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PART A:

In this article (Error and its Meaning in Forensic Science) the authors endeavor about the "errors" in the forensic science and however the center has been moved to incorporate the assessment of strategies and methods instead of basically the expert's interpretation of the outcomes¹. Previous to the Daubert ruling, reliability in scientific methods and validity were not appropriately implemented in the courtroom while giving the testimony¹. But after following the guidelines it was required to include reliability/validity methods¹. The challenge was the interpretation of error in the courtroom and explaining to the people belonging to non-scientific background¹. Furthermore, article discuss about the potential source of any protocol is estimated to be 100%¹. Later, lack of acknowledging scientific methods and other challenges are reported in NAS report¹. The essential objective of this report was to characterize four potential sources of error¹. Practitioner error refers to human error(s)¹. It can be minimize through quality assurance system checks, peer review, maintaining standard laboratory protocols and proficiency testing¹. Instrument error can be determined between a given instrument value and true value and the errors can be reduced by proper maintenance and calibrations of instruments¹. In general terms, statistical errors are defined by standard errors¹. Method (or technique) error is measured by the overlap of different groups of data set¹. It not only influences the sensitivity, probative value and lastly validity of the followed procedure¹. Briefly explained by the example of nuclear DNA having more sensitivity than the mtDNA in determining the recognition¹. The authors stated the reason behind this is because mtDNA occurs more often in the given population of data set¹. To minimize the method errors more calibration need to be taken into consideration¹. Understanding the significance of actualizing measures to limit mistakes and constraints in legal sciences can resolve the issues and perplexity over the importance of results and can prevent the misuse of errors¹. The second piece of the article portrays about the misconception or misunderstanding of error specifically in both legal and scientific communities¹. The authors have recognized various sources with respect to errors; one of them is declaring a "zero state"¹. The article gives a case of testimony in respect to fingerprints and claims while doing the analysis that the error rate for their methodology is zero as the fingerprints are unique¹. Regardless of whether the component is unique it does not imply that the comparison procedure can faultlessly decide if two examples began from a similar source¹. Another claim was about the American Board of Forensic Odontology that examiners executed false positive bitemark errors¹. The article likewise makes reference to about the two hair examination (microscopical hair examination) methodology and how the error rates are characterized by various expert forensic examiners showing constrained (forced) numbers or distortion of information¹. Hence, it was concluded that to limit the distortion of results or misuse of errors in court NAS Report and Daubert rules ought to be pursued for reliability, unwavering quality and legitimacy of our techniques¹. What's more, instructing the lawful networks about the distinction between scientific methods, technique restrictions and uncertainties¹. The best can be practiced by affirmation, potential sources of mistakes in the examination or research analysis¹.

REFERNCE LIST:

- 1) Christensen AM, Crowder CM, Ousley SD, Houck MM. 2014. Error and its meaning in the forensic science. J Forensic Sci [Internet]. [cited 2019 Jan 29]; 59(1):123-126. Available from: <https://fleming.desire2learn.com/d2l/le/content/95117/viewContent/1112832/View>

PART B:

Establishing scientific validity and dependency is very important but also very difficult regarding the determination of error in the field of Forensics. I agree with the author error has different meanings and functions in the courtroom compared with the research setting. Errors occasionally occur and may have very serious consequences as important decisions in intelligence and justice are based on it. The government officials in court lack knowledge as do not have science background so we need to give them a better idea of these concepts [1]. Error has different definition an act, assertion, or belief that unintentionally deviates from what is correct, right, or true; the condition of having incorrect or false knowledge; the act or an instance of deviating from an accepted code of behavior; or a mistake while mathematically and statistically, error may refer to the difference between a computed or measured value and a true or theoretically correct value[1]. This article is relevant as the factors considered to admit a expert testimony, whether the theory or technique in question can be (and has been) scientifically tested, it has been subjected to peer review and publication, its known or potential error rate and the existence and maintenance of standards controlling its operation still pertain [1]. Lets focus on one of the aspect i.e;

- 1) Statistical error it is the deviation between actual and predicted values, generally estimated by the standard error or other measure of uncertainty in prediction [1]. Statistical error often merely expresses normal variability and is inherent in measurements and estimates because they are based on the properties of a sample.
- 2) Practitioner error refers to a mistake or operator (human) error. It may be random or systematic, may be related to negligence or incompetence, and is, for the most part, unintentional and unquantifiable [1]. Another author published about bite marks in relation to practitioner error states bite mark evidence are relatively uncontroversial, and the majority of forensic odontologists are satisfied that bite marks can demonstrate sufficient detail for positive identification, bite mark testimony has been criticized on different grounds [2]. Several methods of bite mark analysis have been reported, all involving three steps: (i) reproductions of both the bite mark and the suspect's dentition through a variety of methods; (ii) direct or indirect comparison of the dentition and bite mark; and (iii) evaluation of the points of similarity or dissimilarity affirmed that even under carefully controlled conditions, albeit in a forced-decision model, errors in interpretation occur even among the most experienced observers [2]. However, even though the examiner may have great

experience, the pool of possible biters may be small or the bite mark pattern may demonstrate sufficient characteristics (leading to an obvious, logical, and understandable analysis), the expert opinion must be based on scientifically derived techniques in which comparisons have been used to calculate error rates where possible [2].

REFERENCE LIST:

- 1) Christensen AM, Crowder CM, Ousley SD, Houck MM. 2014. Error and its meaning in the forensic science. *J Forensic Sci* [Internet]. [cited 2019 Jan 29]; 59(1):123-126. Available from: <https://fleming.desire2learn.com/le/content/95117/viewContent/1112832/View>
- 2) Rivera-Mendoza, Fernando, et al. "Bite Mark Analysis in Foodstuffs and Inanimate Objects and the Underlying Proofs for Validity and Judicial Acceptance." *Journal of Forensic Sciences*, vol. 63, no.2, 2017, pp. 449–459. Available from: <https://onlinelibrary.wiley.com/doi/full/10.1111/1556-4029.13586>

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