DEPARTMENT OF JUSTICE
UNIFORM LANGUAGE FOR TESTIMONY AND REPORTS
FOR FORENSIC AUTOSOMAL DNA EXAMINATIONS
USING PROBABILISTIC GENOTYPING SYSTEMS

I. Application

This document applies to Department of Justice examiners who are authorized to prepare reports and provide expert witness testimony regarding forensic autosomal DNA examinations using probabilistic genotyping systems. This document applies to reports and to testimony based on reports that are finalized after its effective date. Sections III and IV are limited to conclusions that result from forensic autosomal DNA examinations using probabilistic genotyping systems. Section V is applicable to all forensic autosomal DNA examinations unless otherwise limited by the express terms of an individual qualification or limitation.

II. Purpose and Scope[1]

The Uniform Language for Testimony and Reports is a quality assurance measure designed to standardize the expression of appropriate consensus language for use by Department examiners in their reports and testimony. This document is intended to describe and explain terminology that may be provided by Department examiners. It shall be attached to, or incorporated by reference in, laboratory reports or included in the case file.

Department examiners are expected to prepare reports and provide testimony consistent with the directives of this document. However, examiners are not required to provide a complete or verbatim recitation of the definitions or bases set forth in this document. This is supplemental information that is intended to clarify the meaning of, and foundation for, the approved conclusions.

This document should not be construed to imply that terminology, definitions, or testimony provided by Department examiners prior to its effective date that may differ from that set forth below was erroneous, incorrect, or indefensible. It should also not be construed to imply that the use of different terminology or definitions by non-Departmental forensic laboratories or individuals is erroneous, incorrect, or indefensible.

This document does not, and cannot, address every contingency that may occur. For example, an examiner may not have an opportunity to fully comply with its directives during a testimonial presentation due to circumstances beyond his or her control. In addition, this document does not prohibit the provision of conclusions in reports and testimony that fall outside of its stated scope. Finally, the substantive content of expert testimony may be subject to legal rules imposed by the court or jurisdiction in which the testimony is provided.

[1] This document is not intended to, does not, and may not be relied upon to create any rights, substantive or procedural, enforceable by law by any party in any matter, civil or criminal; nor does it place any limitation on otherwise lawful investigative or legal prerogatives of the Department of Justice.

III. Conclusions Regarding Forensic Autosomal DNA Examinations Using Probabilistic Genotyping Systems

An examiner may offer any of the following conclusions regarding forensic autosomal DNA examinations using probabilistic genotyping systems:

1. Support for inclusion
2. Support for exclusion
3. Exclusion (i.e., excluded)
4. Uninformative

Support for Inclusion
'Support for inclusion' is an examiner's conclusion that there is evidentiary support for the inclusion of a known individual as a possible contributor to the DNA typing results obtained from an evidentiary sample.

The basis for a 'support for inclusion' conclusion using probabilistic genotyping[2] software is an examiner's observation that the likelihood ratio[3] resulting from a comparison of the DNA profile of a known individual to the DNA contained in an evidentiary sample is greater than or equal to 2. An examiner may provide additional qualitative descriptions of evidentiary support for the inclusionary proposition as set forth in Section IV of this document.

Support for Exclusion
'Support for exclusion' is an examiner's conclusion that there is a level of evidentiary support for the exclusion of a known individual as a possible contributor to the DNA typing results obtained from an evidentiary sample.

The basis for a 'support for exclusion' conclusion using probabilistic genotyping software is an examiner's observation that the likelihood ratio resulting from comparison of the DNA profile of a known individual to the DNA contained in an evidentiary sample falls within a laboratory-defined range of values. An examiner may provide additional qualitative descriptions of evidentiary support for the exclusionary proposition as set forth in Section IV of this document.

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[2] Probabilistic genotyping refers to the use of biological modeling, statistical theory, computer algorithms, and probability distributions to calculate likelihood ratios and/or infer genotypes for the DNA typing results of forensic samples. Probabilistic genotyping is a tool to assist a DNA examiner in the interpretation of forensic DNA typing results. It is not intended to replace the human evaluation of the forensic DNA typing results or the human review of the output prior to reporting. Probabilistic genotyping results in the report of a likelihood ratio.

[3] A likelihood ratio (LR) is a statistic for the comparison of the probability of the evidence (E), given two competing propositions. The inclusionary proposition (H_1), includes the person of interest and, for mixed samples, known and/or unknown, unrelated individuals. The total count of individuals included in the proposition is equal to the number of contributors interpreted to be in the sample. The exclusionary proposition (H_2) generally consists of unknown, unrelated individuals, equaling the total number of contributors interpreted to be in the sample. The laboratory may choose to report truncated likelihood ratio values. The general formula is: $LR = \frac{Pr(E|H1)}{Pr(E|H2)}$

Exclusion
'Exclusion' is an examiner's conclusion that a known individual is eliminated as a possible contributor to the DNA typing results obtained from an evidentiary sample.

There are two alternative bases for an 'exclusion' conclusion:

> The basis for an 'exclusion' conclusion using visual comparison is an examiner's interpretation that the genetic profile of a known individual is not consistent with the potential genotypes[4] obtained from an evidentiary sample.
>
> The basis for an 'exclusion' conclusion using probabilistic genotyping software is an examiner's observation that the likelihood ratio resulting from comparison of the DNA profile of a known individual to the DNA contained in an evidentiary sample is below a laboratory-defined threshold.

Uninformative
'Uninformative' is an examiner's conclusion that the evidence provides no greater support for either the inclusion or the exclusion of a known individual as a possible contributor to the DNA typing results obtained from an evidentiary sample.

The basis for an 'uninformative' conclusion using probabilistic genotyping software is an examiner's observation that the likelihood ratio resulting from comparison of the DNA profile of a known individual to the DNA contained in an evidentiary sample is equal to 1.

IV. Verbal Scale

A qualitative statement that conveys the equivalent degree of support indicated by the likelihood ratio may be reported in addition to the numerical value of the likelihood ratio. A qualitative statement, if provided, must be reported in accordance with Section III of this document and the verbal scale set forth below.[5] The verbal scale is intended to complement an examiner's opinion and shall not be communicated without the corresponding numerical value for the likelihood ratio. If a qualitative statement is reported, an examiner must include the entire verbal scale in the laboratory report to provide context for the numerical value. An examiner may also provide a likelihood ratio as the strength of the evidence in support of a proposition without a qualitative equivalent.

[4] The interpretation of potential genotypes in a sample includes considering the possibility of allelic dropout.

[5] This verbal scale is in accord with the consensus positions adopted by the Scientific Working Group on DNA Analysis Methods (SWGDAM) in its *Recommendations of the SWGDAM Ad Hoc Working Group on Genotyping Results Reported as Likelihood Ratios*, available at: www.swgdam.org/publications.

LR for (H_1) and 1/LR for (H_2)	Qualitative Equivalent
1	Uninformative
2 to <100	Limited Support
100 to <10,000	Moderate Support
10,000 to <1,000,000	Strong Support
≥1,000,000	Very Strong Support

V. Qualifications and Limitations of Forensic Autosomal DNA Examinations

- An examiner shall not assert that forensic autosomal DNA examinations are infallible or have a zero error rate.

- For any DNA typing examination, the numerical value for a likelihood ratio shall be reported as a quantitative statement of statistical weight for both the inclusionary (H_1) and exclusionary (H_2) propositions, except for results deemed to be an 'exclusion' when using probabilistic genotyping systems.

- The designation of a genetic profile as having originated from an assumed contributor need not be based on a statistical calculation, but must be limited to those situations in which the presence of an individual's DNA in a tested sample is reasonably expected. The assumed donor of the sample must be documented in the case file when statistics are not calculated.

- An examiner shall not assert that a likelihood ratio of any magnitude provides an absolute identification or source attribution of an individual to an evidentiary sample.

- An examiner shall not report a likelihood ratio as 'inconclusive.' The likelihood ratio appropriately conveys the weight of the evidence given the two competing propositions (H_1) and (H_2).

- An examiner shall not assert that an autosomal DNA profile can be used to predict the specific population, racial, or ethnic group to which a person belongs.

- An examiner shall not cite the number of forensic autosomal DNA examinations performed in his or her career as a direct measure for the accuracy of a proffered conclusion. An examiner may cite the number of forensic autosomal DNA examinations performed in his or her career for the purpose of establishing, defending, or describing his or her qualifications or experience.

- 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.[6]

[6] *See Memorandum from the Attorney General to Heads of Department Components* (Sept. 9. 2016), https://www.justice.gov/opa/file/891366/download.