

Data and Communication Flow in CODIS

The Combined DNA Index System (CODIS) is a dynamic system to provide aid in investigations through a tiered architectural approach: Local indexes flow into their respective state index, whereby eligible profiles flow into the National DNA Index System (NDIS). These architectural indexes further comprise searchable indexes, such as the following¹:

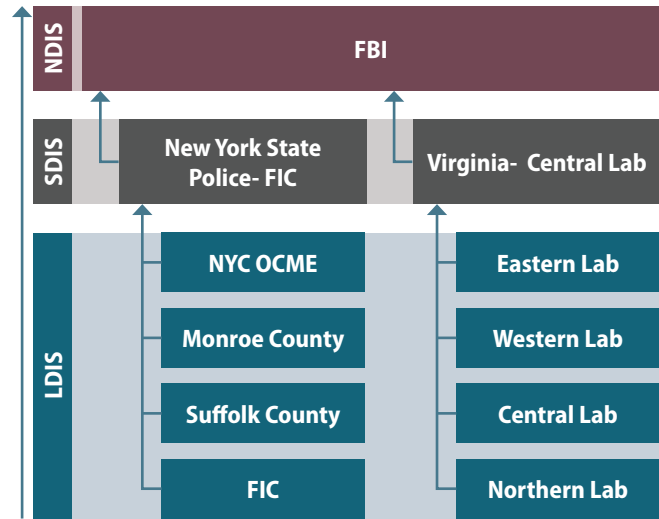
- ◆ **Offender.** DNA profiles from individuals convicted of crimes
- ◆ **Arrestee.** Based on state law, DNA profiles taken from individuals at the time of arrest
- ◆ **Forensic.** Foreign DNA profiles from crimes scene not matched to a victim, suspect, or elimination samples

Unidentified Human Remains, Missing Persons, Biological Relatives of Missing Persons, and Pedigree Tree are all indexes that support the national missing persons program.¹

Each state will have a local laboratory that maintains and operates the State Database Index System (SDIS) and is designated as the SDIS lab. Other public and federal participating laboratories in the state are designated Local Database Index System (LDIS) labs, which transmit data to share with the SDIS indexes; LDIS data communicate with other LDIS data through SDIS. The FBI maintains the national database. If profiles in SDIS meet the NDIS eligibility requirements, the profiles will be searched against eligible profiles from other states (see Figure 1).²

Communication occurs in this tiered approach to achieve effective data sharing, while allowing agencies to operate their local and state databases according to applicable federal, state, and local legislation. Participating agencies have collaborative agreements with other agencies for data sharing and searching assistance.

Figure 1. Tiered Approach of Communication in CODIS



Note: Partial example of architectural indexes and communication flow within CODIS. A tiered approach allows for each lab to operate its participation in CODIS according to applicable federal, state, and local legislation, while allowing the FBI to operate NDIS.

Due to varying SDIS requirements, based on jurisdiction-specific legislation or upload policies, some SDIS-level profiles are never searched at the NDIS level.³ However, requests can be conducted to search a specific SDIS database. Each laboratory will have a CODIS administrator who can provide specific instructions, sometimes based on state codes, for requesting information and searches outside jurisdiction.

Searches at the LDIS and SDIS levels occur as needed, upon upload, as requested, or according to a schedule outlined by standard operating procedures. Searching and transmission of data to NDIS occurs according to a predetermined weekly schedule for each state.² This schedule helps control the volume of data input and prevents bottlenecks that may slow down the transmission and search algorithms.

When CODIS aids an investigation, that means there was a “hit” either in the forensic index that established a possible link between crimes, or between the forensic index and a reference index (e.g., offender, arrestee), identifying a suspected perpetrator.⁴

CODIS investigation “hits”:

- ◆ **Forensic index**—link between crimes
- ◆ **Forensic & reference indexes**—link between indexes that identifies a possible perpetrator

All hits will be reviewed to verify the match or consistency between linked profiles and the eligibility and qualification of the samples. In some situations, samples may be pulled and reanalyzed. After verification, a written notification of the investigation aided will be maintained for records and provided to the investigator, usually in the form of a CODIS hit report.⁴ As of November 2016, CODIS has produced over 355,535 hits, assisting in more than 340,554 investigations and demonstrating the success of the CODIS program.⁵

References:

1. Federal Bureau of Investigation (FBI). Combined DNA Index System (CODIS) Brochure. Retrieved from <https://www.fbi.gov/file-repository/combined-dna-index-system-codis-brochure.pdf/view>
2. Federal Bureau of Investigation (FBI) Laboratory. (2017, January 1). National DNA Index System (NDIS) Operational Procedures Manual, Version 5. Retrieved from <https://www.fbi.gov/file-repository/ndis-procedures-manual-ver4-approved-04272016.pdf/view>
3. Butler, John. (2011, July 21). *Advanced Topics in Forensic DNA Typing: Methodology*. Waltham, MA: Elsevier Academic Press.
4. Federal Bureau of Investigation (FBI). Frequently Asked Questions on CODIS and NDIS. Retrieved from <https://www.fbi.gov/services/laboratory/biometric-analysis/codis/codis-and-ndis-fact-sheet>
5. Federal Bureau of Investigation (FBI). (2016, November). CODIS-NDIS Statistics. Retrieved from <https://www.fbi.gov/services/laboratory/biometric-analysis/codis/ndis-statistics>

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