

## Fact Sheet

# Familial DNA Searching

## Case Example 1.

### Operation Co-Op (New Zealand)

The body of Ms Jamieson, a 23 year old female from Auckland, was found on 19 February 2001. DNA profiling work was undertaken and results from a semen stain were compared to the National DNA Databank. No links to an individual on the databank were found.

Following a review of the case and in the absence of any other leads, police put the case forward for familial DNA searching in 2007. A familial search was undertaken in December 2007. The search highlighted a female profile on the DNA Databank that was similar enough to the profile obtained from the semen stain to be of interest to police. The female whose profile was obtained through the familial search had a brother, Mr Reekers.

As a result of further police investigation Mr Reekers was arrested for the murder of Ms Jamieson in June 2008. Mr Reekers plead guilty to the murder of Ms Jamieson in December 2009. A link to a newspaper report relating to the case is provided below:

<http://www.stuff.co.nz/national/crime/3600379/Marie-Jamiesons-killer-jailed-at-least-15-years>

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## Case Example 2.

### Operation Earnest (South Australia)

Two women were assaulted in separate incidents in North Adelaide in 2012. DNA evidence was recovered linking both incidents to a single unknown male offender. The DNA profile did not link to any person on the National Criminal Investigation DNA Database.

After policing avenues were exhausted, investigators sought approval from the South Australian Familial Testing Advisory Group to conduct a familial search in 2015. After authorisation, the South Australian DNA Database was searched for a relative of the unknown offender.

Following the search and additional Y chromosome DNA testing, one male could not be excluded as a relative. The proposed relationship between the person on the database and the unknown offender was that of father and son.

The name of the potential relative was reported to police and following further investigation, Patrick Perkins was arrested for the crimes in July 2015. Mr Perkins was the biological father of the person identified by the familial search. Mr Perkins plead guilty to both offences in October 2016. A link to a newspaper report relating to the case is provided below:

<http://www.abc.net.au/news/2017-12-04/north-adelaide-rape-victim-tells-court-she-has-not-future/9223088>

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## What is a familial DNA search?

A familial DNA search can identify potential biological relatives of an unknown DNA profile, where a direct match on the National DNA Database has not been obtained.

## How does it work?

Potential biological relationships are assessed through complex statistical calculations. For familial DNA searching to be successful, a biological relative of the unknown person must be present in the DNA database. The closer the relationship (e.g. Parent-Child), the greater the chance that the relative will be identified through a familial DNA search.

## What are the benefits?

Familial DNA searching has the potential to provide investigative leads for serious unsolved crimes and this has been demonstrated in multiple cases (see case examples).

## What are the limitations?

It is important to understand the value and limitations of the search before proceeding. Familial DNA searching is a resource intensive exercise for the DNA analysis laboratory tasked with reviewing a candidate list and potentially performing additional DNA analysis. It can also be resource intensive for investigating officers tasked with examining family structures and investigating biological relatives to identify a person of interest.

Familial DNA searching will rank the entire database, based on the statistical likelihood of a biological relationship. This means that a search will always return a candidate list, regardless of whether or not a true biological relative appears on the database. Depending on the statistical likelihood generated, there is also a risk that a true biological relative may be overlooked entirely if they do not appear high enough on the candidate list to warrant further investigation.

This fact sheet has been developed to explain the process of familial DNA searching, including the results that may be obtained and the local and national implications that may arise. This document should be considered in conjunction with Local Familial DNA Searching Policies, as well as the National Policy for Cross-Jurisdictional Familial DNA Searching for the Investigation of Crime in Australia.

# Familial DNA Searching

## for the Investigation of Crime in Australia

### Intra-Jurisdictional search

A search performed against the reference DNA profiles contained within one state or territory database, subject to legislation +

Searches are generally limited to serious unsolved crimes

Refer to Local Policy

Searches require approval and should be performed in consultation with the local DNA analysis laboratory

Refer to Local Policy

### Inter-Jurisdictional search

A search performed against the reference DNA profiles across multiple state and territory databases, subject to legislation +

Searches are subject to strict case criteria

Refer to National Policy

Searches are subject to strict approval criteria

Refer to National Policy

CONSIDER

CONSIDER

UNKNOWN DNA PROFILE

REQUEST FOR APPROVAL  
SUBMITTED AND GRANTED

SEARCH PERFORMED

Potential biological relatives of the donor of the unknown DNA profile will be ranked on the candidate list by the likelihood of a familial relationship based on complex statistical calculations.

STATISTICAL THRESHOLD APPROACH

Reduces candidate list by applying a statistical threshold, beneath which a potential familial relationship would not be investigated. This threshold would be based upon recommendations by appropriate experts.

TOP X CANDIDATES APPROACH

Reduces candidate list by picking a select number of samples from the top of the list, beneath which a potential familial relationship would not be investigated. This number would be based upon recommendations by appropriate experts.

CANDIDATE LIST  
GENERATED

Samples on the candidate list will be jurisdictional reference DNA samples +

Samples on the candidate list will include reference DNA profiles from other jurisdictions +

There is potential for unrelated individuals to appear higher on the candidate list than true biological relatives given the potential for random people to have DNA in common. There is also the potential for true biological relatives to be excluded where they appear too far down the candidate list. If there is no biological relative of the donor of the unknown DNA profile on the database, the candidate list will not be of value. \*

FURTHER  
DNA  
ANALYSIS

Ability to perform additional DNA analysis will depend on the amount of sample remaining and the tests available at the local DNA analysis laboratory

Approval for further DNA analysis of samples from another jurisdiction would need to be sought. This will likely be dependent on a cost recovery model being available, as well as the capacity for the interstate DNA analysis laboratory to perform the additional testing.

Examples include the analysis of more DNA markers, Y chromosome DNA analysis and mitochondrial DNA analysis. While these techniques may further reduce the candidate list they can be expensive and time consuming.

CANDIDATE LIST  
PROVIDED TO  
INVESTIGATORS

If the local familial DNA search is unsuccessful, the unknown DNA profile may be suitable for an inter-jurisdictional familial DNA search

Approval for further investigation of names from another jurisdiction would need to be sought. If no potential relatives of interest are identified, the search may need to be repeated at selected intervals as additional DNA profiles are uploaded to the DNA database. An appropriate timeframe should be negotiated with the local DNA analysis laboratory

The candidate list **will not** contain the name of the donor of the unknown DNA profile. Investigators will be tasked with examining the family structures of those appearing on the candidate list to identify a potential person of interest. If a person of interest is identified, a reference DNA sample should be collected for comparison to the unknown DNA profile.

+ If DNA profiles from the crime scene index are included in the search, potential relationships between two unknown crime scene DNA profiles will be assessed. This search could provide an investigative lead, whereby police can investigate the potential for the crimes to be linked given the potential familial relationship between the two unknown donors of the crime scene samples. However, a candidate list containing DNA profiles from the crime scene index may be more resource intensive to investigate.

\* The use of different DNA analysis kits may also affect the determination of potential familial relationships. That is, the more DNA information present in the sample, the better the potential weighting to the familial match and samples processed using older DNA analysis kits (e.g. Profiler Plus® 10 markers) may need to be upgraded (e.g. PowerPlex 21® 21 markers or GlobalFiler® 24 markers).

Investigators should liaise with the local DNA analysis laboratory when considering:

- the suitability of an unknown DNA profile for a familial DNA search
- the best approach for reducing the candidate list
- timeframes for further DNA analysis
- the types of profiles included in the search and how best to interpret the results obtained
- whether the search should be repeated in the future.