

# **Forensic use of bioinformation: ethical issues**

**CONSULTATION PAPER**

**NUFFIELD  
COUNCIL ON  
BIOETHICS**

***Deadline for responses: 30<sup>th</sup> January 2007***

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### **The terms of reference of the Council are:**

- 1 to identify and define ethical questions raised by recent advances in biological and medical research in order to respond to, and to anticipate, public concern;
- 2 to make arrangements for examining and reporting on such questions with a view to promoting public understanding and discussion; this may lead, where needed, to the formulation of new guidelines by the appropriate regulatory or other body;
- 3 in the light of the outcome of its work, to publish reports; and to make representations, as the Council may judge appropriate.

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# Forensic use of bioinformation: ethical issues

## Consultation paper

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## **Forensic use of bioinformation: ethical issues**

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**Terms of reference of the Working Group on:**

**Forensic use of bioinformation: ethical issues**

- 1 To identify and consider the ethical, social and legal issues raised by current and potential future uses of bioinformation for forensic purposes.
- 2 To consider, in particular:
  - a) the interpretation of the information;
  - b) the collection, storage and retention of profiles and samples;
  - c) the use of forensic databases for the identification of blood-related, deceased and missing persons;
  - d) issues of informed consent, privacy and confidentiality in the light of data protection and human rights legislation;
  - e) admissibility and use of bioinformation in criminal proceedings;
  - f) arguments for and against population-wide forensic databases;
  - g) sharing of bioinformation for forensic purposes across international boundaries;
  - h) use for forensic purposes of bioinformation collected for non-forensic purposes; and
  - i) access to and use of forensic databases for purposes of research;
  - j) governance of research conducted by or for forensic laboratories.
- 3 To identify the ethical and legal principles and procedures which should govern the forensic use of bioinformation, and to make recommendations.

## Part A

### 1. Introduction

The Nuffield Council on Bioethics has established a Working Group to examine and report upon ethical issues surrounding the use of forensic bioinformation, with particular reference to DNA, and the National DNA Database in the United Kingdom. The Group will consider the scientific principles that underlie the use of DNA in forensic science, and the ethical and legal ramifications of the increasing use of this form of bioinformation by legal authorities.

A variety of scientific approaches and different technologies are currently used in forensic science to investigate crime and to prosecute criminals. An important component of forensic science is the development and use of methods to collect, interpret and apply biological information (known as 'bioinformation') to identify individual people. In the last two decades, there has been significant innovation in this area.

Bioinformation may be derived from the analysis of a range of physical or biochemical characteristics of a person. It is most often used in efforts to uniquely identify individuals, or at least to differentiate individuals from each other. In particular it is used:

- To ascertain whether somebody is the person they claim to be;
- To ascertain whether a person may have been in a particular place or has been in contact with another person or object.

Bioinformation for determining whether a person is who they claim to be can involve the use of photographs, fingerprints and iris scans. The person in question is normally present when these forms of bioinformation are used. Bioinformation for inferring whether a person may have been in a particular place, or in contact with another person or object may include photographs, images on CCTV cameras, fingerprints and DNA 'profiles' (see Box 1). Such 'trace biometrics' or 'trace bioinformation' can be used when the person is not physically present, by comparing traces left behind with those stored on bioinformation databases such as the police fingerprint database, and the National DNA Database (NDNAD), which holds DNA profiles.

Trace bioinformation can also support inferences about what a person did when they were at the scene of a crime. However, used alone, it is not usually sufficient to secure a conviction in criminal proceedings where the identity of the criminal is in dispute. In the United Kingdom, current policy requires additional evidence to support identification before a court is invited to be sure that the suspect is the source of the bioinformation.



## **2. List of questions**

### **1. The interpretation of bioinformation**

- a. In your view, is the SGM Plus® system, which uses ten STR markers, sufficiently reliable for use in ascertaining the identity of suspects in criminal investigations and/or criminal trials?

### **2. Sampling powers**

- a. From whom should the police be able to take fingerprints and DNA samples? At what stages in criminal investigations and for what purposes? Should the police be able to request further information from DNA analysts, such as physical characteristics or ethnic inferences?
- b. Should police expenditure on bioinformation collection and analysis be given priority over other budgetary demands?
- c. Do you consider the current criteria for the collection of bioinformation to be proportionate to the aims of preventing, investigating, detecting and prosecuting criminal offences? In particular: is the retention of bioinformation from those who are not convicted of an offence proportionate to the needs of law enforcement?
- d. Is it acceptable for bioinformation to be taken from minors and for their DNA profiles to be put on the NDNAD?

### **3. The management of the NDNAD**

- a. Is it proportionate for bioinformation from i) suspects and ii) volunteers to be kept on forensic databases indefinitely? Should criminal justice and elimination samples also be kept indefinitely? How should the discretion of Chief Constables to remove profiles and samples from the NDNAD be exercised and overseen?
- b. Is the ethical oversight of the NDNAD adequate? What, if any, research on NDNAD profiles or samples should be permitted? Who should be involved in the oversight of such databases and granting permission to use forensic DNA profiles or samples for research?
- c. Who should have access to information on the NDNAD and IDENT1 databases and how should bioinformation be protected from unauthorised uses and users? Should forensic databases ever be made available for non-criminal investigations, such as parental searches, or the identification of missing or deceased persons?

- d. What issues are raised by the transfer of bioinformation between agencies and countries? How should such transfers be facilitated and what safeguards should be in place for the storage and use of transferred data?

#### **4. Ethical issues**

- a. Is the use of DNA profiles in 'familial searching' inquiries proportionate to the needs of criminal investigations? Do you consider the use of familial searching may be an unwarranted invasion of family privacy?
- b. Certain groups, such as ethnic minorities and young males, are disproportionately represented on forensic databases. Is this potential for bias within these databases acceptable?
- c. Is it acceptable that volunteers (such as victims, witnesses, mass screen volunteers) also have their profiles retained on the NDNAD? Should consent be irrevocable for individuals who agree initially to the retention of samples voluntarily given to the police? Are the provisions for obtaining consent appropriate? Should volunteers be able to withdraw their consent at a later stage?
- d. Would the collection of DNA from everyone at birth be more equitable than collecting samples from only those who come into contact with the criminal justice system? Would the establishment of such a population-wide forensic database be proportionate to the needs of law enforcement? What are the arguments for and against an extension of the database?

#### **5. The evidential value of bioinformation**

- a. What should be done to ensure that police, legal professionals, witnesses and jury members have sufficient understanding of any forensic bioinformation relevant to their participation in the criminal justice system?
- b. How much other evidence should be required before a defendant can be convicted in a case with a declared DNA match? Should a DNA match ever be taken to be sufficient to prove guilt in the absence of other evidence?

#### **6. Other issues**

- a. Are there any other issues, within our terms of reference, which we should consider?

## Part B

### 3. The science of forensic DNA testing in the UK

DNA stands for deoxyribonucleic acid. It is the chemical found in virtually every cell in our bodies which carries genetic information from one generation to the next. It determines our physical characteristics such as hair and eye colour.

The identification of individuals using a technique known as 'genetic fingerprinting' was first used in 1985 during a major police investigation (in the case of *Pitchfork*). The potential of the technique developed by Sir Alec Jeffreys<sup>1</sup> was soon realised, and legislation was introduced to facilitate its routine use. In the early 1990s the new genetic technique of DNA profiling superseded DNA fingerprinting.

#### Box 1: DNA profiling

A DNA profile is obtained by:

- a) Extracting the DNA from a sample,
- b) Measuring the amount of DNA obtained,
- c) Producing multiple copies of specific areas of DNA of interest (these correspond to the 'markers' referred to below),
- d) Separating the resulting pieces of DNA by size, and
- e) Analysing the pattern formed by the pieces of DNA.

The technique currently used for DNA profiling in the UK is SGM Plus<sup>®</sup> (SGM+). It tests for ten so-called markers, known as Short Tandem Repeats (STRs), and a gender marker. STRs are short sequences of DNA that are repeated several times, and the number of repeats varies between individuals. A DNA profile consists of 20 numbers and a gender indicator. The probability of a chance match between unrelated individuals using SGM Plus<sup>®</sup> is on average less than one in a billion (1,000,000,000). The discriminatory power of the analysis decreases for related individuals. SGM, a technique used prior to SGM+, analysed six of the same markers plus the gender marker and had a lower discriminatory power. Some profiles on the NDNAD are based on SGM (22 per cent of criminal justice samples and 19 per cent of crime scene samples). In the case of a match, SGM profiles are upgraded to SGM+. To date, there have been no chance matches between full SGM+ profiles.<sup>2</sup> Chance matches are, however, more likely to arise:

- a) with partial profiles;
- b) between related individuals;
- c) as the size of the NDNAD expands.

<sup>1</sup> Jeffreys, A. J. *et al.* (1985) Positive Identification of an Immigration Test Case Using Human DNA Fingerprints 317 *Nature* 818.

<sup>2</sup> PostNote, Feb. 2006 Number 258, Parliamentary Office of Science and Technology, p.1 & 3.

The technology of DNA profiling does not currently allow the examination of every single difference between individual samples of DNA. However, DNA profiling techniques enable the analysis of specific areas of nuclear DNA that are known to vary widely between people. DNA profiles can be derived from minute samples of, for example, saliva, blood or semen taken from individuals, or recovered from crime scenes.

The police take and retain three types of DNA sample for use in forensic testing:

- *criminal justice* or *CJ samples*, which can be taken from all those who are arrested, without their consent (typically these are in the form of a mouth swab);
- *elimination samples*, which are taken from volunteers to establish that they can be excluded from further investigation;
- samples found at a crime scene, known as *crime scene samples*.

#### **Question 1: The interpretation of bioinformation**

- a. In your view, is the SGM Plus® system, which uses ten STR markers, sufficiently reliable for use in ascertaining the identity of suspects in criminal investigations and/or criminal trials?

#### **4. Background and policy context**

Since the first forensic use of DNA, and the subsequent establishment of the NDNAD in 1995, the number of instances in which DNA has successfully assisted in detecting and prosecuting criminals have risen dramatically. These developments have taken place in tandem with other technological advances throughout the forensic sciences, including the analysis of fingerprints.

The UK has the largest forensic DNA database in the world.<sup>3</sup> It includes approximately 5.2 per cent of the UK population. Predictions suggest that under present laws, it could soon encompass up to 25 per cent of the male population and 7 per cent of the female population.<sup>4</sup> At the end of December 2005, the NDNAD held approximately 3.45 million criminal justice and elimination profiles, and 263,923 profiles from crime scene samples. On average, the DNA profiles of 40,000 citizens are added each month to the database.

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<sup>3</sup> Home Office, *DNA Expansion Programme 2000-2005: Reporting Achievement* (2005) Forensic Science and Pathology Unit, p.4.

<sup>4</sup> Williams R, Johnson P (2005) Inclusiveness, effectiveness and intrusiveness: issues in the developing uses of DNA profiling in support of criminal investigations *J Law Med Ethics* 33: 545-558.

The police retain over 6.42 million sets of fingerprints, stored on IDENT1,<sup>5</sup> including 19 per cent of the UK male population. There are currently also 1.2 million unidentified crime scene fingerprints in storage.<sup>6</sup> However, the advent of DNA technology has meant that the use of fingerprints in the detection and prosecution of serious crime, and their reliable interpretation has come under increasingly critical scrutiny by the scientific community. The process of digitising, storing, and searching for matches of fingerprints on databases means that there are similarities and overlaps with debates on the collection and retention of other bioinformation, such as DNA.

While some argue that in legal and ethical terms DNA sampling is not different from taking fingerprints, others claim that there are important distinctions between these two forms of bioinformation. For example, the analysis of DNA can reveal sensitive information about family relationships. Personal medical information may also be obtained by analysis of DNA samples. The police already analyse some DNA samples to give indications of 'racial' and 'ethnic' features of suspects (see Box 3). Information about race and ethnicity and other physiological information can be derived from minute quantities of human tissue shed involuntarily by everyone. DNA is also stable and therefore durable for long periods. For these reasons, the Working Group will pay particular attention to the uses of DNA within the criminal justice system.

There are differences of opinion on specific issues related to the NDNAD such as when DNA samples or profiles should be retained and to what uses sensitive genetic information should be put. The lack of data on public attitudes to issues such as these was highlighted by the House of Commons Select Committee on Science and Technology.<sup>7</sup> There have been recent calls for a full public debate on the collection and use of bioinformation by the police, particularly on the uses of the NDNAD, and the need for proper ethical scrutiny of its present and future uses.<sup>8</sup> The Home Office also emphasised the need for clearly defined ethical standards:

"In the application of science and technology, the Strategy Group recognises the fundamental importance of ensuring that science and

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<sup>5</sup> IDENT1 is an identification system on which the police store databases such as the fingerprint database, a palm print database, a shoemark database, with others to be added in time.

<sup>6</sup> See Police Information Technology Organisation Annual Report 2005-06 available at [www.pito.org.uk](http://www.pito.org.uk)

<sup>7</sup> Select Committee on Science and Technology (2005) Session 2004-05, 7th Report: *Forensic Science on Trial* (Norwich: The Stationary Office).

<sup>8</sup> See: The Scottish Executive, *Police Retention of Prints and Samples: Proposals for Legislation* June 22, 2005 available at:

<http://www.scotland.gov.uk/Publications/2005/06/17153022/30236> ; Select Committee on Science and Technology (2005) Session 2004-05, 7th Report: *Forensic Science on Trial* (Norwich: The Stationary Office); GeneWatch UK, *The Police National DNA Database*, 2005; Williams, R. & P. Johnson, & P.Martin, *Genetic Information & Crime Investigation*, (2004) Available at:

[www.dur.ac.uk/p.j.johnson/Williams\\_Johnson\\_Martin\\_NDNAD\\_report\\_2004.pdf](http://www.dur.ac.uk/p.j.johnson/Williams_Johnson_Martin_NDNAD_report_2004.pdf);  
Human Genetics Commission *Inside Information: Balancing Interests in the Use of Personal Genetic Data* (Human Genetics Commission, May 2002).

technology is used by the police only to enhance civil society. That is, in the sense of people's safe and secure enjoyment of their lives and property without intrusion that would breach their civil rights or scientific ethics".<sup>9</sup>

#### **4.1 Sampling powers**

The police of England and Wales have wide powers to obtain, and retain, fingerprints and DNA samples from citizens, in particular those who have come to their attention as suspects, victims, or witnesses in criminal investigations. New legislation was introduced to allow bioinformation to be taken, stored and searched against records held by, or on behalf of, the police. However, the NDNAD itself was established without the introduction of specific legislation. The relevant legislation is to be found in the following Acts of Parliament:

- Police and Criminal Evidence (PACE) Act 1984;
- Criminal Justice and Public Order Act 1994;
- Criminal Evidence Act 1997;
- Criminal Justice and Police Act (CJPA) 2001;
- Criminal Justice Act (CJA) 2003;
- Serious Organised Crime and Police Act 2005.<sup>10</sup>

These Acts now permit the taking of fingerprints and DNA samples from any individual arrested for a recordable offence<sup>11</sup> without consent, whether or not DNA or fingerprints are relevant to the crime being investigated. This bioinformation is retained indefinitely on IDENT1 and the NDNAD databases, irrespective of whether the person is charged or convicted of an offence.<sup>12</sup> These fingerprints and DNA profiles are then permanently available for comparison with others from individuals and crime scenes. Victims and witnesses can also have their fingerprints and DNA samples taken for elimination purposes.

Once a DNA sample is taken from the suspect and a profile obtained, it can be used as evidence in the immediate investigation, if it is relevant. It can also be used to search against DNA samples recovered from crime scenes that have yet to 'match' a subject profile on the NDNAD (see Box 2). If the DNA profile is matched on the NDNAD with that from a crime scene sample, a match report will be sent to the police. The information will then be passed to the Crown

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<sup>9</sup> Police Science and Technology Strategy 2003-2008, Home Office Science Policy Unit, p.14. Available at [www.policereform.gov.uk](http://www.policereform.gov.uk)

<sup>10</sup> This permitted the use of the NDNAD to assist in the identification of deceased persons or body parts, to assist coroners in suicides, accidents or mass disasters.

<sup>11</sup> A recordable offence is one that is entered on the Police National Computer. Nearly all offences are recordable, except minor traffic offences.

<sup>12</sup> In May 2006, the Scottish Parliament rejected a proposal to allow the police to store all DNA taken on arrest permanently and agreed that DNA could only be retained from people not charged or acquitted in specific circumstances. For those adults charged with but not convicted of violent or sexual offences, DNA may be retained for three years, after which the police must apply to a Sheriff if they want to keep the DNA sample and information for a further two years.

Prosecution Service who may instigate criminal proceedings. The DNA match report will subsequently be used in court as evidence for the prosecution case.

### **Box 2: Terminology**

**'DNA match'**: this can be a *'crime to subject'* match, i.e. a named suspect being provided to the police in respect of a recovered crime scene profile, or a *'crime to crime'* match, where two profiles from different crime scene samples match, suggesting the same perpetrator.

**'Detection'**: Home Office Counting Rules state that before a crime can be classed as detected there has to have been:

- a) a crime (i.e. a notifiable offence) that has been recorded;
- b) a suspect identified and made aware that the offence will be detected against them; and
- c) sufficient evidence to charge the suspect with the crime.

There are two types of 'detection': sanction and non-sanction. A 'sanction detection' is where a suspect has been charged and has received a caution, penalty or punishment. A 'non-sanction detection' means that the while there was sufficient evidence for charging a suspect, no further action has been taken in respect of that offence. There are a variety of reasons that may lead to no further action being taken in respect of a recorded crime.<sup>13</sup>

**'DNA detection'**: These are detected crimes in which a DNA match report was available. This may include cases where no-one was convicted of an offence in connection with a crime but a DNA match report was still available (a non-sanction detection).

Confidence in the use of DNA profiling to assist in the detection of crime has stimulated government commitment and financial investment, leading in turn to a significant increase in the use of DNA in the criminal justice process.<sup>14</sup> The evaluation of the DNA Expansion Programme demonstrates that the NDNAD provides the police with approximately 3,000 matches per month (over 40,000

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<sup>13</sup> For example, if: the offender dies before proceedings could be initiated or completed; the offender is taken ill and is unlikely to recover or is too mentally disturbed for proceedings to be taken; the complainant or an essential witness is dead and the proceedings cannot be pursued; the victim or an essential witness refuses, or is permanently unable, or if a juvenile is not permitted to give evidence; a crime has been committed by a child under the age of criminal responsibility; the Crown Prosecution Service by virtue of their powers under the Criminal Justice Act 2003 decide not to prosecute; the police decide that no useful purpose would be served by proceeding with the charge.

<sup>14</sup> The government and the police have invested over £300 million in the DNA Expansion Programme over the last five years. Home Office, *DNA Expansion Programme 2000-2005: Reporting Achievement* (2005) Forensic Science and Pathology Unit.

matches were declared in 2004/05) (see Box 2).<sup>15</sup> The chance of a new crime scene profile matching an individual's profile already held on the NDNAD is 48 per cent.<sup>16</sup> The detection rates for crimes where DNA evidence is available are significantly higher, at 40 per cent, than for those crime scenes where no DNA evidence is recovered, at 26 per cent.<sup>17</sup> Detection rates are improved further for different crime types, for example, in domestic burglary the detection rate rises from 16 per cent to 41 per cent when DNA is recovered from the scene.<sup>18</sup>

Bioinformation is not always useful in detecting crimes, and not all matches lead to a conviction, or even an arrest. Initial DNA match reports provided to the police are often accompanied with a series of caveats, with just 49 per cent of matches on the NDNAD leading to a crime being detected (see Box 2).<sup>19</sup> Moreover, in 42 per cent of cases where DNA evidence was available, the police already had the name of the suspect whose identity was suggested by the match report.<sup>20</sup> In 2004–05, the Home Office reported 19,873 'DNA detections' (see Box 2), with DNA evidence proving to be of use in 0.8 per cent of all crimes recorded, since in many recorded crimes, such as fraud, public order offences, etc., DNA will be of little relevance.<sup>21</sup>

There is wide variation between police forces in the proportion of crime scenes that are forensically examined, in the number of DNA samples that are sent for analysis, and in the number of DNA samples that are searched against the NDNAD.<sup>22</sup> Many crimes do not have an obvious crime scene, and forensic examination is either not possible or not required.<sup>23</sup> In addition, as the Home Office states, 'in many cases of minor interpersonal violence, DNA is relatively easily recovered but makes no material impact on the subsequent investigation as the identities of those involved are frequently not in question.'<sup>24</sup>

The law makes clear that bioinformation stored on forensic databases may only be used for purposes related to preventing, detecting, and prosecuting crime, or identifying a deceased person or a body part (for example as a result of death from natural causes or mass disasters), and precludes the use of this bioinformation for any medical or other research. The NDNAD is used, however, for forensic research purposes and within wider police intelligence systems. For

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<sup>15</sup> Home Office, *DNA Expansion Programme 2000-2005: Reporting Achievement* (2005) Forensic Science and Pathology Unit. p.5.

<sup>16</sup> NDNAD Annual Report 2004/05 p.35.

<sup>17</sup> Home Office, *DNA Expansion Programme 2000-2005: Reporting Achievement* (2005) Forensic Science and Pathology Unit. p.16.

<sup>18</sup> *Ibid.*, p.16.

<sup>19</sup> *Ibid.*, p.12.

<sup>20</sup> *Ibid.*, p.15.

<sup>21</sup> *Ibid.*, p.15.

<sup>22</sup> In 2004–05, crime scene examinations by trained crime scene examiners recovering forensic evidence were carried out in only 16.25 per cent of all recorded crimes. *Ibid.*

<sup>23</sup> DNA profiles are currently successfully added onto the NDNAD from 5 per cent of the crime scenes examined. NDNAD Annual Report 2003/04 p.16

<sup>24</sup> Home Office, *DNA Expansion Programme 2000-2005: Reporting Achievement* (2005) Forensic Science and Pathology Unit. p.16.



example, by searching for samples that the same perpetrator left at a range of different crime scenes, police may investigate a serial pattern of offending.

In March 2005, there were 12,095 samples from volunteers held on the NDNAD. The Home Office has published data to counteract claims that the retention of DNA from volunteers and suspects who are not subsequently charged or are acquitted is a disproportionate response to crime.<sup>25</sup> By late 2005, approximately 198,000 profiles that would previously have been removed under the Criminal Justice Act 2001, had been retained on the NDNAD. Of these, at 31 March 2005, 7,591 profiles had been matched with a crime scene sample.<sup>26</sup> Research suggests that whilst samples may be taken initially for minor offences, they can be linked subsequently to more serious crimes as a minority of offenders 'progress' in their criminal careers.<sup>27</sup>

The legality of the retention of DNA samples and profiles from individuals who are not subsequently charged or convicted of any criminal offence after their arrest has been reviewed by the House of Lords. The case of *R v Chief Constable of South Yorkshire (ex parte S and Marper)*<sup>28</sup> held that although the retention of DNA may breach Article 8 of the European Convention on Human Rights, the breach was proportionate and justified in the detection and investigation of crime. The House of Lords also ruled that there was no breach of Article 14. The case is soon to be considered by the European Court of Human Rights.

Recent public campaigns have highlighted the inclusion on the NDNAD and IDENT1 databases of children and of individuals who have been arrested but have not been charged with any offence. These campaigns have drawn particular attention to the increasing numbers of children who have their personal data retained on forensic databases. On 1st December 2005, there were 24,168 persons under 18 years of age on the NDNAD who had not been charged or cautioned for any offence.<sup>29</sup>

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<sup>25</sup> These are often referred to as 'innocent' individuals. While it may be that they had done nothing wrong prior to their arrest, there may be reasons for the police not taking any action against them even if they had been criminally liable for their actions or behaviour.

<sup>26</sup> Home Office, *DNA Expansion Programme 2000-2005: Reporting Achievement* (2005) Forensic Science and Pathology Unit. p.16.

<sup>27</sup> See: Leary R and Pease K 'DNA and the Active Criminal Population', (2003) *Crime Prevention and Community Safety: An International Journal*, 5(1), 7-12, available at: [http://www.jdi.ucl.ac.uk/downloads/publications/journal\\_articles/PeaseLeary.pdf](http://www.jdi.ucl.ac.uk/downloads/publications/journal_articles/PeaseLeary.pdf) and also Townsley, Smith & Pease, 'Using DNA to catch offenders quicker: Serious detections arising from Criminal Justice Samples.' (2005) available at: [http://www-staff.lboro.ac.uk/~ssgf/KP/2005\\_DNA\\_to\\_Catch\\_Offenders.pdf](http://www-staff.lboro.ac.uk/~ssgf/KP/2005_DNA_to_Catch_Offenders.pdf)

<sup>28</sup> The claimants in *Marper & S* appealed against the decision to retain their fingerprint and DNA samples after they were cleared of criminal charges. S had been arrested for attempted robbery, aged 11, and acquitted. Mr Marper (38 years of age and of good character) was arrested and charged with harassment of his partner but his partner did not press the charge.

<sup>29</sup> Hansard Written Answers 8 February 2006 : Column 1269W  
[www.publications.parliament.uk/pa/cm200506/cmhansrd/cm060208/text/60208w25.htm](http://www.publications.parliament.uk/pa/cm200506/cmhansrd/cm060208/text/60208w25.htm).

## **Question 2: Sampling powers**

- a. From whom should the police be able to take fingerprints and DNA samples? At what stages in criminal investigations and for what purposes? Should the police be able to request further information from DNA analysts, such as physical characteristics or ethnic inferences?
- b. Should police expenditure on bioinformation collection and analysis take priority over other budgetary demands?
- c. Do you consider the current criteria for the collection of bioinformation to be proportionate to the aims of preventing, investigating, detecting and prosecuting criminal offences? In particular: is the retention of bioinformation from those who are not convicted of an offence proportionate to the needs of law enforcement?
- d. Is it acceptable for bioinformation to be taken from minors and for their DNA profiles to be put on the NDNAD?

## **4.2 The management of the NDNAD**

The Forensic Science Service (FSS), which became a Government-owned company (GovCo) in December 2005, provides all operational services for the NDNAD. Following partial privatisation of the FSS, the role of the Custodian<sup>30</sup> has now been separated from the FSS to ensure that it stays in the public sector. The NDNAD Custodian Unit in the Home Office is responsible for overseeing delivery of NDNAD operations and the Standards of Performance for forensic science laboratories. The FSS and five private organisations are approved to provide DNA profiles from criminal justice and/or crime scene samples to the NDNAD. They are accredited and monitored by the United Kingdom Accreditation Service and the Custodian.

The NDNAD is governed by a Strategic Board comprising representatives of the Home Office, the Association of Chief Police Officers (ACPO), and the Association of Police Authorities (APA). Two members of the Human Genetics Commission (HGC) have a role in providing ethical oversight and a lay view in the decision making of the Strategic Board. There have been recent calls for an additional external lay member. The Home Office is currently establishing an Ethics Committee to advise the NDNAD Strategy Board on new proposed uses of the database and research proposals, and to review the decisions that it makes.

A National DNA Operations Group provides a link between the Home Office, ACPO, Scientific Support Managers within police forces, and the DNA suppliers.

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<sup>30</sup> The Custodian is entrusted with maintaining and safeguarding the integrity of the NDNAD.

The group provides a forum for debate concerning the operational use of DNA. The Home Office Police Standards Unit also has a remit to ensure that DNA is used to best effect across all police forces. The NDNAD Suppliers Group supplies the DNA Board and Custodian with important information relating to scientific standards and strategic developments.<sup>31</sup>

Each DNA sample is stored by the laboratory where the profile was prepared but is owned by the police. These samples are retained primarily to enable upgrading of profiles as new technology is developed. They can also be used in quality assurance procedures, and to settle disputes regarding processing of samples, and for use by experts working for a defence legal team.

Further to their direct use in criminal investigations, databases for forensic identification are used increasingly as intelligence tools. Scientists are finding new methods of using DNA profiles for investigative purposes, including 'familial searching'. The expanding use of the NDNAD for both investigative and research purposes means that the oversight and management of the facility is increasingly important.<sup>32</sup>

It is legally permissible to request the removal of DNA samples and fingerprints from police databases. This possibility has prompted ACPO to give uniform guidance to Chief Constables regarding the removal of such records. The guidance states that discretion to remove records should only be exercised in exceptional cases. The 'exceptional' cases may include those where the arrest was unlawful or where there was no offence prompting the arrest. The applicant has to demonstrate why their case is exceptional.<sup>33</sup>

Both IDENT1 and the NDNAD are governed by legislation on data protection. Such legislation, however, provides for exemptions, allowing the police to share the data with other agencies for the prevention, investigation, detection or prosecution of criminal offences. The most recent draft EC Council Framework Decision on the protection of personal data processed in the framework of police and judicial co-operation in criminal matters<sup>34</sup> aims to ensure that the rights of individuals whose personal data are processed in this context are protected, while at the same time the freedom and safety of the wider population are maintained. This EC Council Decision requires that personal data used by competent authorities must be:

- processed fairly and lawfully;
- collected for specified, explicit and legitimate purposes;

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<sup>31</sup> NDNAD Annual Report 2004/05.

<sup>32</sup> The NDNAD Custodian has authorised at least 19 research projects since 1995. House of Commons Science and Technology Committee (2005). *Forensic science on trial*. Seventh Report of Session 2005-05. HC 96-I.

<sup>33</sup> Exceptional Case Procedures for Removal DNA, Fingerprints and PNC Records, April 2006, available at: <http://www.acpo.police.uk/policies.asp>.

<sup>34</sup> Available at: [www.poptel.org.uk/statewatch/news/2006/oct/eu-dp-counc-draft-13246-rev1-06.pdf](http://www.poptel.org.uk/statewatch/news/2006/oct/eu-dp-counc-draft-13246-rev1-06.pdf).

- adequate, relevant and not excessive;
- accurate and, where necessary, kept up to date; and
- kept in a form that permits identification of data subjects for no longer than is necessary.

Moves to integrate forensic databases<sup>35</sup> have recently become a priority. However, any integration must still retain the integrity of the individual databases, and ensure that safeguards are in place to protect the data from misuse. The possible 'sharing' or cross-referencing of forensic databases, as well as the potential for forensic use of non-forensic databases, or the non-forensic use of forensic databases are a possible cause for concern. There are also fears that as databases containing sensitive personal data proliferate (including databases for medical research such as UK Biobank<sup>36</sup> and even databases for the fingerprints of school children), police access under some circumstances may be harder to resist in the future.

Demands are also being made for forensic bioinformation to be shared with international law enforcement agencies, and the importance of co-operation over DNA technologies and techniques is increasingly recognised by domestic and international law enforcement agencies.<sup>37</sup> The European Network of Forensic Science Institutes has agreed processes to facilitate exchange of sensitive forensic data according to internationally-agreed quality standards. Exchanges of data are currently made on a case-by-case basis.<sup>38</sup> However, not all countries have the same safeguards in place for the protection of the information.<sup>39</sup>

### **Question 3: The management of the NDNAD**

- a. Is it proportionate for bioinformation from i) suspects and ii) volunteers to be kept on forensic databases indefinitely? Should criminal justice and elimination samples also be kept indefinitely? How should the discretion of Chief Constables to remove profiles and samples from the NDNAD be exercised and overseen?

<sup>35</sup> Such as: the NDNAD; IDENT1; Police National Computer; DVLA database; and other 'forensic' databases containing information on individuals and their criminal records, etc.

<sup>36</sup> The UK Biobank is a project aimed at building a resource for medical researchers. The project will gather information on the health and lifestyle of 500,000 volunteers aged between 40 and 69. Following consent, each participant is asked to donate a blood and urine sample, have some standard measurements (such as blood pressure) taken and complete a confidential lifestyle questionnaire. The UK Biobank is voluntary. Only mature adults are allowed to participate and they have the right to withdraw at any time. Biobank has an Independent Ethics and Governance Council. See: [www.ukbiobank.ac.uk](http://www.ukbiobank.ac.uk).

<sup>37</sup> PostNote, February 2006 Number 258, Parliamentary Office of Science and Technology, p.3.

<sup>38</sup> Since 2004 there have been 519 requests from foreign countries from information from the NDNAD. Joan Ryan MP, 5 June 2006, Hansard, Column 278W.

<sup>39</sup> PostNote, February 2006 Number 258, Parliamentary Office of Science and Technology, p.4.

- b. Is the ethical oversight of the NDNAD adequate? What, if any, research on NDNAD profiles or samples should be permitted? Who should be involved in the oversight of such databases and granting permission to use forensic DNA profiles or samples for research?
- c. Who should have access to information on the NDNAD and IDENT1 databases and how should bioinformation be protected from unauthorised uses and users? Should forensic databases ever be made available for non-criminal investigations, such as parental/familial searches, and the identification of missing or deceased persons?
- d. What issues are raised by the transfer of bioinformation between different agencies and countries? How should such transfers be facilitated and what safeguards should be in place for the storage and use of transferred data?

### **4.3 Ethical issues**

There are ethical issues that could arise from the forensic use of bioinformation in relation to (but not limited to):

- the revelation of 'sensitive' personal or medical information from DNA;
- the presence of biases towards particular groups in databases, raising the possibility of discriminatory treatment;
- the nature of the consent obtained prior to inclusion on a database.

Familial searching of the NDNAD is used to identify possible relatives of a person who left a crime scene sample, when that person is not on the Database. Two types of familial searching on the NDNAD are mainly carried out:

- a parent/child search;
- a sibling search.

There were 78 familial searches in 2005.<sup>40</sup> Other scientific techniques can be used to increase the effectiveness of this approach by eliminating some of the possible relatives, thus minimising public intrusion.<sup>41</sup> However, concerns remain about the potential for invading family privacy, and in particular, the risk of revealing possible familial relationships that were previously unknown.<sup>42</sup>

Apart from gender, SGM+ profiles do not currently provide information of a physical or medical nature. However, much more extensive analysis of a crime

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<sup>40</sup> Joan Ryan MP 9 May 2006, Hansard; Column 209W.

<sup>41</sup> There may be cases where a 'close' match does not actually indicate a familial relationship, but just occurs by chance, so these searches often only reveal possible relatives.

<sup>42</sup> GeneWatch UK, *The Police National DNA Database, 2005*;  
[www.dur.ac.uk/p.j.johnson/Williams\\_Johnson\\_Martin\\_NDNAD\\_report\\_2004.pdf](http://www.dur.ac.uk/p.j.johnson/Williams_Johnson_Martin_NDNAD_report_2004.pdf)

scene DNA sample might reveal details that could narrow the pool of suspects. This approach is currently the subject of research (see Box 3).

There have been concerns raised that the sampling powers of the police have led to biases in the populations held on the NDNAD and IDENT1 databases. Some groups such as young males or ethnic minorities are disproportionately represented in forensic databases (a third of black males in England and Wales are on the NDNAD). Such over-representation of minority groups means that the impact of the retention of bioinformation on databases is not equally shared amongst all citizens.

There have also been suggestions that when a person's bioinformation is present on a forensic database, it inevitably increases the risk of suspicion being raised against him or her, thereby diminishing the presumption of innocence. When a 'match' is declared on the NDNAD, it may have a disproportionate impact on a police investigation, and the strength of the prosecution case in court. The potential for an 'innocent' match at a crime scene or the risk of error could be underestimated.

### **Box 3: Ethnic inferencing**

The ethnicity data currently on the NDNAD is based upon judgements made by police officers about the ethnic appearance of the individual from whom they are taking the DNA sample. There are seven broad ethnic appearance categories: Afro-Caribbean, Arab, Asian, Dark Skinned European, Oriental, White Skinned European and Other. This judgement may not accurately reflect the actual ethnic origin of those from whom samples were taken. This information is used primarily to help reduce a target population on the NDNAD whose profiles match that from a crime scene sample where a witness has reported that the offender has a specified ethnic appearance.

It is possible to provide an inference of an offender's origin from DNA analysis of material recovered from a crime scene. This is because the markers in the DNA profile have different frequencies of occurrence in different ethnic groups. However, it is only an inference and does not provide substantive evidence of ethnic origin. It is used infrequently, and only where it may assist the direction of a police investigation. It is not used as evidence if the suspected offender is found.<sup>43</sup>

Using anonymised data on ethnic appearance (as perceived by the police), forensic scientists have been conducting research in an effort to be able to develop an ethnic inference database for predicting the likelihood of an undetected offender having one ethnic appearance as opposed to another.<sup>44</sup> However, research on ethnic inferencing (sometimes also known as ancestry or

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<sup>43</sup> NDNAD Annual Report 2004/05 p.35.

<sup>44</sup> *Ibid.*, p.33.

lineage research) is controversial because the links between genetic differences and what is known as 'race' is complex. There are no biologically distinct races, and the relationship between skin colour and ancestry is complicated and partially determined by social factors.<sup>45</sup> In addition, there are concerns that uncertain predictions may skew police investigations while reinforcing prejudices about criminality and race.<sup>46</sup>

Once volunteers (who may be victims, witnesses or volunteers on mass intelligence screens) consent to their profiles being put onto the NDNAD, their decision is irrevocable. This approach is contrary to standard practice in medical research, and differs from practice in Scotland and many European countries, where consent can be withdrawn.<sup>47</sup> There is also a lack of clarity as to whether the consent obtained by the police from volunteers can be regarded as genuinely informed consent,<sup>48</sup> as it is often taken in fraught circumstances.

Further, those requested to submit DNA samples as part of a police screening face the prospect of raising a suspicion against them if they do not consent. This possibility would negate the voluntariness of consent in such circumstances. For samples to be taken from minors, a guardian must consent on their behalf, although this is only required when the police are requesting a voluntary sample. If the police are using their powers to collect samples from those suspected of involvement with a criminal offence, consent from minors or their guardian is not required.

In response to these concerns it has been suggested that it would be more equitable to collect DNA from everyone at birth rather than collecting samples only from those who come into contact with the criminal justice system. This approach would ensure that the use of bioinformation was equally applied to all citizens, regardless of race, ethnicity, age or gender. However, the construction of a population-wide database might raise issues of proportionality. It could be argued that such an extension of forensic databases would be disproportionate to the need to prevent and prosecute crime.

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<sup>45</sup> See Keita SOY, Kittles RA, Royal CDM *et al.* (2004) Conceptualizing human genetic variation. *Nature Genetics Supplement*, 36(11), S17-S20.; Shriver MD, Parra EJ, Dios S *et al.* (2003) Skin pigmentation, biogeographical ancestry and admixture mapping. *Human Genetics*, 112, 387-399; Parra EJ, Kittles RA, Shriver MD (2004) Implications of correlations between skin color and genetic ancestry for biomedical research. *Nature Genetics Supplement*, 36(11), S54-S60.

<sup>46</sup> Wallace, H. 'Permanently Detained' Genewatch Vol. 19 (6) November - December 2006, available at: <http://www.gene-watch.org/genewatch/articles/19-6Wallace.html>

<sup>47</sup> In Scotland, the volunteer may limit their consent for the use of their prints and samples to the investigation and prosecution of that specific offence only. Prints and samples taken in this way may be checked against DNA and fingerprints taken from any crime scene and may be retained by the police but only with the written consent of the person from whom they were taken. If the person does give consent for their samples to be retained, they have the right to withdraw that consent in writing at any time.

<sup>48</sup> Expressions such as 'informed consent' are often used but can be somewhat misleading. The Nuffield Council on Bioethics has previously reported on the difficulties in defining, and obtaining, truly 'informed consent' (see paragraphs 6.19–6.20 of: <http://www.nuffieldbioethics.org/go/ourwork/humantissue/publicationlist>

#### **Question 4: Ethical Issues**

- a. Is the use of profiles in 'familial searching' inquiries proportionate to the needs of criminal investigations? Do you consider the use of familial searching to be an unwarranted invasion of family privacy?
- b. Certain groups such as some ethnic minorities and young males are disproportionately represented on forensic databases. Is this potential for bias within the database acceptable in law enforcement?
- c. Is it acceptable that volunteers (such as victims, witnesses, mass screen volunteers) can also have their profiles retained on the NDNAD? Should consent be irrevocable for individuals who agree initially to the retention of samples voluntarily given to the police? Are the provisions for obtaining consent appropriate? Should volunteers be able to withdraw their consent at a later stage?
- d. Would the collection of DNA from everyone at birth be more equitable than collecting samples from only those who come into contact with the criminal justice system? Would the establishment of such a population-wide forensic database be proportionate to the needs of law enforcement? What are the arguments for and against an extension of the database?

#### ***4.4 The evidential value of bioinformation***

The potential for the administration of justice to proceed with a reduced risk of wrongful convictions may be enhanced by scientific techniques. However, this is only the case when the bioinformation used in a prosecution is robust, and is interpreted and represented accurately. Often it may have no evidential value, for example, in an assault where self-defence is raised, or in a burglary at a dwelling where the suspect may have previously been a guest or inhabitant.

Bioinformation can provide a powerful means of excluding innocent suspects from investigations, and has proved extremely valuable in exonerating the wrongly convicted, a power that has allowed many inmates facing capital punishment in the USA to be released. Yet recent successful criminal appeals have highlighted the continuing risks attending the use of complex statistical evidence in criminal courts. Serious doubts about the use of statistics in criminal proceedings remain.

Scientific evidence, and the accompanying statistical data, may not (yet) be properly understood by non-experts involved in criminal proceedings, such as members of a jury, or even judges. While scientists urge the use of statistical evaluations (such as Bayes Theorem) to properly assess the weight of different



pieces of evidence, this approach has been repeatedly rejected by the courts as being too complex for a jury to comprehend. Yet there is doubt over whether clear judicial guidance can ever be given to jury members to assist them in accurately weighing the value of different types of evidence.

There are risks that while a DNA match cannot be used in isolation in a prosecution (other corroborative evidence is required before a prosecution can be brought), it may be given undue weight in the courts. Scientists can be held in high esteem by those with only a lay understanding, and their evidence may not be treated with due critical attention. Bioinformation evidence must be treated with great assiduity, and supporting evidence must be presented. The strength of this supporting evidence remains an issue that the courts have yet to settle, having instead treated the issue on a case-by-case basis.

**Question 5: The evidential value of bioinformation**

- a. What should be done to ensure that police, legal professionals, witnesses and jury members have sufficient understanding of any forensic bioinformation relevant to their participation in the criminal justice system?
- b. How much other evidence should be required before a defendant can be convicted in a case with a declared DNA match? Should a DNA match ever be sufficient to prove guilt in the absence of other evidence?

**Question 6: Other issues**

- a. Are there any other issues, within our terms of reference, which we should consider?

### Further sources of information<sup>49</sup>

Association of Chief Police Officers (July 2003) *DNA Good Practice Manual*, available at: [www.forensic.gov.uk/forensic\\_t/inside/news/docs/DNA\\_Good.pdf](http://www.forensic.gov.uk/forensic_t/inside/news/docs/DNA_Good.pdf)

Forensic Science Service – see [www.forensic.gov.uk](http://www.forensic.gov.uk) for factfiles containing the latest information on DNA and the NDNAD.

Genewatch UK – see [www.genewatch.org/sub.shtml?als\[cid\]=539478](http://www.genewatch.org/sub.shtml?als[cid]=539478) for press releases and reports on the National DNA Database including: *The Police National DNA Database: Balancing Crime Detection, Human Rights and Privacy*, 2005.

Home Office (2005) *DNA Expansion Programme 2000-2005: Reporting Achievement (Forensic Science and Pathology Unit)*, available at: <http://police.homeoffice.gov.uk/news-and-publications/publication/operational-policing/DNAExpansion.pdf>

Home Office (2006) *The National DNA Database Annual Report 2004/05*, available at: [www.acpo.police.uk/asp/policies/Data/NDNAD\\_AR\\_04\\_05.pdf](http://www.acpo.police.uk/asp/policies/Data/NDNAD_AR_04_05.pdf)

Human Genetics Commission (2002) *Inside Information: Balancing interests in the use of personal genetic data*, available at: [www.hgc.gov.uk/client/document.asp?DocId=19](http://www.hgc.gov.uk/client/document.asp?DocId=19)

McCartney C (2006) *Forensic Identification and Criminal Justice: Forensic Science, Justice and Risk* (Cullompton: Willian Publishing)

Select Committee on Science and Technology, Session 2004-05, 7<sup>th</sup> Report: *Forensic Science on Trial*.

Taylor, N, 'Genes of Record – one size fits all?' *The New Law Journal*, 2006 (156) issue 7239, September 1354

Williams R, Johnson P and Martin P (2004) *Genetic Information & Crime Investigation*, available at: [www.dur.ac.uk/p.j.johnson/Williams\\_Johnson\\_Martin\\_NDNAD\\_report\\_2004.pdf](http://www.dur.ac.uk/p.j.johnson/Williams_Johnson_Martin_NDNAD_report_2004.pdf)

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<sup>49</sup> This is not a comprehensive list. Please note that the Nuffield Council on Bioethics does not endorse the content of these sites or publications.

## **Responding to the consultation**

If you are able to send us a response, it would be most helpful if you would send it to us electronically.

**Responses can be submitted on-line via our dedicated consultation website:**  
**<https://consultation.nuffieldbioethics.org>**

**Alternatively you can email your response with the respondent's form (Word document available at [www.nuffieldbioethics.org](http://www.nuffieldbioethics.org)) to:**

**[consultation@nuffieldbioethics.org](mailto:consultation@nuffieldbioethics.org)**

If we receive your response electronically, there is no need for you also to send a paper copy. You will receive an acknowledgement of your response. If you should prefer to respond by post or by fax, you may send your completed response and respondent's form (overleaf) to:

Dr Carole McCartney  
Nuffield Council on Bioethics  
28 Bedford Square  
London WC1B 3JS  
UK

Fax: +44 (0)20 7637 1712

Additional copies of this document can be downloaded from the Council's website: [www.nuffieldbioethics.org](http://www.nuffieldbioethics.org)

For printed copies, please contact the Council at the above address.

**Thank you**

**Closing date for responses: 30<sup>th</sup> January 2007**

## Forensic use of bioinformation: ethical issues

### Respondent's form

Please complete and return with your response by 30<sup>th</sup> January 2007

Details of respondent(s)

Name: \_\_\_\_\_

Address (optional)\* \_\_\_\_\_  
\_\_\_\_\_

Email: \_\_\_\_\_

Are you responding personally, on your own behalf, or on behalf of your organisation?      Personal / Organisation

The author's or organisation's name may be included in the list of those who have commented      Yes/No

This response may be quoted in the report      Yes / No /  
Yes, anonymously

This response may be made available on the Council's website when the report is published      Yes/ No /  
Yes, anonymously

If you have answered 'yes' to any of the above questions, please indicate your name and/or the title of your organisation as it should appear in print:

\_\_\_\_\_

Please let us know where you heard about the consultation:

- Website of the Nuffield Council on Bioethics
- Sent copy by Nuffield Council on Bioethics
- Email mailing list
- Other (please state):

\_\_\_\_\_

\* Please note that if we do not have your address, we will not be able to send you a copy of the report when it is published.

We should like to be able to contact you again both about this topic and future work by the Council that may be of interest to you. May we keep your contact details for this purpose? We will only use these details as specified above and will not pass them to third parties without your specific permission.

Yes, you may keep my contact details

- only until the Report is published, so that you can send me a copy
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- Please do not keep my contact details

**Closing date for responses: 30<sup>th</sup> January 2007**