The Next Generation

Through the combination of increased Federal funding and expanded database laws, the number of profiles in NDIS continues to increase dramatically. Additionally, the need for missing persons and disaster victim identification capabilities continues to grow. With these needs in mind, the FBI has developed the next generation of CODIS to be a user friendly, multi-functional software program capable of efficiently processing large databases. The software provides enhanced kinship analysis tools, for missing person cases, utilizing not only STR, Y-STR, and mtDNA information but also metadata – non-genetic information such as date of last contact, age, or gender – to assist in identification efforts.

The FBI Laboratory is committed to the support of the CODIS program. With the continued cooperation and collaboration of legislative bodies and all components of the criminal justice community - law enforcement, crime laboratories, victims, prosecutors and the judiciary - the future of DNA, CODIS, and NDIS holds even greater promise to solve crime and identify the missing and unidentified.

CODIS Unit Calendar Year Summary (Cumulative Totals by Calendar Year)

Category	2000	2002	2004	2006	2008	2010	2012	2015**
Offender Profiles	441,181	1,247,163	2,038,514	3,977,435	6,399,200	8,564,705	10,086,404	11,822,927
Arrestee Profiles				54,313	140,719	668,849	1,332,721	2,028,734
Forensic Profiles	21,625	46,177	93,956	160,582	248,943	351,951	446,689	638,162
Investigations Aided	1,573	6,670	21,266	45,364	81,955	130,317	190,560	274,648
Forensic Hits	507	1,832	5,056	9,493	14,364	21,983	31,373	44,111
Offender Hits within State	705	4,394	12,482	30,138	59,184	97,772	145,002	211,684
Offender Interstate	26	638	1,834	4,397	8,561	15,724	22,080	32,503
*Total Offender Hits	731	5,032	14,316	34,535	67,745	113,496	167,082	244,187

* An offender hit occurs when one or more forensic profiles are linked to a convicted offender, arrestee, or legal profile.

** Data is current as of June 2015 and is subject to change based upon laboratory submissions and/or retroactive updates.

Contacts

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DNA Casework Unit
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Federal DNA Database Unit
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CODIS Architecture

CODIS Supports

NDIS — NATIONAL DNA INDEX SYSTEM

NDIS is the highest level in the CODIS hierarchy, and enables the Laboratories participating in the program to exchange and compare DNA profiles at the national level.

SDIS — STATE DNA INDEX SYSTEM

SDIS allows laboratories within states to exchange DNA profiles.

LDIS — LOCAL DNA INDEX SYSTEM

DNA profiles originate at LDIS, and then flow to SDIS and NDIS.

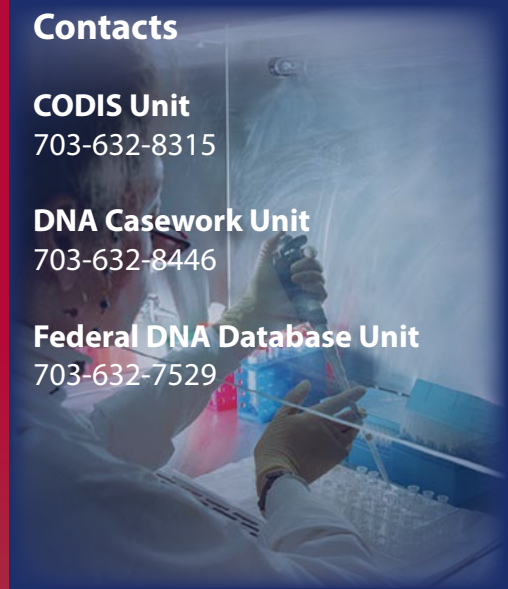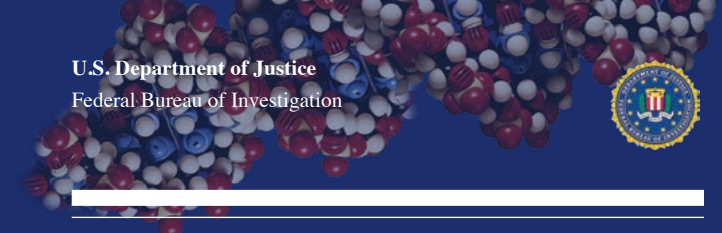Tallahassee
CA
FL
Palm Beach
ME
Miami

Palm Beach

CODIS
COMBINED DNA INDEX SYSTEM

The FBI Laboratory's Combined DNA Index System **(CODIS)** blends forensic science and computer technology into an effective tool for solving crime.

CODIS

The FBI Laboratory's Combined DNA Index System (CODIS) began as a pilot software project in 1990 serving 14 state and local laboratories. The DNA Identification Act of 1994 established the FBI's authority to maintain a National DNA Index System (NDIS) for law enforcement purposes. Today, over 190 public law enforcement laboratories participate in NDIS across the United States. Internationally, more than 90 law enforcement laboratories in over 50 countries use the CODIS software for their own database initiatives. International laboratories using the CODIS software do not have any connectivity to the United States CODIS system.

Crime

CODIS generates investigative leads in cases where biological evidence is recovered from the crime scene. Forensic profiles are searched based on results obtained from nuclear DNA analysis using the 13 core CODIS STR loci. Matches made among profiles in the Forensic Index can link crime scenes together; possibly identifying serial offenders. Once a match is confirmed, police from multiple jurisdictions collaborate and share the leads they developed independently. Matches made between the Forensic and Offender Indexes provide investigators with the identity of a suspected perpetrator(s). Since names and other personally identifiable information are not stored at NDIS, qualified DNA analysts in the laboratories sharing matching profiles verify the match and provide the identifying information.

CODIS

SEVERAL Indexes Categorize the Profiles Entered into CODIS

Forensic
DNA profiles developed from crime scene evidence, such as semen or blood stains attributed to the putative perpetrator of the crime

Missing Persons
DNA reference profiles from missing persons

Biological Relatives of Missing Persons
DNA profiles voluntarily contributed from relatives of missing persons

Convicted Offender
DNA profiles of individuals convicted of crimes

Arrestee
DNA profiles of arrested persons (if state law permits the collection of arrestee samples)

Unidentified Human Remains
DNA profiles developed from unidentified human remains

Pedigree Tree
A graphical representation of the relationship between the missing person and two or more relatives

nuclear DNA

Nuclear DNA is located in the nucleus of the cell and can be found in evidence samples such as blood, semen, bone, cigarette butts, clothing, hats, weapons, bottles, envelopes, etc. It is inherited from both the mother and the father.
Nuclear DNA analysis targets areas of human nuclear DNA called Short Tandem Repeats (STRs). These regions of DNA have no known association with medical conditions, defects or physical characteristics. CODIS allows for the entry of STR loci into indexes seen above.

Nuclear DNA analysis also contains a subcategory of analysis associated with paternal lineage. Y-STR analysis targets areas of the nuclear DNA passed only from father to son. While this method of analysis is not unique to a specific individual, Y-STRs are used in conjunction with STR data for Missing Person cases at NDIS. For questions concerning nuclear DNA analysis, please contact the DNA Casework Unit at 703-632-8446.

mtDNA

Mitochondrial DNA (mtDNA) is found in the mitochondrial of the cell. It is inherited only from the mother.
Mitochondrial DNA is generally extracted from biological items of evidence such as hair, bone and teeth. Typically, these samples contain low concentrations of degraded DNA, often making them unsuitable for nuclear DNA examinations. The aspect of maternal inheritance is useful in missing persons cases where direct DNA reference samples are often not available. Because multiple individuals can have the same mtDNA type, unique identifications are not possible using only mtDNA analyses. CODIS allows for the entry of mtDNA only in the missing persons related indexes. For questions concerning mtDNA analysis, please contact the DNA Casework Unit at 703-632-8446.

Missing Persons

In 2000, the FBI Laboratory developed the National Missing Person DNA Database (NMPDD) Program for the identification of missing and unidentified persons. STR, Y-STR, and mtDNA data can be entered into the missing persons indexes of CODIS. Enhancements to kinship analysis for missing persons data and mass disaster events were a top priority during the development of the Next Generation CODIS software.

First implemented in 2008, these enhancements provide investigators with a powerful tool in the identification of missing and unidentified persons on a national level. Relatives of missing persons can be combined into Pedigree Trees for more thorough analysis. Metadata can be captured to allow non-genetic information to aid in the identification process. And the evaluation of multiple DNA technologies can assist in the reconstruction of maternal and paternal lineages.

These aspects of CODIS have proven to be successful on both the national and international level assisting in Missing Person and Disaster Victim Identification programs.

For questions concerning missing persons case submissions, please contact the DNA Casework Unit at 703-632-8446.

NMPDD uses Multiple Indexes in NDIS

to enter DNA profiles that can be searched against each other

Unidentified Human Remains

Biological Relatives of Missing Persons

Missing Persons

Pedigree Tree