

Program Overview

In July 2020, the Australian Federal Police's National Missing Persons Coordination Centre launched the National DNA Program for Unidentified and Missing Persons. This multidisciplinary Program aims to apply contemporary forensic techniques to Australia's unidentified human remains (UHR), many of which are decades old, in an effort to assist law enforcement to establish their identity, solve missing persons cases and provide answers to families with missing relatives.

The primary techniques that will be used to identify these skeletonised remains include forensic anthropology and forensic odontology examinations, followed by nuclear and mitochondrial DNA testing. For those UHR that cannot be identified through using medical, dental or DNA data matching, other specialist techniques will be used to offer new investigative leads. These may include radiocarbon dating, isotope analysis, forensic DNA phenotyping, craniofacial reconstructions and forensic genetic genealogy.

The Program will use existing Australian Criminal Intelligence Commission databases to facilitate the national searching and matching of unidentified and missing persons cases, including:

▶ **National Missing Persons and Victim System (NMPVS)**

A database for conducting national searches of case and dental records to link UHR and long-term missing persons via matching of circumstantial (e.g. dates, locations), demographic, physical, medical or dental data

▶ **National Criminal Investigation DNA Database (NCIDD)**

A database for conducting national searches of DNA profiles to link UHR and long-term missing persons via direct matching of DNA data

▶ **NCIDD-Integrated Forensic Analysis (NIFA)**

A database for conducting national searches of DNA profiles to link UHR and relatives of long-term missing persons via kinship matching of DNA data

Forensic Techniques

The Program will utilise a number of forensics techniques, including:

Forensic Anthropology:

This technique involves a Forensic Anthropologist examining the UHR to develop a biological profile (e.g. sex, age, ancestry) for upload on to the NMPVS, distinguish between ancestral and modern remains, estimate time since death, detect unique or rare skeletal features or conditions (e.g. fractures, diseases), perform comparisons between unidentified and missing persons medical records (e.g. CT scans) and document trauma to aid cause and manner of death determinations.

Forensic Odontology:

This technique involves a Forensic Odontologist examining the UHR to chart the position and condition of the teeth, including the presence of any dental restorations (e.g. fillings), for upload on to the NMPVS. Additionally, they will upload dental charts of long-term missing persons on to the NMPVS to perform dental comparisons between unidentified and missing persons.

DNA Testing:

This technique involves a DNA Specialist analysing specific DNA markers recovered from the UHR to develop nuclear and/or mitochondrial DNA profiles for upload on to the NCIDD and/or NIFA. Additionally, they will develop nuclear and/or mitochondrial DNA profiles from direct or family reference samples of long-term missing persons for upload on to the NCIDD and/or NIFA to perform DNA comparisons between unidentified and missing persons, or their relatives.

Radiocarbon Dating:

This technique involves a Forensic Geochemist analysing the concentration of radiocarbon (i.e. radioactive isotope of carbon) present in UHR to estimate the year of birth and death of individuals who have lived and died since the bomb pulse in the 1950s. It is also a useful technique to date the UHR to distinguish between ancestral and modern remains.

Forensic Techniques

Isotopic Analysis:

This technique involves a Forensic Geochemist analysing the abundance of different stable isotopes (e.g. oxygen) and metal elements (e.g. strontium) present in UHR to develop a chemical signature that can be used to estimate the residence history, including geographic region of origin, travel history and the dietary preferences of an individual.

Forensic DNA Phenotyping:

This technique involves a DNA Specialist analysing specific DNA markers recovered from UHR to estimate the ancestral origin and physical appearance of an individual, including hair colour, eye colour and skin colour.

Craniofacial Reconstructions:

This technique involves a Forensic Artist approximating the facial features of an individual by reconstructing the soft tissues of the skull of UHR using three-dimensional sculptural and/or computerised methods. Additionally, forensic DNA phenotyping results can be used to add surface details to the facial depiction, such as pigmentation.

Forensic Genetic Genealogy:

This technique involves a DNA Specialist analysing specific DNA markers recovered from UHR to develop a DNA profile for upload on to public DNA databases to find DNA matches to potential relatives of the individual. Then a Genetic Genealogist will use publicly available records (e.g. birth records, newspaper archives) to build family trees of matches to narrow down a list of missing persons to a region, a family or an individual. Identity can then be confirmed using routine DNA testing methods.

Further Information

For more information on the Program please go to our dedicated webpage: www.missingpersons.gov.au/national-dna-program-unidentified-and-missing-persons or contact the NMPCC: missing@afp.gov.au.



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