

Genetic Policing: Forensic DNA Testing in New South Wales

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Introduction

Imagine a society where the government had samples of tissue and fluid from the entire community on file and a computerised databank of each individual's DNA profile. Imagine then that not only law enforcement officials, but insurance companies, employers, schools, adoption agencies, and many other organisations could gain access to those files on a 'need to know' basis or on a showing that access is 'in the public interest'. Imagine then that an individual could be turned down for jobs, insurance, adoption, health care, and other social services and benefits on the basis of information contained in her DNA profile, such as genetic disease, heritage, or someone else's subjective idea of a genetic 'flaw' (Hoeffel 1990:533-534).

In the past decade there has been an explosive growth in public awareness of advances in genetic technology. Popular attention has focused, through the mass media, on symbolic representations of deeply complex and inter-related scientific developments: from 'Dolly' the cloned sheep to 'Missy' the cloned dog; genetically modified food; pigs cultivating human transplant organs; the 'mapped' fruit fly and the near-complete mapping of the human genome; lab mice growing human ears on their backs; disputed paternity cases: 'designer babies'; 'spare body parts'; cancer treatments; DNA-linked surnames; and forensic DNA testing in the criminal justice system. Popular interest reached its zenith in the Hollywood film *Gattaca* (1997), a fictional portrayal of a future in which the human race has been genetically engineered into a hierarchy of intellectual super-humans and servile subspecies. In many respects the film was a contemporary reformulation of the Aldous Huxley's classic, *Brave New World*, which harnessed similar fears about genetic manipulation, scientific enslavement, and the loss of human freedom.

In reality, contemporary genetic technology covers a wide field of scientific endeavour, encompassing cross-disciplinary and multilateral research into humans, animals and plants, across both public and private sectors. Research is driven by the full gamut of human motivations, ranging from the abstract dreams of pure science to the naked pursuit of corporate profits – embodied by the gladiatorial contest to map the human genome between the public Human Genome Project and the private Celera Genomics Corporation. Popular fears and aspirations surrounding genetic technology have been inflamed by the astonishing implications of the research, which may alter the biological foundations of life in ways previously imagined but never before within reach.

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Forensic 'DNA testing'¹ in the criminal justice system cannot be isolated from the popular and political discourses which frame its use. This article places the genetic technology of DNA testing in its socio-political context. The discussion highlights the celebratory rhetoric deployed by 'law and order' politicians, police, and sections of the public; and more sceptical responses to DNA testing advanced by civil libertarians and privacy advocates. The article then examines recently enacted DNA legislation in NSW, including the establishment of the NSW component of the national DNA database ('CrimTrac'). It concludes by evaluating the successes and reliability of DNA testing and DNA databases generally, and addressing the admissibility of DNA evidence in the courts.

Forensic DNA testing and public opinion

The emergent use of forensic DNA testing in criminal investigations world-wide, as an important strand of genetic technology, is embroiled in public controversy. Two aspects of the use of DNA require consideration: DNA testing, and the storage of samples on DNA 'databases'. Advocates of DNA technology claim that it is an extraordinarily successful policing tool, assisting in the highly accurate identification of victims, missing persons and criminals from human genetic samples such as blood, hair, sweat, semen or saliva.

Numerous *cause célèbres* in various jurisdictions have focused public attention on the supposed reliability and accuracy of the technique (Brunsell 1999). In Britain in 1983, the first British case to rely on DNA testing eliminated the prime suspect, Colin Pitchfork, in the murder of two teenage girls in the town of Narsborough. Police had conducted a mass testing of the local community but did not secure a match with the suspect or with any one else (Doherty & Connolly 2000). Later, in August 1987, a man drinking in a hotel told that his friend had bullied him into taking a swab test on his behalf. In January 1988, four years after the murders, Pitchfork was sentenced to two life terms in prison. Paradoxically, the case demonstrated both the (initial) unreliability and (subsequent) reliability of DNA testing, at different stages of the investigative process.

In New Zealand, police used DNA testing in a high profile investigation into the 'South Auckland serial rapist' (McBride 1997). Pacific Island and Maori men aged between 20 and 45 were encouraged to 'volunteer' blood samples for DNA testing. Some men in the area reported being under considerable pressure to 'volunteer' a blood sample. Police claimed that any samples taken would be destroyed once they had been tested, but it was later revealed that the samples had not been destroyed and might be placed on the DNA databank.

In New South Wales, the rural town of Wee Waa became the most recent centre of media attention when the police announced the mass voluntary testing of the entire adult male population in April 2000. Six hundred men aged between 18 and 45 years old were asked to submit a DNA sample (in the form of a saliva swab) for a police investigation into the unsolved sexual assault of a 93-year old woman at the end of 1998. A local indigenous man, Stephen Boney, allegedly admitted to police that he had committed the offence a few weeks

1 In this article, the concepts of DNA 'testing' and 'sampling' are used interchangeably when referring to the use of DNA in criminal investigations, while a DNA 'profile' refers to the forensic analysis or result of a test or sample. These terms are distinguished from the original but misleading concept of DNA 'fingerprinting' – developed and patented in Britain by Jeffries in 1985 – because that concept wrongly implies DNA technology produces unique results. 'DNA' (deoxyribonucleic acid) carries all the genetic information of cellular organisms. It is a double stranded helical molecule containing four bases (adenine, tyrosine, cytosine and guanine) and has coding and non-coding ('junk') areas. The bases link together to form a very stable structure.

after the voluntary sampling began, and before the results of his own voluntary sample were known. The 44 year old man was charged with aggravated break and enter with intent to use violence, breaking and entering a building to commit a felony, and aggravated sexual assault inflicting actual bodily harm (Kennedy 2000a). He pleaded guilty to the charges in Moree Local Court in July 2000 (Kennedy 2000f), and was sentenced in Narrabri District Court to 12 years imprisonment (NSW Council for Civil Liberties 2000).

The Wee Waa offender reportedly came forward because 'the pressure from the inevitability of eventually being caught by DNA had got to him' (Kennedy 2000f). This new form of psychological pressure stemming from a police request for a person's consent to a DNA test has been termed 'DNA request surveillance' (Gans 2001). The police can observe the behaviour of persons requested to submit samples for signs of fear or anxiety. In Wee Waa for example, police noticed that Boney's hands were shaking during the testing (Kennedy 2000g). Gans notes that this new form of surveillance may infringes the privilege against self-incrimination:

By compelling people to reveal their minds, rather than just the contents of their genome, DNA request surveillance infringes the privilege against self-incrimination, which governs the relationship between investigators and citizens. Moreover, in contrast to other techniques pressuring citizens to reveal their criminal behaviour, DNA request surveillance permits investigators to prompt such revelations without any accusation of criminality (Gans 2001:2).

In a perverse use of police investigative discretion, volunteers for testing were also given a police questionnaire which asked them what they believed should happen to the offender if he were caught. The police officially claimed that the questionnaire was 'part of the investigative process', while unofficial 'police sources' suggested that it was a form of psychological profiling to identify suspects (Lagan & Kennedy 2000a). One person interviewed by a major newspaper claimed that he had answered that the offender should be 'gassed'. Police noticed that Boney took much longer than others to complete the questionnaire (Kennedy 2000g).

Less extreme but nonetheless emotive support for the police operation in Wee Waa came from a variety of quarters. Understandably, the victim herself said a 'daily prayer' that the offender was caught by the testing, hoping that he was 'put... on a bull ants' bed' (Ho 2000). The victim's niece was 'buoyed' by support for her aunt from those who volunteered to be tested, as well as from 'strangers' around the country (Kennedy 2000a). Members of the Wee Waa rugby league team were 'among the first' to volunteer to be tested (Kennedy 2000b).

The local member of State Parliament, Mr Slack-Smith, also said he would be 'first in line' to be tested, claiming that '[t]here's not one man in Wee Waa who I've spoken to that is not willing to... submit to a DNA test, and they come from all walks...' (Kennedy 2000c). Mr Slack-Smith argued civil libertarians opposing the testing should speak to the victim to understand its justification: 'If they don't speak to her, then they should go and talk to any other victim of an unsolved rape and see what they think about police using DNA to catch their attacker' (Kennedy 2000c). The classic populist 'law and order' platitude in favour of testing was aired on commercial television, when talk-back radio host Stan Zemanek rolled out the argument that 'the innocent have nothing to hide' (Zemanek 2000).

Perhaps predictably, the NSW Police Service and the NSW State Government were the loudest proponents of the voluntary testing at Wee Waa, with the State Coroner also in support (Jackson 2000). The local area Police Commander unproblematically reversed the presumption of innocence at criminal law by implying that every Wee Waa man was a suspect, despite the total absence of any incriminating evidence: 'important to identifying the offender is to eliminate those people who are innocent so they don't have a cloud hanging over their head' (Doherty & Connolly 2000). The NSW Police Minister stated: '[i]f you are under suspicion, then you have lost your right to privacy' (Whelan 2000a). The Operation Commander of Crime Agencies NSW invoked the 'overwhelming support' of the Wee Waa community, noting that only a small number of people had refused to be tested (Ho 2000).

Importantly, the mass testing at Wee Waa was voluntary because under NSW criminal law at the time, compulsory DNA testing of suspects was not permitted. It was arguably no coincidence that two days before police announced the mass testing at Wee Waa on 6 April 2000, NSW Premier Bob Carr gave details in Parliament of a forthcoming legislative proposal to enable police to take DNA samples from suspects by force (Lagan & Kennedy 2000b). The Premier's triumphal press release trumpeted DNA testing as the 'most advanced and effective crime-fighting tool ever provided to police', and used populist 'law and order' rhetoric by entitling the release '21st Century Crime Fighting'. The Premier claimed hyperbolically that the DNA proposal 'has the potential to revolutionise policing' and 'gives the police a weapon even more effective than fingerprinting.' Premier Carr also argued it could prove the innocence of suspects and the wrongly convicted, while Police Minister Whelan claimed up to 80 per cent of outstanding crimes would be solved.

The linkage between the Wee Waa experiment and the legislative proposal was made clear by the Commander of Crime Agencies NSW, who said police would use Wee Waa as a 'significant learning experience' in anticipation of the new legislation (Lagan & Kennedy 2000b). Police later admitted they had developed a 'media strategy' to 'educate' the public about the benefits of DNA testing, but claimed that the timing of the Premier's announcement and the Wee Waa test was coincidental (Lagan & Kennedy 2000b). The President of the NSW Council for Civil Liberties cynically but plausibly suggested the testing was a 'public relations exercise' for the new legislation (Doherty & Connolly 2000).

Soon after the Wee Waa testing, police foreshadowed the voluntary DNA testing of inner-Sydney Darlinghurst residents, to assist in the investigation of the high profile, unsolved murder of local sex worker Rebecca Bernauer (Crittelle 2000). Police stated that compulsory testing would be used if voluntary testing failed to achieve a result, although the probability of a match within a high density, fluctuating inner-city population would seem much lower than the probability within a small and isolated rural township. Police also publicly announced the use of DNA testing – on fingerprints lifted from a steering wheel – in a high profile case in December 2000, in which a toddler died from heat exhaustion after being abandoned in a stolen car (Kennedy 2000e).

In a separate but related development, NSW Police have begun using DNA technology to help link missing persons to unidentified human remains. The Missing Person Unit has asked relatives of the more than 400 people missing in NSW since the 1960s to provide DNA samples for forensic comparison. The Unit successfully matched a woman's skeleton (missing the jawbone for dental comparison) found in the Blue Mountains in 1998 with a DNA sample volunteered by her mother. Police Minister Whelan has claimed that there are no privacy issues involved because samples would be donated voluntarily and stored and matched against information on the police intranet (Murphy & Kennedy 2000). However, it has not been made clear whether the volunteered samples will be made available for matching with the crime scene database being developed nationally.

Civil liberties implications of DNA testing

Public debate on the Wee Waa experiment elicited some of the key civil liberties issues surrounding the use of forensic DNA testing. Significantly, the DNA swabs taken from the 420 innocent men in Wee Waa, and the analysis data of saliva, thumb prints and photographs, were subsequently destroyed by police at a Sydney incinerator, in front of independent witnesses, including an official from the NSW Ombudsman (NSW Council for Civil Liberties 2000). The innocent volunteers were thus excluded from the database and from future police matching of their profiles with unsolved crime scene stains.

The central criticism made of the mass testing, however, was that people who refused to be tested would be perceived to be guilty, as Independent MP Richard Jones suggested (Doherty & Connolly 2000). This was of particular concern given that only 12 male adults in Wee Waa ultimately refused to be tested (Kennedy 2000d), and could easily have become the focus of police and public suspicion in the absence of the convicted man's confession. A resident of the town was concerned that mass testing was based on a presumption that everyone was guilty (Lagan & Kennedy 2000a). A local solicitor claimed that all men within the specified age group were under 'suspicion' and had to prove their innocence – even though the police had no evidence on which to suspect their involvement in the crime (Lagan & Kennedy 2000b). Justice Action pointed out that by testing individuals not charged with any offence, the onus of proof is 'moved onto the public' (cited by Ho 2000).

The local member of Parliament confirmed this shift when he claimed the testing was necessary to remove 'the cloud of guilt over the town' (Lagan & Kennedy 2000b). As the President of the Australian Council for Civil Liberties noted, the highly public nature of the testing, surrounded by media-driven 'law-and-order hype', arguably reduced the chances of the accused getting a fair trial (Lagan & Kennedy 2000a). In this respect, there is a tendency of DNA testing to replace trial, since a charge becomes determined by the apparently definitive and publicly conclusive DNA test. The presumption of innocence is reversed, undermining a key element of the right to a fair trial, even though a myriad of scientific, statistical and procedural issues may affect the accuracy of a particular DNA test (Johnston 2000; see further below).

A second line of objection noted the potential for corrupt police to plant DNA evidence, implicating innocent people (Arena 2000). In the spectacle of the O J Simpson trial in the US, the defence damaged the prosecution's case when it showed that police had carried a vial of the defendant's blood to the crime scene, raising the obvious risk of contamination. Notably, there is a long and well-documented history of fabrication of evidence in the NSW Police Service. The danger of fabrication was revealed most recently in the Wood Royal Commission (1994-97), which implicated several hundred police officers in 'process corruption' – a problem that seems likely to continue given historical experience (O'Gorman 2000). Reliance on the apparent finality of DNA testing creates new dangers in the planting of evidence, and powerfully warns of the need to maintain bodily integrity and privacy.

A third line of objection was that DNA testing results in unwarranted intrusions on individual liberty and personal privacy. The Chairperson of the NSW Law Society's Human Rights Committee argued the mass testing was a 'frightening glimpse of a future police state in NSW' (Lagan & Kennedy 2000a). Specific concerns relating to the civil liberties implications of the DNA legislation in NSW are addressed in the next section. The more general philosophical implications of DNA testing have been persuasively outlined by the Privacy Commissioner of Canada (1998):

Forensic DNA analysis joins a very exclusive club of physical intrusions that society tolerates of the state. Therefore it is essential that the intrusions inherent in forensic DNA analysis be restricted to those circumstances that are truly necessary in a democratic society.

Common article 12 of the Universal Declaration of Human Rights (1948) and the International Covenant on Civil and Political Rights (1966) recognises that '[n]o one shall be subjected to arbitrary interference with his privacy, family, home or correspondence, nor to attacks upon his honour and reputation'. Jurisprudence from the UN Human Rights Commission has interpreted the term 'arbitrary' broadly, referring to 'elements of injustice, unpredictability, unreasonableness, capriciousness and unproportionality', as well as to a 'lack of due process' (Nowak 1993:172). Arguably, under the First Optional Protocol to the ICCPR, signed by Australia in 1991, individual complaints may potentially be made to the UN Human Rights Committee that DNA testing was not 'reasonable in the particular circumstances' (UNHRC 1994: GC 16).

At a fundamental level, DNA testing is a violation of personal privacy: 'the value at the heart of our individual autonomy; the right to be free from interference, from surveillance, from coercion by others who would use information about us to influence our decisions' (Privacy Commissioner of Canada 1998). Privacy is both an individual right and a broader 'value to society', since it is 'fundamental to maintaining a civil society – respecting one another by maintaining the distance which is essential to our individuality while living closely together' (Privacy Commissioner of Canada 1998). Privacy is measured by

...the degree of control we exercise over what others know about us. No one, of course, has absolute control. As social animals, few would want total privacy. However, we are all entitled to expect enough control over what is known about us to live with dignity and to be free to experience our individuality (Privacy Commissioner of Canada 1998).

Significantly, other human rights depend on the maintenance of privacy:

Our fundamental rights and freedoms, of thought, belief, expression and association, depend in part on a meaningful measure of individual privacy. Unless we each retain the power to decide who should know our political allegiances, our sexual preferences, our confidences, our fears and aspirations, then the very basis of a civilized, free and democratic society could be undermined (Privacy Commissioner of Canada 1998).

In this philosophical context, DNA testing is a form of intrusive modern technology which makes it 'feasible for others to learn many intimate details about us, whether we want them to or not' (Privacy Commissioner of Canada 1998). Additionally, '[w]e cannot ignore the psychological consequences of being poked and prodded by the state... What does that do to a person's sense of autonomy and sense of freedom?' (Privacy Commissioner of Canada 1998).

Although the DNA testing involved minimal physical intrusion on bodily integrity – in that testing procedures are fairly quick and painless – it does constitute a wider violation of 'information privacy'. In the Canadian Supreme Court decision of *Dyment*, Lamer J noted that: '[t]his notion of privacy derives from the assumption that all information about a person is in a fundamental way his own, for him to communicate or retain as he sees fit' (cited by Privacy Commissioner of Canada 1996).

Information privacy has become more and more difficult to protect in modern 'surveillance societies' (Flaherty, cited by Privacy Commissioner of Canada 1996). As the Supreme Court of Canada acknowledged in *Wong v Queen* (La Forest J 1990): '[t]he technical resources which agents of the state have at their disposal ensure that we now run the risk of having our words recorded virtually every time we speak to another human being.' Surveillance technologies like DNA testing are 'akin to the issuance of a general

search warrant on the entire population' (Davies, cited by Privacy Commissioner of Canada 1996). Significantly, the rhetoric of 'law and order' invokes a discourse of technological progress in the 'fight against crime', regardless of privacy consequences:

Privacy is being converted into the poor cousin in debates about public security. Privacy interests that are seen as hindering effective law enforcement or endangering public security, whether they are in truth a hindrance or not, are too often swept aside (Privacy Commissioner of Canada 1996).

The right to privacy is not absolute, and societies recognise various intrusions on privacy considered acceptable in international human rights law (HREOC 2001). In the absence of an articulated and legally binding right to privacy in Australia, or a Bill of Rights, legislatures must weigh privacy as a policy consideration in the formulation of forensic DNA legislation:

Our goal is to strike a balance between the many competing interests in society, those of law enforcement to protect our physical safety, and those of human rights to protect the values that are essential to life in a democratic society (Privacy Commissioner of Canada 1998).

It is important to note that privacy protections in the federal *Privacy Act* 1988 (Cth) apply to forensic material handled by the Australian Federal Police and CrimTrac where an individual's identity is apparent, or may be ascertained from the material (s6(1)). However, an exception to the rule against secondary use and disclosure of personal information without consent is where disclosure is reasonable necessary for the enforcement of the criminal law (IPP 10 & 11 of the *Privacy Act*). This exception enables CrimTrac to store DNA profiles in the national database and to disclose it to the Australian Federal Police. Federal privacy protections do not however appear to extend to state and territory police forces which will access the national database. While the *Crimes Amendment (Forensic Procedures) Act* 2001 allows the federal Minister to make agreements with participating jurisdictions for sharing information on the national database (s23YUD of the *Crimes Act* 1914 (Cth)), there is no express requirement that the privacy of personal DNA information be protected. As demonstrated in the next section, the new NSW legislation fails to adequately balance individual privacy and 'public safety' in significant respects.

DNA legislation in NSW

The Crimes (Forensic Procedures) Bill 2000 No 59 (NSW) was introduced into the New South Wales Legislative Assembly by the Police Minister on 31 May 2000, was assented to on 5 July 2000 and became operative on 1 January 2001 ('the NSW Act'). The Act derives from the Final Draft of the National Model Forensics Legislation released in February 2000. The Model Legislation was the culmination of wide-ranging public consultations over many years. In 1995, following consultation on a discussion draft, the Commonwealth prepared a Model Forensic Procedures Bill, endorsed by the majority of the Ministers at the Standing Committee of Attorney's-General. The 1995 Bill was revised after further consultations and re-released as a draft in May 1999, and then as a Final Draft in February 2000 ('the National Model Legislation'), taking into account the National DNA Database proposed as part of the Federal Government's CrimTrac system, announced in the 1999-2000 Federal Budget.

According to commentators such as the NSW Privacy Commissioner, the Victorian Criminal Bar Association, the NSW Police Service, the John Tonge Centre for Forensic Science (Qld) and Sir Harry Gibbs, the Model Legislation largely strikes an appropriate balance between the forensic needs of police in solving crimes and a respect for individual privacy (Gans 2000; Stuart 1995; Schurr 1995; Ranson 1995). In recent years, a number of

governments have moved to enact legislation essentially consistent with the Model Legislation (Commonwealth, Victoria and South Australia). The Commonwealth legislation – the *Crimes Amendment (Forensic Procedures) Act 2001* – amends Part 1D of the *Crimes Act 1914* (Cth) in relation to ‘forensic material’ and will come into force on 6 October 2001. The NSW Act is substantially similar to the Model Legislation and aims to complement DNA regimes in other jurisdictions.

The Northern Territory has enacted legislation quite different to the National Model Legislation while Queensland has passed legislation based on the Legislation but which is more invasive. Police in Queensland can take DNA samples without consent from all persons arrested or charged in relation to an indictable offence (*Police Powers and Responsibilities Act (Qld)*: s311). This power has been interpreted to include prisoners summarily convicted of indictable offences (*Brogden v Commissioner of the Police Service* [2001]).

Unlike the lengthy process of consultation involved in the preparation of the Model Legislation, a politics of secrecy arguably surrounded the NSW Government’s preparation of its DNA legislation. The NSW Government had consistently refused to disclose the extent of police powers in the legislation until late in its development, despite pressure from the NSW Law Society and the NSW Privacy Commissioner to involve them earlier in the consultation process. The Law Society President also criticised the Police Commissioner for starting the Wee Waa mass testing before the new legislation was passed (Doherty & Connolly 2000).

The NSW Act permits different methods for the taking of forensic samples, including DNA, from ‘volunteers’, ‘suspects’ and offenders convicted of offences attracting a maximum penalty of five years or more. A ‘suspect’ is defined in section 3 of the NSW Act as a person that police suspect on reasonable grounds of having committed an offence attracting a sentence with a maximum penalty of five years or more, a person arrested for such an offence, or a person charged in relation to such an offence. Police may carry out a procedure with the informed consent of a suspect, offender or volunteer. In the absence of consent, a senior police officer can order a ‘non-intimate’ (less invasive) procedure on a suspect under arrest or an offender, while a court order is required to perform either an ‘intimate’ procedure or a ‘buccal swab’ (saliva test). The police may obtain an interim court order to authorise a procedure where the probative value of the evidence is likely to be lost or destroyed if the procedure is delayed.

There is potentially a problematic slippage between the categories of ‘volunteer’ and ‘suspect’. Under s 84 of the Act, evidence of a person’s refusal or failure to consent, or withdrawal of consent, to a forensic procedure is not admissible in proceedings against the person. However police may still use information gathered from observing a person’s refusal to consent in assessing whether there are reasonable grounds to suspect a person’s involvement in a relevant crime. In some circumstances, ‘consciousness of guilt evidenced through a refusal to consent’ could satisfy reasonable suspicion (Gans 2000:12), thus transforming a volunteer (who cannot be compulsorily tested) into a suspect (who can be). In such cases, the consent procedure for volunteers is compromised by police surveillance.

The Act also provides for the establishment of a DNA database enabling DNA profiles (taken from suspects, convicted offenders or consenting volunteers) – and including the physical samples from which the profiles originate – to be matched against DNA ‘stains’ on the ‘crime scene index’. The database will form part of the Federal Government’s \$51 million law enforcement initiative, ‘CrimTrac’, which will co-ordinate the national storage and matching of DNA profiles with crime scenes (Victorian Law Reform Commission

1999). The Act provides for the inter-state exchange of information on DNA databases in other jurisdictions, and for the reciprocal enforcement of orders for carrying out forensic procedures (ss95-97). Similar databases have been established in other jurisdictions, including in the United Kingdom (1995), the Netherlands (1997), Austria (1997) and Germany (1998).

There are some progressive features in the NSW Act which aim to protect the privacy and safeguard the rights of suspects, offenders and people in NSW generally. A suspect can only give 'informed consent' after the police have provided a substantial amount of information about the procedure (ss9 & 13). Such information includes the purpose of the test, the offence it relates to, the right to refuse consent and the consequence of refusal, and the potential use of the test in evidence. A suspect must also be told that the procedure will be carried out by an appropriately qualified police officer or person and that they have a right to have a medical practitioner or dentist present for certain procedures. Suspects must further be given a reasonable opportunity to communicate with a legal practitioner (s9). One safeguard in the Model Legislation (cl 9(1)(j) and 51(1)(i)) was however omitted from the NSW Act. The Legislation requires suspects and offenders to be informed of the provision (cl 72 of the Model Legislation and s84 of the NSW Act) that evidence of a refusal or failure to consent, or withdrawal of consent to a procedure is not admissible in evidence against the person.

Another protection is that the giving of information and consent must be recorded in writing or electronically (s15), and suspects (and their lawyers or 'interview friend') must be provided with copies of, or given opportunity to view or hear, such recordings (s100-101). Consent may be withdrawn in an express or implied manner (s14). Additionally, a volunteer's consent must be witnessed by an independent person (s78). Objections by a suspect or offender under the Act may be made by their lawyer or interview friend (s99). Police must also arrange an interpreter for a suspect or offender if there are 'reasonable grounds' for believing it is necessary (s98).

Aboriginal and Torres Strait Islander suspects must not be asked to consent to a procedure until after the notification of a representative of an Aboriginal legal aid organisation (s10). Further a child or 'incapable person' cannot consent to a procedure, so that a court's authorisation is required (s8). An incapable person is defined in section 3 of the Act as an adult who is incapable of understanding the general nature and effect of a forensic procedure, or incapable of indicating whether or not he or she consents to the procedure. A potential problem is that the police have the discretion to interpret incapability, which is often a difficult social and psycho-medical judgment in which police may not be trained. Misjudgments about capacity may result in the denial of appropriate procedural safeguards.

Despite the 'informed consent' safeguards, some evidence has emerged that they are being ignored in relation to prisoners. The prisoners' rights group Justice Action (2001a:3-9) has reported that some NSW prisoners have been intimidated into consenting to forensic tests by threats of loss of privileges, reclassification of status, violence and harassment. It is also reported that some prisoners who refused consent have actually lost privileges as a result (Justice Action 2001a:6). The testing regimes in Silverwater, Goulburn and Lithgow gaols have been singled out for particular criticism (Justice Action 2001a:5). The statistics show that relatively few prisoners have refused testing to date. As at 31 March 2001, 2,553 serious indictable offenders had been tested, but only 124 of those pursuant to orders issued by a senior police officer and merely two as a result of court orders (Dugandzic 2000:4).

The Act allows no more than 2 hours for the procedure itself to be carried out, not including 'time out', and in addition to the detention after arrest period for suspects under arrest provided under Part 10A of the *Crimes Act 1900 NSW*. Questioning of a suspect must be suspended during the procedure (s45). A procedure must be carried out giving 'reasonable privacy' to the suspect, out of presence or view of unnecessary persons, by a person of the same sex where practicable (s51) and with minimal removal of clothing or visual inspection of the person (s44). A child, incapable, or indigenous suspect has a right to have a lawyer or interview friend present during a procedure (ss54-55).

Although police may use 'reasonable force' to carry out a forensic procedure, they must comply with 'appropriate medical or other professional standards' (s47), and 'cruel, inhuman or degrading' treatment is prohibited (s48). The latter protection is partial recognition of Australia's obligations under the International Convention Against Torture and Other Cruel, Inhuman or Degrading Treatment (1988), and article 5 of the Universal Declaration of Human Rights (1948). In practice the term 'reasonable force' has proven open to interpretation. In May 2001 graphic images were televised of a Victorian prisoner being forcibly tested by a special police squad in full riot gear (including helmets), allegedly after capsicum spray was used (SBS 2001a). In December 2000, the Supreme Court of Victoria detailed one instance of the use of force against a prisoner in Bendigo Prison:

On 19 April 2000 he was locked in his cell and was then asked by prison officers would he consent to the procedure and on his refusal gas was sprayed into his cell. He started to lose consciousness and recalls having shackles placed around his wrists and being dragged to the showers where he was washed down. He was then dragged to the visitors' area and was informed by a police officer as to the procedure which was about to take place. He stated he did not want to be tested but said that he wanted his own doctor to perform the procedure if he had to. He was then held down and a blood sample was taken from his thumb. He was later moved to the Barwon Prison in early May (*Lednar & Ors v The Magistrates' Court & Anor* [2000]: para 45)

In that case Justice Gillard of the Supreme Court set aside the Magistrates' Court order against each of the three applicants (compelling them to provide DNA samples) on the basis that the magistrates had improperly exercised jurisdiction by making the orders in chambers rather than in open court. Nonetheless the facts of the case illustrate the dangers inherent in the exercise of new powers of physical force in prison environments hidden from public view.

Under the Act DNA samples must be destroyed rather than stored where a suspect is found not guilty or where proceedings are not instituted against the suspect within 12 months (s88), and samples from convicted offenders whose convictions are quashed must also be destroyed (s87). The Act provides further that a failure to comply with the Act in carrying out a procedure will render evidence inadmissible (s82), except where the court finds that the desirability of admitting the evidence outweighs the undesirability of admitting improperly obtained evidence. These provisions aim to eventually exclude the innocent from the database, although – remarkably – innocent suspects can still be matched against crime scenes during the period (of up to 12 months) that they remain on the database. One UK decision however has cast doubt on the effectiveness of the provision rendering improperly obtained evidence inadmissible. The UK court held that a DNA sample which should have been destroyed under UK legislation was nonetheless admissible due to the public interest in the effective investigation and prosecution of serious crime (*Attorney-General's Reference (No 3 of 1999)* [2001]).

An independent, non-police statutory body will act as guardian of the DNA database (s87), reducing the capacity of corrupt police to access profiles improperly. Police supervision of procedures prevents those giving samples from substituting another person's DNA sample as their own (s56). The Act also creates offences relating to the supply and use of forensic material, carrying penalties of up to two years' prison and/or an \$11,000 fine. Offences include intentionally or recklessly supplying forensic material for analysis when the material was required by law to be destroyed; improperly accessing information stored on the DNA database; and matching profiles on the database for impermissible purposes. The Act will be monitored by the Ombudsman and reviewed in 18 months (s122).

A State Institute of Forensic Science has also been established to provide a 'professional, timely, cost effective and independent forensic analytical service' to the NSW justice system (Police Commissioner Ryan 2000). The Institute was formed with the involvement of a steering committee comprising representatives from the Department of Health, the Attorney-General's Department, and the Ministry for Police, and chaired by the Police Commissioner. Assuming adequate funding, the Institute should overcome the lack of forensic training and expertise which has hitherto characterised the use of DNA evidence in NSW.

For instance, in 1996, a Chief Inspector of NSW Police noted in 1996 that there has been a 'dearth of specialised training' in emerging forensic techniques within the NSW Police Service. The Director of the National Institute of Forensic Science agreed that a lack of training in 'crime scene' procedures has compromised the 'integrity' of the 'chain of evidence' relating to forensic samples, 'either by contamination of people who shouldn't be at the crime scene, walking through the crime scene, poor collection techniques, [or] poor storage techniques' (ABC Radio National 1996). Within the NSW Police Service, the Forensic Procedures Implementation Team, part of the Forensic Services Group, is responsible for DNA testing. The Department of Corrective Services and the NSW Police have developed Standard Operating Procedures (SOPs) for testing prisoners, while Corrective Services shows a video to inmates before asking for consent to testing (Dugandzic 2001:3).

The final safeguard accompanying the NSW legislation is the establishment of an independent panel to review criminal cases using DNA evidence to help eliminate wrongful convictions (AAP 2000a). The panel will be chaired by a senior legal figure and include representatives of the Privacy Commission, victims of crime, the Director of Public Prosecutions and the NSW Police Service, and will become operative six months after DNA testing begins under the legislation (AAP 2000a). The panel will be responsible for considering cases where: (i) DNA evidence from a crime was unable to be analysed or unavailable at the time of trial; (ii) DNA evidence from an accused was not considered; and/or (iii) DNA evidence may point to another person.

In spite of these progressive features in the legislation, there are a number of concerns regarding the Act's operation. Firstly, the NSW Act, the National Model Legislation, and the Commonwealth Bill permit police to compare DNA profiles taken from suspects and convicted offenders with DNA on the database of crime scene stains, adopting the approach taken in the UK and Germany (Schmitter 1999). Thus a suspect in a particular crime can be linked to an unrelated crime – even if the police do not suspect that the person is involved in the other crime (Gans 2000). For this reason, the practice is known as generating 'cold hits'.

It thus differs from the Belgian approach, which permits profiles to be matched with other crime scene stains only when a suspect's DNA has been linked with a particular crime scene (Van Renterghem 1999). Problematically, pursuing 'cold hits' amounts to speculative policing premised on an absence of probative evidence, a type of 'fishing expedition' (Privacy Commissioner of Canada 1995). Some critics have also interpreted 'cold hits' as a violation of the right to silence (Gans 2000), or of the privilege against self-incrimination (Robinson 2000).

The practice also departs from existing procedures governing forced medical examinations under section 353A of the *Crimes Act* 1900 (NSW). Under that section, a medical examination (including the taking of samples of blood, saliva and hair) of a non-consenting suspect, in lawful custody, may be ordered by a senior police officer if there are reasonable grounds to believe that the examination will afford evidence relevant to the commission of the offence being investigated. The amendment was a response to the decision in *Fernando v Commissioner of Police* (1995), where it was held that the power to examine a person in custody did not give police the power to take forensic samples, and that police have no common law powers to medically examine suspects or arrested persons.

Matching 'cold hits' is thus not permitted under the Crimes Act 1900, since a forensic sample taken under s353A must relate to a person's involvement in a particular crime, and samples must be destroyed as soon as practicable after prosecution and not stored for matching. Section 112 of the NSW Act provides only that the Act 'does not apply to the taking of photographs, hand prints, fingerprints, foot prints or toe prints under sections 353A and 353AA of the *Crimes Act 1900* and section 63 of the *Crimes (Sentencing Procedure) Act 1999*'. By implication, the NSW Act consequently overrides s 353A of the Crimes Act 1900 in respect of the taking of other forensic samples, including blood, saliva and hair, notwithstanding the guarantee in section 115 of the Act that the Act 'does not affect the taking, retention or use of forensic material or information obtained from forensic material in accordance with certain other laws'.

Secondly, the Model Legislation and the NSW Act both distinguish between 'intimate' procedures (invasive tests) and 'non-intimate' procedures (less intrusive) (s3). In the absence of informed consent, a senior police officer can order a non-intimate test for suspects under arrest, but a Magistrate is required to order an intimate test. The distinction aims to ensure intimate tests are only conducted when 'absolutely necessary', discouraging police from conducting excessive intimate (and potentially intimidating) testing (Gans 2000).

Intimate forensic procedures are defined in the Act (s3) to include a variety of procedures which affect the genital or anal area or the buttocks, or the breasts of a female or a transgender person who identifies as a female. Specific procedures relating to these areas include an external examination; a blood sample; a saliva sample (otherwise than by buccal swab); a sample of pubic hair; a sample by swab or by washing; a sample by vacuum suction, scraping or lifting by tape; a dental impression; a photograph; or an impression or cast of a wound.

Non-intimate forensic procedures are defined to include a similar variety of procedures which affect parts of the body *other than* the genital or anal area or the buttocks, or the breasts of a female or a transgender person who identifies as a female. Specific procedures on such body parts include an external examination; a non-pubic hair sample; a sample from a nail or under a nail; a sample by swab or by washing; a sample by vacuum suction, scraping or lifting by tape; a hand print, fingerprint, foot print or toe print; a photograph; an impression or cast of a wound; and the taking of external physical measurements for bio-mechanical analysis.

In the original discussion paper of the Model Criminal Code Officers' Committee, the distinction between intimate and non-intimate tests related both to the nature of the test and the nature of the material that could be extracted from the samples taken. Intimate samples yielded DNA but non-intimate samples did not. However, once hair samples were allowed to be taken as non-intimate samples, this nexus was broken, since DNA can be extracted from hair.

Whereas the final Model Legislation included 'buccal swabs' (saliva tests) as intimate procedures, the NSW Act curiously creates a separate category for them, largely the result of a political compromise reached over a disagreement as to categorisation. In NSW, some had argued for the categorisation of buccal swabs as non-intimate, making the NSW Privacy Commissioner concerned that invasive, non-consensual testing – and the associated use of force – would become normalised as a police practice (cited by Lagan & Kennedy 2000b).

In practice, the NSW categorisation is entirely artificial. In the absence of consent, the police still require a court order to compel a buccal swab, but a senior officer has the power to order an alternative non-intimate procedure, such as taking a hair sample, from suspects under arrest, for prescribed (presently only indictable) offences (s19). Strangely, the police already had the same power under section 17 of the Act. In any event, the NSW Act avoids the UK position, where buccal swabs are 'non-intimate' under the *Criminal Justice and Public Order Act 1994* (UK) amendment to the *Police and Criminal Evidence Act 1984* (UK) (ss63-65).

In the UK, buccal swabs may be taken by force for any 'recordable' offence (generally, any offence punishable by imprisonment). There are two types of non-intimate samples. The first allows for a sample to be taken from a person without consent if they are in detention or being held in custody, upon authorisation of a senior police officer. The officer must have reasonable grounds for suspecting the involvement of the person in a serious recordable offence and believe that the sample will confirm or disprove that involvement (ss63(3), 63(4)).

The second type was created by the 1994 amendment, which provides that a non-intimate sample may also be taken from a person without consent if they have been charged with a recordable offence, or informed they will be reported for such an offence, and they have not had a non-intimate sample taken from them in the course of the investigation, or such a sample was not suitable for analysis. There is no requirement for a belief that the sample will confirm or disprove involvement in the offence (s63(3)(a)).

UK police can thus perform an invasive and potentially violent procedure at their discretion, without court supervision: '[e]ven the swab procedure takes on a very different nature if the suspect does not agree to it. The suspect would have to be held down and have his/her mouth prised open by police' (Gans 2000). It makes invasive testing a routine police matter, regardless of the sample's probative value or relevance in relation to a particular offence.

Thirdly, the NSW Act departs from the Model Legislation in the protection it affords suspects who refuse consent to a non-intimate procedure. Under clause 14(1) of the Model Legislation, a police officer can only order the performance of a non-intimate procedure on a suspect when the officer is satisfied, on the balance of probabilities, that:

(d) there are reasonable grounds to believe that the forensic procedure is likely to produce evidence tending to confirm or disprove that the suspect committed the relevant offence; and

(e) ...carrying out... the forensic procedure without consent is justified in all the circumstances.

In determining whether a procedure is 'justified in all the circumstances', under clause 14(2) of the Model Bill the police officer 'must balance the public interest in obtaining evidence tending to confirm or disprove that the suspect committed the offence... against the public interest in upholding the physical integrity of the suspect'.

The NSW Act offers a lesser protection to suspects in respect of clause 14(1)(d) and (e), and the interpretation of 14(1)(e) in clause 14(2), of the Model Legislation. In the NSW Act, a senior police officer can order a non-intimate procedure if satisfied on reasonable grounds that the procedure 'might' produce evidence of probative value -- a much lower requirement than that it is 'likely' to produce such evidence (ss17 & 20). The term 'might' expresses a mere *possibility*, while 'likely' expresses *probability*. The result is that the police will be able to compel a larger range of suspects to submit to testing, even where the evidence is scant or unlikely. Further, in the NSW Act the determination of whether a procedure is 'justified in all the circumstances' does not include the requirement to balance public safety against physical integrity. As a result, the explicit recognition of the value of personal privacy in the Model Legislation can be ignored by NSW police.

The low evidential threshold under the NSW Act ('might produce evidence') is of further concern given that in many criminal cases, DNA testing would 'contribute nothing' to a police investigation, 'because the crime is such that it will yield no samples from the crime scene' (Privacy Commissioner of Canada 1998). For example, DNA may have little forensic value in 'white collar' crimes, fraud or computer crimes, because they leave no 'testable' evidence as is often the case with 'physical' or violent crimes like burglaries or assaults. Yet under the NSW Act, police could routinely test such suspects in database 'fishing expeditions' (Privacy Commissioner of Canada 1998), potentially placing many more people on the database and at high extra cost. In October 1999, the CrimTrac proposal estimated it would cost \$100 to analyse each offender's sample, and over \$300 per crime scene. If all of the 50,000 indictable matters that went through the NSW courts last year were tested, it would cost at least \$5 million, discounting repeat tests.

A fourth problem arising out of the NSW Act is its failure to require the physical destruction of a person's DNA sample once a profile has been extracted and stored: '[i]t's not a DNA database -- it's a bank of DNA samples' (Keays 2000). This is where the link between human genetic research and forensic use of DNA in the criminal justice system becomes apparent. A forensic DNA sample contains a person's genetic code, which potentially includes information about inherited diseases or behavioural traits (Keays 1999). As the Privacy Commissioner of Canada (1998-1999) notes, '[t]he danger of storing the physical samples is the temptation it offers future governments to authorize further testing for completely unrelated purposes'. For example,

This information could potentially be used by employers, insurers and government departments to discriminate against you. A huge bank of DNA samples could also be used to research criminal links to behaviour or be used by drug companies as a source of genetic material. And... the potential for abuse by corrupt officers is much greater (Keays 2000).

In August 2000, a national survey by the NSW Genetics Education Program revealed over 100 cases of discrimination against families with genetic disorders by insurance companies (Metherell & Smith 2000). Discrimination included higher insurance premiums or denial of

insurance coverage for income, travel, superannuation or life insurance. It is currently not illegal in Australia for insurance companies to use the results of genetic tests to determine premiums. According to the Health Minister, Dr Wooldridge, it is expected that a Federal Government inquiry into the impact of gene technology on human rights, by the Australian Law Reform Commission and the Australian Health Ethics Committee, will not propose laws to deal with genetic discrimination for at least one to two years (Metherell & Smith 2000).

This absence of genetic regulation exists despite the listing of a Private Member's Bill, the Genetic Privacy and Non-discrimination Bill 1998, by Senator Stott Despoja of the Australian Democrats in 1998. That Bill protects the genetic privacy of individuals; makes genetic discrimination against individuals or families unlawful; defines the circumstances in which genetic information and DNA samples may be collected, stored, analysed, and disclosed; establishes the rights and responsibilities of individuals and persons with respect to genetic information; and provides effective mechanisms to enforce such rights and responsibilities. The only genetic regulation undertaken by the Australian Government to date has been laws governing the use of genetically modified organisms in December 2000 (AAP 2000b).

Of particular concern is that storage of forensic DNA samples could ignite a potentially dangerous search for a 'criminal gene', without proper consideration of the consequences:

Scientific curiosity and public pressure to reduce crime will almost certainly lead to interest in using samples of convicted offenders to look for common genetic traits that may be linked to anti-social behaviour. This could lead to the unwarranted labeling and mistreatment of individuals, and their law-abiding biological relatives, as deviant because of their genetic makeup (Privacy Commissioner of Canada 1995).

Yet, as Justice Michael Kirby notes, the search for a 'criminal gene' is a double-edged sword:

The criminal law is built upon the hypothesis of free will. For the crime to be established it is normally necessary to prove both the act of the accused and the will (*mens rea*) occasioning that act. But what are the implications for the law of discovering that, in some cases at least, for some people, the act is practically no more than the product of a genetic characteristic (Kirby 2000:43)?

For the purposes of identification in criminal investigations, only the DNA profile is required, not the physical sample from which it is extracted. Storing the sample itself is not necessary to verify the results of analysis, since obtaining a second sample from the suspect would achieve the same objective (Keays 2000). Police argue for the retention and storage of samples on the ground of cost savings, achieved by dispensing with the need to perform a second physical testing at a later stage. However, it is surely arguable that the additional protection of liberty resulting from a requirement to destroy samples justifies the additional expense involved in conducting further tests. Currently, New Zealand and some European countries require destruction of samples, while Canada and the UK permit storage.

The fifth difficulty with the NSW legislation is applicable to any DNA legislation which establishes a DNA database. The Privacy Commissioner of Canada terms it 'function creep': '[t]he mere existence of such a databank will beg further unrelated uses of DNA samples taken from offenders' (Privacy Commissioner of Canada 1998). At this early stage of the NSW legislation, it is apparent that this risk is already imminent. Premier Carr has indicated that forcible DNA testing may be extended to suspects of serious *summary* offences after 18 months (Doherty 2000), as well as to prisoners for offences attracting a maximum penalty of less than five years. The NSW Police Minister supports routine DNA

testing of all suspects, claiming the 'innocent have nothing to fear' (Gans 2000). The NSW Opposition would extend the legislation to cover 'petty offences' (Kennedy 2000c). The Queensland Government has signalled its intention to expand compulsory DNA testing from individuals *convicted* of serious offences to all individuals *charged* with indictable offences (ABC 2001).

Some members of the Australian community have called for a database including the DNA of all adults, based on driver's licence applications (Keays 2000). The Federal Liberal Member for Herbert (Qld), Peter Lindsey, has called for everyone to be DNA tested (SBS 2001b). The NSW Council for Civil Liberties has noted that compulsory DNA testing at birth 'makes social engineering on a genetic basis a real possibility' and 'doesn't allow the child any choice' (2000). This fear is apparently not so extreme, given that blood spots have been collected from all newborns in Australia since the late 1960s. These so-called 'Guthrie cards' are stored in secure sites and may facilitate the creation of DNA profiles if the blood samples are not degraded or contaminated. Police already use Guthrie cards to identify deceased persons (*R v McIntyre* [2001]).

Experience overseas also demonstrates that 'function creep' is a very real threat. After the Metropolitan Police Commissioner in the UK argued for a DNA database based on the entire British male population, a British House of Commons Committee concluded that, '[a]lthough the creation of a DNA database on the whole male population would undoubtedly be expensive, we consider it a development that would provide considerable benefits for the police' (Privacy Commissioner of Canada 1998). Similarly, in the US the Michigan Commission on Genetic Privacy has proposed the permanent storage of blood samples from babies – collected to detect hereditary diseases – because the samples are a 'valuable resource' for law enforcement and scientific research (Privacy Commissioner of Canada 1998-1999). The US military is taking DNA samples from two million American servicemen – ostensibly to enable identification of 'battle casualties' – but the military will also make the samples available to the police (Privacy Commissioner of Canada 1998).

The sixth problem with the NSW Act is its retrospective application, also provided for under the National Model Legislation (cl 51(1)) and in Victoria (*Crimes Act* 1958, Schedule 8). Current prisoners serving sentences for offences attracting a maximum penalty of five or more years – imposed before the commencement of the new legislation – may retrospectively be required to furnish forensic samples. Thus prisoners serving sentences of, say, only six months could be tested, since there is no requirement that prisoners are actually serving sentences of five or more years.

Although the Model Legislation additionally allows prospective testing of prisoners on parole or those who have served their sentences and been released into the community (cl 52), the threshold for testing is more stringent than in NSW. Under the NSW Act, a court may order a retrospective forensic procedure on a prisoner 'if satisfied that the carrying out of the forensic procedure is justified in all the circumstances' (s17). By contrast, the 1995 Model Bill required the police to satisfy the court that the circumstances of the offence for which the person was convicted are serious, and that there are reasonable grounds to believe that the person may have committed some other serious offence or may commit some other serious offence in the future (cl 69 & 70). This requirement was based 'on the philosophy that people are innocent until there are demonstrable grounds to suggest otherwise and that offenders who have served their sentence have paid their price to society and should not be subject to further impositions' (Model Criminal Code Officers' Committee 1999:33).

The final Model Legislation (2000) reduced this requirement by omitting the need to show reasonable grounds that the person may have committed, or may commit, some other serious crime. Serious offenders in prison may be tested unless they object (cl 51 and 55), upon which a court will rule on the objection (cl 56), taking into account: (a) 'whether this Part would authorise the forensic procedure to be carried out in the absence of an order'; (b) 'the seriousness of the circumstances surrounding the commission of the serious offence'; and (c) 'whether the carrying out of the forensic procedure is justified in all the circumstances' (cl 56(3)). Serious offenders already released from prison need not object, but can only be tested if a court order is granted after consideration of identical factors (cl 51, 57(4)).

The lesser protection afforded to serious imprisoned offenders and released imprisoned offenders in the 2000 Model Legislation was the result of a shift in thinking by the Model Criminal Code Officers' Committee. The presumption of innocence enshrined in the 1995 Model Bill was replaced by 'the view that if a person is convicted of a serious offence, then it is reasonable for society to expect that person to not only surrender their freedom to mix with society for some time, or to live in accordance with conditional freedom (imprisonment or release on a recognisance or parole conditions), but also to be required to give samples to assist with the detection of a repeat offence' (Model Criminal Code Officers' Committee 1999:33). This new 'rationale has more to do with the fact that a person belongs to a class of people likely to offend rather than the specific circumstances of the person's offence' (Model Criminal Code Officers' Committee 1999:33). The NSW Act reflects a further lessening of protection for prisoners, by dispensing with the duty on the court to consider the seriousness of the offence, and referring only to whether a procedure is justified in all the circumstances.

In practice, retrospectivity may be beneficial in that it could help solve outstanding crimes and it signals to recidivists that future crimes are more easily detected. However, the requirement of retrospectivity unfairly imposes an additional penalty upon offenders after they have already been appropriately sentenced. As Sir Harry Gibbs notes, the Act's retrospectivity offends 'the principle that no person should suffer any adverse consequences from committing an offence unless that consequence was provided for by law at the time the offence was committed' (cited by the Model Criminal Code Officers' Committee 2000).

Retrospectivity also dangerously exacerbates the social division between prisoners and non-prisoners, ignoring that prisoners have human rights; that prisoners' rights are human rights. Existing restrictions on prisoners' rights, invoked by the Model Criminal Code Officers' Committee (1999:37) to justify DNA sampling as simply another restriction, present a false analogy. Restrictions under the Minimum Standard Guidelines for Australian Prisons (1984) are designed to 'facilitate the running of the prison' (Model Criminal Code Officers' Committee (1999:37), not to intensify state surveillance of an individual's actions outside of the prison environment. Coerced provision of DNA is of a fundamentally different nature to restrictions on liberty such as wearing prescribed clothing or limits on personal property.

Further, retrospective testing makes assumptions about the likelihood of recidivism among the prison population it targets for sampling, without differentiating between rates of re-offending for particular crimes. It is 'too broad a generalisation' to suggest retrospectivity is justified because serious offenders are likely to re-offend again (Sir Harry Gibbs, cited by the Model Criminal Code Officers' Committee 2000). Neither the National Model Legislation nor NSW Act are based on detailed empirical analysis of recidivism rates for different serious offences, which are highly variable between, for example, sex

offenders and homicide offenders. As Sir Harry Gibbs stated, 'I do not accept that a person convicted of, say, company fraud is likely to commit robbery or burglary' (cited by the Model Criminal Code Officers' Committee 2000).

It is thus arguable that the Model Criminal Code Officers' Committee (2000) was mistaken in finding that 'the balance is in favour of the public interest in protecting the community rather than the public interest in not having retrospective legislation'. Retrospectivity creates a precedent in the criminal law, lowering the threshold for retrospective application of future laws. Importantly, it is an approach which stigmatises individuals as members of a vaguely defined class of recidivists, without reference to the ideal of justice according to individual circumstances, and which hinders prospects of rehabilitation and post-prison reintegration.

A final problem with the NSW legislation is that there is no provision for legal assistance to the defence for mounting or challenging expensive DNA evidence. It has been argued properly in Canada that the state should 'assume the cost of DNA testing done for the defence to ensure that lack of money does not prevent the accused from challenging the accuracy of sophisticated and expensive scientific analyses' (Privacy Commissioner of Canada 1995). The NSW Council for Civil Liberties has similarly noted that '[m]ost suspects will have limited access to the expertise necessary to counter police interpretation of DNA evidence' (2000).

The NSW does not expressly provide for special expert or legal assistance in the interpretation of DNA evidence, which may impinge on the fairness of a defendant's trial. The Act provides limited assistance to defendants in challenging DNA evidence, requiring (i) a suspect to be given a part of a sample taken from the suspect that is sufficient for analysis if there is sufficient material to do so (s58); (ii) a copy of any photograph taken of a part of a suspect's body during a forensic procedure to be made available to the suspect (s59); (iii) a copy of the results of any analysis of material taken from a sample from a suspect to be given to the suspect (s60); and (iv) that a suspect, offender or volunteer, or their lawyer or interview friend, is given copies or transcripts of, or the opportunity to view, any audio or video recordings that are made as required by the Act (s100).

Wider concerns about legal or expert assistance specifically necessary for interpreting and contesting DNA evidence may fall within the court's discretion to exclude or limit unfairly prejudicial, discriminatory or oppressive evidence under the *Evidence Act* 1995 (NSW) (ss135-137). Alternatively, it may attract the limited common law right to legal assistance in complex criminal trials, as an incident of a fair trial, recognised in *Dietrich v R* (1992).

A related issue is the absence of a compensation scheme for convicted persons exonerated of crimes by the use of new DNA evidence. The Law Society of NSW believes it is 'unfair' that such persons do not receive the same compensation as victims of crime, whose situation is analogous (Law Society of NSW 2000). Similar calls for compensation have been made in the US by a coalition of New York lawyers (the Innocence Project), after significant numbers of prisoners in the US have been released on the strength of DNA evidence (Riley 2000).

Most US states (except New York and Illinois) have imposed strict limitations on compensation awards – in California, US\$100 per prison day capped at US\$10,000 – and 33 states have imposed statutes of limitations preventing DNA testing from being used more than 6 months after conviction (Riley 2000). More than half of the 64 US prisoners freed as a result of DNA testing had to challenge their local prosecutors in court to gain the

right to be DNA tested (Riley 2000). In one Louisiana case, a man was released in January 2000 after being wrongly imprisoned for 19 years on a rape charge (Riley 2000). The local prosecutors made him sign a waiver of compensation before allowing him to take the DNA test that demonstrated his innocence. As a result, the only 'compensation' he received was the remainder of 22 cents per hour he had earned working as a cotton labourer while in prison.

Investigative success of DNA testing

The success rates ascribed to DNA technology are often overstated or misrepresented by proponents of the technology. Indeed, the Director of the National Institute of Forensic Science has suggested that the community has 'unrealistic expectations' about the 'strengths and limitations of forensic science' (ABC Radio National 1996). Confusion about the role of DNA testing in criminal investigations has been the hallmark of public responses to the technique in foreign jurisdictions (Schmitter 1999). The Privacy Commissioner of Canada has noted that facts often come second in western societies 'mesmerized by technology' (Privacy Commissioner of Canada 1996).

The aims stated by the NSW Police Commissioner (2000) in favour of using DNA testing are legitimate enough. DNA testing may 'lead to an increase in the detection, arrest and successful prosecution of criminals', help to 'clear up old unsolved crimes, provide suspects in new crimes and act as a deterrent'. It may 'identify or exclude suspects by comparing their DNA profiles with DNA profiles found at a crime scene', or 'through the appropriate use of mass screenings', or by linking 'seemingly unrelated crimes by comparing DNA profiles found at different crime scenes', or by targeting some high volume crime areas with traditionally low clearance rates but higher clearance rates when DNA profiling is used'.

Statistically, it is fair to say that DNA testing has made a valuable contribution to criminal investigations around the world. For example in Austria, the DNA from 300 suspects was matched to crime scenes between Oct 1997 and Nov 1999, while more than 380 crime scenes were linked to suspects, including 4 cases of murder, 22 cases of rape and more than 300 cases of burglary (Scheithauer 1999). In terms of exonerating the innocent, in the US, 64 prisoners were freed by DNA evidence between 1993 and February 2000 (Riley 2000). DNA evidence has also exposed police fabrication of forensic evidence. In March 2000, 99 prisoners in California were released after new DNA evidence revealed that police had falsified prosecutions to increase conviction rates (Riley 2000). In January 2000, the Republican Governor of Illinois – formerly in favour of the death penalty – imposed a moratorium on executions after 13 prisoners on death row were found innocent (Riley 2000).

These startling exonerations beg the obvious question of just how many convicted innocents have been executed, or wrongly imprisoned, in the US. But in relation to its impact on the death penalty in the US, DNA testing is arguably a mixed blessing. On one hand, the freeing of innocent prisoners from death row through the use of DNA testing has led to a more cautious use of the death penalty in some US states. On the other hand, the perceived certainty, precision and infallibility of testing may ultimately strengthen the case in favour of the death penalty in the longer term, since its proponents may argue that the use of DNA testing eliminates the potential for wrongful convictions.

In the United Kingdom, since 1995 the national DNA database has produced 10,000 matches between crime scenes and suspects and has 'cleared up' on average 333 crimes per month. The 'cold hit' rate is 18%, compared with 10% for traditional fingerprinting. In the past three years, DNA testing has matched suspects to 212 murder and manslaughter cases and 868 sexual assaults (Doherty 2000). One third of the 144 voluntary mass tests since 1983 have resulted in arrests (Doherty & Connolly 2000) – although it is not clear how many arrests led to actual convictions.

Statistics on the number of 'matches' between DNA profiles and crime scene stains are, however, misleading in some crucial respects. Firstly, 'matches' do not signify guilt, nor do they represent arrests made or convictions secured. A match simply denotes that a particular person may have been – but was not necessarily – present at a particular crime scene at some point in time. Especially at crime scenes which are public places or are visited by large numbers of people, a match may not mean very much. A match may also be produced by planted evidence – for example, a cigarette or even a semen sample can be moved. Crucially, even a genuine match is only be evidence as to a criminal act (*actus reus*), and does not indicate intention (*mens rea*), which must be proved in the ordinary manner.

Additionally, DNA databases have not been uniformly successful. In the US, a massive testing regime has produced millions of samples but very little cross-matching and few – less than 200 – positive results. Although UK police have reported a 60 per cent increase in 'clear up' rates for some offences, when put in perspective it is not so impressive. For example, the clear-up rate for break, enter and steal in NSW is currently 5 to 6 per cent, and a 60 per cent increase would only result in an 8 per cent clear-up rate.

The deterrent effect of the DNA database on recidivists is also questionable in relation to some serious crimes, considering that most murders and sexual assaults are committed by offenders who are known to the victim. Indeed, in many serious crimes, identification of the alleged perpetrator is simply not an issue, making the collection of DNA irrelevant other than to allow wider matching or the building up of the database.

In addition, given that there are few forensic scientists currently working in NSW, it is possible that the success of testing in NSW will be hindered by a lack of resources. For example, there is a significant DNA backlog in the UK, where 600,000 samples have been submitted for analysis but only 500,000 have been profiled and put on the database (Model Criminal Code Officers' Committee 1999). Although five out of six samples may seem an adequate result, it took more than a decade to achieve at considerable cost. In the US, where comparable resources have not been devoted to testing, the results are far less impressive – around 750,000 collected samples had not been analysed by August 2000.

Finally, the investigative success of DNA testing depends on the reliability of the scientific methods used in particular tests. Before the development of DNA testing, forensic science used the 'classical serological genetic markers', such as blood groups, proteins and enzymes. Although useful, the limitations of these techniques were clear:

These genetic markers were... limited when it was necessary to analyse minimal or degraded material, which is commonly involved in forensic cases. It was, in addition, difficult to analyze biological material other than blood, and therefore the information obtained from hair, saliva and even semen in rape cases was rather limited (Carracedo 1999).

The discovery of DNA 'fingerprinting' by British researchers in 1985 overcame many of these limits on traditional forensic science (Jeffreys et al 1985). DNA techniques have since become increasingly sophisticated and accurate in the identification of genetic material

(Carracedo 1999). Australia has adopted a method of DNA profiling which analyses nine different regions ('loci') of DNA, in conjunction with a gender test, although up to 20 loci may be tested (Chaseling, cited by Smith 2000a). In the US, 13 loci are routinely tested. It is generally assumed that the probability of two people in the general population having the same DNA profile is less than one in 360 million (Chaseling, cited by Smith 2000a). However, DNA profiling is mistakenly equated with fingerprinting, since profiles are not unique and may be shared by twins or siblings (Bretherick 1995). The Australian Genome Research Facility is currently refining the existing testing method – which requires 500 to 1,000 cells for analysis – by studying a 'single cell' technique, which arguably produces reliable samples in 84 per cent of cases (Findlay, cited by Smith 2000b). The method is suited to identifying offenders in sexual assaults involving more than one offender, since the traditional method cannot distinguish reliably between mixed semen samples.

All forensic laboratories in Australia now use a commercial DNA testing system called 'Profiler Plus', developed by the company Perkin Elmer and available since about 1997. It enables the simultaneous inspection of 10 loci and up to 36 different samples (*R v Karger* (2001:para 102)). The reliability of this system has been challenged on a number of occasions in the United States and at least two cases have excluded evidence obtained using this testing method as unreliable (*People of Colorado v Shreck* (2000); *State of Vermont v Pfenning* (2000)). The most recent Australian case involving the reliability of Profile Plus was *R v Karger* (2001:para 614), where it was held by a single judge of the Supreme Court of South Australia that the system is 'generally accepted throughout the forensic science community as reliable and accurate'. There remain concerns however about the 'commercial in confidence' restrictions on Profiler Plus which prevent full public disclosure of the basis of the system.

DNA testing is not infallibly accurate. There are many issues which can affect the reliability of DNA testing: contamination by bacteria or foreign substances during investigation or laboratory testing (Bentley & Georgalis 1990; Bretherick 1995); ageing and degradation (Gill 1993); 'band shift' (Bentley & Georgalis 1990; *US v Yee* (1991); *US v Bonds* (1993); *Caldwell v State* (1990); *People v Keene* (1992); *O'Dell v Netherland* (1996); *Satcher v Netherland* (1996)); statistical variation (Bentley & Georgalis 1990), population frequency (Fedor 1993; *R v Milat* (1996); *Frye v US* (1923); *US v Baller* (1975); *R v Gilmore* (1977); *R v Pantoja* (1996)); genetic mutation (Howard Hughes Medical Institute 1997); lack of police and forensic training; and lack of standardisation across jurisdictions (Carracedo 1999; Brown 1999; Eisenberg 1999; Bramley 1999; Janssen 1999).

There are ongoing disputes within the scientific community about the extent to which each of these factors affects the reliability of DNA testing, and it is not within the scope of this article to adjudicate these disputes. In the courts, controversy has particularly surrounded the extent to which profiles of different races and sub-populations differ from the 'general population' (Lander & Budowle 1994; Gill 1993; Fedor 1993; *Armstead v State* (1996); *People v Miller* (1996); *State v Copeland* (1996); *State v Morel* (1996); *Clark v State* (1996); *State v Jones* (1996); *State v Johnson* (1996); *Tran* (1990)), although this dispute appears to have settled in recent years (National Research Council Committee on Forensic DNA Science 1996).

An issue of recent concern to emerge in the United States has been misconduct by the prosecution's forensic experts. Some scientists have falsified, fabricated or misrepresented test results to assist in securing convictions. One forensic serologist in the West Virginia State Police Crime Laboratory was found by a Supreme Court special commission to have

given evidence in more than 130 cases that was not 'credible' (Rowe 1996:xvii). In 2001 the Federal Bureau of Investigation reported that an Oklahoma City police laboratory scientist had misidentified evidence or given improper testimony in at least five of the eight cases it reviewed, and the scientist's involvement in around 3,000 cases (including death penalty cases) between 1980 and 1993 is currently under investigation (Yardley 2001). These examples illustrate the need for proper accountability controls on and supervision of laboratories, as well as the need for independence from police departments and prosecutors.

Admissibility of DNA evidence in the courts

DNA evidence is a form of expert opinion evidence. Opinion evidence is admissible if it is wholly or substantially based on a person's specialised knowledge, and that knowledge is based on the person's training, study or experience (s79 of the *Evidence Act* 1995 (NSW)). The statutory exception for expert evidence displaces the common law standard that the opinion of a purported expert must derive from a 'field of expertise' (Odgers 3rd ed 1997), a disputed requirement that has been assessed by the courts according to different tests: 'general acceptance' in the relevant specialised scientific discipline (*Eagles v Orth* [1976]; *Carroll* (1985); *R v Lewis* (1987); *R v Runjanjic* (1991); *R v Lucas* [1992]; *Jamieson* (1992); *R v C* (1993)); an assessment of 'reliability' (*Casley-Smith v Evans & Sons Pty Ltd (No 1)* (1988); *R v Runjanjic* (1991); *R v C* (1993); *Shoshana Pty Ltd v 10th Cantanae Pty Ltd* (1987); *Ritz Hotel Ltd v Charles of the Ritz Ltd* (1988); *Interlego AG v Croner Trading Pty Ltd* (1991)); or a combination of both tests (*R v Gilmore* [1977]; *R v Lewis* (1987)).

Expert opinion DNA evidence must also be relevant (s55 of the *Evidence Act* 1995 (NSW)) – rationally capable of affecting the probability of the existence of a fact in issue – and not subject to any policy or discretionary grounds for its exclusion (*R v Jarrett* (1994)) (ss135-138 of the *Evidence Act* 1995 (NSW)). Section 135 of the *Evidence Act* provides that 'the court *may* refuse to admit evidence if its probative value is substantially outweighed by the danger that the evidence might: (a) be unfairly prejudicial to a party; or (b) be misleading or confusing; or (c) cause or result in undue waste of time.' Section 137 provides that in a criminal proceeding, 'the court *must* refuse to admit evidence adduced by the prosecutor if its probative value is outweighed by the danger of unfair prejudice to the defendant'. Section 136 allows the court to limit the use to be made of evidence if there is a danger that a particular use of the evidence might (a) be unfairly prejudicial; or (b) be misleading or confusing.

The prevention of 'unfair prejudice' aims to avoid miscarriages of justice. Evidence must be more than damaging to a party's case. There must be a danger that the trier of fact may use the evidence to make a decision improperly, such as on emotional basis that appeals to sympathy, punitive instincts, a sense of horror, or on a basis logically unconnected with the issues. Such bases are likely to make the trier of fact satisfied with a lower degree of probability than required. Unfair prejudice may also arise from procedural considerations, such as the lack of a chance to challenge the reliability of evidence. The court must consider whether the danger can be reduced by editing the evidence or directions to the jury. In section 135, evidence is 'misleading or confusing' if there is a real danger that evidence of minimal probative value will be given more significance than it deserves (Odgers 3rd edition 1997: 443). Evidence that might 'cause or result in unfair waste of time' may refer to evidence that adds unnecessary complexity to a trial without helping to resolve the facts in issue; is of minimal, incremental, or duplicate value only; or requires other evidence to be admitted in order to evaluate it.

Early Australian authorities supported the discretionary exclusion of DNA evidence on the basis that the probative value of the evidence was, in the circumstances, outweighed by its prejudicial tendencies (*Tran* (1991); *Lucas* (1991)). Indeed, a ground for exclusion in 'unusual cases' dealing with expert scientific evidence is that a jury might be 'overawed by the scientific garb in which the evidence is presented and will attach greater weight to it than it is capable of bearing' (*Duke* (1979); *R v Humphrey* [1999]). An exaggerated popular opinion of scientific accuracy may make its use prejudicial or likely to mislead the jury' (Gilmore [1977]). As the NSW Council for Civil Liberties (2000) argues, 'because many see DNA as definitive, its potential for harm and prejudice is far greater'.

However, as DNA technology has developed, a majority of subsequent Australian authorities have regarded conflicting expert testimony about the reliability of specific DNA testing methods as a factual matter for the jury to determine, subject to appropriate judicial direction (*Pantoja; Re Pantoja* (1998); *Milat* (1994); *R v Jarrett* (1994); *R v Humphrey* [1999]; *R v Green* (1993); *R v Mitchell* (1997); *Chamberlain v The Queen (No 2)* (1984); *Hocking v Bell* (1945); *Commissioner for Government Transport v Adamcik* (1961)). DNA evidence must have sufficient probative value to outweigh its otherwise prejudicial effect (*Lucas* (1991); *R v Lewis* (1987); *R v Mitchell* (1997)). The courts should normally assume that juries are capable of evaluating complex scientific evidence, even where there is conflicting expert testimony:

...under our system... the assessment of the weight to be attached to expert evidence, as to other evidence, is the function of the jury. That being the system, a trial judge must assume... that the jury is capable of understanding that it is not bound to accept the expert evidence, that it is capable of resolving conflicts of opinion amongst the expert witnesses, and that it will not be overawed by the scientific garb in which the evidence is presented to it (*Duke* (1979), 41 (King J)).

For a judge to act otherwise – by ruling the evidence inadmissible – 'denigrates the intelligence and capacity of juries and is contrary to principle' (*R v Jarrett* (1994)), smacks of 'elitism and of intellectual condescension'; and ignores the 'everyday practical experience of the courts' (*R v Lisoff* [1999]). The jury is the 'lynch-pin' of the criminal justice system, and 'the average jury, if properly assisted and directed, will do diligently and conscientiously what the law asks of it' (*R v Lisoff* [1999]). It is worth noting that jury confusion in some cases has been the result of the poor presentation of evidence by experts, rather than the difficulty of the material per se (Steventon 1998). Forensic scientists have given 'expert' probability evidence even though they lacked training in statistics (*R v Borham* (1992); *R v Hammond* (1992)).

Usually, it is sufficient to note that expert opinion evidence subject to challenge is prima facie admissible, as long as it is generally accepted by the relevant scientific community and passes the threshold test of being beyond 'the experimental stages' (*Frye v United States* (1923)) as 'of a body of knowledge... sufficiently organised or recognised to be accepted as a reliable' (*Bonython* (1984)). The courts do not require 'absolute certainty of result or unanimity of scientific opinion':

Unless an exaggerated popular opinion of the accuracy of a particular technique makes its use prejudicial or likely to mislead the jury, it is better to admit relevant scientific evidence in the same manner as other expert testimony and allow its weight to be attacked by cross-examination and refutation (*R v Gilmore* [1977]).

The greatest conflict over expert DNA testimony in the courts has centred on the statistical interpretation of DNA profiles (in the UK, see *R v Doheny and Adams* [1997]; *R v Adams* [1996]; *R v Adams (No 2)* [1998]; *R v Gordon* [1995]; *R v Cooke* [1995]; in the US, see *State v Hill* (1995); *State v Moore* (1994); *State v Gollehon* (1995); *State v Moeller* (1996);

Spencer v Commonwealth (1990); *State v Lyons* (1996); *State v Gentry* (1995); *State v Harrison* (1995)), an issue which has spawned an enormous critical literature (Steventon 1998; Redmayne 1998; Roberts 1998; Kaye 1997; Coutts 1997a; Coutts 1997b; Coutts 1995; Redmayne 1995; Birch and Rees 1995; Balding and Donnelly 1994; Farrington 1993; Thompson and Schumann 1987).

It has been argued that the complexity of interpreting expert statistical evidence precludes the understanding of average jurors, and so may result in an unfair trial (*R v Doheny and Adams* [1997]). There has been little empirical research conducted into how jurors interpret probability evidence (Redmayne 1997). But since the courts have generally admitted such evidence, the importance of clear judicial directions to juries is paramount. Under section 165 of the *Evidence Act 1995* (NSW), a judge, upon request by a party, must warn the jury that certain kinds of evidence, in addition to any other evidence, may be unreliable; inform the jury of matters that may cause it to be unreliable; and warn the jury of the need for caution in determining whether to accept the evidence and the weight given to it.

The Act complements the judge's general powers to give appropriate warnings and directions (s165(5); *R v AGJ* (1997); *R v S* (1997)). The aim is to avoid the 'perceptible risk of miscarriage of justice' (*Longman v The Queen* (1989)), although failure to warn will not necessarily result in miscarriage of justice, particularly where there is other substantial evidence of guilt (*Bromley v The Queen* (1986)). In relation to expert opinion DNA evidence, warning of the 'prosecutor's fallacy' (Bretherick 1995) is crucial, as described by the Lord Chief Justice in the seminal British case of *R v Deen* (1994):

It was fallacious to confuse match probability with what was known as the likelihood ratio. There were two distinct questions:

1. What was the probability that an individual would match the DNA from the crime sample given that he was innocent?
2. What was the probability that an individual was innocent given that he matched the DNA profile from the crime sample?

The 'prosecutor's fallacy' consisted of giving the answer to the first question as the answer to the second.

As Hunt CJ indicated in the leading Australian case of *R v Pantoja* (1996), '[t]he significance of a match between the... DNA of the offender and the suspect... must be clearly explained to the jury: that... it establishes no more than that the accused *could* be the offender' [my emphasis]. Judicial directions should also distinguish legal likelihood from mathematical probability (*Re JS* [1980]; *R v Doheny* (1997)):

...the statistical fact that a particular proposition is true of the majority of persons cannot of itself amount to legal proof on the balance of probabilities that the proposition is true of any given individual (*SGIO v Laube* (1984)).

Juries must be directed to holistically evaluate all of the evidence, regardless of the apparent persuasiveness of statistical probabilities:

But the probability of the correctness of a particular proposition of fact, at least of the present kind, cannot depend completely upon such a mechanical meaning of probability... Testing aside, it may be that further explanation of this process is a matter for the experimental psychologist rather than for the lawyer or mathematician (*Jones v Sutherland Shire Council* [1979]).

The passage of the DNA legislation in NSW will not essentially affect judicial consideration of the admissibility of expert DNA evidence. The Act makes no claim as to the reliability of DNA evidence produced pursuant to the Act. As Police Minister Whelan (2000b) noted in his Second Reading Speech in support of the Act, '[t]he admissibility of forensic evidence will be a matter for the courts to decide, and the weight given to evidence obtained by the exercise of powers under the Act is a question for the court.'

The Act does provide that a failure to comply with the Act in carrying out a procedure will render evidence inadmissible (s82). An exception is where the court finds that the desirability of admitting the evidence outweighs the undesirability of admitting improperly obtained evidence, after consideration of listed matters such as a mistaken but reasonable belief about the age of a child. In such cases, the judge is required to inform the jury of the failure to comply and give warnings. As suggested earlier, this exception could allow DNA evidence that should have been destroyed under the Act to be admissible against the person. The second exception is where evidence of how a procedure was carried out may be admitted to establish or rebut an allegation that unreasonable force was used (s85).

Importantly, a refusal to consent to a procedure, or withdrawal of consent, is inadmissible, except to establish or rebut an allegation that a police officer or other person acted contrary to law during the investigation (s84). As noted earlier however, a refusal to consent by a volunteer does not prevent the police from interpreting that refusal as suspicious in certain circumstances, potentially transforming a volunteer (who cannot be compelled to provide a sample) into a suspect (who can be compulsorily tested).

Finally, the lack of uniformity across jurisdictions in DNA legislation is of serious concern. DNA tests can be compelled in different circumstances in different jurisdictions. For example, a suspect or convicted offender may be compulsorily tested in one state in circumstances not permitted in a second state, due to inconsistencies in the definition of 'suspect' or 'convicted offender'. The police in the second state may then access the DNA obtained in the first state by using the national database and seek to prosecute the person for a crime committed in the second state. Police in the second state could thus obtain DNA evidence otherwise lawfully unobtainable within that jurisdiction.

The federal Crimes Amendment (Forensic Procedures) Act 2001 expressly permits this procedure by adding Division 11 to Part 1D of the Crimes Act 1914, allowing the sharing of information on the database between jurisdictions as long as its collection was undertaken in accordance with the laws applying in the jurisdiction concerned (s23YUA–YUD). The federal Minister may enter into arrangements with a responsible Minister of a participating jurisdiction to share information on the database that may be relevant to the investigation of an offence against the law of the participating jurisdiction (s23YUD).

This information sharing provision is supplemented by s23YP(1) of the federal Act which provides that the federal legislation does not interfere with the taking, retention or use of forensic material generated under other State and Territory laws. Sub-section 23YP(2) provides that information or material lawfully taken under a State or Territory law can be retained or used for the investigative, evidentiary and statistical purposes of the Commonwealth, even if that retention or use would otherwise not comply with the federal Act. The Explanatory Memorandum to the earlier Crimes Amendment (Forensic Procedures) Bill 2000 stated that this provision is necessary to facilitate Australia's federal structure, which can produce variations across jurisdictions despite attempts to achieve uniformity:

...the provision is consistent with the approach taken in the Uniform Evidence Act, namely, to avoid the situation where evidence can be excluded in one jurisdiction even where that evidence would be acceptable to a court in another Australian jurisdiction. It would be most abnormal for it to be any different given Australia's federal structure (2000:para 201).

The Senate Legal and Constitutional Legislation Committee inquiry into the federal legislation noted that the inter-jurisdictional information sharing provisions in Division 11 are 'the most contentious aspect' of the legislation (2000:para 3.55). The NSW Privacy Commissioner submitted to the Senate inquiry that the effect of Division 11 is to

allow the Commonwealth or any State or Territory agency to avoid the restrictions on access or use if this is authorised by legislation in the jurisdiction placing the data on the National Database. It would also allow agencies of a State or Territory to access or use any information on the National Database as authorised by its own legislation. This might not be a problem if all States and Territories passed laws which were consistent with the Model Code provisions... [However] there has been... a bidding war between some States and Territories, encouraged by their Police Commissioners and by a desire to appear 'tough on crime', to minimise and downgrade the recommended protective provisions. This is likely to create a political climate where governments will face renewed pressure to do away with the remaining safeguards... (quoted by Senate Committee 2000:para 3.57).

The Model Criminal Code Officers' Committee itself noted that inconsistent legislation on the collection, use, storage and destruction of forensic material threatened the integrity of the national database and stated that it 'only favours recommending the... provision if there is consistency' (1999:89). In the event that consistency was not achieved, MCCOC recommended changing the federal legislation to prevent material lawfully collected in one jurisdiction from being used in another jurisdiction where its collection would be unlawful (cited in Senate Committee 2000:para 3.60). The Senate Committee also 'strongly' concluded that 'uniform adoption of the highest standards in the collection, use and disposal of information is fundamental to the effectiveness of legislation' (2000:para 3.63).

Presumably the supplementary provision (s23YP) is intended to prevent challenges the admissibility of DNA evidence lawfully obtained in one jurisdiction in proceedings in another jurisdiction where the evidence would otherwise be unlawfully obtained. It could for example be argued that such evidence could be discretionarily excluded by the courts as improperly or unlawfully obtained evidence under s 138 of the *Evidence Act* (though the courts may admit improperly or unlawfully obtained evidence if the desirability of admitting the evidence outweighs its undesirability). It is also arguable that allowing police in one jurisdiction access to DNA samples taken elsewhere which are not lawfully obtainable in the first jurisdiction by-passes the democratic legislative process in that jurisdiction. Parliament in the first state may have intentionally prohibited the collection and use of samples in the circumstances permitted in the second state, so 'back-door' access to such samples from the national database defeats democratic controls on police powers. This problem is not cured by the provision for agreements between federal and state Ministers on information sharing in the federal Act, since a state Minister acts in an executive capacity rather than on behalf of the Parliament.

Despite the existence of the jurisdiction provisions in the federal Act, the Commonwealth is clearly concerned about challenges to the admissibility of DNA evidence in inter-jurisdictional cases. In May 2001 the operation of the national database was 'indefinitely' delayed until state laws achieve greater harmony and consistency (Chulov 2001). Ultimately the States and Territories themselves are free to decide whether their own DNA legislation will permit access to samples obtained in other jurisdictions which would be otherwise be unavailable within their jurisdiction. Section 115 of the NSW Act mirrors

s23YP of the federal Act, so forensic material taken taken in accordance with the law of another State or Territory may be retained or used in NSW for investigative, statistical or evidentiary purposes even if its retention or use would otherwise be a breach under, or failure to comply with, the NSW Act.

Conclusion

At the turn of the millennium, genetic technology has re-emerged as a key site of scientific and commercial endeavour, attracting enormous popular attention and generating political, legal and ethical controversy. Although genetic technology has disassociated itself from the populist eugenics of the past two centuries, legitimate civil liberties and privacy concerns still dog the use of the technology. This is particularly so in relation to forensic DNA testing in the criminal justice system, given that policing has traditionally been, and remains today, a fundamentally intrusive mechanism of social control and surveillance by the state (Morris & Hawkins 1969).

Although DNA testing will undoubtedly assist in solving crimes and enhancing public safety, there are legitimate concerns about how the technology is employed. As the Wee Waa experiment showed, mass voluntary testing may reverse the presumption of innocence and put pressure on individuals to 'consent' to unnecessary violations of bodily integrity. All forms of DNA testing raise the risk of police fabrication or planting of evidence, a particularly acute problem considering the apparent finality and conclusiveness of a DNA match. DNA testing also has significant implications for the internationally recognised right to privacy and freedom from arbitrary interference.

Although the *Crimes (Forensic Procedures) Act 2000* (NSW) establishes important safeguards and rights for suspects, volunteers and convicted serious offenders, it is also problematic in key respects. It allows 'cold hits' and so permits speculative policing unconnected with a person's involvement in particular crime. It provides an unfairly low evidential threshold at which police can compel testing. It preserves rather than destroys DNA samples and may potentially infringe notions of genetic privacy emerging to safeguard against the unethical abuse of human genome research. The Act retrospectively punishes the convicted, downgrades prisoners' human rights, and makes poorly researched assumptions about the likelihood of recidivism. It fails to provide compensation for the wrongly convicted, and does not provide expert or legal assistance to poor defendants to challenge DNA evidence. The Act is open to 'function creep', whereby existing protections may be diminished if the law, as already foreshadowed, is later extended to intrude upon others. There are also serious concerns about the operation of the national DNA database due to inconsistencies in DNA legislation across different jurisdictions.

DNA testing is not infallible. Complex scientific and human errors can damage its reliability. There remain conflicts among scientists as to the validity of particular techniques, and these have spilled over into courtrooms as difficult questions of fact to be determined. The science is not as precise as some advocates claim. Perth's Forensic Biology Laboratory was surprised to learn recently that lipstick could contaminate DNA in saliva (Smith 2000a). The first known false match recently occurred in the UK, where an immobile man with advanced Parkinson's disease was matched to a burglary 200 miles from his home, arrested and held in custody for several months until a DNA test by his solicitor exonerated him (Justice Action 2001b:10–11). There was supposedly only a one in 37 million chance that the man was not the offender. In New Zealand a DNA match compromised by laboratory error led to a man being charged with murder – even though he was on a different island to the offence (Haesler 2001:9). The implications of errors can

profoundly affect the lives of the wrongly accused: in New Zealand, an assault victim was falsely implicated as a double murder suspect after his DNA profile was contaminated (McBride 1997).

Most importantly, in an age of global commercialism, the threat to privacy and liberty comes not only from the intrusive policing of the state, but also from private interests. The human genome research conducted by highly capitalised and comparatively unaccountable corporations is indelibly connected with forensic DNA testing by the state. The possibilities for extraordinary advances in medical research and the quality of human life remain yet to be balanced against the rudimentary, perpetual issues of privacy, bio-ethics and the democratic control of human destiny.

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