

1. Record Nr.	UNINA9910970416103321
Titolo	The evaluation of forensic DNA evidence / / Committee on DNA Forensic Science: an Update, Commission on DNA Forensic Science: an Update, National Research Council
Pubbl/distr/stampa	Washington, D.C., : National Academy Press, 1996
ISBN	0-309-13440-4 1-280-19283-6 9786610192830 0-309-55662-7 0-585-03781-7
Edizione	[1st ed.]
Descrizione fisica	1 online resource (270 p.)
Disciplina	614/1
Soggetti	Forensic genetics
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Note generali	Bibliographic Level Mode of Issuance: Monograph
Nota di bibliografia	Includes bibliographical references (p. 226-0239) and index.
Nota di contenuto	The Evaluation of Forensic DNA Evidence -- Copyright -- Preface -- Contents -- Executive Summary1 -- INTRODUCTION -- CONTENTS OF THE REPORT -- RECOMMENDATIONS -- Recommendations to Improve Laboratory Performance -- Recommendations for Estimating Random-Match Probabilities -- Recommendations on Interpreting the Results of Database Searches, on Binning, and on Establishing th ... -- Recommendation for Research on Juror Comprehension -- Overview -- INTRODUCTION -- OUR ASSIGNMENT -- DNA TYPING -- BASIC GENETIC PRINCIPLES -- FORENSIC DNA IDENTIFICATION -- VNTRs -- DNA Profiling -- Matching and Binning of VNTRs -- Allele (Bin) Frequencies -- PCR-Based Systems -- ASSURING LABORATORY ACCURACY -- POPULATION GENETICS -- Randomly Mating Populations -- Population Structure -- Dealing with Subpopulations -- Persons from the Same Subpopulation -- SOME STATISTICAL CONSIDERATIONS -- The Reference Database -- Match Probability, Likelihood Ratio, and Two Fallacies -- Bayes's Theorem -- Suspect Identified by Database Search -- Uniqueness -- Uncertainty About Estimated Frequencies -- PCR-Based Tests -- THE CEILING PRINCIPLES -- DNA IN THE COURTS --

CONCLUSIONS AND RECOMMENDATIONS -- Admissibility of DNA Evidence (Chapter 2) -- Laboratory Errors (Chapter 3) -- Proficiency Tests -- Duplicate Tests -- Population Genetics (Chapter 4) -- Evidence DNA and Suspect from the Same Subgroup -- Insufficient Data -- Dealing with Relatives -- Statistical Issues (Chapter 5) -- Database Searches -- Uniqueness -- Matching and Binning -- Ceiling Principles -- Further Research -- Legal Issues (Chapter 6) -- ILLUSTRATIVE EXAMPLE -- A Typical Case -- Suspect Found by Searching a Database -- Suspect and Evidence from the Same Subpopulation -- A PCR-Based System -- 1 Introduction -- THE 1992 NATIONAL RESEARCH COUNCIL REPORT -- THE COMMITTEE'S TASK -- THE VALIDITY OF DNA TYPING.

THE USE OF DNA FOR EXCLUSION -- CHANGES SINCE THE 1992 NRC REPORT -- Population Data -- Technical Improvements -- PATERNITY TESTING -- REGULATORY OVERSIGHT -- SEEMINGLY CONTRADICTORY NUMBERS -- VERY SMALL PROBABILITIES -- FINGERPRINTS AND UNIQUENESS -- DESIGNATING POPULATION GROUPS AND SUBGROUPS -- THE NATURE OF OUR RECOMMENDATIONS -- 2 Genetic and Molecular Basis of DNA Typing -- FUNDAMENTALS OF GENETICS1 -- VNTR TYPING -- PCR-BASED METHODS -- CONCLUSIONS -- 3 Ensuring High Standards of Laboratory Performance -- QUALITY CONTROL AND QUALITY ASSURANCE IN THE LABORATORY -- Current QC and QA Guidelines -- The Role of Proficiency-Testing and Audits -- SAFEGUARDING AGAINST ERROR -- Sample Mishandling and Data-Recording Errors -- Faulty Reagents, Equipment, Controls, or Technique -- Evidence Contamination -- Analyst Bias -- SHOULD AN ERROR RATE BE INCLUDED IN CALCULATIONS? -- RETESTING -- CONCLUSIONS AND RECOMMENDATIONS -- Laboratory Errors -- Proficiency Tests -- Duplicate Tests -- 4 Population Genetics -- ALLELE AND GENOTYPE PROPORTIONS -- RANDOM MATING AND HARDY-WEINBERG PROPORTIONS -- HW Proportions in a Large Sample -- Exclusion Power of a Locus -- DEPARTURES FROM HW PROPORTIONS -- Inbreeding and Kinship -- Population Subgroups -- SUBPOPULATION THEORY -- TAKING POPULATION STRUCTURE INTO ACCOUNT -- MULTIPLE LOCI AND LINKAGE EQUILIBRIUM -- How Much Departure from LE is Expected? -- What Do the VNTR Data Show? -- RELATIVES -- PERSONS FROM THE SAME SUBPOPULATION -- PCR-BASED SYSTEMS -- A Conservative Rule for PCR Loci -- DEVELOPMENT OF NEW SYSTEMS -- INADEQUATE DATABASES -- CONCLUSIONS AND RECOMMENDATIONS -- Evidence DNA and Suspect from the Same Subgroup -- Insufficient Data -- Dealing with Relatives -- APPENDIX 4A -- 5 Statistical Issues -- DATA SOURCES -- MATCH PROBABILITY AND LIKELIHOOD RATIO -- Mixed Samples -- Bayes's Theorem.

Bayes's Theorem in Criminal Cases -- TWO FALLACIES -- SUSPECT IDENTIFIED BY A DNA DATABASE SEARCH -- VERY SMALL PROBABILITIES -- UNIQUENESS -- STATISTICAL ASPECTS OF VNTR ANALYSIS -- Determining a Match -- Binning -- Floating bins -- Fixed bins -- CONFIDENCE INTERVALS FOR MATCH PROBABILITIES -- ALLELES WITH LOW FREQUENCY -- INDIVIDUAL VARIABILITY AND EMPIRICAL COMPARISONS -- Geographical Subdivision -- Differences Among Subgroups -- Different Races -- MORE CONSERVATIVE FORMULAE -- THE CEILING PRINCIPLES -- DIRECT COUNT FROM A DATABASE -- CONCLUSIONS AND RECOMMENDATIONS -- Statistical Issues -- Database Searches -- Uniqueness -- Matching and Binning -- Ceiling Principles -- Further Research -- APPENDIX 5A -- APPENDIX 5B -- APPENDIX 5C -- 6 DNA Evidence in the Legal System -- LEGAL STANDARDS AND PROCEDURES -- The Defendant's Right to Discovery -- Expertise -- General Acceptance and Sound Methodology --

Balancing and Weight -- Trends in the Admissibility of DNA Evidence --  
TYPING METHODS -- VNTR Profiling -- PCR-Based Testing --  
LABORATORY ERROR -- Population and Subpopulation Frequencies --  
Convenience Samples -- The Disagreement About Substructure --  
Ceiling Frequencies in Court -- EXPLAINING THE MEANING OF A MATCH  
-- The Necessity for Quantitative Estimates -- Qualitative Testimony on  
Uniqueness or Infrequency -- Quantitative Assessments: Frequencies  
and Match Probabilities -- Quantitative Assessments: Likelihood Ratios  
and Posterior Odds -- Importance of Behavioral Research --  
CONCLUSIONS -- APPENDIX 6A -- Abbreviations -- Glossary1 A --  
Biographical Information -- COMMITTEE CHAIR -- COMMITTEE  
MEMBERS -- COMMITTEE ADVISOR -- STAFF -- Acknowledgments --  
References2 -- Index.

### Sommario/riassunto

In 1992 the National Research Council issued DNA Technology in Forensic Science , a book that documented the state of the art in this emerging field. Recently, this volume was brought to worldwide attention in the murder trial of celebrity O. J. Simpson. The Evaluation of Forensic DNA Evidence reports on developments in population genetics and statistics since the original volume was published. The committee comments on statements in the original book that proved controversial or that have been misapplied in the courts. This volume offers recommendations for handling DNA samples, performing calculations, and other aspects of using DNA as a forensic tool-modifying some recommendations presented in the 1992 volume. The update addresses two major areas: Determination of DNA profiles. The committee considers how laboratory errors (particularly false matches) can arise, how errors might be reduced, and how to take into account the fact that the error rate can never be reduced to zero. Interpretation of a finding that the DNA profile of a suspect or victim matches the evidence DNA. The committee addresses controversies in population genetics, exploring the problems that arise from the mixture of groups and subgroups in the American population and how this substructure can be accounted for in calculating frequencies. This volume examines statistical issues in interpreting frequencies as probabilities, including adjustments when a suspect is found through a database search. The committee includes a detailed discussion of what its recommendations would mean in the courtroom, with numerous case citations. By resolving several remaining issues in the evaluation of this increasingly important area of forensic evidence, this technical update will be important to forensic scientists and population geneticists-and helpful to attorneys, judges, and others who need to understand DNA and the law. Anyone working in laboratories and in the courts or anyone studying this issue should own this book.