

Convictions through Kith and Kin: Legal, Policy and Ethical Issues in DNA Familial Matching and Genetic Metadata

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Abstract

DNA databases are now vast libraries of genetic metadata. It is possible to match the genetic relationships of a person and their family simply through their blood ties. Such DNA searches are called ‘familial matching’. Investigators can take unknown DNA and then search through their existing DNA databases to see if the person may be related to any offenders on their DNA database. While there is legitimate interest in solving crime, it is not hard to foresee a future where thousands of familial matching searches are conducted each day. Despite the existence of this capability, it has barely been debated in Australia. This article tries to balance the legitimate societal need to solve crime against the whole host of legal, ethical, political, economic and racial concerns that familial matching raises.

Keywords: DNA – genetic metadata – familial matching – Australia

Introduction

To understand the concept of familial matching a basic understanding of how DNA works is required. Deoxyribonucleic acid (‘DNA’) is the genetic makeup that is unique to each individual, except for identical twins. It is the base building blocks of all life and how our genetic likeness is passed to our children. When we are born we inherit the genes from our biological fathers and mothers. We share this unique genetic code with our family and they share it with us. Unfortunately for the criminally minded, the miracle of life that is DNA can be used by investigators to put a defendant behind bars very quickly, often signalling an efficient and scientific doom for even the best-prepared defence.

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Since the 1980s, DNA evidence has grown in acceptance by the courts and by the general public (Kirby 2010) and is now commonplace in criminal proceedings. Genetic analysis works by isolating the genetic markers inherent within our DNA. Scientists do this by looking for telltale signs completely individual to us. These signs are called short tandem repeats ('STRs') where our DNA 'stutters' and creates a unique identifier. If a scientist analyses enough of these DNA stutters at enough locations in our genome a unique set of identifiers for every individual is painted. This is then mapped and catalogued as unique to that individual and used to identify them in criminal investigations but also paternity tests. This is made possible by STRs which are 'stretches of DNA where the DNA replicating mechanism appears to "stutter" resulting in a different numbers of copies of repeated sequences' (Greely et al. 2006, p. 249). Each STR has a different number of repeats. These repeats operate as a useful 'markers' for identification. Each marker has a location within the genetic sequence and can be used to map the identifiers on every individual's genome. This location or marker is known as a *locus*, which is a specific location of our chromosome. The identification of the location of such markers is the traditional way in which DNA testing is undertaken in criminal investigations. It is in this way that similarities are often drawn between the markers within our genetic profiles and the whorls, loops and arches present on our fingertips. Most importantly for the purposes of this article, we share half our chromosomes (including STRs) from each parent. When we match these *shared* STRs enough times we can determine genetic relatedness. This is the basic science behind paternity testing. The science is accurate enough to test further genetic relationships, for example, between brothers, sisters, great great grandfathers, uncles and aunties. This relatively new scientific development comes much to the delight of writers of daytime soap operas and to the despair of the biological father trying to shirk his financial obligations. For the purpose of this article it is sufficient simply to understand that DNA is shared between family and that scientists can cross-reference an unknown sample of DNA (for example, from a 'cold case' or unsolved crime) through a database and 'match' a suspect through their blood relatives.

But what is the logical progression of this development and how does this work? What happens when DNA information is used just like metadata, to map and plot our genetic bonds to each other? What happens when it is cross-referenced to a database? Is this fair or just? This article examines the implications of when we combine the scientific principles of testing for the DNA of our family members and cross-reference this data on a DNA database. This is called familial searching or familial matching. The scientific process of familial searching is simple and uses the same principles found in paternity testing. Familial searching involves scouring a DNA database for a closely matching profile, but not a direct match. This type of matching is possible because closely related profiles 'are more likely to have originated from a relative of the donor of the unidentified DNA profile' (Independent Committee 2010, p. 129). If a police officer has an unidentified DNA sample they can search DNA database to search for their relatives. If this is done on a large enough scale, potentially anyone is 'findable' on a DNA database through familial matching. How does this work and how has it evolved from traditional DNA technology?

Familial matching is merely an extension of these basic DNA principles because we invariably share our DNA with our blood relatives. Familial matching can be achieved because 'any individual will often have inherited different length STRs from his mother and his father' so 'they can "mark" which genomes came from which parent' (Greely et al. 2006, p. 249). This is because, with the exception of monozygotic or identical twins, the DNA of each individual is unique because any two human genomes differ at about 3,000,000 sites (Freckleton & Selby 2009 p. 1173). As noted by Urbas and Smith (2012, p. 66), familial matching is made possible because first-degree relatives share at least half of the non-coding

regions, and second-degree relatives share a quarter. Based upon a 26 site allele DNA test, a father and son would share an average of 15.7 alleles (notwithstanding randomly shared alleles). Alleles are essentially different versions of the genes that we inherit from our biological parents. These alleles can be tested and used as identifiers through this partial matching of familial DNA. Crucially, if investigators have the DNA identifiers of one person they can then search, cross-identify and compare these shared characteristics either through actual testing or searching through a database. A crucial difference between familial searching and regular DNA matching is that ‘familial searches generate only leads, which in turn point only to a list of possible suspects, all but one of whom definitely did *not* leave the evidence’ (Murphy 2009, p. 313). This means that all those people who are searchable due to their genetic relatedness to any one profile (that is, an offender whose DNA is on our national system) could be subject to DNA surveillance and the possible consequence police questioning and investigation. While the majority of blood relatives will be speedily eliminated through a familial search, innocent people may become subject to unnecessary and stressful investigations and/or accusations simply based on the family ties to their relatives.

While there has been no confirmed Australian prosecution based on familial matching (Urbas & Smith 2012, p. 66) it is now practically available at the Victorian Police Forensic Services Department (‘VPFSD’) as they have recently upgraded their DNA testing technology to allow them to detect 21 loci instead of nine loci. The science and technology to enable familial matching exists and could be implemented today. A debate throughout the community, academia, the judiciary, lawyers and police associations must occur before any such change is adopted.

DNA databases and ‘findable’ persons

Since 2010, in Victoria, upon a finding of guilt for an indictable offence, an application can be made for a compulsory acquisition of the offender’s DNA under the *Crimes Act 1958* (Vic) s 464ZF(3)(b). Genetic information retained from that sample is then kept on a DNA profile database for future reference and investigation of possible recidivist offenders, crime scene samples etc under s 464ZFD. The national database is called the National Crime Investigation DNA Database (‘NCIDD’), and is operated by CrimTrac. It has been subjected to massive growth of 66.9 per cent of samples between 2010 and 2016. The database has increased 602,317 samples (CrimTrac 2011) to 1,005,322 profiles (CrimTrac 2016). Traditional DNA testing means that only samples that are on the NCIDD would be compared for a *direct* match with any unknown DNA. However, the scientific capacity to genetically identify individuals through their family has the consequence of turning this database into a genetic metadata library for the executive.

This has the capacity to drastically change the way in which the criminal justice system operates because of the sheer number of people who are ‘findable’ through the genetic metadata. Greely et al (2006, p. 249) class a person as ‘findable’ if they are a first-degree relative to someone who has a profile on the database. Using simple arithmetic and a basic assumption that a person has between two and five first-degree relatives, the total number of people who are ‘findable’ if it was used in our current DNA database equates to roughly two to five million people. The sample size of the genetic metadata library is always increasing. While this is not calculated scientifically and is unlikely to represent the true expansion of the database, it does show the sheer size and range of people that could potentially be affected by familial searching. Additionally, these figures only take into account the science as it is capable *today*. Due to the way that DNA is passed through families, it may be possible (in the

future) to use familial searching against second-degree relatives, which further expands the reach of the database (McCarthy 2006, p. 86). It is reasonably foreseeable that the rapid development of science will enable a DNA search to stretch through an offender's bloodline. The point is that any laws formulated today around familial matching must consider future potential scientific developments.

It is imperative that the policy, legal and ethical implications are democratically examined before familial searching is given *carte blanche* in Australia. It is acceptable to a democratic society that a person loses their right to genetic privacy once they have been found guilty of certain offences. But it is a fetter on a person's rights and freedoms for the database to expand through the sphere of the family so that a citizen (either the sample source or their relatives) can be placed under suspicion simply due to their blood relations.

Function creep

The breakdown of the numbers of people who are 'findable' through familial matching is a symptom of what is dubbed by United States ('US') commentators as 'function creep' (Murphy 2010, p. 291). The original function of DNA matching is now changing drastically from its original function and intention. The databases that have collected all of this genetic information can also change in their basic functions as well. DNA matching is no longer isolated to an individual but has crept towards their families as well. If we peer back through the history of justifications for traditional DNA databases we can see that the broad justification for retaining a citizen's DNA profile is essentially to resolve past and future crimes. The public policy of keeping a DNA profile was favourably likened to keeping a record of a person's fingerprint — it is an unobtrusive way of obtaining an identifier of that person. A buccal swab, pre-familial matching, is likened to the taking of a fingerprint sample. The Massachusetts Supreme Judicial Court in *Landry v Attorney General* No 98462 WL 1181741 (Mass 1998) at p. 345 justified in the following way:

The courts then engage in a balancing test, weighing the government's strong interest in preserving an identification record of convicted persons for resolving past and future crimes, against the minor intrusion into their diminished privacy right in their identities by the taking of a DNA sample ... The courts conclude that the high government interest in a particularly reliable form of identification outweighs the minimal intrusion of a pin prick.

In that case the Court held that the taking of a DNA sample does not constitute an unreasonable search and seizure violation of the Fourth Amendment to the US *Constitution* if the appellant had been convicted of a crime. This is because the state has a high interest in preserving a permanent record of convicted felons. The primary justification was that the intrusion was a 'minimal ... pin prick' or today a buccal swab. The court in *Landry* at p. 347 held that:

The State has an established and indisputable interest in preserving a permanent identification record of convicted persons for resolving past and future crimes, and uses fingerprints, and now will use DNA identification, for these purposes. The obtaining of a very small amount of blood by pin prick constitutes only a minimally intrusive search.

The above logic seems to be the status quo in relation to DNA databases and has been widely adopted in the US. There, DNA databases have remained constitutionally valid despite multiple challenges through the vehicle of the Fourth Amendment — and despite it being a form of 'suspicionless search and seizure' (Suter 2010, p. 330). As Suter (2010, p. 330) concludes, 'the societal value of DNA databanks outweighs the privacy interests of convicted

offenders'. The kernel of this reasoning is justified due to the recidivism of people convicted of crimes that then helps to resolve past and future criminal acts.

Within Australia, the retention of DNA profiles operates upon a conviction of prescribed offences. The logic of this is essentially related to: (a) recidivism; and (b) the legitimate need for police to investigate unsolved crimes. Because of this, ensuing laws ensured that DNA databases have exploded in popularity in recent times. In a few short years, all 50 states and the US Federal Government have statutes creating DNA databases with profiles from certain convicted criminals (Suter 2010, p. 311). In Australia, since the authorising statute of Pt 1D of the *Crimes Act 1914* (Cth) and various other state legislation, at least 1,005,322 profiles have been collected, categorised and stored (CrimTrac 2016, p. 41). That is a remarkable amount of growth in the span of a few short years. However, this is nothing compared to the leapfrog in 'findable' people if familial matching was embraced. Documenting the function creep in the US, Suter analyses how '[o]ver the years, the trend has been to broaden the pool of offenders to include nonviolent felons, misdemeanants, and even arrestees' and rightly concludes that familial searching is 'just one more step in this trend toward expanding the reach of DNA profiling' (Suter 2010, p. 311). The concern then becomes that if these two trends conflate then a giant *ad hoc* expansion of the database occurs, placing citizens under genetic surveillance for no reason other than genetic ties.

The United States Supreme Court recently approved the extension of the reach of DNA identification in *Maryland v King* 569 US ___ (2013) where it was narrowly held that a DNA buccal swab upon *arrest* (not conviction) is a proper police 'booking' procedure that does not violate the Fourth Amendment. The decision was a narrow one, with Kennedy J penning the majority judgment with Roberts CJ and Thomas, Breyer and Alito JJ joining. The decision is notable because it categorises DNA as a legitimate booking procedure, that helps police determine that what a suspect has done in the past is part of the profile that police may legitimately start collating upon arrest. Kennedy J held that DNA 'uses a different form of identification than a name or fingerprint, but its function is the same'. Aligning DNA buccal swabs with common practice police 'booking' procedures it was decided that this was not an unreasonable search and seizure. The decision is significant because it extends US police enforcements powers to search the DNA of an arrestee without court order. It is also significant because it is the first instance where the US Supreme Court mentions familial matching. Kennedy J touches on the matter in passing, referring to the Act in question and how '[t]ests for familial matches are also prohibited'. While mention of familial matching is very brief, it is the opinion of this author that *Maryland v King* is significant because it represents the high water mark as to the limit of DNA identification procedures with respect to familial searches. This is because of two factors. First, the majority in *Maryland v King* is razor thin with a strong dissent from Scalia J with Ginsburg, Sotomayor and Kagan JJ agreeing. Scalia J writes:

Today's judgment will, to be sure, have the beneficial effect of solving more crimes; then again, so would the taking of DNA samples from anyone who flies on an airplane (surely the Transportation Security Administration needs to know the 'identity' of the flying public), applies for a driver's license, or attends a public school. Perhaps the construction of such a genetic panopticon is wise. But I doubt that the proud men who wrote the charter of our liberties would have been so eager to open their mouths for royal inspection.

Second, and more importantly, the core reasoning of the majority rests on the fact that a DNA buccal swab is a 'booking' procedure — like fingerprinting or photographing the suspect. The key distinction is that the logic of the majority focuses on the rights of government authorities with respect to searching *arrestees*. It is on this basis alone that a DNA

buccal swab and database search is deemed constitutional. While they did not decide this issue, upon reading the judgment it would seem unlikely that the US Supreme Court would then overturn and extend this line of reasoning and permit familial searches towards people who have not been arrested. By focusing on the procedural element of processing arrestees, it could be interpreted to exclude the ability of the state to 'process' people who have not been arrested.

The function creep is not limited to the mere ease of collecting DNA or the size of the database, but also the function of that database. In essence, DNA databases were traditionally not intended to advance towards a genetic metadata library. Science has forced the advance and our laws and policies have not kept up. Contrary to *Landry v Attorney General*, a DNA profile is no longer analogous to a fingerprint. While *Maryland v King* does make the same analogy that DNA is like fingerprinting, it does seem to confine DNA identification searches to arrestees only. However, we are now in a situation whereby DNA databases may derogate from their original intended mandate and encroach towards the sphere of the family. The creation of the DNA database was justified through its likeness to holding of fingerprint evidence. It was assumed that, like fingerprinting before it, DNA profiles were limited to the offender and the offender only. But science has expanded the breadth of these databases. Having a library of offenders DNA is one thing, but do we want the genetic library to expand to their families?

In Australia, DNA profiles undoubtedly fall under the definition of 'personal information' found in s 6(1) of the *Privacy Act 1988* (Cth). That section defines personal information as 'information or an opinion (including information or an opinion forming part of a database), whether true or not, and whether recorded in a material form or not, about an individual whose identity is apparent, *or can reasonably be ascertained, from the information or opinion*' (emphasis added).

It is clear that each time a familial search is done it scans through the personal information of people who just happen to be related to someone on the DNA database. The repugnancy of this privacy breach does not stem from the search itself; it stems from the suspicion and possible subsequent investigation based purely on someone's blood-relatives. The genetic interrelatedness of citizens can be mapped, measured and quantified as a network of genetic metadata. This is extremely intimate and private information. Moreover, it is likely to circumvent the existing laws that govern the collection and retention of DNA information. It is for this reason that the Victorian Privacy Commissioner raised the spectre that strict existing procedures for collecting DNA could be circumvented by taking samples from a relative instead (Victorian Office of the Privacy Commissioner 2010, p. 18) For example, police may have suspicion that two brothers are engaged in criminal activity. Imagine a state where DNA profiles can be obtained through arrest; police reasoning may be to arrest sister A for the purpose of a partial matching of brothers B and C.

Is familial searching currently legal?

Familial searching impinges on civil liberties and raises serious privacy concerns (Suter 2010, p. 327; Victorian Office of the Privacy Commissioner 2010, p. 114) and fundamental issues of guilt by association. In an Australian context, Urbas & Smith (2012) note that there are no legal principles that would preclude investigation of familial relationships by police. They then use an example of police producing a likeness of a suspect's face, and the witness stating it looked similar and was maybe his brother. They state, 'it would be absurd to suggest that they could not investigate whether this person had a similar looking brother who may have

committed the offence' (Urbas & Smith 2012, p. 66), concluding that familial matching because it using non-coding parts of the genome is 'an advanced form of traditional investigation methods' (2012, p. 66).

With respect, this reasoning is oversimplified and potentially misleading. First, the physical similarity of family is merely that. Genetic information on the other hand is personal information that is unique to the individual. The very nature of the coding itself differs from fingerprints and physical likeness. For example, in the minority judgment of the House of Lords by Baroness Hale of Richmond in *Marper* 1 WLR [2218], Her Honour noted that a person's genetic information (relating to samples and not profiles) is perhaps *the most private* type of information and should be protected by the *European Convention on Human Rights*, specifically the right respecting a private and family life. The European Court of Human Rights ('ENCHR') in *S and Marper v United Kingdom* [2008] ECHR 1581 essentially agreed with Her Honour. While the case was primarily about the indefinite retention of DNA samples on a database, the ENCHR cited the Nuffield Council on Bioethics Report (2007) and the Grand Chamber in *Marper* held that 'the DNA profile's capacity to provide a means of *identifying genetic relationships* between individuals is in itself sufficient to conclude that their retention *interferes with the right to the private life of the individuals concerned*' (emphasis added). It is no small thing to be able to tell the interrelatedness of individuals, with such information being intensely personal.

Second, s 13(a) of the *Charter of Human Rights and Responsibilities Act 2006* (Vic) ('the Charter') recognises that a person has the right 'Not to have his or her privacy, family, home or correspondence unlawfully or arbitrarily interfered with.'

Furthermore, within s 17(1), the importance of families are emphasised as the 'fundamental group unit of society and are entitled to be protected by society and the states. McCarthy (2011, p. 383) argues that these rights are threatened because familial matching can turn family members into 'genetic informants', potentially leading to lifelong genetic surveillance. Privacy and family concerns intersect, with familial matching having the potential to destabilise the family unit. The investigative pressure and suspicion created simply through genetic relatedness may impact on families. For example, familial matching could reveal previously unknown genetic relationships (Suter 2010, p. 347). International comparisons with similar legislation to the Charter indicate that familial matching may be contrary to these rights. Canada has a similar, albeit constitutional, charter of rights. In discussing familial matching under Canadian law, Bellamy-Royds and Norris (2010, p. 21) state that 'even if the Act were amended to permit familial searching, the practice might be considered unconstitutional under the *Canadian Charter of Rights and Freedoms*'. So while it is unclear how familial searching will be judged in Victoria, it is clear that the Charter introduces, via s 38, an interpretive legal principle plainly ignored by Urbas and Smith.

Third, in analysing the operation of Pt 1D of the *Crimes Act 1914* (Cth), the national legislative framework for DNA sampling and profiling, an independent review from the Attorney-General's department noted that there is nothing within Pt 1D that would *prevent* familial matching. Recommendation 23 of the Ford Committee (2010, p. 116) nevertheless recommended that it 'should *only* be adopted after an appropriate exposure to public examination and assessment'. Familial matching is not an issue that has yet been properly considered and debated by the legislature or public. Because of this lack of consideration, the judiciary assumes Parliament did not intend that legislation impinge on fundamental rights unless there is unambiguous language to the contrary. This is a legal principle known as the 'principle of legality' as held in the case of *Evans v NSW* [2008] FCAFC 130.

Due to this principle it is arguable that familial matching may not be possible in Australia. For example, Spigelman CJ citing *Rodriguez v United States*, 480 US 522 (1987) in the case *Faheem Khalid Lodhi v R* [2006] NSWCCA 121 at [32] states ‘no legislation pursues its purposes at all costs ... and it frustrates rather than effectuates legislative intent to simplistically assume that whatever furthers the statute’s primary objective must be the law.’ Lastly, for a juror to hear that the accused is part of a ‘family of crooks’ may create the prejudice of guilt by association, which could bolster arguments for exclusion of that evidence to ensure a fair trial.

Contrary to the arguments of Australian commentators, these factors indicate that familial matching may not be sanctioned under the current framework either at a state or national level in (see generally Pt 1D of the *Crimes Act 1914* (Cth)).

Interestingly, the Northern Territory does have regulations that may just allow of familial matching. Regulation 20B of the *Police Administration Regulations* states:

- (1) For section 147C(3) of the Act, the following types of DNA analysis are prescribed:
 - (a) genomic (nuclear);
 - (b) mitochondrial.

- (2) However, a sample may be analysed to obtain information only for the following purposes:
 - (c) to compare DNA profiles for a person’s identification;
 - (d) to determine the gender of a person;
 - (e) to link a person with one or more of the following:
 - (i) another person;
 - (ii) a place;
 - (iii) a thing.

Regulation 20(2)(a) specifically refers to allowing analysis to obtain information for ‘comparing’ the DNA profiles for a person’s identification and with reg 20(2)(c) to ‘link’ that DNA information with reg 20(2)(c)(i) ‘another person’. Such a regulation arguably encompasses a situation of familial matching. But, on the other hand, this is extraordinarily wide language. It is difficult to imagine what other use there is for genetic information other than comparing to that of another person or linking it with another person, place or thing. That, combined with language of exclusion in the use of the word ‘only’, seems to make for an odd piece of legislative drafting. The two sentiments seem to conflict. If this regulation was relied upon in a court for questions of familial matching, there may be an argument of statutory interpretation in terms of (i) the intention of parliament not extending to that of the family and (ii) the maxim of *expressio unius est exclusio alterius*.

As a matter of reasoning, it cannot be that such a legislative leap could be taken when the original drafters of that legislation had not considered the possibility that DNA could be used in such a novel way. An analysis of the Second Reading Speeches of all legislation that could touch on familial matching revealed no discussion by any parliament on this subject. As a matter of course, the legality of familial matching remains in limbo.

Investigative accuracy

While the scientific accuracy of DNA familial matching is accepted, it should not be assumed that this equates to accuracy at the investigative level. Murphy (2010, p. 20) outlines dual concerns of investigative over-reliance and ‘confirmation bias’ when evidence ‘so

dominate[s] and shape[s] the court of a subsequent investigation that it inevitably taints the results'. Murphy (2010, p. 21) uses an example of the wrongful identification of Oregon lawyer Brandon Mayfield as a perpetrator of the Madrid subway bombings. This injustice occurred when the FBI 'matched' his fingerprints at the scene and worked backwards, built a seemingly damning case based on innocuous facts and an over-reliance on the science and database to provide a match. If familial matching becomes *de rigueur* at the investigative level the possibility of confirmation bias increases the chances of wrongful investigation and conviction simply because of the location of someone's DNA.

Within Australia, the case of the wrongful conviction of Farah Jama is an example of the dangers of confirmation bias and investigative over-reliance in DNA evidence. In his report on the matter Vincent J (2010, p. 37) noted that:

the unreserved acceptance of the reliability of the DNA evidence appears to have so confined thought that it enabled all involved to leap over a veritable mountain of improbabilities and unexplained aspects, that objectively considered, could be seen to block the path to conviction.

Jama's case is a horrific example of our jurisdiction failing to understand the nuance and complexities of the science involved. The 'confined thought' that Vincent J speaks of was present within all arms of the criminal justice system: the judge, defence and prosecuting counsel and the police who investigated the case. The conviction of Farah Jama was based on a single cell of DNA that was attributed to him by secondary transfer; that is, an existing piece of his DNA had contaminated the sample taken from the complainant, thereby securing his wrongful conviction. Vincent J (2010, p. 37) found that the scientific complexities of the case resulted in no one in the criminal justice system considering Locard's Principle, the rule that every contact leaves a trace. Despite the fact that no finding of guilt in Victoria had ever been based on a single piece of DNA evidence before, Mr Jama was wrongfully convicted of rape even though no sexual assault had occurred. On the facts of the case there was no other evidence except for that single piece of DNA. The alleged rape occurred in a nightclub, with neither patron nor security camera providing evidence of a 19-year-old Somalian man being present. The complainant was found in a toilet cubicle locked from the inside. Everything about this case screams of investigative confirmation bias, where an over-reliance on a single piece of sketchy evidence is used to secure a false conviction. Combined with elements of racial profiling and unfounded police suspicions *Jama's case* is a powerful example of investigators over-reliance on 'the science' and the criminal justice systems tacit and unquestioning acceptance of DNA evidence.

A similar example of secondary transfer and miscarriages of justice can also be seen in the High Court case of *Fitzgerald v The Queen* [2014] HCA 28. The case is short on legal analysis and instead focuses on the facts of the case, which essentially involved the 'rare' but valid 'alternative hypothesis' that the blood of the appellant found on a didgeridoo arrived there via secondary transfer. The judgment is important because it extends the secondary transfer argument to a rational alternative theory that *must* be excluded by the prosecution in such a DNA-only case. Both of these cases point to the very real and distinct possibility that investigative accuracy and over-reliance on DNA evidence can lead to wrongful convictions. It remains unknown how these lessons of law will impact any scheme of family matched DNA evidence. Also the practical difficulties for defence counsel and prosecution counsel to prove or counteract this evidence would be quite challenging.

If familial matching was given free reign at the investigative level, police could be monitoring and pursuing the genetic breadcrumbs of suspected family members based on genetic suspicion alone. Such a situation is undesirable due to the massive strain a police investigation can have on an individual's reputation and wellbeing. Murphy (2010, p. 304)

adopts the strong view that ‘familial searches should be forbidden because they embody the very presumptions that our constitutional and evidentiary rules have long endeavoured to counteract: guilt by association, racial discrimination, propensity, and even biological determinism’.

While this view places the privacy of the individual above the legitimate needs of the state to seek justice, it does raise significant points regarding the impact familial matching could have if it was unrestrained. Take, for example, the radio report (‘Police use DNA to track suspects through family’ 2007) about the ‘BTK’ killer, who was apprehended after a warrant was issued to obtain the residual DNA of his daughter’s pap smear. The result of this investigation is undoubtedly just, but that does not mean it may be suitable as a routine investigative procedure for all crimes involving DNA. It is a dangerous precedent to set that in order to put an offender to justice we must investigate his or her relatives. Additionally Gabel (2010, p. 53) argues: ‘The danger is that police would interpret a familial DNA hit as a “Do Not Acquit.” Meaning, they would take a lackadaisical approach to the investigation, and assume that the DNA will win the conviction on its own.’ There is also the accepted rule in Australia that forensic samples could be gathered for one purpose but used for another (Ross 2011): This raises the spectre that police may investigate relatives for comparatively minor or flimsy allegations and then use that DNA information for the ulterior purpose of securing a conviction against a relative.

Logic dictates that if the DNA database is expanded to relatives, so too does the capacity for miscarriages of justice expand. There is a legitimate fear that if familial matching becomes wholly accepted within the criminal justice system, these investigative biases will extend towards the sphere of the family. While the pure science itself may be certain, the capacity for human error cannot be underestimated. In the US, a statistical analysis by Saks and Koehler (2005, p. 892) of 86 DNA exoneration cases found that 63 per cent of wrongful convictions were caused by forensic science testing errors and 27 per cent by false or misleading evidence by scientific experts. By expanding the size, scope, function and reach of the DNA database there is an increased risk of miscarriages of justice.

Racial justice

The fear with DNA familial matching is that it will have a disproportionate impact on ethnic groups that are already over-represented within the criminal justice system. This means that minorities, which are already over-represented, endure far greater genetic surveillance than the White majority as Greely et al. (2006, p. 258) state, ‘not because they are convicted felons, but because they are related to one’. Greely et al. (2006, p. 259) examined the African-American incarcerated population in 2006. Using the working guess of five first-degree relatives it is argued that ‘[u]nder these assumptions, the 1.1 million African-Americans in the Offender Index will have 5.5 million first degree relatives, leading to a total of 6.6 million African-Americans ‘findable’ through the database — the offenders and their relatives. That constitutes about seventeen percent of all African-Americans’. In Australia, as at 30 June 2016 the Australian Bureau of Statistics (‘ABS’) (2016) counted 11,288 prisoners who identified as Aboriginal or Torres Strait Islander representing 28 per cent of the prison population, despite forming only 2.3 per cent of the overall Australian population (ABS 2006). Because of this over-representation in the penal system, Aboriginal and Torres Strait Islander people would endure a far greater and disproportionate amount of genetic surveillance than the Caucasian majority. Familial matching therefore has the capacity to enhance an already biased system and further entrench the racial inequities that we are trying to eradicate.

In response to these critiques, proponents for familial matching like Rothstein and Talbott (2006, p. 154) have adopted the reasoning that '[h]aving a disproportionate number of minority criminals is a social problem, not a DNA database problem'. While this statement rings true, it sidesteps the issues and ignores the fact that familial searching would exacerbate and entrench these existing social problems. This logic ignores the many iniquities that racial minorities and socially disadvantaged groups would face under familial matching. The over-representation of Aboriginal Australians both in the prison system and in the NCIDD would create an instant bias towards this group of people.

The question of racialised justice is perhaps the strongest argument against DNA familial matching. It is noteworthy that several academics, including Greely et al. (2006), have proposed that the *only* way to avoid racialised justice is to establish a universal DNA database, with every citizen's profile being retained. Such a move would invariably have its fierce critics because of the inherent privacy and political concerns. Short of adopting a universal database, DNA familial matching would target the families of people who are often from the poorest and most disadvantaged groups in our society.

Can familial matching be challenged in court?

Generally, when defendants are found guilty of a crime their DNA (if the case is serious enough) tends to go on a DNA database. This is established law that is enabled by statute and common law. However, could a family member of someone on that DNA database launch an attack on the legality of DNA familial matching? For example, could the innocent brother of a burglar challenge in court a familial matching search on behalf of his family and himself? Would the fictional innocent brother even have a right to appear in court and could judicial review apply to a question of law surrounding familial matching? In Victoria, when questions first arose regarding procedural fairness, judicial review, natural justice and DNA sample applications under s 464ZF of the *Crimes Act 1958* (Vic), it was left to the Victorian Supreme Court to decide the issues in *Lednar v Magistrates' Court* [2000] VSC 549. The questions in that appeal concerned the limited right of judicial review regarding forensic sample applications by the police under s 464ZF. The core of the court's judgment found that a person has a right to be heard in relation to forensic sample applications because (a) the principle of *audi alteram partem* ('listen to the other side') essentially requires proper notice to be given to persons affected by the adverse decision, and (b) the taking of such a forensic sample would be a cause of assault and battery. Gillard J notes at [278]:

By its very nature, a term of imprisonment involves the loss of many of the prisoner's rights. He no longer enjoys freedom of movement, he cannot complain that he is being physically restrained against his will, and he is subject to rules and regulations concerning prison discipline. On occasions he may be physically restrained in circumstances which would constitute a trespass to the person but which are justified to ensure prison discipline and the safety and welfare of not only the person involved but other prisoners and prison staff.

The reasoning becomes that upon the finding of guilt of a citizen that citizen sacrifices certain rights in relation to their physical security and privacy that other citizens enjoy. This is legally sound reasoning but it does not apply to familial matching because it is outdated. This uncertainty in the law makes it unclear as to whether the prisoner's loss of rights extends towards becoming genetic informants against their own family. Gillard J has quite rightly limited this reasoning to the physical body of the appellant and not to the consideration of familial matching. This is another example of how courts traditionally (and currently) view the retention of DNA information. The logic is limited to the assumption that DNA

information solely identifies one person. Several questions remain unanswered. Does the loss of the prisoner's rights mean a loss for their families' genetic privacy as well? Or should DNA be limited to just that person? Who gets to make the decision to investigate the DNA of a family member and on what basis is that decision made? Is such a decision something that is able to be challenged and reviewed by a court?

If the courts demand that they 'listen to the other side', does a person have the right to know their DNA is being cross-referenced through familial matching? The case of *Lednar* is also useful because it is authority for the fact that the principle of *audi alteram partem* applies. This principle requires that the person whose interests will be affected by an adverse decision be given adequate notice and a fair opportunity to be heard. Such a right extends to a right to be notified of any decision affecting the 'purse or person' of any person who may be impacted by a decision. The modern statement of this principle has been taken to mean that the 'principle talks about a person's rights, interests or legitimate expectations' (see *Roebuck v Mayor etc of Geelong West* (1876) 2 VLR (L) 189 at [191]). If that is the statement of principle that can be extracted from *Lednar*, then it can be strongly argued that a person whose interests may be affected from a familial matching situation (that is, a family member being investigated for a crime through DNA familial matching) has a right to be heard on such matters. However, a right to judicial review does not necessarily mean that the court would have any power to prevent a familial matching search from occurring. It would be hubris to pre-empt how the court might decide the matter if it did proceed down this path because it is unsettled law. What is settled though is that a clear, considered and democratic approach is far preferable to an *ad hoc* judicial one.

Having a considered approach informed through public debate and enacted democratically through legislation is far preferable than policy evolution through the courts. That is not their role. It is not a stretch of the imagination to assume that sooner rather than later a situation will arise that will require such a question to be decided by the courts. It is argued that the common law and the avenue of judicial review may be insufficient to deal with the legitimate concerns arising out of any future familial matching cases.

The proposed test

There is no existing legal test that deals specifically with familial matching. The parliament did not consider the future possibility of DNA familial matching when creating the statutory framework found in Pt 1D of the *Crimes Act 1914* (Cth). State parliaments were no better. There is a disconnect between the current science and the current state of the law. The scientific advances have created a tension between the legitimate concern of solving crime and the rights of the individual citizen and their families. Recommendation 29 from the Attorney-Generals independent review of Pt 1D of the *Crimes Act 1914* (Cth) (2010, p. 21) stated '[f]amilial matching, should only be adopted after an appropriate exposure to public examination and assessment'. Many years have passed since that recommendation and yet there has been barely a ripple of debate in the law, the public or academia. This is despite the very strong likelihood that it would impact a large majority of citizens and have disproportionate impacts on certain racial and economic groups. Conversely, it could be assumed there are some 'cold cases' that could definitely benefit from such an innovative new technology.

What is clear is that *if* familial matching is implemented, it must be debated extensively. Due to the strong civil liberty concerns, and the potential for this to become a live political issue, it would be wholly inappropriate for familial matching to be adopted by the executive

on a departmental level. Democratic debate will highlight the serious family, privacy, racial and civil liberty concerns raised by the prospect of familial matching. Australia has had a remarkable lack of discussion as to the policy effects and legal validity of familial matching. The public may have serious concerns in relation to their genetic privacy and their freedom from a state cataloguing and searching through citizen's genetic metadata. Such concern is logically implicit in the legislative landscape today: see, for example, s 464ZF applications under the *Crimes Act 1958* (Vic), which must be granted by a judicial officer before a DNA buccal swab can be obtained from criminals who have been found guilty of listed criminal offences. However, there is also the legitimate interest in the executive being able to effectively police and solve crimes. It may be that the debate reveals that a balance should be struck between the interests of genetic privacy and the need of the state to solve certain crimes.

As a result, this article seeks to weigh two important factors:

1. the serious policy concerns raised by familial matching and its impacts on the rights of the citizen; and
2. how to achieve a balance between these rights and the legitimate desire to prosecute unsolved crime.

It is argued that the best way to achieve this balance is through stringent judicial oversight. There should be an appropriate legal test that would limit the capacity of familial matching to impinge on the rights of the citizen. This would be somewhat similar to the operation of a warrant, albeit stricter in application. The judiciary could decide the question after an application brought by the police/prosecution, and give potentially affected person's *locus standi* to argue reasons why the applications should not be granted. Such persons would include any person whose primary DNA is used to identify a relative. The reasons for any judicial decisions should be subject to appeal and, when possible, be published in the public domain. Such a judicial test would have a number of advantages. First, it would be independent and judicially administered, thus allowing faith in the independent application of such an extraordinary power. Second, by giving the affected persons notice and standing to argue against any such application in open court it gives them the opportunity to defend their legal rights. Lastly, by giving notice to affected persons it may prevent, in practice, an investigative over-reliance on DNA and familial matching. Alternatively, police could rely on the DNA notice as a legitimate surveillance technique to monitor the movements of a suspected criminal who feels the net tightening.

The test should read as follows:

Familial matching should only be used for listed serious crimes that would, but for familial matching, remain unsolved. When considering such a matter a judge must weigh the protection of families, minorities, civil liberties, privacy concerns and any other relevant factors against the public interest of solving a crime.

This test is a modified version of the test proposed by Thomas (2006, p. 76), with the addition of 'listed serious crimes' which would presumably appear in a Schedule within the legislation. This has several advantages because it provides democratic legitimacy for what is considered familial matching offence and it limits what may and may not be considered a familial matching offence. This test ensures that traditional policing methods, which generally do not intrude upon civil liberties, would be used for the vast majority of crimes. Only when a crime is substantially serious and outlined by the legislature and where it would remain unsolved by traditional policing methods would familial matching be justified. For example, 'cold cases' where familial matching is at its most useful would clearly pass the proposed test.

This is due primarily to the ‘but for’ test that the crime would remain unsolved, and the clear interest of justice in solving such cases.

The test would restrict the function creep of DNA databases, reduce investigative over-reliance on DNA, ensure democratic accountability and limit the infringement on civil liberties, while also serving the important public interest of bringing criminals to justice. It may well be that for operational reasons such hearings would be required to be heard *ex parte*; however, it would be better to have a test that balances these interests than solely relying on the judgment of investigators.

Conclusion

This article has sought to outline how the science has rapidly evolved past the current law. Undoubtedly, there are unsolved cases across Australia that could benefit from familial matching. Due to the issues outlined in this article there is a delicate balance that needs to be struck between the rights of the citizen and the expectation of a society. There will undoubtedly come a time when the state wishes to utilise the technology of DNA familial matching. It is inevitable. What is not inevitable is how our society chooses to use this new form of crime investigation. Do we want familial matching to become the new norm, the exception or somewhere between the two? The crucial question is: do we want to be living in fear of our own genetic bonds by allowing *unfettered* access to our genetic metadata? A balance must be struck, but this can only be done through public debate and via the proper creation of an appropriately weighted law through parliament. This article has sought to highlight some of the very real dangers and inequalities that can arise if we, as a society, blindly lurch towards an unquestioning acceptance of familial matching. The proposed balancing test to be used by the courts seeks to correct some of these inequalities. Imposing a limit on familial matching will prevent this powerful new technology from becoming a potential instrument of injustice and inequality.

Cases

- Evans v New South Wales* [2008] FCAFC 130 (15 July 2008)
- Faheem Khalid Lodhi v The Queen* [2006] NSWCCA 121 (13 April 2006)
- Fitzgerald v The Queen* [2014] HCA 28 (13 August 2014)
- Landry v Attorney General* No 98462 WL 1181741 (Mass 1998)
- Lednar v Magistrates' Court* [2000] VSC 549 (22 December 2000)
- Marper* 1 WLR [2218]
- Maryland v King* 569 US ___ (2013)
- Rodriguez v United States*, 480 US 522 (1987)
- Roebuck v Mayor etc of Geelong West* (1876) 2 VLR (L) 189
- S & Marper v United Kingdom* [2008] ECHR 1581

Legislation

- Charter of Human Rights and Responsibilities Act 2006* (Vic)
- Crimes Act 1914* (Cth)
- Crimes Act 1958* (Vic)
- Privacy Act 1988* (Cth)

References

- Australian Bureau of Statistics 2007, *Australian social trends*, cat. no. 4102.0, ABS, Canberra.
- Australian Bureau of Statistics 2008, *Population characteristics, Aboriginal and Torres Strait Islander peoples*, cat. no. 4713.0, ABS, Canberra.
- Australian Bureau of Statistics 2013, *Aboriginal and Torres Strait Islander prisoners*, cat. no. 4517.0, ABS, Canberra.
- Bellamy-Royds, A & Norris, S 2010, *New frontiers in forensic DNA analysis: international practices and implications for Canada*, Canadian Library of Parliament.
- CrimTrac 2011, *Annual report 2010/11*, Attorney-Generals Department, Canberra.
- CrimTrac 2016, *Annual report 2015/15*, ACIC, Canberra.
- Freckleton SC, I & Selby, H 2009, *Expert evidence: law, practice, procedure & advocacy*, 4th edn, Thomson Reuters, Sydney.
- Gabel, J 2010, 'Probable cause from probable bonds: a genetic tattle tale based on familial DNA', *Hastings Women's Law Journal*, vol. 21, pp. 3–57.
- Greely, T, Riordan, D, Garrison, N & Mountain, J 2006, 'Family ties: the use of DNA offender databases to catch offenders' kin', *Journal of Law and Medical Ethics*, vol. 34, pp. 248–62.

Independent Committee 2010, *Further independent review of Part 1D of the Crimes Act 1914*, Parliament of Australia, Canberra.

Kirby, M 2010, 'Forensic evidence: instrument of truth or potential for miscarriage?', *Journal of Law, Information and Science*, vol. 20, no. 1, pp. 1–22.

McCarthy, M 2011, "'Am I my brothers keeper?'" Familial DNA searches in the 21st century', *Notre Dame Law Review*, vol. 86, no. 1, pp. 381–412.

Murphy, E 2009, 'Relative doubt: familial searches of DNA databases', *Michigan Law Review*, vol. 109, no. 3, pp. 291–348.

Nuffield Council on Bioethics 2007, *The forensic use of bioinformation: ethical issues*, Cambridge Publishers Ltd, Cambridge, UK.

'Police use DNA to track suspects through family' 2007, *All things considered*, radio program transcript, NPR, New York, viewed 17 April 2018, <http://www.npr.org/templates/story/story.php?storyId=17130501>.

Ross QC, D 2011, *Ross on crime*, 5th edn, Law Book Company of Australasia, Victoria.

Saks, M & Koehler, J 2005, 'The coming paradigm shift in forensic identification science', *Science*, vol. 309, no. 5736, pp. 892–5.

Smith, M 2010, 'Universal law and genetics: the future development of DNA evidence in the Australian criminal justice system', PhD thesis, Australian National University.

Suter, S 2010, 'All in the family: privacy and DNA searching', *Harvard Law Journal of Technology*, vol. 23, pp. 311–30.

Thomas, L 2006, 'Nothing to hide, something to fear?: the use of partial DNA matching in criminal investigation', *Journal of Law Information and Science*, vol. 17, pp. 72–93.

Urbas, G & Smith, M 2012, 'Regulating new forms of forensic DNA profiling under Australian legislation: familial matching and DNA phenotyping', *Australian Journal of Forensic Sciences*, vol. 44, no. 1, pp. 63–81.

Victorian Office of the Privacy Commissioner within the Independent Ford Committee 2010, *Further independent review of Part 1D of the Crimes Act 1914*, Attorney-Generals Department, Victoria.

Vincent, FHR 2010, *Report: inquiry into the circumstances that led to the conviction of Mr Farah Abdulkadir Jama*, Victorian Government Printer.