Impact of DNA Profiling
on the Criminal Justice System

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August 1994
Declaration

This thesis is my original work except where due acknowledgement is made in the text. The thesis does not exceed 30,000 words and has not been previously submitted for any academic award.

Jane Moira Taupin
• Acknowledgements

I would like to thank my supervisors Professor Arie Freiberg and Dr. Austin Lovegrove from the University of Melbourne for their support and advice.

I also thank my co-supervisor Mr Tony Raymond from the State Forensic Science Laboratory for his encouragement and the idea for this thesis.

Thanks to Dr. David Tait and Dr. Henry Roberts for valuable comments on the analysis of the data.

Finally, I thank the many detectives of the Victoria Police who willingly participated in this survey.
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ABSTRACT

The innovative forensic technique of DNA profiling has been acclaimed as the most important advance in forensic science since fingerprinting. Whilst there is much anecdotal information on the impact of DNA profiling on criminal investigation, prosecution and adjudication, there is little quantitative and control comparison data on the routine use of forensic DNA profiling. This study evaluates the effect of the introduction of DNA profiling in Victoria on a number of key points in the criminal justice system. The overall impact of DNA profiling was low as determined by the percentage of criminal cases which utilise DNA profiling. However, in certain classes of cases its impact was measurable, most notably in sex offences committed by “strangers”. Less than one quarter of sexual offence cases DNA profiled resulted in a contested trial, suggesting that the focus of DNA profiling on the criminal justice system should swing to the pre-trial phase. DNA profiling was most often used in sexual offence cases and a database comparison of these cases before and after the advent of DNA profiling was examined. Whilst not statistically significant, trends indicated there were more solved cases, more guilty pleas and fewer trials after the introduction of DNA profiling, but more individuals were drawn into the investigatory process. The number of trials of sexual offences in which consent was an issue was slightly greater than previously. The increase in guilty pleas with DNA profiling was only for stranger type crime. Further research is recommended as DNA profiling becomes the cornerstone of biological forensic analysis.
Chapter One

Introduction

This study will attempt to determine the impact of DNA profiling on the criminal justice system in Victoria. Acclaimed by many as the most important advance in forensic science since fingerprinting, DNA profiling has been the subject of much publicity. The use of DNA profiling to solve an English murder case in 1986 precipitated a world wide demand for this new genetic identification technology. Initially regarded as an investigatory tool which could change the judicial landscape, the acclaim has now been tempered by challenges to its validity in the courts in the United States, Britain and Australia, and by recognition of its limitations (Balding and Donnelly, 1994).

Whilst there is much anecdotal information on the impact of DNA profiling on criminal investigation, prosecution and adjudication, there is little quantitative and control comparison data on the routine use of forensic DNA profiling. This is in part due to the infancy of the technique and in part to the sometimes lengthy process of a criminal case. Information on the impact of DNA profiling is valuable as considerable resources are currently devoted to the new technique by crime laboratories in particular and by the criminal justice system as a whole. This thesis will attempt to evaluate the effect of the introduction of DNA profiling in Victoria on a number of key points in the criminal justice system.

Although current utilization patterns may help describe the forensic potential of DNA, they also help to identify other organizational and legal factors that may constrain the impact of such evidence (Peterson, 1989). For example, in about 60% of rape prosecutions the rape victim has had a prior relationship with the offender, so that if sexual contact is not denied then the significance of the forensic evidence of identity is largely diminished (ibid.). This thesis will attempt to identify factors that constrain the potential impact of DNA profiling evidence on the criminal justice system.
DNA

DNA has been called the genetic blueprint of life. Theoretically, no two people have the same sequence of DNA except for identical twins. DNA is present in every nucleated cell, is a double-stranded molecule, and has the structure of a double helix. This shape was elucidated by two researchers (Watson and Crick, 1953) who, in 1962, were awarded the Nobel Prize for their discovery. Since that time there has been much research on the structure and function of DNA. The exact sequence of human DNA has yet to be determined, with a complex investigation called the "Human Genome Project" underway in the United States in order to elucidate the complete sequence in one individual. Research techniques using DNA analysis, like this project, were initially developed in the search for the chromosomal location of particular genes. These genes were those that were believed to cause inherited diseases and the aim is to eventually find a cure for these disorders using DNA technology.

Advances in the understanding of the structure of human DNA and associated improvements in DNA technology have recently provided forensic science with a powerful array of new methods for discriminating between individuals. It was in 1985 in England that this technology was first applied to the forensic field (Jeffreys et al., 1985). It has long been the ambition of forensic scientists to identify the origin of blood and body fluid stains with the same degree of certainty as fingerprints; the arrival of DNA "profiling" appeared to be a big step towards achieving this end.

DNA Profiling.

The new forensic technique of DNA profiling has been advocated on a number of grounds:

(1) It is better than traditional techniques such as ABO grouping, as it has a higher discriminating power and is more stable than many other systems (Dodd, 1985; Gill et al., 1985; Neufeld and Colman, 1990)

(2) It is a powerful identification tool in cases where there is no reliable eyewitness identification (Office of Technology Assessment, 1990)
(3) It can be used to distinguish serial crimes from "copy-cat" crimes or to link unsolved crimes (particularly rapes) to a serial offender (Federico, 1991; Sheard, 1990).

(4) It can save courts time and money and avoid unnecessary anguish for both victims and suspects by: (a) excluding innocent suspects; (b) eliminating trials where a confession is obtained based on DNA evidence and (c) focusing defence issues in those cases that do go to trial, for example consent or alibi defences (Baird, 1990; Neufeld and Colman, 1990; Office of Technology Assessment, 1990; Petrovich, 1990; Read, 1989; Sheard, 1992).

A most striking example of the advantage of DNA profiling over previous biological identification methods occurred in its first application in a criminal matter in the United Kingdom (Gill and Werrett, 1987; Phillips, 1988; Wambaugh, 1989). Two rape/murders of young girls in an English country town were linked by their modus operandi and conventional biological markers. A local kitchen hand confessed to one of the murders but not the other. However, DNA profiling eliminated him as the source of the semen found on both the bodies. Additionally, the semen had the same DNA profile on each body, thus confirming the suspicion that there was one murderer. A mass blood sampling of nearly 5000 local men was then conducted and the perpetrator, Colin Pitchfork, eventually confessed after he was found to have paid another man to give blood in his place. Pitchfork's blood was DNA profiled and was indeed found to match the DNA profiles from the semen on the two dead girls. This investigation led to a rapid introduction of the technique into casework. This case, whilst providing an amazing "true" story line for a book (Wambaugh, 1989) and widely publicising the DNA technique, also highlighted the importance of security procedures with mass testing.
Criticisms of DNA profiling

Although there is general agreement that DNA profiling has many advantages, there has been controversy over its application in the criminal justice system. Since a murder trial in 1989 in New York (People v Castro) the technique has been subject to close scrutiny. Issues such as reliability and validity, standards, statistics, civil liberties and admissibility have all been canvassed by scientific, legal and law enforcement experts. The main criticisms of the application of the technique of DNA profiling to the criminal justice system are listed below:

1. It has been rushed into the courts without agreement in the scientific community regarding either standards that ensure reliability of evidence or guidelines for interpreting results (Lander, 1989; Neufeld and Colman, 1990; Lewontin and Hartl, 1991)

2. The cost associated will tip the balance even further in favour of the prosecution as compared to defence resources (Office of Technology Assessment, 1990; Petrovich, 1990)

3. It has been used as a lever for more police powers and the eroding of civil liberties (Scutt, 1990). An example is the introduction of legislation which enables the taking of blood samples from a suspect without their consent in Victoria - the Crimes (Blood Samples) Act 1989.

4. The technique is complex and may be difficult for lay juries to understand and may also cause inappropriate weight to be given to the evidence (Freckelton, 1990; Neufeld and Colman, 1990)

5. Most particularly in the United States, the pecuniary stake that many forensic scientists hold in the use of the technique clouds their impartiality (Neufeld, 1989) and the publicity involved in its introduction and progress was abetted by commercial interest.
Forensic Science and DNA

The unprecedented attention associated with the introduction of forensic DNA evidence into some United States courts is only one aspect of the high profile that forensic science has played in the past decade. Whilst many forensic scientists believe that forensic science has been used as a scapegoat for inadequacies in the legal system (Lloyd, 1991; Price, 1991) and is subject to unrealistic demands by that system (Wonder, 1989), concern has been expressed about its quality and application. The appeals of the alleged IRA bombers the Birmingham Six and Maguire Seven in Britain have prompted questions about the social responsibility of scientists in the legal process (Price, 1991). The Royal Commission on Criminal Justice in England has evaluated the role of evidence in criminal trials (Hamer, 1991; Roberts and Willmore, 1993) as a result of the release of the Birmingham Six, Guildford Four and the Maguire Seven. Australia, too, has had Royal Commissions such as those into the convictions of Splatt in South Australia and Chamberlain in the Northern Territory, where the quality of the forensic science evidence has been questioned (Freckelton, 1987). It has been said that forensic science no longer enjoys a respected position within legal circles or within the community generally (Brown and Wilson, 1992).

It is to this controversial arena that DNA profiling has been introduced. Many legal and scientific experts question whether it is ready for the trial process (Freckelton, 1990; Lander, 1989; Lewontin and Hartl, 1991). Others consider there is real doubt about the practical use of DNA technology for criminal investigation (Brown and Wilson, 1992). It has also been thought that the public perception of this technology, as reflected in the media, has moved from unqualified praise to one of confused concern in some countries because of a few headline "errors" in court (Debenham, 1991). The doubt cast upon DNA profiling by defence lawyers may inhibit the true course of justice if disproportionate emphasis is laid on trivial technical detail (ibid.). The level of acceptance of DNA profiling evidence in courts and elsewhere would affect the investigation and prosecution of offences. If DNA profiling receives adverse publicity and is regularly rejected as evidence in trials, then investigators may reluctantly discard the technique.
DNA in Australia

DNA profiling in criminal investigations was pioneered in Australia by the State Forensic Science Laboratory (SFSL) in Victoria and introduced routinely into casework in July 1989. Interest in the technique in this laboratory was aroused in 1986 when the work of Jeffreys in England was critically acclaimed by his scientific peers. Added impetus was given in 1988 by a number of unsolved violent crimes in Victoria and samples were taken to the United States to complete DNA profiling. Accreditation of the SFSL by a company in the United States followed so that DNA profiling could be performed in Victoria on Victorian criminal cases and also on cases from interstate and overseas. The majority of these cases have proceeded through the criminal justice system so that the impact of DNA profiling on each case can now be evaluated. The Crimes (Blood Samples) Act 1989 and the Crimes Legislation (Miscellaneous Amendments) Act 1991 (Vic) were in part a result of the introduction of DNA profiling.

Scientific Evidence

The impact of forensic science evidence may be measured in terms of the assistance it provides decision makers at key points in the judicial process (Peterson, 1989). The elements of discretion occur at various points in the investigation of a criminal offence - for example whether or not to proceed with the investigation and prosecution of the alleged crime. The victim must decide to report the offence and the Department of Public Prosecutions must decide whether to prosecute. Although the controversy surrounding DNA profiling has focused on the trial process, it is even more important to determine the effect of DNA profiling on other key points in the criminal justice system, such as its effect on the rate of guilty pleas or the exclusion of suspects from investigation. It has been postulated that the threat of obtaining a DNA profile may be sufficient to elicit a confession from a suspect, whilst on the other hand the wrongly accused person will often demand a test to clear his name (Gunn, 1990). The "threat" of DNA profiling played an important part in the apprehension and confession of Pitchfork (Wambaugh, 1989).

It has been generally agreed that DNA profiling will have its greatest impact on the investigation of sexual offences. This is because laboratories have only a moderate success rate in association of the suspect with the crime scene using traditional techniques in these
offences. Conviction rates are already very high in murder cases (Peterson, 1989) so that significantly higher rates are unlikely. However there has been recent concern in Australia and most particularly Victoria over the extent of sexual assault in the community. This was highlighted in the media when the Age newspaper (Muller, 1993) reported that its poll estimated that more than a quarter of a million Victorians are victims of sexual assault, and that one woman in every eight in Victoria has been sexually assaulted.

The Study

A matched sample of sexual offence cases in Victoria from a one year period prior to the inception of the technique was compared with sexual offence cases with DNA profiling in the two-year period following. The outcome of each case was determined according to whether the case was "solved", whether the case was resolved by plea or trial, or whether the suspect was not charged. A control group of sexual offence cases without DNA profiling from the later time frame was also analysed in order to ascertain if there are any other major issues that may also have affected the criminal justice system through the introduction of DNA profiling, and if DNA profiling cases are significantly different in case outcome to those not utilising DNA profiling.

This study will attempt to determine the impact of the introduction of DNA profiling on the investigation and prosecution of sexual offences in Victoria with reference to nine hypotheses formulated in the Methodology. An overall perspective will be gained by estimating the proportion of sexual offences that are potentially suitable for DNA typing. It will examine whether DNA profiling is indeed superior to traditional techniques in that it:

1. has a greater discriminatory power and thus excludes more innocent suspects and identifies more potential offenders
2. results in more guilty pleas and verdicts and
3. changes the nature of the defence to one of consent in trial hearings.

The scope of this thesis is limited to the investigation of sexual offence cases in Victoria. In addition, these cases relate only to those referred to the SFSL for forensic analysis. These
represent only a proportion of all sexual offence cases reported. Issues of civil liberties and sentencing are not discussed.

The following chapter presents a literature review of DNA profiling in the forensic field, with particular emphasis on its role in the investigation and prosecution of sexual offences. The methodology of the study is in Chapter Three. Chapter Four reports the findings of the study and in Chapter Five these findings are discussed in the light of the literature review. The conclusions are presented in Chapter Six.
Chapter Two

Literature Review

This chapter will discuss the meaning and application of forensic evidence in general and DNA profiling evidence in particular. A brief history of DNA profiling in Britain, the United States and Victoria and its application to the criminal justice system will be presented. The progress of sexual offence cases from reporting to trial verdict is outlined and analysed with regard to British, American and Victorian data. How the introduction of DNA profiling as evidence may affect the investigation and prosecution of sexual offences is discussed with respect to available data and postulated theories.
1. Scientific Forensic Evidence

A. General

The clear and certain identification of criminals is a priority of any investigative agency. The process of identification using the discipline of science is the province of forensic science. The term “forensic science” has been defined as the application of science and scientific techniques to the investigation of crime, with a view to providing the law courts with impartial evidence (Phillips and Bowen, 1989). Perpetrators of crime may leave forensic samples at the scene of a crime, or may carry samples away with them. These samples may link an individual to the crime. Crimes of violence such as homicide and rape may have most of these samples in a biological form, such as blood or seminal fluid.

Until the introduction of DNA technology, biological evidence could generally not be linked to a particular individual with great certainty. This contrasted with other forms of scientific evidence such as fingerprinting, document examination and firearms, which could often closely associate persons with their crimes. It was as early as 1892 (Galton, 1892) that fingerprints were described as an individualizing characteristic. The use of fingerprints in forensic science was developed empirically without reference to the specific genetic basis of the patterns. The minutiae in these fingerprint patterns result from non-genetic events during development of the foetus. As a consequence, even identical twins have different fingerprints. It has been accepted that the fingerprint pattern of each human being is unique, and that there would be no “fortuitous” match.

Although scientific forensic evidence has long been well accepted as an investigatory and evidentiary tool, there has been little recent research on its impact on the criminal justice system. One recent study in the United States (Peterson, 1989) has examined the use and effect of forensic science evidence on the adjudication of criminal cases. The major findings were: (a) forensic evidence had a limited effect on the decision to convict, particularly in comparison to confessions and other tangible (nonscientific) evidence; (b) scientific evidence was associated with harsher penalties for convicted defendants; (c) prosecutors believed it was principally the absence of scientific evidence, in combination with the lack
of other strong evidence, that resulted in case dismissal or acquittal and (d) jurors understand scientific evidence as well as, or better than, other evidence presented at trial.

The law gives scientific opinions no greater weight than other forms of evidence (Starrs, 1991). Scientific evidence, as expert opinion in a criminal case, is merely one form of circumstantial evidence. Statements of eye witnesses, however, are characterised as direct evidence. The expert forms his or her opinion from an extensive knowledge of the subject associated with experience in the practice of that subject. The specific knowledge of a particular case is applied to these foundations and opinions are then formed and expressed.

Doubts were raised about the quality of the forensic evidence in the recent IRA bombing trials in Britain by the Royal Commission on Criminal Justice. This inquiry was set up by the English government following the liberation of the convicted Birmingham Six, Maguire Seven and the Guildford Four (Hamer, 1991; Roberts and Willmore, 1993). All three cases revealed three major failings in the forensic evidence:

(1) forensic scientists withheld or were not asked to give vital evidence
(2) the defence at the original trial had inadequate forensic advice and
(3) lawyers and judges seemed unable to probe the limitations of such evidence.

DNA profiling is a scientifically complex technique for the layman to understand. The controversy and scepticism that often greets forensic evidence could be heightened if DNA profiling is used widely as an evidential tool. This study will attempt to determine the impact of DNA profiling at the trial stage of a criminal case, where the forensic evidence had played a high profile role in recent years.

B. Traditional Genetic Markers

Evidence of a biological nature may help to prove an element of the crime. If semen is identified on an alleged rape victim it shows that the victim has recently had sexual intercourse. Biological evidence may also indicate how a crime of violence has occurred or the role of the accused - plucked head hairs or blood stain patterns may be present in
homicides and indicate the sequence of events in an altercation. The biological samples for analysis consist mainly of bloodstains or semen stains on cloth or other surfaces, vaginal and other cavity swabs taken after a medical examination, and sometimes hair roots.

Characterization, or “typing”, of these body fluids has been used for forensic purposes for more than fifty years (Gaensslen, 1983). The discovery of the ABO system for blood by Landois in 1875 and subsequent identification of the blood groups in 1900 by Landsteiner was followed by the finding of hundreds of characterising markers in the blood and, to a much lesser extent, in other body fluids and tissues.

The typing of body fluids is based on the principles of genetics, the science of biological variation. It has been recognised since time immemorial that like begat like and that individuals share familial features yet have distinct characteristics. However, it was not until Mendel’s experiments in 1865 that inheritance was discovered to be particulate. The inherited factors (genes) that determine visible traits exist in pairs of alleles (alternative forms of a gene), one on a chromosome inherited from the father and one on a chromosome from the mother. The well-known ABO blood grouping system is an example of this genetically determined between-person variation.

Whilst forensic scientists have exploited this human genetic variability in the analysis of evidence from crime scenes since the turn of the century, the traditional systems lack a high degree of discrimination because of low allele frequency and limited markers (ibid.). The discriminating power of a technique lies in its ability to differentiate between individuals selected at random. Conventional techniques often have sufficient discrimination to exclude individuals. The analysis of semen has only two blood typing systems in use at the State Forensic Science Laboratory, but a serial rape investigation in Victoria recently excluded over 20 suspects who were eliminated from the investigation using these conventional methods. These methods are cost effective and results are obtained rapidly (Scheffer, 1992). However, these conventional techniques have limited use in associating individuals with crimes with any great degree of probability.

The scope for biological examination in sexual assaults is vast (Keating et al., 1990). The submission of items to the laboratory is dictated firstly by the need for scientific evidence to establish that a sexual act has occurred to corroborate the victim’s story. Secondly, scientific
analysis may link the exhibits to an assailant and, where appropriate, other crimes (for example a serial rape).

The enormous publicity accompanying the first scientific peer-reviewed literature on forensic DNA profiling (Jeffreys et al., 1985; Gill et al., 1985) and the use of the term "fingerprint" fixed in the public's mind the idea that DNA profiling could be used for absolute identification. The National Academy of Sciences in America has commented (National Research Council, 1992) that the traditional forensic paradigm of using genetic testing as a tool for exclusion was changed to a paradigm of identification in one catchy phrase - "DNA fingerprinting". That is, DNA profiling could point the finger at a suspect, unlike routine typings which merely excluded suspects from an investigation or included them as "possibles". The exclusion and inclusion rate of suspects when DNA profiling is utilised as compared to traditional techniques is investigated in this thesis.
2. DNA as Evidence

A. Background

DNA, or deoxyribonucleic acid, is the substance which encodes the blueprint for life and is found in every nucleated cell of every organism. Higher organisms, such as human beings, have essentially the same DNA in every tissue (Lewin B., 1987). Before the 1950s it was thought that proteins, and not DNA, somehow encoded for heredity. The discovery in 1953 of the structure of DNA (Watson and Crick, 1953) explained for the first time not only how this molecule could encode biological information, but also how the information could be precisely replicated during cell division. The well-known “double-helix” of its structure consists of two long strands of material of only four different components, or bases, arrayed in different sequences.

Most of the DNA in different individuals is much the same, but about 1 base in 1000 is variable. Since each individual has approximately 3 billion base pairs in their genetic make-up, this level of variability is sufficient to make every individual unique. It is probably the existence of such genetic variation that allows evolution to proceed in a changing environment. A fixed inflexible mechanism for storing and retrieving genetic information would be likely to doom a species to extinction. It is also the existence of this genetic variation between individuals that enables DNA to be used for identification in forensic science.

Advances in DNA technology in the 1970's paved the way for the detection of variation in specific DNA sequences and shifted the study of human variation from the protein products of DNA (traditional genetic markers) to DNA itself. It is usually the variation of “non-coding” regions of DNA, regions so far not known to have any particular function, that is exploited in most present forms of DNA profiling. Relatively small fragments are obtained from the DNA and analysed. Suitable fragments can be obtained in two ways. The first is by cutting up the DNA and establishing the lengths of the fragments produced which is called Restriction Fragment Length Polymorphism, or RFLP (Wyman and White, 1980; Jeffreys et al., 1985). The second is by producing many copies of the individual sections of the
fragments of DNA (Polymerase Chain Reaction, or PCR) and testing these (Saiki et al., 1985).

The RFLP analysis can be done in two ways:

1. The multi-locus method, the first DNA typing technique used in criminal investigation. This technique produces a result that has many bands and is in fact similar to a bar code found on products at a supermarket or

2. The single-locus method, the most widely used DNA typing technique. It results in fewer bands, is more sensitive and interpretation is simpler.

The PCR technique is the so-called “second generation” of DNA profiling and can be used on much smaller samples and produces many copies of small sections of the original DNA. The ability of PCR to make a large number of copies from a limited amount of starting material makes it ideal for analysing very small amounts of blood or semen, and tissue from decomposing remains in which most of the DNA is in very poor condition (Hagelberg et al., 1991; Sykes, 1991).

Because the highly variable, non-coding regions of the DNA are not associated with any known characteristics, no information about the individual can be gleaned by analysing these regions. It is similarities between a crime scene profile and a suspect’s profile that indicates whether the suspect is a possible source of evidence at the scene.
B. History of Forensic Application

(i) United Kingdom

American scientists in 1980 (Botstein et al., 1980; Wyman and White, 1980) had discovered that variations in human DNA could be detected by a technique called RFLP analysis. But it was Alec Jeffreys in England in 1985 who showed “minisatellite” regions of DNA could be used to discriminate between individuals (Jeffreys et al., 1985) and also could be used for forensic purposes (Gill et al., 1985). The multi-locus probe method was used to investigate an immigration paternity case (Jeffreys et al., 1986) and represented the first use of DNA technology in a forensic case. The first conviction in any criminal justice system arising from the use of DNA profiling occurred in Britain in October 1987. A disabled woman was raped in her home near Bristol, England, but was unable to identify her attacker. A suspect, on providing a blood sample and subsequently being notified of a “match” with the crime scene sample, changed his plea to guilty two days before the trial (Phillips, 1988).

However, it was the “Blackpad” murders in Narborough, England, in the mid 1980’s that launched this novel DNA technique into the public arena. A more ideal scenario could hardly be devised to catch the public’s imagination. An innocent 17 year old kitchen hand had confessed to the second of two rape-murders of young girls, yet Jeffreys found that he could not have been the source of the semen on the victims (Gill et al., 1987; Wambaugh, 1989). This was the first instance of the release of a prime suspect shown to be innocent by DNA profiling evidence. The perpetrator, Colin Pitchfork, was found after a mass blood screening of local men and confessed. This investigation led to the rapid introduction of the technique into casework in England (Werrett et al., 1989).

The single locus probe method was used by the Metropolitan Police Laboratories in London (Sheard, 1990) and in 1989 became the standard method of choice in Europe (Watts, 1990). Initially, it was thought that DNA profiling evidence was overwhelming and that it was not possible to contest the evidence in court (Steventon, 1993). However, since an armed robbery case in December 1992 (Steele, 1992) this perception has altered so that DNA profiling evidence is often contested.
(ii) **United States**

Initially, DNA profiling evidence went virtually unchallenged in the United States and was admitted in at least nine states and by several appellate courts (Easteal, 1990). Forensic DNA profiling was only available from three private companies: Lifecodes, Cellmark Diagnostic and Cetus Corporation. Cellmark had the exclusive North American licence to market Jeffreys' single locus technique, whilst the scientists at Lifecodes using RFLP techniques and Cetus using PCR techniques had developed and patented methods of their own (Thompson M., 1988). The public sector began to conduct forensic DNA tests in late 1988 starting with the FBI laboratory and followed by states such as Virginia and New York.

The first trial where DNA profiling was introduced as evidence occurred in Pennsylvinia in 1987 and was known as the Pestkinas case (United States Senate, 1989; Marx, 1988). In that case the operators of a rest home had been charged with negligent homicide of an aged man in their care. It was suspected that his organs had been switched with another's in an attempt to hide the true cause of death. However, the DNA evidence showed that no organs had been switched. The defendants were acquitted of tampering with the body but nevertheless convicted of negligent homicide.

The first scientifically thorough hearing concerning DNA profiling occurred in the landmark case of **People v Castro** (National Research Council, 1992). A caretaker at an apartment building, Castro, was charged with the murder of a woman and her young child in the building. Blood found on the caretaker's watch was DNA profiled and found to match the dead woman's, although Castro said it was his own blood. The judge, in a pre-trial hearing of the murder trial, concluded that the theory underlying DNA profiling was generally accepted but that the technique as applied in the particular case was so flawed as to make the evidence of a match with the dead woman's blood inadmissible, although evidence of an exclusion (that it was not Castro's own blood) was admissible. Despite this the defendant subsequently pleaded guilty. It was as a result of this, and other well-publicised criminal cases, that concerns were raised by the scientific and legal communities over the application of DNA profiling.
The Office of Technology Assessment of the US Congress recently completed a 15 month study on the forensic uses of DNA profiling and found the tests sensitive, accurate, scientifically valid and reliable when properly performed (Office of Technology Assessment, 1990). However, it also highlighted problems such as varying interpretations of test results, human error and improper monitoring of tests. The National Academy of Sciences has also published a set of findings and recommendations (National Research Council, 1992). Whilst the report was expected to make the technique more acceptable in the courtroom, it was not expected to end debate about its use (Anderson C., 1992).

(iii) Victoria

The State Forensic Science Laboratory (SFSL) is the sole agent for forensic criminal investigations in Victoria. Awareness of DNA profiling was increased after attendance by Dr. Gutowski of the SFSL at the 11th Congress of the Society for Haemogenetics in Copenhagen in August 1986. Experimental research on DNA profiling commenced at the laboratory in September 1986 (Gidley, 1989).

Implementation of DNA profiling at the laboratory received added impetus two years later by two unsolved criminal cases in Victoria. Investigation of the rape and murder of Heather Nelson in Geelong in mid-1988 had provided police with 6 suspects. There was suggestion of a link between the seminal fluid on the body, indicating sexual intercourse, and the homicide. However, traditional typing of this semen did not resolve the issue (Raymond, 1989). In July 1988 samples were taken to Lifecodes Corporation in New York, where DNA profiling excluded all 6 suspects as the donor of the semen. Subsequent investigations produced further suspects, one of whom had been courting the victim at the time the victim’s child was conceived. Blood from the child of the victim was DNA profiled and it was ascertained that the father of the child was likely to be the source of the semen at the murder scene. The previous boyfriend of the victim, after a lengthy court application over his refusal to provide a blood sample for DNA profiling, has now been charged and is due to face trial in 1994.

In another case a taskforce was formed in 1985 to find a serial rapist, the supposed perpetrator of a series of rapes over 4 years in Melbourne’s South Eastern suburbs. These rapes (numbering over 14) were linked by modus operandi, and eventually connected to a
string of flat burglaries. A suspect was identified but initially refused to give a blood sample. The suspect's estranged wife and daughter gave blood samples however, and in November 1988 samples were taken to New York and a "paternity" type DNA profiling was performed, linking the suspect with some of the rapes. George Kaufmann, the suspect, was then charged on all counts, and immediately confessed to some of the rapes and provided a blood sample. This improved the odds of a chance match to the crimes to better than 1 in 3 million in one case. His was the first Victorian conviction using DNA profiling, where he pleaded guilty in the County Court to all 14 rapes in October 1989 (SFSL records).

Accreditation of the SFSL by Lifecodes was finalised in June of 1989 so that a routine DNA profiling service has been offered since 1 July 1989. The SFSL pioneered the forensic use of DNA profiling in Australia (with Genetic Technologies in New South Wales) and cases from interstate and overseas have also been analysed. Some 170 cases were investigated using DNA profiling in the 2 year period from July 1989 to June 1991. It is these cases that will be analysed in this thesis.

It can be seen from both the Victorian and the United Kingdom experience that some cases which had baffled police and involved many innocent suspects could be solved by the use of DNA profiling. The relative proportion of cases that are solved when DNA profiling is utilised as compared to traditional techniques will be investigated in this thesis.
C. Method Analysis

Casework conducted by the SFSL in Victoria represents a team effort. Prior to the entry of evidential samples into the molecular biology laboratory of the SFSL for DNA profiling there is generally a "screening" process. A number of specialists representing such diverse disciplines as hair and fibre and serology have on most occasions initiated the scientific evaluation of the collective evidence. Generally, biological samples destined for DNA analysis will be prescreened by serology specialists. As a precautionary measure to ensure extraction of high molecular weight DNA, the biological specimens are frozen if destined for DNA typing. In order to make DNA typing more meaningful, it is crucial that known relevant biological samples from suspects, victims and others associated with the crime be available for complete analysis.

The single locus RFLP method has been the most commonly used technique in DNA profiling, and was the method used in the cases investigated in this thesis. Thus the following commentary will be restricted to this technique. However, it is becoming apparent that PCR will be the preferred technique in the future (SFSL records).

There are three central issues involved in analysis using the technique, all of which may affect the admissibility of the DNA evidence in the court room. The first is the quality and reliability of the testing. The second is the accuracy involved in declaring whether bands are a match or a non-match between two RFLP patterns. Thirdly, and perhaps the most controversial, is the issue of population characteristics. The second and third issues are involved in the interpretation of the results and will be discussed in the next section.

It has been agreed in the scientific community that the technique is scientifically valid and reliable when properly performed (National Research Council, 1992; Office of Technology Assessment, 1990). Forensic samples in and of themselves are not barriers to applying DNA technology (Gill et al., 1987; Giusti et al., 1986; Kanter et al., 1986; McNally et al., 1989). Although theoretically the tests per se may be reliable, serious questions have been raised as to the reliability of the performance of a particular analysis (Office of Technology Assessment, 1990). These questions have arisen from actual court cases, and the need to develop both technical and operational standards has been voiced by many government reports (National Research Council, 1992; Office of Technology Assessment, 1990).
However, queries will still arise on a case by case basis and these specific details may be settled in court.

D. Interpretation of Data

The simplest interpretation of a DNA profiling test result is when two samples of human matter, one from a suspect and one from the crime scene, differ in their DNA patterns. This leads to the conclusion that the two samples came from different persons and thus the suspect would be excluded. The problem arises when the two patterns are indistinguishable. It is not sufficient to say there is a "match" - the chance of picking at random a person who has the same apparent genetic pattern as found in the evidence sample must be determined. The lower the probability of a chance "match" the stronger the inference that the evidence pattern is associated with the suspect.

The calculation of this probability involves two steps. Firstly, the frequency of individual bands is ascertained by examining random population samples. The second step requires estimating the population frequency of the overall DNA pattern. A number of assumptions are required - the population must be freely mixed, and there must be no correlation between different loci on different chromosomes.

It has been generally agreed that the validity of forensic DNA tests does not hinge on population genetics (Office of Technology Assessment, 1990). However, the interpretation of these results depends upon the population frequencies of the markers (Balazs et al., 1989). Which principles, and how best to apply them to single locus RFLP analysis, is hotly contested. It appears to be the pivotal point upon which eminent scientists and lawyers disagree and thus upon which the admissibility of the evidence may hinge. A probability estimate is considered by some to be an essential pre-requisite to the admissibility of DNA evidence because without it no meaning can be given to the existence of a match (Walsh, 1992; R v Lucas, 1992).
E. Impact

The impact of DNA profiling on the criminal justice system will be influenced by legal considerations as well as scientific factors: trial and appellate court decisions governing the admissibility of DNA profiling and already high prosecutor conviction rates (Peterson, 1989).

One of the biggest research projects on examining the rates of usage and the impact of forensic science evidence was undertaken in America between 1980 and 1986 (Peterson, 1989; United States Senate, 1989), before the advent of DNA profiling. This study found that the results of laboratory testing demonstrated a connection between the defendant and the crime in only a small percentage of cases. Bloodstain evidence associated murder defendants with the crime in about 15% of murder cases, whilst semen evidence associated accused rapists with their victims in about 10% of rape cases. Laboratory results which showed a negative association between the defendant and the crime (that is, excluded the defendant) were even more rare (ibid.). Although the technique of DNA profiling has been predicted to be more definitive than routine markers, is this in fact the case? According to the FBI, conclusive results (a positive or negative association) were achieved in 75% of DNA profiling cases, a rate much higher than that achieved by conventional testing (Hicks, July 1991). This thesis will attempt to determine the degree of association of suspect with the crime in cases with DNA profiling as compared to routine markers.

The Uniform Crime Reports state that there are about 20,000 murder and 100,000 rape cases per year in the United States (National Research Council, 1992) and of these it was estimated before the advent of DNA profiling that 30% of all murder cases and 70% of all rape cases were never “solved” by an arrest. There have been conflicting opinions over the effect of DNA tests on the solution rates of this type of offence.

DNA profiling should have a greater impact on the analysis of sexual offence cases than in other serious crimes such as homicides and assaults (Peterson, 1989). This is because routine blood grouping of the seminal fluid found on the victim may not readily associate it with the offender. Only a limited number of traditional blood marker groups are found in semen and there is poor discrimination of these markers. The analysis of mixtures of body fluids (e.g. semen and vaginal secretions) by conventional blood grouping tests can often
give results that are difficult to interpret because the male and female groups are obtained simultaneously (Werrett and Lygo, 1988). However, when DNA is analysed the male component can be tested separately. This is because in semen the DNA is contained in the sperm which can be isolated from the mixture of body fluids. Thus the technique lends itself to the investigation of rape and other serious sexual assault. A pilot study by a group in Maryland, United States, showed that the greatest number of DNA cases involved rape and other sexual assault (Reagen et al., 1994). Homicides and assaults may involve the transfer of the victim's blood to the offender and even if this blood cannot be typed it is often the mere presence of blood on the suspect that may incriminate them.

In addition, about one half of the cases in the Biology Division of the Metropolitan Police Forensic Science Laboratory in London are sexual offences (Davies A., 1991). DNA profiling has revolutionized the quality of their evidence by a greater degree of association between the suspect and the crime scene. There has been an increase in the number of offences attributable to some offenders and the gradual appreciation of the recidivist nature of a significant proportion of sexual criminals. DNA profiling has been integrated as a routine technique into casework and less traditional blood grouping is being carried out (ibid.).

The primary pre-requisite for analysing the effectiveness of DNA profiling is sufficient biological material. DNA profiling is not always possible in sexual offence cases. A London study (ibid.) has shown that approximately 45% of sex cases had no items stained with semen. There are many reasons why this may occur, depending on both the offender and the victim. The sexual problems of attackers may preclude the ability to ejaculate. Offenders may be aware that semen can provide evidence and attempt to render it unavailable. The amount of publicity given to DNA profiling may be increasing this awareness (Davies A., 1992). Rape victims may delay reporting or want to wash all traces of the assault away. A significant number of those that do report do not wish to press charges or undergo a medical examination.

Additionally, a high percentage of sexual offence cases are fought on consent and identity of the offender is not a contentious issue (Freckelton, 1990). Thus it has been suggested that the proportion of cases where DNA profiling would be useful would be low (Mugford,
However, others think that though the figures might represent a small population, nevertheless this number might still be useful (Easteal and Easteal, 1990). These cases would include those involving a degree of violence, as a brutal rape would not feasibly be defended by a plea of not guilty on the grounds of consent (ibid.). It is predicted in this study that DNA profiling will have its greatest impact on sex offences (Hypothesis 2 in Methodology) but that the overall impact on the criminal justice system will not be significant (Hypothesis 1).

DNA profiling may have an impact on the investigation of serial rapes. It may identify series which are missed by other agencies because of one or more of the following factors: distance, long time interval, changed behaviour or lack of a distinctive modus operandi (Davies A., 1991). Of course, it is useful for definitively confirming the existence of links initially recognised by other means. Sexual crimes can be repeated many times by the same person, and numerous sex offenders have admitted many offences for which they have never been investigated (Higgs and Willott, 1988). The number of offences in a series varies enormously (Keating et al., 1990). Most of the known series of offences in the London area were in double figures and of 2 to 3 years duration, only occasionally spanning a longer period (ibid.).

It is predicted in this thesis (Hypothesis 4 in Methodology) that DNA profiling will have its greatest impact on these serial stranger rapes and on the investigation and prosecution of rapes by single strangers, where a suspect may be identified from many suspects provided by the police.
F. Sexual Offences

There are generally three parts to the scientific examination of sexual assault. Firstly there is the demonstration that a sexual act has taken place. If it has, the next step is to show who may have been involved. Finally if an offence is identified, an investigation is made of a possible link with any other offences. Whilst traditionally the forensic scientist's main contribution has been to provide corroborative evidence in criminal cases, there is a substantial role to play in the investigative stages as well (Keating, 1988).

Sexual offences are generally divided into three categories (Smith, L. 1989; Lloyd and Walmsley, 1989): strangers, acquaintances, and intimates (relatives, friends and partners). In the United Kingdom, the proportion of stranger offences fell between 1973 and 1985 (Lloyd and Walmsley, 1989) and this was offset by a large increase in the proportion of offences by intimates. The major part of the rise in rape convictions was also due to the rise in convictions for rape by intimates. It may be that these increases reflect a greater willingness of victims to report these offences by intimates, of the police to prosecute and of the courts to convict.

The rape of adult women is not the only matter of current concern. The sexual abuse of children, its prevalence and the effects it can have are beginning to be recognised after years in which the problem has been minimised or denied (Temkin, 1987). An Australian Institute of Health and Welfare report (Easterbrook, 1993) found that 89% of sexual abuse cases of children were attributed to friends and neighbours. Females were the victims in 75% of sexual abuse cases.

Two different classifications of sexual assault are distinguished in this thesis. The relationship between the victim and the offender is classified according to stranger, acquaintance or familiar categories. Types of sexual assault are grouped according to rapes, aggravated rapes, and child sexual offences. The nature of the investigation and prosecution of these offences may differ from group to group. The utilisation and impact of DNA profiling may thus differ.
3. Investigation of Sexual Offences

A. Recording

The number of rapes reported to police in Victoria too has increased steadily since 1960 (Victorian Community Council Against Violence, 1991). The number of recorded rapes in England and Wales has also been rising steadily since the Second World War (Smith L., 1989; Temkin, 1987).

However, recorded crime figures are not necessarily an accurate measure of the incidence of crime since they are subject to changes in both public reporting and police recording practices. The decision to officially record by the police is affected by the individual officers' attitudes as well as legal requirements. The discretion is to a large extent influenced by sufficiency of evidence. It may also be influenced by the nature of the offence. The "classic" stereotypical rape by a stranger in sudden violent attack is more likely to be officially recorded as crime (Smith L., 1989).

Rape is well known as an offence which is grossly under-reported (Adler, 1987; Smart, C. 1977). Recorded rape estimates are therefore substantial under-estimates. A study in London (Hall, 1985) suggested that fewer than one in ten women who had been raped reported it to the police. According to a Saulwick Age Poll conducted in Victoria in 1993 (Muller) only 18% of respondents who said they had been assaulted said it had been reported. However, studies of unreported rapes are liable to be biased due to the lack of objective information such as medical and police reports.

One of the reasons for the non-reporting of rapes by the victim may be the fear and lack of trust of the police and courts. This may be exacerbated by the common police belief that complaints of rape are frequently false (Adler, 1987). Although there may be some, there is no evidence of this occurring more frequently in rape cases than in other crimes (Temkin, 1987). Victims believe that an allegation of a "classic" rape will be given more credence by the police. What is at issue then is the behaviour of the victim, not the accused. If large numbers of victims, as studies suggest (ibid.), refrain from reporting out of fear that they
will be treated without compassion or respect, then it is a grave indictment of the criminal justice system.

Child sexual abuse is also massively under-reported. There is as yet no comprehensive and reliable data base about child sexual abuse (Family Law Council, 1988).

Reasons why more rapes are being reported to police could be that greater community awareness of crimes of violence against women may encourage more women to report, and that legislative changes may acknowledge the existence of a greater range of circumstances in which rape offences take place (Victorian Community Council Against Violence, 1991). The public may also be encouraged to report if they believe the chances of an offender being caught and prosecuted may be increased due to DNA profiling.

B. Inclusions / Exclusions

It is accepted by many scientists that the most powerful concept in forensic science is the power to eliminate a suspect. Traditional blood grouping and DNA profiling evidence provides the best scientific evidence either to include or exclude as a suspect a person suspected of a sexual assault if the pertinent body fluid is found in the appropriate place or places (Keating, 1988). Admixtures may be present, such as where internal medical swabs are composed of the victim's own biological material as well as the offender's material. The advantage of DNA profiling is particularly relevant in sexual offences as it is possible to determine a mixture of material from two or more individuals.

It has been predicted that the most powerful effect of DNA profiling will be the exoneration of suspects identified through eyewitness testimony and not excluded by routine methods (Office of Technology Assessment, 1990). This is because of the more discriminating nature of DNA profiling over traditional blood grouping techniques. It should also play an important role in serial crime investigations, where many suspects may be involved in one investigation (Davies A., 1991).

The figures to date of the exclusion rate of suspects using DNA profiling (that is the DNA result does not incriminate the suspect but some other individual) are variable. Some early figures from England (Werrett et al., 1989) and America (Baird, 1990) suggested a 25%
exclusion rate. The primary suspect was excluded in 37% of more than 500 rape and homicide investigations completed by the FBI (Office of Technology Assessment, 1990). Other figures from England (Steventon, 1993) show that of 761 cases in 1991 which were primarily sexual assault, 22% excluded the suspect and 40% matched the suspect with 38% giving no result.

The first investigative use of DNA profiling was as an exclusionary tool (Gill and Werrett, 1987) for excluding over 100 men in the "Blackpad" murders. Some of the most spectacular case histories to date involving the technique have been where it has performed the exclusionary function. A rape victim in London gave a positive identification at an identity parade, yet the blood sample from the suspect was excluded as being the source of the semen on the victim (Sheard, 1990). However the profile of the suspect had similarities to the crime scene samples so the question was - could it have been a relative of the suspect? A sample of the brother of the suspect was then obtained and found to match the crime scene sample, and the brother subsequently pleaded guilty. Traditional groupings may not have excluded the original suspect and together with a positive identification from the victim, this initial suspect may have been falsely accused.

The greater discriminating power of DNA profiling may prevent mistaken identification. Suspects identified by complainants have been eliminated subsequently by DNA profiling (Davies A., 1991). Two cases in England (ibid.) involved the identification of the offender by the victims at an identification parade. Both victims were white and allegedly assaulted by men of Afro-Carribean appearance. Although it is well established that Causasians may have difficulty in distinguishing those of other racial appearance, in both instances the police were concerned about the accuracy of the DNA result (in that it excluded the prime suspect identified by the victim).

In contrast, a jury convicted a defendant in a rape case in Connecticut in March 1990. The defendant, Ricky Hammond, had a DNA profile which did not match the semen on the victim's clothes but in spite of this exclusion he was found guilty (Petrosinelli, 1990; Starrs 1990). Though other factors may be involved, the fact that DNA profiling may exclude a suspect and yet have no impact on the trial decision, or the decision to prosecute, is an important issue that will be investigated in this thesis. The police may believe they have the
offender and that the DNA result is incorrect or not relevant. This occurred with routine biological typings in the Pitchfork case in England (Wambaugh, 1989) and the Blackburn case in New South Wales (Brown and Wilson, 1992). In both cases the suspect had a different ABO grouping to the seminal fluid found on the victim(s), yet the police prosecuted each suspect. However, the DNA results later confirmed their non-involvement.

Conversely, may police be using DNA profiling as an investigatory tool and rounding up more suspects in an investigation than otherwise warranted? The elimination of suspects by DNA profiling has been used by some police as an alternative approach to crime investigation (Werrett and Lygo, 1988). Confirmation of alibis may often appear unnecessary. This issue will also be investigated in this thesis.
4. Prosecution of Sexual Offences

A. Identification of Offender

Only a small proportion of criminal cases result in a trial. Many charges are withdrawn, dismissed or culminate in a plea of guilty (Bishop, 1989). Charges may not be laid or may be withdrawn if a brief has not been authorised or if a complainant withdraws an allegation. There has been a heavy concentration of research on the courtroom, especially jury selection and jury deliberation so that the focus is disproportionately on trials to the neglect of plea bargaining.

The "clear up" rate for rape in England and Wales is low compared to other crimes of violence (Temkin, 1987). A little over two thirds of recorded rape offences are cleared up by the police (Adler, 1987). A crime is considered “cleared” when someone has been charged, summoned or cautioned for the offence, or when the case has not been proceeded with for various reasons.

How would DNA profiling affect the clear up rate of sexual offences? It is predicted that DNA profiling would increase this rate because its greater discriminating power would identify more offenders, especially in serial rape offences. These cases would be ones where identity was in issue, not consent. Of course, the suspect must first be identified by the police as such and a relevant blood sample obtained.

B. Guilty Pleas

Cases are categorized by lawyers on the basis of the prosecution case as well as the seriousness of the offence and previous convictions of the defendant (Mather, 1979). According to studies in the United States and the United Kingdom the majority of charged cases (90 to 95 %) are resolved through plea bargaining (Mather, 1979; McDonald and Cramer, 1980; Peterson, 1989). Prosecuted indictable offences in New South Wales had an 82% guilty plea rate (Bishop, 1989). Confessions by the defendant in the record of interview generally lead to guilty pleas.
Persons accused of rape are less likely to plead guilty than those accused of other offences (Adler, 1987). However, defendants who had been strangers to their victims were much more likely to plead guilty than those who had known them previously. One possible explanation may be that it would be more difficult for strangers to the victim to put forward a defence of consent with any credibility.

The committal in serious cases such as that of rape is designed to ensure that cases do not proceed to trial unless there is a substantial case against the defendant (Brereton and Willis, 1990). The discharge rate in Victoria at committals is around 10%. Whilst there are obvious advantages in being able to identify pleas of guilty at the committal stage, there is a generally low guilty plea rate at the committal in Victoria (ibid.).

It was predicted in one study (Peterson, 1989) that the introduction of DNA evidence would tend to push more cases to trial, particularly where the prosecutor refuses to bargain or the defence wishes to challenge the scientific evidence before a jury. An alternative viewpoint is that because DNA typing is likely to change the nature of defence in cases in which identity is in issue, plea bargaining may become more common (Marx, 1988).

The introduction of DNA profiling into the United States criminal justice system led to an increase in guilty pleas (McLeod, 1991; Neufeld and Colman, 1990). Few cases reached trial and the technique gained notoriety without having to endure examination. Apparently in England the mere mention of DNA evidence for the prosecution has generated guilty pleas (Alldridge, 1992). A pilot study in Maryland, United States, showed a higher frequency of convictions and guilty pleas among rape and other sexual assault cases when DNA profiling was utilized (Reagan et al., 1994). Has DNA profiling had a similar effect in Victoria?

The disposition of indictable charges without trial is of enormous benefit to the accused and the community (Bishop, 1989). A guilty plea will attract judicial leniency and contributes to conservation of court resources (ibid.); it also spares the victim from enduring the often harrowing trial process. Thus the possibility that DNA profiling would result in more guilty pleas may be an advantage to the criminal justice system as a whole.
C. Defence

Lack of consent to sexual intercourse is an essential element of the crime of rape (Waye, 1992) whilst consent is by far the most common defence raised in rape trials (McSherry, 1992; Scheffer, 1992). Thus scientific evidence indicating the act has taken place is often not required. Additionally, consent is not a defence in incest or sexual penetration cases. The remaining cases require extensive scientific examination to assist in exculpating or inculpating any suspects presented.

It has been thought that DNA profiling would be useful in cases where only identity and not consent is in issue (Scutt, 1990). Thus DNA profiling would have an impact on a minority of rape cases. According to Dr. Selinger of the ANU (Coelli, 1989) the issue of consent as opposed to denial will form the basis of nearly all rape trials in the future given the strength of DNA evidence. However, DNA profiling in rape cases may be performed not just on the seminal fluid indicating intercourse has occurred. DNA profiling on blood or pulled head hairs may indicate the degree of violence involved and negate the defence of consent, so that this evidence is useful not only in defences of identity. This study will investigate whether the advent of DNA profiling has changed the nature of the defence of the accused.

D. Trial Verdicts

It has been found in one study (Peterson, 1989) that the most important evidence variables predicting case outcome were a. defendant admissions/confessions and b. tangible evidence linking the defendant to the crime. The fraction of cases with scientific evidence linking the accused to the crime was so small that forensic science overall did not prove to be a major predictor of case outcome, and seldom was the forensic evidence alone sufficient to convict. However, semen evidence connecting the defendant to the victim was associated with higher conviction rates.

Studies have shown that contested sexual offence trials have a low conviction rate. Only 44% of 80 defendants pleading not guilty in one English study (Adler, 1987) were convicted of rape or attempted rape. A United States study (Mather, 1979) showed that of all offences tried before a jury, sexual offences had the highest rate of acquittal. One reason may be that the conflict is between the testimony of the defendant and the victim, and because it is a trying ordeal for victims to testify they may be reluctant witnesses.
DNA profiling should result in more successful prosecutions of sexual offenders, based on conclusive evidence of identity (Davies, 1991). Data collected thus far in the United States (Peterson, 1989) indicate very high rates of conviction of defendants linked to crimes through DNA profiling. A majority of these cases involved rape. The prediction that DNA profiling will result in a higher conviction rate will be investigated in this thesis.
5. Summary

There has been little research on the impact of scientific forensic evidence in general on the criminal justice system, although it has played a high profile role in recent criminal trials. The introduction of the new forensic technique of DNA profiling was accompanied by much fanfare but information to date has been mainly anecdotal. It was claimed that this technique was preferable over traditional methods because it was more definitive, solved more stranger type crimes, excluded more innocent suspects, and resulted in a greater proportion of guilty pleas. It was thought that the greatest impact of DNA profiling would be on sexual offences, as opposed to other violent crime. The defence issue would be one of consent once DNA profiling was utilised and that it would result in more successful prosecutions of these offences. The significance of the impact of the introduction of DNA profiling to the criminal justice system and its effect on the issues described above is analysed in this thesis.
Chapter Three

Methodology

This chapter outlines the type of study undertaken and the procedures used to gather and analyse the data. The first section gives a brief description of the methodology, whilst section 2 presents the research design where hypotheses are formulated for the application of the particular conceptual basis of this study. Operational definitions of key terms and dependant variables are given. Section 3 describes the sample population. Instrumentation in Section 4 describes the "tools" used for gathering the data and their limitations. Procedures are set out in Section 5, whilst the scope of the study and its limitations are set out in Section 6.
Section 1

Brief Description of Methodology

This study is an empirical one. Its general premise is that DNA profiling has had an impact on the criminal justice system in Victoria, but that this impact has been confined to the investigative area and to “stranger” type sexual offences. Nine hypotheses have been formulated in order to test this theory.

A summary of SFSL case records and an informal telephone interview with the investigating police officer (the “informant”) was compiled for each sexual offence case in each of four databases correlating to three time frames. Details of the crime, the individuals involved, the forensic and any other evidence in the case, and the proceedings and the final outcome were obtained and recorded for each case.

Sexual offence cases submitted to the SFSL for scientific examination were analysed in two time frames. Cases both with and without DNA profiling in the 2 year period July 1989 to June 1991 were compared in order to determine if cases DNA profiled were significantly different to cases not utilising DNA profiling. Cases in a 1 year period July 1987 to June 1988 prior to the advent of routine DNA profiling were compared with cases in a 1 year period July 1989 to June 1990 after the advent of DNA profiling, in order to determine the impact of the introduction of DNA profiling.

These cases were matched according to sufficient biological evidence, victim-offender relationship and nature of sexual offence. A number of dependant variables were examined approximating steps in the judicial process:

1. Unsolved cases.
2. Suspects discharged.
4. Contested trials.
5. Trial issues and verdict.

The percentage of total cases for the four different databases were analysed and compared according to these case dispositions. The inclusion and exclusion rate of suspects and the
degree of association of suspect with the crime was examined according to whether DNA or traditional techniques were used.
Section 2
Research Design

The method used an ex post-facto design.

(i) Databases.

When databases were compared, only sexual offence cases were considered.

There were four samples from three different frames. Diagram 1 depicts these databases.

The experimental group (A) had all cases exposed to DNA profiling and was in the 2 year period July 1989 to June 1991.

The two control groups (B and C) were not exposed to DNA profiling due to:

B- preceding the introduction of DNA profiling. This database was in the year July 1987 to June 1988.

C- (i) insufficient sample for DNA profiling. For a result using RFLP DNA profiling, sufficient crime sample is needed. This is usually > 1 drop of blood, > 20,000 sperm heads, or > 10 hair roots; and/or
- (ii) evidence in the case did not necessitate DNA profiling. This was determined by the forensic scientist in the case and/or the police investigator or squad. If controversial, the matter was resolved through negotiation of heads of department (police and laboratory). For example, if it was known that the defence would be fought on consent (where the act of sexual intercourse would not be contested and thus DNA profiling irrelevant) or if it was known that the accused may plead, then DNA profiling would not be performed as a matter of SFSL policy.

Database C was in the year July 1989 to June 1990.
Diagram 1: Four databases in three time frames.

- DNA: N = 97
- Non-DNA: N = 112
- C
- D

Timeline:
- 1989/09
- 1990/01
- 1987/88

Legend:
- B: Trail
The experimental group D were those cases in the year July 1989 to June 1990 that had biological sample available i.e. cases with DNA profiling and cases with traditional techniques in a 1 year period.

(ii) Hypotheses

Nine hypotheses were formulated in this study to evaluate the introduction of DNA profiling to the criminal justice system.

HYPOTHESIS 1. The overall impact of DNA profiling on crimes of violence and the criminal justice system will not be substantive as measured by the percentage of reported sex offences that utilise the technique.

HYPOTHESIS 2. The greatest impact of DNA profiling on a class of offences will be on sex offences.

HYPOTHESIS 3. DNA profiling is more definitive than traditional techniques.

HYPOTHESIS 4. DNA profiling has the greatest impact on stranger type sex offences.

HYPOTHESIS 5. DNA profiling results in the identification of more accused and more solved cases.

HYPOTHESIS 6. DNA profiling results in a greater proportion of guilty pleas.

HYPOTHESIS 7. DNA profiling is more useful in the investigative (pre-trial) stage than at the trial stage.

HYPOTHESIS 8. DNA profiling results in more consent issue trials.

HYPOTHESIS 9. A greater percentage of suspects are drawn into an investigation when DNA profiling is utilised.
(iii) **Operational Definitions**

The **independent variable** was whether or not DNA profiling was performed on the case examined. This variable was operationalised as the performance of DNA profiling on sexual offence cases submitted to the SFSL for investigation in the relevant time frame. It was operationalised in two ways: before and after the advent of DNA profiling.

**Dependent variables**

There were nine dependent variables as determined by the nine hypotheses.

1. Reported sex offences to the Victoria Police.
2. Sex offences as a class compared to other violent offences.
3. Result of biological examination.
4. Stranger type sex offences.
5. Solved cases.
6. Guilty plea cases.
7. Cases pre-trial versus trial.
8. Consent defence versus identity defence.
9. Percentage of suspects versus offenders.

(iv) **Definition of Terms**

Case: Each case refers to a sexual offence case submitted to the SFSL for forensic biological examination. They relate to offences prosecuted under the **Crimes Act 1958 (Vic)** and the **Crimes (Rape) Act 1991 (Vic)**. In most instances there is one victim and one offender. As the Victoria Police have adopted the Australian National Classification of Offences (Victoria Police Statistical Review 1987/88) this thesis also adopts the classification. Thus the principle of counting only one offence category for each victim in a case is adopted i.e. if a victim is raped by three offenders then one count of rape would be recorded.

**Sexual Offences:** These offences are all those where the main charge is a sexual assault upon an individual or (rarely) an animal (bestiality). These offences combine "rape" and
“sexual offence” as classified by the Victoria Police Statistical Review. “Rape” is sexual penetration without the victim's consent. “Sexual offences” as classified by the Review include indecent assault, sexual penetration of a victim under 18 years of age, incest, gross indecency and bestiality. For the purpose of this thesis, sexual offence is considered a generic term and incorporates both “rape” and “sexual offence” described above. The offence is broken down into further categories in the analysis of the data and these categories correlate to those of the Review.

**Child Offences:** Sexual offence cases including sexual penetration, incest and indecent assault on victims younger than 18 years of age.

**Stranger Rape:** Sexual offence cases where there was no indication of any previous relationship between the victim and the offender.

**Acquaintance Rape:** Sexual offence cases where some social interchange had occurred but there was no established relationship. Typically refers to the casual meeting in a public house or discoteque.

**Familiar Rape:** Sexual offence cases where there is evidence of an established prior relationship. It includes partners and ex-partners (domestic), relatives, family friends, work colleagues and friends.

**Reported Offences:** Those sexual offence cases reported to the police in a particular year.

**Cleared Offences:** An offence is cleared if, as a result of the investigation:

(a) it is determined that no offence was committed; or

(b) a person that is charged with committing the offence is officially warned by a police officer in lieu of being placed before the court; or

(c) the offender is known, but for legal reasons (e.g. a child under the age of eight) is not charged (Victoria Police Statistical Review).
**Proceeded Offences:** Offenders proceeded against for a particular offence are counted as an individual offender for that offence, irrespective of what other offences may be attributed to them. Thus the one individual offender may be recorded more than once.

**Unsolved Cases:** These are cases where the police could not identify any suspect as the potential offender. This includes cases where no suspect was ever located (may be due to poor memory of victim, no forensic evidence, no witnesses) or the only suspects were excluded through alibis or forensic evidence.

**Suspects Discharged:** Cases where the suspect is identified but not charged, committed or brought to trial. It may be a false report, insufficient evidence to go to trial, the suspect may have absconded and is unlikely to be found, or the suspect may have suicided before the trial.

**Guilty Pleas:** A plea of guilty to the charge at any stage of the proceedings until a final verdict by the jury. This may result through a confession or plea-bargaining.

**Contested Trials:** Those cases that result in a criminal trial where the evidence is contested.

**Guilty Verdicts:** A verdict by a jury, judge or magistrate that find the accused guilty.

**(v) Matching**

The databases A, B, C and D were matched on several variables considered to affect any of the dependent variables.

1. Sufficient evidentiary biological sample.

DNA profiling is not performed unless there is enough crime scene sample available to potentially obtain a profile. In many sexual offences (see data in Results chapter) there is no biological evidence, and in these cases there may be some confounding variable that may affect the dependant variable. For example, defendants may be more willing to go to trial if there is a lack of any biological evidence incriminating them.
2. Type and seriousness of sexual offence.

More serious offences may be more likely to go to trial, thus confounding the percentage of guilty pleas and contested trials. Child offences may also have more severe sentences, yet may be harder to proceed with due to the evidence of children needing corroboration.

3. Relationship between victim and offender.

Offences are classified according to the relationship between the offender and the victim - stranger, brief acquaintance and familiar. Non-stranger rape trials are harder to prosecute and win than the "traditional" street abduction rape (Waye, 1992). The lack of consent, an element of proof of the offence, is harder to prove.
Section 3
Selection of Subjects

The offences analysed were those submitted to the SFSL for forensic biological examination. These cases, however, are only a proportion of total offences reported to the police in the state of Victoria. In particular, the sexual offence cases analysed are only a proportion of all sexual offence cases reported (see Results chapter for data).

The offences were initially selected according to the definition of the offence as described in the Crimes Act 1958 (Vic), or more particularly, as described by the informant. These cases had not changed in classification in the years 1987 to 1991, the databases examined. Cases in the Biology Division are classified into homicides, sexual offences and “other” cases (which include attempted murder and robbery). When cases are submitted for DNA profiling to the Molecular Biology Section of the Biology Division of the SFSL the cases remain classified according to this structure. This is because the nature of the offence and sample determines the prioritization of the case. SFSL laboratory policy stipulates that DNA profiling is not performed on minor offences or where consent is the issue, due to the cost and time involved in the technique.

Sexual offence cases were classified according to whether the principal offence was of a sexual nature. For example, if there was a homicide/rape, this offence was classified as a homicide. If there was a rape charge (Statutory meaning) with additional charges of indecent assault, the offence would be classified as rape. All sexual offence cases described (in the three databases) were those to which the Crimes (Rape) Act 1991 (Vic) apply and define. Even though this Act was promulgated on the 1st January 1992, its classification of offences did not substantially alter from those in July 1987. The new Act was devised primarily to clarify the concept of consent (Waye, 1992).

Cases were also selected according to when they were submitted for analysis to the SFSL. Particularly in database A for DNA cases, a case may be submitted at a certain date but analysed, prosecuted and heard by a trial at a much later date. This may be due to case backlogs, delay from initial examination to DNA examination in the laboratory, and the sometimes appreciable delay in the criminal justice system from identification of accused to
trial adjudication. This study incorporates a case which was entered in 1990 for DNA profiling but the contested trial was not heard until May 1994.

Cases were analysed over three time frames. Sexual offence cases in the year July 1987 to June 1988 were in database B. The DNA profiling technique was effected routinely in July 1989. Thus database B encompasses those cases with no DNA profiling and where DNA had not been envisaged as a potential tool of evidence. The aim of analysing this group of cases was to provide a reference group for the impact of DNA profiling. The cases were selected according to whether there would have been sufficient sample for DNA profiling. This is to avoid any confounding variable that may exist if cases had insufficient sample for DNA profiling.

The DNA profiling cases analysed in database A were from a 2 year period from July 1989 to June 1991. These cases were those sexual offence cases with sufficient biological evidence for DNA profiling, and deemed to require DNA profiling by either the SFSL or the investigating police. A two year period was chosen in order to obtain a sufficient number of cases in the database (in the order of 100).

The third database, C, incorporated those sexual offence cases in the 2 year period from July 1989 to June 1991 where DNA profiling was not performed, essentially a control group. These cases were separated according to whether there was sufficient sample for DNA profiling or insufficient.

Finally, the fourth database D encompassed those cases that had a biological sample available in the year July 1989 to June 1990 and were either DNA profiled or had traditional typing techniques. These cases were analysed to determine the overall impact of DNA profiling on the criminal justice system on comparison with database B.

Generally, each case considered had one victim and one offender, thus one victim-offender relationship. However, in a minority of cases more than one offender raped one victim (multiple rape), or a number of victims were raped by one offender (a serial rapist). These cases were analysed according to a single victim-offender relationship, as the DNA profiling analysis was applied on a case by case basis or offender basis.
Section 4

Instrumentation

There was a combination of two survey instruments utilised. The first instrument was case records held in the Biology Division of the SFSL. This provided information as to nature and initial investigation and prosecution, if any, of the case. The second instrument was an informal telephone interview of the police officer in charge of the case, and (in cases utilising DNA profiling) the forensic scientist.

Each case submitted to the Biology Division of the SFSL is accompanied by a form giving brief details of the crime. These are, in general:

- nature of offence
- name and age of victim
- name and age of suspect (if any)
- whether suspect charged
- name and station of investigating police officer
- list of items for examination
- type of analysis requested
- brief report of circumstances
- whether consent an issue
- court dates if known.

Also accompanying each case file were a number of other reports, some more common (as in the forensic report detailing scientific results) than others (as in victim statements). This was no doubt due to the nature and role of the government agency holding the file (the SFSL). These reports included:

-Laboratory report, generally in the form of a Certificate of Scientific Tests (under the Evidence Act) or a Statement. These reports detailed the results of the biological analysis.
The aim of these reports is to supply the factual findings, to interpret them in the context of the case, and to assess their significance. In the case of DNA profiling, results were either a match or non-match with a suspect, and the estimated statistical probability of that match.

-Case notes of the scientist. These notes were detailed scientific workings of the examination undertaken by each scientist in the case and results. They sometimes included conversations with detectives and/or the DPP as to the progress and meaning of the case, for example, if no further examination was required.

-Medical report by the examining police surgeon. This is a report of the medical examination of the victim carried out as soon as practicable after the alleged offence. It provides details of any physical violence occasioned to the victim. Also it indicates any possible legitimate sexual intercourse, such as consenting sexual relations with a partner.

-Victim statements. These provide an overall perspective and summary of the alleged offence from the victim's point of view. They may be valuable regarding the victim-offender relationship and provide an insight into the offence not gained from statistical data.

Once a summary of each case was compiled from the above written reports, an informal telephone interview was held with each investigating police officer. Occasionally the relevant police officer could not be located and their associate or superior was interviewed. The result of the case and the importance of the forensic biological evidence was ascertained.
Section 5

Procedures

Case files are stored in the Biology Division of the SFSL. Thus they were easily accessed by the author, a scientist in this division. Approval to access and utilise the case files was given by the Director of the laboratory as long as absolute confidentiality was maintained. That is, no reference was made as to the identity of the victim or the defendant where the identity is not on public record. The Legal Advisers Office of the Chief Commissioner of Police was also consulted and stated there appeared to be no concerns for the Force, the justice system and the community, again provided confidentiality was upheld. The Human Research Ethics Committee at the University of Melbourne was also consulted and approved the ethics of the research. The relevant correspondence is attached to the Appendix.

Thus this thesis does not identify a particular suspect, victim or accused unless the accused has been convicted and that conviction published in daily newspapers and thus on public record. The victim was not identified in any case. The author had no direct contact with the victim, suspect or defendant of a case.

A summary of each case was prepared which included the relevant data. The DNA profiling cases of database A were examined initially. A continuing update on the progress of each DNA case was held informally with the relevant scientist and noted on the summary sheet. Databases B and C were then examined and summarized. If a case had "no examination required" on the file, then the analysis of the file ended and the case was not included in the database. If there was no biological sample available in database B, again the analysis of the file ended and the case was not included in the database.

The author then attempted to contact the relevant police informant of the case, generally by telephone although occasionally by personal contact. Sometimes the informant or associate could not be contacted, and thus the case was assigned "no information available", which did result in an appreciable percentage. The analysis of the file thus ended at this point and the case was not included in any database.

Once the informant was contacted, an informal interview was conducted. This involved general questions concerning the adjudication of the case, the relevance of the biological
evidence, and nature of the circumstances of the offence. Depending on the informant concerned, only minimal information was elicited, or a complete history with informant's views and other anecdotal data was obtained. Unfortunately this aspect could not be controlled.

The answers to the interview questions were then added to the initial summary of the case and a history of each case compiled.
Section 6

Limitations

A major concern of this study was the reliability of the information from which the data was drawn. Data was assumed “valid” from both the SFSL case files and from the police informant. Whilst the laboratory data could be double checked, the police information in cases other than DNA generally could not.

This thesis dealt with reported sexual offences. Rape is a much under-reported offence. Thus it is impossible to know how representative these reported rapes are of all rapes in the community. There may be fluctuations in reporting on a year to year basis that may be subject to other variables not considered in this study.

There is a sample bias in each database towards offences by “strangers”. This is because stranger type offences are less likely to be contested on the issue of consent. If consent is the issue then the fact of sexual activity is not important. Whether the victim consented to the act or not is the issue. The analysis of biological evidence is then corroborative or unnecessary, and the case is not submitted to the SFSL or is not examined.

It is difficult to determine whether consent will be a defence, even to the day of the trial, so that the need for DNA profiling in a case may fluctuate. The defendant has a right to make a “no comment” record of interview, and to reserve their plea and type of defence until the trial. Even if consent is declared at an early stage, the accused may change his mind, witnesses may refuse to give evidence, or videotaped records of interview may not be admitted in court. Some detectives may even prefer a “DNA match” over a confession (personal communication, Homicide Squad detective).

It is also difficult to determine reasons why accused plead guilty, why jurors convict, or why there is a particular defence. This is because the accused has the right of confidentiality and does not need to disclose any reasons for a particular action. Jurors also are expected to maintain confidentiality and not disclose why they chose a particular verdict. Thus the effect of DNA profiling on a case may not always be ascertained.
Other forensic evidence is not taken into account in this study. Evidence such as fingerprints and ballistics, non biological evidence, may affect any particular case. Very strong fingerprint evidence may sway a defendant to plead guilty - the absence of such evidence may even preclude a suspect being identified for an offence. Thus case disposition or other dependent variables may be affected and confound the results obtained.
Chapter Four

Results

This chapter presents the results of the survey. Section 1 analyses the type of offences that are DNA profiled compared to the total cases that are submitted for biological forensic examination. Numbers of sexual offence cases that are submitted for forensic examination are also compared with the numbers of sexual offences reported to the Victoria Police, in an attempt to determine any potential impact that DNA profiling may have on the criminal justice system as a whole.

Section 2 presents an analysis of the cases that are chosen for DNA profiling. Cases were examined according to their degree of association of suspect with the crime, the type of sexual offence DNA profiled, the final outcome of the case, and the relative proportion of suspects as compared to identified offenders drawn into the investigation.

Section 3 presents an analysis of four different sets of databases in order to determine the effect of the introduction of DNA profiling in two ways:

1. A comparison of sexual offence cases utilising DNA profiling with cases not utilising DNA profiling in the same time frame. This was performed in order to determine whether DNA profiling has a significant association with the type of sexual offence analysed and the case outcome; and
2. A comparison of sexual offence cases before the advent of DNA profiling with cases after the advent of DNA profiling in order to determine the impact of DNA profiling on the criminal justice system as a whole.
Section 1
Offence Analysis

The data analysis in this section attempts to answer the following questions: for what offences was DNA profiling performed, and what is the overall impact of DNA profiling. The first two hypotheses of this study were tested. The first hypothesis, that the overall impact of DNA profiling on violent crime will not be substantive, was tested according to the percentage of all cases submitted for forensic biological analysis that were analysed using DNA profiling. The second hypothesis, that DNA profiling will have its major impact on sexual offences, was tested according to the percentage incidence of reported sex crimes that were analysed using DNA profiling and the relative proportions analysed as compared to other violent crime.

(A) Initial Classification

The DNA profiling cases analysed were those cases selected for DNA profiling from a total number of cases submitted to the SFSL for biological examination. Cases were separated into homicides, sexual offences and “other offences” (which included attempted murder and armed robbery). Table 1 lists cases submitted for DNA profiling compared with the total number of biology cases according to the nature of the offence.

Table 1 shows that DNA profiling is performed on a minority of cases at the SFSL. Only 15% of all cases submitted to the Biology Division were considered suitable for DNA profiling. The greatest percentage of DNA profiling cases were sexual offences. Sexual offence cases comprised 65% of all cases DNA profiled (107 cases from a total of 165 cases). This is due in part to the predominance of sexual offence cases submitted for biological examination. Of all biology cases, 51% were sexual offences (558 cases of a total of 1094 cases). Table 1 also shows that there were 19% of sexual offence cases submitted for DNA profiling, and 11% of homicides and “other” cases submitted (58 cases of a total of 536 cases). Thus the prediction that DNA profiling would have its greatest impact on sexual offences as opposed to other serious crimes (Peterson, 1989; Reagan et al., 1994) is supported by Table 1. Hypothesis 2 of this study, that DNA profiling would have its greatest
impact on sexual offences, is supported in terms of the numbers of sexual offence cases DNA profiled.

**Table 1**

A comparison of cases submitted for DNA profiling in the years July 1989 to June 1991 with the total number of all cases submitted for biological examination.

<table>
<thead>
<tr>
<th></th>
<th>Homicides</th>
<th>Sexual Offences</th>
<th>Other Offences</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. of cases submitted</td>
<td>25</td>
<td>107</td>
<td>33</td>
<td>165</td>
</tr>
<tr>
<td>for DNA Profiling</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total No. of cases to</td>
<td>135</td>
<td>558</td>
<td>401</td>
<td>1094</td>
</tr>
<tr>
<td>Biology SFSL</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>% Total cases submitted</td>
<td>18.5</td>
<td>19</td>
<td>8</td>
<td>15</td>
</tr>
<tr>
<td>for DNA Profiling</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Data source: SFSL records, Biology Division.*

Data analysis in the following subsection attempted to answer the question: what percentage of reported sexual offences are analysed, and subsequently submitted for DNA profiling? This is so that the potential impact of DNA profiling on sex crimes can be postulated.

**(B) Sexual Offences**

**(i) Percentage of reported crime submitted for analysis**

Sexual offence cases initially submitted to the Biology Division were analysed in three time frames. It is from this total "pool" that the DNA profiling cases are drawn. These cases were compared with the total number of sexual offences reported to the Victoria Police, in order to determine the percentage of reported cases that are submitted to the SFSL. Table 2 categorises the number of offences reported into "rapes" and "other sexual offences", as these figures are obtained from the Victoria Police Statistical Review. Cases submitted to the SFSL are similarly categorised.
Table 2 shows that a small percentage of total reported offences of a sexual nature are submitted for forensic examination. There were 10% of total reported cases submitted in 1987/88, and 12% of total reported cases submitted in 1989/90 and 1990/91. A very low percentage of sexual assaults other than rape ("other sexual offences" which include indecent assault and incest) are submitted to the SFSL. These figures were only 2% or just under of reported "other sexual assault" in 1987/88 and 1989/90, and 4% in 1990/91. However, a much greater percentage of reported rapes are examined at the SFSL - a range of 36% (in 1990/91) to 43% (in 1989/90). This is probably because the offence of rape is more likely to have a crime scene sample, and require it to be analysed, than other cases of sexual assault. Cases of indecent assault incorporate many instances where there is no ejaculation. Reported cases of incest may occur long after the actual incident (sometimes years) so that any forensic evidence (if present) would have long since been washed away. There were approximately 3 times (in 1990/91) to a little over 5 times (in 1989/90) as many rapes submitted as other sex offences (Table 2).
<table>
<thead>
<tr>
<th>Cases reported to police</th>
<th>Other sex offences</th>
<th>Rape offences</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>279 (12)</td>
<td>64 (4)</td>
<td>215 (36)</td>
<td>590</td>
</tr>
<tr>
<td></td>
<td>43 (2)</td>
<td>236 (43)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>39 (2)</td>
<td>192 (42)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Time Frame</th>
<th>1/7/87 to 30/6/88</th>
<th>1/7/89 to 30/6/90</th>
<th>1/7/90 to 30/6/91</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>458</td>
<td>553</td>
<td>1782</td>
</tr>
<tr>
<td></td>
<td>2240</td>
<td>2641</td>
<td>1752</td>
</tr>
<tr>
<td></td>
<td>2342</td>
<td>236 (43)</td>
<td>590</td>
</tr>
<tr>
<td></td>
<td>64 (4)</td>
<td>215 (36)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>43 (2)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 2

Comparisons of sexual offence cases reported to the Victoria Police

(ii) *Examination*

Not all cases submitted for forensic analysis are subsequently examined. The following analysis was performed in order to determine the proportion of cases submitted for analysis that were never actually analysed. Table 3 lists the number of all sexual offence cases submitted to the Biology Division of the SFSL compared to the number of these cases that were not examined.

**TABLE 3: Comparison of Sex Cases Submitted With Those Examined.**

<table>
<thead>
<tr>
<th>Time Frame</th>
<th>Total No. of Sex Cases</th>
<th>Cases Not Examined</th>
<th>% Cases Not Examined</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/7/87 to 30/6/88</td>
<td>231</td>
<td>69</td>
<td>30</td>
</tr>
<tr>
<td>1/7/89 to 30/6/90</td>
<td>279</td>
<td>68</td>
<td>24</td>
</tr>
<tr>
<td>1/7/90 to 30/6/91</td>
<td>279</td>
<td>73</td>
<td>26</td>
</tr>
</tbody>
</table>

*Data source: SFSL records, Biology Division.*

Table 3 shows that the percentage of all sexual offence cases that were not examined did not change appreciably from 1987 to 1991 (a range of 24% to 30%), although there was a trend to a slight decrease. This decrease may have been caused by the advent of DNA profiling (see Discussion chapter). Cases are not examined if charges are subsequently withdrawn, dismissed or culminate in a plea of guilty and these procedures have taken place or are likely
to take place before the forensic examination. The examination may take a month or so after the case has been submitted and sometimes steps in the judicial process (such as the complainant withdrawing the complaint or an early identification of a guilty plea) may make any forensic examination unnecessary. It is often not known why cases submitted for examination are no longer required: this data has not been regularly recorded at the SFSL. Again, because these cases are not examined it is not known what proportion have a crime scene biological sample. Finally, at this early stage of the judicial process, Table 3 shows that on average 74% of sexual offence cases submitted to the SFSL are examined and that there is further attrition in the numbers of reported sex cases.

(iii) Biological sample available

A proportion of sexual offence cases do not have any forensic sample available. The following analysis was performed in order to determine what percentage of cases had a biological crime scene sample available. Table 4 compares sexual offence cases from three time frames according to the type of analysis, whether there was information about the case or not, and whether there was a biological crime scene sample available.

Table 4 shows that 39% of 1987/88 cases and 36% of 1989/90 cases that were examined and had information available had no suitable biological sample (body samples from the offender such as semen) for forensic analysis. These cases would thus have no potential for either DNA profiling or traditional typing, simply because an adequate sample is needed for either of these testings. Thus an appreciable percentage of sex offences (about 37% on average in this study) have no potential for DNA typing, even if other circumstances warrant it, such as the accused denying their presence at the crime scene.
<table>
<thead>
<tr>
<th>Sample Biological with No Cases</th>
<th>Sample Biological Available Information</th>
<th>Examined Cases</th>
<th>Type of Analysis</th>
<th>Time Frame</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
<td>46</td>
<td>DNA</td>
<td>1/7/89 to 30/6/90</td>
</tr>
<tr>
<td>57</td>
<td>55</td>
<td>46</td>
<td>DNA</td>
<td>1/7/89 to 30/6/90</td>
</tr>
<tr>
<td>39</td>
<td>89</td>
<td>128</td>
<td>Non-DNA</td>
<td>1/7/87 to 30/6/88</td>
</tr>
<tr>
<td>0</td>
<td>0</td>
<td>97</td>
<td>Non-DNA</td>
<td>1/7/89 to 30/6/91</td>
</tr>
</tbody>
</table>

Data source: SFSL Records.

Year 1 1988/90 that were DNA profiled, not necessarily in the one year and thus were not included (see Table 3 for total numbers). b. There were 49 cases in the year 1 1987/88 that were DNA profiled some three years later.
Summary

The above analysis gives an appreciation of the small proportion of all reported violent crime cases where DNA profiling is potentially useful. Only 15% of all violent crime cases submitted for forensic examination at the SFSL was considered suitable and analysed using DNA profiling (Table 1). The majority of 85% of violent crime cases was either not analysed, had no crime scene sample available to perform any genetic typing, or was analysed with traditional techniques. Whilst other issues are involved (and discussed later in this thesis) this finding supports the first hypothesis of this study: that the overall impact of DNA profiling on violent crime would not be great.

There were 11% of total violent crime cases other than sex offences (homicides and “other offences”) that were considered suitable for DNA profiling; 19% of all sexual offences submitted to the SFSL were considered suitable for DNA profiling (Table 1). The majority of cases DNA profiled (65%) were sexual offences (Table 1). This finding supports the second hypothesis of this study in terms of numbers: that the greatest impact of DNA profiling on a particular class of offence would be on sexual offences.

Only 11% average of all reported sex crimes to the police were subsequently submitted to the SFSL; however, 40% on average of reported rapes were submitted (Table 2). There were between 3 and 5 times as many rapes submitted as other sex offences (Table 2).

Twenty six per cent of submitted sex cases were never examined (Table 3). Of the 74% that were examined, 37% did not have a biological sample and so would be unsuitable for DNA profiling (Table 4). Thus there was a considerable attrition of cases through even the initial steps in the criminal justice system, from reporting to the police to biological analysis. Figure 1 gives a schematic diagram of the attrition of rape cases from reporting the offence to the police to determining if a sample is available (and thus the potential for DNA profiling).

The progress of a rape case through this scheme was considered. On average just 28% of reported rapes were examined at the SFSL - 40% of reported rapes are submitted and of these 74% are examined. The figure of 28% is further reduced because on average 37% of
these cases had no biological evidence linking the assailant with the victim. Thus just 17% of reported rapes would have the potential for DNA profiling. Additionally, DNA profiling is not performed if it is known that consent is the issue, a further avenue of attrition. The conclusion is that even in offences where it would have the most impact (sex offences) and where a sample would most likely be available (rapes), the percentage of the total reported cases (17%) where DNA profiling could potentially be used is indeed quite small. Nevertheless, this percentage may be quite important, as is seen in the next sections.

This result again supports the first hypothesis of this study - that the overall impact of DNA profiling on crimes of violence with respect to the number of offences would not be great - and answers the question why.
Figure 1: Attrition of rape cases

- 100% Rapes reported to police
- 40% Submitted for analysis
- 28% Examined
- 17% Biological sample available = DNA potential
Section 2
DNA Profiling Cases

(A) Population Analysis

This subsection attempted to determine the nature of the sex offence cases DNA profiled with respect to the type of offence and victim/offender relationship and the result of the DNA analysis in order to determine what cases are DNA profiled and how meaningful is the result.

Cases for the two year period July 1989 to June 1991 were classified as database A. There were 107 sexual offence cases submitted for DNA profiling (Table 1); 97 cases were examined (91%, Table 4). Cases were not examined as a result of information from the police informant: the charges may have been dropped or the accused may have already pleaded guilty. The technique is expensive and time consuming, so that unless it is known that the analysis is to be an integral part of the case, DNA profiling is not performed.

(i) Association

Data was analysed to test hypothesis 3 of this study, that DNA profiling is more definitive than traditional techniques. The following analysis was performed in order to determine if the scientific results in the DNA profiling cases (database A) had a greater degree of "association" than results in cases with an appropriate sample available using traditional techniques before the advent of DNA profiling (database B).

Table 5 classifies cases according to whether there was a "match" or "non-match" between the suspect's blood sample and the crime scene sample, no result or an inconclusive result was obtained, or the analysis was not performed.
**TABLE 5: Association Between Suspect And Crime Scene**

<table>
<thead>
<tr>
<th>Database</th>
<th>No. of Cases</th>
<th>Match/Non-match</th>
<th>No Result/Inconclusive</th>
<th>Not Done</th>
</tr>
</thead>
<tbody>
<tr>
<td>A) DNA Cases</td>
<td>107</td>
<td>82</td>
<td>15</td>
<td>10</td>
</tr>
<tr>
<td>B) 1987/88 Biological Crime Scene Sample Available</td>
<td>78</td>
<td>8</td>
<td>13</td>
<td>57</td>
</tr>
</tbody>
</table>

A large proportion of cases before the advent of DNA profiling (73%, 57 of 78 cases) had no typing analysis performed, as compared to just 9% (10 of 107 cases) of DNA profiling cases (Table 5). In most of the cases where the traditional type analysis was deemed to be not required and thus was not done it was due to an early notification of a consent defence (and thus the result of an association or not would be irrelevant) or an early settlement of the case (such as the complainant withdrawing the complaint).

However, in 9 of the traditional cases where the analysis was not done (11.5%, 9 of 78 cases) the analysis was deemed to be an integral part of the investigation. The suspect refused a request by the police for a reference blood sample. Like DNA profiling, traditional techniques require a reference blood sample from the suspect. Prior to the **Crimes (Blood Samples) Act**, enacted in 1989, a suspect could refuse a blood sample when requested to give one. There were no suspects in the DNA profiling cases who ultimately refused to give a blood sample (if they initially refused, a court order was obtained under the Crimes Act). Thus a greater potential for degree of association or disassociation in the DNA profiling cases could occur through the avenue of an Act of Parliament, forcing suspects to give reference blood samples.

There was a result for 82 of the DNA profiling cases, as compared to 15 cases with no result (Table 5); that is, 84% (82 of 107 cases) of cases that were analysed using DNA profiling yielded associative or disassociative results, either including or excluding the suspect as a possible offender. Subsection C gives inclusion/exclusion data for suspects. There was a
result for only 8 of the cases before the advent of DNA profiling as compared to 13 of these cases with no result; that is 38% (8 of 21 cases) of cases utilising traditional techniques yielded associative results - none of these traditional cases excluded the suspect.

The hypothesis that DNA profiling is more definitive than traditional techniques is supported by the above results.

(ii) Type of sexual offence

The type of sexual offence analysed through DNA profiling was categorised according to rape/indecent assault, aggravated rape and child sexual offences (see Methodology). Table 6 lists the proportion of these offences compared to the total examined.

<table>
<thead>
<tr>
<th>Offence</th>
<th>Profiling Number</th>
<th>% Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rape/Indecent Assault</td>
<td>67</td>
<td>69</td>
</tr>
<tr>
<td>Aggravated Rape</td>
<td>14</td>
<td>14</td>
</tr>
<tr>
<td>Child Offences</td>
<td>16</td>
<td>17</td>
</tr>
</tbody>
</table>

Clearly from Table 6 the most prevalent sexual offence where DNA profiling is utilised is that of rape/indecent assault - 69% of all cases. The category of rape/indecent assault here also includes attempted rape and indecent assault, where no penetration has occurred. Nevertheless there may be forensic evidence of seminal fluid present in these cases; for example the assailant may have masturbated on the victim.

Aggravated rape offences are the least common category. The possibilities for DNA profiling are greater in these type of offences, as blood may be shed or hair pulled and DNA profiling may be performed on these body samples as well as on any possible seminal fluid. However, a minority of offences have aggravating circumstances (SFSL records).
DNA profiling of cases where the victim is a child as opposed to an adult are in the minority. There were 17% of offences where the victim was a child (Table 6). This is no doubt due to the time delay in reporting to the authorities when children are concerned. Sometimes the offence has occurred many years, or even decades, previously. The forensic evidence may also be argued to have been placed there legitimately, such as seminal fluid in the father's bed where the father allegedly assaulted the daughter, so that there is no need for a comparative analysis. Of course, child sex offences may be the least reported category of all sexual offences.

(iii) Victim-offender relationship

The nature of the relationship between the victim and the offender was categorised for all DNA profiling cases examined according to (a) gender and (b) stranger, acquaintance and familiar categories.

(a) Gender

Victims and offenders for each DNA profiling case were categorised according to their gender. Table 7 lists the total number of victims and offenders according to gender for database A.
TABLE 7: Gender Relationship in DNA Cases

<table>
<thead>
<tr>
<th></th>
<th>Victims</th>
<th>Offenders</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female</td>
<td>97</td>
<td>-</td>
</tr>
<tr>
<td>Male</td>
<td>4</td>
<td>104</td>
</tr>
</tbody>
</table>

There were no cases where there were either victims or sexual assaulters with a mixture of gender i.e. a male and a female victim. There were also no female sexual assaulters. Each case with a male victim involved a single male to male encounter. Two of the male victims were children (8 and 14 years of age) and two victims were adult.

(A) Nature

Table 8 lists the proportion of these cases examined according to the total number DNA profiled for the degree of acquaintance between the victim and the offender.

TABLE 8: Relationship Between Victim and Offender

<table>
<thead>
<tr>
<th>Relationship</th>
<th>Number</th>
<th>%Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stranger</td>
<td>51</td>
<td>53</td>
</tr>
<tr>
<td>Acquaintance</td>
<td>16</td>
<td>16</td>
</tr>
<tr>
<td>Familiar</td>
<td>30</td>
<td>31</td>
</tr>
</tbody>
</table>

Table 8 shows that the most prevalent sexual offence cases DNA profiled were the "stranger" type crimes where the victim did not know their assailant, and frequently could not identify them later. The lack of identification was either due to the victim being blindfolded, the assailant wearing a mask or similar, or the offence occurring at night. Case 1 describes a typical example.
*Case 1.*

The victim was a woman in her mid-30's who was attacked in her own bed late one night by an unknown male. He had got in through an open back door. She could not later identify him as he was wearing a pillow case on his head. He forced her to masturbate him. A suspect was located who had made suggestive comments about her at the local hotel. Seminal stains on her bedsheets and nightdress were DNA profiled and did not match this suspect. The suspect was thus eliminated from the investigation. The serial Armadale rapist later admitted to this offence (amongst others) and pleaded guilty. This offence was originally not believed to be part of the series as it was in a different locality.

Hypothesis 4 of this study, that DNA profiling will have the greatest impact on stranger sex offences, is supported by the above results.

(B) Case Disposition

The following data analysis was performed in order to determine the relative proportions of the final outcome of the DNA profiling cases. This was done to test three hypotheses of this study: that DNA profiling would result in more solved cases and the identification of more accused (Hypothesis 5), more guilty pleas (Hypothesis 6) and would be more useful in the pre-trial stage of an investigation (Hypothesis 7).

Figure 2 gives an analysis of the numbers and proportion of total sexual offence cases DNA profiled. Each disposition category is discussed more fully in the following subsections.

It can be seen from Figure 2 that only a small proportion of all DNA cases result in a contested trial (less than one quarter). There were 58% of cases where an individual was prosecuted - 35% of these cases were resolved by plea and 23% by contested trial. A substantial percentage of DNA profiling cases (42%) had no prosecution.

Thus the utilisation of DNA profiling appears to be in the earlier stages of the investigation, before the trial process. This finding supports the hypothesis that DNA profiling is more useful in the pre-trial stage of an investigation.
DNA cases (N=97)

- 34%
- 23%
- 18%
- 22%
- 19%
- 1%

Sexual offence cases utilising DNA profiling in the years July 1989 to June 1991

Figure 2
(i) Unsolved Cases

These cases were those where a suspect was eliminated through DNA profiling and the case was currently unsolved (as at June 1994). As 18% of DNA cases are unsolved (some 18 cases in all in a 2 year period, Figure 2) this is quite an appreciable number. DNA profiling is not the ultimate identifier that some suggest it to be. DNA profiling cannot provide the name of a suspect - the suspect must first be identified by some other method such as fingerprints, previous similar convictions or eyewitnesses. The investigating police must put forward the individual to be tested.

However, whilst these unsolved cases that are DNA profiled are a concern for the community, they need to be put into perspective. As a percentage of total reported rapes (1.6%, 18 cases from 1143, Table 2) they are not significant. Conversely, not all unsolved sexual offences are sent for DNA profiling as there may be no biological evidence present. Those unsolved crimes not sent for DNA profiling but nevertheless examined forensically are analysed in the next section.

All of these unsolved DNA cases were stranger rapes where the victim could not identify the offender and they generally occurred in the victim’s home. The following case study illustrates this point.

Case 2
The victim was in bed in her home in the early hours of the morning when she was blindfolded and assaulted by a male stranger. Seminal stains were detected on the bedsheets and the crotch of the victim’s underpants. A suspect was located who had recently been released from gaol for a sexual assault with a similar modus operandi. This suspect denied this particular offence and willingly gave a blood sample. DNA profiling excluded him as the source of the semen of the crime and the case is currently unsolved.
(ii) Suspect discharged

These cases are determined to be "solved" by the police and the file is closed. Either a suspect has been identified for the offence by the police but has not and will not be charged, committed or brought to trial, or the offence has been identified as a "false report" where the victim was believed to have fabricated the crime. Just under one quarter of DNA cases (23%) fell into this category (Figure 2). The following case study illustrates an alleged offence where there were two suspects identified as potential offenders for the crime, yet whom were not charged.

Case 3
The victim was an intellectually disabled 17 year old girl and was walking home from a special school when she was accosted by two young brothers, one of whom she knew through school. They lured her to their house where they allegedly raped her. Blood on bedding of the house was DNA profiled and matched the victim with the probability of a chance match of 1 in 11. However, due to the paucity of other evidence - no admissions from suspects and victim retarded - the brief was not authorised and no charges were laid.

There were two cases utilising DNA profiling where the complainant had been identified by the police as fabricating the offence or the suspect was falsely accused- a “false report”. In both of these cases the DNA profiling result excluded the suspect as the source of the biological stains profiled and assisted in preventing charges being laid. These two cases are described below.

Case 4
The complainant alleged she was sexually assaulted in her flat by the suspect, who was well known to her. Seminal stains were detected on a chair and rug of the lounge room, but none on her clothing as she claimed. The suspect denied all allegations. Blood from the suspect did not match these stains when DNA profiled. The complainant then withdrew the complaint.
Case 5

The complainant was a prostitute from St. Kilda and claimed that she had been raped by the suspect. He denied any offence but said that there had been a disagreement over money. DNA profiling excluded him as the source of the seminal fluid from the complainant. Thus the complainant’s story was not substantiated and no charges were laid. Initially the suspect was strongly implicated as he had prior convictions for aggravated rape.

(iii) Guilty pleas

The greatest proportion of DNA cases resulted in a plea - 35% of all cases DNA profiled (Figure 2). Guilty pleas by the accused were entered at either the committal (7 cases) or trial (27 cases) stage. The reasons for entering a plea of guilty are not always revealed but in several cases a guilty plea was entered after incriminatory DNA profiling evidence was presented prior to or at the committal proceedings. Case 6 is an example of the suspect pleading guilty at the committal.

Case 6

The victim was a tourist from London who had an argument with her boyfriend whilst out on the town one night. She decided to walk home alone as she thought Melbourne was a safe city. She was accosted by a male stranger who raped her. A suspect was picked up the next evening in a neighbouring suburb assaulting a girl with a cricket bat. Seminal stains on the tourist’s skirt were DNA profiled and matched the suspect’s blood with a probability of a chance match of 1 in 6 million. On being informed of the DNA result the suspect immediately confessed and pleaded at the committal. He was sentenced to 5 years gaol.

A reasonable inference from case 6 would be that the DNA profiling result had some influence in the accused pleading guilty. Of the 34 cases where a guilty plea was entered (Figure 2) there were 23 cases where DNA profiling was ultimately an issue and 11 cases where DNA profiling was not an issue. Thus 68% (23 of 34) of plea cases were affected by the results of DNA profiling, a majority. All of the 23 cases where DNA profiling was an issue had a “match” of the suspect’s blood sample with the crime scene sample. The degree of this match varied from a minimum of a 1 in 7 chance match with another individual, to a maximum of a 1 in 400 million chance i.e. extremely unlikely that anyone other than the suspect had a matching DNA profile.
The above results support the hypothesis that DNA profiling would have an impact on the number of guilty pleas.

(iv) Contested trials

The final stage in the judicial process as considered in this thesis is the contested trial. Contrary to popular perception, a minority of all DNA cases resulted in a contested trial. There were 22 cases from a total of 97 cases that proceeded to a contested trial (Figure 2). Table 9 compares the main issue at trial with the trial verdict for these 22 cases. Figure 3 illustrates whether there was a "match" of DNA evidence according to verdict for the defence of identity.

Table 9 shows that most contested trials of DNA cases are fought on the issue of consent (14 cases) as opposed to identity (8 cases). Once consent has been identified as the main defence the DNA profiling is not a point in issue, even though it may have been a "persuader" to change the nature of the defence from identity to consent during the course of the prosecution.

Only in three cases where identity was in issue did DNA profiling link the accused and the offence - there was a verdict of guilty in all three (Figure 3). The other 19 contested trials had either consent as the main defence, or the DNA profiling result did not link the accused with the crime. The only cases where DNA profiling could be considered critical evidence in the trial were the three cases where there was a link through DNA profiling and identity was the main defence. The degree of the match varied from a probability of a chance match of 1 in 175 to 1 in 15,000. These probabilities are quite conservative and not of the high orders of magnitude as commonly quoted and condemned by critiques of the technique (Lewontin and Hartl, 1991).
was issue and the verdict guilty.

b. There were also no results in another two cases where identity
the verdict was not guilty had no incriminating DNA evidence.
a. The three cases where the assailants identity was in issue and

<table>
<thead>
<tr>
<th>22</th>
<th>8</th>
<th>14</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>9</td>
<td>3</td>
<td>6</td>
<td>Not Guilty</td>
</tr>
<tr>
<td>13</td>
<td>5</td>
<td>8</td>
<td>Guilty</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Consent Identity</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Verdict Main Issue at Trial</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 9 DNA profiling cases that resulted in a contested trial and the main issue of the defense contested: consent versus identity with the assailants trial verdict.
<table>
<thead>
<tr>
<th>No Match</th>
<th>Match</th>
<th>Verdict</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>3</td>
<td>Guilty</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Not Guilty</td>
</tr>
</tbody>
</table>

With the resultant verdict total, evidence of a match or non-match was compared.
The three cases quoted above represent just 3% of all cases DNA profiled (3 of a total of 97, Figure 2). The proportion of reported rapes to the police that are suitable for DNA profiling is estimated to be 17% (Figure 1). Thus an estimated 0.5% (3% of 17%) of reported rapes result in a contested trial where DNA profiling is critical.

The above figures support hypothesis 7 that DNA profiling is less useful at the trial stage, contrary to popular opinion in legal circles. The majority of the literature on DNA profiling has focused on its application in the court room. This study suggests that the real impact of DNA profiling has been elsewhere (i.e. pre-trial) and that perhaps more attention needs to be paid to these areas.

The following case study shows how DNA profiling may be used as a persuader before the trial to change the nature of defence from identity to consent.

Case 7

The victim was at a discotheque when offered a lift home by the three accused (one male and two females). Once at her home, they bashed and robbed her and the male raped her. All three accused initially denied all offences. Seminal staining on the victim's bedding was DNA profiled and matched the male accused's blood with a probability of a chance match of 1 in 1.6 million. The two females then pleaded guilty to kidnapping and theft, whilst the male fought the rape charge on consent at the trial. The accused was found guilty by a jury and received a 6 year gaol sentence.

Case 7 shows that sometimes it is difficult to isolate the effect of DNA profiling from other variables, such as plea bargaining and the nature of the defence chosen by the accused. The two females' plea of guilty in case 7 may have had some influence on the change of defence of the male offender.

When consent is the pivotal point in the trial then the fact of a match with DNA becomes irrelevant. The following case study illustrates this point.
Case 8

The victim was a student and part-time escort girl. She drove to an arranged escort job where she picked up the accused, who allegedly gagged, assaulted and raped her holding a knife to her throat. She was then abandoned without her car. Seminal staining on the victim was DNA profiled and matched the accused's blood with a probability of a chance match of 1 in 2900. At the trial the accused did not deny sexual intercourse and stated the victim consented. The victim's sexual history and profession was a significant issue. The accused was acquitted by the jury.

(v) Unheard case

This case had not been finalised (as at June 1994) although it is determined to be “solved” by the police. The accused is on a charge of rape for a young Victorian girl. However he is currently serving a 5 year gaol term interstate for an attempted murder committed shortly after the alleged rape. Thus this case outcome can only be categorised as unheard.
C. Suspects and Offenders

Data was prepared to determine how DNA profiling is used in an investigative sense. Hypothesis 9 of this study, that more suspects are drawn into an investigation when DNA profiling is utilised, was tested. The relative numbers of suspects drawn into an investigation as compared to identified offenders was calculated, and the proportion of these that were subsequently excluded.

(i) Inclusion and exclusion of suspects

Table 10 shows that there was a total of 132 suspects in the 97 cases examined. Using DNA profiling there were 52 of these suspects excluded through a “non-match” with the crime scene and the suspect’s blood, and 53 suspects included through a “match”. The remaining cases had no identifying DNA present. Thus approximately equal numbers of suspects are excluded as included (39% versus 40%).

| TABLE 10: Numbers of Suspects included/excluded through a Match or Non-match of DNA Profiles |
|--------------------------|-----------------|-----------------|-----------------|-----------------|
| Cases | Total Suspects | Included Suspects | Excluded Suspects | Included by Traditional/Excluded DNA |
| 97 | 132 | 53 | 52 | 22 |

It has been predicted that the most powerful effect of DNA profiling would be through exonerating suspects not excluded by routine methods (Office of Technology Assessment, 1990). There were 22 suspects from a total of 132 suspects excluded through DNA profiling who were not excluded by traditional techniques (Table 10). One case had 12 suspects where the seminal staining on the victim had the same routine blood type as the victim herself - thus traditional typings could not exclude any of the suspects whilst DNA profiling could resolve the issue and eventually excluded all 12 suspects (the case is currently unsolved). Most of the suspects excluded through DNA profiling had no traditional
technique comparison performed on their blood sample. This is because there may not have been enough crime scene sample to perform more than one test, and DNA profiling is treated as the preferred option. All of these tests are destructive, where the sample is destroyed in the course of the test.

The above results negate the commonly held conception that DNA profiling is the tool for identification. It is just as much a tool for exclusion. However, the concept is dependent on police practice. The police may be involving more suspects through DNA profiling than otherwise. This aspect is discussed in the following chapter.

The original suspect in the Pitchfork case (Wambaugh, 1989) was excluded through routine biological typing. However, the police still charged this individual and did not drop the charges until DNA profiling evidence excluded him as the source of the semen on the victims. There were no cases in this study where DNA profiling was performed if routine methods had excluded the suspect (SFSL policy).

Just as importantly, has DNA profiling been used to exclude a suspect yet had no impact on the decision to prosecute or the trial decision? There were 4 cases where DNA profiling excluded the suspect as the source of the biological evidence. However, in all of these cases it was determined by the investigating police that the particular evidence DNA profiled was not related to the offence. Two of these cases are described below.

Case 9

The accused was a friend of the victim's family and was staying with them for a few nights. The adults had all been drinking and it was alleged that the accused went to the bedroom of the victim (a 3 year old girl) and digitally penetrated her and ejaculated on her bed. Seminal stains were detected on the bed sheets, but when DNA profiled did not match the accused. However, apparently others used this bed and the owners of the house were not overly fastidious so it was deemed that these seminal stains were not related to the offence. The accused confessed at the record of interview and pleaded guilty. He received 8 months gaol.
Case 10

The accused was a senior mental retardation nurse in a home and it was alleged that he raped a female inmate in her room on a mat at the edge of her bed. The case was one of 69 charges of rape by the accused on a dozen or so inmates of the home. Seminal stains on the mat were DNA profiled but did not match the accused. It was believed by the police that the victim had had several boyfriends and that these seminal stains were not related to the offence. The victim was intellectually disabled and her evidence was videotaped. But she was unable to get in the witness box to verify the truth of the videotape and the magistrate dismissed the case at committal. However, the other charges on the other victims were subsequently proven and the accused was sentenced to 2 years gaol.

It can be seen from the above two case studies that it is important that the biological evidence DNA profiled can be shown to be related to the offence.
(ii) *Multiple suspects and offenders*

The majority of all offences DNA profiled were committed by lone men (as in Keating et al., 1990). Table 11 (below) examines the total numbers of victims, offenders and suspects for DNA profiling cases.

**TABLE 11: Numbers of Suspects versus Offenders**

<table>
<thead>
<tr>
<th>Cases</th>
<th>Victims</th>
<th>Offenders</th>
<th>Suspects</th>
</tr>
</thead>
<tbody>
<tr>
<td>97</td>
<td>101</td>
<td>104</td>
<td>132</td>
</tr>
</tbody>
</table>

The most striking comparison in Table 11 is the number of suspects versus the number of offenders. There was an additional 28 suspects over offenders i.e. 27% more suspects than offenders.

All DNA profiling cases had suspects. A comparison sample from a possible offender must be provided for DNA profiling analysis. This is also the situation using traditional techniques. However, before the advent of DNA profiling there was no recourse to a compulsory blood sample through the *Crimes Act 1958*, so that if a suspect refused a blood sample a comparison could not be done.

It was then considered whether the technique of DNA profiling is used by the police to include more suspects in an investigation than otherwise. Do the police round up more suspects because they have greater confidence in the new technique? The answer to this question will be attempted in the database analysis in the next sections.

(iii) *Stranger and Serial Rapes.*

It has been postulated that DNA profiling would have its major impact on the investigation of serial rapes (Davies A., 1991) and single stranger type rapes. DNA technology is hoped to provide laboratories with improved tools to link offences committed by the same individual and to identify otherwise unknown assailants via access to a database composed of DNA profiles of prior offenders (Peterson, 1989). The following analysis attempted to determine
how and in what way DNA profiling has been used in cases where there was more than one suspect provided by the police as a possible offender.

(a) Serial Rapes

There were 3 serial rapes that used DNA profiling in database A. All of these cases had extensive publicity through the media due to the nature of the offences. In all cases the victims were alone and assaulted in their homes by an unknown (stranger) male in a surprise attack. Each serial was named by the police according to the locality of the offences.

The Armadale Rapist: Both routine and DNA techniques were used in this investigation. There were 15 suspects provided by the police who were excluded through traditional techniques. There were a further 2 suspects who were excluded through DNA profiling who were not excluded through traditional methods. The accused was eventually caught through other means (apprehended in the act of burglary) and confessed to the series. The accused entered a plea of guilty at the trial. His blood sample also matched another case in database A (described in Case 1) that was initially not connected to the series (due to it being in a different locality) and the accused also pleaded guilty to this offence.

The Clifton Hill Rapist: There were 2 suspects excluded through DNA profiling. The third suspect confessed before DNA profiling was performed.

The (X...) Rapist: There were 2 victims, and 2 suspects were excluded through DNA profiling. This series is currently unsolved and is not identified.
(b) Stranger Rapes

There were 5 other cases in database A where more than one suspect (but only one offender identified by the police) was involved. These were all "stranger" rapes where the nature of the offence and its notoriety warranted DNA profiling.

- A young girl was abducted and raped. There were 12 suspects excluded through DNA profiling. This case is currently unsolved.

- A young woman ran into the path of a car and died after a sexual assault. DNA profiling was used to exclude 2 suspects. The case is currently unsolved.

- A woman was raped in Melbourne city gardens walking to work early one morning. DNA profiling excluded 4 suspects. The case is currently unsolved.

- A woman and her stepchild were raped in their own home in front of the father. DNA profiling excluded 3 suspects. The case is currently unsolved.

- A young Caucasian woman was raped by a stranger of Aboriginal appearance. There were 2 suspects excluded and 1 suspect included through DNA profiling. The included suspect pleaded guilty.

The above results support the hypothesis that DNA profiling has an impact on stranger type rapes and is used as an investigative tool. This data is compared with stranger rapes in other databases later in this thesis.

Summary

This section illustrates that DNA profiling is more definitive than traditional techniques and supports Hypothesis 3 of this study. There were 82 out of 107 cases that were DNA profiled that yielded an associative or disassociative result (Table 5). Only 8 of 21 cases using traditional techniques yielded associative results - none of these cases yielded disassociative
results. There were also 22 suspects from a total of 132 suspects (17%, Table 10) excluded through DNA profiling who were not excluded by traditional techniques.

Hypothesis 4, that DNA profiling has the greatest impact on stranger rape, is supported. Over half of all cases DNA profiled were stranger type rapes (Table 8).

The major impact of DNA profiling is on the pre-trial part of the investigation as compared to the trial process. The greatest proportion of DNA cases resulted in a plea (35%, Figure 2). Less than one quarter of cases utilising DNA profiling result in a trial. Additionally, some 42% of cases had suspects that were not prosecuted (either excluded as a suspect or discharged). There were only 3 cases where identity was in issue where DNA profiling linked the accused and the offence (Figure 3). Thus DNA profiling is an investigative tool as well as a tool for prosecution.
Section 3
Database Comparison

(A) DNA Cases Compared with non-DNA Cases in Same Time Frame

The following analysis was performed in order to determine how cases that were DNA profiled compared with cases not utilising DNA profiling in the same time frame for identified variables. This analysis also attempted to identify the nature of cases that were selected for DNA profiling.

(i) Offence Category

Cases not utilising DNA profiling but traditional techniques and with and without biological sample (database C) were compared with DNA profiling cases (database A) according to the nature of the sexual offence. Table 12 lists numbers and percentages for three categories of sexual offence versus each database.

TABLE 12: Cases Categorised According to Nature of Sexual Offence

<table>
<thead>
<tr>
<th></th>
<th>C. Non-DNA Cases 1989/90</th>
<th>A. DNA Cases 1989/91</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N=112</td>
<td>N=97</td>
</tr>
<tr>
<td></td>
<td>No.</td>
<td>% Total</td>
</tr>
<tr>
<td>Rape</td>
<td>82</td>
<td>73</td>
</tr>
<tr>
<td>Aggravated Rape</td>
<td>9</td>
<td>8</td>
</tr>
<tr>
<td>Child Offenses</td>
<td>21</td>
<td>19</td>
</tr>
</tbody>
</table>

There was not a significant association of DNA profiling with the type of sexual offence analysed ($X^2 = 2.209, p=.05$; Ott and Mendenhall 1990). However, there was a slight trend detected to more aggravated rapes selected for DNA profiling. There were 6% more aggravated rapes selected for DNA profiling (Table 12). The reasons for this may be twofold. Aggravated rapes may have more biological sample to analyse due to the nature of
the offence. Secondly, these type of rapes may also be considered more serious and be preferentially selected for DNA profiling on this basis.

(ii) Victim-Offender relationship

The two databases C and A were compared according to the relationship between the offender and the victim on (a) gender and (b) degree of acquaintance.

a. Gender.

Table 13 lists the numbers of victims and offenders according to gender for each database.

<table>
<thead>
<tr>
<th></th>
<th>C. Non-DNA Cases 1989/90</th>
<th>A. DNA Cases 1989/91</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N=112</td>
<td>N=97</td>
</tr>
<tr>
<td>Victims</td>
<td>Offenders</td>
<td>Victims</td>
</tr>
<tr>
<td>Female</td>
<td>110</td>
<td>2</td>
</tr>
<tr>
<td>Male</td>
<td>7</td>
<td>119</td>
</tr>
<tr>
<td></td>
<td></td>
<td>97</td>
</tr>
</tbody>
</table>

The gender relationship for DNA cases has been previously described (Table 7). For the non-DNA cases, all male victims were in a single male/male encounter. A case example is described below.

Case 11

A 17 year old male had come to Melbourne from Queensland looking for work and was living in a Youth Refuge. He met the accused at the Fitzroy Social Security Office and was invited back to the accused's room for a drink. The victim remembers drinking a can of beer which tasted strange and then passing out after the accused had made suggestive comments about sex between men. The victim woke up in the refuge. It transpired that the refuge workers had seen the accused drop the unconscious victim off. There was no sperm or seminal staining on the rectal swab or underpants of the victim, so there was no sample for DNA profiling or traditional techniques. However a medical examination of the victim
showed a tear in his anus, and his blood sample showed traces of Mogadon and Serapex. The accused fought the case on identity and was found guilty by a jury at the County Court. He had an extensive criminal history and was wanted in Western Australia for serious assault. He received 6 years gaol.

There was one non-DNA case that had a female victim and one male offender assisted by two female offenders. This case was the sole instance of female sexual assailters in all three databases A, B and C (a total of 287 cases). The following study describes this case.

**Case 12**

The victim was a 21 year old female and had been living in a de-facto relationship with the 19 year old male accused. They had broken up but were still living in the same house together with the male accused's current 14 year old girlfriend. One night the male accused, his girlfriend and another 15 year old female friend decided to assault the victim. They inserted a battery into her vagina, crashed her head into a door and then threw her into a sewerage pit under the house. Hairs from the victim were located on the door but there was no vaginal tissue detected on the battery, and thus there was insufficient sample for routine typing or DNA profiling. However, the victim's injuries were extensive and the medical evidence overwhelming. All three accused pleaded guilty. The male received 9 years gaol, the two female accused received a non-custodial sentence.

The gender relationship did not change appreciably from database C to A (Table 13). That is, gender does not appear to have an influence on whether a case is selected for DNA profiling.
b. Nature of Relationship

Table 14 lists the degree of acquaintance between the victim and the offender according to number and percentage for each database.

TABLE 14: Relationship Between Offender and Victim

<table>
<thead>
<tr>
<th></th>
<th>C. Non-DNA Cases 1989/90</th>
<th>A. DNA Cases 1989/91</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N=112</td>
<td>N=97</td>
</tr>
<tr>
<td></td>
<td>No.</td>
<td>% Total</td>
</tr>
<tr>
<td>Stranger</td>
<td>42</td>
<td>37.5</td>
</tr>
<tr>
<td>Acquaintance</td>
<td>28</td>
<td>25</td>
</tr>
<tr>
<td>Familiar</td>
<td>42</td>
<td>37.5</td>
</tr>
</tbody>
</table>

DNA profiling had a marginally significant association with the cases analysed according to the nature of the relationship between the offender and the victim ($X^2 = 5.09$ and $p > .05$). A trend was detected for more stranger type rapes selected for DNA profiling (53% as opposed to 37.5% for non-DNA cases) as would be predicted.

(iii) Case Outcome

Cases with and without DNA profiling were compared according to case outcome. DNA cases were analysed over the 2 year period July 1989 to 1991 and non-DNA cases over a 1 year period July 1989 to June 1990. Figure 4 compares total percentages of case outcomes in each database.

The relative percentages of case outcomes did not vary significantly from database to database ($X^2 = 1.98$, $p > .10$, Figure 4). However, there were trends detected. There were fewer unsolved cases when DNA profiling was used (19% as compared to 21%). This tends to support hypothesis 5 that there are more solved cases with DNA profiling. There are more pleas with DNA profiling (34% as compared to 29%). This tends to support hypothesis 6 of this study. There are more trials when DNA profiling is utilised (23% as compared to 20%).
July 1989 to June 1990: 1 year
Non-DNA cases.
Database C: N=112

July 1989 to June 1991: 2 years
DNA cases.
Database A: N=97

Plea

Trial

Unheard

% 23% 20%

21%

% 34%

% 19%

Suspect discharged

Unsolved

Profililing in similar time frame
Disposition of sexual offence cases utilising and not utilising DNA

Figure 4
(iv) **Trial Verdict**

The following analysis was performed to determine if DNA profiling was associated with a consent defence to a greater degree than when it is not utilised. Cases with and without DNA profiling were compared in the two databases A and C according to trial verdict and the nature of the defence. Table 15 lists the number of cases for each verdict and defence issue of consent or identity. There were 22 cases in each database so it was suitable to compare on number of cases.

**TABLE 15: Defence Issue At Trial and Verdict**

<table>
<thead>
<tr>
<th>Verdict</th>
<th>Consent</th>
<th>Identity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Guilty</td>
<td>8</td>
<td>10</td>
</tr>
<tr>
<td>Not Guilty</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>Total</td>
<td>14</td>
<td>16</td>
</tr>
</tbody>
</table>

Table 15 indicates that the trial issue is more one of identity than consent when DNA profiling is utilised, although the differences are not that large and certainly no firm conclusion can be drawn on such a small number of cases. However, this result is the reverse of what had been predicted. It was thought that because DNA profiling is more definitive, fewer cases would be fought on the defence of identity. A reason is that DNA profiling may selectively take cases where the defence issue is one of identity as opposed to consent.

It is interesting to note that equal numbers of cases in each database (Table 15) were found guilty (13) to not guilty (9). It appears that DNA profiling does not affect the trial verdict.
(v) Suspects and offenders

The two databases C and A were analysed according to the number of victims, offenders and suspects for each case. This analysis was performed in order to determine if there was a difference in the percentage of suspects investigated by the police when DNA profiling was utilised or not. Table 16 lists these numbers for each database.

**TABLE 16: numbers of individuals for each database**

<table>
<thead>
<tr>
<th>Database</th>
<th>Cases</th>
<th>Victims</th>
<th>Offenders</th>
<th>Suspects</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. DNA 1989/91</td>
<td>97</td>
<td>101</td>
<td>104</td>
<td>132</td>
</tr>
<tr>
<td>C. Non-DNA 1989/90</td>
<td>112</td>
<td>117</td>
<td>121</td>
<td>96</td>
</tr>
</tbody>
</table>

The above table shows that whilst there were 28 more suspects than offenders in the DNA profiling cases, there were 25 fewer suspects than offenders in cases not utilising DNA profiling. This indicates that the police are using the DNA profiling technique in an investigative manner and “rounding up” more suspects for cases where the technique is used. This result supports the hypothesis, part of Hypothesis 7, that more suspects are drawn into an investigation with DNA profiling. However, the cases chosen for DNA profiling may be preferentially selected on the basis that they are stranger type crimes and serial offences where there may be more than one suspect traditionally. A more valid comparison would be a comparison of cases with biological sample before and after the advent of DNA profiling, an analysis performed in the next section.
(B) Cases with Biological Sample Compared in Two Time Frames

The analysis in this section was performed in order to determine the impact of the introduction of DNA profiling on certain variables, and ultimately its potential effect on the criminal justice system. Cases before the advent of DNA profiling and with suitable forensic sample (database B) were compared with cases after the advent of DNA profiling with suitable forensic sample (database D). Cases were analysed which either used traditional techniques only, or DNA profiling with or without traditional techniques.

(i) Offence analysis

Cases from the two databases B and D were compared according to the nature of the sexual offence to determine if there was an association between the type of sexual offence analysed and the two time frames. Table 17 lists the number of cases for each database according to the type of sexual offence.

<table>
<thead>
<tr>
<th></th>
<th>B. Pre-DNA 1987/88</th>
<th>D. Post-DNA 1989/90</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N=78</td>
<td>N=101</td>
</tr>
<tr>
<td></td>
<td>No. % Total</td>
<td>No. % Total</td>
</tr>
<tr>
<td>Rape</td>
<td>49</td>
<td>66</td>
</tr>
<tr>
<td></td>
<td>63</td>
<td>65</td>
</tr>
<tr>
<td>Aggravated Rape</td>
<td>10</td>
<td>14</td>
</tr>
<tr>
<td></td>
<td>13</td>
<td>14</td>
</tr>
<tr>
<td>Child Offenses</td>
<td>19</td>
<td>21</td>
</tr>
<tr>
<td></td>
<td>24</td>
<td>21</td>
</tr>
</tbody>
</table>

The introduction of DNA profiling has not had a significant effect on the category of sex offences analysed of cases with biological sample available ( $X^2 = 0.329$, $p > .05$, Table 17). There were also no discernible trends detected.
(ii) \textit{Nature of relationship between offender and victim}

The two databases B and D were compared according to the nature of the relationship between the victim and the offender, and gender.

\textbf{a. Gender}

Table 18 lists the numbers of victims and offenders according to gender for each database.

\begin{table}[h]
\centering
\begin{tabular}{|c|c|c|c|c|}
\hline
 & \textbf{B. Pre-DNA} & & \textbf{D. Post-DNA} & \\
 & \textbf{N=78} & & \textbf{N=101} & \\
\hline
\textbf{Victims} & 68 & - & 102 & - \\
\textbf{Offenders} & 13 & 86 & 4 & 123 \\
\hline
\end{tabular}
\caption{Gender Of Victims and Offenders}
\end{table}

There was a greater percentage of male victims in cases pre-DNA profiling (Table 18). Of the 13 male victims, 12 were children aged between 5 and 16 years. The remaining male victim was an adult gaol inmate and was raped by three fellow adult inmates. The four cases post-DNA profiling with male victims (Table 18) had 2 male child victims (8 and 14 years of age) and 2 adult victims. There was not a significantly greater percentage of child sex offences pre-DNA profiling (Table 17) so it can be postulated that there were more male child victims than female child victims pre-DNA than post-DNA. However, this would not be expected to impact on any other variables analysed.

\textbf{b. Nature}

Table 19 lists the number of cases according to the degree of acquaintance between the offender and the victim for each database.
TABLE 19: Nature Of Relationship Between Victim and Offender

<table>
<thead>
<tr>
<th></th>
<th>B Pre-DNA 1987/88</th>
<th>A. Post-DNA 1989/90</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N=78</td>
<td>N=101</td>
</tr>
<tr>
<td></td>
<td>No. % Total</td>
<td>No. % Total</td>
</tr>
<tr>
<td>Stranger</td>
<td>31</td>
<td>47</td>
</tr>
<tr>
<td>Acquaintance</td>
<td>14</td>
<td>18</td>
</tr>
<tr>
<td>Familiar</td>
<td>33</td>
<td>33</td>
</tr>
</tbody>
</table>

The introduction of DNA profiling did not have a significant effect on the nature of the relationship between the victim and the offender for cases with biological sample available ($X^2 = 1.438, p > 0.10$, Table 19). However, there were trends detected. More stranger rapes were analysed post-DNA than pre-DNA (some 9%), and less familiar rapes were analysed post-DNA (again 9%).

(iii) Case Outcome

An analysis was performed to determine if the advent of DNA profiling had any effect on case disposition of cases (with sample) as a whole. There were no identifiable confounding variables so there was no matching on nature of sex offence, gender relationship or victim-offender relationship. Cases with sample available were compared both before and after the advent of DNA profiling in order to determine the overall impact of DNA profiling on the criminal justice system. Cases with sample available in the year 1987/88 before the advent of DNA profiling (database B) were compared with cases with sample available in the year 1989/90 after the advent of DNA profiling (database D). Database D includes both DNA cases and cases with biological sample but no DNA profiling was performed. Figure 5 shows case outcome according to each database.

Whilst the outcomes for each database are not statistically significantly different ($X^2 = 3.13, p > .05$, Figure 5), the data tend to support rather than disprove Hypotheses 5, 6 and 7 of this thesis. More cases are solved after the advent of DNA profiling (79% solved post-DNA compared to 74% solved pre-DNA, figure 5). More suspects are discharged (21% post-DNA compared to 14% pre-DNA). More cases are resolved through pleas (36% post-DNA compared to 29% pre-DNA) and fewer cases proceed to trial (23% post-DNA compared to 31% pre-DNA).
Figure 5

Disposition of sexual offence cases with biological sample available before and after the advent of DNA profiling.
(iv) **Trial outcome**

The following analysis was performed to determine if the advent of DNA profiling pushed more cases to a consent defence than pre-DNA profiling. Trial issues were compared for the two databases B and D according to the verdict. Table 20 lists the nature of the defence for each database versus the trial verdict. There were 24 cases in database B and 23 cases in database D - it was considered valid to compare numbers of cases only.

**TABLE 20: Defence and Trial Verdict**

<table>
<thead>
<tr>
<th>Verdict</th>
<th>Consent</th>
<th>Identity</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>B. Pre-DNA</td>
<td>D. Post-DNA</td>
</tr>
<tr>
<td>Guilty</td>
<td>7</td>
<td>11</td>
</tr>
<tr>
<td>Not Guilty</td>
<td>7</td>
<td>6</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>14</strong></td>
<td><strong>17</strong></td>
</tr>
</tbody>
</table>

Although the numbers are small Table 20 shows that more cases are fought on consent than identity after the advent of DNA profiling. There were 17 cases with the consent defence and 6 cases with the identity defence post-DNA, whereas there were 14 cases with the consent and 10 cases with the identity defence pre-DNA profiling (Table 20). This supports Hypothesis 8 of this study, that DNA profiling would result in more consent issue trials.

(v) **Suspects and Offenders**

The two databases B and D were analysed according to the numbers of victims, offenders and suspects so that the difference in percentages of suspects investigated by the police before and after the advent of DNA profiling could be determined. Table 21 lists the numbers according to each database.
TABLE 21: Numbers of Individuals for each Database

<table>
<thead>
<tr>
<th>Database</th>
<th>Cases</th>
<th>Victims</th>
<th>Offenders</th>
<th>Suspects</th>
</tr>
</thead>
<tbody>
<tr>
<td>B. Pre-DNA 1987/88</td>
<td>78</td>
<td>81</td>
<td>86</td>
<td>68</td>
</tr>
<tr>
<td>D. Post-DNA 1989/90</td>
<td>101</td>
<td>106</td>
<td>123</td>
<td>121</td>
</tr>
</tbody>
</table>

Table 21 shows that whilst there were approximately equal numbers of offenders and suspects for cases after the advent of DNA profiling, there were 18 fewer suspects than offenders before the advent of DNA profiling.

**(vi) Solved Cases**

The following analysis was performed to determine the respective results pre and post-DNA profiling for cases where a suspect was identified by the police as the offender. This was so the effect of DNA profiling on suspects and victims of cases where individuals faced the full criminal justice process could be postulated. These “solved” cases were examined in databases B and D, and their dispositions illustrated in Figure 6. This scheme was also performed for stranger sex offences (Figure 7) and non-stranger sex offences (Figure 8). These two groups were examined separately to determine whether any observed effect is present for both groups, and thus whether the overall effect is “real”.

1. Suspect Discharged

There was an overall increase of 7% of suspects discharged with the advent of DNA profiling (26% post-DNA cf. 19% pre-DNA, Figure 6).

In all of the 11 cases pre-DNA, the suspect was discharged due to reasons “other” than biological evidence. Three of these 11 cases had a suspect who suicided before the trial. One suspect (a young male) hanged himself from a tree the night before the trial. Another suspect had an extensive history as a paedophile and left a suicide note regretting his sexual activities. The third suspect was accused of a rape and murder allegedly committed shortly after the sexual offence in database B and hanged himself in Pentridge Prison. There were no suicides in database D, post-DNA. There were 4 cases pre-DNA where the suspect could
not physically face charges (3 suicided and 1 absconded) and there was 1 case post-DNA (1 absconded).

Two of the cases post-DNA were discharged due to biological evidence (2.5%, Figure 6). The remaining 19 cases were discharged for “other” reasons.
Figure 6 - Disposition of solved sexual offence cases before and after the advent of DNA profiling.

From: Database D

July 1987 to June 1988

N=58

From: Database D

July 1989 to June 1990

N=80

Post-DNA

Pre-DNA

Not guilty

Guilty

Not guilty

Guilty

Identity

Consent

Other

Evidence

Biological

Identity

Consent

Other

Evidence

Biological

24% 11% 0%

u=11 0=0

23.5% 17% 7%

u=19 11 7

21% 17% 3%

u=11 0 2

8% 6%

u=6 5

3% 8%

u=2 8

12% 14%

u=7 8

11% 10%

u=11 10

17%

u=10

29%

u=23

45%

u=36

26%

u=21

41%

u=24

40%

u=23

19%

u=11

Discharged

Plea

Trial

Discharged

Plea

Trial
These other reasons were generally that there was insufficient evidence to charge the suspect, or the complainant withdrew the complaint. Thus even though there is an overall increase of suspects discharged with the advent of DNA profiling (7%, Figure 6) this cannot be directly attributed to the evidential value of DNA profiling, as only 2 cases were discharged through the technique.

2. Guilty Pleas

There was an overall increase of 5% in guilty pleas with the advent of DNA profiling (45% post-DNA cf. 40% pre-DNA, Figure 6).

Stranger sex offences had an increase in guilty pleas of 8% (68% post-DNA cf. 60% pre-DNA, Figure 7). However, non-stranger sex offences had a decrease of 2% in pleas after the advent of DNA profiling (35% pre-DNA cf. 33% pre-DNA, Figure 8).

Thus the overall increase in guilty pleas detected appears to be due to the greater percentage of stranger rapes analysed post-DNA (49% post-DNA cf. 40% pre-DNA, Table 19). The conclusion is that DNA profiling has resulted in a greater percentage of guilty pleas, but that this has been for stranger sex offences only.

3. Trials

There was an overall decrease of 12% of trials with the advent of DNA profiling (29% post-DNA cf. 41% pre-DNA, Figure 6).

There was a decrease of 23% for stranger trials (7% post-DNA cf. 30% pre-DNA, Figure 7). There was a smaller decrease for non-stranger trials with the advent of DNA profiling (40% post-DNA cf. 44% pre-DNA, Figure 8). Thus the decrease in the percentage of all trials detected with the advent of DNA profiling appears to be mainly due to stranger type sex offences, where DNA profiling causes a greater plea rate.
Figure 7 - Disposition of solved stranger sexual offense cases before and after the advent of DNA profiling.

From: Database D
July 1987 to June 1988

N=10

Post-DNA

N=28

Discharged

Plea

Trial

Consent

Biological evidence

30%

u=3

% 30%

u=0

% 0%

u=0

% 10%

u=1

% 0%

u=0

% 3.5%

u=1

% 3.5%

u=1

% 21.5%

u=6

Consent

Other

Identity

68%

u=19

25%

u=7

7%

u=2

Other

From: Database D
July 1989 to June 1990

Solved stranger cases

Not guilty

Not guilty

Not guilty

3.5%

u=1

3.5%

u=1

21.5%

u=6

% 0%

u=0

% 0%

u=0

% 0%

u=0

% 3.5%

u=1

% 3.5%

u=1

% 21.5%

u=6

Not guilty
advent of DNA profiling before and after the sexual offence cases of solved non-stranger

Figure 8 - Disposition

Solved Non-Stranger

Post-DNA N=52

Pre-DNA N=48

DNA

Trial

Plea

Discharged

Plea

Discharged

Biological evidence

Consent

Identity

Other

27%

n=14

33%

n=17

40%

n=21

21%

n=10

0%

n=0

15%

n=7

20%

n=13

9%

n=5

44%

n=21

35%

n=17

21%

n=10

25%

n=16

13%

n=6

7%

n=4

2%

n=1

Not guilty

Not guilty

Not guilty

Not guilty

Not guilty

Guilty

Guilty

Guilty

Guilty

Guilty

Guilty

Guilty
Consent and identity defences at trial were then considered. There was an overall decrease of 3% in consent issue trials with the advent of DNA profiling (21% post-DNA cf. 24% pre-DNA, Figure 6) and a decrease of 9% of identity issue trials (8% post-DNA cf. 17% pre-DNA, Figure 6).

There was a slight increase in consent issue trials with the advent of DNA profiling for stranger sex offences (3.5% post-DNA cf. 0% pre-DNA, Figure 7) but a much greater decrease in identity issue trials of 26.5% (3.5% post-DNA cf. 30% pre-DNA, Figure 7).

For non-stranger sex offences there was a slight increase of 2% for consent issue trials with the advent of DNA profiling (31% post-DNA cf. 29% pre-DNA, Figure 8). There was a decrease of 6% in identity issue trials (9% post-DNA cf. 15% pre-DNA, Figure 8).

Thus the advent of DNA profiling brings a slight increase (2-3%) in consent defences for both stranger and non-stranger sex offences. There appears to be a slight drop in overall consent issue trials (24% pre versus 21% post-DNA, Figure 6) but this is due to an increased percentage of stranger incidents post-DNA and thus a reduced percentage of trials in total due to a higher plea rate (Table 19).

It may be surprising on the surface to find that a stranger type crime would be fought on the issue of consent. One of the two stranger cases that went to trial after the advent of DNA profiling was fought on the issue of consent and found guilty (3.5%, Figure 7). This case study is presented in case 13.

Case 13

The female victim walked out of a pub in St. Kilda late one night and was accosted by two male strangers looking for a prostitute. She was forcibly taken back to their place and bashed and raped. As she left she took some of their identification. Seminal stains were located on a vaginal swab and tampon from the victim. These stains were DNA profiled and matched the blood sample from one of the suspects with a chance probability of 1 in 34 million; the other co-suspect was excluded. Both the suspects pleaded not guilty and fought the issue on consent. They were both convicted by a jury. The accused with a DNA profiling match received 12 years gaol; the other accused 5 years gaol.
It may be postulated that DNA profiling evidence, together with identification papers siezed by the victim, persuaded the two accused to change their defence from one of identity to consent.

4. Conviction Rate

The conviction rate is calculated by adding the number of guilty pleas to the number of guilty trial verdicts. There was a 65% conviction rate for solved cases pre-DNA profiling (38 cases from a total of 58 cases, Figure 6) and similarly a 65% conviction rate for solved cases post-DNA profiling (52 cases from a total of 80 cases, Figure 6). Thus it appears that the conviction rate has not altered with the advent of DNA profiling, although the means to conviction has (more guilty pleas and fewer trials).
Summary

Cases that were selected for DNA profiling were compared with cases not utilising DNA profiling in a similar time frame. The cases did not differ significantly statistically on type of sexual offence analysed or in case disposition, but more stranger type sex offences were DNA profiled. Trends detected were fewer unsolved cases and more pleas with DNA profiling. More suspects were drawn into the investigation when DNA profiling was utilised.

Cases before and after the advent of DNA profiling were matched so that the effect of DNA profiling could be evaluated. The cases looked at here were essentially different to those above in that they all had biological sample available and thus had the potential for DNA profiling. The cases did not differ significantly statistically between databases on type of sexual offence analysed, case disposition or victim-offender relationship. However trends showed more cases solved, more suspects discharged, more pleas, fewer trials and more consent defences post-DNA profiling. The conviction rate was the same, although the means to conviction was different. More suspects are involved post-DNA profiling.

Finally, the disposition of solved cases was analysed so that how the suspect and the victim faced the criminal justice system after the advent of DNA profiling could be evaluated.

1. The discharge rate of suspects was confounded. It appears that more suspects are discharged post-DNA, but this cannot be related to the evidential value of DNA profiling.

2. DNA profiling impacted only on the rate of guilty pleas for stranger sex offences (an increase). Thus for these stranger type cases fewer accused and fewer victims face the trial process.

3. There was an overall decrease in trials with the introduction of DNA profiling. Those cases that went to trial had a slight increase in consent defences with the advent of DNA profiling. There was a larger decrease in identity defences, but this was mainly reflected in the identity defence cutting out at the plea stage. Thus
victims of stranger type rapes will be advantaged by DNA profiling due to a higher plea rate and less will face the trial process. However, victims who were acquainted with the suspect in some way (non-stranger sex offences) face more consent issue trials and thus a more harrowing ordeal.

The percentage changes in case disposition for all cases analysed in the two databases B and D, and for all solved cases in these databases, are summarized in Tables 22 and 23.
TABLE 22: % Change Post-DNA from Pre-DNA in Case Disposition
for all Cases

<table>
<thead>
<tr>
<th></th>
<th>Unsolved</th>
<th>Discharged</th>
<th>Plea</th>
<th>Trial</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>-5%</td>
<td>+7%</td>
<td>+7%</td>
<td>-8%</td>
</tr>
</tbody>
</table>

All unsolved cases were stranger type sex offences.

The following table lists the percentage difference in case disposition for solved cases after the advent of DNA profiling (database D) as compared to before the advent (database B). An increase is denoted as “+”, a decrease is denoted as “-”.

TABLE 23: % Change Post-DNA from Pre-DNA in Case Disposition for
Solved Cases

<table>
<thead>
<tr>
<th>Disposition</th>
<th>Total</th>
<th>Stranger</th>
<th>Non-Stranger</th>
</tr>
</thead>
<tbody>
<tr>
<td>Discharge</td>
<td>+7%</td>
<td>+15%</td>
<td>+6%</td>
</tr>
<tr>
<td>Plea</td>
<td>+5%</td>
<td>+8%</td>
<td>-2%</td>
</tr>
<tr>
<td>Trial</td>
<td>-12%</td>
<td>-23%</td>
<td>-4%</td>
</tr>
<tr>
<td>Consent Issue</td>
<td>-3%</td>
<td>+3.5%</td>
<td>+2%</td>
</tr>
<tr>
<td>Identity Issue</td>
<td>-9%</td>
<td>-26.5%</td>
<td>-6%</td>
</tr>
</tbody>
</table>
Chapter Five

Discussion

1. The Impact of DNA Profiling

This study hypothesised that the impact of DNA profiling on crimes of violence and ultimately the criminal justice system would not be substantive as measured by the percentage of criminal cases that utilise DNA profiling (Hypothesis 1). It was also hypothesised that the greatest impact of DNA profiling on a class of offences would be on sex offences (Hypothesis 2) and of these, on stranger type sex offences (Hypothesis 4). These three hypotheses are supported by the results of this study.

DNA profiling is potentially useful in a minority of violent crime. Only 15% of all violent crime cases submitted for forensic examination was analysed using DNA profiling (Table 1). This accords with the prediction that the proportion of cases where DNA profiling would be useful would be low (Easteal and Easteal, 1990; Mugford, 1990).

Sexual Offences

The majority of cases DNA profiled were sexual offences (65%, Table 1). This result accords with the predictions (Peterson, 1989; Werrett and Lygo, 1988) and preliminary results (Reagen et al., 1994) of other researchers. The discriminatory power of traditional techniques in sexual offence cases compares poorly with the new technique of DNA profiling. There is also a more frequent innocent transfer of seminal fluid in sexual offences, such as from the victim’s partner before the attack, compared to the innocent transfer of blood in homicides and assaults. This seminal fluid may persist and complicate results when traditional techniques are used, but the higher discriminatory power of DNA profiling may discriminate between these mixtures. Additionally, the majority of crimes of violence biologically examined are sexual offences (51%, Table 1).

Forensic biological examination, and thus DNA profiling, is performed preferentially on the more serious offences. This is because a greater percentage of these serious cases are submitted by the police for examination, and forensic evidence is required more often in
these cases. There was an average of 11% of all reported sex crimes submitted for analysis, but an average of 40% reported rapes were submitted (Table 2). There were between 3 and 5 times as many rapes submitted as other sex offences (Table 2). These figures accord with data from England (Keating et al., 1990) on a proportional basis, although a greater percentage of cases are examined there (84% of reported rapes to the police and 8% of other reported sexual assault are examined at this English laboratory).

**Stranger Sex Offences**

It has been gradually realised that the media and public's perception of rape as one involving random stranger attacks may be an inaccurate one. According to a recent Victorian study, the first in that State providing information about the nature and extent of sexual assault in the community, only a minority (39%) involved strangers (Victorian Community Council Against Violence, 1991). Most reported incidents (61%), involved people who were in some way acquainted prior to the rape. The danger of the common perception of stranger-attacks is that it gives a false impression of the circumstances in which women and children can be safe (ibid.).

The greatest proportion of all sexual offences DNA profiled were stranger type crimes (53%, Table 8). Cases not utilising DNA profiling but in the same time frame as DNA cases had an equal number of stranger cases and familiar cases (37.5% in each category, Table 14). There were 40% of cases analysed with a biological sample that were stranger crimes before the advent of DNA profiling, and 49% of these cases after the advent of DNA profiling (Table 19).

All databases were probably biased towards stranger type sex offences in this study. Sex offences submitted for forensic examination are more likely to involve strangers to the victim. Forensic evidence is more likely to be present and not washed away in these types of crime, due to more timely reporting. Additionally, these offences are not likely to be fought on consent. A complete forensic examination is not performed if consent is identified as the defence on submission of the case (SFSL policy).

DNA profiling, because of its discriminating power, is expected to be preferentially utilised in cases where identity is in issue. It may be postulated that the closer the relationship between the victim and the offender the more likely the issue of consent, and not identity.
Thus non-stranger offences are less likely to require DNA profiling evidence. However, it is clear from this study that a proportion of non-stranger crimes are nevertheless fought on identity, at least in the pre-trial stage of the investigation. There were 47% of cases that were DNA profiled that were non-stranger sex offences (Table 8).

There is no indication that stranger type sex offenders are using precautionary measures to prevent detection, such as the wearing of condoms. There was an increase of 9% of stranger type sex offences with sample available after the advent of DNA profiling (Table 19). Stranger type sex offences still appears to be an opportunistic crime.

Factors Constraining the Impact of DNA Profiling

Whilst DNA profiling is a valuable investigative tool, there are factors that constrain its potential impact and account for its relatively low utilisation. Only a proportion of all reported sex offences are submitted for forensic analysis (11% average, Table 2). The defence of consent is one of the reasons for this low submission rate. Most sexual offence cases are fought on the issue of consent (Freckelton, 1990). If the fact of sexual intercourse with the suspect (and thus identity) is not in dispute, then biological evidence will generally not be of benefit to the case, unless this evidence shows violence was used. In addition, if consent is identified as the issue after submission of the case but prior to any DNA analysis, then DNA profiling is not performed (SFSL policy).

An average of 26% of submitted sex cases were never examined (Table 3). Cases were not examined if the SFSL was notified of an early guilty plea, or if charges were withdrawn or dismissed, after the submission of the case but before examination had commenced. Clearly a significant percentage of cases submitted for examination are not likely to need this examination. Many sex offence cases are resolved without forensic evidence.

The lack of available biological evidence in a case is another factor that constrains the potential impact of DNA profiling. This study estimates that an average of 37% (Table 4) of sex offence cases submitted for forensic analysis did not have biological evidence present. These figures are not dissimilar to a London study (Davies A., 1991) that showed that approximately 45% of sex cases had no items stained with semen. There was a slight increase of 3% of cases with sample available after the advent of DNA profiling (39% of
cases had no sample in 1987/88, 36% of cases in 1989/90, Table 4). Public awareness of DNA profiling may encourage a victim to report in a more timely manner, and thus preserve any biological evidence, if they believe that an offender would be more likely caught and prosecuted using this technique. It is beyond the scope of this thesis to determine the relative import of factors that result in a lack of biological evidence.

These constraining factors account for the attrition in reported sex offences that are eventually DNA profiled, and thus the limited impact of DNA profiling. Even in offences where it would have the most impact (sex offences) and in the type most submitted (rape cases), the percentage of the total reported rape cases where DNA profiling could be used is small (17%, Figure 1).

The above constraining factors limit the utility of DNA profiling. It was also considered whether the impact of DNA profiling was constrained after the analysis. The prosecution (the police or the DPP) may ignore the DNA result and believe it to be incorrect or irrelevant. There were 4 sexual offence cases DNA profiled (from a total of 97 cases, Table 4) where the DNA profiling result excluded the suspect as the source of the biological evidence, yet the suspect was prosecuted. However, in all of these cases the prosecution believed that the biological evidence did not relate to the offence.
2. DNA Profiling and Case Disposition

Whilst this study has found that the overall effect of DNA profiling on the criminal justice system is minimal, it has also found that DNA profiling does have an effect on certain classes of offences and a further 4 hypotheses of the study are supported. Whilst not statistically significant trends showed more cases are solved (Hypothesis 5), there are more guilty pleas (Hypothesis 6), there is greater utilisation pre-trial than trial (Hypothesis 7) and more cases are fought on consent (Hypothesis 8) with the introduction of DNA profiling.

Solved Cases

There were fewer unsolved cases after the advent of DNA profiling (21% post-DNA cf. 26% pre-DNA, Figure 5). All unsolved cases were stranger type sex offences, where the potential offender could not be identified by the police. Because there were more stranger type crimes included for the database after the advent of DNA profiling (9%, Table 19), it may be postulated that DNA profiling results are assisting in solving stranger type sex offences. The greater discrimination of DNA profiling and comparison with data on files may lead to a greater solution rate. Of course, since there is a time lapse of about two years between these two databases, more effective police practices or legislation may account for the difference.

Discharged Cases

There were more suspects discharged post-DNA profiling for all cases (21% post-DNA cf. 14% pre-DNA, Figure 5). However, an analysis of Figure 6 for solved cases reveals that only 2 cases in the two databases were discharged due to biological evidence. The greater discharge rate is thus caused by factors other than the introduction of DNA profiling, such as a requirement for more evidence or the complainant withdrawing the complaint.

Guilty Pleas

There have been two conflicting schools of thought as to whether the introduction of DNA profiling would result in a greater proportion of guilty pleas. One is that more cases may go to trial as the prosecutor may refuse to bargain on the strength of the evidence, or the defence may wish to challenge the DNA profiling evidence if they believe it controversial
(Peterson, 1989). The second is that plea bargaining may become more common as the DNA evidence will be likely to change the nature of defence to consent (Marx, 1988). Both in England and the United States anecdotal data has suggested that most cases would be resolved through pleas and not trials (McLeod, 1991; Neufeld and Colman, 1990; Alldridge, 1992; Reagen et al., 1994). The results of this study accord with this anecdotal data.

There were 23 of 34 cases DNA profiled (68%) where DNA profiling could be directly related to a plea (Section B(iii), Results). All of these cases resulted in a "match" of the suspect's blood sample with the crime scene sample. It appears that the degree of a match does not influence a guilty plea, although other factors may be involved. The remaining 11 cases where the accused pleaded guilty did not have DNA profiling as an issue. There were 4 exclusions, where the DNA evidence was thought by the investigating police to be not relevant. There were 6 "no matches" and 1 "match". It could not be determined whether there was one overriding issue that persuaded the accused to plead guilty in these 11 cases. Certainly at one stage identity was an issue, because DNA profiling was performed. However, at the entering of the plea the fact of a match or not with DNA was no longer an issue in these 11 cases.

There was a higher percentage of guilty pleas overall post-DNA (+5%, Table 23). However, this was due to the greater percentage of stranger type sex offences analysed post-DNA (Table 19). There was a small decrease in pleas in non-stranger cases post-DNA (-2%, Table 23) but an increase in pleas for stranger cases (+8%, Table 23). The conclusion is that DNA profiling increases the rate of guilty pleas, but that this is for stranger type crime only.

Whilst there may be some other variables that increased the plea rate overall, the preferential increase in stranger rape pleas accords with the theory that biological evidence of identity would be more important in these cases than in non-stranger sex offences.
Pre-trial Versus Trial

The controversy and scepticism surrounding the introduction of DNA profiling in the scientific literature and the media has focused on the trial process. In addition, there has been a disproportionate concentration on research in the courtroom, so that plea bargaining has been neglected. The data in this study suggests that DNA profiling is more useful, and has an impact on the criminal justice system, before the trial process commences.

Fifty-eight per cent of all cases that were DNA profiled were resolved pre-trial; the suspect was either discharged or pleaded guilty (Figure 2). Once cases went to trial, few resulted in contests where the DNA profiling evidence was critical. Only 3 cases where DNA profiling evidence was critical resulted in a trial (Figure 3), just 3% of all cases DNA profiled.

Stranger type cases were less likely to proceed to a contested trial after the introduction of DNA profiling. This was mainly due to an increase in plea rate and in suspects discharged - thus DNA profiling has only been partially responsible for the decrease in trials. Only 7% of solved stranger cases resulted in a contested trial post-DNA profiling, whereas 30% of cases resulted in a trial pre-DNA profiling (Figure 7). All cases in both databases (5 in total, Figure 7) received guilty verdicts. Non-stranger sex offences had a much lesser decrease in trial rate (-4%, Table 23).

Consent Issue Versus Identity Issue Trials

It was thought that the issue of consent as opposed to denial would form the basis of nearly all rape trials in the future given the strength of DNA evidence (Coelli, 1989). Has this been the case?

There were 14 cases fought on the issue of consent compared to 8 cases fought on the issue of identity for DNA profiling cases (Table 9). An appreciable number of cases are still fought on the issue of identity, even when DNA profiling is utilised. However, when these 8 cases were analysed for a “match” or “non-match” with DNA evidence (Figure 3), there were 5 cases with a non-match (no result). These 5 cases may have been fought on identity because of a lack of a match through DNA profiling. Just because DNA profiling is
performed, there is no guarantee of a strong match, or even a result (due to quantity and quality of sample).

The advent of DNA profiling brought a slight increase (2-3%) in consent defences for both stranger and non-stranger sex offences (Table 23). It may be postulated that DNA profiling is a “persuader” in that it changes the defence from identity to consent, presuming there is a match. There was a much larger decrease in trials with the advent of DNA profiling for stranger sex offences than non-stranger (-23% for stranger cf. -4% non-stranger, Table 23).

Conviction Rate

There was a 65% conviction rate for solved cases pre-DNA and post-DNA profiling (Figure 6). The number of individuals convicted has not altered with the introduction of DNA profiling, although the means to conviction has (more guilty pleas and less trials). The benefit to the criminal justice system is clear. The cost of a trial in the County Court in Melbourne is estimated to be between $5000 to $10,000 a day (William Johnston, personal communication). A conviction for an individual is preferable through a guilty plea than by trial as not only does it save the justice system considerable money, it saves on personal costs as the victim and the accused are spared the ordeal of a trial. An appreciable number of serious rape cases result in a contested trial. During the year 1992/93, there were 84 rape trials in the County Court in Melbourne (Gary Ching, personal communication). Of these, 39 were cases where the accused pleaded guilty and 45 were cases that resulted in a contested trial. Any reduction in the number of these contests through the avenue of DNA profiling would be an advantage.

DNA versus non-DNA cases

Sex offence cases that were DNA profiled were compared with cases not utilising DNA profiling. Because of the perceived advantages of DNA profiling, cases were preferentially selected for DNA profiling on the perceived requirement for identity evidence. Thus a case disposition comparison between these two databases may not reflect the true picture of the influence of DNA profiling. There were fewer unsolved cases using DNA profiling (2% less, Figure 4) but this may be due to a lack of biological evidence in the non-DNA cases and thus no “pointer” towards a suspect. There were fewer suspects discharged using DNA
(7% less, Figure 4) but this may be due to DNA cases requiring a certain body of evidence before analysis. There were more pleas with DNA cases (5% more, Figure 4). There were more trials in DNA cases (3% more, Figure 4) but this may reflect the lesser discharge rate of these cases.
3. DNA Profiling and Social Control

Checks and balances are needed in the implementation of the technique of DNA profiling, because human genetics lends itself to social misuse (Motulsky, 1989). Genetic or pseudogenetic information has been seriously abused for political purposes in the past. The horrific experiments on inmates in the concentration camps promulgated by Germany in the Second World War is a well known example. The social advantages and disadvantages of DNA profiling are discussed in this section.

The effective implementation of DNA profiling has required an amendment to the Crimes Act 1958 (Vic) in the compulsory taking of blood samples. Some commentators have viewed this as an infringement of an individual's rights. The cost of DNA profiling should not be considered only in financial terms but also in social. The French philosopher Foucault has viewed biological testing of individuals as a source of power of the state, a strategy of political domination and means of “normalisation” (Foucault, 1979). There is a cultural appeal of testing, whereby social problems are reduced to biological problems and thus measurable terms. Whilst the media has constructed a view that DNA testing is a panacea to the high levels of reported crime (Jeffreys, 1993), this thesis has shown that DNA profiling has relevance to only a small number of cases. The danger of media hyperbole is that expectations will be created that cannot be fulfilled.

*Degree of Association*

The anticipated impact of DNA technology is based on its power, using biological evidence, to associate persons to crimes with a far greater level of certainty than is possible using conventional blood grouping and genetic marker systems (Peterson, 1989). What may be more important is the power to exclude a greater percentage of suspects than was previously possible, and to remedy mistaken identification (Office of Technology Assessment, 1990). The results of this study support the hypothesis that DNA profiling is more definitive than traditional techniques (Hypothesis 3).

There were 82 out of 107 cases that were DNA profiled that yielded an associative or disassociative result (84%, Table 5). This compares favourably to the FBI, where conclusive results were obtained in 75% of DNA profiling cases (Hicks, July 1991), a figure much
higher than conventional testing although these conventional testing figures were not stated. The degree of the “match” appears to have had no effect on whether the suspect was convicted. Unlike other areas of application in the life sciences, no two criminal cases ever have identical circumstances. However, likelihood ratios go a long way in assisting investigating police and courts of law with a meaningful presentation of evidence.

Investigation of Suspects

The new technique of DNA profiling may be drawing more individuals into the net of social control as described by Stanley Cohen (Cohen, 1985). More suspects may be investigated by the police than previously if the police investigator views DNA profiling as another investigative tool. For example, a suspect's general modus operandi may be different to the modus operandi of the offence, yet the police may wish this suspect to be DNA profiled as a precaution - prior to DNA profiling this individual may not have been investigated as a suspect.

There were 28 more suspects than offenders in the DNA profiling cases, but 25 less suspects than offenders in cases not utilising DNA profiling (Table 16). Considering cases with sample pre and post-DNA, there were approximately equal numbers of suspects and offenders (123 offenders and 121 suspects, Table 21) post-DNA. However, prior to DNA there were 18 less suspects than offenders (86 offenders and 68 suspects, Table 21).

It is clear that the utilisation of the new technique of DNA profiling investigates more individuals, supporting Hypothesis 9. This may be considered a disadvantage in terms of social control. Against this must be balanced the fact that more cases are solved using DNA profiling. Additionally, the greater discriminating power may exclude those suspects not able to be previously excluded, giving peace of mind to suspects and possibly avoiding any miscarriage of justice.
4. The Cost of DNA Profiling - the Scales of Justice

There are two aspects to the costs involved in the utilisation of DNA profiling - (a) the financial and (b) the social.

(a) Financial

There is a greater degree of association and more solved cases when DNA profiling is utilised. Thus there is a saving in police investigative resources, although this is difficult to cost. There are fewer trials and more guilty pleas and thus there is a substantial saving in court costs.

DNA profiling is expensive in terms of the consumables and laboratory staff and equipment needed to perform the tests. Obtaining a full DNA profile is also time consuming. Additionally, considerable expense has been involved in researching and improving the technique. These costs are eventually borne by the public.

(b) Social

Notorious unsolved cases create an extraordinary amount of fear in the community. If more offenders are brought to justice as when DNA profiling is utilised, victims and the community are brought peace of mind. The greater discrimination power of DNA profiling is able to exclude more suspects, so that these suspects are also brought peace of mind. Serial offenders may be prevented from committing further offences if apprehended in a more timely manner if DNA profiling is utilised. There are fewer trials when DNA profiling is utilised, and thus fewer victims endure the ordeal of a contested trial.

Whilst there are fewer trials overall with the advent of DNA profiling, a slightly greater percentage of these cases are fought on consent. It may be argued that the victim faces a more trying ordeal if the issue is consent as opposed to identity. More individuals are investigated as suspects through DNA profiling.
Weighing the Advantages and Disadvantages

The advantages and disadvantages of DNA profiling were considered in terms of both financial and social costs. This thesis postulates that the advantages of DNA profiling outweigh any potential drawbacks. There is considerable expense involved in the utilisation of the technique and it is beneficial in only a small percentage of crime cases. However, this expense may be recouped due to saving in police investigative resources and to the saving in the number of trials. More individuals are investigated and slightly more victims face consent issue trials. However, because DNA profiling is more discriminatory, innocent suspects are more likely to be excluded. There are fewer unsolved crimes with the new technique and prevention of further offences in a serial is more likely. The resulting peace of mind to the victim and the public cannot be measured. If just one serious crime may be prevented through the use of DNA profiling, then surely the expense and a slightly greater degree of social control can be borne.
Chapter Six

Conclusion

DNA profiling is crucial in only a small percentage of cases. It has the greatest impact on stranger type sexual offences, where the point in issue is likely to be identity. However, most sexual offence cases are fought on consent and DNA profiling is thus of limited benefit. The results of this study indicate that the use of DNA profiling increases the rate of guilty pleas, but only for stranger type crime. Additionally, stranger type crime is less likely to proceed to a contested trial if DNA profiling is used.

The application of DNA profiling in the court room has attracted a great deal of publicity and controversy. The findings of this thesis suggest that the greatest utility of DNA profiling is pre-trial, and that perhaps more attention needs to be paid to these areas. DNA profiling is used to screen suspects in the investigation stage. It is used to exclude individuals suspected of involvement in a crime, or provide strong enough evidence of involvement to induce a guilty plea. There are not only savings in costs and resources, but social savings to the victim, the innocent suspect and the community as a whole. There are drawbacks involved in terms of the greater degree of social control and victims facing more consent issue trials, but these must be weighed against the advantages of the technique.

DNA profiling evidence is not a panacea to the level of crime in society. It must be interpreted in the context of other evidence and not alone. Showing that a seminal stain on the clothing of a rape victim originates from a suspect does not, by itself, necessarily prove that the suspect was a rapist. The findings of this thesis show that DNA profiling is an investigative tool, but like other innovative techniques its utility may have been exaggerated through media hyperbole. Further study is needed as DNA profiling appears to be progressing to be the cornerstone of biological forensic techniques, and many more cases have been investigated using the technique since this survey (SFSL records). Trends identified in this study may well become statistically significant.
The Future

The second generation of forensic DNA analysis is PCR, first described in 1985 by Saiki (Saiki et al., 1985). Already it is now the basis for most forensic DNA analysis in Victoria (SFSL records). The problems and consequences for PCR are envisaged to be the same as for the introduction of RFLP DNA analysis. Furthermore, new approaches to DNA analysis are being discovered, such as minisatellite variant repeats. This particular method makes it possible to express an individual's genetic information in digital code (Jeffreys et al., 1990; Jeffreys et al., 1991). The field is one of constant change and is full of exciting developments.

Unsolved cases from many years previous may also have the potential to be solved by DNA analysis. The analysis of ancient DNA began in 1984 and was expanded by Hagelberg (Hagelberg et. al., 1984). The identification of the remains of Josef Mengele, the notorious Auschwitz camp doctor, is an example (Jeffreys et. al., 1992).

The technique of DNA profiling is an innovative one, but it is also constantly evolving. Like any innovation, it must be subject to checks and balances. However, with proper safeguards as to the performance of the technique and an individual's rights, this author views its application as warranted and necessary. Many new techniques, especially those in the world of medical science, have traditionally been viewed with apprehension and distrust (De Kruif, 1927). It would be detrimental to the criminal justice system if media and legal hyperbole over the use of DNA profiling in the court room overwhelmed the real utility and worth of DNA profiling.
Chapter 7

References

Adler, Zsuzsanna.

Alldridge, Peter

Anderson, Christopher.

Baird, Michael.

Balazs I., Baird M., Clyne M. and Meade E.

Balding D.J. and Donnelly P.

Bishop, John B.

Botstein D., White R.L., Skolnick M. and Davis R.
Brereton, David.


Brereton D. and Willis J.


Brown M. and Wilson P.


Ching, Gary.

Solicitor DPP, County Court Melbourne.

Coelli, Andree.


Cohen, Stanley


Davies, Anne.


Debenham, P.G.

Dixon, Robyn.

Dodd, Barbara

Easteal P.
Report to the Australian Police Minister's Council on the forensic use of DNA profiling in Australia: need for a national database. AIC August 1990.

Easteal S. and Easteal P.
The legal use of DNA. Search 21(7), October/November 1990 pp215-216.

Easterbrook, Margaret.
20,000 children abused, survey finds. The Age 17 June 1993 p11.

Family Law Council.

Federico, Ricardo.

Foucault, Michel.
Freckelton, Ian.


Gaensslen R.E.

Galton, Sir Francis.
   Fingerprints. London. 1892.

Gidley, David.
   DNA profiling: the transition from watching brief to the courts- a Victorian perspective. A.I.C. Conference proceedings no. 2 1989 pp97-100

Gill P., Jeffreys A., and Werret, D.

Gill P., Lygo J., Fowler S., and Werrett D.

Gill P. and Werrett D.

Giusti A., Baird M., Pasquale S., Balazs I. and Glassberg J.
Gunn, Peter.

Hagelberg E., Gray, I. and Jeffreys A.

Hall, Ruth E.

Hamer, Mick.

Hicks, John.

Higgs D.F. and Willott G.M.

Jeffreys A., Wilson V., and Thein S.L.


Jeffreys A., Brookfield J. and Semeonoff R.
Jeffreys A., Neumann R. and Wilson V.

Jeffreys A., Macleod A., Tamaki K., Neil D. and Monckton, D.

Jeffreys A., Allen M.I., Hagelberg E. and Sonnberg A.

Jeffreys A.

Johnston, William.
Courts Management Division, Melbourne.

Kanter E., Baird M., Shaler R., and Balazs I.
Analysis of restriction fragment length polymorphisms on deoxyribonucleic acid (DNA) recovered from dried bloodstains. Journal of Forensic Sciences. 31(2), April 1986 pp402-408.

Keating S.M.
Keating S.M., Higgs D.F., Willott G.M. and Stedman L.R.

De Kruif, Paul.

Lander, Eric.

Lewin, Benjamin.

Lewontin R. and Hartl D.
Population genetics in forensic DNA typing. Science 254, 20 December 1991
pp1745-1750.

Lloyd C. and Walmsley R.
Changes in rape offences and sentencing. Home Office Research Study No. 105,
1989 London: HMSO

Lloyd, John.

Marx, J.

Mather, Lynn.

McDonald W.F. and Cramer J.A.
McLeod, Neil.


McSherry, Bernadette.


McNally L., Shaler R.C., Baird M., Balazs I., De Forest P. and Koblinsky L.


Motulsky, Arno G.


Mugford, Stephen.


Muller, Denis.

Sexual violence: 262,000 victims, 41% at home. The Age, Wednesday 16 June 1993 p1,6.

National Research Council.

Neufeld, Peter J.

Neufeld, P. and Colman, N.

Office of Technology Assessment, Congress of the United States.

Ott L. and Mendenhall, W.

Peterson, Joseph.

Petrosinelli, Joseph.

Petrovich, Stephen.

Phillips, John.
Phillips, J., and Bowen, J.

Price, Christopher.

Raymond, Tony.
DNA profiling: the transition from watching brief to the courts - a Victorian perspective. A.I.C. Conference proceedings no. 2 1989 pp89-95.

Read, Richard.


Roberts, P. and Willmore C.

Saiki R.K., Scharf S., Faloona F., Mullis K., Horn G., Erhlich H. and Arnheim N.
Enzymatic amplification of beta-globin genomic sequences and restriction site analysis or diagnosis of sickle cell anemia. Science 230, 1985 pp1350-1354.

Scheffer, John.
Scutt, Jocelynne.

Sheard, Brian.


Smart, Carol.

Smith, Lorna JF.

Starrs, J.


Steele, John.

Steventon, Beverley.

Sykes, Bryan.
Temkin, Jennifer.

Thompson, Mark.
DNA's troubled debut. California Lawyer June 1988 pp36-44.

United States Senate.

Victorian Community Council Against Violence.

Walsh, John J.
The population genetics of forensic DNA typing: could it have been someone else? Criminal Law Quaterly 34, 1992 pp469-497.

Wambaugh, Joseph.

Watson, J.D. and Crick, F.H.C.

Watts, Susan.

Waye, Vicki
Werret D.J. and Lygo J.E.


Werret D.J., Lygo J.E. and Sutton J.G.


Wonder, Anita.


Wyman, A.R. and White, R.

A highly polymorphic locus in human DNA. Genetics 77 (11), November 1980 pp6754-6758.

Young, Simon.


REFERENCES COURT CASES

People v Castro, 545 N.Y.S. 2d, Supreme Court of New York, Bronx, 1989.

R. v Lucas (1992) 2 V.R. 109
Chapter 8

Appendix
2 March 1993

To whom it may concern,

Ms Jane Taupin, a forensic scientist at the State Forensic Science Laboratory, has approval from this Laboratory to use data from case files and records for her Master of Arts Thesis, in accordance with the University of Melbourne guidelines and the Human Research Ethics Committee. This material may be published in her M.A. Thesis provided absolute confidentiality is maintained. That is, no reference is made as to the identity of the victim or defendant where the identity is not on public record.
TO: Director, SFSL

FROM: A/D (Biol)

DATE: 2 March 1993

RE: Authority to use SFSL files for Masters Thesis of Ms. J.M. TAUPIN

Ms. J.M. TAUPIN was authorised by the Director to carry out a Masters degree in Criminology on the 18th March 1991. To that end she requires as stated on her application (see attached) access to case files held at the SFSL!

Mr. Stevens from the Legal Advisers Office was briefed as to the implications and stated verbally that there appeared to be no concerns for the Force, the Justice system and the community, provided confidentiality was upheld. At my request, he forwarded a letter consolidating and reinforcing that view.

The Human Research Ethics Committee at Melbourne University requires written proof that the Director of this organisation granted access to Ms. TAUPIN to SFSL files for Thesis publication.

Consequently, please could the attached authorisation be duly signed.

M.A. RAYMOND.
Our Ref: DAS:CAO

Attention: Mr Tony Raymond
Assistant Director Biology
STATE FORENSIC SCIENCE LABORATORY

CHIEF COMMISSIONER OF POLICE

Re: Request for advice concerning the legal ramifications of the use of D.N.A. profiling information in a university criminology project.

Further to my telephone discussion with Mr Tony Raymond of 18 February 1993 I provide the following summary of the advice given in conference on 23 December 1992.

I am advised that an employee of the S.F.S.L. proposes to submit a project concerning the effectiveness of D.N.A. profiling in criminal proceedings as part of criminology studies. It is proposed that the project will involve, amongst other things, an analysis and comparison of the success of prosecutions and investigations before and after the introduction of D.N.A. profiling.

In conference advice was sought as to whether there were any problems associated with such a project. I advised that it would be necessary to take precautions concerning the identity of the persons being the subject of the statistics used in the project. In my opinion, having regard to considerations of privacy, the Freedom of Information Act, and Section 464ZD(8) of the Crimes Act, it would not be appropriate for use to be made of any information which could identify a particular suspect or victim. It is my understanding that this restriction would not handicap the proposed project.
I confirm my advice to Mr Raymond that if further assistance is required in the future when the project is in a more concrete form I shall be pleased to help.

David Stevens
Assistant Legal Adviser