

### B84 A Report on the Forensic Science Research and Evaluation Workshop: A Discussion on the Fundamentals of Research Design and an Evaluation of Available Literature

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The goal of this presentation is to make attendees aware of the information contained in the published report.

This presentation will impact the forensic science community by serving as a guide to improve research design and literature evaluation.

This report is based on a “Forensic Science Research Evaluation Workshop” sponsored by the National Science Foundation and the National Institute of Justice and was held at the American Association for the Advancement of Science headquarters in Washington, DC. The impetus for the workshop was recent criticisms of the forensic sciences from public, legal, and scientific sources. One of the more important critical reports was the 2009 National Research Council Report, *Strengthening Forensic Science in the United States: A Path Forward*.<sup>1</sup> It was highly critical of the scientific foundations for several of the forensic disciplines, declaring that “Little rigorous systematic research has been done to validate the basic premises and techniques in a number of forensic science disciplines.” and “. . . a statistical framework that allows quantitation . . . is greatly needed.”<sup>1</sup>

Since the early 1990s, DNA analysis testimony began stating the probability of identified matches. Researchers have only recently begun to look at a mathematical and statistical basis for pattern comparison analysis, such as latent fingerprints, fired bullets, and toolmarks.<sup>2-4</sup> Materials such as paints, fibers, and tapes that are often found as physical evidence at crime scenes could be of greater value should we establish a statistical significance of an association with a suspect or victim. Knowing the abundance and variation in composition of these materials could be used to establish probability estimates of these materials randomly being found at the scene. Historically, there has been resistance to this approach because information on manufactured materials has been considered to be too difficult to maintain due to production changes; however, the establishment of well-maintained centralized databases are possible and should be developed.<sup>5</sup>

The workshop was formed to discuss the fundamentals of research design and the evaluation of the literature in order to conform to higher scientific standards in critical thinking and laboratory performance. The publication from the workshop is intended to provide some grist for evaluating and elevating the research efforts in the forensic sciences and it may be of value for the Organization of Scientific Area Committees (OSAC) members advanced practitioners, peer reviewers, and students of forensic science.<sup>6,7</sup>

The workshop was organized by a planning committee. Three subject areas were chosen, each consisting of a half-day session as follows: (1) experimental design and statistics; (2) interpretation and assessment; and, (3) policy implications. The goal was to bring together a range of 17 experts in the experimental and behavioral sciences, law, policy, and government funding to address the need for a higher standard of forensic science research. Each session consisted of one plenary speaker and four to five additional speakers. Each speaker had one-half hour to present their topic.

Each participant submitted a short essay of the topic they presented at the workshop, and they are included in the publication.<sup>6</sup> Additional observations and conclusions were made during panel discussions and these are included after the write-ups of each section.

In the summary of the report publication, there is an outline of topics to design research and evaluate forensic science literature.<sup>6</sup> The outline provides important considerations when planning a research project, reviewing submitted papers for publication, or simply determining the scientific quality of forensic literature. The report is intended to be a guide to assess forensic science research and its literature. The topics are not all-inclusive and are meant as a starting point. Each write-up has significant references to assist in a greater depth of background on the subject. For each specific discipline within the forensic sciences, evaluators will need a thorough knowledge base of the specific discipline to properly evaluate writings. If the evaluator is not strong in statistics, it is recommended that they confer with a statistician. A close look will be required to determine if the statistics used are appropriate. With this, it is hoped that a greater level of forensic science research is attained in the future.

#### Reference(s):

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#### Forensic, Research, Evaluation