Exclusionary DNA of Forensic Workers and Australian Forensic Procedures Legislation†

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I. Introduction

DNA evidence may be used in a variety of ways in a criminal investigation and prosecution. Most commonly a DNA profile from a crime scene sample, for example, semen on the victim's clothes in a sexual assault case[1] or a cigarette butt at the scene of a murder, is compared with the DNA profile of a reference sample taken from a suspect.[2] If the two profiles match, this would tend to place the suspect's DNA at the scene of the crime, and may, when considered alongside other evidence, support an inference of the suspect's guilt.

The situation is more complicated where several single-source DNA profiles are obtained from crime scene samples, or where a single crime scene sample contains the mixed DNA of more than one person. In this situation further reference samples may be obtained from victims and bystanders whose DNA may also have been left at the crime scene. If their DNA profile matches one of the individual samples or part of a mixed sample, then that DNA profile can be reported as an apparent match with that victim or bystander and excluded from subsequent comparisons. The probative value of a match between a suspect's DNA profile and the remaining crime scene DNA profile will be significantly

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1 If semen is gathered from the victim with a vaginal swab, this will clearly involve an invasive procedure, and raises different issues from the gathering of other crime scene samples. It is likely to produce a mixed sample containing the DNA of the victim as well as that of the perpetrator, and the victim's profile should be excluded for the remaining profile to be used to identify the perpetrator: ALRC 2003: Recommendation 41-45.

2 E.g., *R v Pantoja*; *R v Karger*. Alternatively the identification of the perpetrator may be achieved by matching the DNA profile of a biological sample found on property associated with the suspect — e.g. clothing or vehicle — with the DNA profile of the victim: e.g. *R v Robinson*. For more unusual uses of DNA identification evidence, see *R v GK* and *R v Keir*. For the purpose of this article it will be convenient to focus on the more common scenario outlined in the text.

increased. As a result of continuing advances in technology, allowing smaller and more degraded samples to be successfully analysed, and the increasing prevalence of DNA testing,[3] exclusionary DNA issues will arise with increasing frequency in the future (Lim 2004; FSS 2004:13).

Forensic procedures legislation in all Australian jurisdictions provides for the collection and use of DNA for forensic purposes, its retention and eventual de-identification.[4] It covers forensic procedures on serious offenders and suspects to gain evidence which may implicate or exonerate them in criminal investigations, as well as procedures on victims and bystanders for the purposes of elimination. Forensic procedures for incriminatory purposes may, in some circumstances, be carried out without consent, while victims and bystanders are viewed as 'volunteers' — their consent is required. Volunteers enjoy further safeguards with regards to the limited uses to which their DNA can be put, and its de-identification following that use. As outlined in Part III, the rationale for these safeguards is readily apparent.

However, it is not only victims and bystanders whose DNA profiles may be required for the purposes of exclusion. Despite training and quality assurance procedures, police officers and crime scene examiners attending a scene, forensic scientists and laboratory technicians and even people involved in the manufacture and maintenance of scientific equipment may unintentionally add their DNA to samples collected from a crime scene (Howitt 2003). In this article, this group of employees will be collectively referred to as 'forensic workers'. Given that contamination has occurred in the course of their employment, different considerations apply to the gathering and use of exclusionary DNA from forensic workers. Should they be required to supply their DNA as one of the requirements of the job? Should their DNA profile be placed on a database for automatic comparison with all crime scene DNA profiles? What should happen if such a comparison implicates the forensic worker? What should happen to their profile when forensic workers leave their employment?

Within Australia, only the legislation of Western Australia makes any attempt to address these issues, and it leaves many questions unanswered. In other jurisdictions there are no specific provisions, and the relationship between the forensic procedures legislation and the exclusionary DNA profiles of forensic workers is still less clear. Part IV considers whether the legislation covers the exclusionary DNA of forensic workers, or whether it permits the operation of unregulated exclusionary DNA databases. Part V surveys the issues raised by the exclusionary DNA of forensic workers and sketches out an agenda for reform.

Before embarking on a consideration of the regulatory issues, it is necessary to consider the probative effect of eliminating extraneous DNA in a criminal prosecution.

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3 DNA databases are rapidly growing in size (Clarke 2005). Use of DNA profiling is also growing quickly, and expanding from serious to volume crime (e.g. VPLRC 2004:322–323). Leading the world is the UK's National DNA Database, which was reported in February 2006 as containing over 3 million profiles from individuals and over a quarter of a million crime scene profiles (POST 2006:1). In 2004/05 it was used to make '40,000 detections' (FSS 2005:18). The reported rate of crime detection is significantly higher where DNA has been recovered from a crime scene (POST 2006:2).

4 *Crimes Act* 1914 (Cth), Part 1D; *Crimes (Forensic Procedures) Act* 2000 (ACT); *Crimes (Forensic Procedures) Act* 2000 (NSW); *Police Powers and Responsibilities Act* 2000 (Qld), Part 5; *Criminal Law (Forensic Procedures) Act* 1998 (SA); *Forensic Procedures Act* 2000 (Tas); *Crimes Act* 1958 (Vic), Part 3; *Criminal Investigation (Identifying People) Act* 2002 (WA); *Police Administration Act* (NT).

II. Evidentiary Value of Exclusionary DNA

This part illustrates the significant, potentially ambiguous role that may be played by the exclusionary DNA of a forensic worker. The discussion aims to avoid oversimplification, but does not get too embroiled in the genetic or statistical technicalities (for which, see Evett & Weir 1998; Butler 2000; Wall 2004). It provides an appropriate context for the examination of the regulation of exclusionary staff databases in the remainder of the article.

Deoxyribonucleic acid, or DNA, is an extremely complex molecule with a double-stranded helix structure. It provides a genetic blueprint for all living things and is present in most cells. Other than identical twins, every human being is believed to have a unique genetic make up, even though 99.9% of DNA is shared between all humans (Drell 2006; VPLRC 2004:106). It is the distinctive nature of an individual's DNA that makes it a valuable identification tool in criminal investigation.

The most common analysis kit for DNA profiles in Australia is 'Profiler Plus' (VPLRC 2004:63). This commercial kit measures the number of repeating sections at ten points, or loci on the human genome. A measurement is taken at each locus, yielding two results, or alleles, one from each parent. The exception is where each parent has contributed the same allele. Other than one locus — the amelogenin — which indicates gender, the loci are believed to be non-coding or 'junk' DNA, with no effect on physical characteristics.

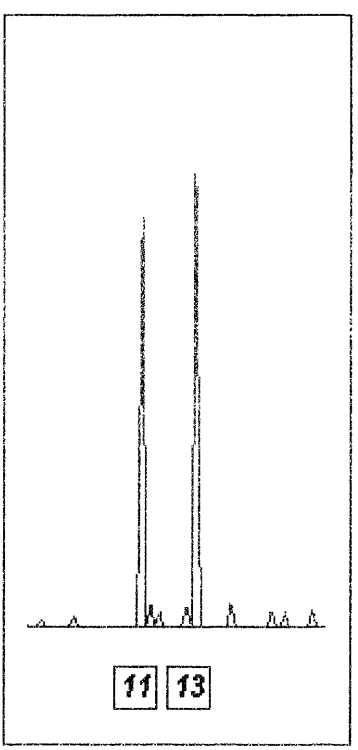

Figure 1: Single-Source Profile

While an individual's overall genetic make-up is believed to be unique, other than in identical twins, there is no guarantee that his or her ten loci DNA profile will be. However, putting close relatives to one side, statistical analysis suggests that it would be extremely improbable for two individuals to share an identical DNA profile. The 'match probability' for two unrelated individuals sharing the same alleles at all ten loci is in the order of one in a billion (FSS 2004:19; Lee, Lee & Hwang 2004). This means that if a DNA profile obtained from a crime scene sample matches the profile obtained from a suspect, it is highly unlikely that the crime scene DNA came from someone other than the suspect. The match would tend to place the suspect at the scene of the crime and, in the absence of an innocent explanation, may carry considerable inculpatory force.

In order to identify the profile of the perpetrator, the police may need to exclude the profiles of the victim and other people who have deposited their DNA at the scene. If all other profiles can be excluded, then the DNA identification of the suspect will have considerable probative value. Of course, any doubt about the exclusionary process will reduce the significance of the identification of the suspect.

This exclusionary process becomes more complex where the crime scene contains, not several individual profiles, but a mixed profile. To understand the impact of exclusionary DNA on this situation it will be helpful, initially, to focus on a single locus. A simple profile from a buccal swab taken from a suspect may be represented as shown in Figure 1. In this example, the position of the peaks along the x axis indicates that there are 11 and 13 repeats, that is, alleles 11, 13, at this particular locus.

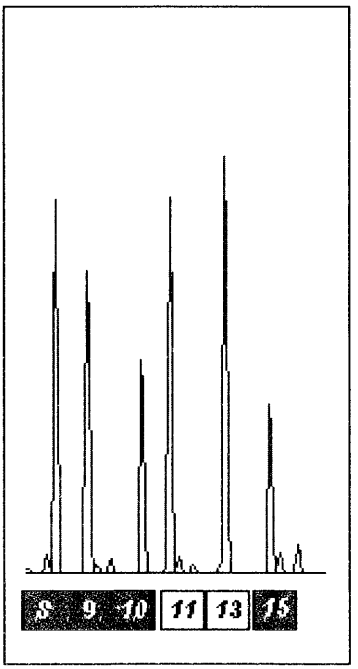

Figure 2: Mixed Profile

Figure 2 shows a crime scene profile containing the same 11, 13 alleles as in Figure 1, but accompanied by four other alleles. The six peaks shown in this figure could be interpreted as representing the 11, 13 alleles from our suspect, plus the DNA of at least two other individuals. It may be, for example, that one of these individuals has alleles 8, 9, and the second, alleles 10, 15. However, this graph could also represent any of fourteen other possible permutations,[5] twelve of which do not match the suspect's profile. In addition, a chance match between a suspect and this mixture is quite high, with more than half of all possible individual profiles at this locus matching the mixture (CGE 2004).

But if evidence indicates that alleles 8, 9 were contributed by the victim and can therefore be excluded, the number of possible profile combinations in the mixture is reduced from fifteen to only three. The remaining alleles can either represent 10, 11 and 13, 15; or 10, 13 and 11, 15; or 10, 15 and 11, 13. A match with the suspect's 11, 13 alleles becomes far more incriminating. And then, if further evidence is led that alleles 10, 15 should be excluded on the basis that they match the contaminant profile of a crime scene examiner, a singular match with the suspect is secured. The chance of this match occurring by coincidence has further decreased, and the inference that the suspect is the perpetrator becomes correspondingly stronger.

The example above focused on a single locus. When profiles across ten loci are used, the probative effect of excluding the DNA of a victim, bystander or forensic workers is far more dramatic. In *R v Gallagher*, blood recovered from the scene contained DNA from 'at least two persons' (at [3]). A mixed DNA sample from two people can give rise to up to 40,000 possible DNA profile combinations and, without considering any other evidence, a match with the defendant's profile — just one of these 40,000 — is of doubtful significance. The prosecution's use of exclusionary DNA can then be crucial. In *R v Gallagher* the prosecution argued that it was reasonable to assume that the deceased contributed to the mixed DNA profile, and that the evidence is 'sixty-three billion times more likely [if the observed profiles came] from the deceased and the defendant than from the deceased and an unknown, unrelated individual' (at [3]).

Of course, the underlying question is whether it is appropriate to exclude 'known' DNA profiles. Where, as in *R v Gallagher*, the mixed sample matches the DNA of the deceased plus that of the defendant, the prosecution's exclusionary argument appears highly plausible. However, in other situations, defence counsel could challenge prosecution's attempt to simply exclude the DNA that, inconveniently, fails to match the defendant.

Gill (2001:231) argues that, broadly speaking, there are three distinct grounds on which the prosecution may seek to exclude DNA which matches one of a number of individual

5 Excluding any homozygote or overlapping alleles between individuals, which would significantly increase the number of possibilities.

crime-scene profiles or a single mixed crime-scene profile. The prosecution may seek to classify it as:

- An *adventitious match* — the person with the matching profile innocently deposited their genetic material at the scene prior to or during the commission of the crime; or
- A *scene contamination* match — a police officer or other investigator or official deposited their DNA during the examination of the crime scene; or
- A *sample contamination* or *cross-contamination* match — foreign DNA was introduced during analysis in the forensic laboratory.

In the first case, the defendant may question whether the match truly was adventitious. Was the DNA deposited innocently, or could that person be the perpetrator? The strength of such a defence theory will, of course, depend upon the existence of additional evidence incriminating the other person. The match may provide evidence of opportunity. If the other person is known to the victim, some kind of motive may not be too difficult to suggest. It should be kept in mind that the defendant need only come up with a theory strong enough to create or contribute to a reasonable doubt in the mind of the jury.

Questions may also be raised by defence counsel about supposed contamination by forensic workers. In particular, caution should be exercised in carrying out automated comparisons with large forensic worker databases (Haesler 2001:27; Gans & Urbas 2002:3). There are about 19,000 personnel in the NSW police service, and over 60,000 nationally (AIC 2003). Statistically, one in several thousand profiles can be expected to match part of a three-person mixed DNA sample (Sullivan 2004). An automated comparison with a NSW police database could be expected to yield a handful of false matches, and a national police database might generate dozens.

It would be inappropriate to exclude DNA on the basis of a 'cold hit' with such a large database and then attribute greater probative significance to a match between the defendant's DNA and the remaining crime-scene DNA. Without additional supporting information, such as a crime scene attendance log, indicating that the forensic worker could indeed have been the source of the additional DNA, the significance of a match between a mixed sample and a profile on the database would be impossible to assess. Should greater significance be attached to the match with the defendant? Or is the exclusionary match false? Or might the forensic worker be the perpetrator? The latter argument may be particularly strong where a single-source sample from the scene matches a profile on the exclusionary database, and the prosecution has provided no reasonable explanation as to how that forensic worker's DNA got there.

Even if the prosecution can plausibly explain how a police officer or laboratory worker contaminated the crime scene or crime scene sample the exclusionary argument may provide defence counsel with ammunition. There is something paradoxical in the prosecution, on the one hand, arguing that the chance of the crime scene DNA coming from someone other than the defendant is one in a billion, but on the other hand, conceding police or laboratory contamination. Indeed, prosecution claims of sample or cross-contamination would call into question a laboratory's quality control procedures, and would tend to undermine the probative value of DNA evidence across all cases processed by that laboratory (Howitt 2003; Edwards 2005:74).

Prosecution reliance on exclusionary DNA clearly has the potential of being a two-edged sword. It may give a match with the defendant's DNA decisive significance. However, it may provide the defendant with the foundation for pointing to someone else as a possible perpetrator. Alternatively, in an extreme case the defence may seek to persuade the court that:

> ... the results of testing are so attended by uncertainty that they are to be excluded from the jury's consideration either on the basis that there is no reliable foundation accessible to the jury upon which they could properly assess the reliability of the opinions expressed by the experts or alternatively on the basis that the prejudicial effect of the evidence far outweighs its probative value (*R v Juric*, at [43]).

It is clear from the above discussion that the prosecution's pre-trial disclosure to the defence should include the details of all DNA samples found at the crime scene, any suspected cases of contamination, and the existence of any known DNA that was excluded from statistical calculations (Ligertwood 2004:269–272; Edwards 2005:74; VPLRC 2004:328). It would be inconsistent with the notion of a fair trial for the prosecution to present what appears to be highly incriminating evidence about the existence of a singular match between a crime scene DNA profile and the defendant's profile without revealing that this singular match was only achieved by the exclusion of the DNA profiles of the victim, bystanders or forensic workers. With this further information, evidence of the match with the defendant's profile may be liable to exclusion on the grounds that it is irrelevant (e.g. *Evidence Act* 1995 (Cth) s55), misleading, confusing, a waste of time (ss135(b), (c)) or unfairly prejudicial (ss135(a), 137).[6]

III. Forensic Procedures Legislation

The previous section outlined the evidential value of exclusionary DNA. As noted, this form of evidence has an ambiguous nature, with potential benefits for both sides. On the one hand, with gains in the sensitivity of DNA technology and the collection of increased quantities of extraneous DNA, the prosecution will become more dependent upon exclusionary DNA. On the other hand, as the improved and more cost-effective technology pushes match probabilities closer towards 'scientific certainty', the presence of other DNA at the crime scene and police and laboratory error will become of increasing importance to the defence case (Thompson et al 2003). This shift has been evident in recent cases, such as *R v Karger*; *R v Robinson*; *R v Wakefield* and has been noted by commentators such as Edwards (2005). In these circumstances the lack of effective regulation of the exclusionary DNA of forensic workers is a matter of serious concern.

This part outlines the regulatory regime applying to the acquisition and use of DNA profiles, including the exclusionary profiles of victims, bystanders and forensic workers. Part IV will demonstrate that, in most jurisdictions, the application of current legislation to the DNA profiles of forensic workers is far from clear.

Restrictions on Forensic Procedures

As discussed in Part II, DNA identification generally operates by matching the DNA profile of a sample from a crime scene with the DNA profile taken from a suspect's reference sample. It will also be necessary, in some cases, to carry out exclusionary matches of crime scene profiles with profiles from the reference samples of victims and other bystanders.

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6 Although in *R v Lisoff* the trial judge's exclusion of DNA evidence under s137 on the grounds of contamination was criticised by the NSW Court of Criminal Appeal which upheld the prosecution's appeal. The defendant was charged with the malicious infliction of grievous bodily harm, and the prosecution presented evidence that blood found on the defendant's clothing matched the victim's profile. This was considerably weakened by defence expert testimony that the blood on the defendant's clothes was post-transfusion, in which case it got there after the victim reached hospital following the attack. Goldring DCJ had thought that the jury would have difficulty with the complexity of the scientific issues and that the defendant could be unfairly prejudiced.

DNA technology is widely recognised as a powerful forensic tool, particularly as DNA databases grow in size (NSWLCSC 2002:[3.94]). It is clear, however, that the unrestricted use of DNA technology in criminal investigation would threaten the privacy and other civil liberties of the parties involved (NSWLCSC 2002:Ch 4; ALRC 2003:Part B; VPLRC 2004:Ch 4). The taking of a sample will generally diminish the subject's physical integrity, and the generation, storage and use of the subject's DNA profile could constitute a form of surveillance (Gans 2001; Marx 2006).[7]

A subject may have a legitimate concern that the presence of their profile on a DNA database could expose them to the risk of wrongful accusation in the event that an incriminating match occurs through chance, error or deliberate tampering (Edwards 2005; Wilde 2005). The appropriate use of DNA technology in criminal investigation requires a policy decision to be made as to how the subject's civil liberties should be balanced against the need to enforce the criminal law.

All Australian jurisdictions have recently put in place regulatory regimes governing forensic procedures. These have mostly been based upon a model code developed by the Model Criminal Code Officers Committee in the 1990s (VPLRC 2004:60–61). The Commonwealth legislation sticks most closely to the Code and will form the focus of this discussion, however, reference will also be made to other jurisdictions. The legislation provides for the gathering, retention, use and de-identification of DNA samples and profiles. It contemplates the automation of the matching of DNA profiles on a computerised DNA database system. But all the procedures are constrained by safeguards against undue infringements of privacy and misuse.

The requirements and protections depend primarily upon the classification of the person providing a DNA reference sample. The least degree of legislative protection is extended to a 'serious offender', defined in s23WA as a person convicted of an offence punishable by more than five years imprisonment. A non-intimate sample[8] may be taken without the offender's consent on the order of a constable under s23XWK.[9] Under s23XWL, in deciding whether to make such an order, the constable should consider matters such as whether it would assist law enforcement, and would be justified in all the circumstances.[10] The offender's DNA profile can then be held on the DNA database system indefinitely, or until the conviction is quashed, or the offender is acquitted or pardoned, in which case the

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7 Since the loci used in DNA profiling are believed to be non-coding, they do not threaten the subject's genetic privacy, although unauthorised testing of the samples may do so (ALRC 2002:[39.13] citing a submission of Dr Jeremy Gans). Given the inherited nature of DNA, the surveillance and genetic privacy aspects also have implications for the subject's family.

8 Buccal swabs, the preferred basis for DNA profiling, are classified in the Commonwealth legislation as 'intimate': *Crimes Act* 1914 (Cth), s23WA(1). The order of a magistrate or judge is required where the offender does not consent: s23XWO. But DNA profiles can be generated from hair samples including the root, which are classified as 'non-intimate': see *Crimes Act* 1914 (Cth), ss23WA(1), 23XL. Law reforms have been proposed to facilitate self-administered buccal swabs on the basis that they are less painful and less intrusive than hair-with-root samples: e.g. ALRC 2003:[41.31], Recommendation 41.1; VPLRC 2004: Recommendation 4.8. In some jurisdictions the buccal swab is already classified as non-intimate (VPLRC 2004:45–46).

9 The consent of the offender may first be requested (s23XWH), however, given that the refusal of consent may result in coercion and that the offender must be told of this (s23XWJ(2), (3)), it is doubtful how genuine this consent would be, as illustrated by the facts of *Kerr v Commissioner of Police*. Reforms may remove the request requirement (ALRC 2003:[41.23]).

10 In Queensland even these minimal pre-requisites are absent. DNA samples may be taken solely on the basis that the person has been found guilty of an indictable offence: *Police Powers and Responsibilities Act* 2000 (Qld), s312.

profile should be de-identified under ss23YDAA and 23YDAG. While on the database serious offender profiles may be matched against crime scene profiles for any number of criminal investigations under s23YDAF.

Greater protections operate in respect of the DNA profile of a suspect. A non-intimate sample can be taken under s23WM without the suspect's consent by order of a senior constable.[11] The senior constable must be satisfied on the balance of probabilities that there are reasonable grounds to believe that the suspect has committed an indictable offence, that the forensic procedure would be likely to produce evidence tending to confirm or disprove the suspect's involvement, and that the procedure is justified in all the circumstances (s23WO(1)). In determining that the procedure should be carried out without consent, the senior constable is specifically directed to balance the public interest in prosecuting crime against the public interest in maintaining the suspect's physical integrity (s23WO(2)). More importantly, the suspect's DNA profile can only be held for 12 months from the date of the original sample, or, if at the end of that period the suspect is still the subject of criminal proceedings, then until those proceedings have been completed or discontinued (s23YD). Over that period s23YDAF allows the suspect's DNA profile to be used to investigate indictable offences other than the one that originally gave rise to the sample being taken. But, unlike the serious offender, the suspect does not face the prospect of their DNA profile being held on a police database indefinitely, available for regular computer-based comparison, potentially implicating them in other police investigations.

Clearly, a victim or bystander whose DNA may be required for exclusionary purposes will enjoy the greatest degree of protection. Such a person will be treated under s23XWO as a 'volunteer'. Under s23XWR, they are to be given detailed information by a constable about the forensic procedure, their legal rights, the uses to which their DNA may be put, and so on. Without their informed consent, no DNA sample can be taken. A volunteer may exercise considerable control over the use to which their DNA profile can be put. First, they may limit the 'identifying period' for which their DNA profile is kept on the database under ss23XWR and 23YDAG. Secondly, they may elect to be a 'limited purpose' volunteer, and specify precisely the use to which their profile may be put (ss23XWR and 23YDAF). In effect, they can ensure that their DNA profile is used only for excluding their DNA from consideration in connection with a specific crime scene so as to identify more clearly the DNA of the perpetrator. Unlike a serious offender or a suspect, a volunteer can exclude the risk of potentially incriminating evidence remaining in police hands to be used against them in connection with other offences.[12]

Consequences of Breach

Breach of the safeguards and restrictions laid down in the forensic procedures legislation may have two distinct consequences. First, evidence obtained or retained in breach of the

11 The suspect's consent may first be sought (s23WH), however, the suspect should be first notified that the failure to consent may result in coercion (s23WJ(3)). See the comments in n 10.

12 In 2003 Victorian police thought they had made a breakthrough in their investigation into the murder of the toddler, Jaidyn Leskie, which had occurred six years earlier. DNA found on Jaidyn's clothes matched a DNA profile on their database. However, as Edwards (2005:72) observes, 'the match raised more questions ... than it answered'. The match was with the DNA profile of a rape victim in a totally unrelated case. The second inquest into Jaidyn's death ultimately concluded that the match was due to laboratory contamination. Whilst, depending on the consent granted by the volunteer, in some instances a rape victim's profile could legally be compared to crime scene samples from other cases, the Leskie case highlights a worse-case scenario for a victim, where they are erroneously drawn into the investigation of another serious offence. The permissible matching table within the legislative framework seeks to avoid such an outcome by placing restrictions on profile comparison.

legislation may be inadmissible. Secondly, a breach may result in the responsible person being held criminally liable.

Under s23XX of the *Crimes Act* 1914 (Cth), breach of the procedures laid down in the legislation may result in the evidence thereby obtained being held inadmissible at a subsequent trial. The question may arise whether the prosecution can bypass the inadmissibility provision simply by obtaining the same evidence a second time, this time without breaching the procedures. For example, suppose that a profile of a limited purpose volunteer was improperly but positively matched with an unrelated crime scene profile, believed to be that of the perpetrator. Evidence of the match between the volunteer's profile and the crime scene profile would be prima facie inadmissible in a criminal prosecution of that person. But the police may then classify the person as a 'suspect', and secure a match with a sample taken from the person on that basis. It appears reasonably clear that evidence of this match should also be inadmissible. Under s23XX(3)(c) the exclusionary rule extends to 'any other evidence made or obtained as a result of or in connection with the carrying out of the forensic procedure'.

The inadmissibility provision does not apply generally. Evidence will be inadmissible only in 'proceedings against the person' from whom a sample was taken in contravention of the Act. This means that if procedures are breached in taking exclusionary DNA from one person, for example a victim, this will not prevent the prosecution from using the exclusionary DNA in prosecuting another person. And s23XX(5) gives the court a discretion to admit the otherwise inadmissible evidence, having regard to a range of matters including its probative value, the nature of the offence being prosecuted, the seriousness of the breach, and whether admission would seriously undermine the protection provided by the Act. The view has been expressed that the perceived high probative value of DNA evidence may result in its being admitted despite breaches of procedure (ALRC 2003:[44.102]). This is despite the fact that s23XX(6) seeks to address this risk by specifically providing that '[t]he probative value of the evidence does not by itself justify its admission'.

While inadmissibility under s23XX is subject to exceptions, inadmissibility under s23XY of the Act is absolute.[13] This provision relates to samples, and profiles from samples, which should have been de-identified under the Act. De-identification of forensic material is required where a forensic procedure was ordered without consent from a suspect or offender and the justification for the order has passed -- for example an offender's conviction has been quashed (s23YDAA), or the suspect has been eliminated from enquiries (s23YD). De-identification is also required under s23YDAB where evidence in

13 Exclusionary rules that operate without exception carry the controversial risk of freeing guilty defendants. A similar rule in s64 of the *Police and Criminal Evidence Act* 1984 (UK) ('PACE') led to apparently guilty defendants avoiding conviction for rape and murder in *R v B* and *R v Weir* respectively. While there was strong DNA evidence in each case, this was held by the Court of Appeal to be inadmissible as the defendants' samples had been taken in connection with other investigations which had not resulted in convictions, and the profiles should have been removed from the National DNA Database. While the House of Lords suggested there was some scope for the trial judge to admit such evidence (*R v Weir*; *A-G's Reference (No 3 of 1999)*) it was then too late to pursue the defendants in these cases. Following public outcry, PACE was amended in 2001 so that the profiles could remain on the database despite charges being discontinued or resulting in acquittal. Challenges to these provisions under the *Human Rights Act* 1998 (UK) in *R v Chief Constable of South Yorkshire* were unsuccessful. In July 2004 it was suggested that, since the amendment, 128,000 profiles have been kept which would previously have been removed, 5,922 of which matched with 6,280 crime scene samples, including those relating to 53 murders and 94 rapes: (FSS 2004:30).

connection with a forensic procedure has been held inadmissible under s23XX. Note further that de-identification of material from a 'volunteer' is required where that person has subsequently withdrawn his or her consent (s23XWT). In this case, however, a magistrate may order that the forensic material and information derived from it be retained for a further period if considered sufficiently probative, and if this appears justified in all the circumstances (s23XWV).

Breaches of the forensic procedures legislation, as well as resulting in potential inadmissibility of the evidence obtained, also carry the risk of criminal liability for the person in breach. For example, the following are criminal offences punishable by two years imprisonment: to obtain forensic material other than that fitting one of the seven recognised categories with the intention of obtaining from it a DNA profile and uploading that profile to a DNA database system (s23YDAD(2)); to access information from a DNA database system where such access is not permitted by the Act (s23YDAE(1)); to seek to compare profiles on a DNA database system where that comparison is not permitted by the Act (s23YDAF(2)).

IV. Current Regulation of Exclusionary DNA of Forensic Workers

The discussion in Part III suggests that the current legislation establishes a broad regulatory regime for the use of DNA in criminal investigations. Subject to specified preconditions, forensic procedures may be carried out on serious offenders, suspects and volunteers, and the resulting profiles may be stored on a DNA database system. Profile matching across the database system is controlled, and the forensic material and profile is to be de-identified in certain circumstances. The various safeguards in large part depend upon the categorisation of the profile. They are backed up by criminal sanctions and evidential exclusion.

But two questions arise in regard to the scheme's coverage of the exclusionary DNA of forensic workers. Is the scheme appropriate and workable? And if not, can exclusionary DNA of forensic workers be gathered and used outside of the scheme?

In answer to the first question, the legislation appears ill-suited to exclusionary DNA of forensic workers. Given that the object is exclusion rather than incrimination, forensic workers would appear to fall within the category of volunteers — clearly they are not serious offenders or suspects. But forensic workers differ from other types of volunteers, such as victims and bystanders (VPLRC 2004:327–328). The formality attaching to the procedures on members of the public may be unnecessary and impractical, indeed, the complexity of procedures has been criticised even in relation to members of the public who may require protection (NSWLCSC 2002:[5.101]–[5.109]; Victoria Parliamentary Debates 2002:188–189). The DNA profile of a forensic worker may have continuing relevance to criminal investigations while they continue to work in that capacity. It may be questioned whether, practically, ethically and legally, forensic workers should really be categorised as 'volunteers', and enjoy the same safeguards as victims and bystanders. A more appropriate scheme is outlined in Part V. The question considered here is whether the exclusionary DNA of forensic workers must be dealt with under the inappropriate legislation or whether it is potentially unregulated.

Exceptionally among Australian jurisdictions the *Investigation (Identifying People) Act* 2002 (WA) is intended to provide comprehensive regulation of the use of exclusionary DNA of law enforcement officers in the investigation of crime. It makes express provision for the taking and use of police DNA profiles (ss22 and 64; *Criminal Investigation (Identifying People) Regulations* 2002 (WA) reg3A). In other Australian jurisdictions,

however, it is difficult to discern the precise scope of regulatory schemes and whether or not they cover the exclusionary DNA of forensic workers, and this issue has only received brief, inconclusive and inconsistent treatment in the numerous recent government reports (e.g. VPLRC 2004:262–265; ALRC 2003:[41.61]–[41.63]). Whatever the strict legal position, it appears that most forensic laboratories currently operate their own internal staff elimination databases (VPLRC 2004:264; NSWLCSC 2002:[3.61]). The practice with respect to the exclusionary police DNA remains unclear (VPLRC 2004:262–265; ALRC 2003:[4.60]–[4.63], [29.27]–[29.28]), and a source of industrial tension (e.g. AFPA 2006).

As stated above, the forensic procedures legislation appears to be comprehensive. However, initial appearances may be misleading. The problem is exemplified by the circularity of the 'simplified outline' in the Commonwealth Act: '*If* the carrying out of a forensic procedure is authorised under this Part, it must be carried out in accordance with the rules and procedures set out' (Part 1D, emphasis added). If, on the other hand, a procedure is carried out without legislative authorisation then, rather than being in breach, it appears that the procedure is unregulated. It might be thought that, if DNA procedures are to be carried out on a person for criminal investigation purposes without reliance on the coercive provisions relating to 'suspects' and 'serious offenders', then that person must be a 'volunteer' within the terms of the Act and have the benefit of the associated legislative safeguards and protections. But rather than having this normative operation the term 'volunteer' in s23XWQ(1)(a) merely describes 'a person who volunteers to a constable to undergo a forensic procedure'. The implication is that where a person undergoes a procedure involuntarily, or where a person volunteers to someone other than a constable, the person is not a 'volunteer' under the Act. Of course, where a person carries out a procedure without consent and without legal authority he or she would face both civil and criminal liability. But if a sample has been volunteered, but not to a constable, then the procedure may be legitimate, but lie beyond the reach of the legislation (see also NSWLCSC 2002:[5.146]–[5.147]). The term 'constable', as defined in s 3, includes all police members and special members but would not include laboratory or administrative staff or contractors.

But that is not the end of the matter. A strong argument can be mounted that, although the generation of DNA profiles of forensic workers may lie beyond the scope of the Act, the Act would still prevent access to crime scene and other reference profiles on the DNA database system for the purposes of comparison and elimination. In effect this would prohibit the use of forensic workers' profiles for exclusionary purposes. Section 23YDAE(1) of the Commonwealth Act states plainly: 'A person is guilty of an offence if the person accesses information stored on the DNA database system otherwise than in accordance with this section'.[14] Sub-section (2) lists seven purposes for which the database may be accessed, the central one being paragraph (a): 'the purpose of forensic comparison permitted under section 23YDAF (permissible matching)'. Section 23YDAF(1) provides a permissible matching table, each square of which indicates whether a particular two-way comparison is permitted: 'yes', 'no' or 'only if within purpose'. It appears that comparisons are permitted only if a 'yes' or 'only if within purpose' appears in the relevant square, and,

14 It could be argued that s23YDAE has no application to crime-scene profiles since, unlike the profiles of volunteers, suspects, etc, they contain 'information that cannot be used to discover the identity of any person': sub-s(3). But it seems clear that this exemption is intended only to cover profiles in the 'statistical index': see s23YDAC. Although the crime scene profile is not initially identified with a particular purpose, its entire raison d'Itre is the identification of the perpetrator. Furthermore, the restrictions in s23YDAE operate by reference to the permissible matching table in s23YDAF which covers the crime scene index, but not the statistical index.

in the latter case the comparison is within purpose. This means that profiles not on the database cannot be matched with profiles on the database. For a forensic worker's profile to be matched with a crime scene profile, the forensic worker must have volunteered the profile within the terms of the legislation.

The application of the forensic procedures legislation to the exclusionary DNA of forensic workers appears not to have been tested in the courts. This may reflect the fact that, while forensic scientists have always been aware of the risk of contamination, it is only now, with the increased sensitivity of DNA technology, that it is becoming a significant issue for defence counsel and the courts. However, in a number of cases, the courts appear to have recognised the existence of another class of unregulated DNA profile — that of a defendant obtained by the police from a discarded object, such as a cigarette butt or a styrofoam coffee cup, without complying with legislative procedures. The defendant argued that the DNA profile obtained from the discarded object should be excluded since it was generated without complying with the legislative safeguards — with neither the defendant's consent nor a proper order. This was rejected on the basis that those safeguards operate on 'forensic procedures' and, in the terms of the Act, 'a forensic procedure ... is a procedure actually carried out on the person of some specific individual' (*R v Kane* at [13]; applied in *R v White* at [13]; see also *R v Truong Hon Phuc* at [16], [17]). The profiles, taken from discarded objects rather than directly from individuals, did not involve regulated forensic procedures. The defendants may have had more success arguing that the comparison of the unregulated DNA profile with a crime scene profile contravened the permissible matching table, and therefore, the results of comparison should be inadmissible.[15] As indicated above, the forensic procedures legislation is not only concerned with the threat that the gathering of DNA poses to the individual's physical integrity. The legislation also addresses the surveillance aspect of DNA technology by restricting the use of DNA profiles.

The argument presented above — that exclusionary and other forensic DNA comparisons must be carried out in terms of the permissible matching table, or not at all — carries some weight. However, there are three possible responses. First, it may be suggested that permissible matching under ss23YDAE(1)(a) and 23YDAF(1) is wider than has been suggested. The permissible matching table in the latter section does not claim to be exhaustive. It does not state that *only* the listed comparisons are permitted. Instead s23YDAF(1) states comparisons are 'not permitted' if 'no' appears in the relevant square of the table or if 'only if within purpose' appears, and the comparison is being carried out for some other purpose. While the permissible matching table expressly permits comparisons for which 'yes' appears in the relevant square of the table, it is arguable that comparisons lying wholly outside the table are also permitted. An exclusionary comparison between an uncategorised forensic worker's profile and a profile within the crime scene category, while not expressly permitted, may nevertheless be allowed. Awkward drafting of the legislation leaves this argument open, however, the ambiguity is likely to be resolved in favour of a broader application of the permissible matching table. It should be noted that, in taking a sample from a limited purpose volunteer, s23XWR(2)(ba) requires a constable to inform the person 'that the information may *only* be used for [the specified] purpose' (emphasis added).

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15 The inadmissibility provisions in the legislation may not apply since they are limited to 'evidence obtained as a result of a forensic procedure conducted on a person': *Crimes Act* 1958 (Vic) s464ZE(1); see also *Crimes (Forensic Procedures) Act* 2000 (NSW) s82(3)(a); *Crimes Act* 1914 (Cth) s23XX(3)(a). Recourse may instead be had to *Evidence Act* 1995 (Cth) s138 or the common law requirements of *Bunning v Cross*: see *R v Daley*; *R v Nicola*.

A second argument is that the permissible matching restrictions could be avoided by carrying out exclusionary comparisons 'off database' (NSWLCSC (2002:[6.27]–[6.30]). The permissible matching table applies to matching within a DNA database system which is defined, under s23YDAC of the Commonwealth Act, as 'a database (whether in computerised or other form and however described) containing' (a) seven listed 'indexes of DNA profiles ... and information that may be used to identify the person from whose forensic material each DNA profile was derived; and (b) a statistical index; and (c) any other index prescribed by the regulations.' Submissions to the NSWLCSC (2002:145) suggested that a DNA database lacking just one of these elements would fall 'outside of the definition' and 'outside the scope of ... regulation' (see also Sherman et al (2003:[3.176]–[3.181]; Wilde 2005:60). However, the strictly conjunctive interpretation of the term 'and' in the definition is unwarranted. Clearly, the purpose of the legislation would be better served by giving the definition a cumulative construction (Pearce & Geddes (2001:[2.26]). A DNA database system comprises *one or more* of the indexes listed in (a), (b) and (c). It would be absurd for DNA profiles to be denied legislative protection simply because, for example, no statistical index is included. The definition is clearly intended to operate broadly, including databases 'whether in computerised or other form and however described' (s23YDAC). A profile that would fit within one of the listed indexes should be considered to be part of the DNA database system and subject to its safeguards immediately upon its creation, regardless of the intentions of its creator or its possessor, irrespective of its physical or electronic location, and without regard to the existence of other material already on the system.

A third, stronger argument in favour of allowing exclusionary comparisons independently of the permissible matching table is that such comparisons would be covered by ss23YDAE(2)(c) and 23YDAF(3). Access would be for 'the purpose of administering the DNA database system'. It is difficult to predict whether such an argument would succeed. Admittedly, the exclusionary DNA is that of forensic workers, not members of the public. But access to the crime scene profile for the purpose of an exclusionary comparison is not purely administrative. It is not comparable to accessing data for the purpose of backing up the database or implementing or testing new software. As discussed in Part II the exclusionary comparison has considerable forensic significance for both sides. An exclusionary match may significantly strengthen the prosecution's identification of the defendant, but at the same time the presence of the additional DNA and the possibility of contamination may provide useful ammunition for the defendant. From this perspective it appears inappropriate to classify the exclusionary process as an administrative exercise, internal to the police service or forensic laboratory. The recommendation of the VPLRC (2004:[9.5]), that exclusionary processes be governed purely by policy appears inappropriate. As NSWLCSC recommends (2002:[47]), all uses of DNA should be governed at the level of legislation passed by Parliament, and no lower.

As DNA technology continues to increase in sensitivity, and defence counsel and the courts become aware of the issue, the exclusionary DNA of forensic workers will become central to many criminal prosecutions. However, its status under the existing regulatory regime is far from clear.

V. Agenda for Reform

This part will canvass the issues raised by the exclusionary DNA of forensic workers, consider some of the regulatory options, and outline a comprehensive agenda for reform. The issues fall under three headings and include the following:

Membership

- Should forensic workers be compelled to provide samples for their DNA profiles to be uploaded to an exclusionary database?
- Should a distinction be drawn in this connection between new workers and existing workers?
- How widely should the term 'forensic workers' be defined?

Use

- Should DNA profiles of forensic workers be used only for exclusionary purposes (and not for incriminating the forensic worker)?
- What other restrictions should apply to access to and the operation of the exclusionary database?

Retention and de-identification

- When a person leaves employment as a forensic worker, what should happen to their DNA sample and profile?

Some of these issues have been addressed explicitly in jurisdictions such as Western Australia and the United Kingdom, but, as outlined below, the solutions there adopted are incomplete and otherwise open to criticism.

Mandatory Membership

As discussed at the outset of this article, improvements in DNA technology will make the exclusionary use of DNA increasingly important in criminal prosecutions. The enforcement of criminal justice will necessitate that core forensic workers — those posing the greatest risk of contamination such as crime scene examiners and forensic laboratory staff — make their DNA available for exclusionary databases. It is more doubtful whether this should be a requirement for other staff such as administrative personnel, cleaners and equipment manufacturers, although as DNA technology continues to increase in sensitivity, it may become necessary to consider whether membership should be extended to such persons (Howitt 2003). The scope of membership of the exclusionary database should, however, always be based upon a proper assessment of the risk of contamination. Legislative safeguards should be put in place so that the scope of the database does not creep outwards without adequate scrutiny (Meagher 2000:85; Tracey & Morgan (2000:673).

It appears justifiable for a greater degree of compulsion to apply to forensic workers than to members of the public. Providing an exclusionary sample is arguably an inherent part of the forensic worker's job, and this will be increasingly so in the future. Having chosen that line of work they should be willing to accept its incidents. Their situation is very different from that of a victim or bystander who has unwittingly and unwillingly been drawn into a criminal investigation. Of course, the notion of choice is not unproblematic. It should be acknowledged that the forensic worker's provision of an exclusionary profile is a relatively new part of the job. Existing workers, if they do not wish to provide a profile, should be given the opportunity to move to positions for which this is not necessary. New workers should be given proper notice that this is part of the job description.

As noted above, the *Criminal Investigation (Identifying People) Act* 2002 (WA) deals with the exclusionary DNA of forensic workers, however it has not squarely addressed these membership issues. The Commissioner of Police has the power under s22 to require both existing and newly appointed police officers to provide a forensic sample from which a DNA profile may be taken, and subject to certain limitations, may direct this to be compared with a crime scene and other profiles. However, for this profile to be uploaded to a database, so as to enable automatic exclusionary checking across multiple cases, s64(1)(b)

requires the police officer's approval. The uses to which a profile can be put, whether on or off a DNA database system, are discussed further in the next section.

In the United Kingdom samples are to be taken from members of a police force on their appointment (Avon and Somerset Constabulary 2003, Northumbria Police 2006). In practice this means that inclusion on the database is mandatory for members of the police force appointed following the commencement of the database, and voluntary for those appointed previously. The British government recently indicated that, as at 21 January 2005, there were 78,600 DNA profiles from police officers and police staff on the PED, representing 44% of police officers and 5.8% of police staff, and including '[t]he vast majority of police officers and police staff who attend crime scenes or handle forensic material' (UK Parliamentary Debates 2005).

In including both police officers and police staff in its database, the United Kingdom goes further than the Western Australian legislation which under s22(1) is limited to police officers. However, Howitt (2003) of the United Kingdom's Forensic Science Service has suggested that, 'given the risk of DNA contamination occurring through secondary and tertiary transfer', the exclusionary database should be extended still further to include cleaners and other support staff within the agency, defence experts 'who require access to sensitive areas within the laboratory' and 'production staff of manufacturers of key consumables used in the DNA process'. Howitt noted that a manufacturer of laboratory consumables had already consented to an anonymous database of staff members' profiles being made available for exclusionary purposes (Howitt 2003; FSS 2004:13). However, without the identity of the profiles, and given the difficulty of associating particular consumables with particular manufacturing staff, the significance of a match with the database will be unclear. As discussed in Part II above, where a crime scene sample, particularly a mixed sample, matches a large anonymous exclusionary database, the defendant will be able to suggest that this is purely by chance and irrelevant, or alternatively, that it incriminates the anonymous individual.

Limited Use of Profiles

A proposal for mandatory profiling of forensic workers may raise concerns (ALRC 2003:[29.27], [29.28]; Taylor 2000:2). Some reassurance may be provided by restrictions on the use to which the profiles may be put. The goal should be to confine the use of forensic workers' samples and profiles to the exclusion of their DNA in connection with criminal investigations. Before samples and profiles are used against workers in either criminal or police integrity proceedings, they should be given proper notice, and their consent should be obtained (see also Keelty 2004; Carbonell 2004). Samples should not be accessible for the purpose of health screening, even in respect of conditions that may affect a worker's ability to perform operational duties, such as conditions carrying a risk of seizure. In respect of all these issues, the legislation should be carefully drafted so as to reduce the risk of function creep (Gans & Urbas 2002:6).

Given the increased globalisation of many forms of crime — from drug trafficking to terrorism — it would also be necessary to consider the extra-jurisdictional utilisation of the exclusionary database. It may be unrealistic to expect different jurisdictions to adopt uniform systems of regulation (Puri 2001:376–379); this has not even been achieved among Australian jurisdictions presenting an obstacle to the creation of a national DNA database (VPLRC 2004:63–65). Access to the exclusionary database should only be granted to agencies from overseas jurisdictions where there can be a high level of confidence that they will comply with these restrictions. In many situations it should be possible for the domestic agency to supervise any access by a foreign agency.

Some of these issues have been addressed in jurisdictions operating exclusionary databases, but the solutions appear ad hoc. The Western Australian legislation imposes restrictions on the profiles with which police profiles can be compared. Under ss64(1)(a) and 22, the permissible matching table applies to police DNA profiles as though they were limited purpose volunteer profiles, the purpose being 'investigating an offence or a suspected offence or offences generally'. It should be noted that, according to the permissible matching table in s78, profiles of limited purpose volunteers can be compared with crime scene profiles, but not with reference profiles of other persons. The database may therefore have limited usefulness where samples other than crime scene samples may have been contaminated. Moreover, while the Commissioner of Police, under s64(1)(a), may direct comparisons to take place in respect of 'offences generally', a police officer's approval is required under s64(1)(b) for his or her profile to be uploaded to a database, inhibiting automated comparisons. Of course, depending on the industrial climate, it may be difficult for police officers to withhold approval.

The PED of the United Kingdom suffers similar weaknesses. The legislation has little to say about how the police profiles may be used. However, under reg19(2) of the *Police Regulations* 2003 (UK), the PED must be 'kept separate' from the National DNA Database. And so, despite its large membership, the PED may have limited functionality. It would appear difficult for the PED to be used for automated exclusionary comparisons. Guidelines in some police constabularies provide that information held in the exclusionary staff database can only be accessed for the purposes of resolving a specific contamination issue in relation to a particular case (Avon and Somerset Constabulary 2003; Northumbria Police 2006; Taylor 2002:2). This approach appears to be working fine at the present time. But as DNA technology becomes more sensitive and used more broadly these issues will arise with greater frequency. Consideration will need to be given to more systematic approaches and the possibility of adopting the kind of automated comparison that takes place on the National DNA Database.[16]

There appear to be several different stages at which an attempt could be made to restrict the incriminatory use of forensic workers' profiles. First, the restriction could operate at the comparison stage. That is, comparison of a forensic worker's profile with a crime scene or other profile would only be permissible where it appears that contamination has occurred, and that the forensic worker is a possible source of the contamination. This is the current approach with the PED. This has the advantage that there would be little chance of a match incriminating the forensic worker. But it appears impractical. First, in many cases it would be difficult to identify a case of contamination in the absence of a match with a forensic worker. Secondly, it would be time-consuming to collate and analyse records of all the staff that may have come into contact with a crime scene or forensic sample, no matter how casual and brief the contact.

From the point of view of administrative practicality, it would be preferable for profiles obtained during criminal investigations to be compared, as a matter of course, with the entire exclusionary database. This could be fully automated and would be at low cost. Often, a match with a forensic worker's profile will be the most readily available indication that contamination may have occurred. If a match is found, resources can be expended in determining whether this may be the product of contamination. Work records will reveal

16 From its inception in 2000 until 31 March 2004, profiles from only 155 crime scene profiles were compared with the profiles of 709 named individuals on the PED resulting in 22 exclusions (FSS 2004:13). Over a slightly shorter period on the National DNA Database, 480,000 individual profiles were compared with 133,000 crime scene profiles, incriminating 280,000 individuals (at 21).

whether there was any chance of primary transfer — from the worker to the sample. It will be less straightforward determining the risk of secondary transfer — from the worker to some other object to the sample (Thompson et al 2003). But the conclusion may be drawn that the worker could not have contributed their DNA in a work capacity, in which case the match may appear to incriminate the worker. As stated above, the goal is to use the forensic workers' profiles for exclusion not incrimination. However, in a number of respects, the achievement of this is not straightforward.

It may not be feasible to keep the existence of the match from the consideration of the investigators. And in any event, this level of protection of the forensic worker is not warranted. Investigators may ultimately exclude the profile on the basis, for example, that the forensic worker had innocent contact with the crime scene in a non-work capacity. Alternatively, the worker may have a cast-iron alibi making it appear that the match must be coincidental or through untraceable secondary transfer. In the former case, the existence of the match may still have forensic importance. It would unnecessarily hinder the investigation for the match to be excluded from consideration at this early stage.

The restriction on the use of the forensic worker's DNA profile should instead operate at the trial stage. Evidence of a match with a crime scene profile should be made inadmissible if adduced by the prosecution in any proceedings against the forensic worker. This exclusionary rule is limited in two respects. First, it would not prevent some other person charged with the crime from producing evidence of the match in his or her own defence. Secondly, it would not operate to provide total immunity from prosecution. To borrow from wording in s23XY(1)(d) of the Act, the evidential exclusion may extend to 'any other evidence made or obtained as a result of or in connection with' the original match. This is not the place to attempt to refine this formulation, or examine the subtle problems that the exclusionary rule may present. However, the exclusionary rule should foreclose an attempt to secure an admissible match by obtaining a further profile of the worker under provisions relating to suspects. The exclusion may also extend to a confession obtained as a direct result of the worker being told of the inadmissible match. However, other evidence flowing from the investigation — motive, means, opportunity, tendency, eyewitness identification, a confession unconnected with the match — would generally not be excluded.[17]

Retention and De-identification

Finally, the question arises as to what should be done with samples and profiles of forensic workers when they leave that employment.

Section 64(1)(c) of the *Criminal Investigation (Identifying People) Act* 2002 (WA) provides that a police officer's profile must be 'destroyed if the person, having ceased to be a [police officer] requests the Commissioner of Police to destroy it'. Regulation 19(3) of the Police Regulations 2003 (UK) provides that a forensic sample and DNA profile of a police officer 'shall be destroyed on his ceasing to be a member of [the] police force'. The latter appears preferable in that it does not require the police officer to take positive steps to bring

17 There has been little authoritative consideration of the similar provision, s138(1)(b) of the Uniform Evidence Law: *R v Haddad and Treglia* at [73]. While in *DPP v Carr* at [69] Smart AJ referred to the but-for test, Adams J in *DPP (NSW) v Coe* at [24] suggested 'something more' would be required, such as that the contravention was 'intended or expected (to a greater or lesser extent)' to be productive of the incriminating evidence. The s138(2)(b) phrasing, 'in consequence of', is potentially narrower than 'as a result of or in connection with'. It is unclear whether the prosecution could avoid exclusion under either provision by arguing that the evidence would ultimately have been discovered at a later stage in any case.

about the de-identification of the information. However, neither seems able to deal with the possibility that a forensic worker's profile may have continuing relevance to ongoing investigations or prosecutions following his or her cessation of employment.

While the immediate de-identification of DNA profiles appears inappropriate, so too does indefinite retention. A good compromise would be for de-identification to be required within a specified period, say twelve months, from the worker finishing employment, but with an extension of time permitted with the worker's consent or by order of a magistrate. Similar provisions currently operate in connection with suspects' profiles (*Crimes Act* 1914 (Cth), s23YD). To make such an order the magistrate would need to be satisfied that the sample and profile were relevant to an ongoing case, and that the case was being pursued with due diligence. The worker should be notified that such an order is being applied for, and given the opportunity to oppose it.

The possibility also arises that the DNA profile of a former forensic worker may regain exclusionary relevance to an investigation following its de-identification. In this situation the worker should be treated like any other volunteer. There should be no scope for mandatory sampling if the person is no longer a forensic worker.

VI. Conclusion

DNA profiling is a forensic identification tool of considerable power. The chance of two unrelated individuals sharing the same DNA profile is in the order of one in a billion, and so a match between a crime scene profile and that of a suspect will be of crucial importance. As DNA databases grow in size and the technology continues to improve, DNA evidence will play an increasing role in criminal investigations and trials. In recognition of the threat to privacy posed by the taking of DNA samples and the retention and use of DNA profiles, all jurisdictions have passed forensic procedures legislation to regulate the use of the technology. However, this article has identified shortcomings in the legislation which, unless rectified, will present serious difficulties.

The increasing sensitivity of DNA technology leads to a greater risk of crime scene and laboratory contamination by forensic workers. There will be a growing need for the DNA profiles of forensic workers to be compared with other profiles for the purpose of exclusion. However, the existing legislation appears ill-suited to the regulation of this task. The only category into which forensic workers would fit is that of the 'volunteer', however, unlike members of the public, forensic workers are not bystanders, accidentally drawn into the investigation. The formalities governing the taking of a sample appear unnecessary and impractical, and the forensic worker's DNA would have ongoing relevance beyond the instant investigation.

The solution may appear to be to deal with the exclusionary DNA of forensic workers without regard to the legislation, as a matter internal to the police service or forensic laboratories, governed by their internal policies and procedures. However, this is inappropriate for a number of reasons. First, it appears doubtful whether the legislation in its current form would allow for unregulated exclusionary DNA comparisons. Secondly, this would appear to pay too little regard to the privacy rights and other concerns of forensic workers. Finally, the issues raised by contaminated crime scenes and samples have relevance beyond the police service and forensic laboratories. They are of central importance to the parties and the court in a criminal trial.

There is an urgent need for the forensic procedures legislation to be amended so as to deal properly with the exclusionary DNA of forensic workers. This article has flagged the

major issues and has sketched out solutions. While it is appropriate that forensic workers' membership of exclusionary databases be made mandatory, such a requirement should only be introduced with proper notice. The DNA profiles of forensic workers should be used only for exclusion in criminal investigations. They should not be admissible as evidence against workers in criminal or police integrity proceedings, and workers' DNA should not be available for analysis for any other purpose such as health screening. The DNA and profiles should be de-identified within a specified period from the worker ceasing forensic employment unless still required for an ongoing criminal investigation.

The current regulatory scheme leaves the legal position of forensic workers' exclusionary DNA obscure. Early amendments have the potential to avert foreseeable difficulties in the administration of criminal justice.

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