

Forensic Science Scrutiny

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In 2016 the White House reported that they were going to scrutinize some forensic sciences in the court room. The White House's scrutiny, however, over some forensic disciplines is probably justified. When the level of evidence required is very high, the expectations from the scientific community should also be very high. These are usually cases where consequences of decisions can lead to long imprisonments. Being speculative about what evidence means, or making decisions based on poor science is irresponsible. The public has high expectations from the scientific community, and when experts testify that there is scientific evidence which proves a case, there is trust involved in those statements. If judges allow experts to present themselves as such, and to express their opinions as the

truth, errors involved making scientific conclusions may not be well understood by the layperson.

Potential for errors in analysis and interpretation of results in science always exists, even when results seem very obvious. Mishandling of samples or evidence can lead to gross misinterpretations. Poor calibration, quality assurance, training, or miscommunication can lead to errors of all degrees. Scientists of the highest caliber have been found to make some of the most grotesque errors. For example, in 1999, NASA lost a \$125 million Mars orbiter when a Lockheed Martin engineering team used English units of measurement while NASA used metric units, even though NASA had been using metric units since 1990.

This article mentions that forensic science results must be “repeatable, reproducible, and accurate.” This is fundamental characteristic of any quality analysis, because if the test results vary a lot, then two exact cases or samples may be determined to be quite different. If the forensics are going to be useful, they need to arrive at the same conclusions for the same conditions each time. Repeatability, reproducibility and accuracy are terms of precision. **Repeatability** in science is the variation of a test when performed by an individual with the same equipment, same procedure, under the same conditions, same location, etc. **Reproducibility** is the variation of a test when performed by different individuals, different equipment, at different locations. In other words, it is the ability of a test to replicate the results of others performing the same test. **Accuracy** is the variation of the test result from the true value, which is only possible to measure when standards are being tested. The article mentions that casework is not valid research, and

experience alone cannot establish valid scientific validity. This isn't explained in the article, but it is a valid point. Casework and experience do not provide a "known answer" to which accuracy of test results can be based. Certainly repeatability and reproducible results can be shown with casework and experience, but if the results are not accurate, this is not known without knowing the right answer, or a standard. Scientific studies therefore would have to be performed that control for "right answers", with appropriate blinding of scientists to determine how accurately they are able to arrive at the "truth".

Experience might be noted by someone's training, degrees and certifications, and work experience. While it is true that experience alone cannot establish scientific validity, experience does deepen the understanding that scientists have when it comes to their profession and ability to interpret test results. Experience can aid in decision making, and in interpreting the results that will be necessary in making a rationale and conclusion.

This is a good discussion from the White House in criminal justice. The public has high expectations from the scientific community, and without good science to provide the backing for solid answers, scientist can be left making best guesses which might be misinterpreted by the public to mean more than it is. The White House's concern of forensic science should make more money available to advance forensic sciences. More money for research is generally a good step, and they have provided some specific goals where there may be needs for research.

References:

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