

## H3 Recognizing the Misuse of Probabilistic Language (PL) and False Certainty in False Accusations of Child Abuse

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**Learning Overview:** The goal of this presentation is to increase awareness of the misuse of PL, false certainty statements, and their impact of false allegations of child abuse.

**Impact on the Forensic Science Community:** This presentation will impact the forensic science community and evidentiary rulings regarding false certainty statements in court.

PL is language used to convey mathematical probabilities in narrative form. Terms like “concerning for,” “highly likely,” “never,” and “suspicious of” are common PL. PL play a large and previously unanalyzed role in child abuse prosecution and particularly false accusations of child abuse; a common occurrence. PL can be used in conformance with principles elucidated in forensic epidemiology or systemically misused with intentional imprecision, when not justified, to promote a misdiagnosis of abuse, with dire consequences.<sup>1</sup> The application of actual probability analysis using tested mathematical models, like Bayes Theorem, is essential to an analysis of the actual probability of abuse, in a specific case, to avoid false accusations of abuse.

Bayes Theorem, first published in 1764, is a calculation of actual odds (“posterior odds”) of an event (like abuse) or a result (like having a disease), being a true positive, based on mathematical probabilities that are known.<sup>2</sup> It is imperative to remember that the result being calculated is a mathematical probability, not a certainty. The posterior odds are computed with the consideration first, of the “prior odds” of an event (abuse) occurring in a defined population of subjects (i.e., What is the rate of abuse among professional caregivers?). Defined populations can be general (all caregivers) or specific (i.e., military families, professional caregivers, foster parents, etc.). The prior odds are then multiplied by calculations of the reliability of an “indicator” or criteria (i.e., a lab result, an imaging finding, or a physical finding, like a bruise or petechiae). The magnificence of Bayes Theorem is the simplicity in which an infinite variety of subpopulations, with different prior odds, can be conjured up and used with a wide variety of indicators, each with its unique reliability. Reliability is calculated using variants of conventional sensitivity and specificity which, when compared as a ratio, create a “likelihood ratio.” The likelihood ratio is a reflection of the reliability of an indicator to deliver the correct decision. Indicators can be very reliable evidence, like DNA matches, that generally help to prove the event (abuse) occurred. Indicators, on the other hand, when analyzed, can comport with forensic standards defined as non-specific and unreliable. Using mathematics, Bayes brings clarity to subjectivity and/or potential bias, reflected in imprecise “false certainty” statements. In reality, when studied, the indicators used in modern child abuse to diagnose disputed abuse cases are uniformly quite unreliable. This calculated unreliability results in very low posterior odds that generate calculated probability and reliability that abuse occurred under 1%.

With evidentiary standards beginning at 50% reliable in certain court proceedings, and rising in criminal matters to >95%, to have evidentiary value, low calculated probabilities using Bayes suggest that false certainty statements, about unlikely hypothesis, create opportunities for injustice. In contested abuse cases without witness evidence, imprecise probabilistic language is widely used as evidence. With the pediatric abuse literature and fund of knowledge of child abuse pediatrics now widely questioned by independent scientific analysis, all forms of imprecision take on the character of false certainty statements. After probability analysis using Bayes, it is manifestly obvious that such imprecision and false certainty have become the *sine qua non* of accusatory expert opinion. The suppositious statements of false certainty that are used, currently, only detected by scientists and physicians with the requisite advanced knowledge of these issues, expose deep flaws in the practice of child abuse pediatrics. On balance, there is an emerging reality that the collective suffering of falsely accused families dwarfs the horrific impacts associated with real abuse and exposes that iatrogenic abuse may be the most common form of child abuse in the legal system. Furthermore, a false accusation of child abuse is child abuse.

The misuse of PL to convey false certainty and its ramifications for innocent caregivers must be acknowledged as a first step in eliminating false accusations of child abuse.

### Reference(s):

1. Goodman S.N., Royal R. Evidence and Scientific Research. *Am J Public Health* 1988; 78: 1568-1574.
2. Bayes, T. An Essay Toward Solving a Problem in the Doctrine of Chances. *Philosophical Transactions of the Royal Society of London* 1764. 53, 370-418.

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### Child Abuse, False Accusations, Probabilistic Language