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**Standard for Training in the use of Combined DNA Index  
System (CODIS)**



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# Standard for Training in the use of Combined DNA Index System (CODIS)

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410 North 21<sup>st</sup> Street  
Colorado Springs, CO 80904

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## Foreword

This standard defines the minimum requirements to be met in a forensic DNA analyst training program for the use of Combined DNA Index System (CODIS). The aim is to provide a framework for quality training that will result in consistency in the forensic DNA community.

This document was revised, prepared, and finalized as a standard by the DNA Consensus Body of the AAFS Standards Board. The draft of this standard was developed by the Biological Data Interpretation and Reporting Subcommittee of the Organization of Scientific Area Committees (OSAC) for Forensic Science.

The American Academy of Forensic Sciences established the Academy Standards Board (ASB) in 2015 with a vision of safeguarding Justice, Integrity and Fairness through Consensus Based American National Standards. To that end, the ASB develops consensus based forensic standards within a framework accredited by the American National Standards Institute (ANSI), and provides training to support those standards. ASB values integrity, scientific rigor, openness, due process, collaboration, excellence, diversity and inclusion. ASB is dedicated to developing and making freely accessible the highest quality documentary forensic science consensus Standards, Guidelines, Best Practices, and Technical Reports in a wide range of forensic science disciplines as a service to forensic practitioners and the legal system.

Questions, comments, and suggestions for the improvement of this document can be sent to AAFS-ASB Secretariat, [asb@aaafs.org](mailto:asb@aaafs.org) or 401 N 21st Street, Colorado Springs, CO 80904.

All hyperlinks and web addresses shown in this document are current as of the publication date of this standard.

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**Keywords:** *CODIS, database, familial Searching, DNA standard, training.*

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# Standard for Training in the use of Combined DNA Index System (CODIS)

## 1 Scope

This standard outlines the minimum requirements for training a forensic DNA analyst (casework and database) in the use of Combined DNA Index System (CODIS). This document excludes software training for CODIS users and required training for CODIS administrators.

## 2 Normative References

The following reference is indispensable for the application of the standard. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ANSI/ASB Standard 022, *Standard for Forensic DNA Analysis Training Programs*<sup>a</sup>.

FBI National DNA Index System (NDIS): *Operational Procedures Manual*<sup>b</sup>.

## 3 Terms and Definitions

For purposes of this document, the following definitions apply. Where applicable, definitions from the FBI National DNA Index System (NDIS): *Operational Procedures Manual*, July 1, 2022 are used.

### 3.1

#### **candidate match**

A possible match between two or more DNA profiles discovered by CODIS software.

### 3.2

#### **CODIS**

An acronym for the Combined DNA Index System administered by the FBI. There are three levels of CODIS: the Local DNA Index System (LDIS), used by individual laboratories; the State DNA Index System (SDIS), used at the state level to serve as a state's DNA database containing DNA profiles from LDIS laboratories; and the National DNA Index System (NDIS), managed by the FBI as the nation's DNA database containing all DNA profiles uploaded by participating states.

### 3.3

#### **CODIS administrator(s)**

An employee of a participating federal, state or local criminal justice agency responsible for administration and security of the laboratory's CODIS at a laboratory performing DNA analysis on database, forensic and casework reference samples.

### 3.4

#### **CODIS core loci**

An established set of short tandem repeat (STR) loci required for inclusion of a DNA profile at the national level in CODIS.

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<sup>a</sup> Available from: [www.aafs.org/academy-standards-board](http://www.aafs.org/academy-standards-board).

<sup>b</sup> Available from: [www.fbi.gov/file-repository/ndis-operational-procedures-manual.pdf/view](http://www.fbi.gov/file-repository/ndis-operational-procedures-manual.pdf/view)

### **3.5 familial searching**

An additional search of an unknown forensic profile in a DNA database to identify profiles from potential biological relatives.

### **3.6 hit**

A confirmed match that aids an investigation and one or more of the case(s) involved in the match are unsolved.

### **3.7 Popstats**

A program in the CODIS software suite used to provide statistical estimates.

### **3.8 specimen category**

The classification assigned to a DNA record that designates the indices the DNA record will be stored and searched in (e.g., convicted offender or forensic unknown).

## **4 Requirements**

### **4.1 General**

ANSI/ASB Standard 022, *Standard for Forensic DNA Analysis Training Programs* shall be used in conjunction with this document because ANSI/ASB Standard 022 provides the foundational training program requirements upon which additional specific requirements, such as this document, will be based.

The laboratory's training program shall include all requirements applicable to the work conducted by the laboratory and by the individual in training.

### **4.2 Knowledge-based Training**

**4.2.1** At a minimum, the knowledge-based portion of the training program shall require review of the following:

- a) NDIS Operational Procedure Manual;
- b) the laboratory's protocols for CODIS;
- c) the laboratory's applicable validation studies;
- d) literature used to support validation;
- e) applicable reference material as assigned by the trainer;
- f) applicable state and federal legislation.

**4.2.2** The knowledge-based training component of the laboratory's training program shall provide the trainee with basic instruction on CODIS to include, at minimum, the following topics in 4.2.2.1 through 4.2.2.9.

**4.2.2.1** CODIS structure, optional use of Popstats, software security, genetic privacy, program responsibilities, ownership, and relevant laws and guidelines, topics to include the following.

- a) National DNA Index System (NDIS).
  - 1) Federal DNA Identification Act.
  - 2) Memorandum of Understanding for Participation in the National DNA Index System.
  - 3) NDIS Operational Procedures Manual.
  - 4) FBI Quality Assurance Standards (QAS).
- b) State DNA Index System (SDIS):
  - 1) state specific legislation;
  - 2) laboratory policies and procedures.
- c) Local DNA Index System (LDIS):
  - 1) local legislation if applicable;
  - 2) laboratory policies and procedures.

**4.2.2.2** Determination of sample eligibility for upload to NDIS, SDIS, and LDIS, topics to include:

- a) the required number of CODIS core loci;
- b) sample origin (e.g., case scenario, specimen category, link to putative perpetrator, request/testing of elimination samples, as appropriate for forensic crime scene samples and specimen category for database samples)
- c) statistical threshold, including Match Rarity Estimate (MRE) and Moderate Match Estimate (MME), which are formulae used to estimate the number of matches expected to be returned from a search of CODIS;
- d) laboratory's supporting documentation requirements;
- e) other pertinent requirements, as applicable (e.g., use of Rapid DNA technology, outsourcing considerations).

**4.2.2.3** Entry of DNA records and the corresponding effect on searches, topics to include:

- a) specimen identifier;
- b) specimen category (e.g., forensic unknown, convicted offender, legal);
- c) partial profile due to allele or locus drop-out versus complete profile and use of obligate allele designations.

**4.2.2.4** CODIS database searches, topics to include:

- a) forensic and missing person databases;
- b) authorized searches that occur at NDIS, SDIS, and LDIS;
- c) differences in search stringency (high, moderate, low) for the different searches;
- d) indexes that search each other;
- e) frequency of searches.

**4.2.2.5** Evaluation of candidate matches, topics to include:

- a) potential for mismatches;
- b) writing CODIS hit notifications/reports for offender and forensic hits, as applicable;
- c) offender hit confirmation process, including the submission of suspect reference standards as needed.

**4.2.2.6** Use of familial searching, topics to include:

- a) instruction on the specific laboratory protocol; state legislation, if applicable.

**4.2.2.7** Missing persons cases, topics to include:

- a) the type and number of reference samples that should be obtained;
- b) the number of loci and quality of data to be used;
- c) the necessity for additional technologies;
- d) what indices may be searched;
- e) the use of a pedigree tree and the samples required;
- f) the differences in terminology used in missing person cases;
- g) the application of kinship analysis.

**4.3 Practical Training**

**4.3.1** The practical component of the laboratory's training program shall provide the trainee with sufficient practical instruction for the trainee to obtain the skills for the use of CODIS.

**4.3.2** At a minimum, the practical portion of the training program shall include the observation of a trained analyst performing the processes at least once or until clearly understood with exercises representative of the range, type, and complexity of routine casework or database samples processed by the laboratory.



**4.3.3** At a minimum, the practical portion of the training program shall include hands-on exercises for the use of CODIS representative of the range, type, and complexity of routine casework or database technologies in accordance with the trainee's job responsibilities and the extent to which the trainee will participate in the use of CODIS.

#### **4.4 Competency Component**

##### **4.4.1 General**

The competency component of the laboratory's training program shall demonstrate knowledge-based and practical competency in the use of CODIS by the individual. The format of the test(s) and the criteria for passing the competency test shall meet Section 4.3 of ANSI/ASB Std 022, *Standard for Forensic DNA Analysis Training Programs*.

##### **4.4.2 Knowledge-based Competency**

The trainee shall successfully complete a knowledge-based test covering the critical information obtained during the training of the use of CODIS. The format of the test(s) shall be at the discretion of the DNA technical leader or comparable authority. The test(s) shall cover, at a minimum, the topics outlined under 4.2 and its subsections.

##### **4.4.3 Practical Competency**

The trainee shall successfully complete a practical competency test covering each of the CODIS protocols for which he or she will be independently authorized. Practical competency tests shall include samples representative of the range, type, and complexity typically analyzed by the laboratory.

#### **5 Conformance**

In order to demonstrate conformance with this standard, the laboratory shall meet Section 5 of the ANSI/ASB Std 022, *Standard for Forensic DNA Analysis Training Programs* and all the requirements set forth in this document.

## **Annex A** **(informative)**

### **Bibliography**

The following information provides a list of the resources that may assist the DNA technical leader in defining the breadth and scope of the materials to be reviewed by the trainee. This list is not meant to be all inclusive.

- 1] ANSI/ASB Standard 022, *Standard for Forensic DNA Analysis Training Program*, 2019. 1<sup>st</sup> Ed.<sup>c</sup>.
- 2] FBI CODIS and NDIS Fact Sheet<sup>d</sup>.
- 3] FBI National DNA Index System (NDIS) Operational Procedures Manual<sup>e</sup>.

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<sup>c</sup> Available from: [www.aafs.org/academy-standards-board](http://www.aafs.org/academy-standards-board).

<sup>d</sup> Available from: [www.fbi.gov/about-us/lab/codis/codis-and-ndis-fact-sheet](http://www.fbi.gov/about-us/lab/codis/codis-and-ndis-fact-sheet).

<sup>e</sup> Available from: [www.fbi.gov/file-repository/ndis-procedures-manual-ver4-approved-04272016.pdf/view](http://www.fbi.gov/file-repository/ndis-procedures-manual-ver4-approved-04272016.pdf/view).

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