E120 Perceptions and Estimates of Error Rates in Forensic Science: A Survey of Forensic Analysts

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Learning Overview: The goal of this presentation is to educate attendees about commonly held beliefs of forensic analysts across multiple disciplines regarding the prevalence and acceptability of different types of errors (i.e., false positive and false negative errors) in their field.

Impact on the Forensic Science Community: This presentation will impact the forensic science community by providing results of the first study to empirically assess forensic analysts' opinions and attitudes regarding the prevalence and acceptability of errors within their discipline, as well as to show common misperceptions relating to error rates among forensic analysts.

Historically, many forensic scientists have adamantly denied the presence of error in their field.[1,2] Critical reviews have noted that such statements are not scientifically defensible and have called for research to appropriately quantify error in all valid forensic science disciplines.[3,4] However, because such research is relatively recent and controversial, error rates in many forensic science disciplines remain unknown and even the best estimates are unreliable.[3,5]

The present study sought to evaluate how forensic analysts think about error in their disciplines and how demographic characteristics might influence such perceptions. In total, 183 practicing forensic analysts from wide-ranging disciplines completed a three-part survey at the outset of five training programs in the United States. For the current study, results are presented from the first two parts of the survey addressing: (1) attitudes regarding the acceptability of error types, and (2) estimates of error rates within forensic science.

Before asking questions about perceptions or estimates, participants were educated on false positive and false negative errors. Analysts then indicated how they "weigh and prioritize the risk of each type of error" on an 11-point scale ranging from 0=*I minimize the risk of false positives*, to 10=*I minimize the risk of false negatives.* Participants also completed similar questions indicating how they believed their laboratory, and discipline as a whole, weigh and prioritize the risk of each error type. In part two of the survey, participants estimated the false positive and false negative error rates in their discipline using a scale of 14 possible error rates ranging from "approximately 1 time in 2," to "such an error is impossible." After estimating error rates, participants either identified a specific source for their estimates or indicated that they did not know of any source documenting known error rates in their discipline.

Analysts generally perceived false positive errors to be less frequent than false negatives, although both error types were considered to be infrequent. Across disciplines, 38% of analysts indicated that the rate of *false positive errors* was equal to or less than one in one billion, with 10% stating that such errors were not possible. Likewise, 22% of analysts indicated that the rate of *false negative errors* was equal to or less than one in one billion, with 6% stating that such errors were not possible. Notably though, estimated error rates differed according to discipline, with forensic biology analysts typically estimating that errors were less common than did pattern evidence analysts. When asked to identify a source for their estimated error rates, the vast majority of analysts (78.7%) did not provide a source.

In general, analysts reported that they, their workplace, and their discipline prefer to minimize the risk of false positives and thus tolerate a greater risk of false negatives. Crime scene investigation analysts were the lone exception in that they held a more balanced view regarding minimizing false positive and negative errors. Additional detailed results and moderating variables (e.g., work experience) will be addressed at the conference.

In conclusion, this presentation will discuss how forensic analysts view error rates in their field and discuss implications for future practice and research. For example, although most forensic science disciplines do not have established error rates, the fact that more than one in five analysts estimated the risk of each error type to be impossible or very low (i.e., less than one in one billion) is concerning in light of: (1) the inevitability of errors, and (2) human vulnerability to cognitive bias.[3] Results highlight the need for further work investigating and disseminating error rates as a step toward informing policy and practice.

Reference(s):

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