Missing and Unidentified Persons

Goals

Law Enforcement Partners

- Help LE understand resources and technologies available at ISP Laboratory
- Collection of UHR and MP samples
- Submission Requirements
- Results of comparisons and searches

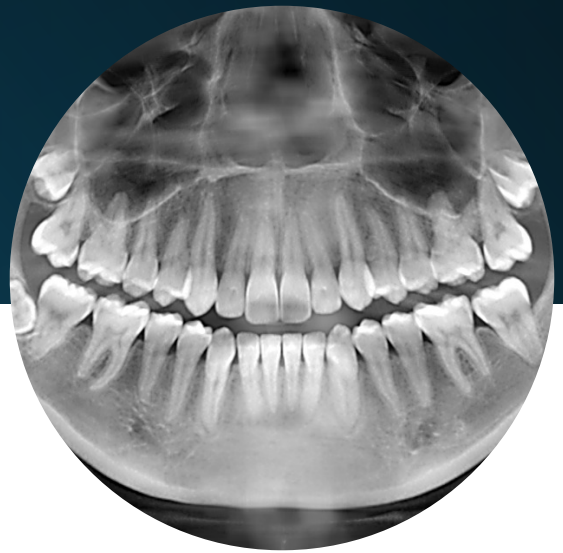
Family of Missing Persons

- Help family understand what they can do
- NamUs as resource for searching
- Standards for comparison
- How identifications work/happen

General Public

- Submission of standards for Forensic Investigative Genetic Genealogy

Methods of Identification



Other than physical identifications, unidentified persons may be identified through these traditional methods.

- Dental Records
- Fingerprints
- Distinguishable features: birthmarks & tattoos
- Medical devices and/or X-rays

DNA Analysis

For skeletal, decomposed or unrecognizable remains

- DNA Analysis is best option for identification.
- Three types of analysis available
  - Autosomal STR (including Y-STR)
  - SNP
  - FIGG

What is DNA?

Deoxyribonucleic Acid	➢Basic unit of heredity
Inherited from biological parents	➢Half passed down from each parent
Unique to an individual	➢Only identical twins have same DNA
Located in most cells of the body	➢And remains the same throughout life

Which allows for DNA to be used to identify individuals through comparison of DNA samples from known relatives to DNA samples from Unidentified and Missing Persons

Samples to Collect for Analysis

Unidentified Human Remains (UHR)

- Blood
- Buccal swabs
- Tissue or bone

Possible Family Members of UHR

- Buccal swabs

Missing Persons (MP)

- Toothbrush/Hairbrush/Razor
- Clothing
- Medical specimens

Possible Family Members of MP

- Buccal swabs

For Law Enforcement Partners, refer to Physical Evidence Bulletin (PEB-17) for recommendations on sample collection and storage; https://www.in.gov/isp/labs/evidence-submission-protocolsforms/

Autosomal STR Analysis

- Used in most forensic laboratories
- Also referred to as traditional DNA analysis
- Suitable for majority of forensic samples and useful for mixture interpretation
- Regions of repetitive short segments or Short Tandem Repeats (STR) known to be highly variable between individuals
- Analyze ~20 regions (loci) which can then be used for comparison and/or database searching

Autosomal STR Analysis

Example of Short Tandem Repeat (STR) variation

Typical Case Resolution with DNA Analysis

DNA profiles from a UHR are most often compared to possible family members directly with presumptive identity cases and no database search is required

UHR may be searched in the CODIS database against all indexes including relatives of reported missing persons to generate leads on identity

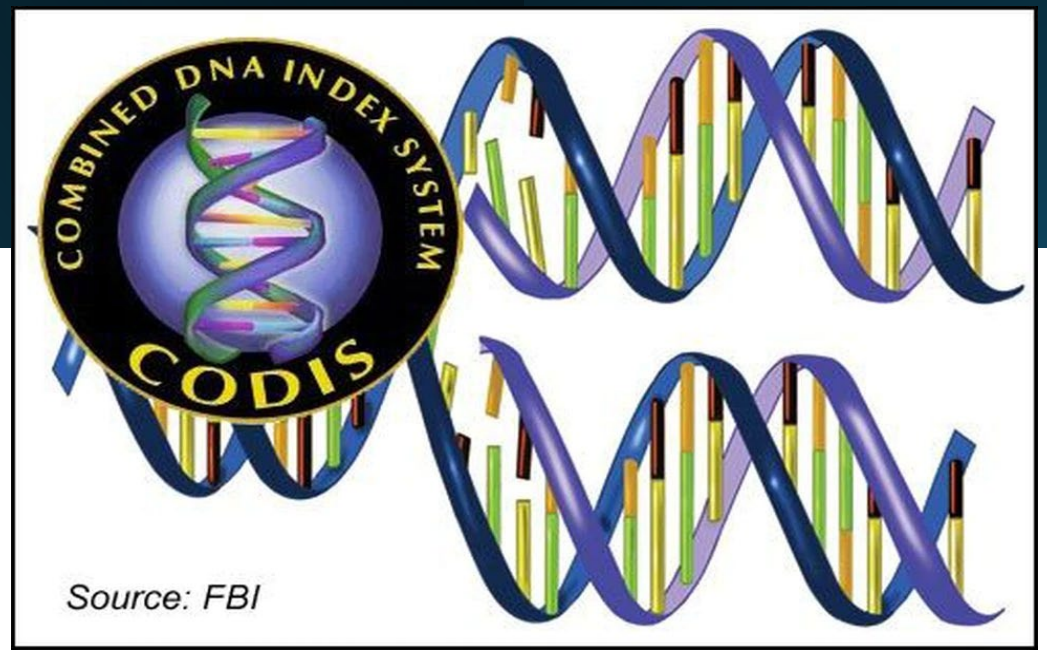
DNA profiles from MP personal items (toothbrush, clothing) or medical specimens are entered into database to be compared to UHR profiles for possible matches

DNA profiles from MP family members are entered into Relatives of Missing Persons database and are only compared to UHR profiles (no crime scene samples) for associations

CODIS Database

CODIS – Combined DNA Index System

- FBI developed and introduced this national DNA database in 1998
- Enhancements to the program were incorporated in 2008 to aid in the identification of missing and unidentified persons on a national level
- Autosomal STR, Y-STR, and mtDNA data can be entered and searched to help generate investigative leads along with metadata information (non-genetic case information)
  - mtDNA analysis not performed by ISP Laboratory
- Often takes time to resolve body identifications using this method and is dependent on samples available in database for comparison



Database Searching

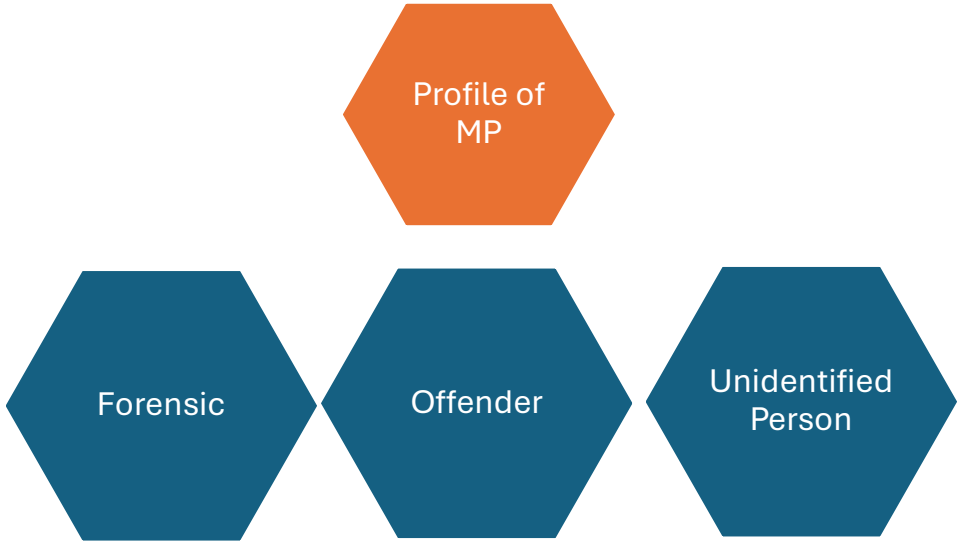
UNIDENTIFIED PERSON INVESTIGATION

- ONLY IF no relative standards for comparison and no presumptive identity
- DNA profile of UHR will be entered into CODIS Database
  - And searched against all indexes in CODIS: Forensic, Offender, Missing Person, Relatives of Missing Persons and Pedigree, and Unidentified Person
- Details about the UHR assist in evaluating potential associations
- May generate hits or matches to provide leads on identification

Database Searching

MISSING PERSON INVESTIGATION

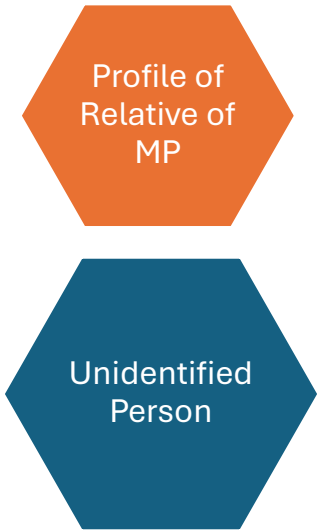
- DNA profiles of MP will be entered into CODIS Database
  - And searched against Forensic, Offender, and Unidentified Person indexes
- Details about the MP assist in evaluating potential associations
- May generate hits or matches to provide leads on identification



Database Searching

MISSING PERSON INVESTIGATION

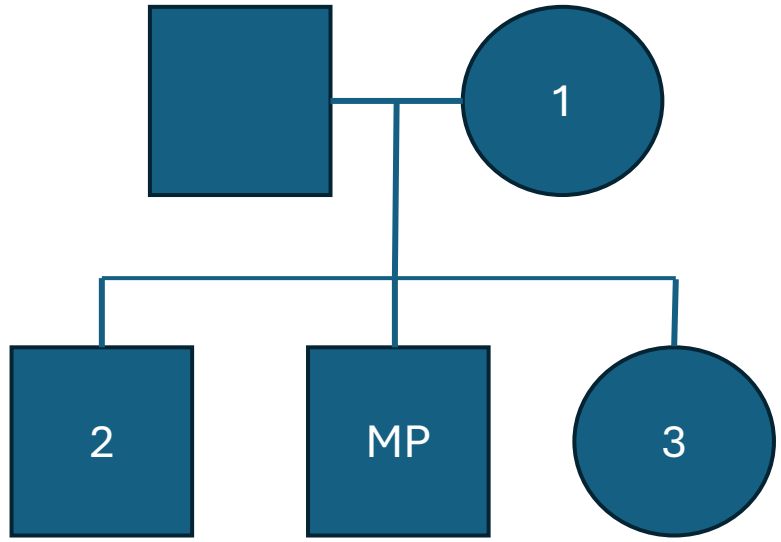
- DNA profiles of relative of MP will be entered into CODIS Database
  - And ONLY searched against Unidentified Person index
- Details about the MP assist in evaluating potential associations
- May generate hits or matches to provide leads on identification



Database Searching

MISSING PERSON INVESTIGATION

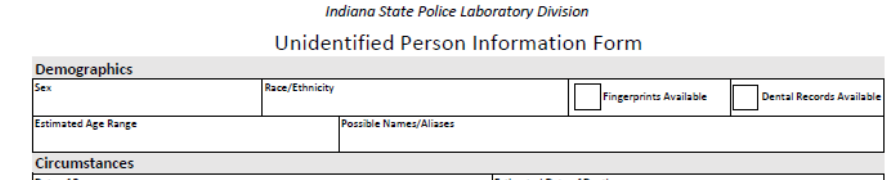
- Multiple relatives of MP can be entered together into CODIS Database to be searched as a pedigree
- Close relatives (i.e. parents, children, and siblings) allow for stronger connections with database searching
- Data from several technologies (Autosomal STRs, Y-STRs, and mitochondrial) can be associated to the pedigree
- More information can be used to filter through the Unidentified Human profiles in CODIS
- Develops strong potential associations which may lead to identification



Requirements for Database Searching

UNIDENTIFIED PERSON INVESTIGATION

- Sample from UHR
- Submission of proper form to input as much data as possible for screening potential matches
- Need case information including:
  - UHR's Demographics
  - Circumstances of Recovery
  - Physical Description
  - Clothing/Accessories
  - Distinctive Markings/Conditions
- Used to evaluate potential matches from database search



Indiana State Police Laboratory Division

Unidentified Person Information Form

Demographics

Sex	Race/Ethnicity	☐ Fingerprints Available	☐ Dental Records Available
Estimated Age Range	Possible Names/Aliases		

Circumstances

Indiana State Police Laboratory Division

Unidentified Person Information Form

Demographics

Sex	Race/Ethnicity	☐ Fingerprints Available	☐ Dental Records Available
Estimated Age Range	Possible Names/Aliases		

Circumstances

Date of Recovery	Estimated Date of Death
Location Found Street Address City State Zipcode Country	
Circumstances of Recovery:	

Physical Description

Height	Weight	Hair Color	Head Hair Description	Facial Hair Description
Eye Color	Tattoos		Distinctive Marks	
Medical Devices/Implants				

Clothing/Accessories

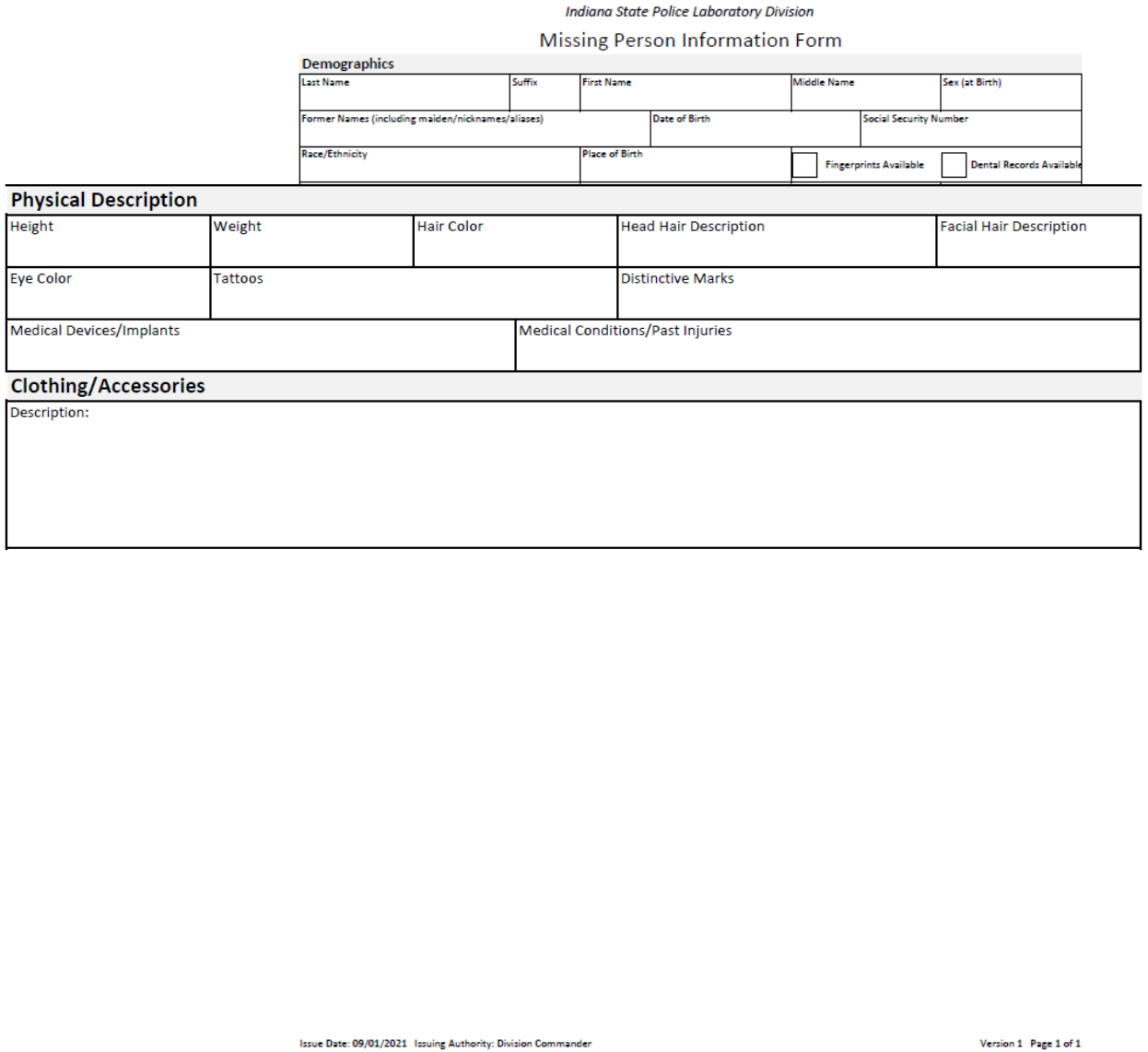
Description:

https://www.in.gov/isp/labs/evidence-submission-protocolsforms/

Requirements for Database Searching

MISSING PERSON INVESTIGATION

- Sample from MP like medical specimen or personal items
- Submission of proper form with information on MP for database search
- Need case information including:
  - Missing Person's Demographics
  - Circumstances of Disappearance
  - Physical Description
  - Clothing/Accessories
  - Distinctive Markings/Conditions
- Used to evaluate potential matches from database search



Indiana State Police Laboratory Division

Missing Person Information Form

Demographics

Last Name	Suffix	First Name	Middle Name	Sex (at Birth)
Former Names (including maiden/nicknames/aliases)		Date of Birth	Social Security Number	
Race/Ethnicity		Place of Birth	☐ Fingerprints Available	☐ Dental Records Available

Physical Description

Height	Weight	Hair Color	Head Hair Description	Facial Hair Description
Eye Color	Tattoos		Distinctive Marks	
Medical Devices/Implants		Medical Conditions/Past Injuries		

Clothing/Accessories

Description:

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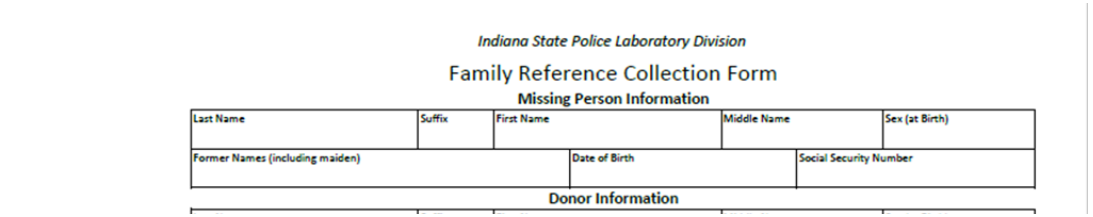
https://www.in.gov/isp/labs/evidence-submission-protocolsforms/

Requirements for Database Searching

MISSING PERSON INVESTIGATION

- DNA profiles of Relatives of Missing Person
  - Buccal swab standards
- Signed consent for DNA collection and search from the Missing Person Relative
- Submission of proper form detailing relationship to MP
- Need case information including:
  - Missing Person's Demographics
  - Circumstances of Disappearance
  - Physical Description
  - Clothing/Accessories
  - Distinctive Markings/Conditions
- Used to evaluate potential matches from database search



Indiana State Police Laboratory Division

Family Reference Collection Form

Missing Person Information

Last Name	Suffix	First Name	Middle Name	Sex (at Birth)
Former Names (including maiden)		Date of Birth		Social Security Number

Donor Information

Indiana State Police Laboratory Division

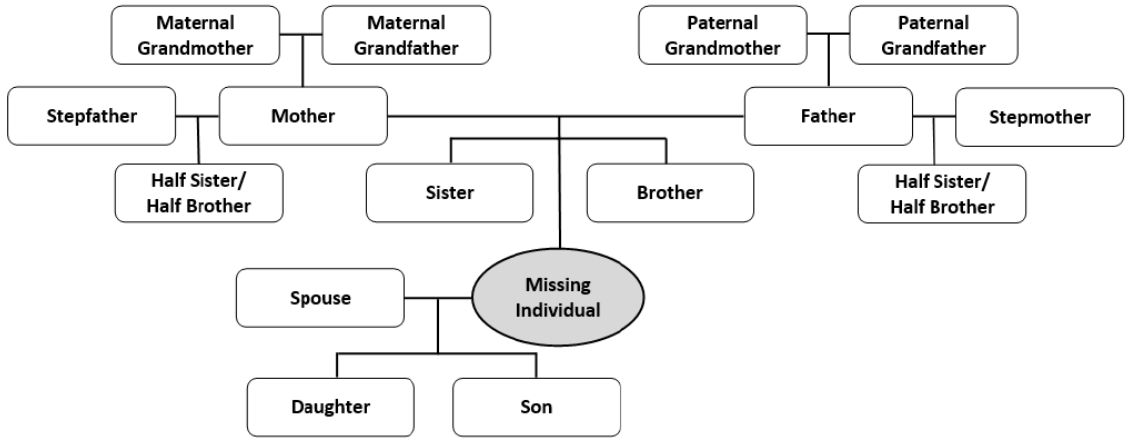
Family Reference Collection Form

Missing Person Information

Last Name	Suffix	First Name	Middle Name	Sex (at Birth)
Former Names (including maiden)		Date of Birth		Social Security Number

Donor Information

Last Name	Suffix	First Name	Middle Name	Sex (at Birth)
Home Address Street Address City State Zipcode Country				Date of Birth
Relationship to Missing Individual: (also circle below if applicable)				



https://www.in.gov/isp/labs/evidence-submission-protocolsforms/

NamUs

NIJ funded program went online in 2007

Offers an online, publicly searchable database

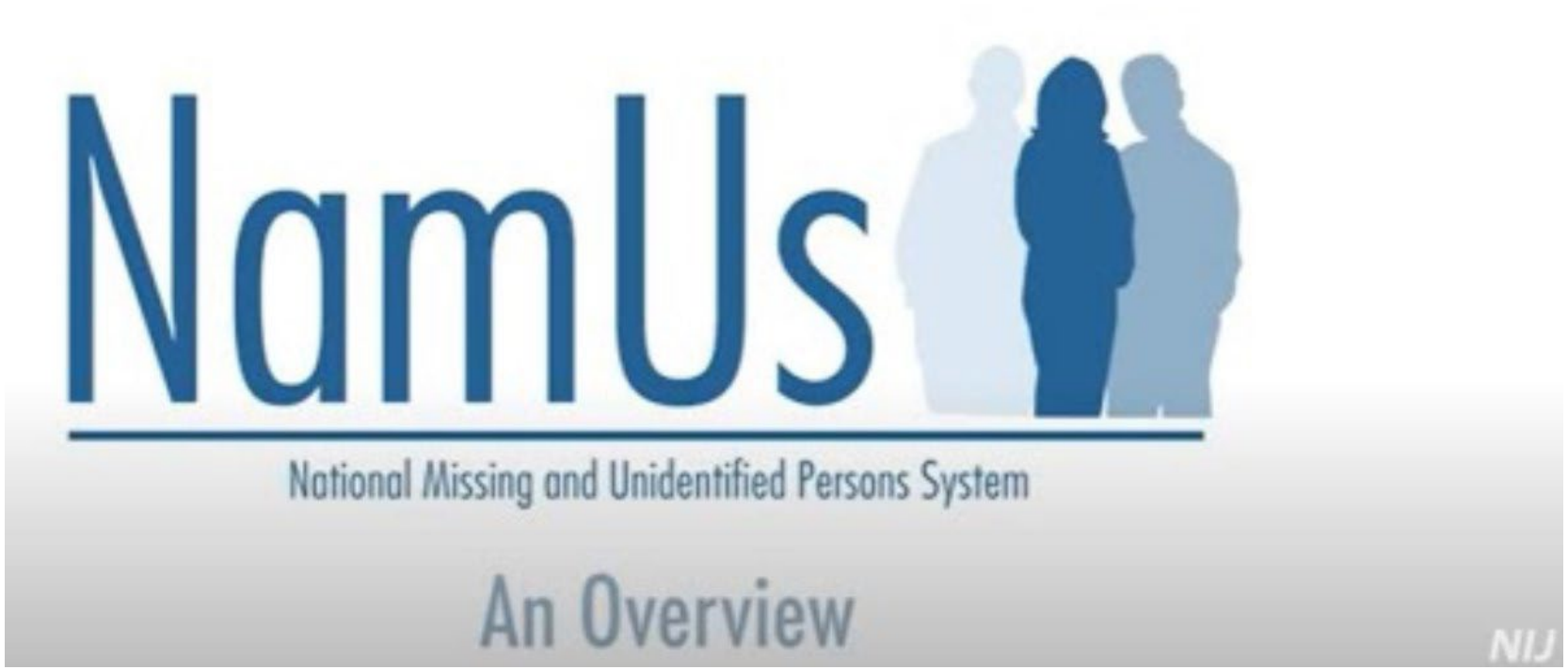
Provides tools for family members of missing persons to assist in searching for their loved one

Allows law enforcement including coroners to compare case information to help resolve unidentified individuals

Can enter and use metadata to filter through possible matches and record exclusions

Serves as a repository of dental, fingerprint, and other records that can be used for identification

NamUs



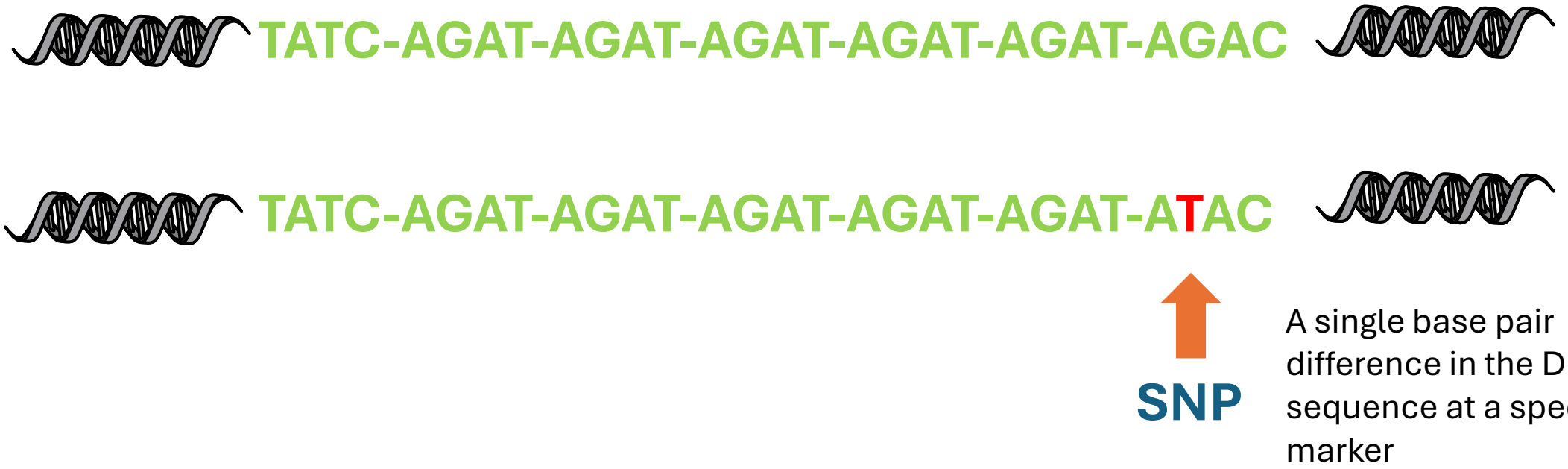
National Institute of Justice, https://youtu.be/DH3ZXa-J-Ps

SNP Analysis

- Additional analysis method recently implemented at ISP Laboratory
- Single Nucleotide Polymorphism (SNP)
- Not available in most public, forensic laboratories
- Useful for unidentified remains and degraded samples
- Develops sequence of DNA in targeted regions to examine single base pair differences
- Analyze hundreds to thousands of loci
- Used to determine Ancestry and Phenotype Predictions of unidentified human remains and for Forensic Investigative Genetic Genealogy

SNP Analysis

Example of Single Nucleotide Polymorphism (SNP) variation



Forensic Investigative Genetic Genealogy

- SNP DNA profile developed in UHR cases
- Can be searched in law enforcement accessible public databases (GEDmatch PRO and FamilyTreeDNA)
- Generates connections to possible relatives to further research through genealogy
- Members of public need to “opt-in” to allow searching to crime scene samples if interested in assisting with case resolution
- More information on how to “opt-in” available on website below

  https://www.in.gov/isp/labs/biology-and-combined-dna-index-system-codis/

DNA Standards

Key to the success of DNA analysis and Database Searching for the resolution of Unidentified Human Remains and Missing Persons cases is the submission of DNA standards for Missing Persons and Relatives

If you are a loved one of a Missing Person, please contact your local law enforcement office to make a missing persons report and submit a DNA standard for submission to the ISP Laboratory

If you are investigating a Missing Person, it is essential to collect standards from Relatives and samples from items belonging to the Missing Person (ie. toothbrush, razor)

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