



A34 The Questionable Thought Processes in Requiring Error Rates in Forensic Science

Joseph P. Bono, MA*, Indiana University-Purdue University Indianapolis, Forensic Sciences Program, 402 North Blackford Street, Indianapolis, IN 46202

After attending this presentation, attendees will better understand the questionable requirement some have demanded of forensic scientists to answer the question: What is your error rate?

This presentation will impact the forensic science community by discussing a number of concepts, which have arisen over the past few years, some in light of the National Research Council report, and others, which have been discussed in detail, especially since 1993. Some of these concepts without substantive definitions have taken on a life of their own. The number of purported experts who advocate a point of view does not determine the legitimacy of an argument. Legitimacy should be determined by the relationship of an argument to the real world. One of these arguments for the “requirement of a science,” and more specifically forensic science, is the demand for specifying an “error rate” in a forensic discipline. Some claim that the validity of any forensic discipline cannot be determined without an “error rate.” The requirement for any definition must go beyond providing examples. Without a definition, the term has no substantive meaning; and without a substantive meaning of the term, there is little credibility in the arguments of those who insist on a requirement for this concept, which cannot be defined.

In researching the literature there are a number of articles (mostly from those who do not have a degree in a natural or physical science) which advocate an inherent requirement to specify the “error rate” in order to determine whether a scientific method is valid. Some have said publicly that without an error rate, a method is not scientific. There are a number of inconsistencies in these “requirements” which lead the uninformed to ask an apparently basic question: What is your error rate? This is a question without an answer.

One can calculate the number of unacceptable results in a specific proficiency test in a forensic science discipline administered to a defined set of test takers. However, this number cannot be used to extrapolate a conclusion regarding the number of unacceptable results that would occur in actual case work in the same forensic science discipline across the spectrum of those who perform a similar forensic science analysis. Giving examples without a definition does not provide an answer to the basic question: What are you talking about?

Most can remember a definition from fourth grade math: the term “rate” meant and is still defined by “numerator/denominator.” Until those who continue to pontificate this purported requirement for an error rate define the numerator, and then the denominator, expressing any term which includes the word “rate” is mathematically illogical. There is a difference between claiming that an error can occur in a forensic science method, and claiming that an error has occurred in a forensic science analysis. The first argument is based on a philosophical/statistical discussion; the second is based on an evaluation of data or images in a specific case. The decisions in the judicial system are, or should be based on what has transpired in the individual case which is being tried. Arguments in trial should be evaluated by the presentation of facts in the form of data and justification for the methodology rather than by a discussion of whether an error can occur. The question should be: Has an error occurred? There is no arguing that there is a nonzero probability

of an error having occurred with a resulting erroneous conclusion. The question should be: Did an error occur in this case?

Mistakes/errors do occur in forensic science laboratories; however, no method exists for quantifying the “rate” at which these mistakes/errors occur in actual casework. The other side of this issue which is even more interesting is that these arguments related to forensic science are usually attributed to philosophers, psychologists, statisticians, and lawyers. This presentation will also deal with shortcomings in the arguments of lawyers, based on fundamental science and resulting opinions in the Supreme Court cases cited in *Daubert vs. Merrell Dow Pharmaceuticals, Inc.*, 509 U.S. 579 (1993) and *Kumho Tire Co. vs. Carmichael* (97-1709) 526 U.S. 137 (1999) 131 F.3d 1433, *Reversed*.

This presentation will evaluate both “quasi scientific” and legal arguments erroneously arguing for the requirement of “error rates.” The presentation will also look at some examples used to describe “error rate” which have little if any application to forensic science.

Error Rate, *Daubert vs. Merrell Dow Pharmaceuticals, Kumho Tire Co. vs. Carmichael*