Regulating New Forms of Forensic DNA Profiling under Australian Legislation: Familial Matching and DNA Phenotyping

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OVERVIEW

• DNA matching in criminal investigations
• Cold-hit matching with DNA databases
• Partial or ‘familial’ matching
• DNA phenotyping
• Forensic procedures legislation
• Regulatory issues
• Questions and discussion
DNA IN CRIMINAL INVESTIGATIONS

• Generation of a DNA profile from a crime scene or related sample (may include a sample taken from the body of a victim)

• Comparing this with the DNA profile generated from a sample taken from a suspect (which may be given voluntarily or by court order) or a victim / volunteer

• Result is match / non-match (no other meaning apart from sex marker)
DNA IN CRIMINAL INVESTIGATIONS

• DNA matching at the investigation stage may assist (depending on other evidence)
  • a DNA match (inclusion) may help to focus suspicion on a particular person or group
  • a DNA non-match (exclusion) may help to exclude persons from suspicion

• This can occur through a variety of means
  • individual comparison between DNA profiles
  • mass screening and comparison (e.g. Wee Waa)
  • DNA database searching (e.g. “cold hit” matches)
DNA IN CRIMINAL INVESTIGATIONS

“The most important method of mass comparison is through the use of databases of DNA profiles from known persons, each of which can be easily compared with every crime profile, potentially yielding “cold hits”, that is, entirely unsuspected links between known persons and crimes.”

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DNA IN CRIMINAL INVESTIGATIONS

- **Partial matches** are normally not taken to be significant as there is a good chance of two individuals having the same DNA profile at some subset of genetic markers being compared (e.g. 9-loci Profiler Plus)

- **Familial matching** is an exception in that it may lead to a suspect’s identification through a relative’s DNA on a database (requires strong similarity of profiles)
DNA IN CRIMINAL INVESTIGATIONS

• Example (UK manslaughter case)
  – Brick thrown from footbridge at lorry
  – Driver suffered fatal cardiac arrest
  – DNA profile obtained from brick
  – No full match against DNA database
  – Partial match against an offender
  – Questioning revealed brother as a suspect
  – DNA profile obtained fully matched brick DNA
DNA IN CRIMINAL INVESTIGATIONS

• CrimTrac’s NCIDD database
  – “Familial matching is the use of DNA profiles to link blood relatives in order to assist in criminal investigations. The concept is the same as for kinship matching. Familial matching involves searching the DNA database to determine if a crime scene profile can be linked to a blood relative of a person on the database. Familial matching has been used successfully overseas to assist in solving numerous serious crimes. CrimTrac will examine the numerous legislative, ethical, privacy and technical issues surrounding familial matching.”
  
• http://www.crimtrac.gov.au/
DNA IN CRIMINAL INVESTIGATIONS

- **Phenotypic analysis** involves derivation of likely features such as hair and eye colour, height from a DNA sample.
- Has reportedly been used in some overseas investigations e.g. US.
- Reliability / usability are unknown.
- Possible also to link names to non-coding DNA patterns using database statistics.
DNA IN CRIMINAL INVESTIGATIONS

• **Regulation** of DNA samples and matching through forensic procedures legislation e.g.
  – *Crimes Act 1914* (Cth), Part ID
  – *Crimes (Forensic Procedures) Act 2000* (NSW)

• **Categories of samples** i.e. crime scenes, suspects, convicted offenders, volunteers, missing persons, unknown deceased

• **Permissible matching** e.g. permitted except for (limited purpose) volunteers
DNA IN CRIMINAL INVESTIGATIONS

• **Informed consent** is required for sampling of volunteers and some other categories of persons e.g. suspects / offenders (if not under court order)

• **Volunteer (or suspect / offender)** must be informed *inter alia* that the forensic procedure may produce evidence that might be used (against the suspect / offender) in a court of law
DNA IN CRIMINAL INVESTIGATIONS


  - I consent to my fingerprints, footwear impressions and DNA sample and information derived from it being retained and used only for purposes related to the prevention and detection of a crime, the investigation of an offence or the conduct of a prosecution either nationally or internationally.

  - I understand that my fingerprints, footwear impressions or DNA sample may be checked against other fingerprint, footwear impressions and DNA records held by or on behalf of relevant law enforcement authorities, either nationally or internationally.

  - I understand that once I have given my consent for my fingerprints, footwear impressions or DNA sample to be retained and used I cannot withdraw this consent.
DNA IN CRIMINAL INVESTIGATIONS

• **Admissibility of evidence** may be affected by any breach of sampling requirements, permissible matching etc. under both forensic procedures legislation and *Evidence Act 1995* (Cth and NSW)

• **Offences** apply to impermissible matching, failure to destroy samples as required etc.

• **Judicial oversight** of the use of DNA in criminal investigations is thus incorporated
DNA IN CRIMINAL INVESTIGATIONS

• Is familial matching regulated?
  – Arguably regulated as is other DNA matching
  – Legislation refers to ‘matching’, ‘match’ and ‘forensic comparison’ not to results of process
  – Possible to argue that consent provisions for suspects / offenders should also refer to possible use of sample to produce evidence that may be used against other persons
  – No known judicial decisions on familial matching in Australia to consider the issue
DNA IN CRIMINAL INVESTIGATIONS

• Is phenotypic analysis regulated?
  – Not as a form of ‘matching’ as it involves direct analysis of a given sample
  – Crime scene material (e.g. blood spot on carpet) involves no (intimate or non-intimate) forensic procedure as defined in legislation if no bodily examination or taking of ‘sample’
  – Phenotypic analysis of DNA samples may be regulated through restricting permissible methods and uses of results (e.g. NT regs)
DNA IN CRIMINAL INVESTIGATIONS

• Is phenotypic analysis regulated?
  – **Netherlands** legislation permits determination of race, gender and other externally visible characteristics
  – **Germany** and some **US states** prohibit DNA phenotyping in criminal investigations
  – **United Kingdom** does not regulate DNA phenotyping but it has reportedly been used by Forensic Science Service (FSS)
DNA IN CRIMINAL INVESTIGATIONS

• Arguments for use of DNA phenotyping limited to externally visible characteristics?
  – Functionally equivalent to an “eye witness”
  – No significant invasion of privacy

• Argument for use of DNA phenotyping beyond externally visible characteristics?
  – No alternative means of obtaining same data
  – Any privacy invasions outweighed by public interest in bringing offenders to justice
DNA IN CRIMINAL INVESTIGATIONS

• Risks of use of DNA phenotyping limited to externally visible characteristics?
  – If unregulated could be used to bypass existing forensic procedures requirements

• Risks of use of DNA phenotyping beyond externally visible characteristics?
  – Might be used for improper purposes e.g. to put undue pressure in a suspect found to have particular health susceptibilities
DNA IN CRIMINAL INVESTIGATIONS


  – “As a matter of principle, the legislation should not be framed in terms of prohibiting the adoption of developments in DNA technology but any significant new techniques should not be employed until they have been subjected to public scrutiny.” (p.115)
DNA IN CRIMINAL INVESTIGATIONS

