

This response was submitted to the consultation held by the Nuffield Council on Bioethics on *The Forensic use of bioinformation: ethical issues* between November 2006 and January 2007. The views expressed are solely those of the respondent(s) and not those of the Council.

The British Academy of Forensic Sciences

1. 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?

In current circumstances SGM Plus, using ten markers plus a gender indicator, has shown itself to be sufficiently reliable. However, as the UK National DNA Database (NDNAD) expands, the likelihood will increase of a chance match with an innocent individual, even when a full profile is obtained. When SGM Plus is used, not only is the calculated match probability of one in one billion an average, but it is also based on the false premise that all individuals in the population are unrelated.

While much is made of the usefulness of DNA in excluding potential suspects, the widely perceived power of DNA to incriminate will mean that a chance match with an innocent person, more likely to occur in the future, could result not only in unacceptable consequences for that individual, but also in a delay in arresting the real perpetrator.

It is also the case that many of the profiles derived from crime scenes are not complete, and will therefore produce multiple matches, only useful for intelligence purposes. Partial profiles are normally the result of the DNA present being low either in quantity, or in quality, or both, so that the larger of the markers in the SGM Plus system are lost in the analysis.

While other very different test systems have been proposed, such as single nucleotide polymorphisms, these would not serve us well in the UK because of the large number of individuals already profiled using SGM Plus and stored in the NDNAD. If a better system were introduced, using different markers, it would be necessary to update the database, which would require a substantial investment in time and money. Ideally additional markers would be added: in the same way as SGM profiles (with six markers) can be updated to SGM Plus (with ten markers), in cases where greater differentiation were needed, so SGM Plus could be supplemented. Because of the need to address cross-border crime, any new markers should be agreed by international bodies.

The matter of adding new markers, however, is not straightforward, as the SGM Plus system only has room for the addition of those larger markers that are more vulnerable to loss within compromised crime samples. The manufacturer of SGM Plus, or of any other system that provides the same markers, would have to be persuaded to modify the system to incorporate new markers, and to ensure that this was done within the current size range, and within one test system. This would require a very large investment by any companies involved. It should also be remembered that there is an international market, heavily influenced by the requirements of the US, whose database requires a different set of markers from those used in SGM Plus.

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2a From whom should the police be able to take fingerprints and DNA samples?

The large size of the UK NDNAD, in comparison with all other countries, is a consequence of the policy of taking samples from any person arrested for a recordable offence. The usefulness of this approach in identifying the likely source of a sample left at a crime scene, which can currently be done in nearly 50% of cases, probably makes it more than acceptable to the general public. Arguably, it also guards against reoffending, and will reduce the likelihood of intrusive questioning of individuals who have committed crimes in the past, by eliminating them.

In many other countries the collection of DNA for databasing purposes is limited to individuals who have committed more serious crimes. Many such individuals however, often have a long history that includes minor crime. The ability to identify these individuals quickly, through the NDNAD, gives the UK a significant advantage.

It is not just arrested individuals, however, who have their DNA or fingerprints taken. Victims, witnesses, volunteers and any individuals involved in the collection or analysis of crime scene material will also have their profiles recorded on the database. Although the latter group understand the importance of being sure that profiles are not the result of contamination, it is not clear that the former groups necessarily understand all the ways in which their material might be used in the future. The law now allows indefinite retention of their material, but it is not always clear that they would have known this when they gave their consent. While mechanisms exist for the removal of an individual's profile, these are not widely known about.

Some will argue that the obvious answer is to profile everyone. This could appear more equitable, but is unlikely to be cost effective and will probably lead to problems. Because a large proportion of active criminals already have their profiles on the database, it is not likely that augmenting the database further will make a significant difference to crime detection levels. At the same time, adding innocent people will only increase the probability of a chance match. It is unlikely that the process will be welcomed by a population already distrustful of the heavy surveillance culture prevalent in the UK. A larger databasing activity will lead to a greater chance of error, with any resulting miscarriage of justice undermining confidence in the criminal justice system. There will be more false positive matches, particularly between related individuals and particularly where profiles are only partial.

In addition, while it might be relatively simple to collect material from law-abiding individuals, those entering the country illegally will not be so easily profiled, and may steal DNA in order to implicate others.

Individuals who have committed a recordable offence should continue to have their DNA profiles recorded on the DNA database. The profiles of others (witnesses, victims, volunteers and professionals) should also be collected and stored, though only for as long as they are needed. There should be a well-publicised and reliable process to allow an individual to request the removal of their profile once it is no longer needed. This is best activated by the individual concerned.

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At what stages in criminal investigations and for what purposes?

Sampling for the DNA database should take place as soon as there are reasonable grounds for suspicion. The purpose should be broadly defined in terms of aiding the identification of the perpetrator and forwarding the investigation.

Should the police be able to request further information from DNA analysts, such as physical characteristics or ethnic inferences?

The current SGM Plus system can only provide very limited information about ethnic background, and even then is susceptible to substantial error. While systems for this purpose are currently being developed internationally, they can still only provide broad information. Systems that can help define physical characteristics are similarly poorly developed. All would require additional and costly testing. While some systems are currently able to predict red hair, for example, there are probably not enough red hair criminals to make such a system useful. Despite the inaccuracies of the methodology, the police still desire such information for intelligence purposes. For example, the Spanish police were very interested to know whether any of the DNA left on mobile phones implicated in the Madrid bombings was likely to have originated from Caucasian, or non-Caucasian individuals. It could be argued that, currently, insufficient research has been done: any prediction will bring with it a high risk of error, and this in turn may lead police in the wrong direction.

b) Should police expenditure on bioinformation collection and analysis take priority over other budgetary demands?

Police budgets should not, on their own, determine whether any forensic procedures are adopted. It is difficult to generalize about the levels of expenditure required because different areas of the country will have different needs and priorities. For example, the collection of bioinformation is likely to be given higher priority in large conurbations.

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?

It is useful to collect bioinformation from persons who have been arrested for a recordable offence, even though some of them will not be convicted. It may be that some individuals are deterred from criminal activity by knowing that their profiles are on the database. Conversely, the continuing retention of information could, in some cases, undermine rehabilitation. Although the retention of the profile of someone who has not been convicted may cause public disquiet, it is also true that retention in these circumstances has led to crimes being solved at a later time.

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d) Is it acceptable for bioinformation to be taken from minors and for their DNA profiles to be put on the NDNAD?

As the database has become more effective, so some criminals have made use of vulnerable minors to obscure their own identity. Inclusion of profiles from competent minors (such as those in secondary education) might therefore be appropriate. Many crimes are committed by children of this age and inclusion of their profiles could prove an important deterrent. There is concern, however, that the number of profiles currently on the NDNAD from individuals under 18 is already substantial, and it might be more acceptable to the public if inclusion of minors on the database were limited to those convicted of a crime – and only entered on the database after conviction.

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?

Before the change in the law in 2001, problems were caused by the failure to remove from the NDNAD profiles relating to individuals who had either been acquitted or were never charged. Profiles that should have been removed, but had not, were sometimes matched with subsequent crimes. Given public perceptions of the power of DNA, it would not generally have been considered acceptable, in these circumstances, for a match to have been ignored, especially if it related to a serious crime. Post 2001, on the other hand, volunteers who give their DNA freely for the purpose of assisting an investigation are not automatically removed from the database, and may have to appeal to the Chief Constable. Profiles provided by volunteers for use in a particular case do not, however, need to be entered onto the database.

If we were to revert to pre 2001 arrangements, under which those who are acquitted or never charged are removed from the database, the process must be, and must be seen to be, efficient and accurate. A cross-discipline information portal would be needed, developed specifically for the purpose. This would require significant investment, as well as agreement across agencies and is unlikely to be cost-effective.

It is helpful that profiles are kept indefinitely as they may still be of use after decades. The retention of actual samples, rather than data, however gives rise to logistical problem, because of the large number of freezers needed, although more reliable ways of preserving material at room temperature are being developed.

Police officers have been criticized recently for deciding either to remove or retain profiles on the NDNAD. It would be preferable for an independent body, comparable with the Human Fertilisation and Embryology Authority (HFEA), to oversee this process.

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?

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There should be lay representation on the Human Genetics Commission (HGC).

While individuals who have not given specific consent, and others, may argue that the NDNAD should not be used for research, the NDNAD is a valuable source of samples which has made possible the continuing development of new markers. This in turn has allowed old profiles to be updated.

Research on samples is important: new testing technologies need to be evaluated against known data, such as found on the NDNAD. A databank the size of the NDNAD also provides useful opportunities for the development and assessment of statistical models of population data.

Data or samples used for research should, of course, only be made available on an anonymised basis, and requests for use of the data made through an independent ethics committee. Data from this source should not be made available for purposes other than research associated with law enforcement.

c) Who should have access to information on the NDNAD and IDENT1 databases and how should bioinformation be protected from unauthorized 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?

Everyone involved in the criminal justice system (both prosecution and defence) should be granted access to the NDNAD and IDENT1 through a documented enquiry to ACPO, which must meet certain criteria.

In principle all individuals whose profiles are on the database should be allowed access. In practice, however, this could be difficult to administer and the data would, in any case, be difficult for lay people to interpret.

Information held on these databases should not be used for other purposes. Confidentiality should be rigorously protected.

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?

Sharing information across borders is important in the fight against crime, particularly in Europe where there is substantial population movement. Databases are not necessarily compatible across different countries, but discussions are taking place within Europe in order to facilitate sharing, through Interpol. International agreement would also have to be reached about the representation of numbers and formatting of data. Information would need to be transmitted by direct electronic means because of the risk of transcription error.

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?

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Familial searching has already resulted in the high profile identification of individuals that are subsequently convicted of previously unsolved murders (R v Gafoor, for example). As the NDNAD grows it will become more common for individuals possibly related to the perpetrator to be matched with the crime scene profile. This kind of match may also produce information previously unknown to the individuals concerned. Because this information can have significant psychological implications, familial searching should not be undertaken lightly. The rate of non-paternity in established families is estimated to be around one in twenty, so previously unknown attributions will not be uncommon.

Familial searching can probably, therefore, be considered unethical. Whether or not it is considered acceptable will depend on the relative importance placed on the solving of a serious crime, on the one hand, and the effect on innocent family members, on the other. This is another matter for greater public education and debate.

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?

Ethnic minorities and young males are more heavily represented amongst the convicted, but there is, nevertheless, danger of bias if these groups are targeted disproportionately by police for questioning. This bias may lead to the unfair identification of members of these groups unless there are safeguards against chance matches (see section 1), This is a matter for the police to address.

Some will argue, including Professor Alec Jeffreys, that bias can be avoided by entering everyone on to a database at birth, but this has numerous disadvantages (see 4d)

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?

Different considerations apply where volunteers are concerned. Many volunteers probably do not understand the full implications of their data being held on the database. If in future decisions are made that affect the way their information can be used, will volunteers be informed? Did they know when they gave their consent that their profiles would be retained for ever?

There should be no need for volunteers' profiles to be entered on to any database; their profiles can be considered only in the context of a particular case. Consent should be requested from these individuals only in relation to that case. Although the profiles are likely to be retained in a case file held by the prosecution scientist, any request for disclosure should be independently reviewed and should not be granted unless relevant to the original case.

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 justices system? Would the establishment of such a population-wide forensic

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database be proportionate to the needs of law enforcement What are the arguments for and against an extension of the database?

Professor Jeffries has put forward the view that profiling everyone at birth would be equitable. If this could be done reliably then his view might be correct, but in reality there are a number of disadvantages:

- The scale of the operation would be disproportionate, since only a minority commit crimes
- It would increase anxieties about 'big brother', already evoked by widespread CCTV coverage and proposed biometric identity cards
- It might be seen to imply that we are all guilty until proven innocent
- There have, and will be, mistakes, chance matches and false matches with close relatives, made even more likely where profiles are incomplete
- Links will be established all the time between the scene and innocent individuals, leading to false inferences
- It would render every member of the population vulnerable to attack, by for example having their DNA planted at a crime scene
- In future it is possible that profiles could also reveal confidential information about the health of an individual
- It would be impossible to control for the large numbers of people who enter and leave the country, both legally and illegally.

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 bio-information relevant to their participation in the criminal justice system?

This can only be done by the proper training of professionals and guidance of juries by the judiciary. Short intensive courses may be helpful in some cases. In addition to being able to evaluate the strength of any evidence, it should always be remembered that the reliability of DNA evidence is dependent on scrupulously careful techniques by those collecting the material and by those analyzing it in the laboratory, in order to avoid cross contamination.

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 guilty in the absence of other evidence?

Ideally all DNA matches should be supported by other, non-genetic, evidence. Juries need to understand the limitations of DNA evidence, and that it needs to be interpreted in terms of probability, rather than fact. In making their decision, jurors need to put DNA evidence alongside non-genetic evidence, in order to make their decision about innocence or guilt. In assessing evidence, juries do not need statistical expertise, but clear information and common sense.

Rarely will there be a situation where DNA is the only evidence. In such cases scientists aim to provide a match probability so large that it would take very significant contradictory evidence to challenge it. Sometimes there will be powerful reasons to put a case before

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a jury even though the only evidence is DNA based. In such circumstances it is even more important that the judge should help the jury to understand the difference between the probability of a match and the conclusion that the person is guilty. This difference is one that many people find difficult to understand, and has led what is known as the prosecutor's fallacy: that is the answer to the first question 'What is the probability of a match?' being proposed for the second question 'Is the person guilty?'

The first question might be: 'What is the probability that your profile matches DNA found at the scene of the crime?' Possible answer: 'One in one billion'. This figure is often taken to indicate the probability of someone's guilt. But the answer to the second question 'Did you commit the crime?' might be 'No, I was in prison at the time'. The DNA evidence which at first appeared a very powerful indicator of guilt has been refuted by non-genetic evidence, which carries far more weight. If, on the other hand you were not in prison and someone matching your description had been observed close to the scene, then the power of the DNA evidence is reinforced. Either way, the ultimate value of the DNA evidence has been determined by non-genetic information.