commitment would minimally impact their documentary standards setting program. For other OSAC Subcommittees, their documentary standards setting should focus on test methods that currently meet the aforementioned criteria, as determined by NIST, or on standard terminology, classifications, guides, practices, or specifications,³ while additional research is conducted for test methods that do not meet the criteria. Some aspects of documentary standards may not require prior validation. For example, a standard can request sample labeling and specific documentation in reports that would be independent of how specific tests are conducted or the limitations of those tests.

It is the view of the NCFS that an institutional entity assigned a permanent scientific review function would facilitate the gathering of scientific research, knowledge and expertise over time creating a service resource for forensic science, technology research and user communities. A trusted and impartial process of judging scientific merit of forensic practices and the presentation of data must be developed to ensure that all forensic results are based on sound and current science.

² Dept. of Justice, Bureau of Justice Statistics, Sourcebook of Criminal Justice Statistics Online, Table 5.22.2009, <http://www.albany.edu/sourcebook/pdf/t5222009.pdf>

³ “Know Your Types of Standards,” Standardization News, October 2000, available at http://www.astm.org/SNEWS/OCTOBER_2000/oct_howto.html (last accessed, 3/1/2016).