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# Human Rights (and Wrongs) of DNA Testing and Evidence

**By Robyn Lincoln, Assistant Professor, Criminology, Bond University**

There has been considerable media coverage and public discussion about DNA testing in the past few years. This is because of a number of high profile cases where DNA evidence has been utilised. It is also because DNA evidence is said to have revolutionised police investigative methods and is set to eclipse traditional forms of forensic evidence presented at trial. Some examples help illustrate this point.

- In the USA by the end of last year, it was claimed that over 70 people who were on death row had their convictions overturned because of fresh evidence obtained through DNA tests. Indeed, there are estimates that hundreds more American prisoners have been released following DNA evidence that demonstrates their innocence.<sup>1</sup>
- In Australia, police tested all men between the ages of 18 and 45 years in the town of Wee Waa in NSW following the brutal bashing and rape of an elderly woman. In this case the offender came forward to police following this mass testing process.<sup>2</sup>
- Another Australian case concerns the murder of a woman at an island resort in Queensland almost 20 years ago. A man was convicted recently of this crime after DNA samples found on her red beach towel were shown to match his.<sup>3</sup>
- Australian police claim that there are 5,000 cases that they have not yet solved and would like to submit to DNA tests and there is the prediction that 40 per cent of unsolved crimes will be resolved by using our DNA database.<sup>4</sup>
- And, even though DNA tests are mainly used for violent crimes, a British expert who was recently in Australia suggested that the national DNA database would double the number of property crimes being cleared by the police.<sup>5</sup>

So DNA tests can be used for a variety of positive outcomes. They can assist those who claim they have been wrongfully convicted to help "prove" their innocence and be released from prison. They are useful to police for solving current cases either by engaging in mass screenings of communities or in utilising databases of DNA samples from those arrested or convicted. They can also be used in "cold cases" that have remained unsolved for many years now that more reliable and cheaper DNA tests are available.

However, there are considerations about human rights issues that need to be examined when relying on DNA profiling.<sup>6</sup> There are other more practical considerations too about how this evidence might be used in court, or privacy issues relating to the keeping of samples on mass databases. Both these positive and negative aspects of DNA testing are

discussed below. First however, it is important to have some understanding of what is involved in a DNA test and how the samples are collected and stored.

## What DNA testing involves

DNA stands for deoxyribonucleic acid and comprises our genetic makeup. Except for identical twins, DNA is unique to individuals. We've known about DNA since 1869 but it is only since the late 1980s that it has been used for forensic purposes.<sup>7</sup> There are a variety of DNA techniques such as RFLP (Restriction Fragment Length Polymorphism), PCR (Polymerase Chain Reaction), VNTR (Variable Number of Tandem Repeats) and STR (Short Tandem Repeats). While DNA testing has been used for more than ten years it has improved significantly with the STR form incorporating laser technology, for example, and the most recent developments use combinations of these techniques making them more powerful and accurate.<sup>8</sup>

The new testing procedures are far more reliable than the earlier versions. Now the time it takes to conduct tests is reduced from the six to eight weeks it previously took, as a DNA test can now be completed in one day. Further, the new techniques mean that the amount of sample needed has decreased because of amplification procedures that can multiply a sample in the laboratory. In addition, the problems associated with having only old or degraded samples are now less important as the tests are more sensitive than the earlier ones used. Finally the costs have been reduced by about half and now the fee is between \$300 and \$500 per test.<sup>9</sup>

Most laboratories in Australia have adopted the PCR approach. PCR is faster, better for degraded samples and does not eat up the sample in the testing process so that it can be re-tested to achieve checks on the results.<sup>10</sup> So there are many different kinds of tests that have different outcomes and different success levels depending on the quality and size of the samples obtained, but all are grouped together here under the rubric of DNA testing. It is important to note however, that when using a genetic profiling method, only the "junk DNA" is tested. This is part of the DNA strand that does not carry other identifiable information, such as a propensity to develop a genetic disease and so on.<sup>11</sup>

DNA tests are able to match up individual characteristics rather than just general group features that were previously used when blood groupings were the main form of evidence presented. In the past, forensic scientists were able to conduct blood matches and say that the person has a chance of being the one whose blood (or other physical evidence) was found at a crime scene. This was expressed as a probability such as a "one in 200,000 chance". Now, with DNA testing they are able to individualise that information to state with much greater certainty that the person is the one whose sample was found at a crime scene, although probability estimates are still made.

The other aspect to DNA however concerns the use of databases, for investigators rely on having samples to match with crime scene evidence. So the federal government has spent about \$50 million dollars (with additional funding from the states) on Crimtrac over three years. This new system will probably cost about \$10 million per year to maintain.<sup>12</sup> It will house electronic data on individual profiles and crime scene samples and will store up to 30,000 new samples annually.<sup>13</sup> It was ready for operation from March this

year however, the majority of the cross-checking work will commence from July. It is designed to make Australia "safer by reducing crime" and it extends to fingerprints, missing person information and sex offender databases, not just DNA information.<sup>14</sup>

The most significant aspect is that it is a national database intended to standardise and integrate data sources across the country. So, at long last, the various police services will be able to share information on an ongoing basis rather than operating in a fragmented way as occurred in the past. The national database in Australia mirrors that being compiled in the USA and again it is significant that all 50 US states have passed relatively similar legislation and agreed to take part in a nation-wide scheme.

DNA testing is intended to be adopted in the criminal arena where it is deemed most appropriate for sexual assault offences, serial crimes, unsolved crimes, some property crimes and the identification of victims. However it can also be employed in the civil arena such as in cases of paternity determination, helping with missing persons and even immigration decisions where familial relationships are an issue.<sup>15</sup>

## New laws governing DNA testing

New laws have been passed in New South Wales and Queensland and these reflect those operating in other states and territories in Australia, namely South Australia and Tasmania. Indeed, what the federal government is trying to achieve are national laws that are standardised across the jurisdictions, even though crime matters are usually state issues.

The laws in both New South Wales and Queensland, for example, have been legislated as part of amendments to the police powers acts (for example in Queensland it is Part 4 which deals with DNA Procedures). These new laws essentially deal with consent issues surrounding the obtaining of samples; how to deal with children or others who are impaired in terms of giving their consent; the fact that those arrested, going to court or imprisoned are under an obligation to provide a sample; and also deal with more practical issues of how to collect and store samples in a proper manner.<sup>16</sup>

In essence, what the new laws mean are that all those currently in prison for indictable offences and those who are sent to prison during the next three years, will have samples taken. In addition, all people who have actions taken against them by the police (usually this means being arrested for a serious offence) will have to provide a sample. The samples are usually taken by mouth swab and police and prison officers have been trained in how to carry out this procedure in a correct and efficient manner.

## DNA in the courtroom

Although we have new laws governing the collection of DNA samples, it is less clear how DNA evidence will be used in Australian courts. While such evidence has been generally accepted in US courts there are a number of concerns about its use in Australia where we are questioning the admissibility or probative value of the test results and their interpretations.

A range of problems have been identified such as: there could be contamination caused by the probe that took the sample; the level of certainty about the matching of bands;

whether the samples have been degraded or not; and the whole process of calculating the probability evidence derived from the DNA test. A number of Australian cases have explored some of these questions such as *R v Tran*, *R v Lucas*, *R v Pantoja* and *R v Milat* and in the USA the main referent case is *People v Castro*.<sup>17</sup>

In Australia we are most worried about how juries will interpret DNA evidence and what problems it presents them with and so judges have been trying to make it as accessible as possible to jurors. They don't want jurors to be overwhelmed, confused or misled by such evidence. In recent Australian cases judges have warned that a DNA test "merely establishes that the suspect and the offender may be the same person, not that they are the same person".<sup>18</sup> So the "courts are still evaluating the appropriate role and utility of DNA evidence within the criminal justice system".<sup>19</sup>

In addition to how juries take in this complex information, there are concerns that the technology is changing so rapidly that it is difficult to keep pace, not only for forensic experts who might provide evidence in court, but more importantly for lawyers and judges who need to question such experts and have some understanding of what the evidence involves. This is an important point with far-reaching ramifications because many high profile miscarriages of justice have been because of confusion over complex forensic evidence.<sup>20</sup> So that now with DNA it is imperative that those who are defending, prosecuting or adjudicating have some appreciation of its limitations in order to avoid wrongful convictions.<sup>21</sup>

A major study in the United States for example examined 26 cases where DNA evidence was relied upon by the juries but where the convictions had been overturned. In 18 of these cases it was suggested that the defence lawyers did not seem to understand DNA evidence, had failed to appreciate the significance of the expert forensic witness and had not cross-examined the expert witness properly.<sup>22</sup> And there are other problems associated with DNA evidence detailed below.

## Problems of DNA testing

A number of human rights (and wrongs) arise in the use of DNA testing. These involve the collection and testing processes, elements of a fair trial, and include issues surrounding privacy and the right to silence.

### Collection and testing processes

One area where human rights issues arise has to do with the collection process. This involves the means by which the sample is obtained: whether it is compulsory and forced; whether it is voluntary and covers a whole population; or whether it is regulated in some way as a requirement for certain groups of people. These raise serious rights issues.

The risk of contaminants in the collection process is a more specific problem. The probes used may have foreign elements on them, for example lipstick can interfere with a mouth swab result. There is also the possibility of "planting" DNA evidence at the scene of a crime by any number of people, not least of which could be the police. While this might seem an extravagant claim, it is not difficult to get saliva from a glass or samples of hair to leave at a crime scene.

There have also been questions asked by defence counsel about the "reliability of the sample kits" when manufacturers failed to provide details about their production process.

As a result DNA evidence had to be disregarded in two recent trials.<sup>23</sup> So there is, and should be, some concern about how the kits are manufactured and what implications this might have for the sample material that is subsequently tested in laboratories. Other problems have also surfaced about procedures used in laboratories: namely how secure they are; how items are labelled and stored; and whether there is any possibility of cross-contamination when tests are being conducted.<sup>24</sup>

In one New Zealand case a man who was a victim of a crime and who therefore had his samples sent to the laboratory soon came under suspicion for a murder and later a gangland-style killing because his DNA matched that found at both crime scenes. Fortunately, he was cleared of any connection to the two crimes but a major inquiry was launched to determine why there was this cross-contamination. The findings were inconclusive but it was assumed that human error came into play.<sup>25</sup> Of course, most would say that this would not happen in Australia because of stringent safeguards we have in place.<sup>26</sup>

Another problem is that there is already a considerable backlog of DNA tests to be performed, so that the government laboratories may be unable to keep up with this testing backlog. This can result in serious time delays in our justice system. A related problem is one of potentially escalating costs. For, while the individual tests are relatively inexpensive the costs can mount just for evidence from one crime scene alone. So an over-reliance on DNA tests can mean that justice will take longer and will cost more.

A tangentially related problem is the time it is going to take to complete all the standard testing and to get the databases to a truly functional state. It is suggested in the USA that the taking of samples from prisoners is woefully behind schedule and this may occur in Australia. In Queensland, for example, it has taken the first three months of this year to test 450 of 3,300 prisoners. However it is reported that NSW is ahead of schedule.<sup>27</sup>

A final concern here is what might happen with the information that is stored in these newly-formed DNA databases. Questions revolve around who has access to the information; how long will it be kept; what amount of information is kept, and so on. This scenario impacts on rights to privacy. Although, as noted above, the part of the DNA that is tested is referred to as "junk DNA" and the implications are that these samples will not contain information about an individual's propensity to genetic diseases and similar information.

## Fair trials

The other major realm of concern relates to the solving of crimes and how DNA evidence is used, and specifically how this might impact on a fair trial. There are practical problems about whether investigators might rely too heavily on DNA evidence and fail to collect other corroborating evidence and what juries might think about DNA evidence "proving" the guilt of a person.<sup>28</sup>

First there is a chance that investigators may come to rely only on the new technology rather than on traditional methods of policing. So they may fail to obtain corroborating evidence like eyewitness testimony and other forms of evidence. Included here is an over-reliance on science in general and the often mistaken view that science produces correct results every time. It should be noted that the test procedures and interpretations are still better at excluding a sus-

pect than they are at identifying one and this is why supplementary evidence is vital. We know that a number of miscarriages of justice have occurred because of unreliable expert evidence based on forensic testing and this can certainly occur with DNA results. Indeed, it may be even more so because of this perception that they are extremely accurate.

One of the main problems is that DNA evidence can only tell us that a person was at a crime scene, it cannot "prove" that the person committed that crime, for it is unable to reconstruct the crime event for us. For example, it has been noted how important this is in cases of rape or sexual assault where a positive DNA test may help with identity but it says nothing about matters of consent or criminal responsibility.

Even if forensic evidence can link a suspect to a victim, such as if the victim's blood is positively identified as being on the suspect's clothing, there is a range of reasons why this may have occurred without the suspect being culpable for a crime. This is particularly so with intra-familial crime, where blood or other evidence from a crime scene may show that it is from other family members, yet this would be expected in a household of persons residing together where accidents and other daily living activities may leave everyone's DNA around the house.

And of course the other side of the coin is that while we may believe that DNA tests do "prove" guilt, this is not the case when it comes to "proving" innocence in cases of miscarriages of justice. A number of cases in the United States have recently been re-examined using DNA tests and the results ostensibly show that the convicted person could not be responsible for the crime. However, some of these now "innocent" people have not been released from prison because authorities do not accept DNA as proof of innocence.<sup>29</sup>

Related to the above issues, is the problem that DNA tests appear to give us a very accurate picture of the likelihood that this sample comes from this particular person. However, "the significance of the results is determined by a statistical calculation of the frequency with which the characteristics found would be likely to appear in the population".<sup>30</sup> This means that the results are interpreted by recourse to probability estimates, for example "one chance in two million". So while the laboratory tests themselves may have a high accuracy level, the interpretations that follow based on probabilities are not as reliable.

Another set of practices that have been heavily criticised by civil libertarians is DNA "trawling" through databases or the "dragnetting" of communities. Usually DNA evidence has been seen as the final step in compiling evidence for a trial, but increasingly detectives (especially in the USA) are using it as their first step. These practices treat everyone as if they were suspects. Even though giving samples is voluntary, those who refuse run the risk of being labelled a suspect and those who give samples feel as if they are somehow labelled as suspects and report feeling pressured into giving the samples. These practices are also expensive, constitute a lazy police investigatory approach, and have not been successful so far in murder cases in the USA in which they have been used from San Diego to New York City.<sup>31</sup>

This raises the final human right issue of equating failure to provide a sample with the right to silence. Human rights may be contravened if there is force used, or if there is an obligation to provide a sample, and it is not clear what infer-

ences are drawn by criminal justice personnel and juries if one does not provide a sample. Some suggest that this might go against a presumption of innocence which is fundamental to one's right to a fair trial. The Police Minister in Queensland, Mr Tom Barton, is quoted as saying that "anyone who refused DNA testing would not automatically be regarded as a suspect".<sup>32</sup> However, he also noted that police could order the collection of samples if there was "reasonable suspicion", and as noted above there can still be labelling of those who refuse.

## Conclusions

Genetic and forensic science may have made crime solving a lot more efficient. The major improvements in DNA tests in the past ten years now give us much more confidence in the procedures. As a result, we often resort to the view that the innocent have nothing to worry about, yet it is imperative that we consider the human and civil rights of victims, suspects and offenders. For there are concerns for the innocent as well as the guilty.

First, DNA evidence only proves identity, it does not say what happened at a crime scene nor does it prove culpability or tackle consent issues in sexual assault cases. Second, there is an over-reliance on the science of DNA which is deemed to be infallible and yet there are humans involved. This means that mistakes can be made such as cross-contamination or incorrectly stored and labelled samples. A third concern is about our right to silence and whether this is infringed by not giving a sample for DNA testing. People who may not be suspects may be asked to give samples to assist in excluding them, but there is the potential (however remote) that a voluntary sample could incriminate an innocent person. Also the information that is stored can infringe on rights to privacy. It can also result in less than efficient criminal investigation techniques where witnesses are still the best source of information (even if sometimes unreliable) rather than hoping some test that is done as a result of database "trawling" will produce a match. Finally, such rapid development in the technology has happened in such a short space of time. It is unclear what further refinements might occur in the next five or so years. So to presume that we have reached the absolute pinnacle of DNA testing has been called "premature" by some.<sup>33</sup>

Future directions in the next five to ten years are predicted by the NIJ to include greater supplementary use of mitochondrial DNA that is able to utilise much smaller or more degraded samples (like hair shed from the head that does not contain the root which is essential to other testing forms) and some automated kits. There will also be greater checks against greater numbers of loci within the DNA, and a move from VNTRs to STRs as the basis of comparison. It is also projected that a greater number of cases will be re-examined especially where evidence for a conviction did not previously include DNA testing. There will also be improvements in collection procedures and in the purification techniques so that we can have greater certainty about the test results. And finally, better developed and more inclusive databases as samples continue to be tested and added to the national information pool.<sup>34</sup>

## Questions for Discussion

1. Are civil liberties eroded because of the sweeping changes to police powers in several jurisdictions allowing police to take samples for DNA profiling?
2. Does mass screening of a community or a targeted group create dangerous precedents?
3. What features of the principles of a fair trial might be interfered with by the inclusion of DNA evidence?
4. Should there be a fully national database in Australia containing details for all citizens, not just those arrested or convicted of crimes?
5. What are the problems when DNA evidence is used in cases where there is a wrongful conviction?

<sup>1</sup> Ostrow, R.J. and R.L. Jackson (1998) "DNA Database To Be Used to Fight Crime" Los Angeles Times, 13 October

<sup>2</sup> Sunday Mail, 13 October 2000

<sup>3</sup> Hansen, P. (2001) "Battle of the Boffins" Sunday Mail, 4 February

<sup>4</sup> Nicholls, S. (1998) "DNA Detectives" Weekend Australian, 10-11 October

<sup>5</sup> Sunday Mail, 13 February 2000

<sup>6</sup> Corns, C. (1992) "The Science of Justice and the Justice in Science" Law in Context, 10(2)

<sup>7</sup> Freckelton, I. and H. Selby (2001) Expert Evidence, Law Book Company, Sydney.

<sup>8</sup> Richie, K.L. et al (1999) "Long PCR for VNTR Analysis" Journal of Forensic Science, 44(6)

<sup>9</sup> Nicholls, op cit

<sup>10</sup> Richie, op cit

<sup>11</sup> Connors, E. et al (1996) Convicted by Juries, Exonerated by Science, US Department of Justice, Washington DC

<sup>12</sup> Nicholls, op cit

<sup>13</sup> ibid

<sup>14</sup> Attorney-General's Department (1998) CrimTrac Project: Request for Information, AG Department, Canberra, page 2

<sup>15</sup> Freckelton and Selby, op cit

<sup>16</sup> See for example, Queensland Parliament (2001) Police Powers and Responsibilities and Other Acts Amendment, Queensland Government, Brisbane, accessed on 20 February via www.qld.gov.au

<sup>17</sup> Freckelton and Selby, op cit; see R v Tran (1990) 50 A Crim R 233, R v Lucas (1992) 55 A Crim R 361, [1992] 2 VR 109, R v Pantoja (1996) 88 AI Crim R 554, R v Milat (unreported) NSW Supreme Court 30 May and 5 June, People v Castro (1989) 144 Misc 2d 956, 545 NYS 2d 985

<sup>18</sup> Hocking, B.A. et al (1997) "DNA, Human Rights and the Criminal Justice System" Australian Journal of Human Rights, 3(2), page 14 italics in original

<sup>19</sup> ibid, page 15

<sup>20</sup> Brown, M. and P. Wilson (1992) Justice and Nightmares: Successes and Failures of Forensic Science, UNSW Press, Sydney

<sup>21</sup> Odgers, S. and J. Richardson (1995) "Keeping Bad Science Out of the Courtroom: Changes in American and Australian Expert Evidence Law" UNSW Law Journal, 18

<sup>22</sup> Connors, E. et al, op cit

<sup>23</sup> Chulov, M. (2001) "Infamous Crims Give DNA to Database" The Australian, 4 April

<sup>24</sup> Hansen, op cit

<sup>25</sup> Smith, D. (2000) "Beyond Reasonable Doubt" Sydney Morning Herald, 22 April

<sup>26</sup> It should also be noted that in Australia we are testing for ten point matches, whereas in other jurisdictions they only test for six

<sup>27</sup> Chulov, op cit

<sup>28</sup> Freckelton, I. (1992) "Problems Posed by DNA Evidence: Of Blood, Babies and Bathwater" Alternative Law Journal, 17(1)

<sup>29</sup> See case of Earl Washington who was released only last month even though DNA evidence essentially exonerated him early last year.

<sup>30</sup> Freckelton and Selby, op cit, page 1-3633

<sup>31</sup> Leonard, J. (2001) "Using DNA To Trawl for Killers" LA Times, 10 March

<sup>32</sup> Power, L. (2000) "Volunteers Line Up" Sunday Mail, 9 April



<sup>33</sup> For example, fingerprint evidence has long been used in investigations but there are now questions about whether "it has not been adequately tested, that the error rate has not been calculated, and that there are no standards for what constitutes a match"; see Ritter, M. (2001) "Fingerprint Evidence Faces Hurdles" Associated Press, 7 April

<sup>34</sup> National Institute of Justice (2000) The Future of Forensic DNA Testing: Predictions of the Research and Development Working Group, NIJ, Washington DC

## FUTURE EVENTS

1. Are you considering a career in Law? – **"Law as a Career"** – free workshop sponsored by the Law Society of NSW and Bond University for students in years 10, 11 and 12. A full-day workshop about the range of job options for law graduates.

Saturday 23 June – 9.30am-12.30pm – 1.30pm-4.30pm at North Sydney. Contact Robyn Cross at the Law Society of NSW. Tel: 9926 0253 or email rnc@lawsocnse.asn.au

2. The Law Experience:

**Law: Moving into the Future** Presented by Bond University School of Law 4-5 August 2001.

The Law Experience is a workshop for students to find out what studying law is all about. Students will have interesting workshops and lectures from faculty members on topics of interest. The Law experience is designed for high school students contemplating studying law at Bond or elsewhere. It is held on the 4-5 August 2001 at Bond University. It costs \$70. Accommodation is available on campus if required. The Law Experience coincides with Grand Final of the Bond University Mooting Competition on the Saturday and the Bond University Open Day on the Sunday.

For more details contact Cherie Balquiedra at the School of Law Bond University on tel 07 5595 2057 or fax 07 5595 2246 email: chbalqui@bond.edu.au

3. **Legal Studies Teachers Conference.** 25-26 October 2001 Information and Conference program will be sent out later in the year. For further details contact Robyn Cross at the Law Society of NSW.