

# Raccomandazioni sull'interpretazione statistica di un misto



U.S. Department of Justice  
Federal Bureau of Investigation

**FORENSIC SCIENCE COMMUNICATIONS**  
July 2000 Volume 2 Number 3

## Statistical and Population Genetics Issues Affecting the Evaluation of the Frequency of Occurrence of DNA Profiles Calculated From Pertinent Population Database(s)

DNA Advisory Board  
February 23, 2000

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### Introduction

When a comparison of DNA profiles derived from evidence and reference samples fails to exclude an individual(s) as a contributor(s) of the evidence sample, statistical assessment and/or probabilistic reasoning are used to evaluate the significance of the association. Proper statistical inference requires careful formulation of the question to be answered, including, in this instance, the requirements of the legal system. Inference must take into account how and what data were collected, which, in turn, determine how the data are analyzed and interpreted.

Previously, the DNA Advisory Board (DAB; June 21, 1996, New York, New York) endorsed the recommendations of the National Research Council's Report (1996; henceforth NRC II Report):

The DAB congratulates Professor Crow and his NRC [National Research Council] Committee for their superb report on the statistical and population genetics issues surrounding forensic DNA profiling. We wholeheartedly endorse the findings of the report in these substantive matters.

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As the NRC II Report (1996) describes, there are alternate methods for assessing the probative value of DNA evidence. Rarely is there only one statistical approach to interpret and explain the evidence. The choice of approach is affected by the philosophy and experience of the user, the legal system, the practicality of the approach, the question(s) posed, available data, and/or assumptions. For forensic applications, it is important that the statistical conclusions be conveyed meaningfully. Simplistic or less rigorous approaches are often sought. Frequently, calculations such as the random match probability and probability of exclusion convey to the trier of fact the probative value of the evidence in a straightforward fashion. Simplified approaches are appropriate, as long as the analysis is conservative or does not provide false inferences. Likelihood ratio (LR) approaches compare mutually exclusive hypotheses and can be quite useful for evaluating the data. However, some LR calculations and interpretations can be complicated, and their significance to the case may not be apparent to the practitioner and the trier of fact.

Bayesian inference, which accounts for information other than the DNA evidence, also could be applied. Bayesian approaches sometimes require knowledge of circumstances beyond the domain of the DNA scientist and have not been addressed in U.S. criminal courts for DNA analysis. The DAB believes it is for the courts to decide whether or not Bayesian statistics are solely the responsibility of the trier of fact. The DAB recognizes that these different approaches can be applied, as long as the question to be answered and the assumptions underlying the analyses are clearly conveyed to the trier of fact.

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*Traduzione: ...raramente esiste solo un approccio statistico per interpretare e spiegare la prova. La scelta dell'approccio è condizionata dalla filosofia e dall'esperienza dell'utilizzatore, dal sistema legale, dalla praticità dell'approccio, dalle domande poste, dalla disponibilità dei dati e/o dalle ipotesi. Per le applicazioni forensi è importante che le conclusioni abbiano un senso. Approcci semplicistici o meno rigorosi sono spesso tentati....*