

Approved Standards for Scientific Testimony and Reports for Autosomal DNA Testing

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1 INTRODUCTION

This document provides examples of statements that are approved for reporting scientifically supported conclusions and offering expert opinions during testimony by Forensic Examiners within the FBI Laboratory's biology discipline, also called the DNA discipline. It is noted that these examples are not intended to be all inclusive and may be dependent upon the precedent set by the judge or locality in which a testimony is provided. Further, these examples are not intended to serve as precedent for other forensic laboratories and do not imply that statements by other forensic laboratories are incorrect, indefensible, or erroneous.

2 SCOPE

This document applies to Forensic Examiners who prepare an FBI *Laboratory Report* (7-1 or 7-1 LIMS) and/or provide testimony related to autosomal DNA examinations. This document applies to reports and to testimony based on reports that are finalized after its effective date.

3 RESPONSIBILITIES

- A. The Examiner will ensure that a *Laboratory Report* is consistent with the approved language contained within this document.
- B. The Examiner will ensure that his/her testimony related to autosomal DNA examinations is consistent with the standards contained within this document.
- C. The Technical Reviewer will ensure that a DNA *Laboratory Report* contains language consistent with the standards contained within this document.
- D. An authorized evaluator will assess if testimony provided by DNA staff complies with the statements contained within this document in accordance with the FBI Laboratory Quality Assurance Manual (LAB-100) section for monitoring of testimony related activities.

4 STATEMENTS APPROVED FOR FBI AUTOSOMAL DNA TESTIMONY AND/OR LABORATORY REPORTS

4.1 Inclusion/Cannot Exclude/Match

An Examiner may state or imply that a known individual is included as a possible contributor to the DNA evidence when the DNA typing results obtained from the evidence sample and the known contributor are the same or when the DNA results from a known reference sample are observed in a mixture. Each DNA inclusion must be clearly and properly qualified with either a statistic or a qualitative statement.

When statistics are provided, STRmix™ analysis is performed to provide a likelihood ratio (LR). The lowest calculated LR from applicable population groups is reported. When this LR is > 1 , support for an inclusion is reported. A qualitative statement, which verbally describes the amount of support for the inclusion, is based on the LR and may be provided.

<u>Likelihood Ratio:</u>	<u>Qualitative Equivalent:</u>
2 to <100	Limited support for Inclusion
100 to <10,000	Moderate support for Inclusion
10,000 to <1,000,000	Strong support for Inclusion
≥ 1,000,000	Very strong support for Inclusion

A qualitative statement of inclusion that is not supported by a statistical calculation must be limited to situations in which the presence of an individual’s DNA on an item is reasonably expected. The provenance of the sample must be established in the case record when statistics are not calculated.

4.2 Inconclusive or Uninformative

An Examiner may state or imply that no conclusion can be provided for a comparison between the DNA typing results obtained from an evidentiary sample and a known reference sample. When the lowest calculated LR from applicable population groups is one, this conclusion is generally reported as uninformative.

4.3 Unsuitable Results

An Examiner may state or imply that the DNA typing results are not suitable for comparisons when:

- a sample amplified using the GlobalFiler™ (GF) kit results in a mixture of 5 or more individuals,
- a sample amplified using the Identifiler Plus® (ID+) kit results in a mixture of 5 individuals without an assumed contributor, or
- a sample amplified using the ID+ kit results in a mixture of more than 5 individuals.

Sample quality issues (e.g., contamination) may also render the DNA typing results unsuitable for comparisons.

4.4 Exclusion / Support for Exclusion

An Examiner may state or imply that a known individual is excluded as a possible contributor to the DNA obtained from the evidence when the DNA profile obtained from the evidence and the known reference sample are different (i.e., a visual exclusion).

An Examiner may state or imply that a known individual is excluded as a possible contributor to the DNA obtained from the evidence when the LR calculated with STRmix™ results in an $LR \leq 1/100$ (i.e., 0.01). The calculated LR will not be included in the report, but it will be maintained in the casefile and may be stated during testimony.

An Examiner may state or imply that there is limited support for exclusion when the LR calculated with STRmix™ results in: $1/100 < LR \leq 1/2$ (i.e., $0.01 < LR \leq 0.5$). In this instance, the $1/LR$ is included in the report, and a qualitative statement of “limited support for exclusion” may be provided.

4.5 Mixtures

An Examiner may state or imply that a mixture of DNA was obtained from an evidentiary sample. The interpreted number of contributors to a mixture may be provided in the report and stated during testimony.

4.6 Sex Determination

An Examiner may state or imply that the sex typing results indicate the presence of female DNA, male DNA, a mixture of male and female DNA, no sex typing results were obtained, or that no conclusion regarding sex typing results can be provided.

4.7 Familial Comparisons

An Examiner may state or imply biological relatedness based on the probability of the DNA profile results when compared under two mutually exclusive hypotheses. Statements of biological relatedness will be supported by a statistical estimate [likelihood ratio (LR) or combined kinship index (KI)] with values > 100 generally supporting the hypothesis of relatedness.

When the KI is between 1 and 100, the Examiner may state or imply that there is insufficient support to conclude relatedness.

Statistical estimates with values < 1 generally support the hypothesis of unrelatedness; however, the conclusion drawn is dependent on the relatives provided:

- The most informative pedigrees include at least one parent or one child, or at least two full siblings. When the KI is < 1 for these pedigrees, an Examiner may state or imply that biological relatedness is unlikely.
- Less informative pedigrees include only one full or half sibling, or more distant relatives. When the KI < 1 for these pedigrees, an Examiner may state or imply that there is insufficient support to conclude relatedness.

4.8 Other Nuclear DNA Conclusions

An Examiner may state or imply that no DNA typing results were obtained from the evidence or that no DNA typing results foreign to or unlike an individual whose DNA is reasonably expected to be present were obtained from the evidence.

An Examiner may state or imply that no DNA was detected from the evidence at the quantitation step; therefore, DNA typing was not conducted.

An Examiner may state or imply that the DNA typing results obtained from the sample are suitable for comparison purposes.

4.9 False Inclusions

An examiner may state or imply that the probability of observing an LR of x or larger from an unrelated non-donor is no more than 1 in x .

5 STATEMENTS NOT APPROVED FOR FBI AUTOSOMAL DNA TESTIMONY AND/OR LABORATORY REPORTS

5.1 Absolute Identification

An Examiner may not state or imply that a match provides an absolute identification of the individual from whom the biological material originated.

5.2 Reasonable Degree of Scientific Certainty

An examiner shall not use the expressions ‘reasonable degree of scientific certainty,’ ‘reasonable scientific certainty,’ or similar assertions of reasonable certainty in either reports or testimony unless required to do so by a judge or applicable law.

5.3 Racial/Ethnicity Prediction

An Examiner may not state or imply that an autosomal DNA profile can be used to predict the specific population, racial, or ethnic group to which an individual belongs.

5.4 Zero Error Rate

An Examiner may not state or imply that forensic autosomal DNA examinations have a zero error rate or are infallible.

6 LABORATORY REPORT REVIEWS

The content of a *Laboratory Report* will be reviewed per the Level 1 documents and the DNA Level 2 documents to ensure compliance with the standards contained within this document.

7 TESTIMONY REVIEWS

Testimony provided by DNA staff will be reviewed in accordance with the Level 1 documents to ensure compliance with the standards contained within this document.

8 REFERENCES

Office of the Attorney General Memorandum, Recommendations of the National Commission on Forensic Science, September 6, 2016

United States. Department of Justice. Office of Legal Policy. *Forensic Science. Department of Justice Uniform Language for Testimony and Reports for the Forensic Autosomal DNA Examinations Using Probabilistic Genotyping Systems*. Retrieved from the Department of Justice Web site: <https://www.justice.gov/olp/uniform-language-testimony-and-reports>.

Bright, J-A, et.al. Internal validation of STRmix™ – A multi laboratory response to PCAST. *Forensic Science International: Genetics* 24 (2018) 11-24.

SWGDM. Recommendations of the SWGDAM Ad Hoc working group on genotyping results reported as likelihood ratios. 2018. Available at www.swgdam.org.

9 REVISION HISTORY

Revision	Issue Date	Changes
00	08/15/2022	Reformatted DNA 710-4 into new template and assigned new Doc ID.