



# LAW REFORM COMMISSION

*Discussion Paper*

## Forensic Use of DNA

[April 2009]

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- (b) a representative of the Judiciary appointed by the Chief Justice;
- (c) the Solicitor-General or his representative;
- (d) a barrister, appointed by the Attorney-General after consultation with the Mauritius Bar Council;
- (e) an attorney, appointed by the Attorney-General after consultation with the Mauritius Law Society;
- (f) a notary, appointed by the Attorney-General after consultation with the Chambre des Notaires;
- (g) a full-time member of the Department of Law of the University of Mauritius, appointed by the Attorney-General after consultation with the Vice-Chancellor of the University of Mauritius; and
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# LAW REFORM COMMISSION

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## **(A) Introductory Note**

1. The Commission has taken note of legislative proposals [a draft of the DNA Identification Bill] for the taking of DNA samples and their forensic use, protection and storage. The comments of various stakeholders on the proposed legislation have also been brought to our attention.<sup>1</sup> In this Discussion Paper, the Commission examines the policy issues relating to the forensic use of DNA and the establishment of a DNA Database.<sup>2</sup>

## **(B) Preliminary Remarks about Forensic Use of DNA**

2. The Commission reckons that recourse to DNA profiling<sup>3</sup> has become an increasingly powerful tool for fighting crime. Crimes are more successfully solved when DNA is

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<sup>1</sup> The Ag. Director, Forensic Science Laboratory, the Commissioner of Police, the National Human Rights Commission, the Ministry of Health and Quality of Life, and the Data Protection Commissioner.

<sup>2</sup> DNA testing has recently retained the attention of Parliamentarians: vide reply to PQ B/224 about DNA tests carried out in a case [15.04.08]; reply to PQ B/693 [17.06.08] where reference is made to DNA testing as one tool in the process of enhancing investigative capability; reply to PQ B/838 [15.07.08] regarding resort to DNA testing as tool for investigation and prosecution of crime; reply to PQ B/86 [07.04.09] as to whether legislation will be introduced to making it compulsory for a suspect to undergo DNA testing.

<sup>3</sup> DNA [deoxyribonucleic acid] is found in the nucleus of every cell in the human body and is present in virtually all body tissues [bone, hair, blood, saliva and other body fluids and tissues]. It is inherited from both parents and is unique to each individual, with the exception of identical twins. DNA, whose structure (double helix) was deduced by Watson and Crick in 1953, is the principal molecule which carries genetic information from one generation to the next.

DNA profiling refers to the identification of particular parts of a person’s DNA molecule. It is a technique which enables scientists to compare two biological samples and to determine the likelihood that these samples originated from the same individual. Because DNA is the same in all cells of the body, DNA profiles extracted from different samples at different times and in different places can be compared to determine whether they have come from the same person. If human biological samples are found at a crime scene, DNA profiling can determine whether a suspect could be a possible source of a sample.

The technology underlying DNA profiling was developed as a result of an unexpected discovery by Professor Sir Alec Jeffreys and colleagues in the 1980s at the University of Leicester in the course of research into DNA variation and the evolution of families of genes [Jeffreys, Wilson and Thein “Hypervariable ‘Minisatellite’ Regions in

recovered from a crime scene and the DNA profiles are successfully loaded onto a National DNA Database.<sup>4</sup>

A popular example that is often advanced as encapsulating the benefits of DNA profiling and the establishment of a profile database can be given<sup>5</sup>: a young woman is attacked and raped in her home by a burglar. A local man who was seen in the area at the time of the offence and who has a previous conviction for sexual assault is arrested. The DNA profile of the assailant is generated from the seminal stains on the victim’s vaginal swabs. The profile is checked against a database containing the profiles of convicted offenders, which includes the primary suspect’s profile. The original suspect is eliminated, but a ‘hit’ or ‘match’ is found against another man whose profile was entered and retained following an earlier conviction. This is what is referred to as a ‘cold hit’, meaning that the person matched was never a suspect for this offence until the match occurred.

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Human DNA” (1985) 314 *Nature* 67-73 and Jeffreys, Wilson and Thein “Individual-Specific ‘Fingerprints’ of Human DNA” (1985) 316 *Nature* 76-79.]

Comparison of human DNA molecules does not require analysis of the entire DNA molecule, as about 99.9 per cent of DNA is common to all people. Rather, DNA comparison need only focus on a portion of the remaining 0.1 per cent of human DNA that is sufficiently variable to be unique to individuals. Such variable DNA— termed “non-coding” (or “junk”) DNA—plays no direct role in the development of human characteristics.

The variations in DNA sequences, which are found at particular locations, or “loci”, in the genome, are known as “alleles”. Modern comparative techniques compare only a small set of features of non-coding DNA. Such sets of features are known as DNA profiles and can be represented as an ordered series of numbers. The features comprised in a DNA profile must be sufficiently variable throughout the population to have an acceptable statistical likelihood that the profile is unique in that population. There are various techniques for DNA profiling and there have been significant technological advances in this scientific field. Multi locus probes (MLP) and Single locus probes (SLP) have given way to the routine use of Polymer Chain Reaction (PCR) where small samples can be examined because the extracted DNA can be replicated in a controlled way.

The most prevalent method of DNA fingerprinting used today is based on PCR and uses short tandem repeats (STR), such as the SGM+ system in UK and the rest of Europe. For highly degraded samples, mitochondrial DNA (mtDNA) is sometimes typed due to there being many copies of mtDNA in a cell, while there may only be 1-2 copies of the nuclear DNA. Y chromosome testing may also be resorted to target the male fraction of a biological sample. There are prospects for further developments in profiling technology, such as use of capillary electrophoresis and mass spectrometry.

<sup>4</sup> A DNA database is a repository of DNA profiles, generated from biological samples, which can be electronically stored for comparison with profiles generated from material found at the scene of a crime. The primary aim of a DNA database is to link individuals to unsolved offences and unsolved offences to each other by means of DNA profiling.

<sup>5</sup> Vide McKenna, “The Value of a National DNA Database” (1998) *Forensic Science News* Issue 3.

3. Since the introduction of the DNA database in the UK in 1995, scores of ‘cold hits’ in stranger rape cases have given useful pointers as to the person on whom the investigation should focus and many cases have been solved, some of them many years after they were committed.<sup>6</sup> DNA databases established in various countries worldwide have proved to be very successful investigative tools.<sup>7</sup>
  
4. The Commission acknowledges the importance of developing a comprehensive and unambiguous legal framework for the establishment and management of a DNA database for the limited purposes of criminal investigation, determining affiliation and

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<sup>6</sup> There have been a number of notable successes in which crimes have been solved, some many years after they were committed, including:

(i) The murder of 14 year-old Roy Tutill in Surrey in 1968: The development in scientific techniques enabled a DNA profile of the suspected killer to be generated from stains found on Roy’s clothing. The profile was entered onto the database in 1996. Three years later, Brian Field was stopped by the police on a drink-driving offence. A routine mouth swab was taken and the resulting profile was entered on the database. The profile matched against the 1968 scene of crime stain profile. In November 2001, having pleaded guilty to murder, Field was sentenced to life imprisonment [FSS *Annual Report and Accounts 2001-2002*, at 12];

(ii) The rape and murder of 14 year-old Marion Crofts in Hampshire in 1981. A laboratory microscope slide containing the samples collected from Marion’s body lay untouched for 20 years. In 1999 the FSS used DNA Low Copy Number30 to generate a full profile of the suspected perpetrator from stains found on some of her clothing. The profile was checked against the database and in August 2001 a match was found after Tony Jasinskyj was arrested for another crime and his DNA profile was routinely loaded onto the database. Jasinskyj was convicted and sentenced to life imprisonment

[See the FSS website at: [http://www.forensic.gov.uk/forensic/news/casefiles/2002\\_07\\_marion.htm](http://www.forensic.gov.uk/forensic/news/casefiles/2002_07_marion.htm)];

(iii) The rape of a 21 year-old *au pair* in North London in 1989. The profile generated from the scene of crime stain was stored on the database. Nick Keall, a minicab driver, was arrested for assault on Christmas Day 2001. A sample was taken from him and his profile was run against the database and a ‘match’ was reported with the stain from the crime scene of the rape. Keall was convicted and sentenced to eight years imprisonment [“Man jailed for rape 14 years after attack” *The Times* 5 August 2003].

<sup>7</sup> UK Home Office Statistics indicate that in cases where DNA was recovered, the crime detection rate rose from 26% to 40% in 2004/05 [it was then estimated that about 5.2% of the UK population was represented on the database]. In 2005-06 45,000 crimes were matched against records on the DNA Database; including 422 homicides (murders and manslaughters) and 645 rapes. DNA profiles are, however, successfully loaded for less than 1% of recorded crimes, as DNA is not always left at crime scenes, not all crimes are associated with a scene where DNA could be left [UK FSS, *The National DNA Database Annual Report 03/04*].

In New Zealand, a DNA Databank was set up in 1995 by the police force and the Institute of Environmental Science Research (ESR). In its first few years in operation it yielded impressive results: of all DNA profiles loaded from unsolved cases, approximately 50% matched an individual profile present on the national DNA database and approximately 30% of profiles generated from scene of crime stains in unsolved cases, when loaded, matched other crime scene profiles contained in the Crime Sample Database

[See the website of the ESR at: [http://www.esr.cri.nz/features/esr\\_and\\_dna/databank/index.htm](http://www.esr.cri.nz/features/esr_and_dna/databank/index.htm)].

identification.<sup>8</sup> The technology for DNA profiling and the methods for estimating frequencies and related statistics have progressed to the point where the reliability and validity of properly collected and analyzed DNA data are not to be doubted.

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<sup>8</sup> Experience so far has shown that DNA profiling is a powerful tool for human identification, and the detection of crime and the exoneration of the innocent:

- In the 1950s, Anna Anderson claimed that she was Grand Duchess Anastasia Nikolaevna of Russia; in the 1980s after her death, samples of her tissue that had been stored at a Charlottesville Virginia hospital following a medical procedure were tested using DNA fingerprinting and showed that she bore no relation to the Romanovs.
- In 1987, British baker Colin Pitchfork was the first criminal caught using DNA fingerprinting in Leicester, the city where it was first discovered.
- In England in 1987, Robert Melias became the first person to be convicted on the basis of DNA evidence of the burglary and rape of a 45 year old disabled woman. Semen stains found on the victim’s clothing were analyzed and compared with Melia’s genetic material, revealing a match.
- In 1987, Tommy Lee Andrews was the first person in the United States to be convicted as a result of DNA evidence for raping a woman during a burglary, after matching DNA from semen traces found on the rape victim with a DNA profile generated from a sample of his blood [*State v Andrews* 533 So.2d 841 (Dist. Ct. App. 1989)].
- In 1989, Chicago man Gary Dotson was the first person whose conviction was overturned using DNA evidence.
- In 1991, Allan Legere was the first Canadian to be convicted as a result of DNA evidence, for four murders he had committed while an escaped prisoner in 1989.
- In 1992, DNA evidence was used to prove that Nazi doctor Josef Mengele was buried in Brazil under the name Wolfgang Gerhard.
- In 1993, Kirk Bloodsworth was the first person in the US to have been convicted of murder and sentenced to death, whose conviction was overturned using DNA evidence.
- In 1994, RCMP detectives in Canada successfully tested hairs from a cat known as Snowball, and used the test to link a man to the murder of his wife, thus marking for the first time in forensic history the use of non-human DNA to identify a criminal.
- In 1998, Dr. Richard J. Schmidt was convicted of attempted second-degree murder when it was shown that there was a link between the viral DNA of the human immunodeficiency virus (HIV) he had been accused of injecting in his girlfriend and viral DNA from one of his patients with full-blown AIDS. This was the first time viral DNA fingerprinting had been used as evidence in a criminal trial.
- In 2002, DNA testing was used to exonerate Douglas Echols, a man who was wrongfully convicted in a 1986 rape case. Echols was the 114th person to be exonerated through post-conviction DNA testing.
- In August 2002 Annalisa Vincenzi was shot dead in Tuscany. Some time later, Bartender Peter Hamkin, 23, was arrested in Merseyside in March 2003 on an extradition warrant heard at Bow Street Magistrates’ Court in London to establish whether he should be taken to Italy to face a murder charge.
- In 2003, Welshman Jeffrey Gafoor was convicted of the 1988 murder of Lynette White, when crime scene evidence collected 12 years earlier was re-examined using STR techniques, resulting in a match with his nephew. This may be the first known example of the DNA of an innocent yet related individual being used to identify the actual criminal, via "familial searching".
- In June of 2003, because of new DNA evidence, Dennis Halstead, John Kogut and John Restivo won a retrial on their murder conviction. The three men had already served eighteen years of their thirty-plus-year sentences.
- In March 2003, Josiah Sutton was released from prison after serving four years of a twelve-year sentence for a sexual assault charge. Questionable DNA samples taken from Sutton were retested in the wake of the Houston Police Department's crime lab scandal of mishandling DNA evidence.
- In 2004, DNA testing shed new light into the mysterious 1912 disappearance of Bobby Dunbar, a four-year-old boy who vanished during a fishing trip. He was allegedly found alive eight months later in the custody of William Cantwell Walters, but another woman claimed that the boy was her son, Bruce



In its 2002 Report on the ‘Review of the Crimes (Forensic Procedures) Act 2000’, the Standing Committee on Law and Justice of the Legislative Council of New South Wales heard evidence on the reliability of DNA technology and its effectiveness in criminal investigations. It had this to say on the reliability of DNA matching for forensic investigation purposes:

“From the evidence and submissions received by the Committee, and the opinions of forensic and legal experts contained in journal articles, it is clear there is a broad consensus that DNA profiling technology is accurate and reliable. In New South Wales, this is supported through strict quality assurance mechanisms and an independently managed and administered database.

Despite the reliability of DNA profiling, the technology cannot be considered unassailable. The evidence before the Committee indicates that errors and intentional contamination can occur, and coincidental matches, whether between strangers or relatives, cannot be ruled out. The Committee understands that the incidence of chance matches declines with the increase in the number of loci used. As the Profiler Plus system used in New South Wales tests 9 loci, a chance match would be only a remote possibility, although it is certainly not impossible.

The Committee is aware that there remain divergent opinions about the most accurate means of calculating match odds and determining the significance of a match in general, and considers that a State Institute of Forensic Science would be an appropriate means of seeking to obtain a consensus.”<sup>9</sup>

As regards the effectiveness of DNA matching as an investigative tool and the effectiveness of statistical evidence, the Committee said:

“Both the information reviewed and the opinions provided to the Committee suggest abroad consensus that DNA matching is effective for investigative purposes. The Committee notes, however, that DNA technology is not entirely failsafe.<sup>10</sup> The use of DNA profiling in an investigation should occur with

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- Anderson, whom she had entrusted in Walters' custody. The courts disbelieved her claim and convicted Walters for the kidnapping. The boy was raised and known as Bobby Dunbar throughout the rest of his life. However, DNA tests on Dunbar's son and nephew revealed the two were not related, thus establishing that the boy found in 1912 was not Bobby Dunbar, whose real fate remains unknown [Vide "DNA clears man of 1914 kidnapping conviction," *USA Today*, (May 5, 2004), by Allen G. Breed, Associated Press.]
  - In December 2005, Evan Simmons was proven innocent of a 1981 attack on an Atlanta woman after serving twenty-four years in prison. Mr. Clark was the 164th person in the United States and the fifth in Georgia to be freed using post-conviction DNA testing.

<sup>9</sup> Paragraphs 3.90 – 3.92.

<sup>10</sup> At least one such false match from a ‘cold hit’ has occurred in Britain. In 1998, a profile from a crime scene stain at a burglary in Bolton, England produced a match on the national database. The hit, which had a match probability

awareness that the science cannot provide a definitive identification of an offender. With that qualification, DNA matching can be an enormously effective investigative tool, assisting with identifying possible suspects, reducing investigative time and costs, identifying links between crimes, and exculpating the innocent. This has positive flow-on effects for the criminal justice system as a whole.

The Committee notes that DNA profiling is only one of a range of methods available to the police, and is most effectively used in conjunction with traditional policing methods. A match between a suspect’s profile and a crime scene profile is not sufficient to conclude that the suspect committed the offence. Barring fabrication of evidence or a coincidental match, the presence of the suspect’s DNA at the crime scene would confirm only that the suspect had been at the crime scene. Further evidence would be required to make the case against the suspect, particularly where identification of the suspect occurred by means of a database search.”<sup>11</sup>

Despite serious challenges to analytical methods and the statistical interpretation of the results, there is now general acceptance of DNA evidence and of more advanced systems of DNA analysis.<sup>12</sup>

5. The potential of DNA profiling has inspired law enforcement agencies around the world to establish DNA databases as a key policing strategy. During the past decade, the development of forensic DNA databases has been a priority of national and international law enforcement agencies. This policy is reinforced by INTERPOL, which is committed to facilitating the exchange of DNA related intelligence and has been working towards

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of 1 in 37 million, linked Mr. Raymond Easton to the crime. Mr. Easton was charged with the crime in August 1999, despite a lack of corroborating evidence. Indeed, the evidence was in the defendant’s favour, as he lived 200 miles away, suffered from advanced Parkinson’s disease, and was unable to drive and had a sound alibi. The match was shown to be a chance match when the Crown Prosecution Service requested more advanced profiling, using 10 loci, and the charges were dropped. *Vide* “The ‘British Mistake’”, Paper given at the Third Annual Canadian Symposium on Forensic DNA Evidence, 14 October 2000, tendered by Mr. Chris Puplick, 8 August 2001.

<sup>11</sup> Paragraphs 3.163 and 3.164.

<sup>12</sup> *Vide* D.H. Kaye, “The Science of DNA Identification: From the Laboratory to the Courtroom (and Beyond)” (2007) 8 *MINN. J.L. SCI. & TECH.* 409-427.

The *US Panel Seeking Restriction on Use of DNA in Courts* sought support, inter alia, from the 1<sup>st</sup> 1992 Report of the National Academy of Sciences (NAS) on DNA Technology in Forensic Science, which suggested improvements in quality control and assurance of forensic DNA analysis and called for more objective standards for declaring matches. The updated NAS Report in 1996 on “The Evaluation of Forensic DNA Evidence” concluded, whilst making recommendations for improvement of laboratory performance and statistical interpretation of results, that properly collected and analyzed data was reliable and valid [*Proc. Natl. Acad. Sci. USA* 94 (1997) 5498-5500].

the establishment of “an international criminal police DNA database”.<sup>13</sup> INTERPOL has been monitoring its members’ use of DNA profiling for some years and in 2003 published the results of its latest global survey of its members to ‘determine the extent of forensic DNA analyses internationally’.<sup>14</sup> The survey examined their legislative regimes, the regulation of forensic laboratories, the existence of DNA databases and any restrictions applying to data-sharing. Interpol found that during the 1990s there was a steady increase in the number of DNA sampling regimes. In 1991 approximately 30 countries had introduced forensic sampling for criminal investigations. By 2002, 72 countries were using DNA sampling for forensic purposes.<sup>15</sup> A total of 51 countries were recorded as having a national database, while a further 14 were at an advanced stage in planning for the establishment of such a database.<sup>16</sup>

6. Any proposed legislative framework for the taking of DNA samples and profiles and the creation of a DNA database must, however, sufficiently ensure that the perceived advantages for society in operating an intelligence DNA database to fight crime outweigh the perceived dangers to civil liberties that the forensic use of genetic information presents.<sup>17</sup> There is a need to balance individual rights with the rights of society in the

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<sup>13</sup> Pierre van Renterghem, Rudolf Kaniski and Werner Schuller, ‘Global Survey on the Use of DNA Analysis in Criminal Investigations’, *First DNA Users’ Conference*, 24 November 1999, Lyon, France. INTERPOL has adopted a technical standard based on the profiling system used in the United States of America for DNA profiles on the INTERPOL database. Background on the DNA Monitoring Expert Group (DNA MEG) is available on the INTERPOL website at <http://www.interpol.int/Public/Forensic/dna/Inquiry/Default.asp>.

<sup>14</sup> Susan Hitchin and Werner Schuller, *Global DNA Database Inquiry: Results and Analysis*, INTERPOL DNA Unit (2002) available at <http://www.interpol.int/Public/Forensic/dna/Inquiry/Default.asp>.

<sup>15</sup> *Ibid.*

<sup>16</sup> *Ibid.*

<sup>17</sup> UK’s Human Genetics Commission (HGC) [“Inside Information: Balancing Interests in the use of Personal Genetic Data” (May 2002)] recognized there are different categories of genetic information, which may range from non-sensitive to sensitive, for example the likelihood of the inheritance of a genetic disorder, such as cystic fibrosis or Huntington’s chorea. DNA testing may thus reveal the presence of a socially stigmatizing genetic disorder or unveil behavioural traits, such as the rape or murder gene (*ie* behavioural genetics). Testing may disclose information about significant future episodes and possibly shameful events, such as susceptibility to disease. DNA testing may also divulge information that an individual has chosen to keep confidential, such as sexual orientation. Such information could be misused if disclosed to other government departments or even private parties, such as employers or insurance companies: insurers or employers could use genetic information to deny cover or

prevention and detection of crime and the victim’s rights to have their attackers apprehended.<sup>18</sup>

7. Any proposed legislative framework must also be examined in the light of legislative developments, reports and studies in other jurisdictions.<sup>19</sup> The Commission has tried to take into account not only the present state of science and the forensic techniques flowing

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employment – and lead in effect to genetic discrimination. There is also the possibility that DNA testing may be misused in some way – the oft cited examples are in a degenerated eugenics movement and Nazi Germany’s racial hygiene programme, a murderous genocidal ‘ethnic cleansing’ campaign on a massive scale.

Vide also the 2003 Report of the Australian Law Reform Commission on ‘The Protection of Human Genetic Information in Australia’ [ALRC 96]; Dr. S.E. Hasnain, ‘DNA Fingerprinting: Ethical and Social Issues’ [Press Institute Lecture, CDFD, March 30, 2007].

<sup>18</sup> Vide, for instance, the Recommendation No. R (92) 1 of the Committee of Ministers of the Council of Europe to Member States, with regard to ‘The Use of Analysis of Deoxyribonucleic Acid (DNA) within the Framework of the Criminal Justice System’.

<sup>19</sup> We have paid particular attention to legislation and standards laid down in the following jurisdictions: (1) UK: section 64 of PACE as amended by the Criminal Justice and Police Act 2001, the Criminal Justice Act 2003, and the Serious Organized Crime and Police Act 2005; (2) US: legislation passed by Congress - DNA Identification Act 1994, Crime Identification Technology Act 1998, DNA Analysis Backlog Elimination Act 2000, Justice for All Act 2004 and DNA Fingerprinting Act 2005 - and other State legislatures, as well as the Standards laid down by the DNA Advisory Board and the recommendations made by the National Commission on the Future of DNA Evidence; (3) Australia (in particular the New South Wales Crime (Forensic Procedure) Act 2000 and subsequent amendments made in 2002, 2006 and 2007); (4) New Zealand: the 1995 Criminal Investigations Bodily Samples Act 1995, as subsequently amended, and Regulations made there under; (5) Canada (in particular the 1998 Federal DNA Identification Act and Regulations made there under); (6) France: the relevant provisions of the Code de Procédure Pénale on ‘identification génétique’; (7) India: the draft DNA Profiling Bill 2007, and the 2005 amendments effected to sections 53 and 53-A of the Code of Criminal Procedure; and Republic of Ireland: Criminal Justice (Forensic Evidence) Act 1990 and the draft Criminal Justice (DNA Database) Bill 2005.

We have also paid heed to relevant case law from the above jurisdictions and to the Annual Reports from the National DNA Databanks.

The following studies and reports have also retained our attention: (1) the 2004 Consultation Paper and the 2005 Report of the Law Commission of the Republic of Ireland on the Establishment of a DNA Database; (2) Report of the US National Commission on the future of DNA Evidence and also the publications of the US National Institute of Justice on DNA testing and DNA evidence, in the context of the President’s DNA Initiative for Advancing Justice through DNA Technology; (3) the 2003 Report of the Australian Law Reform Commission on ‘The Protection of Human Genetic Information in Australia’ [ALRC 96], in particular Part J thereof dealing with ‘Law Enforcement and Evidence’; (4) the 2004 Report of the Law Reform Committee of the Victorian Parliament of Australia on ‘Forensic Sampling and DNA Databases in Criminal Investigations’; (5) the 2002 Report of the Standing Committee on Law and Justice of the Legislative Council of New South Wales regarding the ‘Review of the Crimes (Forensic Procedures) Act 2000’.

from it, but also possible future scientific developments which would impact on the law in this field.<sup>20</sup>

**(C) Human Rights Requirements in relation to DNA Sampling/Profiling and the Operation of a DNA Database**

8. The scope of forensic sampling [that is under what conditions samples may be obtained and from whom, when can the profiles be retained, and whether the samples can and should be retained indefinitely] would very much depend on the balance which is being struck between the need for community protection, for the detection and solution of criminal activities, and for police to have access to technologies and information which are up to date, relevant, and which will assist them in the discharge of their responsibilities, against the need for there to be some limitation on the powers of police.
  
9. Whenever a person is requested to provide a biological sample for DNA profiling, three individual rights are likely to be interfered with: first, the right to privacy; secondly, the right to physical/bodily integrity; and thirdly, the privilege against self-incrimination. The extent to which the interference with the rights would be justified would depend on the interests of society in the prevention and detection of crime. The rights of third parties including the victim’s rights to have their attackers apprehended must also be considered.<sup>21</sup> Any interference with these rights would only be justifiable if shown to be proportionate to the legitimate aim of law enforcement.

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<sup>20</sup> This is an area where science may move more rapidly than legislation and in ways that may make “today’s certainties less obvious tomorrow and tomorrow’s discoveries perhaps more challenging to lawmakers than today’s knowledge might seem.” [Vide Office of the Victorian Privacy Commissioner *Submission to the Victorian Parliament Law Reform Committee on its Inquiry into Forensic Sampling and DNA Databases* (17 July 2002) at 34-35. Available at: [http://www.parliament.vic.gov.au/lawreform/.](http://www.parliament.vic.gov.au/lawreform/)]

<sup>21</sup> As pointed out by Lord Steyn in *Attorney-General’s Reference (No 3 of 1999)* [2001] 2 AC 91 at 118, a case concerning the admissibility of DNA evidence:

## The Right to Privacy

10. The right not to be subjected to arbitrary or unlawful interference with one’s privacy is guaranteed by Article 17 of the International Covenant on Civil and Political Rights [CCPR], to which Mauritius is a State party. This right is afforded protection by sections 3 and 9 of our Constitution.<sup>22</sup>
  
11. The right to privacy encapsulates the notion that individuals should be free to determine for themselves what information to disclose to others and also that individuals should be free to go about life without unnecessary intrusion by the State.<sup>23</sup> The right to privacy is plainly interfered with when people access genetic or other information about a person who does not want to reveal private matters or to be subjected to unnecessary intrusion into his personal affairs.

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“The purpose of the criminal law is to permit everyone to go about their daily lives without fear of harm to person or property. And it is in the interests of everyone that serious crime should be effectively investigated and prosecuted. There must be fairness to all sides. In a criminal case this requires the court to consider a triangulation of interests. It involves taking into account the position of the accused, the victim and his or her family, and the public.”

<sup>22</sup> Section 9(1) of the Constitution, which affords protection for privacy of home and other property, provides that, except with his own consent, no person shall be subjected to the search of his person or his property or the entry by others on his premises. Section 9(2)(a), however, is to the effect that a law may inter alia make provision in the interest of public order or public safety for the search of any person, except so far as that provision or, as the case may be, the thing done under its authority is shown not to be reasonably justifiable in a democratic society. Section 50(1) of the District and Intermediate courts (Criminal Jurisdiction) Act thus provides that a Magistrate may cause to be made any examination of the person of the accused as circumstances may require. Section 14(1)(b) of the Police Act is to the effect that where, in a case of urgency, communication with a Magistrate would cause delay that would defeat the ends of justice, a police officer, not below the rank of Assistant Superintendent, may call upon a Government medical officer, or other medical practitioner, to make such examination of the person of an alleged offender as the circumstances of the case may require.

<sup>23</sup> The right to privacy is the value at the heart of our individual autonomy. As pointed out by the Canadian Privacy Commissioner, it is “the right to be free from interference, from surveillance, from coercion by others who would use information about us to influence our decisions [and is] fundamental to maintaining a civil society – respecting one another by maintaining the distance which is essential to our individuality while living closely together... we are all entitled to expect enough control over what is known about us to live with dignity and to be free to experience our individuality.” [quoted by the Standing Committee on Law and Justice of the Legislative Council of New South Wales in its 2002 Report on the ‘Review of the Crimes (Forensic Procedures) Act 2000’ at p. 63]

12. The information contained in a DNA profile constitutes sensitive personal data, which is afforded protection by the Data Protection Act. The processing of such data is subject to data protection principles, though personal data processed for the prevention and detection of crime are exempt from some of those principles.
13. It has been suggested that DNA sampling involves intrusion into three forms of individual privacy: bodily privacy, where the sample is taken from a person’s body; genetic privacy, where predictive health and other information about the person is obtained from the sample; and behavioural privacy, where the information is used to determine where a person has been and what he/she has done.<sup>24</sup> DNA sampling may also impinge on familial privacy where information obtained from one person’s sample provides information regarding his or her relatives.

The processing of DNA profiles also allows authorities to assess the likely ethnic origin of a person. The possibility the DNA profiles create for inferences to be drawn as to ethnic origin makes their retention all the more sensitive and susceptible of affecting the right to private life.

14. One cannot also ignore the concerns of individuals about the possible use of private information retained by authorities, in particular bearing in mind the rapid pace of developments in the field of genetics and information technology. One cannot discount the possibility that in the future the private-life interests bound up with genetic information may be adversely affected in novel ways or in a manner which cannot be anticipated today.<sup>25</sup>

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<sup>24</sup> J Gans, Submission to the Victorian Parliament Law Reform Committee’s Inquiry into Forensic Sampling and the Use of DNA Databases in Criminal Investigations (2002), 2.

<sup>25</sup> Vide observation of European Court of Human Rights in *S & Marper v United Kingdom* [judgment of 4 December 2008] at para. 71; vide also Law Reform Commission of Ireland *Consultation Paper on the Establishment of a DNA Database* (2003), at paragraphs 5.06 seq.

15. The Office of the Victorian Privacy Commissioner in its 2002 submission to the Victorian Parliament Law Reform Committee Inquiry into forensic sampling and DNA databases had this to say on the issue of interference with privacy:

“Privacy and respect for human dignity need not be abandoned when balancing civil liberties with community safety. In many ways, privacy principles will enhance the integrity and legitimacy of DNA profiling by limiting collection to the minimum necessary to achieve the legitimate aims of law enforcement agencies, requiring its use to be in accordance with these aims, demanding secure storage of DNA material, and requiring its destruction or de-identification when the information is not needed ... Transparency and accountability reassure the community that what is sacrificed for greater safety and security is done so legitimately”

16. The Case Law of the European Court and Commission of Human Rights, in respect of Article 8 of the European Convention on Human Rights (ECHR) guaranteeing the right to privacy/respect for private life, is instructive as to the circumstances when interference with privacy/respect for private life would be viewed as justified. It has been held that the keeping of records, including documents, photographs and fingerprints, relating to criminal cases of the past is necessary in a modern democratic society for the prevention of crime, and is therefore in the interests of public safety.<sup>26</sup> But it has also been considered that in order for the retention of personal data by public authorities to be deemed proportionate and not constitute a violation of the right to privacy, safeguards must exist against the unlawful release of the information.<sup>27</sup> Seemingly, the use to which a DNA profile may be subjected and the safeguards in existence against misuse are important factors to be taken into account in applying any proportionality test to the retention of profiles on a national database. It is also apparent that the greater the amount

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<sup>26</sup> The European Commission on Human Rights decision in *X v Federal Republic of Germany* [Application No 1306/61] in respect of the alleged infringement of Article 8 ECHR [European Convention on Human Rights] safeguarding right to privacy.

<sup>27</sup> European Court of Human Rights decision in *Rotaru v Romania* [Application No. 28341/95, 5 May 2000 at paragraph 59].



of personal information contained in a DNA profile, the higher the protection that should be afforded to it.<sup>28</sup>

In *S & Marper v United Kingdom*<sup>29</sup>[judgment of 4 December 2008], the European Court of Human Rights acknowledged that the retention of fingerprints, cellular samples and DNA profiles may in general be regarded as justifiable as the fight against crime, in particular organized crime and terrorism, depends to a great extent on the use of modern techniques of investigation and identification. Indeterminate retention of samples and profiles of persons who had been suspected, but not convicted, of certain criminal offences, was regarded as unjustified since interference with rights was disproportionate to the legitimate aim pursued.

17. When determining the scope and limits of forensic sampling [whilst reconciling law enforcement and privacy interests], it is important to distinguish between the DNA sample and the DNA profile because they are stored, analyzed, used, transferred and destroyed in entirely different ways.

DNA sample consists of an actual tissue sample such as blood, semen, saliva, skin, hair root etc. It contains the full genetic information of the individual and has a greater potential to divulge personal information.<sup>30</sup> Public co-operation with law enforcement

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<sup>28</sup> In *Z v Finland* (1998) 25 EHRR 371, the Applicant was the spouse of a person accused of committing serious sexual offences. Her complaint concerned the introduction into her husband’s trial of her medical records, which explained her infection with the HIV virus. It was accepted that the interest in the investigation of crime could outweigh the confidentiality of the medical data. However, it was also stated that the more intimate the data, the greater the obligations imposed on the State to protect confidentiality.

<sup>29</sup> Applications Nos. 30562/04 and 30566/04.

<sup>30</sup> The Victorian Parliament Law Reform Committee in its Report on ‘Forensic Sampling and DNA Databases in Criminal Investigations’ (2004) at p. 124 considered there is the possibility that the sample collected for DNA profiling could also be used to obtain other personal information, such as the donor’s appearance or genetic predisposition, for criminal investigations; or for other purposes, such as research, employment or insurance related matters, not authorized when the DNA sample was obtained. It identified four ways in which the use of the sample could be regulated and, particularly, limited to the purposes for which it was originally collected. These were:

- requiring that the *purpose* for which a DNA sample may be collected, including the analysis that can be undertaken, is clearly specified;
- regulating *forensic access to and use* of DNA samples obtained for other purposes;
- requiring the *destruction of the sample* once the original purpose has been achieved; and/or

agencies might be jeopardized if members of the public believed that their DNA samples could be retained and used for purposes other than that for which they were collected. The retention of samples is particularly intrusive given the wealth of genetic and health information contained therein. Clear provision for the destruction of the sample when it is no longer required would ensure confidence in the integrity of a DNA sampling regime, and in the security of the material provided.

The DNA profile, derived from the tissue sample, is a numerical representation of 10 regions of repetitive DNA sequence which lie in the ‘junk’ DNA between a person’s genes. The DNA profile contains very little personal genetic information but it can show strong proof of parentage and relatedness.<sup>31</sup> The profile, while not capable of revealing personal information, can be more easily disclosed and re-used and there should be provisions as to the circumstances leading to its erasure on a DNA database.

### **The Right to Physical (Bodily) Integrity**

18. The right to physical (bodily) integrity is afforded protection in our law and is guaranteed by the Constitution. The European Court of Human Rights has held that any use of physical force on an individual detained by state authorities, which has not been made strictly necessary by the conduct of the detainee, will be contrary to Article 3 [on which section 7(1) of our Constitution, to the effect that “no person shall be subjected to torture or to inhuman or degrading punishment or other such treatment”, is modeled].<sup>32</sup>

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- regulating or prohibiting the *transfer of forensic material* to other agencies or jurisdictions.

<sup>31</sup> It is the non-coding areas of the DNA molecule (areas of DNA where there aren’t any genes) that are used in forensic work. The non-coding areas provide a more suitable basis for identification as there is more variation between individuals in these areas. However, there are examples where STR loci originally thought to be non-coding may be shown to reveal quite personal information about the source. Thus, the prospect that a forensic profile may be interpreted and that sensitive information may be derived is not an entirely remote prospect. One must be cautious in claiming that a forensic profile will never give rise to privacy concerns.

<sup>32</sup> *Ribitsch v Austria* (1995) 21 EHRR 573 at para. 38.

Taking of samples can be justified in the interests of preventing crime and disorder, so long as the interference with the right to physical integrity is proportionate with the aim pursued.<sup>33</sup> US cases have held that it is easier to justify an interference with a convicted person’s bodily integrity rights than a mere suspect’s rights.<sup>34</sup> The justification given for this in the US cases is that analysis of a convicted person’s DNA could be necessary to solve previous crimes and it is also more likely that a person previously convicted of a crime will commit a further offence. Consequently, it is easier to satisfy the proportionality test in respect of a convicted person than in the case of a person who is merely a suspect. These principles must be considered when examining whether and if so, when is it permissible for reasonable force to be used to extract samples from suspects.

### **The Privilege against Self-Incrimination (Right to silence)**

19. The freedom from coerced self-incrimination is protected as an aspect of the right to a fair hearing in the determination of criminal charges under section 10(7) of the Constitution and is implied in the right to be presumed innocent until proven guilty under section 10(2)(a) of the Constitution.<sup>35</sup> The Constitution, no doubt, confers on any accused the sacred right to remain silent but the Constitution does not forbid our Courts to draw, in appropriate cases, certain inferences from an accused’s silence when the circumstances

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<sup>33</sup> Vide *Peters v Netherlands* (Application 21132/93) 77-A DR 75 EComHR , and *X v Netherlands* (Application No. 5239/78) 16 DR 184.

<sup>34</sup> *Shaffer v Saffle* 101 F3d 1336 (10th Cir 1996), *Boling v Romer* 148 F3d 1180 (10th Cir 1998).

<sup>35</sup> In *Ramdeen v. R* (1985) MR 125, the Court held that the right of an accused to silence, whether from the beginning of his arrest at the enquiry stage or throughout the proceedings at the trial stage, is a fundamental principle of our criminal law. The Court considered that:

"This right is founded on the constitutional presumption of innocence. For this reason, an accused person is cautioned at the enquiry stage before he is questioned.<sup>35</sup> For this reason as well, at the trial stage, he is reminded by the Court, if he is not represented by counsel, that it is his right to remain silent or else to make a statement from the dock or to depose, if he so wishes."

are such that one would expect some form of explanation from him/her.<sup>36</sup> In *Averill v United Kingdom* [ECHR 6 June 2000], the European Court of Human Rights explained that the question whether the drawing of adverse inferences from an accused party’s silence infringes article 6 of the European Convention on Human Rights [on which section 10 of the Constitution is modeled] is to be determined in the light of all the circumstances of the case, having regard to the situations where inferences may be drawn, the weight attached to them by the national Courts in their assessment of the evidence and the degree of compulsion inherent in the situation.

20. DNA profiling leads to the recognition of links between individuals and particular crimes by comparing DNA profiles, obtained from those individuals and stored on a database, with DNA profiles obtained from crime scenes. The issue is whether compulsorily obtaining a DNA profile from a suspect infringes the privilege against self-incrimination. The question for consideration is whether the privilege against self-incrimination extends beyond the traditional gathering of “testimonial evidence” to cover “real evidence”. In *Saunders v United Kingdom*,<sup>37</sup> the European Court of Human Rights accepted that there was a distinction between the right of the accused person to remain silent and the use in criminal proceedings of material obtained through the use of compulsory powers but which has an existence independent of the will of the suspect for example breath, urine or

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<sup>36</sup> In *Ramdeen v R* (1985) MR 125, it was pointed out that that the right to silence does not prevent a court to consider effect of a failure to depose:

“The right of an accused person to silence, however, only means that the burden of proving his guilt beyond reasonable doubt is cast squarely on the prosecution. And no accused person should be expected to explain or contradict until so much has been proved as to justify the reasonable conclusion of his guilt, in the absence of an explanation, which it is, and must remain, within the province of the trial court to accept or reject. And where an explanation has been given by an accused person in the course of the enquiry, its weight or otherwise when pitted against the evidence adduced by the prosecution may depend on a number of factors, including on when it was given as well as on whether it was given on oath even though it may be forth-coming for the first time at the trial.”

See also *Fullee v. R* (1992) MR 1, where the Court observed that the Constitution, no doubt, confers on any accused the sacred right to remain silent but the Constitution does not forbid our Courts to draw, in appropriate cases, certain inferences from an accused’s silence when the circumstances are such that one would expect some form of explanation from him. In *Jannoo v. State* (2000) SCJ 30, the Court considered that it is in no way improper, and it does not infringe an accused’s right to silence under section 10 (7) of our Constitution, for a Magistrate to convey the idea that, after the prosecution had established a *prima facie* case, one would expect the accused, on whom a tactical burden lay, to offer some evidence in rebuttal.

<sup>37</sup> (1996) 23 EHRR 313.

bodily samples.<sup>38</sup> The right not to incriminate oneself was held not to apply to such real evidence samples. The taking of a bodily sample does not, therefore, constitute an interference with the privilege against self-incrimination.<sup>39</sup>

21. The potential for self-incrimination occurs, however, when a suspect is requested to consent to a procedure, rather than in any evidence obtained from the sample. An individual may incriminate himself/herself when asked to consent to a DNA test, if he/she appears anxious about what the test may reveal and where investigators seek to rely on a refusal to consent to a forensic procedure as a sign that the individual has “something to hide”. This would constitute what is referred to as ‘DNA request surveillance’<sup>40</sup> and might breach the privilege against self-incrimination. The revealing of the negative reaction to the request for a sample could be regarded as self-incriminatory as it can support an inference that the individual is guilty of crime. It is clear that DNA request surveillance is a form of compelled rather than voluntary self-incrimination. Recipients of a request can either submit to that request or reveal their fear of that surveillance. There is no real choice in these circumstances. This could arise, for example, in respect of a suspect who is asked to give voluntarily a sample or in relation to a situation of mass screening where the whole population in a particular area is requested to give a sample. In such a case, the suspect or other person cannot reveal his or her reluctance to give a sample without incriminating himself or herself. This is different to the case where a suspect is compelled to submit a sample as the recipient of this coercive request is not revealing anything by his or her reluctance to give a sample. In the event of the privilege against self incrimination being breached, the unconstitutionally obtained evidence

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<sup>38</sup> There is judicial consensus to the effect that the privilege only applies to the gathering of testimonial evidence. It has been held by the English Court of Appeal in *R v. Smith* [1985] Criminal Law Review 590 that the taking of bodily samples does not breach the privilege against self-incrimination. This approach has also been followed in the US. As observed by Holmes J in *Holt v US* (1910) 218 US 245 at 252-253 “the prohibition on compelling a man in a criminal court to be witness against himself is a prohibition of the use of physical or moral compulsion to exert communications from him not an exclusion of his body as evidence when it may be material”.

<sup>39</sup> Vide on this issue discussions of Law Reform Commission of Ireland, *Consultation Paper on the establishment of a DNA Database* (LRC CP29 – 2004), at pp. 70 seq.

<sup>40</sup> This is defined by Gans in “Something to Hide: DNA, Surveillance and Self-Incrimination” (2001) *Current Issues in Criminal Justice* 168 at 168 as a technique which “allows the observation of individuals’ fear of a match between their DNA and material connected with a past (or future) crime, by assessing their response to a request to provide a DNA profile voluntarily”.

should be excluded from court. Consequently this evidence can only be used for investigative purposes.

The potential interference of DNA request surveillance with the privilege against self-incrimination has to be taken into consideration if it is contemplated to legislate on the situations in which DNA sampling can take place and the inferences that can be drawn from a refusal to consent to sampling. In deciding on the extent of permissible interference with this privilege by the legislature, one would have to bear in mind the constitutional principles at stake, as discussed above.

## **(D) Specific Policy Issues relating to DNA Sampling/Profiling, its Forensic Use and the Operation of a DNA Database**

### **(1) Safeguards in respect of DNA Sampling and Retention of DNA Samples/Profiles**

22. The forensic use of DNA implies the taking of biological samples and its analysis to yield a profile. The composition of any database of DNA profiles is primarily dependant on whether the authorities may lawfully obtain a bodily sample from an individual from which a profile can be generated. Thereafter, the question arises to what extent the profile and samples could be retained. The composition of a DNA database would very much depend on whether the authorities are permitted to retain the profile for storage and search on a database.

It is in the public interest that the taking, as well as the retention of DNA profiles, should only occur under a clear legislative framework. It is essential to have clear, detailed rules governing the scope and application of measures, as well as minimum safeguards

concerning, *inter alia*, duration, storage, usage, access of third parties, procedures for preserving the integrity and confidentiality of data and procedures for its destruction, thus providing sufficient guarantees against the risk of abuse and arbitrariness.<sup>41</sup>

23. Before examining the categories of persons whose profiles could be retained on a DNA database, it is useful to examine the underlying rationale and justifications for the sampling and retaining of DNA profiles since they purport to justify the interference with the rights to privacy and bodily integrity that the taking of samples and their retention necessarily entails.

(a) Justifications for Taking of Samples and Retention of Samples/Profiles

24. The first justification for obtaining a DNA profile is that it would ‘tend to prove or disprove involvement in an offence’. In other words, the profile must have some ‘evidential significance justification’ in the investigation, for example because biological material thought to have emanated from the perpetrator has been found at the scene of crime. Comparator profiles are required not only to identify a potential suspect, but also to eliminate from further investigation as a prime suspect those who have been present innocently at the scene. Where a hair root sample (from which a profile may be generated) is found at the scene of a homicide in a house, it is essential to establish that the hair does not belong to anyone living in (or perhaps even those who have recently visited) the house. If the hair root sample is unaccounted for, in the sense that the source has not been identified as emanating from those innocently present, then perhaps in the absence of other evidence, this may provide a vital lead to the investigators. If an individual was observed close to the scene of the homicide, then a comparator sample would be required from that person in order to carry out a comparison with the supposed “crime stain” or hair root profile so as to determine whether that person or that person’s hair can be placed at the scene. This justification, which is in the main applicable to

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<sup>41</sup> *S & Marper v United Kingdom* [Judgment of European Court of Human Rights on 4 December 2008], at para. 99.

*obtaining* samples, is particularly cogent in relation to the investigation of past and present crimes. This is because a profile may be compared to those profiles generated from biological material found at the scene of either the present crime or an historic crime. However, in relation to the investigation of a future crime, any evidential significance that the profile may have is speculative.

25. Where the concern is with facilitating the detection of future crimes, the principal rationale is the intelligence gathering or database justification, which is more broadly applicable to *retaining* profiles than obtaining them. This argument is that retaining profiles, especially on a database in a searchable format, is not only a useful intelligence tool for investigating crimes which have been committed but also could have some deterrent value as regards the criminal activity of those whose profiles are stored on the database. The tool therefore has a dual function. As regards the first function, the storage of profiles has two applications: first, where there is no match between the scene of crime stain profile and any of the database profiles, the investigatory authorities may exclude those individuals whose profiles are stored from further investigation; and secondly, where there is a match between a profile from a crime scene stain and a database profile, this provides useful intelligence to investigators, who may then seek to detain and question the individual concerned. This latter application may also be more broadly described as enabling the State to combat recidivism or ensure that those who repeatedly re-offend are apprehended quickly and dealt with appropriately. Secondly, it is also possible that the storage on a database of profiles may have a deterrent effect on those contemplating criminal activity although in most cases this seems rather far-fetched (especially considering that proportionately a large number of offenders for which DNA evidence would be relevant would be sexual assaults). The effectiveness of profiling and the storage of profiles on a database are such that perpetrators are likely to be identified and linked to a crime even through the discovery of a single hair root sample at the scene. Although, it should also be noted that the countervailing argument is that criminals may become more adept at preventing their biological material being left at the scene of crime in the first place. The difficulty is where one should draw the line: just because the



storage of DNA profiles on a database may fulfill these two functions of detection and deterrence, can this justify retaining profiles across a broad spectrum of circumstances or for that matter justify the retention of everyone’s DNA profile? This is as much a policy matter as it is a jurisprudential question.

26. The third justification for DNA profiling is the need to establish the true identify of the individual concerned. This was one of the main justifications provided by the Minister for Constitutional Affairs and Lord Chancellor, Lord Falconer, to the UK Parliament’s Joint Committee on Human Rights in explaining the proposals contained in the Government’s *Criminal Justice Bill* to further extend the power to take and retain fingerprints and samples.<sup>42</sup>

(b) Suspects

***Sampling/Profiling:-***

27. The issue is whether or not a non-consenting suspect may be obliged to provide a forensic sample from which a profile may be generated and, if so, in what circumstances. In democratic societies, it has been considered justifiable to compulsorily resort to DNA sampling on a non-consenting suspect when:

- (a) a serious offence [involving offences committed with violence, such as murder or manslaughter, and sexual offences] has been committed;
- (b) material against which the sample can be compared has been found at the crime scene, on an object or person associated with the offence, or on the victim; and

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<sup>42</sup> Joint Committee on Human Rights *Eleventh Report of Session 2002-03 Criminal Justice Bill: Further Report* (9 June 2003 HL Paper 118 HC 724) at paragraph 48. These amendments make sampling part of the ‘booking procedure’ that is carried out when someone is detained on suspicion of involvement in an offence.

- (c) there are reasonable grounds to believe that the conduct of the procedure on the person may tend to confirm or disprove his or her involvement in the commission of the offence.

Judicial safeguards are generally provided: only a court can order the taking of a sample on a non-consenting suspect and its DNA profiling.

28. The usual international practice has been to concentrate on obtaining samples from those suspected of the most serious of offences.

Under the Canadian *Criminal Code* a warrant to obtain bodily samples may only be obtained if there are reasonable grounds to believe that a “designated offence” has been committed.<sup>43</sup> Designated offences, which fall into the two categories of primary and secondary, are enumerated in the *Criminal Code* and include the more serious crimes, such as facilitating terrorist activity, murder, manslaughter, sexual assault (which are primary), child pornography, indecent acts and assault (which are secondary).<sup>44</sup>

In New Zealand, section 13 of the Criminal Investigations (Bodily Samples) Act 1995 [as amended in 2003] permits an order only in respect of a ‘relevant offence’, which includes offences against life, integrity (including sexual integrity) and property.

In New South Wales section 3 of the *Crimes (Forensic Procedures) Act 2000* provides that a DNA sample may only be obtained from individuals who are suspected of a “prescribed offence” or who have been convicted of a serious indictable offence. A prescribed offence is defined as an indictable offence or any other offence that the State has prescribed by regulation. Although the scope of DNA sampling procedures may be

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<sup>43</sup> Section 487.05 of the *Criminal Code*.

<sup>44</sup> Section 487.04 of the *Criminal Code*.

widened by the State passing regulations designating offences, sampling is concentrated on the more serious offences.<sup>45</sup>

29. Originally in England and Wales the *Police and Criminal Evidence Act 1984* (“PACE”), which governs the powers of the police, set the threshold at the level of a ‘serious arrestable offence’.<sup>46</sup> This threshold has been lowered by subsequent amendments<sup>47</sup> to a ‘recordable offence’.<sup>48</sup> A recordable offence is one which is potentially punishable with imprisonment of any length as well as certain other specified offences such as loitering or soliciting for the purposes of prostitution, possessing a weapon with a blade or a point in a public place, or tampering with a motor vehicle. The result of this shift in the requisite level of seriousness of offences has been that the number of profiles stored on the database has increased exponentially since 1995.

It should, however, be emphasized that the law applicable in England and Wales is the exception rather than the rule and that the majority of States confine forensic sampling to the more serious offences. The position in the UK has in fact attracted considerable

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<sup>45</sup> Indeed, the Parliament of New South Wales Legislative Standing Committee on Law and Justice in its Review of the *Crimes (Forensic Procedures) Act 2000* (“NSW Review”) considered that less serious summary offences should not result in DNA sampling and recommended that no additional offences be prescribed for the purposes of section 3. [Parliament of New South Wales Legislative Standing Committee on Law and Justice *Review of the Crimes (Forensic Procedures) Act 2000* Report No 18 (February 2002), at p. 79, recommendation 13]. The NSW Review also expressed concern about the use of secondary legislation to expand the range of offences that might result in a suspect being subjected to a forensic procedure and took the view that such public policy decisions should be made only after full parliamentary debate. Accordingly, the NSW Review recommended that the Attorney-General remove the enabling provision from section 3, thus ensuring that any further prescribed offences are added only after debate and by primary legislation.

<sup>46</sup> The definition of “serious arrestable offence” is set out in section 116 of the *Police and Criminal Evidence Act 1984*. This section divides these offences into two categories. The first category provides for the offences that are so serious that they will always constitute “serious arrestable offences”. These offences are set out in Schedule 5, Parts I and II of the Act. An example of such an offence is murder. Any other arrestable offence is serious only if its commission has led or is likely to lead to any of the consequences specified in subsection (6) – namely: (a) serious harm to the security of the State and public order; (b) serious interference with the administration of justice or with the investigation of offences; (c) the death of anyone; (d) serious injury to anyone; (e) substantial financial gain to anyone; and (f) serious financial loss to anyone in the sense that having regard to all the circumstances, it is serious for the person suffering loss.

<sup>47</sup> The *Criminal Justice and Public Order Act 1994*, and later the *Criminal Justice and Police Act 2001*.

<sup>48</sup> See section 62(2)(a) of the PACE Act 1984, as amended.

criticism. Indeed the Human Genetics Commission commented that “the emphasis in forensic profiling should primarily be on its use for serious criminal offences particularly those involving personal injury to another”.<sup>49</sup> The Commission expressed concern that DNA samples could be compulsorily taken from those suspected of minor offences for example shoplifting and fraud. It encouraged a greater public dialogue on the issue and urged the UK Government to review their decision to increase the range of offences for which a sample may be taken.

30. In addition to the offence being a serious one, the practice in democratic societies has been to require as a condition for compulsory testing on a non-consenting suspect that the DNA test would serve some useful evidential purpose, hence the need for a crime scene sample to be available.<sup>50</sup>

For instance, under section 13(2)(b) of the New Zealand Criminal Investigations (Bodily Samples) Act 1995 an application for a suspect compulsion order must include facts relied on to show there are reasonable grounds to believe that analysis of a bodily sample taken from the suspect would tend to confirm or disprove his/her involvement in the commission of the offence.

Under section 487.05(1) of the Canadian Criminal Code, a compulsion order may only be made by a provincial court judge when there are reasonable grounds to believe that

- (a) a designated offence has been committed,
- (b) a bodily substance has been found or obtained (i) at the place where the offence was committed, (ii) on or within the body of the victim of the offence, (iii) on anything worn or carried by the victim at the time when the offence was committed, or (iv) on or within

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<sup>49</sup> Human Genetics Commission *Inside Information: Balancing Interests in the Use of Personal Genetic Data* (May 2002) at paragraph 9.18.

<sup>50</sup> Vide observations of Parliament of New South Wales Legislative Standing Committee on Law and Justice in its Report on the Review of the *Crimes (Forensic Procedures) Act 2000* at para. 5.20 [recommendation 12]. Also observations of the Victorian Parliament Law Reform Committee in its Report on ‘Forensic Sampling and DNA Databases in Criminal Investigations’ (2004) at pages 216 seq.

the body of any person or thing or at any place associated with the commission of the offence,

(c) that a person was a party to the offence, and

(d) that forensic DNA analysis of a bodily substance from the person will provide evidence about whether the bodily substance referred to in paragraph (b) was from that person.

31. Most jurisdictions adopt a system whereby court orders are required for testing non-consenting suspects, rather than police orders, as this presents a higher level of protection and ensure that compulsory DNA samples are taken only where justified.<sup>51</sup>The Victorian Parliament Law Reform Committee on ‘Forensic Sampling and DNA Databases in Criminal Investigations’ (2004), examined the desirability of permitting police compulsion orders as an alternative to court orders and had this to say at pages 226 seq:

“The Committee accepts that judicial supervision of the sampling of suspects provides a buffer between the suspect and the law enforcement agency. It ensures that the interests of law enforcement are weighed against the rights and interests of the defendant impartially. The Committee also believes that the considerations taken into account by courts in determining relevant suspect applications achieve the purpose of judicial supervision of this process: they ensure that the taking of the sample occurs where there are grounds for suspicion that the person has been involved in the commission of a serious indictable offence. The Inquiry notes that the requirements do not impose onerous burdens of proof on the police applicant, as the ‘reasonable suspicion’ test is lower than would apply in criminal trials.

From a public policy perspective, the Inquiry sees the current system of court orders as affirming a connection between the taking of the sample and its forensic utility in a specific investigation. This serves to ensure that the primary purpose of DNA sampling of suspects remains the detection of offences for which they have already been identified as suspects. Finally, the Inquiry notes that as relatively few orders are sought, the court order system does not impose administrative or resource burdens on the court or on investigators. The Inquiry therefore recommends that the current provisions in relation to the requirement for court orders for compulsory forensic procedures involving relevant suspects be retained.”

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<sup>51</sup> Vide section 13 New Zealand Criminal Investigations (Bodily Samples) Act 1995; section 487.05 Canadian Criminal Code.

32. The Supreme Court of Canada had the opportunity in *R v S.A.B* [2003] 2 S.C.R. 678 to consider the constitutionality of DNA warrant provisions, regarding the obtaining of a DNA sample and profile from a non-consenting suspect, in sections 487.04 to 487.08 of the Criminal Code.

Sections 487.04 to 487.09 of the *Criminal Code* deal with the issuance of search warrants for the purpose of seizing bodily substances for forensic DNA testing. The process of obtaining a DNA warrant is commenced under s. 487.05 by sworn information presented *ex parte* to a provincial court judge.

Section 487.05(2) provides that in considering whether to issue the warrant, the judge must also consider “all relevant matters”, including but not limited to:

- (a) the nature of the designated offence and the circumstances of its commission; and
- (b) whether there is a peace officer or other person under the direction of a peace officer, who is qualified (by training or experience) to collect the bodily substance (s. 487.05(2)).

The investigative procedures to be used in taking samples are delineated in s. 487.06(1). The following means may be used to take bodily samples:

- (a) the plucking of individual hairs including the root sheath (this includes the plucking of pubic hairs, as is suggested in the French version of the provision by the use of the word *poils*);
- (b) the taking of buccal swabs by swabbing the lips, tongue and inside cheeks of the mouth; and
- (c) the taking of blood by pricking the skin surface with a sterile lancet.

Section 487.06(2) additionally requires that a warrant include any terms and conditions that the provincial court judge “considers advisable to ensure that the seizure of a bodily substance authorized by the warrant is reasonable in the circumstances”.

Before executing the warrant, a peace officer must inform the person from whom the sample will be taken of five matters (six in the case of a young person), namely:

- (a) the contents of the warrant;
- (b) the nature of the investigative procedure by which the samples are to be taken;
- (c) the purpose of taking the samples;
- (d) the authority to use as much force as is necessary in executing the warrant;
- (e) the possibility that the results of the DNA analysis may be used in evidence (s. 487.07(1)). (The additional rights of a young person are outlined under s. 487.07(4).)

In the case of a young person against whom a warrant is executed, in addition to any rights arising from detention (s. 487.07(2)), the minor has the right to a reasonable opportunity to consult with and have present at the time the warrant is executed, counsel and a parent or person in lieu of a parent (s. 487.07(4)). A young person may waive these rights, but such a waiver must be recorded on audio or video tape or otherwise or made in writing with a statement signed by the minor that he or she has been informed of the right being waived (s. 487.07(5)).

Section 487.08(1) restricts the use of bodily substances collected under a warrant except for forensic DNA analysis in the course of an investigation. The results of such DNA analysis may only be used in the course of an investigation of the designated offence (s. 487.08(2)). Contravention of either subs. (1) or subs. (2) is an offence punishable on summary conviction (s. 487.08(3)).

33. The Court held that the DNA warrant provisions are in conformity with section 8 of the Canadian Charter of Rights and Freedoms, which provides that “everyone has the right to be secure against unreasonable search and seizure”. The Court had this to say:

“The reasonable expectation of privacy protected by s. 8 requires assessing whether the public’s interest in being left alone must give way to the government’s interest in advancing its goals, notably law enforcement. Balancing these interests requires a system of prior authorization of a warrant by a decision maker capable of balancing the interests at stake and acting judicially. The DNA warrant scheme fulfills this requirement. The *Criminal Code* also restricts DNA

warrants to designated offences and requires that the judge be satisfied that it is in the best interests of the administration of justice to issue the warrant.

Generally, the DNA provisions appropriately balance the public interest in law enforcement and the rights of individuals to dignity, physical integrity, and to control the release of personal information about themselves. The state’s interest in the scheme is significant. DNA evidence has enormous power as an investigative tool and may exonerate an accused. Effective law enforcement benefits society and law enforcement is interested in arriving at the truth in order to bring offenders to justice and to avoid wrongful convictions. With regard to privacy, although the taking of bodily samples under a DNA warrant clearly interferes with bodily integrity, under a properly issued warrant, the degree of offence to the physical integrity of the person is relatively modest. The requirement that a warrant shall include any terms and conditions advisable to ensure that the seizure is reasonable alleviates any concern that the collection of bodily substances constitutes an intolerable affront to the physical integrity of the person.

The informational aspect of privacy is also clearly engaged by the taking of bodily samples under a DNA warrant, however the DNA samples are collected for a clearly articulated, limited purpose. Only non-coding DNA is used and DNA analysis is conducted solely to compare identifying information to an existing sample. The DNA warrant scheme also explicitly prohibits misuse of DNA information.

The *ex parte* nature of the proceedings does not render the legislation unconstitutional. *Ex parte* proceedings are constitutionally acceptable as a norm because of the risk that a suspect might take steps to frustrate the execution of a warrant. There is also no reason to import a constitutional imperative that DNA warrants should only be available as a last resort when the state cannot investigate effectively with less intrusive techniques. DNA searches are specific to an accused and may exonerate him early in the investigative process. Unnecessary warrants are prevented by the requirement that a warrant must be in the best interests of the administration of justice. Finally, the “reasonable grounds” standard that is appropriate for ordinary warrants is sufficient for DNA warrants. This standard is well recognized at law and there is no reason to adopt a higher standard for DNA warrants.”



***Retention of Profiles:-***

34. The question arises as to the retention on a database of the DNA profile of suspects who are not subsequently convicted. The European Court of Human Rights in *S & Marper v United Kingdom*<sup>52</sup>[judgment of 4 December 2008] had the opportunity to address this issue. It considered the interference with rights to privacy/respect for private life would not be justified when the material may be retained irrespective of the nature or gravity of the offence with which the individual was originally suspected or of the age of the suspected offender. It would also not be justified when the retention is not time-limited: when the material is retained indefinitely whatever the nature or seriousness of the offence of which the person was suspected and there exist only limited possibilities for an acquitted individual to have the data removed from the nationwide database or the materials destroyed; in particular, there is no provision for independent review of the justification for the retention according to defined criteria, including such factors as the seriousness of the offence, previous arrests, the strength of the suspicion against the person and any other special circumstances.<sup>53</sup>

35. It is worthy to note that in New Zealand, the *Criminal Investigations (Bodily Samples) Act 1995* provides for the destruction of DNA samples and related records on acquittal, or on withdrawal of a charge.<sup>54</sup> Under section 60(f) a sample must be destroyed 12 months after it has been taken if within that period there has been no charge in relation to the investigation. Section 61 of the Act allows for the extension, on an application to the High Court, of the period within which a sample may be retained, where a person has not been charged with an offence within 12 months of the taking of the sample. In order to extend the period of retention, the High Court judge must be satisfied that there is still good cause to suspect that the person committed the offence, that there is good reason

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<sup>52</sup> Applications Nos. 30562/04 and 30566/04.

<sup>53</sup> At para. 199.

<sup>54</sup> See section 60(d).

why he or she has not yet been charged, and that it is important to the investigation of the offence that the bodily sample and the profile be retained.

36. In Australia, Victorian legislation permits use of the suspect’s profile for a period of twelve months from the date of the forensic procedure. This means that for twelve months the profile can be compared not only to the crime scene for the investigation for which it was obtained, but can be compared on the database with the profiles of other unsolved crimes. At the end of the twelve-month period, the profile must be destroyed or a court order obtained for its retention. A court order can be granted for the retention of the suspect’s profile on the database, if:

- the suspect has been found guilty of an offence for which the DNA evidence was relevant; or
- the taking of the sample may include or exclude the person from an investigation in relation to an indictable offence.

If a retention order is granted, the reference sample and related information may be retained on the database as specified in the order. A retention order cannot be sought after the suspect has been acquitted, eliminated from the investigation, or if charges are not laid or withdrawn.<sup>55</sup>

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<sup>55</sup> Victorian Parliament Law Reform Committee on ‘Forensic Sampling and DNA Databases in Criminal Investigations’ (2004) at page 244.

The Committee considered proposals for the indefinite retention and unrestricted use of a suspect’s profile on the database, whether or not a finding of guilt is entered in relation to the investigation, as well as for a more restrictive use of a suspect’s sample prior to the conclusion of the investigation for which the DNA profile was obtained. The Committee concluded that the current provisions effectively recognize the desirability of making forensic use of the DNA evidence available from the investigation while also providing safeguards against the retention and use of profiles belonging to persons who have been eliminated from the investigation or who have been acquitted of the charges laid. The Committee therefore recommended [at page 252] there was no need to change the current Victorian provisions.

(c) Convicted Offenders

37. The advantages of sampling convicted people are twofold. First, the profiles obtained can be checked against profiles of past crime scene stains to see if the convicted person had some link with these offences. Secondly, the storing of the profiles on the database could in the future implicate a convicted person in a crime and could consequently, although arguably improbably, deter the convicted person from committing a crime. The taking of samples from convicted persons [and the retention of profiles of suspects when they are convicted] serves both the intelligence gathering or database justification and the true identity justification for DNA sampling/profiling. The question is whether the sampling and retention of profiles of convicted persons is justifiable, where their DNA profile has not been obtained as a suspect.
38. A preliminary issue is whether the proposed scheme for sampling should be prospective. The prohibition against retrospective criminal legislation, enshrined in section 10(4) of the Constitution, concerns the imposition of a penalty that was not available at the time the offence was committed. Should the obligation to submit to a DNA test be viewed as an additional penalty to that imposed on conviction? The sampling requirement is to be regarded as merely preventive rather than punitive. This is evident from *Ibbotson v United Kingdom*<sup>56</sup> where the European Commission on Human Rights held the registration requirements for the *Sex Offenders Act 1997* were preventive rather than punitive and therefore not a ‘penalty’. It is just a form of evidence, which has been collected using a more sophisticated device than was available at the time of the offence. There is, therefore, no constitutional impediment to the taking of a sample from a person who is at present convicted of an offence.

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<sup>56</sup> Application No. 40146/98 21 October 1998; [1999] *Crim LR* 153.

39. Section 487.055(1) of the Canadian Criminal Code permits retrospective applications. A provincial court judge may, on an *ex parte* application, authorize the collection of DNA samples from previously convicted and sentenced offenders who, on the date of the application, are still serving a sentence of imprisonment of at least two years for one or more of those offences.<sup>57</sup>

In *R v Rodgers* [2006] 1 S.C.R 554, the Supreme Court of Canada considered that section 487.055(1) of the Criminal Code does not infringe section 8 of the Canadian Charter of Rights and Freedoms. The Court said:

“While the taking of bodily samples for DNA analysis without consent constitutes a seizure within the meaning of s. 8 of the *Charter*, the collection of DNA samples for data bank purposes from designated classes of convicted offenders is reasonable. These samples may only be used in order to create profiles in the DNA data bank ... The provisions put DNA technology to use to identify offenders in a manner analogous to fingerprinting and other identification measures. Society’s interest in using this powerful new technology to assist law enforcement agencies in the identification of offenders is beyond dispute. The resulting impact on the physical integrity of the targeted offenders is minimal. Furthermore, in restricting the use of DNA sampling for data bank purposes to an identification tool only, Parliament has adequately answered any heightened concern about the potentially powerful impact that DNA sampling has on the informational privacy interests of the individual. In this case, R had no reasonable expectation of privacy in respect of his identity. Section 487.055 targets dangerous convicted offenders. Since R’s identity as a multiple sex offender has become a matter of state interest, he has lost any reasonable expectation of privacy in the identifying information derived from DNA sampling. The data bank provisions strike an appropriate balance between the public interest in the effective identification of persons convicted of

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<sup>57</sup> There are three categories of convicted offenders in respect of which a judicial authorization to seize DNA samples may be obtained for data bank purposes. First, s. 487.051 applies in respect of offenders convicted of a designated offence after the proclamation of the *DNA Identification Act 1998*. Second, s. 487.052 deals with convicted offenders who have committed a designated offence prior to the proclamation of the *DNA Identification Act* but are still before the court. (Designated offences are defined under s. 487.04 of the *Criminal Code* and, in general, may be described as the more serious offences under the *Criminal Code* in respect of which it may reasonably be expected that DNA may be left behind by the offender.) Third, s. 487.055 applies to three classes of offenders who have been convicted and sentenced prior to the proclamation of the *DNA Identification Act*: (a) persons already declared to be “dangerous offenders”; (b) persons convicted of “more than one murder committed at different times”; and (c) persons convicted of “more than one sexual offence” and who, on the date of the application, are still serving a sentence of imprisonment of at least two years for one or more of those offences. (The list of targeted offenders has since been expanded by deleting the requirement that there be “more than one murder committed at different times” and by including dangerous sexual offenders and persons convicted of manslaughter who, on the date of the application, are still serving a sentence of imprisonment of at least two years for that offence (S.C. 2005, c. 25, s. 5).)

serious offences and the rights of individuals to physical integrity and privacy ... The *ex parte* hearing is a constitutionally valid legislative option.”

The Court was also of the opinion that section 487.055(1) of the *Code* does not infringe section 11(h) or 11(i) of the *Charter*.<sup>58</sup> This is what the Court had to say on the issue:

“These sections are inapplicable because the taking of DNA samples does not constitute a punishment within the meaning of s. 11. The word “punishment” under ss. 11(h) and 11(i) does not necessarily encompass every potential consequence of being convicted of a criminal offence. As a general rule, a consequence will constitute a punishment when it forms part of the arsenal of sanctions to which an accused may be liable in respect of a particular offence and the sanction is imposed in furtherance of the purpose and principles of sentencing. A DNA sampling is no more part of the arsenal of sanctions to which an accused may be liable in respect of a particular offence than the taking of a photograph or fingerprints. The fact that the DNA order may have a deterrent effect on the offender does not make it a punishment.”

40. The question arises whether the offences for which it is permissible to obtain samples from convicted people should be the same as those for which it is possible to take samples from suspects. It is easier to justify interference with a convicted person’s right to bodily integrity than a suspect’s right. Consequently, the threshold for sampling convicted offenders is not the same as the threshold for obtaining samples from suspects.<sup>59</sup>

In South Australia under section 30(3)(a) of the *Criminal Law (Forensic Procedures) Act 1998*, all prisoners are sampled. It is considered the fact that the convicted person has received a sentence of imprisonment makes the offence not so minor as to preclude compulsory sampling. But it is to be noted that in New South Wales,<sup>60</sup> as in Victoria,<sup>61</sup>

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<sup>58</sup> Section 11(h) and (i) of the Canadian Charter is to the effect that any person charged with an offence has the right if finally acquitted of the offence, not to be tried for it again and, if finally found guilty and punished for the offence, not to be tried or punished for it again; and if found guilty of the offence and if the punishment for the offence has been varied between the time of commission and the time of sentencing, to the benefit of the lesser punishment.

<sup>59</sup> The Parliament of New South Wales Legislative Standing Committee on Law and Justice in its Review of the *Crimes (Forensic Procedures) Act 2000* (2002) at page 90 agreed with comments from witnesses that the thresholds for offenders and suspects are intentionally different and arise from the different rationale for testing suspects and offenders. Vide also the Victorian Parliament Law Reform Committee Report on ‘Forensic Sampling and DNA Databases in Criminal Investigations’ (2004) at p. 184.

the requirement is that the person must have been convicted of a serious offence, generally an indictable offence that is punishable by a maximum penalty of 5 or more years’ imprisonment.

In the US, the obtaining of DNA samples from convicted persons irrespective of whether they are suspected of committing another offence has been held not to amount to a breach of Fourth Amendment rights. In *Boling v Romer*<sup>62</sup> and *Shaffer v Saffle*,<sup>63</sup> it was held that the interest of society in the identification of those arrested in order to solve current as well as past and future crimes outweighed any claims to protection under the Fourth Amendment. Particular emphasis was placed on the fact that prison inmates forfeit some of their rights on being convicted and only minimal intrusion would be involved in the DNA sampling.

Therefore, while it may not be justifiable to take a suspect’s sample unless it may help to prove or disprove involvement in a serious offence, the taking of a convicted person’s sample is justifiable in wider circumstances. The fact that a person has been convicted increases the likelihood that they may have committed other offences and will commit further offences so it is justifiable to take a sample to detect either of these occurrences. A convicted person has also by unlawful conduct in effect waived the right to avoid having a DNA sample taken. A DNA database may be useful in preemptively detecting re-offenders.

41. Another question is the length of time for which a profile obtained from a convicted person may be retained on the database. Should it be retained even after the convicted

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<sup>60</sup> Vide Review of the *Crimes (Forensic Procedures) Act 2000* by Parliament of New South Wales Legislative Standing Committee on Law and Justice (2002) at page 85.

<sup>61</sup> Vide Victorian Parliament Law Reform Committee Report on ‘Forensic Sampling and DNA Databases in Criminal Investigations’ (2004) at p. 161.

<sup>62</sup> 101 F 3d 1336 (10th Cir 1996).

<sup>63</sup> 148 F 3d 1180 (10th Cir 1998).

person has served his/her prison sentence? It is instructive to examine the comparative law on this matter. In Australia, there is no provision preventing the use of profiles obtained from convicted people for matching purposes after the convicted person has served their prison sentence.<sup>64</sup> In New Zealand similarly, under the *Criminal Investigations (Bodily Samples) Act 1995*, there is no need to destroy profiles obtained from convicted people. It does not appear that the indefinite retention of a convicted person’s profile would infringe his right to privacy. As pointed out in *McVeigh, O’Neill and Evans v UK*,<sup>65</sup> the category of applicant is an important factor to be taken into account when deciding whether a measure is proportionate. Retaining a convicted person’s profile on a database indefinitely could have significant crime detection and prevention functions. It could allow the police to detect any future offences committed by the convicted person or could deter the person from committing any further offences. The benefits obtained by retaining this profile justify the interference with the convicted person’s privacy rights.

(d) Volunteers and the Requirements of an ‘Informed Consent’

42. Taking samples from volunteers for crime investigation purposes is a widespread practice. It may be necessary to take samples from volunteers for a range of reasons. In any crime investigation where DNA is involved, it is imperative to take samples from the victim and from all other people who had contact with the scene but are not yet suspects in order to ensure that the DNA present at the scene does not originate from them. This is based on the evidential significance justification. The taking of all samples should be exclusively governed by legislation and should encompass all samples, even those taken on a voluntary basis.

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<sup>64</sup> Vide, for instance, section 88 of the New South Wales *Crimes (Forensic Procedures) Act 2000*.

<sup>65</sup> (1983) 5 EHRR 71.

43. The comparative law indicates that provision is made in most international legislation for the sampling of volunteers. However, in these jurisdictions there are also a number of provisions which require the consent of the volunteer before any sample can be taken. In the UK, under sections 63(1) and (2) of the *Police and Criminal Evidence Act 1984*, a sample may be taken from any person provided that the appropriate consent is given in writing. In New Zealand, the police may request a volunteer to give a sample under section 30(1) of the *Criminal Investigations (Bodily Samples) Act 1995*. However, in order for the consent to be a valid one, the police are obliged to provide the volunteer with a notice containing a number of statements. These must set out the purpose for which the sample is required, a statement that the person is under no obligation to consent to the taking of a sample, a statement that a person may consult a lawyer before consenting to the taking of the sample and a statement that the sample will be retained on the national databank and used for the investigation of offences. The consent must also be in writing, signed by the person, given orally and recorded on a videotape by virtue of section 34(1) of the Act. Part 8 of the NSW *Crimes (Forensic Procedures) Act 2000* requires that the consent of a volunteer be informed and given in writing in the presence of an independent person.

44. Taking a blood sample from someone who is not suspected of the commission of the crime without his/her informed consent could constitute an infringement of his/her right to bodily integrity. Any legislative framework must provide for safeguards, akin to those in New Zealand or in Australia, to ensure that the consent of the volunteer is informed and real.<sup>66</sup> In the event of a failure to follow these safeguards, any evidence obtained from the volunteer should be inadmissible in the absence of a subsequent informed consent and the profile would have to be destroyed. However, as part of the direction, the individual should also be informed of his/her moral, albeit not legal, duty to assist in solving the crime.

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<sup>66</sup> Vide observations of Law Reform Commission of Ireland, *Consultation Paper on the establishment of a DNA Database* (LRC CP29 – 2004), at p. 144 seq.



It is also important that samples are not taken unnecessarily from volunteers. Individuals should only be requested to provide bodily samples if their samples are likely to be useful for the investigation of an offence. Such an intrusive procedure should only be carried out if it is necessary. It is probable that volunteers may feel under pressure to provide a sample when they are requested to do so by the police. Consequently, such a request should not be made readily. It is also possible that a request to submit to giving a sample in this instance could constitute a breach of the individual’s privilege against self-incrimination. A failure to consent to DNA profiling could lead the police to suspect the individual of committing the crime even though they did not initially have such suspicions.<sup>67</sup>

45. When a volunteer provides a sample, it should not automatically be assumed that such a sample may be inserted onto the national database. While an individual may consent to the taking of a sample where it will assist a particular investigation, this may not extend to allowing their profile to be placed on a database for an indefinite period. For example, while an assault victim will generally be receptive to providing a sample for the purposes of the recognition of the victim’s own profile in the case against the alleged attacker, there is less likely to be consent to the use of this profile for unrelated purposes. In other words, while a person may accept the obtaining of this sample for the evidential significance justification, consent may not be forthcoming for its retention for the intelligence gathering justification.<sup>68</sup>

The Victorian Parliament Law Reform Committee Report on ‘Forensic Sampling and DNA Databases in Criminal Investigations’ (2004) considered that the samples obtained from victims and their relatives should only be used in the investigation for which they are collected, and should not be stored in or matched against the crime scene index of a database. It recommended that, with a view to ensuring the interests of community

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<sup>67</sup> Ibid., at p. 145.

<sup>68</sup> Ibid., at 148 seq.

confidence, samples from these donors are used exclusively for the purpose for which they are collected, any that any breach of these requirements should result in the DNA evidence being inadmissible<sup>69</sup>

46. Volunteers may be asked to provide samples in the course of mass screens.<sup>70</sup> The evidential significance justification supports the use of mass screens, but special safeguards are necessary. The Legislative Standing Committee on Law and Justice of the Parliament of New South Wales in its Review of the Crimes (Forensic Procedures) Act 2000 Report No 18 (February 2002 Report) recommended that “mass screenings should only be used as a last resort”.<sup>71</sup> The Review criticized the use of this procedure because traditional forms of investigation could be more useful and impinge less on police resources. They also recognized that those who failed to consent to the procedure on conscientious grounds could suffer abuse by the community and could also be the subject of suspicion from the police for this reason alone. This could induce people to submit to testing purely to avoid this criticism and suspicion. This would constitute a form of indirect compulsion. Obtaining samples from people in these circumstances could perhaps constitute an unjustifiable breach of their rights to privacy and bodily integrity. A safeguard against the potential breach of the non-suspect’s privilege against self-

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<sup>69</sup> At page 261.

<sup>70</sup> A mass screen involves inviting individuals, sometimes only those of a specified sex and age, within a particular area to submit to DNA testing in an attempt to find the perpetrator of a crime. Those in favour of mass testing refer to the case of Colin Pitchfork [vide supra, footnote 8], where Pitchfork’s evasion of giving his sample in such a mass screen eventually resulted in the discovery of his guilt. A friend of Pitchfork’s was overheard boasting that he had provided a sample in place of Pitchfork. This convinced the police to investigate Pitchfork. Without the mass screen here, perhaps Pitchfork’s guilt would never have emerged. Another example of a successful mass screen is the case of *The People (DPP) v David Lawlor* in the Republic of Ireland. In this case a successful mass screen resulted in the identification of David Lawlor as the murderer of Marilyn Rynne. However, there are also cases where despite the taking of samples from huge numbers of people, the screen has been completely unsuccessful. For example, in the UK in the investigation of Sara Cameron’s murder, samples were taken from 4500 people in a mass screen to no avail. In Australia, criticism was directed at the sampling of a community of 500 people when it emerged subsequently that the offender was one of the suspects questioned initially in the investigation [This case was criticized by the Parliament of New South Wales Legislative Standing Committee on Law and Justice in *Review of the Crimes (Forensic Procedures) Act 2000 Report No 18* (February 2002) at paragraphs 5.86–5.95].

<sup>71</sup> At para. 5.95.

incrimination in a mass screen would be to provide that evidence of a person’s failure to consent to testing during a mass screen should not be admissible in court.

47. In most jurisdictions, legislation provides that consent by a volunteer to the retention of his/her profile can be withdrawn. In New Zealand under section 36 of the *Criminal Investigations (Bodily Samples) Act 1995*, a person can withdraw his/her consent to the use of their sample at any stage after the sample has been obtained. Section 78 of New South Wales Crimes (Forensic Procedures) Act provides likewise.

(e) Vulnerable Persons

48. Special safeguards are needed in respect of incapacitated persons and minors as they may be unable, due to their age or incapacity, to make an informed decision to consent to forensic sampling.

49. In New South Wales as well as the State of Victoria in Australia, court orders are necessary to authorize the sampling of children and incapacitated persons. The Law Reform Committee of the Victorian Parliament in its Report on ‘Forensic Sampling and DNA Databases in Criminal Investigations’ (2004) examined ‘substitute consent’ as a policy option to court orders, and considered that it might be preferable, and consistent with the existing provisions, to require a court order to authorize the DNA sampling of an incapable person.<sup>72</sup> The Committee, whilst recognizing the importance of involving children and young people in decisions that directly affect them, favoured the retention of

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<sup>72</sup> At page 290. The Committee approved the views of the Public Advocate that the implications of consent in criminal investigations were quite different from those operating in relation to medical treatment and that a court order should be required for this purpose.

It is to be noted that the Law Institute of Victoria, the Privacy Commissioner, the Public Interest Law Clearing House, YouthLaw and Victoria Legal Aid all submitted that court orders provide a necessary safeguard for the interests of a vulnerable person.

the current regime, where the forensic sampling of children may only be undertaken pursuant to a court order.<sup>73</sup>

(f) Non-Retention/Destruction of Biological Samples

50. The important distinction between the samples and the profiles has already been discussed.<sup>74</sup> A further distinction is made in respect of the two categories of biological samples that primarily feature in this field, namely a scene of crime stain and a comparator sample. Although, both potentially could contain much or all the genetic information about the source of the sample, the purpose and therefore the position of each in a criminal investigation is strikingly different. A scene of crime stain has usually been left or discarded, whereas a comparator sample is provided (not always consensually) for the purpose of exculpating or implicating the source of the sample in some way or otherwise assisting the investigation.

51. Clearly, the physical evidence from a crime scene must be retained whilst the investigation continues and is not closed. The basis upon which biological samples found at the scene are initially retained is essentially the same as with other physical evidence (such as clothing, weapons, and non-biological stains), namely in order to allow examination and test analysis to be carried out, either at the behest of the defendant or at the request of the prosecuting authority in the hope that with improved technology, a conclusive outcome may be obtained. The careful retention of the stains recovered from a scene of crime may also facilitate the defendant and enable a retained sample to be independently tested so that the result of the further test is available for the trial or perhaps for a subsequent appeal against any conviction founded on such evidence.

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<sup>73</sup> Ibid., at p. 293. The Committee took the view that these provisions afford the maximum protection for children.

<sup>74</sup> Supra, at para. 17.

The Council of Europe Committee of Ministers to Member States on the use of analysis of DNA within the framework of the criminal justice system recommended that “samples and other body tissues, or the information derived from them, may be stored for longer periods ... (ii) when the sample cannot be attributable to an individual, for example when it is found at a scene of an offence.”<sup>75</sup>

It makes sense that where biological samples are found at the scene of a crime they should be retained indefinitely, principally as a safeguard in the event that an individual convicted of the offence to which the sample relates alleges that a miscarriage of justice has occurred and wishes to challenge the veracity of the original evidence.<sup>76</sup>

52. As regards comparator samples (generally obtained from suspects or volunteers), fears concerning genetic privacy have prompted policy-makers to decide the samples themselves should be destroyed once the DNA profile has been generated and the trial has concluded (any by implication any appeals process). Indeed, even in 1992, the Council of Europe Committee of Ministers recommended that:

“Samples or other body tissues taken from individuals for DNA analysis should not be kept after rendering of the final decision in the case for which they were used, unless it is necessary for purposes directly linked to those for which they were collected.”<sup>77</sup>

53. In the US there is a variable policy regarding retention of samples: some State laboratories retain them where others destroy them.<sup>78</sup> A number of countries choose to retain samples for database-hit confirmation or future testing in the case of errors or

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<sup>75</sup> Council of Europe Committee of Ministers Recommendation No R (92) 1 on the use of deoxyribonucleic acid (DNA) within the framework of the criminal justice system at paragraph 8.

<sup>76</sup> Vide also recommendation of the Law Reform Commission of Ireland in its 2005 Report on the Establishment of a DNA Database, at para. 3.06.

<sup>77</sup> Council of Europe Committee of Ministers Recommendation No R (92) 1 on the use of deoxyribonucleic acid (DNA) within the framework of the criminal justice system at paragraph 8.

<sup>78</sup> See Human Genetics Commission *Inside Information: Balancing Interests in the use of Personal Genetic Data* (May 2002) chapter 9: Forensic uses of Personal Genetic Information at 155.

advancing technology.<sup>79</sup> In Belgium, Germany, Norway, and Switzerland various provisions exist requiring samples to be destroyed. This may be once a profile has been generated and entered on to the database or a defined period of time after entry or as soon as the sample is no longer needed for comparison.<sup>80</sup>

54. The prospect of governmental organizations having the power to collect, analyze, and retain (perhaps for future analysis) an individual’s genetic material may to most people be particularly unpalatable. The indefinite retention of samples could discourage people from volunteering a sample in order to help with an investigation (or for that matter consenting to a forensic procedure). It is necessary for the sample to be retained until the conclusion of the trial in order for it to be presented as an exhibit in court. However, after the trial, it might have to be destroyed. Destroying the comparator sample after a profile has been generated and verified and a final decision in the particular case has been rendered would go a long way in allaying concerns about misuse and possible future analysis, as well as inspiring public confidence in DNA profiling and the establishment of a profile database. But one must reckon that, with advances in DNA technology,<sup>81</sup> by destroying samples a database may not be ‘future proofed’. Without ‘future proofing’, there is the risk of being restricted to a slower and more expensive type of analysis; the database would be locked, by legislation, into current technology. It makes sense, therefore, that when the profile of a suspect, convicted person or volunteer is placed on the database, the comparator sample will also be retained and stored by the custodian of

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<sup>79</sup> Austria, France, Hungary, England and Wales, retain samples as well as profiles. See further the European Network of Forensic Science Institutes DNA Working Group *Report on ENFSI Member Countries’ DNA Database Legislative Survey* prepared by Christopher H. Asplen, Smith Alling Lane, PC. Available at <http://www.enfsi.org/>.

<sup>80</sup> European Network of Forensic Science Institutes (“ENFSI”) *Working Group on DNA Survey on ENFSI Member Forensic DNA Database Laws* (2003).

<sup>81</sup> Major change has occurred in the forensic DNA field in the past when the technology moved from analyzing RFLPs to STRs. The most likely drive for change would be the development of a technology which is faster and cheaper, such as SNPs. This is a new DNA identification technique that does not rely on STRs but looks at different areas of the DNA called single nucleotide polymorphisms (SNPs) has been developed. SNPs are differences at single base pair positions along the DNA strand. The advantages of using SNPs as a means of DNA profiling are that they can be detected in very small amounts of DNA and are therefore useful to analyze degraded samples, particularly those from crime scenes. Vide observations of Law Reform Commission of Ireland in its 2005 Report on the Establishment of a DNA Database [LRC 78-2005], at para. 3.12.

the database. If, for whatever reason, the profile is removed from the database and destroyed, the sample then must also be destroyed.

## **(2) The Permissible Uses of the DNA Samples and Profiles**

### ***Permissible Analysis of Biological Samples:-***

55. A matter that has to be determined is what type of forensic analysis is permissible in respect of biological material left at a scene of crime. This question is of importance as DNA found at a scene of crime may be from a person who was not the perpetrator of the offence, but happened to be present for some innocent purpose. But more important still is the possibility of subjecting a scene of crime stain to analysis which will identify common characteristics, such as ethnicity, skin, hair and eye colour, stature, weight, age and facial characteristics.<sup>82</sup> Being able to find out that the person whose DNA was left at the scene of crime may have certain physical characteristics would undoubtedly be useful intelligence in the investigation of an offence, particularly when the investigating authorities have not found other evidence to lead them to the perpetrator, but it gives rise to a human right issue.

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<sup>82</sup> The UK Forensic Science Service (“FSS”) has already conducted research into ethnic inference, as well as other commonplace characteristic markers. There have been two pilot studies by the FSS into ethnicity prediction: one in the West Midlands and the other in South Yorkshire. As a result of this research the FSS run an ethnic inference service as well as a red hair prediction service. The ethnic inference test is based on DNA sequences associated with the gene pool of a population, such as British Afro-Caribbeans who display a greater number of distinctive characteristics. Using DNA sequences, the probability of a person’s ethnicity can be calculated by comparing their SGMplus profile with the relevant population database. The prediction is generated using a FSS software package known as ALFIE (allele frequency for the inference of ethnicity). The frequency of an SGMplus profile in each of the five British ethnic groups – white-European, Afro-Caribbean, Indian Subcontinent, South East Asian and Middle Eastern – is calculated. The red hair prediction test, on the other hand, is based on the difference in the DNA of the MC1R gene (melanocortin 1 receptor) that determines hair pigmentation. A mini-sequencing technique detects variations in the *coding* sequence of this gene. It is anticipated that, together with the research being conducted by the Human Genome Project, other genes may be identified that determine other human features, such as eye colour, skin colour, and perhaps even facial structure. Vide *FSS Fact Sheet on commonplace characteristics.*, available at: [http://www.forensic.gov.uk/forensic/foi/foi\\_docs/43L\\_Commonplace\\_characteristics.pdf](http://www.forensic.gov.uk/forensic/foi/foi_docs/43L_Commonplace_characteristics.pdf)].

56. The question that arises is: when it appears from genetic markers that the source of the scene of crime stain is likely to belong to a person from a particular ethnic group would the constitutional right to be held equal before the law, as guaranteed by sections 3 and 16 of the Constitution, prohibit the police from using this information as an investigatory lead enabling them to focus enquiries on members of that particular group? Ethnicity is a legitimate consideration in deciding whom to approach as a suspect when descriptions of the perpetrator of an offence include ethnicity.<sup>83</sup> What would probably be unconstitutional and repugnant would be using information about ethnicity in a way that targets or discriminates against people.

57. What would also be objectionable is to allow DNA analysis to ‘creep’ towards identifying genetic disorders and personality and behavioural traits. This goes beyond physical characteristics, such as for instance ethnicity and racial features. The danger is that advances in our understanding of genetics, whilst having beneficial implications in respect of the treatment of genetic disorders might also have potential ramifications conducive to discrimination and stigmatization. The analysis of a scene of crime stain should only be conducted for the purpose of detecting, investigating and preventing crime, so as to aid the authorities to catch a perpetrator or improve profiling techniques and statistical frequency databases. Accordingly, any legislative framework should preclude the authorities from conducting any kind of medical/behavioural research using the samples; but this should not prevent further forensic analysis for the legitimate purpose of furthering the investigation and prevention of crime and improving forensic techniques.

58. In contrast to samples provided with the informed consent of the donor in the context of medical, scientific and biotechnological research or for that matter biological material

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<sup>83</sup> See for example *Waldron v United States* 206 F 3d 597 at 604 (6th Circuit 2000) where it was held that an investigative stop of a bank robber that was based in part on the witness’ description of his race was not illegal “racial targeting” as “common sense dictates that, when determining whom to approach as a suspect of criminal wrongdoing, a police officer may legitimately consider race as a factor if descriptions of the perpetrator known to the officer include race”.



found at a scene of crime, samples provided in the context of a criminal investigation are not always given consensually. These comparator samples are provided for a specific purpose, namely for comparison with a biological sample left at a scene of crime. The objective is either to exculpate or to point towards presence at the scene, and even, inferentially, guilt. This comparator sample has not been abandoned in the way that a scene of crime stain has been discarded. A comparator sample that is taken from a suspect or volunteer is in an entirely different category, as a sample of blood or the cells on a mouth swab or rather more specifically the genetic information contained within these samples, is uniquely attributable to one individual. Consequently, there is a sound view that because of the nature of the material and what may be derived from it different considerations should be contemplated. Whilst current profiling techniques examine only the non-coding parts of the DNA molecule, advances in forensic science suggest that the non-coding areas may contain information relevant to health or diseases or other characteristics. The Australian Law Reform Commission has expressed its concern about the potential extension of forensic analysis of comparator samples to physical and behavioural characteristics.<sup>84</sup> The Human Genetics Commission also commented on this issue, as follows:

“It appears to us that there is a clear distinction between using DNA for comparison or identification purposes (which the public broadly accepts) and using it to predict the characteristics of a person. We take the view that the public might have concerns about such uses and that it should be subject to wider debate”.<sup>85</sup>

There would be little use in determining the colour of the hair or ethnic origin of the donor where this is already known. This phenotype information or information regarding observable characteristics would only be useful to discover from and through testing the source of a sample left at a scene, but once a suspect is found this information is apparent. It is only the genotype information that is not discoverable through visual examination and it is this information that is arguably the most sensitive. Accordingly an individual should have the right to keep this private and the authorities should be

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<sup>84</sup> Australian Law Reform Commission and the Australian Health Ethics Committee *Report – Essentially Yours: The Protection of Human Genetic Information in Australia* (ALRC 96, 2003) at paragraphs 41.108-41.111.

<sup>85</sup> Human Genetics Commission *Inside Information: Balancing Interests in the use of Personal Genetic Data* (May 2002) at 156-157.

precluded from gaining access to this data. Therefore, unlike the scene of crime stain, which may legitimately be subjected to further testing in the interests of furthering a criminal investigation in exceptional circumstances, a comparator sample should not be subject to analysis beyond that which is necessary to establish the likelihood that the donor of the comparator sample is the source of the scene of crime stain. After all, the knowledge that ‘suspect X’ has a particular genetic disorder does little or nothing to show whether he or she was at the scene, let alone whether he or she is in actual fact guilty of the particular offence being investigated.<sup>86</sup>

59. This type of protection exists in the laws of other jurisdictions, such as Germany. German law precludes the analysis of DNA to draw conclusions as to personality traits, dispositions or diseases.<sup>87</sup> However, German law does not explicitly restrict analysis to the non-coding DNA regions. This is to avoid limiting or precluding future scientific development. At present it is the non-coding regions that are of particular use for analysis because they contain the most variation. The coding regions contain substantially less genetic variation between individuals and are not especially useful when attempting to distinguish between possible sources of a scene of crime stain. However, should it be discovered in the future that the non-coding regions and in particular the loci used in forensic profiling are not truly ‘non-coding’, then it may become necessary to discontinue the use of these areas. Any legislation providing for the analysis of DNA samples for comparison with biological samples left at the scene of a crime should exclude testing which might reveal information about genetic disorders, personality and behavioural traits and predispositions.<sup>88</sup>

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<sup>86</sup> Vide observations of Law Reform Commission of Ireland, *Consultation Paper on the establishment of a DNA Database* (LRC CP29 – 2004), at pp. 181 seq.

<sup>87</sup> *Bundesverfassungsgericht 2 BvR 1741/99* of 14 December 2000 paragraph 48.

<sup>88</sup> Vide discussion of the Law Reform Commission of Ireland in its 2005 Report on the Establishment of a DNA Database, at para. 3.22 seq.

*Permissible Uses of the DNA Database:-*

60. The purposes for which a DNA database may be used should be set out explicitly in legislation; the purpose of the database must be explicitly limited to criminal investigation and identification purposes. The dissemination of the information on the database to public or private bodies for purposes beyond those stipulated should be expressly prohibited.

It is imperative that the permitted uses of the DNA database be clearly defined to avoid the possibility of ‘function creep’. One of the greatest concerns in relation to DNA retention is the temptation to expand its usage. The phenomenon of ‘function creep’, whereby technology introduced for one narrowly defined purpose is extended in its usage over time to other areas, must be guarded against. It is to be noted that ‘function creep’ has already occurred with DNA in other jurisdictions.<sup>89</sup>

61. DNA Identification can be used as a means of ascertaining or confirming the identity of unknown deceased persons. The DNA of the deceased person can be matched with DNA from their personal articles or from their close personal relatives to determine their identification. In the event however of a mass disaster and in certain other circumstances, it could prove useful to match the profiles from the deceased persons with the profiles on the database. The profiles of deceased’s persons may be matched against the convicted offenders’, suspects’ and volunteers’ indexes of the database for the purpose only of identifying these persons and not for any other purpose such as paternity determination. Using the database for the purpose of determining relatedness and parentage in this

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<sup>89</sup> Justice Action in its submission to the New South Wales Legislative Standing Committee on Law and Justice during its Review of the *Crimes (Forensic Procedures) Act 2000* submitted that “Governments in Iceland and Tonga have sold the genetic information of their entire populations to multinational corporations without the consent of their people [Submission 10, 6 June 2001, p 3.] There is also the danger of insurance companies seeking access to DNA material.

instance could cause severe distress to the family of the deceased person and could constitute an unjustifiable infringement of their right to privacy.<sup>90</sup>

62. It should also be possible to make a court application seeking the searching of a deceased’s profile against the profiles on the crime scene index. In the UK under PACE, it is possible to take a sample from a dead body if there is reasonable suspicion that the deceased person may have committed the offence.<sup>91</sup> There is a public interest in the resolution of outstanding offences. Discovering that a deceased person’s profile matches a crime scene profile may enable the police to resolve and close the case and prevent resources being wasted. It is also in the victim’s interest. There should however be a requirement to show that there is a reasonable suspicion that the deceased committed the offence before a court order is made. In addition to this, given that such an order may naturally cause distress to the relatives of the deceased and impinge on the traditional respect for the dignity of the dead, the judge should be given discretion in deciding whether or not it is an appropriate case in which to make such an order. It is only where the public interest in the resolution of the outstanding offence outweighs these considerations that the court should allow a sample to be taken and the deceased’s profile to be searched against the crime scene profiles on the database. The deceased’s profile should not be retained on the database beyond the time that it is necessary to deduce whether there is a match or not.<sup>92</sup>

63. There will also be rare instances where a person is so severely injured that he/she is unable to identify himself/herself. Where this arises, determining his/her identity will probably be desirable. In the majority of cases where DNA matching is required to

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<sup>90</sup> Vide observations of Law Reform Commission of Ireland, *Consultation Paper on the establishment of a DNA Database* (LRC CP29 – 2004), at para. 7.23-7.27; vide also 2005 Report on the Establishment of a DNA Database, at para. 2.11.

<sup>91</sup> Human Genetics Commission Inside Information: Balancing Interests in the Use of Personal Genetic Data (May 2002) at paragraph 9.10.

<sup>92</sup> Vide observations of Law Reform Commission of Ireland, *Consultation Paper on the establishment of a DNA Database* (LRC CP29 – 2004), at para. 7.28-7.30; vide also 2005 Report on the Establishment of a DNA Database, at para. 2.14.

ascertain the identity of the injured person, the person will be incapable of giving an informed consent to the disclosure. In this situation a person with a proper interest in the matter should be entitled to make a court application seeking the identification of the person from the database. A court order could then be granted allowing for the searching of the database for the identity of the person where the court deems it appropriate. The searching of the severely injured person’s profile against the profiles on the database could prove useful in certain circumstances. Such a legislative framework would ensure that an appropriate balance is maintained between the right of the injured person to consent to the disclosure of their identity and the need for the identity of this individual to be revealed in certain circumstances.<sup>93</sup>

64. Families of missing persons face tremendous emotional turmoil when they are unable to learn about the fate of their loved ones. Through the use of DNA technology, it is now technically possible in many cases to make a positive identification of remains, either by matching the DNA profile of the remains with a DNA profile derived from the personal effects of a missing person, or by comparing the DNA profile of the remains with the DNA profile of close biological relatives of a missing person.<sup>94</sup> The inclusion of a missing persons index and an unidentified persons index in the DNA database would be appropriate for this identification purpose. As volunteers, relatives of missing persons would have the right to withdraw consent to the retention of their forensic material at any time. The unidentified persons index would contain the DNA profiles of unidentified

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<sup>93</sup> Vide observations of Law Reform Commission of Ireland, *Consultation Paper on the establishment of a DNA Database* (LRC CP29 – 2004), at para. 7.31-7.32; vide also 2005 Report on the Establishment of a DNA Database, at para. 2.17.

<sup>94</sup> DNA was very useful for the identification of deceased people in the aftermath of the terrorist attack on the New York World Trade Centre on the 11th September 2001 and in the aftermath of the 2002 Bali bombing. The use of DNA for identification purposes proved also invaluable in the aftermath of the 2004 Asian tsunami disaster. Vide Law Reform Commission of Ireland, *Consultation Paper on the establishment of a DNA Database* (LRC CP29 – 2004), at pp. 185 seq.; 2005 Report of the Law Reform Commission of Ireland on the Establishment of a DNA Database, at para. 2.11seq.

human remains. This index may also contain the DNA profiles of individuals who are so severely injured as to be unable to indicate their identity.<sup>95</sup>

The missing persons index could be matched against the convicted persons, suspects, volunteers and unidentified persons indexes of the database for identification purposes only. However, the missing persons index (which may include the DNA profiles of the relatives of missing persons) should not be speculatively searched against the crime scene index of the database. Whilst there is strong public interest in the resolution of crime, this interest needs to be balanced against the public interest in ensuring that persons are not reluctant to notify the police of a disappearance, or to assist in identifying victims of mass disasters and other missing persons, through fear of implicating themselves in outstanding or future offences.<sup>96</sup>

65. DNA forensic analysis may also be used, in such circumstances as are permitted by law, for the purpose of establishing the identity of a person’s parents. Whilst a profile reveals only a snippet of information about an individual’s DNA at a number of loci along the vast DNA strand, the profile conclusively proves parentage and relatedness.<sup>97</sup> DNA testing has been resorted to in UK in immigration disputes cases to establish affiliation.<sup>98</sup>

66. Apart from the identification of deceased, severely injured persons, missing persons and establishing the identity of a person’s parents in such circumstances as are permitted by law, a DNA database must be confined to use for crime investigation purposes. This is

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<sup>95</sup> Vide 2005 Report of the Law Reform Commission of Ireland on the Establishment of a DNA Database, at para. 2.100.

<sup>96</sup> *Ibid.*, at para. 2.101.

<sup>97</sup> Vide Law Reform Commission of Ireland, *Consultation Paper on the establishment of a DNA Database* (LRC CP29 – 2004), at para. 1.30.

<sup>98</sup> Shortly after its discovery by Sir Alec Jeffreys, DNA analysis was used to show that a Ghanaian boy, who had been denied entry into the UK by the immigration authorities, was in fact the son of a woman who was a UK resident as was contended. Accordingly, the boy was entitled to enter the UK. Vide Jeffreys, Brookfield and Semeonoff, “Positive Identification of an Immigration Test Case Using Human DNA Fingerprints”, (1986) 317 *Nature* 818-19.

because only crime investigation purposes could justify the significant infringement on an individual’s privacy and bodily integrity rights and their privilege against self incrimination that the taking of samples and retaining of profiles involves. Using the profiles for crime investigation purposes advances the legitimate aim of safeguarding the interests of society and the victims of crime. These interests justify the limited infringement on the individual’s rights involved. The database’s primary function in the criminal investigation system is to enable ‘speculative searches’ to be conducted. This essentially involves searching for matches between the profiles on the crime scene index and those on the other indexes. The specific purposes for which the database may be used should be clearly defined in legislation. In the UK, legislation provides that the samples can be utilized for “purposes related to the prevention or detection of crime, the investigation of an offence or the conduct of an investigation”<sup>99</sup>

67. The capacity of DNA evidence to exclude a person conclusively has made DNA profiling a valuable tool in post-conviction reviews. In some ways, the exculpatory power of DNA can be more compelling than its capacity to connect a person to a crime scene. If two DNA profiles do not match, a suspect can be excluded with certainty, whereas a match between the profiles of the accused and the crime scene inculcates a person, but does not prove his/her guilt. In cases where the identity of the perpetrator was at issue, and where the prosecution had relied on circumstantial evidence, DNA evidence can play a leading role in overturning a wrongful conviction. In the same manner that the prosecution may seek to use DNA sampling to provide evidence for a prosecution, convicted persons may seek to use the same technology to search for new evidence in regard to a past conviction.

68. In the USA, innocence projects have been reviewing the convictions of offenders on death row for over 10 years. Barry Scheck and Peter Neufeld established the first Innocence Program at Cardozo Law School in 1992. The Program is staffed with pro bono lawyers, supported by academics and law students. Approximately 200 cases are

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<sup>99</sup> Section 64(1A) of the *Police and Criminal Evidence Act 1984*.

reviewed annually, with priority being given to cases involving offenders on death row. Nationally, more than 100 prisoners have been released since the inception of ‘Innocence Programs in the USA’.<sup>100</sup> Background on the US experience is provided by a comprehensive study of 28 US cases, where convictions were overturned on the basis of fresh or re-examined DNA evidence.<sup>101</sup> All these cases related to sexual offences, and six of these involved murder. They had been concluded between 1979 and 1991, and most of the offenders had served 10 years or more of their prison sentences, having appealed their convictions at least once before their convictions were finally overturned. At their trials the identity of the perpetrator had been at issue and the prosecution relied on largely circumstantial evidence. In many of these cases, no DNA evidence had been led at the trial. Either the trial had occurred before the advent of this technology, or the relevance or potential of the evidence had been overlooked. The initial wrongful conviction was often based on uncertain or uncorroborated identification evidence, or coerced confessions.

‘Innocence projects’ have also been established in other jurisdictions.<sup>102</sup>

69. The Australian Law Reform Commission in its Inquiry into DNA was of the opinion that a process should be established to consider applications for post-conviction review from any person who alleges that DNA evidence may exist that calls his or her conviction in question.<sup>103</sup> So did the Victorian Parliament Law Reform Committee in its 2004 Report on

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<sup>100</sup> See website of US Innocence Project at <http://www.innocenceproject.org>.

<sup>101</sup> Connors et al, *Convicted by Juries, Exonerated by Science: Case Studies in the Use of DNA Evidence to establish Innocence after Trial* (1996).

<sup>102</sup> In Australia at the Law Faculty at Griffith University, Queensland, an Innocence Project was established at Griffith University to examine other claims of wrongful conviction. Both this Project and its counterpart at the University of Technology in Sydney involve legal academics and pro bono lawyers supervising law students to screen and follow up applications from prospective applicants. Teams of students assess applications from offenders who are seeking assistance to prove their innocence on the basis of fresh DNA evidence. Vide Victorian Parliament Law Reform Committee Report on ‘Forensic Sampling and DNA Databases in Criminal Investigations’ (2004) at pp. 425-426.

<sup>103</sup> ALRC, *Essentially Yours* (2003) Recommendation 45-2, 1130.



‘Forensic Sampling and DNA Databases in Criminal Investigations’.<sup>104</sup> We consider it is desirable to have some form of review mechanism available for cases where DNA evidence [when crime scene exhibits have been preserved and would be accessible] could provide fresh evidence on which to challenge a conviction. Legislation should enable offenders to access DNA sampling to challenge their convictions, the more so as conviction of the wrong person is not sustainable in any sense. But in order to avoid the post-conviction review process giving way to an avalanche of requests, clear criteria must be established for the assessment of applications for post-conviction review, including but not limited to the following:

- (a) the availability of biological evidence which, if analyzed, could produce a relevant, meaningful and probative result;
- (b) whether the applicant has consistently maintained his/her innocence; and
- (c) the nature of the evidence relied upon to convict the applicant.

70. When considering the permissible uses of a DNA Database, one must address the question whether the profiles on the database may permissibly be given to other jurisdictions or to an international body for insertion onto a database. INTERPOL encourages the exchange of profiles between jurisdictions.<sup>105</sup> DNA Database sharing is inevitable but it must be done in a way which ensures that the information disclosed is not used in a manner inimical to our law.

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<sup>104</sup> Vide Victorian Parliament Law Reform Committee Report on ‘Forensic Sampling and DNA Databases in Criminal Investigations’ (2004) at pp. 430-431.

<sup>105</sup>Vide Interpol Handbook on *DNA Data Exchange and Practice*, available at: <http://www.interpol.int/Public/Forensic/dna/handbook.asp>.

### **(3) Quality Control of the Collection, Handling and Analysis of DNA Samples**

71. The reliability and utility of DNA profiling would very much depend on (a) the flawless collection of evidence at the crime scene, (b) laboratory processes for DNA analysis being subjected to quality control and quality assurance procedures, and (c) the use of population genetics for the evaluation of the statistical significance of a match.

#### **(a) Crime Scene Management**

72. One of the major problems which affect the probative value of DNA evidence is contamination.<sup>106</sup> It is also one of the primary reasons which will lead to DNA evidence being excluded from the trial.<sup>107</sup> DNA profiling is very sensitive and therefore contamination substantially increases the risk that the sample given may not have come from the accused but from another source. It is consequently very important that the crime stain is not contaminated in any manner during the process of detection, collection or preservation. Not only must the security of the DNA evidence be impeccable, but it must also be *seen* to be impeccable. Public and professional confidence in the integrity of the collection and handling processes is crucial. The lack of satisfactory collection protocols can expose the samples to the risk of contamination and to allegations of tampering.

73. The Interpol DNA Monitoring Expert Group has recommended that the scene of crime strategy must be reviewed in the light of experience which demonstrates what material

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<sup>106</sup> The definition given of contamination in the *Interpol Handbook on DNA Data Exchange and Practice* at 46 is ‘the accidental pollution of the crime stain with other biological substances’.

<sup>107</sup> Where doubts as to the continuity of the chain of custody of a DNA sample are shown to be justifiable, the value of the evidence may be diminished or the evidence may even be excluded.

can now provide a DNA profile.<sup>108</sup> In the absence of appropriate procedures, DNA from unusual sources would not be detected. In addition to this, quality control mechanisms must be assessed to ensure that they meet the demands of DNA profiling. For these purposes, it is very important that every police officer involved in the process from discovery of the crime scene to the relinquishment of the evidence to the Forensic Science Laboratory is properly trained and competent.<sup>109</sup>

The Interpol DNA Monitoring Expert Group has also suggested that “countries should organize training, competence assessment, and accreditation for those people involved in work with DNA evidence”.<sup>110</sup> Police officers should be alerted to the need to preserve the scene and to prevent contamination and they should be aware of the mechanisms available to do this while carrying out the first actions at the scene. Special training programs should be organized, time and again, to provide the scene of crime examiners with a detailed knowledge on the particular problems presented by the collection of DNA evidence.<sup>111</sup>

74. During the evidence collection process, those involved in the collection of the samples should wear appropriate barrier clothing to avoid the contamination of the evidence. In

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<sup>108</sup> Interpol DNA Monitoring Expert Group *Interpol Handbook on DNA Data Exchange and Practice* at 9.

<sup>109</sup> As observed by Dr R K Bramley in his Paper *Quality Assurance in DNA Profiling* at the 1st International DNA User’s Conference 24<sup>th</sup>-26<sup>th</sup> November 1999 in Lyons.

<sup>110</sup> Interpol DNA Monitoring Expert Group *Interpol Handbook on DNA Data Exchange and Practice* at 9.

<sup>111</sup> It is to be noted that Mr. Barrie Warburton, International Crime Scene Adviser, and Mr. Malcolm Boots, Forensic Scientist, both from the UK Forensic Science Service, were in Mauritius from 28 January to 15 February 2008 to conduct a ‘Crime Scene Review’, the objectives of which were as follows -

- (a) training for scene of crime staff with a view to improving their awareness of opportunities to recover DNA from crime scenes;
- (b) support to write protocols for crime scene management;
- (c) review kits used and storage protocols for forensic material, and
- (d) review of five unresolved crimes.

[reply to PQ B/224 on 15 April 2008]

Police officers have also benefitted from training programs run by an expert team from Staffordshire University and by a French Forensic Specialist and a member of the ‘Police Judiciaire’ [reply to PQ B/693 on 17 June 2008].

particular, masks must be worn if the examiner is suffering from a cold.<sup>112</sup> Otherwise, contamination could occur by the shedding of body fluids. The equipment used to obtain the samples must also be clean. Traditional cleaning methods are not always effective in removing DNA. Interpol has suggested that specially designed sampling kits with disposable ‘DNA free’ equipment and packaging should be used at the crime scene.<sup>113</sup> It is also suggested that materials and samples from suspects should be kept separate from those from victims to avoid any risk of cross-contamination. There is also the risk that a suspect may be falsely implicated through tampering with the crime scene. The measures above would assist in reducing this risk. In addition to this, the scene of crime examiner must seal the exhibits with evidence sealing tape so that any tampering with the sample is evident. Maintaining the continuity of the samples also reduces this risk. Items of evidence should also be stored in secure laboratory areas with access limited to authorized personnel. Keeping the analysis of the samples separate from the investigation also reduces the risk of tampering. It is therefore important for these purposes that the FSL is a separate agency<sup>114</sup>.

75. While the measures described above significantly reduce the risk of contamination, they do not eliminate it. In order to ensure that a large proportion of these mistakes are detected, the record of the chain of evidence in respect of each item must be strictly maintained by the police and the scientists in the Forensic Science Agency from collection until final disposition of the samples. It is important that the record of the chain of custody of the exhibit materials and samples is carefully maintained and kept for production in court.

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<sup>112</sup> DNA Monitoring Expert Group *Interpol Handbook on DNA Data Exchange and Practice*, at 51.

<sup>113</sup> *Ibid* at 48.

The evidence should be placed in sealed bags on acquisition. These bags containing the sample should be labelled immediately to avoid the need for reopening. Once the bags are sealed, they should not be opened for any reason before they are handed over to the laboratory. Each item must be packed individually and packaging should not be reused.

<sup>114</sup> Vide observations of the Law Reform Commission of Ireland in its *Consultation Paper on the establishment of a DNA Database* (LRC CP29 – 2004), at para. 8.55-8.56.

In addition to this, those involved in the investigative process and the victims should give samples. Their profiles would then be used to eliminate innocent or accidental contamination of the crime stains. In the UK a Police Elimination Database has been established for this purpose.<sup>115</sup> In the UK, Police Regulations, brought into force in April 2003, require all new recruits to provide DNA samples for the Police Elimination Database. If police officers do not provide profiles for this database, they are not permitted to attend crime scenes. The Police Elimination Database is entirely separate from the National DNA Database. Consequently speculative searches of the profiles on the Profile Elimination Database against profiles from unsolved crimes are not carried out. A profile from the elimination database may only be matched with a specific crime scene profile when there is a real belief that there may have been contamination and there is fear that the ratio of ‘legitimate access’ outcomes to identifications may be unacceptably high.<sup>116</sup>

76. It is suggested that a DNA Profiling Board could be set up, which would be responsible inter alia for keeping under review the procedures adopted by the police in respect of crime scene examinations to ensure that they meet the technical advances, the technological improvements and the added complications DNA evidence presents, and that they reflect best practice procedures. Maintaining reliable procedures requires provisions to verify and review protocols on a regular basis. In the regulation of day-to-day procedures, it is as important to establish systems which ensure that minimum

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<sup>115</sup> See, for instance, the Forensic Science Service ‘*The National DNA Database Annual Report 2002-2003*’ at 19 for a description of this database. Vide also 2005 Report of the Law Reform Commission of Ireland on the Establishment of a DNA Database, at para. 4.38-4.41, and of the Victorian Parliament Law Reform Committee Report on ‘Forensic Sampling and DNA Databases in Criminal Investigations’ (2004) at pp. 326-329.

<sup>116</sup> To identify the profile of a possible suspect involves eliminating from crime scene samples the DNA deposited by those with legitimate access and eliminating all possible sources of contamination. Those with legitimate access include investigators, as well as witnesses or suspects who are able to demonstrate a legitimate reason for the presence of their DNA at the crime scene. In UK, the 2002 Blakey Report expressed concern at the number of samples for which ‘legitimate access outcomes’ were being recorded. It noted that there is a growing belief amongst the scientific support community that the ratio of ‘legitimate access’ outcomes to identifications is unacceptably high [Home Office, Blakey, *Under the Microscope – Refocused* (2002) 10].

standards are routinely met, as it is to provide the means to review and rectify instances where conduct falls short of these standards.<sup>117</sup>

(b) The Independence of the Custodian of the DNA Database and the Reliability of Laboratory Processes

77. In setting up a national database, the body who will act as Custodian over the database and the samples must be named in the legislation. This body will have the vital function of ensuring the security of the database and also of guaranteeing the accuracy of the results on it. It will manage the destruction of the profiles where appropriate. It will be required to ensure that the DNA samples are protected from interference and destroyed where this is deemed necessary.

Strong security measures should be implemented to ensure that the information on the database is used only for the permitted purposes set out in the legislation. Stringent and effective safeguards must have also to be put in place to ensure that all biological samples are stored under appropriately secure conditions. An efficient system should be designed to ensure that both the DNA profiles and samples are destroyed as provided for by legislation. Expert advice should be sought regarding the precise form that these measures should take.<sup>118</sup>

It is therefore crucial that the custodian of the database be independent and competent and that the public have confidence in its ability to carry out this task. It may give rise to a potential conflict of interests if the same body [the Forensic Science Laboratory]

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<sup>117</sup> Vide Victorian Parliament Law Reform Committee Report on ‘Forensic Sampling and DNA Databases in Criminal Investigations’ (2004) at pp. 316-317.

<sup>118</sup> Vide 2005 Report of the Law Reform Commission of Ireland on the *Establishment of a DNA Database*, at paragraphs 4.19, 4.22, and 4.29.

performs the dual functions of acting as custodian and as supplier of profiles through the carrying out of laboratory processes.<sup>119</sup> We consider, therefore, that a DNA Profiling Board should be established to overview the operation of the database (and security aspects associated therewith), the handling of samples and profiles, and the integrity of laboratory processes.

78. In line with best international practices, legislative arrangements for the independent external review of this body (external oversight) will be necessary to inspire and ensure public confidence in its operation, security and capacity for efficiency, integrity and confidentiality.<sup>120</sup> The external review should be conducted on a regular basis to examine the operation of the database and to make recommendations for any changes that should be implemented.

79. The accuracy of a DNA analysis depends on the quality control and quality assurance procedures in the forensic laboratory. Quality control refers to measures to help ensure that each DNA analysis result meets a required standard of quality.<sup>121</sup> Quality assurance refers to monitoring, verifying and documenting laboratory performance. Laboratory accreditation programs are a useful technique for ensuring quality control and assurance in the DNA analysis process. These programs set high standards and procedures, in line

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<sup>119</sup> Vide observations of the Law Reform Commission of Ireland in its *Consultation Paper on the establishment of a DNA Database* (LRC CP29 – 2004), at para. 8.15.

We appreciate that a team from Staffordshire University visited Mauritius in November 2007 and assessed the needs of the Forensic Science Laboratory. It identified fields in which training was required: forensic awareness; expert witness training, and training of the staff itself. We understand that, from 28 January to 15 February 2008, a Scoping Study to develop a long-term strategy for the use and development of forensic science in Mauritius had been conducted, with a view to establishing a user requirement for the laboratory, assess forensic science standards, and preparing a report on development issues for a long-term strategy for the use of forensic science [vide reply to PQ B/224 on 15 April 2008]

<sup>120</sup> For a comparative review of mechanisms of oversight, vide observations of the Law Reform Commission of Ireland in its *Consultation Paper on the establishment of a DNA Database* (LRC CP29 – 2004), at para. 8.07-8.13.

<sup>121</sup> We take note that in May 2006 new equipment was acquired by the Forensic Science Laboratory which has enabled the laboratory to use modern and improved technology in accordance with international standards in the field of DNA profiling [vide reply to PQ B/838 on 15 July 2008].

with best international standards, and ensure that there is external oversight of compliance with them.<sup>122</sup>

80. At present, there are no private laboratories conducting forensic analysis for crime investigation purposes operating within this jurisdiction. It is possible that a private laboratory or a number of such laboratories may seek to conduct forensic analysis in the future. This will become more probable in the future when the cost of DNA profiling has decreased. As a result, the appropriate legislative framework must be in place to guard against incompetence or abuse by these organizations. While the emergence of private forensic laboratories is to be encouraged in that the competitiveness could enhance service, the private laboratories should be subject to accreditation procedures and external audit systems. The private forensic laboratories will merely be responsible for generating a profile from the samples. Once the profile has been generated, it should be forwarded to the custodian of the database. Records of it may be retained until the conclusion of the trial in respect of which the profiling was carried out. The crime scene and comparator samples should also be dispatched to the independent body for appropriate storage or destruction, depending on the case in hand, after their functions in respect of them have been completed.

81. There is also a need to facilitate timely defence access to forensic services. Effective facilities should be provided to suspects to permit them a secure, independent scientific scrutiny of DNA samples alleged to relate to them.<sup>123</sup>

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<sup>122</sup> Victorian Parliament Law Reform Committee Report on ‘Forensic Sampling and DNA Databases in Criminal Investigations’ (2004) at pp. 355-360.

<sup>123</sup> *Ibid.*, at pp. 361 seq.



(c) Use of Population Genetics in the Statistical Evaluation of a DNA Match

82. On the establishment of a DNA database, evidence of matches between a suspect’s DNA profile and a DNA profile from a crime scene would be adduced in court. Statistical models have been developed to calculate and explain the significance of a match between two profiles. It is accepted that every individual, other than an identical twin, has a unique genetic make-up, determined by his/her unique genetic inheritance. However, a DNA profile is not obtained from the coding regions of the DNA molecule containing the unique genetic material, and therefore it cannot be assumed that the profile is unique. If two profiles are found to be a perfect match, then the significance of the match needs to be explained. Statistical evidence is required to show that the match was not merely coincidental; that the probability of a coincidental match was so remote that the two profiles were likely to have been obtained from the same source. To do this, population geneticists have used population databases containing DNA profiles to estimate the frequency of each possible combination of alleles at a given locus. As the DNA databases may contain only a small proportion of the DNA profiles of the population, it has been necessary to develop statistical models to extrapolate from this small database the frequency of each possible combination of alleles in the population at large.<sup>124</sup>

83. Many jurisdictions have discrete databases for ethnic groups. In the USA, the UK, New Zealand and some Australian jurisdictions, the DNA database relating to the ethnic population subgroup of which the accused is a member can be taken into account in calculating the likelihood ratio.<sup>125</sup> But doubts have been cast, however, on the attempts

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<sup>124</sup> Ibid., at pp. 351 seq. Vide also observations of the Law Reform Commission of Ireland, in its *Consultation Paper on the establishment of a DNA Database* (LRC CP29 – 2004), at para. 9.03 seq.

<sup>125</sup> The UK has two population subgroup databases for the Afro Caribbean and Indo-Pakistani subgroups and claims the ability of these databases to distinguish between Caucasians and Afro-Caribbeans in nearly 85 per cent of cases. See Duster, ‘The inexorable expansion of the DNA forensic database and the looming spectre of an early 21st century phrenology’ (2002) 9. The USA has subgroup databases for certain ethnic groups while New Zealand maintains subgroup databases for the Eastern Polynesian, Western Polynesian and Asian populations. New Zealand authorities also obtain detailed background on the ethnic origin of donors of forensic DNA samples, while the VFSC

made to date to identify race as a distinguishing factor in databases, and to calculate the probability of a coincidental match with another person of the same race.<sup>126</sup>

84. One of the difficulties with match probability evidence is the impression of absoluteness that it conveys. There appears to be a fairly widespread misconception that there is a real ‘statistical probability’ to be assigned to a profile but this is not the case. There is an infinite range of ways of carrying out the calculation that underlies the figure given. The method chosen in the individual case must be seen to be as much a matter of opinion as one given in other areas of forensic science.<sup>127</sup> While various methods have been devised to calculate the likelihood that a match could be achieved by coincidence, they all rely, however, on certain assumptions about the frequency at which profiles occur in the population.<sup>128</sup>

Nonetheless, it is evident that the present DNA profiling system is indicative of a probability in the order of less than one in a thousand million or less than one in a billion that a randomly selected, unknown, unrelated person would share this profile with the matching person. There is widespread acceptance within the scientific community as to the reliability of the science of DNA evidence in general. Indeed, there is no scientific

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does not identify the donor’s ethnicity. The New Zealand authorities have ‘detailed ethnic information which indicates racial pedigree over a period of four generations.’ See S A Harbison, J F Hamilton and S J Walsh, ‘The New Zealand DNA Databank’, *First International Conference on Forensic Human Identification*, London, 23-26 October 1999, Conference papers, 4.

<sup>126</sup> The Victoria Forensic Science Centre submitted to the Law Reform Committee of the Victorian Parliament on ‘Forensic Sampling and DNA Databases in Criminal Investigations’ that the ethnicity of the suspect is not relevant to any calculation performed to determine the evidential value of matching DNA profiles [VFSC, Submission 23S3,2].

<sup>127</sup> Ian Evett, et al, ‘DNA Profiling: A Discussion of Issues Relating to the Reporting of Very Small Match Probabilities’, (2000) *Criminal Law Review* 341, 346.

<sup>128</sup> Two ways of calculating match probabilities have been used in criminal proceedings. By the ‘match probability’ method, the probability that ‘a randomly selected, unknown, unrelated person would have the same DNA profile as the suspect, is calculated’. The second method is to calculate a ‘likelihood ratio’, which compares the probability of the two profiles coming from the one person, to the probability that they come from different people. See ALRC, *Discussion Paper 66* (2002) 886. Vide observations of the Law Reform Commission of Ireland, in its *Consultation Paper on the establishment of a DNA Database* (LRC CP29 – 2004), at para. 9.34-9.36.

publication available which disputes the validity of the underlying scientific theory in respect of the DNA profiling system.<sup>129</sup>

85. It would make sense to us if an expert group on the statistical presentation of a DNA match could be consulted and guidance provided in the form of a professional code of practice on the presentation of the statistical significance of a DNA match. An Institute of Forensic Science could be established for research/training in forensic science, which would undertake further research into the calculation of DNA matches.

#### **(4) The Admissibility and Probative Value of DNA Evidence**

86. DNA evidence is relevant in a relatively small proportion of criminal proceedings.<sup>130</sup> In cases where the identity of the perpetrator is not at issue, DNA evidence is not relevant. Nor is it relevant where the crime scene has not yielded DNA evidence. While the number of cases in which DNA evidence is relevant may still be relatively small, the impact of DNA evidence in those cases where it is available is much vaunted. While DNA evidence may have a compelling effect in criminal trials, caution must be exercised first, to ensure that the evidence is clearly presented and fully comprehended and secondly, to ensure that its effect is not disproportionate to its probative value.

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<sup>129</sup> Vide Final Report of the Parliament of New South Wales Legislative Standing Committee on Law and Justice in its ‘Review of the *Crimes (Forensic Procedures) Act 2000*’ (2002) at page 22. See also Law Reform Commission of Ireland, in its *Consultation Paper on the establishment of a DNA Database* (LRC CP29 – 2004), at para. 9.03.

<sup>130</sup> In the reply given to PQ B//838 on 15 July 2008, Dr. Hon. Prime Minister indicated that since 2001 deoxyribonucleic acid (DNA) testing has been resorted to as a tool in crime investigation in 107 cases. These tests have led to the elucidation of ten cases. In three of these cases, tests were carried out abroad during the period 2001 to 2003. For the seven remaining cases, testing was done locally by the Forensic Science Laboratory during the period 2007-2008.

(a) DNA Evidence and the Prosecutor’s Case

87. Even where the probative value of the DNA evidence is limited, it is believed that its presence will strengthen the prosecution’s case, especially in cases that relied largely on circumstantial evidence.<sup>131</sup>

88. It should be noted that the potential power of DNA profiling in criminal investigations should not necessarily be reflected in the numbers of court cases. Much of its impact is behind the scenes: excluding suspects and reducing court load through plea changes and bargaining.<sup>132</sup> The existence of DNA evidence is said to have an influence on the admissions made by suspects in criminal investigations.<sup>133</sup>

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<sup>131</sup> Vide Victorian Parliament Law Reform Committee Report on ‘Forensic Sampling and DNA Databases in Criminal Investigations’ (2004) at pp. 378 seq.

Mark Findlay and Julia Grix, in ‘Challenging Forensic Evidence? Observations on the use of DNA in certain criminal trials’, (March 2003) 14(3) *Current Issues in Criminal Justice* 269, had this to say at 272:

“The compelling nature of DNA gives it a special relevance for a circumstantial case. A Crown Prosecutor has commented to the review that without the inclusion of DNA evidence, the circumstantial case in question would not have been prosecuted. The inference is that DNA becomes the centre-piece of a circumstantial case and only requires corroboration of the slightest form to confirm its significance.”

<sup>132</sup> Patricia Weiser Easteal and Simon Easteal, ‘The Forensic Use of DNA profiling’, *Trends and Issues Paper 26* (1990) Australian Institute of Criminology, at <http://www.aic.gov.au>, 3.

<sup>133</sup> Jane Taupin in a research thesis [Master of Arts Thesis, Department of Criminology, University of Melbourne entitled ‘*Impact of DNA Profiling on the Criminal Justice System*’] examined the use of DNA profiling in sexual offence cases during 1989-1991, found that only 97 of the 621 cases in which DNA samples were submitted were ultimately analyzed. The study revealed that the use of DNA evidence in these cases was not always relevant; if consent and not identity was at issue, the DNA evidence was not required. In the cases analyzed, approximately equal numbers of suspects were included and excluded. The study examined the role of the DNA evidence in the sexual offence cases and concluded:

“The main value of DNA profiling is in the earlier stages of an investigation, before the trial. It is a powerful investigative tool for excluding people falsely suspected of involvement in a crime. It can provide very strong evidence of involvement, and this is often enough to induce the defendant to plead guilty, or to fight the case on consent.”

See also H. Roberts, J. Taupin and T. Raymond, *The Role of DNA Profiling in Criminal Investigation*, at 4.

It appears that DNA profiling techniques in the United Kingdom has also lead to pleas of guilty – when suspects are told that a link exists between them and an unsolved crime, they tend to admit to the crime rather than take it through to trial [WA Legislation Committee, *Forensic Procedures and DNA Profiling: Report 48* (1999)].

89. We strongly advise that the Office of Director of Public Prosecutions conducts regularly a research study on the impact of DNA evidence on criminal prosecutions/proceedings, specifically including:

- (a) the number of investigations in which DNA evidence is used, indicating the type of offence involved, and specifically identifying serious crimes against the person, sexual offences; and
- (b) in relation to prosecutions involving DNA evidence,
  - (i) the number of guilty pleas and findings of guilt recorded;
  - (ii) the number of prosecutions resulting primarily from a DNA database detection;
  - (iii) the role of the DNA evidence; and
  - (iv) whether the DNA evidence was contested and, if so, on what basis.

(b) DNA Evidence in Court

90. Courts, around the world, have accepted the reliability of the DNA technology in general. In Britain, Lord Taylor CJ introduced his decision in *R v Gordon*<sup>134</sup> with the words “We do not doubt the validity and value of DNA evidence in general”. In the Australian case of *R v Krager*<sup>135</sup> the reliability and accuracy of the DNA technology in place was accepted due to the absence of scientific evidence disputing its reliability. It was commented by Hunt CJ in the Australian case of *R v Pantoja*<sup>136</sup> that “DNA testing has been accepted by the courts for some years as an acceptable scientific technique for the identification of the source of bodily tissues”. Similarly in New Zealand in *R v Pengelly*<sup>137</sup> the scientific reliability of DNA testing was accepted without question. The

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<sup>134</sup> (1995) 1 Cr App R 290.

<sup>135</sup> [2001] SASC 64.

<sup>136</sup> (1996) 88 A Crim R 554.

<sup>137</sup> [1992] 1 NZLR 545.

same conclusion has been drawn in the US.<sup>138</sup> It is apparent from this that, irrespective of the problems concerning DNA evidence which are discussed below, DNA technology in general is a valuable tool in criminal cases and will continue to be used in the future. In reality while the reliability of the results of this profiling technique have been called into question, the theory of the DNA profiling technique has not been refuted.<sup>139</sup>

***Probative Value of a DNA Match:-***

91. What is the evidential significance of a match? On the establishment of a DNA database, evidence of matches between a suspect’s DNA profile and a DNA profile from a crime scene would be adduced in court. Of course, such a match does not mean that the suspect committed the crime. While a match constitutes evidence that the suspect is the source of the sample, it does not always in the absence of other evidence show that the defendant has committed the crime. This was clearly expressed by Cripps JA in the Australian case *R v Green*<sup>140</sup> He stated that the ‘match’ in this case only proved that it was ‘possible’ that the defendant was responsible for the crime not that he actually was the offender. As he observed, in this case “the “matching” results could not, in the absence of other evidence, prove beyond reasonable doubt that the appellant was the person responsible for semen stains”.<sup>141</sup>

92. The Law Reform Commission of Ireland in its Consultation Paper on the ‘Establishment of a DNA Database’ advances six reasons why a match may not conclusively show the

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<sup>138</sup> See, for instance, *State v Woodall* 385 SE 2d 253.

<sup>139</sup> Vide Law Reform Commission of Ireland, in its *Consultation Paper on the establishment of a DNA Database* (LRC CP29 – 2004), at para. 9.04.

<sup>140</sup> New South Wales Court of Criminal Appeal 26 March 1993.

<sup>141</sup> *Ibid* at 9.

guilt of the defendant.<sup>142</sup> There could be explanations for a match other than that the crime scene sample originated from the defendant.

First, the match could have arisen due to an error on the part of the laboratory staff in conducting the DNA analysis. An error could be made at any stage in the DNA profiling. There is the possibility of errors being made at the DNA extraction, quantification and amplification and detection stages. Mislabelling samples is also a potential human error that could occur.<sup>143</sup> While protocols and precautions can be introduced to reduce the amount of errors, the potential for human error can never be completely removed.<sup>144</sup> Miscarriages of justice can therefore arise if a match is regarded as proving the defendant’s guilt.

Secondly, contamination of samples can also lead to error matches. This could arise where a member of the laboratory staff accidentally contaminates the sample.<sup>145</sup> For example, he/she could inadvertently mix the sample with other samples. The sample could also become contaminated through inadequate storage facilities in the laboratory in question. The sensitivity of the present profiling technology means that there is an increased risk of accidental contamination.<sup>146</sup> This arose in New Zealand where

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<sup>142</sup> Vide Law Reform Commission of Ireland, *Consultation Paper on the establishment of a DNA Database* (LRC CP29 – 2004), at para. 9.06-9.11.

<sup>143</sup> The United States National Research Council adverted to this possibility in “The Evaluation of Forensic DNA Evidence” (National Academy Press 1996) at 80. It observed in this Paper that “[e]very human activity is associated with some risk of error. There are potential sources of error at every stage in the processing of physical evidence, from collection in the field through laboratory analysis to interpretation of results of analysis”.

<sup>144</sup> In Puit “DNA Evidence: Officials Admit Error, Dismiss Case” *Las Vegas Review-Journal* 18 April 2002, it is reported the consequence which a clerical error occurring in a Las Vegas forensic laboratory had. This arose when a man in a detention centre accused another of raping him. DNA profiles were taken from both men and their profiles were entered on to the State DNA database. One man’s profile matched two unsolved sexual assaults and he was charged with these offences. It emerged that the man’s name had accidentally been switched with his cellmate’s name when entering the profiles on to the DNA database. This resulted in a false match.

<sup>145</sup> See Koehler “On Conveying the Probative Value of DNA Evidence: Frequencies, Likelihood Ratios, and Error Rates” *University of Colorado Law Review* 871.

<sup>146</sup> Freidman “DNA Profiling in the 21st Century” (1999) 43 *International Journal of Offender Therapy and Comparative Criminology* 168 at 173.

traditional investigative methods discovered that the suspect could not have committed the offence, despite the fact that his profile had matched the crime scene profile.<sup>147</sup>

Thirdly, pre-analytical error may arise when the results are abnormal because of the way the specimen was treated before the laboratory received it.<sup>148</sup> Forensic samples may be old, of low volume or have been kept in bad conditions prior to laboratory analysis. Specimens may also have been subjected to “burial in damp-earth, freeze-thaw action, baking and irradiation under the sun, contamination by animal deposits, bacterial or other microbial infestation and all manner of other treatments”.<sup>149</sup> Such pre-analytical treatment of a forensic sample may lead to less definitive results being obtained than those, which would be acquired from a “fresh” sample.<sup>150</sup> Therefore, contamination may impact appreciably on the reliability of DNA evidence. It is also questionable whether contaminated samples are of sufficient accuracy to be used as evidence implicating the accused at all. This will, in practice, depend on the extent to which the sample is degraded. Even if the match is of sufficient accuracy to be admitted, a match from a contaminated sample will always be of less probative value than a match from a ‘fresh sample’.

Fourthly, even where there is no error in handling the sample and there is indeed a match, it is possible that this is a chance match or an accidental match. A DNA profile consists

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<sup>147</sup> Despite reviews by a number of bodies, the cause of the contamination was not detected. [Rt Hon Sir Thomas Eichelbaum and Professor Sir John Scott *Report on DNA Anomalies* 30 November 1999]. It was ultimately accepted by a Ministerial Inquiry that the incorrect results were almost definitely caused by accidental contamination that occurred during the early stages of processing the DNA sample [See Judge Tompkins “Challenges to DNA in the Courtroom” Paper delivered at Interpol’s Third International DNA Users’ Conference in Lyon on 19-21 November 2003].

<sup>148</sup> Young “DNA Evidence – Beyond Reasonable Doubt?” Crim LR 264 at 265-266.

<sup>149</sup> *Ibid* at 266.

<sup>150</sup> In *R v Juric* [Supreme Court of Victoria Court of Appeal 29 May 2002] the Victorian Court of Appeal noted the difference between a pure and unadulterated sample that can give rise to statistical improbabilities running into the millions or even billions and a sample so old and adulterated that an expert is prevented from giving an opinion on the statistical probabilities.



of only a small section of an individual’s DNA and so might not be unique. It is, theoretically at least, possible that two individuals other than identical twins could have the same sample.<sup>151</sup> It is more likely that such a “chance match” would occur among close relatives.<sup>152</sup> The chance of such a coincidence significantly decreases as the number of loci examined along the DNA molecule increases.<sup>153</sup> It is to be noted that in the UK, no true chance matches entailing full SGM Plus™ profiles have been identified.<sup>154</sup>

Fifthly, a match could have resulted from tampering with the crime scene. This could arise if the actual offender, a police investigator or other person leaves the suspect’s genetic sample at the crime scene. This is not as improbable as it seems given the ease with which such a substitution could take place. While it is very difficult to lift a fingerprint from one place and leave it in another place, transferring DNA evidence is a relatively easy task. It could involve the picking up of a cigarette butt with saliva on it or taking a hair from someone’s coat and depositing it at a crime scene. Although the risk of tampering by police investigators could be minimized by proper procedures being in place to prevent it, “only the blinkered, the foolish and those who are myopically pro police would discount the fabrication of evidence”.<sup>155</sup> In any event, appropriate safeguards cannot alleviate the risk of a sample being planted by a person unconnected with the police force. The risk of such an eventuality cannot be ruled out and significantly decreases the value of DNA evidence in the absence of other evidence suggesting that the

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<sup>151</sup> As affirmed in Hageman, Prevett and Murray *DNA Handbook* (Butterworths Canada Ltd 2002) at 41.

<sup>152</sup> For example see *R v Watters* English Court of Criminal Appeal Criminal Division 19 October 2000.

<sup>153</sup> In respect of a profile calculated on the basis of ten loci, the probability that a randomly selected, unknown, unrelated person would have the same DNA profile as the suspect is stated in the courts to be 1 in a thousand million or 1 in a billion. The situation has been summed up as follows:

“It is agreed that there is a chance that there are two individuals who share the same profile, no matter how remote that chance is, but as stated previously, no two unrelated individuals have ever been found to match at greater than six loci”.

[Dr Raymond’s submission to the Parliament of New South Wales Legislative Standing Committee on Law and Justice *Review of the Crimes (Forensic Procedures) Act 2000* Report No 18 (February 2002) at 26.]

<sup>154</sup> Forensic Science Service, *The National DNA Database Annual Report 2002-2003*, at 15.

<sup>155</sup> The Public Defenders Submission to the Parliament of New South Wales Standing Committee on Law and Justice *Review of the Crimes (Forensic Procedures) Act 2000* Report No. 18 (February 2002) at 37.

accused was at the crime scene. This risk of tampering also reinforces the importance of establishing an independent and secure repository for the DNA database.

Finally, the suspect could have been at the crime scene for a number of innocent reasons – including having come accidentally across the victim. Presence at a crime scene does not automatically establish criminal culpability. In many instances, the suspect will be a friend or relative of the victim and, in such cases, the probative value of a DNA match may be very limited as there are valid reasons why the suspect would have been at the location. As a result, it must be remembered that technology is not a ‘quick-fix’. It is still necessary to have a properly resourced police force that will need to conduct traditional investigation and evidence gathering.

93. The unanimous view of the courts has been to hold DNA evidence in general to be admissible; the admissibility of the DNA evidence can, of course, be challenged as a preliminary issue. In the US, the first serious challenge to the admissibility of DNA evidence arose in *People v Castro*.<sup>156</sup> It was acknowledged in this case that DNA evidence will generally be admitted into court on the basis that it satisfies the *United States v Frye*<sup>157</sup> test. It was accepted that pre-trial hearings must be held to determine whether the testing laboratory performed the accepted scientific techniques in analyzing the forensic samples in the particular case. The New York Supreme Court in *People v Castro* proposed a comprehensive discovery regime concerning DNA testing whereby all the evidence concerning the testing, sampling, chain of custody etc would be admitted and considered in the pre-trial hearing. Pre-trial hearings are also held in other jurisdictions to decide on the admissibility of the DNA evidence in question. In *R v Doheny and Adams*<sup>158</sup> it was held that the risk of laboratory error, the method of DNA analysis used and the basis of subsequent statistical calculation should be examined

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<sup>156</sup> (1989) 545 NYS 2d 985 (New York Supreme Court).

<sup>157</sup> *United States v Frye* (1923) 293 F 1013. This test states that novel scientific evidence will be admissible into court if it is sufficiently established to have gained general acceptance in the field in which it belongs.

<sup>158</sup> (1997) 1 Cr App R 369 at 369-370.

before trial to decide if the evidence should be admitted. A similar approach is adopted in Australia in considering whether the evidence should be admitted into court. In *R v Tran*<sup>159</sup> DNA evidence was excluded as a result of dubious methodology, possible contamination or crossovers of tracks, incomplete bands on the autorad, controversial interpretation of faint results, contested statistical interpretation and the absence of an appropriate database. Holding an evidential hearing to decide whether the match is sufficiently reliable to be admitted goes a long way to rectifying the problems detailed above with respect to laboratory errors and sample contamination. It also avoids the problem of leaving conflicting expert testimony about the reliability of specific DNA testing methods as a factual matter for the jury to decide. This is problematic as it may lead to the jury “being overawed by the scientific garb in which the evidence is presented”<sup>160</sup> and therefore accepting the evidence even though it is unreliable.

94. The question has arisen whether DNA evidence is sufficient on its own to warrant a conviction, or whether additional supportive or corroborative evidence is needed. Corroboration is not required as a matter of law, although a court would be expected to approach such evidence with caution as it is potentially unreliable [as much as would be the evidence of an accomplice or identification evidence]. Each case would have to be considered on an individual basis in order to decide if corroboration is necessary in the particular case. This is evident from the case of *R v Watters*.<sup>161</sup> This was a case where the prosecution sought to rely almost solely on DNA evidence. The Court of Appeal concluded in this case that the DNA evidence alone was not enough to ground a conviction in this particular case. This decision however was clearly grounded in the facts of the case.

This is evident from the following:

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<sup>159</sup> (1990) 50 A Crim R 233.

<sup>160</sup> *R v Humphrey* [1999] SASC 67.

<sup>161</sup> *R v Watters* Court of Appeal 19 October 2000.

“Every case of this kind has to be judged on its own facts. There is no rule that enables the court to say, when a figure reaches a certain level it is safe to leave it to the jury, but below that it is not. But in every case one has to put the DNA evidence in the context of the rest of the evidence and decide whether taken as a whole it does amount to a prima facie case”.

In this particular case, it was the possibility that the DNA originated from the accused’s brothers that led the court to refuse to admit the DNA evidence in the absence of material independent supporting evidence.

While it is accepted that in a large volume of cases, DNA evidence alone will not be enough to ground a conviction, it is evident that a DNA match could in certain instances prove the guilt of the defendant beyond reasonable doubt.<sup>162</sup>

95. A related question is whether a match obtained through a profile which is acquired in breach of the rules, which govern how it is to be obtained, and is placed on the national database should be admissible in court. The situation would in essence depend on whether the breach of the rules is unconstitutional or illegal, and the rules governing the admissibility of such types of evidence would be applicable and would determine the issue.<sup>163</sup>

### ***Presentation of Evidence at Trial:-***

96. DNA evidence would be presented by the forensic scientist, as an expert witness, either as a ‘match probability’ or as a ‘likelihood ratio’.<sup>164</sup> What is important to bear in mind is that failure to present the DNA match obtained from the DNA database in a statistically accurate way would infringe the right of an accused to a fair hearing, as required by section 10(1) of the Constitution as well as the right to be presumed innocent, as guaranteed by section 10(2)(a) of the Constitution.

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<sup>162</sup> Vide Law Reform Commission of Ireland, *Consultation Paper on the Establishment of a DNA Database* (LRC CP29 – 2004), at para. 9.23.

<sup>163</sup> Vide P.R. Domingue, *Law of Evidence* [2001, University of Mauritius, Centre for Lifelong Learning], Units 1.4.2.2 and 9.5.

<sup>164</sup> Vide, *supra*, para. 84.

97. One related question is whether the scientific evidence can be given by way of a certificate (Deeming Provisions). Such a provision, in our opinion, would be contrary to section 10(1) of the Constitution; it would taint the hearing of a charge with unfairness. This is so as the results of DNA analysis can be open to differing interpretations. Experts may differ in their opinions as to the number of contributors whose DNA is present in a mixed sample.<sup>165</sup> While refinements in profiling technology and the resolution of problems associated with the presentation of complex evidence may reduce the range of contested evidentiary issues, it is unlikely that these issues will ever be entirely eliminated. From a technical perspective, even with technological advances, the possibility of flawed execution, differences of interpretation and the disputed significance of the results will remain. Fairness requires that the expert witness testifies as to the actual processes used in the DNA analysis so that a court can ascertain not merely the protocols or standards applying to the conduct of forensic DNA analysis, but also the actual steps taken. A deeming provision would have the effect of closing off, rather than ventilating, the consideration of the DNA evidence.

It is noteworthy that the Law Reform Committee of the Victorian Parliament in its 2004 Report on ‘Forensic Sampling and DNA Databases in Criminal Investigations’ noted that Australian courts have proceeded beyond their initial concern as to the validity of the profiling system, to inquire into the validity of the specific processes used to obtain the evidence at issue. The Committee concluded that it would not be appropriate or desirable to ‘deem’ the evidence produced by DNA sampling to be incontrovertible when there remain a number of grounds on which the reliability of the evidence may be contested.<sup>166</sup>

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<sup>165</sup> In *R v Lisoff* [1999] NSW CCA 364, experts contested the significance attributed to bands occurring in DNA analyses undertaken using the silver staining technique.

<sup>166</sup> Victorian Parliament Law Reform Committee Report on ‘Forensic Sampling and DNA Databases in Criminal Investigations’ (2004) at p. 400.

98. One common error that is made in presenting evidence is known as the ‘prosecutor’s fallacy’,<sup>167</sup> which when it happens infringes the right to presumption of innocence. This error could be made by the forensic scientist in presenting the evidence. Alternatively, it could be made by counsel or by the judge in summing up the evidence. Or it could be made by the jury in applying the evidence even though the evidence has in fact been presented and summed up correctly.

There are two questions, which may be asked concerning evidence of a match between a defendant’s profile and the profile obtained from a crime scene. First, what is the probability that the defendant’s DNA profile matches the crime scene profile, given that he is innocent? Secondly, what is the probability that the defendant is innocent, given that his or her DNA profile matches the crime scene profile? The first question assumes the innocence of the defendant and asks about the chance of getting such a match. This is an appropriate question for an expert to answer. The second assumes the defendant’s profile matches and asks about guilt or innocence. The ‘prosecutor’s fallacy’ involves inadvertently giving the answer to the first question as the answer to the second.<sup>168</sup> Expressed in another way, “the ‘prosecutor’s fallacy’ is that the statistics of the match necessarily translate into the equivalent chance of the accused being guilty.”<sup>169</sup>

99. Controversy has also arisen over whether Bayes’ Theorem should be used in formulating probabilities. This is a standard mathematical formula which essentially explains how to assess information, such as evidence, within the laws of probability. Applying Bayes’ Theorem in this context would involve multiplying the likelihood ratio by the prior odds (their assessment of the probability of the defendant’s guilt before hearing the DNA evidence). This would then produce the posterior odds, the calculation that the defendant

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<sup>167</sup> Vide Law Reform Commission of Ireland, *Consultation Paper on the Establishment of a DNA Database* (LRC CP29 – 2004), at para. 9.37-9.38; also Victorian Parliament Law Reform Committee Report on ‘Forensic Sampling and DNA Databases in Criminal Investigations’ (2004) at p. 385.

<sup>168</sup> D Balding and P Donnelly “The Prosecutor’s Fallacy and DNA Evidence” (1994) *Crim LR* 711 at 713. See also *R. v. Deen*, *The Times*, January 10, 1994, CA; and see *R. v. Gordon*[1995] 1 Cr.App.R. 290, CA.

<sup>169</sup> Matthew Goode “Some Observations on Evidence of DNA Frequency” (2002) 23 *Adelaide Law Review* 45 at 50.

is guilty given the DNA evidence and the other evidence presented at trial.<sup>170</sup> However rather than subjecting the jury to a very complex analysis of statistics, it could be more appropriate simply to inform the jury that the DNA match is not evidence of the defendant’s guilt and that they must take all the evidence into account in deciding whether the guilt of the defendant has been proved beyond reasonable doubt. The use of this theorem was initially accepted in *R v Doheny & Adams*<sup>171</sup> but its use was ultimately rejected by the Court of Appeal. This was on the basis that the use of Bayes Theorem would plunge the jury into inappropriate and unnecessary realms of theory and complexity deflecting them from their proper task.

100. The cogency of DNA evidence makes it particularly important that: (a) DNA testing is rigorously conducted to obviate the risk of laboratory error; (b) the method of DNA analysis and the basis of subsequent statistical calculation should, as far as possible, be transparent to the defence; and (c) the true import of the resultant conclusion is accurately and fairly explained to the jury.
  
101. To achieve these ends, the following procedural guidelines were laid down in *R. v. Doheny and Adams* [1997] 1 Cr.App.R. 369, CA. First, the scientist should adduce the evidence of DNA comparisons together with calculations of the random occurrence ratio. Secondly, the prosecution should serve on the defence sufficient details of how the calculations were carried out so as to allow the basis of those calculations to be scrutinized. Thirdly, on request the forensic science service should make available to a defence expert the databases upon which the calculations were based.

When the scientist testifies, it is important that he should not overstep the line which separates his province from that of the jury. He should explain the nature of the match between the DNA in the crime stain and the defendant's DNA. He should, on the

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<sup>170</sup> Redmanye “Doubts and Burdens: DNA Evidence, Probability and the Courts” [1995] Crim LR 464 at 467.

<sup>171</sup> (1997) 1 Cr App R 369 (CA).

basis of empirical statistical data, give the jury the random occurrence ratio, the frequency with which the matching DNA characteristics were likely to be found in the population at large. If the necessary data are available, it might be appropriate to state how many people with those matching characteristics were likely to be found in the population, or perhaps within a more limited sub-group. That would often be the limit of the evidence which could properly be adduced. A scientist should not be asked his opinion on the likelihood that it was the defendant who left the crime stain, nor when giving evidence should he use terminology which might lead a jury to believe that he was expressing an opinion.

In summing up, the judge should explain the relevance of the random occurrence ratio; and he should draw attention to the extraneous circumstances which gave that ratio its significance; and to any extraneous evidence which conflicted with the suggestion that the defendant was responsible for the crime stain.<sup>172</sup>

102. In *R. v. Mitchell* [The Times, July 8, 2004, CA], it was held that evidence of a DNA profile taken from the crime scene that does not match the accused is powerful evidence which the jury should consider and weigh in the scale of the prosecution evidence; and it had been a misdirection to direct the jury that a non-match was neutral, helping neither side, where there had been expert evidence to the effect that, since the possibility of contamination could not be eliminated, it was possible that, whilst the DNA was not that of the defendant, it might not have been the offender's either; this was theory or speculation, which the judge raised to the status of evidential material, whereas what was truly evidential material was the non-match with the defendant; in respect of DNA, judges should consider the way scientific evidence was used for the purposes of a jury's logical and common-sense decision making with great care and not raise speculative possibilities in a way which detracted from evidence that an accused could genuinely rely on.

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<sup>172</sup> See also *Pringle v. R* [2003] UKPC 17.



**(E) Concluding Observations:**  
**The Way Forward for Effective Forensic Use of DNA**

103. DNA evidence is a powerful tool for criminal investigation but it is not a substitute for proper police investigation. DNA must be used in conjunction with good police intelligence and investigation, including traditional ways of gathering evidence as well as new tools (such as CCTV systems).
104. It is imperative for those involved with the presentation and evaluation of DNA evidence to understand it. Legal education on presentation of DNA evidence ought to be organized for forensic expert witnesses, legal practitioners, as well as judicial officers.
105. DNA technology is a fast evolving discipline. Consideration should be given as to whether or not it may be appropriate to set-up a Mauritius Institute of Forensic Science, which would conduct research in this field and provide the necessary training to the stakeholders. This institute could, with foreign assistance, aspire to become a regional centre of excellence.
106. Forensic scientists are crucial in the process of having increasingly recourse to DNA evidence for criminal investigations and prosecutions. Not only must the Forensic Science Laboratory be well equipped but it must also be perceived as conducting the laboratory processes in line with best international standards. In order to attract and retain the best scientists in this field, consideration would have to be given as to whether or not it should be incorporated as a company (which would be in a position to offer better terms and conditions than those currently offered) and permitted to provide independent forensic DNA services both to police and suspects.