E4 Science 101: Accuracy, Reliability, and Validity – From the Lab to the Courtroom

Gerald M. LaPorte, MSFS*, National Institute of Justice, Investigative & Forensic Science Division, 810 Seventh Street, Northwest, Washington, DC 20531

After attending this presentation, attendees will have a better understanding about the scientific concepts of accuracy, reliability, and validity.

This presentation will impact the forensic science community by providing an in-depth discussion about accuracy, reliability, and validity. It is critical that forensic scientists be able to demonstrate that these factors have been sufficiently tested prior to issuing an official report.

Science can be thought of as "any systematic knowledge-base or prescriptive practice that is capable of resulting in a correct prediction or reliably-predictable type of outcome. In this sense, *science* may refer to a highly skilled technique, technology, or practice from which a good deal of randomness in outcome has been removed." The methods and results used in all sciences are sometimes described as accurate, reliable, and valid, but these terms can have many connotations, and thus be interpreted quite differently. This presentation will provide a discussion about the concepts of accuracy, reliability, and validity as they pertain to forensic science methods. Moreover, forensic scientists should be prepared to demonstrate, when called upon in court, that the results attained in their testing have satisfied a working hypothesis. The conclusions that are reached must be based on the results and supported by the data.

Sometimes, forensic scientists can derive dissimilar conclusions when presented with the same results. This is not necessarily unusual from other science-based practices because the interpretation of data by humans is invariably complex and is often related to the type and extent

of training and knowledge, years of experience, and the ability to make a decision given multiple types of information. However, it is imperative that attorneys understand the methodologies used to derive forensic conclusions and if they are valid and reliable.

Forensic Science, Accuracy and Reliability, Validity