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ISSUES: Are the Experts truly experts?

The experts for the state are not experts in fields in which they seek to testify and are overstepping their bounds.
Are they formally trained?
How long?
Tested?
What was the score?
Continued proficiency testing?
Who taught them?
How much of the course was actually on point?
What is their personal error rate?
Have their opinions been subject to blind peer review?
What were the results?

Research by the Virginia Law review, in 2009 revealed
experts for the prosecution overstepping their boundaries with regard to training and testifying and/or misstating empirical data have occurred in a majority of cases in which defendants were ultimately exonerated by post-conviction DNA[i].
See **Scientific Argument** Virginia Law Review, Volume 95 March 2009, No 1 at 1.

WHY IT IS A PROBLEM

Research conducted involving 137 cases in which defendants were wrongfully convicted revealed that in a majority of the cases (60%) "Forensic analysts called by the prosecution provided invalid testimony at trial. That is testimony with conclusions misstating empirical data or wholly unsupported by empirical data."[ii]

This was not testimony from only one or two experts but included "invalid testimony by 72 forensic analysts called by the prosecution and employed by 52 laboratories, practices, or hospitals from 25 states."[iii]

Unfortunately as stated in the article "courts and scholars have long recognized that jurors had special trust in scientific evidence. Studies also suggest the manner in which forensic evidence is presented to the jury impacts how jurors weigh that evidence."[iv]

In a situation where an expert claims, for example, his findings are consistent with, for example, chloroform or decomposition odors, "is not only extremely prejudicial but potentially misleading." To say "that two items are consistent without being able to tell the jury that consistently is rare or common, renders the evidence potentially misleading, and hence raises questions whether it is admissible as both irrelevant and unduly prejudicial."[v]

As indicated in the Law Review Article, "invalid testimony could be explained not by intentional or reckless acts, but rather by inexperienced, poor training, or inadequate supervision." [vi]

In 2000, the Federal Judicial Center published the Reference Manual on Scientific Evidence, 2nd edition) The following is found at page 45-6 discussed how judges must explore underlying expert's opinions:

" 1. Was an appropriate universe or population identified?
2. Did the sampling frame approximate the population?
3. How was the sample selected to approximate the relevant characteristics of the population?
4. Was the level of nonresponse sufficient to raise questions about the representativeness of the sample?
5. What procedures were used to reduce the likelihood of a biased sample?
6. What precautions were taken to ensure that only qualified respondents were included in the survey?
The other reference guides cover additional areas in which expert evidence is frequently offered and disputed."

National Academy of Science:

On March 3, 1863, President Abraham Lincoln incorporated The National Academy of Sciences. [1] In 1916, the Academy established the National Research Council.[2] This council has subsequently been affirmed by executive orders from President Eisenhower and Bush.[3]

On ll/22/2005, Congress authrosed "the National Academy of Sciences to study forensic science."[4]

Thereafter, on August 2, 2009, the National Research Council of the National Academies published "Strengthening Forensic Science in the United States: a Path forward". This was funded by the U.S. Department of Justice.

This project was approved by members of national academy of sciences.[5]

Forensic science page

Status and Needs of Forensic Science Service Providers: A Report to Congress) pages of the report)

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[1] http://www.nationalacademies.org/about/history.html 4/3/2011
[2] Id.
[3] Id.
[4] Strengthening the Forensic Science in the United States A Path Forward. National Academy of Sceinces, , *the National Academies Press*, 2009. Descriptor of document, unpagenated. at 1
[5] Strengthening the Forensic Science in the United States A Path Forward. National Academy of Sceinces, , *the National Academies Press*, 2009. Descriptor of document, unpagenated.

The preface at XX found "the forensic science system, encompassing both research and practice, has serious problems that can only be addressed by a national commitment to overhaul the current structure that supports the forensic science community in this country."

Page 40 of that report discusses the importance of blind trials by indicating, when dealing with DNA, "No laboratory should let it's results with new DNA typing method be used in court unless it has undergone… proficiency testing via blind trials."

Page 37 "new doubts about the accuracy of some forensic science practices have intensified with the growing number of exonerations resulting from DNA analysis…"

"Finally, if evidence and laboratory tests are mishandled or improperly analyzed**;** if the scientific evidence carries a false sense of significance; or if there is bias, incompetence, or a lack of adequate internal controls for the
evidence introduced by the forensic scientists and their laboratories, the
jury or court can be misled, and this could lead to wrongful conviction or
exoneration. If juries lose confidence in the reliability of forensic testimony,
valid evidence might be discounted, and some innocent persons might be
convicted or guilty individuals acquitted."

Page 111 indicates "the law's admission of and reliance on forensic science discipline is founded on a reliable scientific methodology leading to accurate analysis of evidence and proper reports and findings…"

112 "Methods to reduce errors are part of the study design so that, for example, the size of the study is chosen to provide sufficient statistical power to draw conclusions with a high level of confidence or to understand factors that might confound results."
"to confirm the validity of a method or process for a particular purpose… validation studies must be performed" page 113

114 discusses general requirements for competence including " assessment of the uncertainty of the results based on scientific understanding of the theoretical principles of the methods and practical experience" as well as
"systemtatic assessment of the factors influencing the result"

115 when , referring to for example DNA labs, show they must have written general guidelines for the interpretation of the data."
And. "the laboratory shall verify that all control results are within the established tolerance limits"
Surely the requirements are no less strict in labs involving ____analysis or experiments on ____

Error rates:
120"error rates are defined as proportion of cases in which the analysis led to a false conclusion."

Discussed on page 117 for example, when discussing hair analysis,
"as in the case of all analyses leading to classification conclusions…the microscopic hair analysis process must be subjected to performance and validation studies in which appropriate error rates can be defined and estimated.

Page 122 states
Although only illustrations, these examples serve to demonstrate the importance of:
 the **careful and precise characterization of the scientific procedure**, so that others can replicate and validate it;
 the identification of as many sources of error as possible that can affect both the accuracy and precision of a measurement;
 the quantification of measurements (e.g., in the example of GC/MS analysis of possible heroin, reporting peak area, as well as appropriate calibration data, including the response area for a known amount of analyte standard, **rather than merely "peak is present/absent");**
 the reporting of a measurement with an interval that has a high probability of containing the true value;
 the precise definition of the question addressed by the method (e.g., classification versus individualization), and the recognition of its limitations; and
 the conducting of validation studies of the performance of a forensic procedure to assess the percentages of false positives and false negatives.
"Most importantly,
as stated above, whether the test answer is correct or not depends on the question the test is being used to address."

119 discusses need for true positives and true negatives and false positives and false negatives.

Bias

In Strengthening Forensic science, in the United States : a Path Forward, published by the National Academies Press, the National academies of science, the National Academy of Engineering , the Institute of Medicine and the National Research Counsel collaborated to define forensic science and it's limitations.

The findings reveals that "human judgment is subject to many different types of bias, because we unconsciously pick up cues from our environment…"[6]

In fact, this book reveals an experiment wherein contextual bias was introduced. The scientists were told that a suspect had confessed to a crime and in 6 out of the 24 examinations, the results were different from that same scientist examining that same print with out the bias introduced.

"independent (blind) verification"[7] is necessary to reduce the impact of bias. "the goal is to make scientific investigations as objective as possible so that result do not depend on the investigator"[8]

The results revealed "Forensic evidence is the most important investigative tool available to iury adversarial system of justice that can help identify the guilty and exonerate the innocent." Page 8 of the report found, "the federal government should sponsor research to validate forensic science disciplines to address basic principles, error rates and standards of procedure."'

An example of problems which can occur which result in erroneous convictions and expensive second trials can be found in the Bullet Lead Analysis fiasco. In a 2008 updated article by CNN it was revealed that for years "the FBI believed that lead in bullets had unique chemical signatures…" see article first page. And it was revealed these conclusions were not based on science but subjective beliefs for 4 decades. The basic premise had never actually been scientifically tested. In 2002 the FBI asked NAS to conduct an independent review and the National research counsel authored a report finding the conclusion was overstaed, misleading and deeply flawed.[9]

On 11/27/2006, Eugenie Reich, a science reporter revealed in an article published in the Boston Globe that scientists at the Oak Ridge National Laboratory (ORNL) admitted to misrepresenting key data in a paper published over a decade ago. Her source revealed "there is a direct, incontrovertible evidence of systemic data manipulation and scientific misconduct in this manuscript Dr. Pennycook, the leader of the team responsible for the research received

[6] Strengthening Forensic Science in the United States : a path forward, National Research Counsel of the National Academies, National Academies press, 2009 at 122
[7] Id at 124
[8] Id.
[9] http://www.cbsnews.com/stories/2007/11/16/60minutes/main3512453.shtml

funding about 2 million per year from taxpayers Ms. Reich sought to obtain information from ORNL under the Freedom of Information Act regarding the facts and research which resulted in the misrepresentation. The ORNL subsequently refused to provide this information resulting in a lawsuit demanding the duly discoverable material by Ms. Reich under a FOI demand.

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[i] Virginia Law Review, Volume 95 March 2009, No 1 at 1.
[ii] Id at 2.
[iii] Id.
[iv] Id at 25 citing Daubert v Merrell Dow Pharmaceuticals Inc. 509 U.S. 579, 595 (1993) and Koehler Jonathan, the Psychology of Numbers in the Courtroom: How to Make DNA Match Statistics Seem Impressive or Insufficient, 74 S. Cal.L.Rav.1275 (2001).
[v] Id at 19.
[vi] Id at 24.