F9 The National Institute of Standards and Technology (NIST) Plans and Approaches to Conducting Scientific Foundation Reviews of Forensic Science Disciplines

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The goal of this presentation is to discuss the development of NIST approaches of examining scientific foundations (technical merit reviews) for various forensic science disciplines as requested in the President's Council of Advisors in Science and Technology (PCAST) Report and by the National Commission on Forensic Science.

This presentation will impact the forensic science community by discussing the importance of having documented research and validation studies to support measurement and interpretation claims in forensic science.

Science matters and makes a difference in quality forensic science efforts. Data are necessary to demonstrate that measurement claims are valid and appropriate interpretations can be made. In the past year, the forensic science community has been reminded of the importance of documenting data supporting claims in drawing reliable conclusions on forensic evidence. The PCAST, the National Commission on Forensic Science (NCFS), and the American Association for the Advancement of Science (AAAS) have published recommendations encouraging further research and studies assessing the scientific foundations of forensic disciplines.[1-3]

PCAST and NCFS recommendations request the NIST to examine the scientific literature and conduct technical merit evaluations and validation studies of forensic science methods and practices. For example, the NCFS requested that the results of the technical merit evaluations "be issued by NIST as publicly available resource documents" and that "NIST's evaluation may include but is not limited to: a) research performed by other agencies and laboratories, b) its own intramural research program, or c) research studies documented in already published scientific literature."[2] NCFS also requested that these evaluation documents "should be broadly disseminated in the scientific and criminal justice communities and accompanied by judicial trainings."[2]

The first NIST scientific foundation review underway covers DNA mixture interpretation. In July 2006, the International Society for Forensic Genetics (ISFG) DNA Commission provided a series of recommendations and core principles regarding appropriate interpretation of DNA mixtures.[4] Forensic DNA publications covering the time period of 2007 to 2017 were gathered, analyzed, and summarized as part of understanding how responsive the community has been to the ISFG recommendations. Articles were sorted by topic and relevance to research questions addressed. In addition, interlaboratory study results gathered through NIST studies and other collaborative exercises have been examined as part of this assessment with the hope of designing future interlaboratory studies to explore the capabilities and limitations of probabilistic genotyping systems that aid DNA mixture interpretation.

This presentation will review plans and progress made by NIST and others in these scientific foundation reviews. The important role that interlaboratory studies play in evaluating performance across the forensic science community and the ability to achieve specific levels of measurement accuracy will be emphasized. As part of these scientific foundation reviews, NIST plans to prepare regular reports to help the legal community as well as other scientists understand the capabilities and limitations of specific techniques in forensic science.

Reference(s):

1. President's Council of Advisors on Science and Technology (PCAST). *Forensic Science in Criminal Courts: Ensuring Scientific Validity of Feature-Comparison Methods.* (Released September 20, 2016); available at https://obamawhitehouse.archives.gov/sites/default/files/microsites/ostp/PCAST/pcast_forensic_science_report_final.pdf.
2. National Commission on Forensic Science (NCFS). Recommendation to the Attorney General (approved September 12, 2016). *Technical Merit Evaluation of Forensic Science Method and Practice.*; Available at https://www.justice.gov/ncfs/page/file /905541/download.
3. American Association for the Advancement of Science (AAAS). *Forensic Science Assessments: A Quality and Gap Analysis – Fire Investigation.* (Released July 11, 2017); available at https://www.aaas.org/page/forensic-science-assessments-quality-and-gap-analysis and https://www.aaas.org/report/fire-investigation.
4. Gill, P. et al. (2006). DNA commission of the International Society of Forensic Genetics: Recommendations on the interpretation of mixtures. *Forensic Science International*. 160, 90-101; available at https://www.isfg.org/Publication;Gill2006.

Scientific Foundation, PCAST, Validation

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