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Prejudice, Stigma and DNA Databases

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Introduction

The collection, use and storage of DNA for forensic purposes have increased rapidly since 1995, when the world's first DNA database was set up in Britain. The use of DNA in criminal investigations can undoubtedly be highly beneficial, providing evidence that can help to convict the guilty and exonerate the innocent. Storing DNA evidence from crime scenes, and the computerised DNA profiles obtained from it, can also be extremely valuable if past crimes need to be reinvestigated. However, the retention of individuals' DNA profiles and other information on computer databases, combined in some countries with the storage of linked biological samples, raises many privacy and individual rights issues. These include how the information might be misused by governments or others, and the prospect that false DNA matches may lead to intrusive investigations of innocent people by law enforcement agencies.

This paper discusses the evidence and reasons that innocent people whose DNA profiles are contained in DNA databases may be vulnerable to stigmatization or prejudicial treatment. It draws on experiences from the development and operation of the National DNA Database in Britain, which contains the largest proportion of the population of any DNA database in the world.

What is special about DNA?

DNA and fingerprints differ from other means of surveillance, such as photographs and iris scans, because they do not require equipment to be installed in particular places (such as a border control) in order to trace or record where an individual has been. Both DNA and fingerprints may be left wherever a person goes. The retention of DNA profiles and fingerprints from an individual on a database therefore allows a form of biological tagging or 'biosurveillance', which can be used to establish whether they have been present at a particular location.[1] This purpose goes beyond mere 'identification', to mapping an individual's movements, including (but not limited to) using biological evidence to establish their likely presence at a crime scene.

Unlike fingerprints, DNA can also be used to investigate biological relationships between individuals (including paternity and non-paternity), and thus trace other individuals who may be related to a person whose DNA profile has been obtained from a crime scene or elsewhere. Biological relationships can be statistically inferred from computerised DNA profiles by searching for partial matches between profiles (an indication of relatedness), a process known as 'familial searching'.

The computerized DNA profiles held in DNA databases are a string of numbers based on specific areas of each individual's DNA, known as short tandem repeats (STRs). However, some countries also retain the biological samples collected from individuals, linked to their record on the computer database by a reference number. A person's DNA sample contains additional private information about their health and other physical characteristics. Some of this information (such as carrier status for a

genetic disorder) may be highly sensitive and/or unknown to the individual. Health information can currently only be gleaned from biological samples by undertaking additional genetic analysis of stored samples, not from the DNA profiles themselves.

Although DNA has some special characteristics, the extent to which retained DNA profiles may lead to stigmatization or prejudicial treatment also depends on the extent to which other information (including names, addresses, ethnic appearance and suspected crime) is retained alongside the DNA profile, or in linked computer databases, and how this information may be accessed and used.

The National DNA Database in Britain

The National DNA Database (NDNAD) in Britain was the first to be established and contains a much larger proportion of the population than any other country in the world. An estimated 576,250 individuals had records added to the Database in 2006/07: one person every minute.[2] About 4.2 million people – nearly 7% of the population - had their DNA profiles retained on the Database by the end of October 2007.[3] Approximately 1 million of these individuals have never been convicted or cautioned for any crime. Many countries are considering establishing or expanding their databases in line with the changes made in Britain, and examination of the NDNAD therefore provides an opportunity to consider the potential for stigmatization or prejudicial treatment of individuals with records on the Database.

Legal framework

There is no specific piece of legislation governing the operation of the National DNA Database. Instead a series of laws have established the circumstances under which the police may take and retain DNA samples and data[4]. The Database was set up in 1995 but in recent years it has expanded rapidly due to two changes in the law.

In 2001, legislation was introduced as part of the Criminal Justice and Police Act of 2001 to allow DNA profiles to be kept on the Database even when a person was acquitted of a crime. This change in legislation applied in England, Wales and Northern Ireland. It has not yet been fully implemented in Northern Ireland, although an agreement has now been adopted allowing export of individuals' DNA profiles from Northern Ireland to the NDNAD[5]. An estimated 50,000 profiles from acquitted persons may have been kept illegally on the Database before the law was changed[6]; the 2001 Act appears to have been intended to bring the law in line with this unlawful practice. There was no separate vote or debate on the part of the bill relating to the retention of DNA from innocent people and the UK Government was criticised by Members of Parliament (MPs) for introducing the 2001 legislation without allowing sufficient time for debate.[7]

In April 2003, the law was changed again to allow DNA to be taken as soon as a person is arrested, rather than waiting for them to be charged with an offence: this legislation came into affect in England and Wales in April 2004. The section of the Criminal Justice Act 2003 which allows DNA to be taken on arrest, rather than on charge, was introduced via a late amendment submitted by the Secretary of State during the first week of the Iraq war. This section of the bill required a separate vote in the House of Commons. No Northern Ireland MP from any party voted in favor of it; however the provisions were later applied to Northern Ireland via the Criminal Justice (Northern Ireland) Order 2004, using special powers granted to the Secretary of State whilst the Northern Ireland Assembly was suspended.[8]

In England, Wales and Northern Ireland the police now take DNA samples routinely without consent from anyone aged 10 or over (the age of criminal responsibility) who is arrested in connection with any recordable offence and taken to a police station. The police may use "*reasonable force*" (which usually involves pulling out a few hairs from a person's head) if the arrested person refuses to allow a mouth swab to be taken. Recordable offences include begging, being drunk and disorderly, taking part in an illegal demonstration, and minor acts of criminal damage caused by children kicking footballs or throwing snowballs. In Scotland DNA is taken on arrest for "imprisonable" offences. This is a narrower category of offences than in the rest of the UK, but still includes minor offences such as "Breach of the Peace".

Uses of the NDNAD may include any purpose "*related to the prevention or detection of crime*". Uses now include: familial searching (using partial DNA matches to try to identify the relatives of a suspect); searching by name; and undertaking various types of genetic research (including controversial attempts to predict ethnic appearance from DNA). [9]

Indefinite retention of DNA profiles from unconvicted persons

The law in England, Wales and Northern Ireland allows the police to retain all DNA profiles permanently, whether or not a person is charged or convicted. This is out of step with practice in other European countries and with the principles adopted by bodies such as the Council of Europe[10], which require time limits on the retention of DNA profiles for all but the most serious offenders.

The indefinite retention of DNA profiles from innocent persons on the NDNAD is controversial and has been criticised by the influential Nuffield Council on Bioethics.[11] This practice has also been subject to a recent challenge in the European Court of Human Rights, from which a judgment is awaited.[12]

The Scottish Parliament voted against indefinite retention of DNA profiles and samples from persons acquitted or not proceeded against, in May 2006.[13,14] Instead, police powers were expanded to allow temporary retention (for up to 5 years, with judicial oversight) from a much smaller number of people who had been charged but acquitted of a serious violent or sexual offence.[15] The Scottish Government is currently conducting a review of this decision in order to assess whether the temporary retention of data from this more limited category of unconvicted persons is appropriate.[16] In conducting its review, the Scottish Government has expressly ruled out the indefinite retention of fingerprint and DNA data acquired from individuals who are not convicted of any crime.

Retention of additional information and biological samples

In England and Wales, records on the NDNAD include a person's name and ethnic appearance, as well as their DNA profile. Ethnic appearance is categorized according to a Government coding system, based on appearance to a police officer, rather than an individual's own description of their ethnicity. The categories are: Afro-Caribbean; Arab; Asian; Dark-Skinned European; Oriental; and White-Skinned European.

Operation of the National DNA Database has recently transferred from the Forensic Science Service (FSS) to a new Government agency: the National Policing Improvement Agency (NPIA). A new forensic regulator and ethics board have also been established, however neither has any statutory powers. The FSS was made into a government-owned company in 2005, and further privatization is under

consideration. The FSS now competes with other commercial companies to analyze and store DNA samples for the police.

Part of each sample collected by the police is kept permanently by whichever company has analyzed it, for an annual fee. The sample is linked to the individual's record on the DNA Database using a unique barcode reference number.

People who have been arrested also have an arrest summons number (ASN) included in their record on the NDNAD, which provides a link to other information on the Police National Computer (PNC). When the NDNAD was established in 1995, records were supposed to be removed at the same time as an individual's criminal record.[17] However, the change in legislation allowing DNA records to be retained has subsequently been used to justify a change in policy which means that all PNC records are now kept permanently.[18] The retention of permanent records of arrest is unprecedented in British history. Retention of the PNC records enables the police (who do not have direct access to the NDNAD) to establish whether or not a DNA sample has already been taken from an arrested person. However, PNC records may also be accessed by a much wider range of individuals and agencies than the DNA Database, and used for other purposes, such as pre-employment checks.

The Home Office is in the process of establishing a Police National Database (PND), which will provide a single access point for searching across all of the information currently held on the PNC.

Who is on the National DNA Database and why?

Before considering how being on the database may lead to stigmatization or prejudicial treatment, it is important to consider who has their DNA profile recorded on the Database and why.

Unconvicted persons

The number of individuals with their data held is not known exactly, because a number of records appear to be replicates of the same DNA profile, associated with different names. The latest estimates of the breakdown of individuals on the Database are given in Table 1, based on figures given in response to a Parliamentary Question (PQ).[19]

Table 1: Estimated numbers of individuals on the NDNAD at end June 2006.

	Original PQ*	Recalculated**
Unconvicted persons with a PNC record	605,069	605,069
Persons who have received non-custodial sentences or cautions, recorded on the PNC	1,681, 284	1,681, 284
Persons who have had a custodial sentence, recorded on the PNC	636,271	636,271
Estimated total no. individuals on NDNAD with a PNC record	*2,922,624*	*2,922,624*
*Estimated total no. of individuals on NDNAD with no PNC record (includes 18,056 volunteers).***	*534,376**	*429,501***
Estimated number of individuals with profiles on the NDNAD	**3,457,000***	**3,352,125****
Estimated number of replicate profiles	427,270*	532,145**

Total number of individuals' DNA profiles on the NDNAD	**3,884,270**	**3,884,270**

* Assuming the 11% replication rate then in use.
**Assuming the 13.7% replication rate now in use.

The figures show that approximately one million people have their DNA profiles retained on the NDNAD although they have no record of conviction on the PNC. Unconvicted persons arrested in 2006 or later will have a PNC record, but those arrested before this date may not. Most of these million people will have been acquitted or not charged, although some will be awaiting trial. The majority will have had their DNA taken on arrest (or, before 2004, on charge) without their consent - only the 18,000 volunteers are required to give consent. A further 1.68 million people with DNA profiles retained on the Database have received non-custodial sentences or cautions. Cautions are issued at the police station for minor offences, and do not require a person to be charged or convicted by a court.

Most individuals do not have their DNA profile entered on the DNA Database in order to investigate a specific crime, since DNA evidence is relevant to less than 0.5% of crimes. Because DNA is taken routinely on arrest for any recordable offence, the purpose is usually to include the individual's DNA profile on the Database in order to perform a 'speculative search' and look for matches with DNA profiles from all past unsolved crimes. Whatever the outcome of the speculative search, and regardless of whether a person is charged, cautioned or convicted, DNA profiles are then retained and subjected to all future speculative searches of the Database. Current policy is to retain all profiles until the individual reaches age 100. A match between the individual's DNA profile and a DNA profile, obtained from the scene of a future crime, may then lead to the individual being identified as a possible suspect for that crime. Match reports, which identify one or more suspects for a crime, are sent to the police force which submitted the original crime scene DNA sample.

The 'added value' of putting individuals on a database is only to introduce new suspects into an investigation, not to exonerate innocent individuals who are already suspects for a crime (from whom DNA can always be taken in relation to that crime, without entering their details on a database).

Contrary to popular perception, the figures on DNA matches are dominated by volume crimes, such as burglaries and theft, not by more serious crimes such as rape and murder, for which the Database is much less effective. The proportion of DNA detections is much higher for these volume crimes and the value of using the Database is greater. The main reasons for this are: (i) detection rates have historically been low for crimes such as burglary; (ii) the identity of the suspect is often unknown, so a 'cold hit' from the database can provide an important lead for an investigation.[20] The Database (as opposed to the use of DNA evidence in court) is much less effective for violent crimes because:

- Most murderers, rapists and perpetrators of violent crimes such as assault are known to their victims. This means that although DNA evidence can sometimes be an important part of the evidence in court, the Database is not usually necessary to identify a list of suspects.
- The most useful DNA in murder investigations is often the victim's DNA, not the perpetrator's – for example, scientists might examine blood stains on someone's clothing to see if they came from the victim. Whether the suspect's DNA is on the Database, or not, is not relevant to this comparison.
- In some types of cases – such as rape – there is often no disagreement about identity (i.e. the man involved) but a disagreement about whether a crime has taken place (whether the woman has given her consent). DNA can help solve

disputes about identity, but not about consent. Although Britain has by far the largest DNA database in Europe, it has the lowest conviction rate for rape.

Racial bias

Approximately 27% of the entire black population, 42% of the male black population, 77% of young black men, and 9% of all Asians have records on the National DNA Database, compared with just 6% of the white population.[21] These figures are approximate because they are calculated by comparing the proportion of the population recorded as 'Afro-Caribbean' on the Database (based on appearance to a police officer) with the proportion identifying themselves as belonging to the relevant ethnic group in the national census.[22] According to the Liberal Democrat MP Sarah Teather, an estimated 55% of those from black and minority ethnic communities who have their details on the database have never been charged or convicted of any offense.

The figures undoubtedly reflect both social exclusion and discrimination in the criminal justice system. A 2007 parliamentary report concluded that statistics show that young black people are over-represented at all stages of the criminal justice system.[23] Black people constitute 2.7% of the population aged 10–17, but represent 8.5% of those of that age group arrested in England and Wales. As a group, they are more likely to be stopped and searched by the police, less likely to be given unconditional bail and more likely to be remanded in custody than white young offenders. Young black people are over-represented as suspects for certain crimes such as robbery, drugs offences and - in some areas - firearms offences. Young black people and those of 'mixed' ethnicity are also likely to receive more punitive sentences than young white people and more likely to be victims of violent crimes.

The report concluded that social exclusion, educational underachievement and school exclusion interact to form a web of disadvantage, bringing young black people disproportionately into contact with crime and the criminal justice system as both victims and offenders. The report also argues that the relationship between black communities and the police in Britain leads to greater involvement in the criminal justice system - in some instances due to discrimination, and in other cases because suspicion or mistrust of criminal justice agencies leads young people to take the law into their own hands to protect themselves or exact redress.

A 2003 Home Office crime study found that for every age group, there was either no statistical difference among white, mixed race and black groups or, more commonly, that white people were more likely to have offended than either mixed race or black people.[24] The report was based on self-reporting of offending from 12,000 individuals up to the age of 65. Over 42% of white people reported that they had committed an offense in their lifetime, against 28% of black people, and 21% of white people reported committing a serious offence in their lifetime, against 14% of black people.

Children and young people

More than one million of the four million profiles on the National DNA Database were taken from children and young people who were aged under 18 at the time of their arrest.[25] DNA may also be taken from children under ten if their parents give consent.

In England and Wales, the Crime and Disorder Act 1998 removed the presumption that a child aged 10-14 was 'doli incapax', which had required the prosecution to prove that the child knew the act to be seriously wrong, rather than merely naughty. This is one of the lowest ages of criminal responsibility in Western Europe. For the

purposes of taking DNA, children who are aged ten or above are therefore treated in the same way as adults. Freedom of Information requests by Action on Rights for Children (ARCH) have recently confirmed that police forces in England and Wales have no special policies regarding the collection or retention of DNA from children.

Along with the reduction in the age of criminal responsibility, police targets for arrests and convictions, introduced by the New Labour Government, have led to significant increases in the numbers of arrests of children and young people.

The police themselves have raised many concerns about this 'target culture'. The Police Federation has described some arrests, such as that of a child for throwing a slice of cucumber, as "*ludicrous*".[26] Chief Inspector Sir Ronnie Flanagan, who recently published a review of policing, raised concerns with the Home Affairs Committee of MPs, that children were being arrested for fighting in school playgrounds.[27] A child who has done nothing wrong can also be arrested in these situations, because one of the children will often make a counter-accusation, which may or may not be true. Both children will then have their DNA taken and entered on the Database. Police Constable Stuart Davidson told the BBC: "*We get exactly the same points for cautioning a girl for pulling another girl's hair as we would for domestic burglary. In terms of statistics they're exactly the same*".[28] Police Commander Brian Paddick, then standing as a Mayor of London candidate for the Liberal Democrat party, also expressed concerns about the points system to the Home Affairs Committee: "*Clearly that is a nonsense, and clearly it is distorting what the police are concentrating on*".[29]

The former chair of the Youth Justice Board, Professor Rod Morgan, summarized the situation:
"To meet crime targets, the police are picking low-hanging fruit - the lowest of which comprises juvenile group behavior in schools, residential homes and public spaces, offences that could be dealt with informally, more effectively, speedily and cheaply, and in former times were. There has been a 26% increase in the number of children and young persons criminalized in the past three years. This at a time when the British Crime Survey and police statistics indicate that most crimes, including those committed by juveniles, have been falling." [30]

According to Action on Rights for Children, Government figures show that the arrests of 10-17-year-olds are rising disproportionately: between 2002 and 2006 they rose by 16.4% to 348,500, while adult arrests rose by 6.6% during the same period.[31] As the number of arrests has risen, so, too, have arrests that do not lead to any disposal. In 2003/04, 25,317 arrests of children and young people received no further action. By 2005/06 this had risen by 84% to 46,640. [32]

Exact figures are not available for the number of under-18 year olds with records on the National DNA Database who have not been convicted of any offence, but GeneWatch UK and Action on Rights for Children have estimated that about 100,000 children and young people fall into this category.[33] This figure does not include children given reprimands and final warnings by the police.

Reprimands and final warnings account for around 44% of disposals, and some parents may underestimate the seriousness of these sanctions and fail to ensure that their children get legal advice at the police station; they may even exert pressure on children to make admissions in order to 'get it over with'. A reprimand or final warning is not a finding of guilt in law, and they can be administered without the consent of the child or their parent.

Implications for individuals with DNA profiles on the Database

The NDNAD is a useful tool in criminal investigations, but the permanent retention of DNA from everyone who has been arrested for a recordable offense raises important concerns about privacy and rights, including:

- the potential threat to 'genetic privacy' if information is revealed about health or family relationships, not just identity;
- the creation of a permanent 'list of suspects' that could be misused by governments or others;
- the potential for unauthorised access, abuses and/or misuses and mistakes;
- the exacerbation of discrimination in the criminal justice system.

These vulnerabilities give rise to a number of places where prejudicial treatment can occur towards individuals who have had their DNA included in the database. Prejudicial treatment and stigma can arise due to:

- false matches with crime scene DNA;
- the potential for harassment or stigmatization of innocent people or minor offenders;
- the possible use of the database for the tracking or surveillance of individuals or their relatives;
- the risk that people with records on the database will be refused visas or a job as the result of a record of arrest; and
- the loss of an individual's right to refuse to take part in controversial genetic research.

Each of these is discussed in more detail below.

False matches

The use of DNA in criminal investigations can undoubtedly be highly beneficial, providing evidence that can help to convict the guilty and exonerate the innocent. However, DNA evidence is not foolproof and individuals who have their DNA profiles retained on a Database may face being wrongly implicated in a crime due to a false match between their profile and a DNA profile collected from a crime scene, or perhaps because they were present at the crime scene earlier in the day, but were not the perpetrator.

Many DNA matches are not with the perpetrator of a crime. For example, at the scene of a burglary or murder, DNA may have been deposited by many people, or transferred there from elsewhere (on a cigarette butt, for example). Matches also include false matches, often because DNA profiles obtained from crime scenes are not complete. For example, the National DNA Database Annual Report 2005/06[34] states that between May 2001 and April 2006, 50,434 matches with crime scene profiles, or 27.6% of the total number of match reports, involved a list of potential suspects, not a single suspect, being given to the police, because matches with multiple records on the NDNAD were made. The report states that this is "*largely due to the significant proportion of crime scene profiles that are partial*". However, no detailed breakdown of these figures is available and other factors, such as the large number of related of individuals who now have profiles on the Database, may also be important.

Table 2 shows the number of false matches expected to occur purely by chance between crime scene DNA profiles and the DNA profiles of individuals, calculated by the Forensic Science Service and assuming full profiles are available using Britain's SGM Plus profiling system. This uses ten regions of an individual's DNA (for comparison, the US CODIS system uses 13 regions, and the old British SGM system

uses six). In practice, many more false matches will occur because many crime scene DNA profiles are not complete – although the information that a partial crime scene profile is involved is included in the match report sent to the police.

Table 2: Predicted adventitious DNA matches using full profiles on the NDNAD[35]

Year	2004	2005	2006	2007	2008	2009
No. on database (millions)	2.77	3.27	3.77	4.27	4.77	5.27
No. of case stains (thousands)	584	634	684	734	784	834
Expected mean no. of adventitious matches	2	2	3	4	4	5

No details are available on the outcomes of individual match reports as sent to the police. Roughly speaking, for the NDNAD, eight DNA matches lead to four detections, two of which lead to convictions, one of which will involve a custodial sentence.[36] However, only about half of these are 'new' detections, which require the Database – in the other cases the suspect will already have been identified prior to collection of their DNA. These figures are dominated by volume crimes, such as burglaries and theft.

The figures suggest that the majority of individuals who have their name passed to the police in a DNA match report do not subsequently get convicted for an offence. In some cases these individuals may be quickly eliminated from an investigation, without any impact on their lives. But in other cases, even assuming there are no miscarriages of justice, an intrusive investigation may result and the individual may be required to provide alibis or other evidence to demonstrate that they did not commit the alleged offence.

Familial searching is sometimes used when a DNA profile from a crime scene does not match an individual's profile on the Database. Since it is possible that a relative of the suspect is on the Database, looking for a partial match between profiles might identify a parent, child, brother or sister of the suspect, who can then be interviewed by the police. Familial searching usually produces a long list of names of people to be interviewed and raises ethical concerns because it is possible that it could reveal cases of paternity or non-paternity that the people interviewed did not know about, and also reveal to relatives who is on the Database. The use of 'familial searching' means that anyone who is genetically related to an individual on the Database may also become implicated as a suspect.[37]

New techniques may also increase the risk of false identification and of miscarriages of justice. The increasing use of Low Copy Number (LCN) DNA analysis – which allows a DNA profile to be extracted from a single cell – has led the Director of the Forensic Institute in Edinburgh to warn that innocent people may be wrongly identified as suspects as a consequence of being on the NDNAD[38] and a senior judge to criticise specialist evidence on this technique as contradictory, both during the Northern Ireland Omagh bombing trial and in his detailed judgment in the case.[39,40] Amongst a string of problems and concerns about contamination, one report claimed that the LCN technique had identified a 14-year old English schoolboy as one suspect for planting the bomb.[41]

LCN analysis and other new techniques such as 'DNABoost',[42] increase the sensitivity of DNA analysis (allowing very small samples or mixed samples to be analysed, respectively) but also increase the chance of a false match between a scene of crime DNA sample and an individual's DNA profile. Issues include not only

how well the laboratory technique and statistical analysis is validated, but also whether very small DNA samples could be transferred to a crime scene via another person, without the individual ever having been there.[43]

The larger DNA databases become, and the greater the number of comparisons with crime scene DNA profiles, the more false matches are likely to arise. In 2007, the European Union adopted an agreement on the stepping up of cross-border cooperation, particularly in combating terrorism and cross-border crime, based on the Prüm Treaty, which was originally negotiated between a minority of EU countries, led by Germany.[44] A draft agreement on implementation discusses the exchange of DNA-data in detail.[45] Although not yet finalized, the draft agreement suggests that matches at only 6 regions of a person's DNA will be regarded as sufficient for data to be shared. If so, this will considerably increase the likelihood of false matches between crime scene DNA samples collected elsewhere in the European Union and the DNA profiles of individuals with records on the NDNAD. The Information Commissioner warned a House of Lords Committee in 2007[46] that matches based on only 6 regions of DNA could lead to further cases like that of Raymond Easton, a man who was arrested in England in 1995 (when Britain's DNA profiling system used only six regions) although he could not have been the perpetrator of an alleged crime[47]. The Commissioner also reminded the Committee of a case from 2003 when a UK citizen who had never been to Italy was wrongly arrested for a murder in Italy on the basis of apparent DNA evidence (the case of Peter Hamkin[48]). Hamkin had never been to Italy, but he was arrested on the basis of a DNA match reported by Interpol. He was arrested, taken from Liverpool to London, kept in a police cell overnight, and remained under investigation for 20 days. The police later told him that a 'more refined result' from a second DNA sample showed that it was not a match.

Potential for false harassment or stigmatization of minor and young offenders

The Database exacerbates the potential for harassment or stigmatization of minor offenders, including racial harassment and the stigmatization of young people who in the past may simply have been told off, rather than treated as criminals in the making. Other vulnerable people, such as the mentally ill, may also be disproportionately affected. Political protestors can also have their details added and retained on the Database much more easily than in the past. If one person paints a slogan on a wall during a demonstration, for example, a whole group of people may be arrested on suspicion of committing an offence. All will have their DNA and fingerprints taken and permanently retained, even if they did nothing more than join the demonstration.

Matilda MacAttram, Director of Black Mental Health UK, has commented on the implications for black people suffering from mental illness: "*Pathways into care for black patients are invariably via the police or criminal justice system; this means that countless people with healthcare needs are being criminalized in the process of seeking help. It is disturbing to know that those needing healthcare are on a criminal database; wherever this is the case it is imperative that their details are removed as quickly as possible. This begs the question, what kind of a society criminalizes those who need help?*".[49]

Criminalization may also be particularly significant for children and young people. The system of reprimands and final warnings was developed in order to keep children out of the courts whenever possible because it was recognized that early exposure to the criminal justice system is counter-productive. Terri Dowty, Director of Action on Rights for Children, argues that the majority of children go through periods

of challenging and difficult behavior, and it is important that they can learn from their mistakes and leave difficulties behind upon reaching adulthood.[50] She highlights that significant recent research has demonstrated that contact with the police may have harmful effects for children and young people. The Edinburgh 'Study of Youth Transitions and Crime'[51] followed the progress over ten years of 4,000 young people who started secondary school in Edinburgh in the autumn of 1998. It found that young people who were caught by the police were more likely to persist in their offending than those who offended at a similar level but who were not caught. This fits with the theory that much youth crime is committed by adolescent offenders who will grow out of crime if they are not damaged by interventions from the criminal justice system.

Retaining DNA indefinitely can also lead to anxiety for children who have committed no offence, and who may even have been reporting an offence or trying to aid the police with their inquiries. For example, Caitlin Bristow, aged 15, was arrested in England in 2005 and had her DNA and fingerprints taken. She had reported an assault and a counter-claim had been made against her, but she was never charged, let alone convicted, of any offense. Caitlin told her local paper: "*I'm worried that it will scar my record for life. It might come up if I went for jobs, such as with children – not that I've been in trouble, but just that I'm known to the police*."[52]

Focus group research has found that both parents and children have reservations about samples being taken for petty crime and feel that there are dangers in stigmatizing young people for a one-off act.[53]

A recent suggestion by the head of forensic sciences at Scotland Yard and the new DNA spokesman for the Association of Chief Police Officers (ACPO), Gary Pugh, that children of primary school age should be placed on a national DNA register if they show signs of "becoming a criminal" has also attracted widespread criticism.[54]

Tracking and surveillance

The rapid expansion of the National DNA Database has enormous implications for the balance between the power of the state to implement 'biosurveillance' on an individual and the individual's right to liberty and privacy. There is also significant potential for others – including organised criminals – to infiltrate the system and abuse it, for example by using it to reveal changed identities and breach witness protection schemes.

GeneWatch UK obtained information about the research uses of the DNA Database and samples as a result of a series of Freedom of Information requests made in 2006.[55] The list of projects included some 'operational requests', including one on behalf of the police, to check the Database for named individuals. One research project involved the selection of some groups of individuals from the Database on the basis of '*having African name'*, '*having typical Muslim names*', or '*having typical Hindu/Sikh names'*. In this case, this information was used for research on match probabilities, rather than to identify or track the people in these categories. However, it would not be unlawful for the police to use such a process to identify groups of individuals, provided the use of the Database could be claimed to fall within the broad definition of "*purposes related to the prevention or detection of crime*".

Allowing the Database to be searched by name, or by using a 'familial search' (looking for partial matches between a DNA profile and profiles stored on the Database), means that an individual's DNA profile can be obtained and used to trace their movements or identify relatives. If a person's DNA sample is also accessed,

other personal genetic information may also be obtained. The same approach may be used to trace identifiable groups of individuals.

Because an individual may leave DNA wherever they go, there is also potential for it to be used to try to identify whether he or she has been present at scenes other than crime scenes (for example, a political or religious meeting). The legal restriction of uses to "*purposes related to the prevention and detection of crime*" provides no meaningful barrier to such surveillance, nor is there any independent scrutiny which could identify such uses. Particular concern arises in the context of the right to protest, because acquittal by a court, or a spent conviction for a relatively minor offense, no longer results in removal of a person's record from the NDNAD or the Police National Computer (PNC).

If criminals can infiltrate the system they may also be able to use it to track individuals or their relatives.

In practice, the process of collecting, analyszing and storing DNA allows numerous points of access to confidential information (for example, by employees working in the commercial laboratories which analyze and store the DNA samples for the police). If criminals can infiltrate the system they may be able to use it to identify people whose identity is protected, including people in witness protection schemes and undercover police officers, and to trace their relatives or reveal private genetic information (including paternity and non-paternity). Vulnerable women and children may be particularly at risk. The risk to privacy is also increased by plans to share more information with EU countries and to check DNA or police records on the spot using hand-held devices[56,57]. A worst case scenario is that someone who infiltrates the law enforcement system of another country, or who gains access to the British system, could use DNA matching to track down a potential victim, by submitting a DNA profile obtained from, say, the toothbrush of a child, rather than a crime scene.

Emails supplied to GeneWatch UK as a result of a Freedom of Information request in 2006 revealed that the commercial company LGC kept a "mini-database" of information sent to it by the police, including individuals' demographic details, alongside their DNA profiles and samples.[58,59] Thus, anonymity is not maintained by separating identifying information from the DNA profiles themselves, because identifying information is sent by the police to the commercial laboratories which analyse the samples.

A recent Home Office consultation proposed further extending police powers (outside Scotland) by allowing DNA to be taken on arrest in the street or in short-term holding facilities, in shops or town centres, where people could be detained for up to 4 hours.[60] Suspected offences for which DNA can be taken would be expanded to include non-recordable offences (such as dropping litter), from anyone aged ten or above. Both computerised DNA profiles and DNA samples would be permanently retained. The main purpose of taking DNA and fingerprints would change from investigating offences to establishing 'identity': this implies a new link between the NDNAD and the proposed National Identity Register.

These new proposals significantly increase the risk of infiltration of the system, especially if they powers to check identity using fingerprints and DNA are given to staff who are not police officers. Any process of identification using biometrics on the street, or anywhere where privacy cannot be guaranteed, can pose a serious threat to vulnerable people who need their identity protected: including people on witness protection schemes and women or children in hiding from abusive partners, parents or carers.

Discrimination based on permanent records of arrest

The retention of permanent records of arrest, on the Police National Computer, is unprecedented in British history.

PNC records are available to a wide range of agencies, although a plan is being developed to 'step down' records so that access will be limited to the police after similar time-frames to those which used to result in their removal.[61] However, information contained in these records may continue to be made available to others as the result of an Enhanced Criminal Record Check. Employers may also lawfully require an individual to undertake his or her own subject access request to the police and reveal this as a condition of employment (known as 'enforced subject access'). The retention of permanent records of arrest may have serious potential consequences for an individual, including: refusal of visas or access to visa waiver schemes (such as that operated by the US); refusal of employment in any occupation not covered by the Rehabilitation of Offenders Act (including all jobs working with children or young people, and a wide range of professions, such as the legal profession); and excessive Government or police surveillance (of individuals or selected groups of people).

Genetic research without consent

The NDNAD has routinely been used for research without consent. In March 2005, the Home Office was severely criticized by the House of Commons Science and Technology Committee for allowing research without consent or any ethical oversight. An ethics committee, which Members of Parliament were told was being discussed, has only recently been set up (it held its first meeting in October 2007). Although new procedures for approving research projects are likely to be established, it remains a matter of concern that controversial genetic research may take place without consent.

Freedom of Information requests made by GeneWatch UK in 2006 showed that since the year 2000, 19 research projects had been allowed and 14 refused.[62] The requests revealed that stored DNA samples have been used for genetic studies of the male Y-chromosome, without the consent of the people involved, as part of a controversial attempt to predict ethnicity from DNA. This type of research could also inadvertently reveal other genetic characteristics such as a man's risk of infertility. Despite numerous requests for information, the list of research projects is still incomplete and, in addition, the decision making process for granting access to stored samples remains inadequate and unclear.

Retention of individuals' DNA samples increases privacy concerns. Individuals' samples are destroyed in some other countries, such as Germany, once the computerized DNA profiles used for identification purposes have been obtained. The Home Office has recognised that retaining samples is "*one of the most sensitive issues to the wider public*"[63] and the Human Genetics Commission has concluded that the reasons given for retaining them are "*not compelling*".[64,65] Only temporary, not permanent, storage is necessary for quality assurance purposes and a new sample can always be taken from the suspect if a DNA profile requires checking or upgrading.

The research that has been done using the Database with the aim of trying to predict an individual's ethic appearance from their DNA is particularly controversial. It is part

of the research and development of a new commercial product: a DNA test to predict ethnicity or ancestry. This research has used both the DNA profiles on the computer Database and the stored DNA samples. The expected role in criminal investigations of predicting ethnicity or ancestry from DNA is to try to build up a 'genetic photo fit' of a suspect purely from a crime scene DNA sample.

Historically, genetic explanations of race have been used against ethnic minority groups, causing stigma and discrimination, and being used to justify racism, colonialism and eugenics.[66] More recent research suggests that there is a complicated relationship between genetic differences and what is commonly called "race". Human beings are all one species and biologically distinct races do not exist.[67] The relationship between skin color and ancestry is also complex[68,69] and also appears to have been influenced by social factors (the racist treatment of people identified as black).[70]

To some extent broad geographical ancestry (for example, Africa, Europe or Asia) can be predicted from the frequency of different genes.[71] Many companies are now selling genetic ancestry tests commercially: some market these tests to the police as well as individuals. There are two main techniques: [72]
1. *Lineage-based tests*, which try to trace the inheritance of some of a person's DNA through the male or female line. Maternal lineage-based tests use mitochondrial DNA (mtDNA), which a person inherits only from their mother. Paternal lineage-based tests use the Y-chromosome, which men inherit from their father. Some relatively rare lineages can be traced to particular ethnic groups or locations using this method, but others are much harder to place. Predictions in mixed urban populations are likely to be much less reliable.[73]
2. *Bio-geographical ancestry tests* use the statistical distribution of different genetic markers in different countries and different ethnic groups. These tests try to estimate a person's ancestry from the percentage of these markers that they have. However the results are of questionable reliability because they depend on the regions considered, the number of genes tested and the extent to which populations have mixed in the past.

The Nuffield Council on Bioethics has warned: "*In view of the significant ethical and practical problems, and the limited usefulness of the information provided, attempts to infer ethnicity from DNA profiles and samples fail the test of proportionality and we recommend that ethnic inferences should not be routinely sought, and should be used with great caution*". However, people with DNA profiles on the Database cannot refuse to give consent to their profiles or samples being used for this type of research.

To date, the Database appears not to have been used for behavioral genetic research. However, this type of research is equally – if not more – controversial and could also be conducted under current legislation without the consent of the people whose genetic data is used. A 2007 study assessed the views of criminal justice practitioners about behavioral genetics. [74] The study included barristers, solicitors, judges, probation officers and social workers who are involved in the management of individuals that may be deemed at risk of displaying violent and aggressive behaviors. It identified concerns that a policy emphasis on aggressive and antisocial behavior exacerbates the shift towards further control and surveillance of citizens, particularly of those deemed 'risky' who are already over-patrolled. It is possible that genetic information relating to behavior could be slotted into existing systems of profiling and collating information on individuals, including children. In June 2008, a committee of MPs warned against profiling to predict criminal behavior and stated that it would be particularly concerned if information held on children was used for the

purposes of predictive profiling rather than child protection.[75] The reliability and predictive value of such information is extremely questionable.

Discussion and conclusions

GeneWatch UK recognizes the extremely important role that DNA can play in some criminal investigations. We are not opposed to the existence of the National DNA Database, but are deeply concerned that its rapid expansion is spiraling out of control. The law in England, Wales and Northern Ireland allows the capture and use of genetic information without consent from a defined section of the community (those who have been arrested for a recordable offence), often referred to as the 'active criminal population', despite the fact that many of these individuals will not have committed any crime.

There is a strong bias in the system towards the inclusion of DNA profiles from young black men and vulnerable people, including children and the mentally ill.

The rapid expansion of the Database has enormous implications for the balance between the power of the state to implement 'biosurveillance' on an individual and the individual's right to privacy. There is also significant potential for others – including organised criminals – to infiltrate the system and abuse it, for example by using it to reveal changed identities and breach witness protection schemes.

The permanent retention of all DNA profiles, samples and police records, significantly changes the relationship between the individual and the State. Individuals with records on the DNA Database lose their presumed legitimacy to go about their daily life, their right to refuse to take part in genetic research and their right to keep their family relationships and other genetic information private. Even if they have never been charged or convicted of any offence, they may be refused employment or a visa as a result of the retention of a permanent record of their arrest on the Police National Computer (PNC). The retention of an individual's DNA profile also allows their movements to be tracked or their relatives to be identified. The potential implications for the right to protest are particularly serious.

There are many circumstances in which the retention of an individual's DNA profile and linked data will give rise to potential identification – only in the minority, not the majority, of cases does this involve the identification of the individual as the perpetrator of a crime. Many individuals identified through matches on the Database will be subject to investigation by the police, but are subsequently acquitted of any crime. The purpose of data retention is quite different from the purpose of collection, since it is a form of surveillance based on the idea that the individual, or a relative of theirs, may commit a <u>future</u> crime, not that they have already committed one. Records and samples are also used for a much broader range of purposes than they were originally collected, including use for genetic research without consent.

It is difficult to reconcile the current situation with the principle of equal application of the law (the concept that everyone is equal before the law).

People on the Database are treated as members of a 'risky population', whose DNA requires permanent retention by the State.[76] Young people, people suffering from mental illness and people from black and minority ethnic groups are particularly likely to be members of this 'risky population'. Retention of an individual's DNA profiles on a Database is likely to be of most benefit when he or she has a record as a 'career criminal' and is considered likely to re-offend. However, the population on the Database now includes anyone who is arrested for a recordable offence. Ministers

have accepted that: "*As far as we are aware, there is no definitive data available on whether persons arrested but not proceeded against are more likely to offend than the population at large*."[77]

The lesson from the rapid expansion of the National DNA Database is that there is significant potential for stigma and prejudicial treatment of people who have their DNA profiles retained. Although putting everyone on the Database is sometimes proposed as a solution to discrimination, it would not prevent the Database being used in a discriminatory way and would considerably exacerbate concerns about potential misuse and about false matches. Such proposals are also widely regarded as extremely costly and impractical.

The rapid expansion of the National DNA Database has not improved the crime detection rate. GeneWatch UK believes that there are important changes that could be made that would improve safeguards for human rights and privacy without compromising the role of the DNA Database in tackling crime. A better balance would be struck by:

- reintroducing a system of time limits on how long people are kept on the Database – so that only DNA profiles from people convicted of serious violent or sexual offences are kept permanently;
- destroying all individuals' DNA samples once an investigation is complete, after the DNA profiles used for identification have been obtained;
- ending the practice of allowing genetic research using the Database or samples, so that research is limited to performance management and database improvements;
- better governance, including an independent regulator;
- public and parliamentary debate before new uses of the Database are introduced;
- a return to taking DNA on charge rather than arrest, except where it is needed to investigate a specific offence.

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