Standard for Validation of Probabilistic Genotyping Systems, First Edition, 2020

WHAT IS AN AAFS STANDARD FACTSHEET?

The AAFS produces clear, concise, and easy to understand factsheets to summarize the contents of technical and professional forensic science standards on the OSAC Registry. They are not intended to provide an interpretation for any portion of a published standard.

WHAT IS THE PURPOSE OF THIS STANDARD?

Testing of evidence containing DNA (e.g., blood, semen, saliva, tissue) is routinely performed to exclude or potentially link an individual to a crime scene.

Software that assists with the interpretation and comparison of the DNA test results is being used in many forensic DNA testing laboratories. Commonly referred to as *probabilistic genotyping software*, prior to its use in a laboratory, sufficient validation studies must be performed to establish the range of DNA profiles upon which the program may be used effectively.

This document establishes minimum standards for documented validation studies to be conducted and retained by the developer of the software and the laboratory user of the software.

WHY IS THIS STANDARD IMPORTANT? WHAT ARE ITS BENEFITS?

This standard provides requirements for software developers and DNA testing laboratories that use specialized software programs for the evaluation, interpretation and comparison of DNA test results, as well as for generating statistical values that may aid in the assessment of the DNA test results in the context of an identified individual.

Validation of these software systems is necessary to have confidence in the results, demonstrate reliability, and identify any potential limitations.

HOW IS THIS STANDARD USED AND WHAT ARE THE KEY ELEMENTS?

Probabilistic genotyping software uses statistical theory and modeling informed by actual data generated in the laboratory, along with probability distributions and mathematical formulae to assess the possible DNA data pairs, termed genotypes, present in the DNA test results obtained from an item of evidence. The standard provides direction for conducting the necessary foundational validation studies by a probabilistic genotyping software developer and within a DNA testing laboratory. Such studies are required for demonstrating appropriate parameters and defining limitations for its use, including establishing its accuracy, sensitivity, specificity and precision. While the probabilistic genotyping software typically also provides a statistical value, generally in the form of a likelihood ratio, this standard does not address the use of that value.

The standard is intended to be used in conjunction with ANSI/ASB Standard 020 (Standard for Validation Studies of DNA Mixtures, and Verification of a Laboratory's Mixture Interpretation Protocol) and ANSI/ASB Standard 040 (Standard for Forensic DNA Interpretation and Comparison Protocols).

This is a minimum standard of practice, which means that additional tests beyond those required in the standard may be necessary depending on the testing assays used in the laboratory and the types of evidence tested within the laboratory.

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