



B82 The Data Needed to Realize the Value of Forensic Science

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After attending this presentation, attendees will better understand the dangers associated with reporting test results in isolation and the effect of addressing activity-level propositions rather than source-level propositions.

The presentation will impact the forensic science community by highlighting the broader role that forensic scientists must play to ensure their information and findings do not contribute to miscarriages of justice.

The concept of forensic scientists addressing propositions at different levels of the hierarchy is well documented in the scientific literature.¹ The higher up the hierarchy, the greater is the value provided by the forensic scientist.

This presentation will outline the impact of addressing activity propositions rather than source propositions and highlight the type of data forensic scientists need to ensure their information is not misleading or used by others in a misleading manner.^{2,3} Source propositions are those in which the scientists seek to establish whether two materials share the same origin or not, while activity propositions address what materials are expected to be found given a specific activity. Activity propositions need data on the probability of materials transferring in given scenarios and provide much more useful information to forensic questions. Following this logic, it is seen that the scientist may address whether two groups of glass fragments share the same source. This demands information on the discriminating power of the techniques used and the frequency of occurrence of specific parameters. This may be useful in court but will not be as helpful as considering whether the findings support the suspect being the man who broke the window rather than some other man. To address the latter, the scientist needs information for the court on the likelihood of glass transferring given the details of the breaking glass and the time since the incident to address the prosecution proposition and will need to know the probability of specific populations having glass on their clothing to address the defense proposition. The weight of evidence or likelihood ratio is the ratio of these two probabilities. This type of information is less well documented and sometimes less explicit than the data on techniques and frequency of occurrence.

Confining reports to source propositions can be misleading. Consider a situation in which a rare fiber is recovered from a garment and found to be indistinguishable from a reference sample. In isolation, the court is likely to consider this information to be helpful, but consider again if, given the contextual information, the scientist expects that multiple fibers should be transferred and recovered. It is advanced that the court needs this information and that the scientist has a duty to supply it.

The logic applies to all trace evidence and is, according to this presentation, also the case for low levels of DNA in which the discriminating power of the technique may overwhelm the other relevant factors.

The basis of this presentation will be the three principles learned from Evett: (1) that forensic science findings need to be interpreted in a context; (2) that at least two propositions should be addressed; and (3) that the scientist is well placed to address the probability of the findings rather than the probability of the propositions.¹

This presentation will include examples from personal experience in which source rather than activity propositions were misleading and examples to illustrate why the context is important.

Reference(s):

1. Cook, R, Evett, IW, Jackson, G, Jones, PJ, and Lambert, JA. 1998. A hierarchy of propositions; deciding which level to address in casework. *Science and Justice*. Vol 38 pp 232-239.
2. ENFSI Guideline for Evaluative Reporting in Forensic Science. *European Network of Forensic Science Institutes*. 2015 v3.0.
3. Standards for the formulation of evaluative forensic science opinion. *Science and Justice*. Vol 49 (2009) pp161-164.

Data, Principles, Activity