



Annual Report of The Ethics Group: National DNA Database

2016

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Chair's Introduction



It is with great pride that I present the ninth annual report of the National DNA Database Ethics Group (EG). In what has proved an extremely productive year, the EG made a significant contribution to the debate surrounding the utility of Next Generation Sequencing. The EG published a comprehensive set of ethical considerations in relation to the large variety of new technologies becoming available on the market that have the potential to be applied to criminal investigations. We hope that by outlining the potential ethical harms and benefits associated with the implementation of these technologies, it will enable decision makers to deploy technologies that result in the maximum benefit to the criminal justice system whilst respecting the ethical and human rights of the British public.

I also welcome the publishing of the group's triennial review, in which it was recommended that the EG expands its remit to cover wider biometric and forensic practises. I am delighted that the Home Office has welcomed the broadening of the EG's remit to include biometrics and forensics within its purview, as this demonstrates the value that the department places on the work of the current group and its commitment to ethical, as well as evidence based, policy making.

This year we have already started to engage in these areas including having undertaken some preliminary ethical and privacy impact advice concerning the use of surveillance cameras, custody images, and fingerprints.

Furthermore, we have also undertaken to produce a set of governing ethical principles for the group, to be published in early 2018. These principles will provide those who plan to bring items before the group with a clear set of guidelines to help them assess the ethical issues relevant to their work. They will also provide transparency on the considerations that are undertaken by the group itself when assessing a new proposal.

The expansion of the EG's remit provides the opportunity to recruit new members to the group. These recruits will be from a diverse range of professional backgrounds, which may include genetics, forensic science, biometric data, political science, data protection, the ethics of consent, the police service, social science and legal services. These new members will ensure that the group stays dynamic, relevant and comprehensive in its expertise. I am greatly looking forward to welcoming our new colleagues.

I hope you find this report an enlightening insight into our work.

A handwritten signature in black ink, which reads "C. Hughes". The signature is written in a cursive, flowing style.

Christopher Hughes OBE

Chair, Ethics Group: National DNA Database

Chapter 1: Vision, Mission and Values of the Ethics Group

Background

The Ethics Group (EG) of the National DNA Database (NDNAD) is an advisory non-departmental public body of the Home Office. It was established in 2007 to provide Ministers with independent ethical advice on the operation and practice of the NDNAD. Its membership includes representatives from various disciplines and professions and it is led by an independent Chair. It publishes minutes of its meetings, an annual report, various discussion papers and advice to Home Office Ministers on the government website at:

www.gov.uk/government/organisations/national-dna-database-ethics-group

Remit

To ensure that all decisions relating to the forensic use of DNA (obtaining, storage, retrieval) are considered in the light of ethical and human rights principles, and that individuals may only have their DNA taken for lawful forensic purposes and at all times be treated fairly and with dignity and respect.

Mission

The EG aims to ensure that the culture of the operational framework supporting the NDNAD in England and Wales places ethical issues at the forefront of all activities at all times.

Values

The following values and principles underpin the EG's role in terms of establishing and resolving ethical issues:

- that the NDNAD must have a proper lawful basis that is compatible with the Human Rights Act 1998 and that provides for independent and accountable governance of its operations;
- that there are clear, detailed, open and transparent rules governing the everyday operations of the NDNAD so as to ensure that processes are just and lawful and provide sufficient guarantees against the risk of abuse;
- that the use of forensic DNA sampling should be appropriate and proportionate and should not discriminate against members of any section of society;
- that the operations of the NDNAD are at all times fully based in credible science that shows a strong and cogent rationale for justifying such activities;

- that all decisions taken in relation to the operation of the NDNAD within the criminal justice system are proportionate and fair when balancing the rights of individuals against the needs of society to detect and prevent crime;
- that all persons who are lawfully required to give a DNA sample are treated fairly with dignity and respect and that there is an established independent appeals process to guarantee their right to an effective remedy;
- that the public is fully informed about all aspects of the NDNAD in ways that are understandable including providing information to those individuals who are required to provide a DNA sample;
- that research using the NDNAD is only permitted after full consideration that it is fully compatible with these principles and has been submitted to independent scientific and ethical scrutiny;
- that the rights of children, young people and other vulnerable people should be protected in the light of their vulnerability and in accordance with international conventions.

Chapter 2: Membership of the Ethics Group

The current Ethics Group (EG) membership is as follows:

Chair: Christopher Hughes OBE

Members: Dr Adil Akram
Dr Alan Clamp
Dr Nina Hallowell
Dr Christopher Harling CBE
Professor David Latchman CBE
Carol Moore CB
Isabel Nisbet
Professor Barbara Prainsack
Professor Jennifer Temkin

Further information about members can be found in Appendix A: Biographies of Ethics Group members.

The following individuals/organisations are represented on the EG:

The Home Office
The National DNA Database Delivery Unit
The Forensic Science Regulator
The Biometrics Commissioner

Chapter 3: Activities of the Ethics Group

Meetings

This year there were four meetings of the Ethics Group (EG). The minutes of these meetings were published and can be found on the gov.uk website via the web link:

www.gov.uk/government/organisations/national-dna-database-ethics-group

At these meetings the EG was provided with presentations by:

- Andy Derwent (Crime, Policing and Fire Group, Home Office) on DNA paternity testing for child maintenance cases;
- Andy Feist (Crime and Policing Analysis Unit, Home Office) on examining the role of forensics in achieving criminal justice outcomes;
- Carrie Golding and Wendy DuChesne (Home Office Biometrics [HOB] programme) on the HOB programme and plans for a privacy impact assessment (PIA) of the programme;
- Lisa Hall (Fingerprint Consultant, Metropolitan Police Service) on fingerprint identification;
- Shazia Khan (Metropolitan Police Service) on Prüm and the exchange of DNA profiles with other countries;
- Neil Redmond-King (Police, Science and Technology Unit, Home Office) on custody images;
- Professor Cillian Ryan (Chair of the Leicestershire Police Ethics Group) on the use and retention of facial images;
- David Shaw (Interim Programme Manager for Forensics Research and Development projects) on Home Office research projects; and
- Chief Constable Iain Spittal (National Police Chiefs Council [NPCC] lead for ethics) on ethical considerations within the NPCC and the police forces.

Home Office Business

The EG was informed of a number of Home Office business work-streams and strategies throughout the year; three are highlighted below.

- **National DNA Database and Fingerprint Strategy Board**

The EG continued to work closely with the National DNA Database (NDNAD) and Fingerprint Strategy Board (SB); the SB is responsible for implementing the recommendations of the EG. The EG Chair sits on the SB as an ex-officio member and EG members with lead responsibilities for certain issues have been involved in SB work programmes where appropriate.

- **Biometrics Programme**

The HOB programme aims to converge Home Office biometric systems into a single shared services environment enabling the delivery of a unified biometric service. It will run until 2019, and provide continuity of existing services as well as developing future capabilities. The HOB programme consists of three main modalities:

- DNA;
- fingerprint identification; and
- facial recognition.

This year the EG has established a working group and provided ethical and privacy advice on a range of PIAs that are integral to the HOB programme. Further details on the EG's work on the HOB programme is provided in Chapter 4.

- **Custody images review**

In February 2017, the Home Office published its review of custody images¹. The review did not align with the EG's previous advice, that the retention times directed in the Protection of Freedoms Act 2012 for the retention of DNA samples and fingerprints should also be applied to the retention of custody images. Instead, the review recommended that individuals should be able to request the deletion of their custody images, with the rules regulating this taking account of the nature of the offence and the age of the offender. The police should also undertake regular reviews to delete images. Further details on the EG's work on custody images is provided in Chapter 4.

Ethics Group Chair representation at other meetings

Throughout the year the Chair has met with, attended and/or made contributions or representations to the following.

- He participated in a Forensic Policy Group organised by the Home Office. The group brought together representatives from police forces, forensic science providers, academics and directors of forensic services with the aim of producing a more coordinated approach to forensic science, and improving efficiencies within the system.

1 See: www.gov.uk/government/publications/custody-images-review-of-their-use-and-retention

- The Chair met with Gary Pugh, the Chair of the SB, to discuss the reconstitution of the SB as the DNA and Fingerprint Strategy Board. He also represented the EG on the SB. Further information is provided in Chapter 4.
- The Chair met with Alex Marshall at the College of Policing to discuss responsibility for the oversight and promotion of research around the NDNAD.

Other members of the EG kept ‘watching briefs’ on their various topics of responsibility and took part in relevant visits and briefings.

Discussion with Leicestershire Police Ethics Group

In February the EG invited the Chair of the Leicestershire Police Ethics Group, Professor Cillian Ryan, to meet with the EG. The Leicestershire Police Ethics Group had previously considered the ethical issues arising from the use and retention of facial images taken by CCTV and police body cameras. These images were compared with a database of images held by Leicestershire police and 20 suspects had been identified in relation to serious offences. It was emphasised that these images were used purely for identification purpose and had not been used in court. The EG was concerned that the retention of such images could potentially disproportionately target certain groups and might include the images of individuals who had not been charged with an offence.

The Leicestershire Police Ethics Group had considered whether the retention of images ought to be subject to the same constraints as DNA and fingerprints or whether there were inherent differences with images that meant the same ethical principles for retention did not apply. The EG thought that facial images were comparable to fingerprints, given the quantitative and non-binary nature of the comparisons. The view was held that facial images should be subject to the same ethical principles as other biometrics. This position was consistent with the recommendation that the EG made in its 2015 annual report in relation to the retention and use of custody images (see Chapter 6).

Discussion with Chief Constable Iain Spittal, Cleveland Police

The EG invited Chief Constable Iain Spittal (the NPCC lead for ethics) to its September meeting. He explained that a code of ethics, which would lay out expectations and standards for the police, was in development by the College of Policing. The intention was to encourage critical thinking amongst the policing profession rather than hierarchical decision-making. A shift had occurred within Cleveland police whereby applicants to the force were assessed in relation to their values rather than their competencies. The EG heard that Cleveland police had set up an ethics committee, which examined past police decisions, reviewed future plans and considered specific ethical challenges.

The EG suggested that the police could adopt the so-called ‘seven principles for public life’², a set of ethical standards expected of public office holders that are in use across other public institutions. It was agreed that the EG would keep abreast of developments on the ethical codes for policing through continued interactions with the NPCC and the College of Policing.

2 See: www.gov.uk/government/publications/the-7-principles-of-public-life

Chapter 4: Work of the Ethics Group During 2016

Ethical Principles

During 2016 the Ethics Group (EG) made the decision to develop a set of high-level ethical principles to guide its ethical assessments. A working group led by Professor Jennifer Temkin was established to undertake this piece of work. The purpose of the principles was to provide a common first step to frame members' initial considerations of a new study or a new technology, and to provide transparency, both to the Government and the public as to the processes undertaken by the EG. The principles would also provide a framework for other groups or individuals, either within or outside the Home Office, to guide their consideration of ethical issues and further facilitate the embedding of ethical considerations into project and policy work.

The EG agreed that the principles should be broad and provide a degree of structure but not be prescriptive or restrain thinking. They should be accompanied by a set of open questions to facilitate consideration of the principles. In order to complete this work, the working group has undertaken an extensive review of the literature from a variety of disciplines and philosophies and has extracted principles relevant to biometrics and forensics.

The EG looks forward to being able to share these principles in the future.

Ethical Advice for Government

National DNA Database and Fingerprint Strategy Board

During the year the remit of the National DNA Database (NDNAD) and Fingerprint Strategy Board (SB) expanded to include oversight of both DNA and fingerprint databases. The EG was supportive of these changes and acknowledged that the overarching issues that affected both DNA and fingerprint databases could be effectively addressed by the same board.

Familial searching

The EG was invited by the SB to respond to a consultation on a new policy that had been developed to provide a framework for undertaking familial searching on the NDNAD. Familial searching is used to identify potential suspects in a criminal investigation or unidentified bodies or victims. The NDNAD is searched to identify individuals who could be biologically related to a person of interest. The searches for biological relationships include parent/child relationships and siblings. The process exploits the fact that members of a biological family share certain amounts of DNA.

Prior to the implementation of the familial searching policy, requests to undertake familial searches were approved on a case-by-case basis by the SB. The EG reviewed the familial searching policy. It decided that it would no longer be necessary for each application for familial searching to be approved by the SB, as each application would be checked for compliance with the new policy.

The EG noted concerns about exceptional cases to undertake familial searches that did not meet the requirements of the policy. The group suggested that the principles that would be applied when assessing exceptional cases should be made explicit. If it was thought that the familial search request was pushing the boundaries of the policy from an ethical viewpoint, then the EG and the Biometrics Commissioner should be asked whether the search would be proportionate.

DNA profiles and the National DNA Database leaflet

The EG assisted the SB with the redrafting of an information leaflet titled 'DNA profiles and the National DNA Database'. This would be given to individuals when providing DNA samples for the inclusion of their DNA profiles on the NDNAD. The EG's focus was to ensure that the leaflet would:

- be accessible to a wide target audience; and
- provide background information about DNA and DNA profiling in a clear and understandable format.

Work on the leaflet was conducted by a working group led by Dr Nina Hallowell. Once finalised the leaflet would be published and made available to all police forces.

Home Office Biometrics Programme

The Home Office Biometrics (HOB) programme aims to converge Home Office biometrics systems in the UK into a single shared services environment. This would enable the delivery of a unified biometric service and provide a platform for delivering future capabilities. The HOB programme consists of three main modalities:

- DNA;
- fingerprint identification; and
- facial recognition.

The EG was provided with further details of these three modalities.

With regards to DNA, changes to the NDNAD would occur over three stages. The first stage would focus on:

- the infrastructure of the database and automation of processes;
- the establishment of a central elimination database;
- bringing the missing persons database within the infrastructure of the NDNAD; and
- ensuring all safeguards were in place for a resilient service.

Subsequent stages would enable:

- the international exchange of DNA;
- improved functionality to allow rare alleles³ to be stored on the database, thus improving matching probabilities;
- establishing rules based on calculating allele frequencies rather than counting the number of alleles;
- a better mechanism for the interpretation of mixed DNA profiles;
- storing Y-short tandem repeat (Y-STR) profiles on the NDNAD; and
- improvements to quality checks.

The EG agreed that, ideally, the ethical impact of new processes should be given consideration prior to implementation. As an overarching point, the EG noted that training for users of the DNA information needed to be aligned to changes to the technology.

With regards to fingerprints and facial images the EG was informed that within the HOB programme, solutions would be sought that would improve and expedite the identification of offenders. It was agreed that the EG would be engaged in discussions as these emerge.

The EG was asked by the Home Office to provide privacy and ethical advice on a number of specific privacy impact assessments (PIAs) for pieces of work that fell within the HOB programme. An EG working group was established, led by Isabel Nisbet, to provide feedback on PIAs throughout the span of the HOB programme.

Biometrics Commissioner

The role of the Commissioner for the Retention and Use of Biometric Material – ‘the Biometrics Commissioner (BC)’ – was established by the Protection of Freedoms Act (PoFA) 2012. The PoFA also established a new regime to govern the retention and use of DNA samples by the police in England and Wales. One of the key responsibilities of the BC was to provide independent oversight of the implementation of the PoFA. The BC ensures that DNA profiles are retained on the NDNAD in accordance with statutory provisions; this role dovetails with the EG’s advisory role on ethical issues around the operations of the NDNAD. The EG and the BC have continued this year to work collaboratively on matters of joint concern and the BC or a representative from the BC’s office attended all EG meetings in 2016.

The EG discussed with the BC an issue concerning the national Counter Terrorism DNA databases (CTDNAD). The implementation of the PoFA in 2012 meant that the DNA of individuals who had not been convicted of a notifiable offence could only continue to be held

3 DNA profiling involves the comparison of individuals’ alleles – variants of genes – to a reference ‘ladder’ of common alleles. Rare alleles do not correspond to those in the reference ladder.

on the CTDNAD if a National Security Determination (NSD)⁴ had been undertaken. Police forces were initially given two years to review their holdings on the CTDNAD and to undertake NSDs, and were later granted an extension. The EG was concerned about the length of time taken to put these procedures in place following the implementation of the PoFA legislation, but was reassured that the processes were now firmly established. The EG also sought assurance that the BC was confident that profiles were deleted from the CTDNAD when NSDs were rejected. The BC assured the EG that appropriate controls were in place to ensure the deletion of profiles.

The EG and BC have identified areas of mutual interest for both parties going forward including:

- gaining an understanding of the effectiveness of NSDs and any potential ethical issues;
- improving the transparency of matching algorithms used in biometric databases;
- ensuring that people, especially the young, understand their rights to request to have their biometric data destroyed in certain circumstances;
- determining how complex forensic evidence should be presented in the courts; and
- a cost–benefit analysis of DNA evidence, which would reveal the proportion of criminal cases involving DNA evidence that led to successful criminal justice outcomes.

Forensic Science Regulator

The Forensic Science Regulator (FSR) ensures that the provision of forensic science services across the criminal justice system is subject to an appropriate regime of scientific quality standards. The FSR was represented at all meetings of the EG during 2016.

The FSR sought advice from the EG on ethical issues that could arise in relation to the establishment of Y-STR elimination databases, which might not previously have been considered in relation to autosomal⁵ DNA databases. The request came about as the FSR develops a quality standard for Y-STR DNA analysis, which will require forensic science providers (FSPs) to put in place Y-STR elimination databases.

The EG considered the ethical issues in relation to Y-STR elimination databases. These issues included that Y-STR profiling could provide information about biological relationships, presumptive information about male infertility problems and would indicate if an individual had undergone a sex change. When an individual within a FSP has a DNA sample taken to be loaded onto a Y-STR elimination database, there was the potential that the Y-STR profiling could reveal this information. The EG considered how such information should be handled by the FSP if it were to be obtained from Y-STR profiling. The group was strongly in favour of the FSP not feeding back health information to individuals on the grounds that it would be irresponsible due to the information only

4 NSDs are made by a chief officer of police of ‘NPCC (formerly Association of Chief Police Officers – ACPO)’ rank to retain a DNA profile on the CTDNAD from an individual who has not been convicted of a notifiable offence. The BC reviews and assesses NSDs to determine whether sufficient information has been provided to demonstrate that the chief officer’s decision is reasonable and proportionate. The BC has the power to order the destruction of a DNA profile on the CTDNAD, but first would allow the chief police officer to provide additional information to support the NSD. NSDs are time-limited and after two years the DNA profile or fingerprints must either be destroyed or a further NSD be approved.

5 Autosomal: Pertaining to chromosomes that are not sex chromosomes (X or Y).

being presumptive⁶ rather than predictive or diagnostic. However, the group acknowledged that in the future Y-STR profiling might reveal more significant medical information, and if so, the EG would need to reconsider the issues.

The EG suggested that the priorities should include ensuring that Y-STR profile data were kept confidential and separate from personal details, with a limited number of individuals within a FSP having access to the keys to decode the information. In addition, individuals needed to be made aware of these issues prior to giving their consent and FSPs would need to be transparent with individuals when they were recruited that Y-STR profiling would reveal if an individual had undergone a sex change.

Surveillance Camera Commissioner

The EG was invited to respond to a consultation by the Surveillance Camera Commissioner⁷ on a draft National Surveillance Camera Strategy for England and Wales.

The aim of the draft consultation was to encourage the voluntary adoption of the Surveillance Camera Code of Practice (SC Code). The consultation set out that there were between four and six million CCTV surveillance cameras in the UK. Only certain authorities, such as the police and local councils, were obliged by statute to follow the SC Code whilst many public bodies (for example, the National Health Service) could volunteer to adopt the SC Code. The public bodies with a statutory duty to follow the SC Code make up only a small number of total surveillance cameras in the UK.

The EG provided its views on the consultation and stated that proportionality should be the central ethical principle for determining the use of surveillance cameras. The EG was supportive of the consultation and considered it timely given recent increases in body-worn cameras and automated number plate recognition cameras. The EG was of the opinion that whilst surveillance cameras provide the ability to record and investigate criminal offences, there was limited evidence that they keep the public safe and protect them. Although research has found that a large majority of the public support the use of surveillance cameras, it was unclear how well informed the public are of the various uses of the images they collect. There are clear ethical issues around privacy and whether they intrude on an individual's sense of self. Conversely, such cameras may make people feel more secure.

The EG indicated that it would be able to assist the Surveillance Camera Commissioner in the future in regards to determining how public authorities comply with Article 8 of the European Convention on Human Rights and the proportionate use of surveillance cameras.

6 A presumptive genetic test (also known as a susceptibility or pre-dispositional health test) provides an indication of the absolute lifetime risk and/or the relative risk of an individual developing a condition compared with the general population.

7 The Surveillance Camera Commissioner's statutory function is to encourage compliance with the Surveillance Camera Code of Practice.

International Exchange of DNA – Prüm

In its 2015 annual report the EG provided details of the Prüm treaty, which enables European Member States to exchange data rapidly on DNA, fingerprints and vehicle registration numbers belonging to persons suspected to be cooperating in terrorism, cross-border crime and illegal migration. A full Business and Implementation Case was undertaken by the UK in relation to rejoining the Prüm treaty and the UK undertook a Prüm-style pilot to exchange DNA profiles with other countries.

The EG was provided with the evaluation of the Prüm-style pilot whereby DNA profiles from police forces across the UK were sent to France, Germany, The Netherlands and Spain and compared with the DNA profiles on their criminal databases. If a match was identified secure links were established between the police in the associated countries to allow details about the suspect to be shared. The information was provided as intelligence; only when scientific verification had confirmed a true DNA match could a country request the personal details of the person who matched the DNA profile. There were 118 DNA matches with profiles held on databases in these other countries. The number of matches suggested that if the UK were to exchange DNA profiles with other countries as part of its standing operating procedures, it would improve the identification of offenders and help to protect the public. Matches were verified for a range of crimes including rape, sexual assault and burglary and the police are actively pursuing individuals both in the UK and abroad. The UK police force shared 9,931 profiles in less than 6 months during the Prüm-style pilot.

The UK Government has indicated that it would legislate to ensure that other countries could only search against UK DNA profiles and fingerprints of individuals convicted of crimes. This is to protect British citizens becoming caught up in overseas investigations.

The EG continued to welcome the Government's position to rejoin Prüm. The EG believed that the criteria governing the sharing of DNA and fingerprints, and the safeguards that are implemented would be critical for ensuring the protection of an individual's civil liberties. The EG supports the implementation of robust governance structures, written into legislation, for the international sharing of DNA profiles and fingerprints. The group will monitor this area and provide ethical advice to the Government at appropriate intervals in the future.

Custody Image Review

Custody images are the pictures of individuals taken by police forces when a suspect is arrested. There are over 19 million custody images on the Police National Database with images also stored by individual police forces. Police forces have indicated that custody images are an important investigative tool.

In its 2015 annual report the EG outlined its ethical concerns with the retention and use of custody images. The group made the following recommendations about custody images:

- the retention times directed in the Protection of Freedoms Act 2012 for the retention of DNA samples and fingerprints should also be applied to the retention of custody images;

- robust governance structures should be in place for all police databases that contain biometric identifiers, including custody images. Careful consideration should be given to the most appropriate mechanisms to facilitate take-up and compliance with a biometrics ethics framework.

The Home Office has published a review of custody images to provide specific guidance to police forces as to how long they should retain custody images⁸. The review recommended that there should be no PoFA-style automatic removal of custody images from police records. Instead, individuals should be able to request the deletion of their custody image, with the rules regulating this taking into account the nature of the offence and the age of the offender. The review recommends a presumption of deletion for non-convicted individuals but this remains at the discretion of the relevant chief police officer. The police would also undertake regular reviews to delete images. The review recommends that the retention of custody images should be considered again in 2020.

The EG was asked by the Home Office to consider again the ethical issues relating to the use of custody images, in conjunction with the independent Digital Ethics Panel for Policing, and the EG will address this going forward.

Home Office projects

The EG was invited to comment on two project proposals that related to biometrics and forensics work and that had been approved for funding.

Joint Forensics and Biometrics Programme

The Joint Forensics and Biometrics Programme (JFBP) examined the future of forensic services in the criminal justice system as well as the exploitation of real-time digital capture of forensic evidence and intelligence. The programme looked at new technologies to facilitate more effective and efficient crime detection and reduction. The EG could envisage the benefits that might be gained by obtaining forensic evidence more rapidly. However, the group cautioned that unless the necessary business changes were implemented to accompany the technical enhancements (for example, the re-focus of police efforts) the public safety benefits would not be fully realised. This, in turn, would raise ethical concerns. The EG was also cautious that real-time forensics had the potential to drive a change in the types of crime securing a conviction. Police investigators' forensic awareness would need to be developed to ensure that the use of real-time data was properly contextualised to mitigate against biased conclusions. Thus, in order for the public benefits of real-time forensics to be achieved the accompanying business changes must be implemented, including the re-allocation of police resources and efforts.

Forensic Research and Development Study

The objectives of this study were to examine the forensic research and development (R&D) landscape, paying specific attention to service delivery models and digital forensics. The view was to propose improved R&D models that would be in line with the future requirements of forensic science. The EG was supportive of this work and noted that it would be important to determine how the outputs of the project would be used and promoted in a way that was relevant to stakeholders. In addition, the EG suggested that ethical advice should be sought throughout the life cycle of the project.

8 See: www.gov.uk/government/publications/custody-images-review-of-their-use-and-retention

Ground-Truth Databases

Ground-truth databases (GTDs) contain data from known individuals (for example, volunteers rather than offenders) and therefore the data within the GTDs can be validated as correct. In the field of biometrics, GTDs are used to calibrate, develop and test biometric analysis software. The Home Office Centre for Applied Science and Technology (CAST) considered the establishment of a national fingerprint GTD in order to test the next generation of fingerprint algorithms.

The EG raised a number of ethical considerations with the fingerprint GTD. These included:

- how much ground-truth data would be required to make the GTD robust;
- whether databases from different ethnic groups would be required;
- how the volunteered data were retained; and
- how much awareness the volunteers would have about the use of their data.

In addition, the extent to which these data were anonymised was considered important, as there would be a trade-off between the privacy of the volunteers and the descriptive value of the data (for example, to identify gender or ethnicity). There was also the potential for unauthorised or unethical use of the digital keys that unlock this anonymisation. The EG will continue to engage with the CAST on these and other ethical issues related to GTDs.

DNA paternity testing for child maintenance cases

The EG provided advice to the Home Office and the Department for Work and Pensions (DWP) on a process⁹ to use DNA paternity testing in the investigation of fraud in child maintenance cases. The DWP had used DNA profiling in the past to ascertain parentage, in cases where this was disputed. However, the DWP had reason to believe that in some cases, the biological parent of a child was fraudulently avoiding paying child maintenance by instructing an impersonator to provide a DNA sample on their behalf. Once the new process was in place, if there was evidence to suspect that an impersonator had provided the DNA sample rather than the non-resident parent, the DWP would ask the police to take a DNA sample from the alleged non-resident parent under the Police and Criminal Evidence Act 1984 (PACE). If the DNA sample taken from the non-resident parent under PACE did not match the original sample, this would provide evidence of fraud. The NDNAD would also be speculatively searched using the original DNA profile in an attempt to identify the impersonator.

The EG fed back its views on the process to the Home Office and indicated that it was supportive of the process to identify cases of fraud in child maintenance cases. However, the group thought that there was a requirement for the police to establish a clear justification for taking a DNA sample under PACE. Furthermore, the EG recommended loading the original DNA sample on the NDNAD (as opposed to conducting a speculative search) since the sample could be considered a crime stain.

9 A Memorandum of Understanding had been drawn up between the National DNA Database Delivery Unit within the Home Office, the Department for Work and Pensions and the National Police Chiefs Council.

The role of forensics in achieving criminal justice outcomes

The EG was asked to provide advice on a research project proposal that would examine the role of forensics in achieving criminal justice outcomes for sexual assaults by strangers. To date, there has been limited research in this area and the majority of studies so far have been conducted in Australia or the USA. The project proposal involved linking data from the National Crime Agency (NCA) with the NDNAD and would assess the role of DNA evidence in helping to achieve a conviction for sexual assaults by strangers.

The EG had previously expressed support for research in this area, and welcomed the research proposal from the Home Office. The EG hoped that this research would identify the proportion of sexual assault cases that involved DNA evidence, and whether DNA evidence was being used to its full potential. Members of the EG noted that such data would help the group to assess the proportional use of DNA evidence in the future, and could inform policy surrounding the retention of such evidence by the police. The EG highlighted that it would be useful for this study to identify which crimes led to suspects being on the NDNAD in the first instance, and that in the future, assessing the role of forensic evidence in jury decision making would be a valuable avenue to explore. The EG will monitor the results of this study with great interest.

Ethical Advice on new DNA sequencing technologies

Next generation sequencing

There are many Next Generation Sequencing (NGS) technologies¹⁰ in various stages of development that in the future will allow analysis of DNA from samples that would not have previously been possible. These NGS technologies are capable of providing additional information to that currently provided by DNA STR¹¹ analysis, for example, by providing predictive information about an individual's physical features.

The EG was aware that NGS technologies had the potential to be a powerful tool in criminal investigations and coupled with the significant decline in costs associated with NGS technologies over the last decade, their introduction into forensic analysis was highly probable. However, many NGS technologies produced information relating to DNA matches that were probabilistic in nature, meaning that they were not 100 per cent accurate. The EG would wish to ensure that these aspects of the tests are properly understood prior to implementation, as otherwise there is the risk that innocent individuals could be implicated in criminal investigations. Furthermore, it would be important to ensure that any infringements on an individual's right to privacy that may result from the increased amount of information that can be gathered by NGS, is proportionately balanced against the necessity and ability to assist in criminal investigations. The EG was conscious that improper use or poor understanding of NGS technologies could

10 Next Generation Sequencing' is a term used to describe DNA sequencing technologies whereby multiple pieces of DNA are sequenced in parallel. This allows large sections of the human genome to be sequenced rapidly. The name is a catch-all-phrase that refers to high-throughput sequencing rather than the previous Sanger sequencing technology, which was much slower. NGS is also known as Massive Parallel Sequencing and the terms are often used interchangeably.

11 STRs (short tandem repeats) are sections of DNA dispersed within coding and non-coding regions of the human genome that contain hundreds of repeats of a short sequence of DNA. Different people have different numbers of repeats and when a number of regions are analysed, the chance of two people having the same number of repeats at all loci is small.

damage public acceptance and confidence in the technology, as well as causing serious distress to the individuals affected. The EG is aware of its own role in promoting public openness and transparency regarding the ethical issues of NGS.

In last year's annual report, the EG recommended that NGS techniques must be considered in a stepwise fashion both practically and ethically. It went on to say that a regulatory framework should be developed, in tandem with technology development, to oversee the ethical issues and the collection, compilation, storage, sharing and use of information and data derived from NGS technologies. In order to facilitate this Professor Barbara Prainsack led an EG project to produce:

- an outline of the NGS technologies that are likely to become available in the next ten years; and
- a map (albeit not yet an in-depth discussion) of the ethical challenges associated with the application of these technologies for forensic purposes¹².

In developing this document, the EG sought the views of its stakeholders in the form of a consultation. This document mapped the potential issues related to the forensic use of NGS, and provided a table outlining:

- the potential public benefits and harms;
- the groups that would be most affected;
- threats to human rights; and
- the risks of errors occurring.

The purpose of the document was to provide advice and inform the thinking of those who were considering the development of NGS technologies, and those considering the application of these technologies for the investigation of crimes. In the future the EG would need to consider the ethical issues of individual technologies in greater detail, prior to their introduction.

Y-Short Tandem Repeating Profile

Y-STR profiling is a technique that is increasingly being used as a tool in forensic investigations. The Y-chromosome is found only in males and is inherited from the male parent, and so analysis of markers on the Y chromosome can be used to link males who have the same paternal ancestry. Y-STR profiling is therefore valuable in determining genetic relationships amongst males as well as the investigation of sexual assault cases, where the large volume of female DNA might mask any trace levels of male DNA that is present.

The EG heard about a pilot undertaken by the Metropolitan Police Service (MPS) to produce Y-STR profiles from samples obtained from crime scenes in sexual assault cases with the results loaded onto a locally held database. Preliminary analysis of results found that the Y-STR database established during the pilot was a useful intelligence tool, with profiles obtained that would not have been possible with standard autosomal DNA profiling. The MPS is still evaluating the pilot and will report its findings to the EG and other stakeholders in due course. The EG indicated that it was in favour of a centrally governed Y-STR database as opposed to local police forces holding their data in separate pockets.

12 See: www.gov.uk/government/publications/next-generation-sequencing-technologies-ethical-considerations

The EG will continue to monitor Y-STR profiling and will provide a response to the MPS pilot study upon its completion. The EG will also continue to monitor the progress of the recommendations it made about Y-STR profiling in its 2014 annual report (see Chapter 6).

Rapid DNA profiling

Rapid DNA profiling refers to automated DNA analysis technology that can produce a DNA profile in just a few hours, significantly faster than conventional DNA profiling techniques. This technology is portable and can be taken to crime scenes to expedite DNA analysis. However, it is currently in its infancy and can only generate profiles from blood stains or mouth swabs.

In its last annual report, the EG provided an overview of the advice it had given on a rapid DNA profiling trial. This year the EG was invited to review a project delivery report on rapid DNA technology produced by CAST. The report critically reviewed three potential applications for rapid DNA technology:

- screening (to assess the quality of DNA recovered from crime scenes);
- intelligence (to screen potential suspects); and
- identification (to compare suspects' DNA profiles whilst in custody).

After being provided with an overview of rapid DNA technology, the EG fed back its concerns. The EG was concerned that this technology could lead to individual police forces or officers producing local DNA databases of criminals, which could undermine public confidence in the governance of a central DNA database. To prevent this, the EG thought that an appropriate governance model was required, to oversee the use of rapid DNA technology.

The EG recommended that research was required to analyse the impact of rapid DNA technology on criminal investigations and outcomes. This was specifically required in relation to the impact of the technology on identifying new leads and pursuing existing leads more rapidly. The EG suggested that a cost-benefit analysis of the technology should be undertaken.

The EG identified that a further risk of the technology was in moving analysis-based decision making to the front line; errors in the technology could lead to error-driven decisions being made at an early stage of investigations. Conversely, a positive aspect of this technology would be that individuals could be cleared from enquiries more quickly.

Overall, the EG thought that steps should be taken to minimise the risks associated with rapid DNA technology. The technology must be shown to achieve consistent and repeatable high quality outcomes in order to provide real value to the criminal justice system and also prevent the implication of innocent individuals in investigations. As a result, the EG was supportive of an appropriate governance model being established to prevent the misuse of rapid DNA technology, and will continue to monitor the progress of rapid DNA technology going forward.

Ensuring all police and supplier DNA databases are subject to robust governance standards

Profiling DNA samples from young people without consent from a responsible adult

The EG was asked to provide advice on an issue that had arisen in relation to the profiling of DNA elimination samples¹³ taken from young people under the age of 18, in which the associated paperwork for the elimination sample had not been countersigned by a responsible adult. The EG was informed that in some situations, FSPs had not processed the elimination samples due to the absence of a counter-signature. This situation had arisen in instances when a young person had been the victim of a serious and/or sexual crime and had attended a Sexual Assault Referral Centre (SARC) without a responsible adult and did not want their parent/guardian informed of the crime. These individuals had been assessed as Gillick competent¹⁴ – capable of comprehending and agreeing to the procedure without parental consent – however the appropriate paperwork had not been countersigned.

The EG was asked to consider whether the Gillick competence principle should be applied in this situation. In addition, if Gillick competence was ascertained, whether the medical or policing professionals should countersign the form giving permission for an elimination sample to be taken.

The EG thought it ethically acceptable for a Gillick competent person to consent to have an elimination sample taken without their parents' knowledge. The group did not think it was either necessary or appropriate for the medical practitioner who assessed Gillick competence to countersign the elimination form. Instead it suggested that minor changes to the form and accompanying policy could make FSPs aware that it was not mandatory for such elimination samples to be countersigned.

Assessment of risks with the DNA supply chain

In previous years the EG has been involved in work that assessed risks to the DNA supply chain to identify the areas in the chain where errors were most likely to occur. The purpose of this work would be to put measures in place to reduce the likelihood of errors occurring. The EG was extremely supportive of this work as it would reduce the chance of errors that might lead to the wrongful inclusion or exclusion of individuals within a criminal investigation.

This year the EG was informed that the on-going work had paused in order for an understanding to be gained as to what would be the correct metrics to gather from an operational point of view. The EG heard that the National DNA Database Delivery Unit would be holding discussions with the FSR and the UK Accreditation Service. The EG will continue to provide advice in this area when required.

Ethical advice on a central elimination database

13 Elimination DNA samples are taken from victims in order to exclude that individual as a source of DNA from samples recovered at a crime scene.

14 Gillick competence is a term originating from the case of *Gillick v West Norfolk and Wisbech Area Health Authority* describing the principle to determine whether a child is able to consent to his or her own medical treatment, without the need for parental permission or knowledge. A child is considered Gillick competent if they understand the nature of the procedure and thus can consent to it without the permission of a responsible adult.

Over the past few years the EG has been kept updated about plans to establish a central elimination database (CED). This is expected to hold the DNA profiles from serving police officers and special constables as well as others who come into contact with crime scenes. The CED would be separate to the NDNAD but crime scene profiles loaded onto the NDNAD would be checked against the CED. A CED would prevent the inadvertent loading of DNA profiles from police officers onto the NDNAD, due to contamination of crime scene samples. The EG has previously expressed strong support for the establishment of a CED as well as the purging of contamination profiles currently held on the NDNAD.

The CED has been brought under the first stage of the HOB programme and the EG had been informed that steady progress had been made to establish the database.

In addition to police officers, scene of crime officers and police staff have started to be added to the CED. Manufacturers of DNA consumables have been contacted to inquire whether they would be willing for their staff to be loaded onto the CED. Work was also on-going to load the DNA profiles from staff employed in SARCs. The EG understood that consideration was being given to the platform that would hold the CED and how it would interact with the NDNAD. The EG will monitor progress in this area as the plans develop.

Chapter 5: Review of the Implementation of Recommendations Made in Previous Annual Reports

Recommendations from previous annual reports that are still being progressed

Report	Recommendation	Progress made	Anticipated date for completion
2015	The retention times directed in the Protection of Freedoms Act 2012 (PoFA) for the retention of DNA samples and fingerprints should also be applied to the retention of custody images.	The Home Office Custody Images Review (2017) recommended the adoption of a different system to that used for DNA and fingerprints under the PoFA. This system requires individuals to apply for their images to be removed, and for the police to carry out periodic reviews of the images they hold. The Ethics Group has been asked to work with the Independent Digital Ethics Panel for Policing to consider further the ethical issues of the retention and use of custody images. The review is available from www.gov.uk/government/publications/custody-images-review-of-their-use-and-retention	2017/18

Report	Recommendation	Progress made	Anticipated date for completion
2015	Robust governance structures should be in place for all police databases that contain biometric identifiers, including custody images. Careful consideration should be given to the most appropriate mechanisms to facilitate take-up and compliance with a biometrics ethics framework.	The Ethics Group continues to engage with the Home Office and the Biometrics Commissioner to promote robust governance structures for biometrics.	Not specified
2015	New next generation sequencing (NGS) technologies must be considered in a stepwise fashion, both practically and ethically. A regulatory framework should be developed, in tandem with technology development, to oversee the ethical issues and the collection, compilation, storage, sharing and use of information and data derived from NGS technologies.	The Ethics Group has produced a document that maps the NGS technologies that are likely to become available in the next ten years and the ethical challenges associated with the application of these technologies for forensic purposes. Going forward, the group will need to consider the ethical issues of individual technologies in greater detail, prior to their introduction into criminal investigations.	Not specified
2014	The benefits of an independent audit and scrutiny of the Counter Terrorism DNA Database (CTDNAD) should be explored by the Home Office and the Metropolitan Police Service.	Counter terrorism falls within the remit of the Biometrics Commissioner. The implementation of the Protection of Freedoms Act 2012 means that individuals who have not been convicted of a notifiable offence can only continue to be held on the CTDNAD if a National Security Determination (NSD) has been undertaken. The Ethics Group will assist the Biometrics Commissioner to assess the effectiveness of NSDs and the related ethical considerations.	2018

Report	Recommendation	Progress made	Anticipated date for completion
2014	Following the introduction of Y-short tandem repeat (Y-STR) allele profiling, the use of these profiles should be monitored and an ethical impact analysis should be carried out.	Y-STR profiling is used on an ad hoc basis by police forces but there is no centrally held Y-STR database. The Ethics Group will monitor the progress of Y-STR profiling with the Metropolitan Police Service and will review further reports on the outcomes of the initial pilot.	Not specified
2014	Informed public consultation and debate about ethical issues arising from the profiling and storage of Y-short tandem repeat (Y-STR) alleles should be prioritised and facilitated.	Once the Metropolitan Police Service has reported on its Y-STR pilot the Ethics Group will consider what public debate could be promoted.	Not specified
2013	The Home Office should collate evidence on rape cases where a DNA match led to a conviction.	The Ethics Group has been made aware of a project proposal from the Home Office to use data from the National Crime Agency's Serious Crime Analysis Section and the National DNA Database to examine the role of forensics in criminal justice outcomes for sexual assaults by strangers. The group will monitor the progress of this work.	Not specified

Recommendations from previous annual reports that have been completed this year

Report	Recommendation	
2015	The Ethics Group recommended that the Cabinet Office incorporates continuous ethical consideration into the ethical framework for the use of data’.	The Cabinet Office published Data Science Ethical Framework on 19 May 2016. The need to make sure that accountability and oversight is provided through the lifetime of a project has been incorporated into the fifth principle of the document. The document is available at: www.gov.uk/government/publications/data-science-ethical-framework
2014	In order to promote a better understanding of the sources of error around the forensic use of DNA and to support systematic work around error reduction, a systematic review of error rates in the collection and forensic use of DNA in the criminal justice system should be carried out.	The Ethics Group considered the establishment of an expert network to identify risks to the DNA supply chain and to ensure that the expected guidance for those who handle crime scene samples is appropriate. The group will comment on the outputs from this work and the effectiveness will need to be monitored in the future.
2013	Efforts should be made to purge the National DNA Database (NDNAD) of contaminant profiles.	This recommendation was considered complete. The establishment of a central elimination database (CED) will fall under the Home Office Biometrics programme. DNA profiles from serving police officers and special constables will be checked against the NDNAD on a weekly basis. The Ethics Group will review the position when the CED is fully operational.
2009	As a matter of urgency, to improve the level of easily available and assimilated public information on the use of forensic DNA.	The Ethics Group believes that the level of easily available public information on the use of DNA has improved and the Strategy Board annual reports contain a high level of detail. These reports can be found at: www.gov.uk/government/collections/dna-database-documents#reports
2008	Improving the process for taking consent and providing a better consent form for adult volunteers.	The Ethics Group believes that this recommendation is complete. The consent forms have been updated and the group has provided its views on these. An information leaflet on DNA profiling for use in custody suites is in progress and the group will review the final version.

Chapter 6: Future Work Plan

This future work plan for the Ethics Group (EG) has been written paying consideration to the expanded remit of the group to include the ethical issues of all biometric identifiers. Once the remit of the EG has been finalised this future work plan will be updated.

- To ensure that all police and supplier databases containing biometric information are subject to robust governance requirements and to provide ethical advice on their operations.
- To provide support and advice on ethical matters to the Biometrics Commissioner and others as required, including police forces.
- To embed new governance arrangements and responsibilities for the EG in light of the findings of the Triennial Review of the Group¹⁵.
- To develop a set of principles and ethical values to be considered by the EG when undertaking ethical reviews for the use and retention of biometric identifiers.
- To continue to monitor and assess potential disproportionate or discriminatory effects that the use and operation of biometric databases may have on ethnic minority groups and vulnerable people.
- To review the policies and safeguards that are developed if the UK rejoins Prüm and to ensure that the international exchange of biometric information is ethical.
- To continue to monitor the treatment of children and young people in relation to DNA and fingerprint sampling and retention to ensure that they are safeguarded and their distinct rights are recognised.
- To monitor the development of Next Generation Sequencing technologies and their applications for the investigation of crimes.
- To monitor developments and consider the ethical issues surrounding rapid DNA testing at crimes scenes.
- To monitor the retention and use of custody images and the implementation of governance structures.
- To monitor the implementation of elimination databases.
- To monitor the review of errors in the DNA supply chain.
- To review the annual report of the National DNA Database (NDNAD) and Fingerprint Strategy Board and other policy and consultation documents prepared by the Home Office.
- To review policy on NDNAD access and usage and review opportunities for research using the NDNAD.

¹⁵ See: www.gov.uk/government/publications/home-office-science-non-departmental-public-bodies-ndpbs-triennial-review

Chapter 7: Resources

Costs

The Ethics Group (EG) is funded by the Home Office. Budget spend for 2016 was £2,525.

Costs were associated with the provisions of facilities for meetings and expenses properly incurred by group members in undertaking their duties.

Members are unremunerated for their activities on behalf of the EG.

Secretariat

The EG Secretariat support has been provided by the Home Office Science Secretariat, with costs for the Secretariat met from the Home Office Science Secretariat budget.

Appendix A: Biographies of Ethics Group members

Christopher Hughes, OBE (Chair)

Chris devotes his professional time to a range of part-time public and judicial appointments.

In his judicial capacity he sits in the Health Education and Social Care Chamber dealing with the rights of individuals detained in psychiatric hospitals, and in the General Regulatory Chamber resolving disputes about access to information held by public bodies (Freedom of Information), environmental issues, as well as other cases.

Among his public appointments he has served as chair of a statutory regulator and as chair of a forum advising Ministers on chemical regulation. He serves on the audit committee of the Open University and is an alternate chair of the Board of Appeal of the European Chemicals Agency. He has been a member of health and local authorities and served on a regulatory board of the Law Society. He was for many years the Chief Legal Adviser to the British Medical Association and prior to that a lawyer in local government service.

He holds degrees from Cambridge, London and the Open University and is a chartered biologist.

Dr Adil Akram

Adil is a consultant psychiatrist at South West London and St George's Mental Health NHS Trust. He is also an honorary senior lecturer at St George's, University of London. He has published on antipsychotics, perinatal psychiatry, parenting with mental illness and the social care needs of women with mental illness. He has qualifications in healthcare education and mental health research. In addition, he has a longstanding interest in genetics and medical ethics from his student days at the University of Cambridge. He has significant experience of dealing with complex ethical dilemmas and risk assessment.

Adil is also a judicial officer and medical member of the first tier tribunal service, hearing detained patient appeals under the Mental Health Act. He has detailed knowledge and experience of legislation relevant to mental health. He has worked with the General Medical Council to help to write and develop tests of competency. He is keen to contribute to public service, as demonstrated by his time volunteering as a psychiatrist at the London 2012 Olympic Games. He is also a shadow governor of the NHS Trust where he works, leading the Merton crisis resolution and home treatment team.

Dr Alan Clamp

Alan is the Chief Executive of the Security Industry Authority (SIA), a regulatory body sponsored by the Home Office. He was previously the Chief Executive of the Human Tissue Authority, and has also held senior positions at the Qualifications and Curriculum Development Agency (QCDA) and Office for Standards in Education, Children's Services and Skills (Ofsted).

Alan's experience in inspection and regulation is complemented by a background in science, including a PhD in clinical biochemistry. He also holds non-executive roles as the Director of an academy and as a member of the Qualifications Committee at the Bar Standards Board.

Dr Nina Hallowell

Nina is a Senior Researcher at the Ethox Centre, Nuffield Department of Population Health, University of Oxford, where she is involved in a programme of research on ethical issues arising from the use of big data. She has over 20 years of experience of undertaking research on the social and ethical implications of the introduction of genetic and genomic technologies in medicine, and has published widely in this field. She has qualifications in social sciences and medical law and ethics. She taught ethics at the University of Edinburgh and has been a member of a number of research ethics committees in Edinburgh, Cambridge and Newcastle.

Dr Christopher Harling, CBE

Kit retired from his career as a consultant physician in occupational medicine, Director of NHS Plus, and Senior Policy Adviser at the Department of Health in 2011. He has been a member of a number of medical advisory bodies, particularly concerning blood-borne viruses. He has a particular interest in medical ethics having chaired his specialties Ethics Committee for eight years and published guidance and book chapters in the UK and Europe. He has also taught ethics to postgraduate medical students.

Since retirement, Kit has completed a master's degree in marine biology at Plymouth University and is currently studying for a PhD in the Engineering and Environment Faculty at the University of Southampton.

Professor David Latchman, CBE

David is Master of Birkbeck College, University of London. He is also Professor of Genetics at Birkbeck and University College London (UCL).

He gained his degree at Cambridge in natural sciences tripos specialising in genetics, followed by a PhD. Following a career at UCL, culminating in Dean of the Institute of Child Health (UCL) where he was also Professor of Human Genetics, he was appointed Master of Birkbeck in 2003.

In his role as Master of Birkbeck, David serves on a number of committees including the Board of London First, Universities UK Board and the Research Policy Network.

He was appointed a Commander of the Order of the British Empire in 2010 for services to higher education.

Carol Moore, CB

Carol worked as a civil servant in the Northern Ireland Civil Service (NICS) from 1974 to 2011. As a senior civil servant, she made a significant contribution to local public service strategy, policy, and organisational effectiveness and efficiency, in functions as diverse as policing, criminal justice, culture, arts and human resources. Her most recent posts were Director of Criminal Justice (Northern Ireland Department of Justice) and Director of Policing and Security (Northern Ireland Office). She is therefore familiar with developing policy and strategy in sensitive, political environments.

Carol has considerable experience relevant to the work of the EG from her role as Director of Central Personnel for the NICS, in particular knowledge of human rights legislation and employment law in relation to discrimination. She also represented the Northern Ireland Department of Justice on the National DNA Database (NDNAD) Strategy Board for just over a year, giving her a good understanding of the technical, legal and ethical challenges surrounding the UK NDNAD.

Since her retirement, Carol has continued to contribute to public life by providing consultancy support to some Northern Ireland government departments. She also serves as an independent assessor on behalf of the Office of the Commissioner for Public Appointments (Northern Ireland) and as a member of both the Board and the Governance Committee of Northern Ireland's largest mental health charity, Praxis, which provides services across the UK and Republic of Ireland.

Isabel Nisbet

Isabel has a strong academic background in moral philosophy, with additional knowledge of medical law and ethics.

Isabel has previously held a variety of senior posts in the Civil Service, and then moved on to work in the regulation of medicine and education. She has held chief executive and director positions at several statutory regulatory bodies (including Ofqual and the General Medical Council), giving her extensive experience of dealing with complex and sensitive human rights, fairness and public confidence issues.

She is a member of the National Statistician's Data Ethics Group and of the Board of Qualifications Wales (the regulator of examinations and qualifications in Wales). She serves on the Board of Governors of two higher education institutions (the University of Hertfordshire and the British School of Osteopathy). She is also a member of the British and Irish Ombudsman Association and from 2004 to 2011 she was an independent member of the Council of St George's Medical School.

Professor Barbara Prainsack

Barbara has a PhD in political science, and is Professor of Sociology in the Department of Global Health and Social Medicine at King's College London. She is also an Honorary Senior Research Fellow at the Department of Twin Research and Genetic Epidemiology, St Thomas' Hospital. She has previously held a number of other academic positions.

Her academic interests involve exploration of the ethical, regulatory and social dimensions of biosciences, with a special emphasis on genetic technologies in medicine and forensics. Her publications at the interface of forensics and society include a book on prisoners' views of DNA evidence (with Helena Machado, PT, 2012) and has edited a book on the governance of forensic DNA databases across various jurisdictions (with Richard Hindmarsh, AU, 2010). She has also produced several publications addressing issues such as the use of 'racial' categories in DNA-based identification, and transnational bioinformation exchange.

Since 2009 Barbara has been a member of the Austrian National Bioethics Council advising the federal government in Vienna. In 2017 she was appointed a member of the European Group on Ethics and New Technologies advising the European Commission.

Professor Jennifer Temkin

Jennifer is Professor of Law at City, University of London and emeritus Professor of Law at Sussex University. She is a Bencher of the Middle Temple and a Fellow of the Academy of Social Sciences. Her specialist area is criminal justice particularly in relation to sexual offences. She has published widely in this field and her books include *Rape and the Legal Process* (2002) and *Sexual Assault and the Justice Gap* (2008) with Barbara Krahe. She has been a frequent contributor to discussion in the media. She has also engaged in training programmes for Crown prosecutors, judges, barristers and doctors. In connection with her work, she has served on the following committees:

- Old Bailey Scrutiny Committee on Draft Criminal Code, 1985–1986;
- Home Office Advisory Group on Video-Recorded Evidence in Criminal Trials [The Pigot Committee], 1988–1989;
- National Children's Home Committee of Enquiry into Children and Young People Who Abuse Other Children, 1990–1992;
- SCOSAC (Standing Committee on Sexually Abused Children), 1993–1996, Patron (with Dame Margaret Drabble);
- Justice Committee on Sexual Offences Law Reform, 1998;
- External Reference Group, Home Office Sex Offences Review, 1999–2000;
- Scientific Expert, Council of Europe's Committee of Experts on the Treatment of Sex Offenders, 2003–2005;
- Expert Group on Rape and Sexual Assault, Victims of Violence and Abuse Prevention Programme, Department of Health and National Institute for Mental Health in England, 2005–2007;
- Disability Forum, Disability Protection Project, Handicap International, 2010, Expert Advisor;
- Board of Diploma in the Forensic and Clinical Aspects of Sexual Assault (DFCASA), Society of Apothecaries of London, 2010–2012.

At City, she now teaches a course entitled *Forensic Science and the Legal Process*. She is chairing the Ethics Group's working group on Ethical Principles.

Glossary

Biometric Information	Information about an individual's physical characteristics such as fingerprints or eye colour, which are distinctive and measurable.
Biometrics Commissioner	Independently appointed post to provide oversight of the regime established by the Protection of Freedoms Act 2012 to govern the retention and use by the police in England and Wales of DNA samples, DNA profiles and fingerprints. The post has a UK-wide oversight function as regards this retention and use by the police on national security grounds.
Central Elimination DNA Database (CED)	In development: A centrally held database of DNA profiles taken from individuals who are involved in a role where there is an increased risk that they may inadvertently contaminate a sample taken from a crime scene with their own DNA, such as manufacturing or laboratory staff, crime scene officers and police personnel.
Counter Terrorism (CT) DNA Database	A DNA database operated by the Metropolitan Police Service that contains the DNA profiles obtained through searches, crime scenes and arrests in relation to counter terrorism.
Crime Scene Stain	Biological material recovered from the scene of a crime from which DNA may be able to be extracted.
Criminal Justice Sample	A sample of DNA obtained compulsorily from people arrested by the police for a recordable offence under the provisions of the Police and Criminal Evidence Act 1984.
Crown Prosecution Service (CPS)	Established in 1986, it prosecutes criminal cases investigated by the police in England and Wales. It advises police, reviews cases submitted by the police and prepares and presents papers for cases in court.
Custody Images Review	Review by the Home Office to consider the proportionality of the use and retention of custody images on a national database. The review is available at www.gov.uk/government/publications/custody-images-review-of-their-use-and-retention
Data Linkage	A process which brings together two or more sets of data from different databases, organisations or countries to enhance the information that can be obtained from the data (e.g. by combining different datasets, new patterns may become apparent)

Deoxyribonucleic Acid (DNA)	The chemical in the cells of an organism that carries that organism's heritable material used in the development, functioning and reproduction of all known living organisms. DNA is a nucleic acid and consists of two strands coiled around each other to form a DNA double helix. Each DNA strand is composed of smaller units called nucleotides and the sequence of these nucleotides encodes biological information.
DNA Profile	A numerical representation of the characteristics of certain sections of (typically non-coding) DNA obtained following the analysis of a DNA sample, which can be uploaded onto a database and compared with other DNA profiles. [See also Mixed DNA profile; Partial DNA profile]
DNA 17 Profile	A profile produced using the latest system of DNA profiling technology, which examines 16 sections of DNA plus a gender marker to produce a numerical DNA profile that can be loaded onto the National DNA Database. The methodology used creates greater discrimination between profiles than the previous Second Generation Multiplex plus (SGM+) methodology and reduces the probability of chance matches between individuals. [See also Second Generation Multiplex]
Elimination DNA sample	A DNA sample taken from an individual and used to create a DNA profile in order for that individual to be eliminated as the source of a sample found at a crime scene [see also <i>Central Elimination DNA Database</i>]
Facial Recognition System	A computer application capable of identifying or verifying a person from a digital image or a video source by comparing selected facial features from the image with those on a facial database.
Familial Searching	Involves searching the database for DNA profiles that do not match fully to a comparison profile, but where an unusually high number of loci match. This could indicate a biological relationship such as parent, child, sibling, cousin, uncle.
Forensic Science Regulator (FSR)	Ensures that the provision of forensic services across the criminal justice system is subject to an appropriate regime of scientific quality standards. The FSR works with the Home Office.
Low copy number (LCN)	A modified version of DNA profiling that is performed when the amount of DNA recovered from a biological sample is very limited. The number of Polymerase Chain Reaction (PCR) cycles is increased compared to standard SGM+, which enhances the sensitivity of the technique and improves the likelihood of detecting DNA. [See also Second generation multiplex]

Mixed DNA Profile	A profile where DNA from more than one individual is present. A mixed DNA profile is evident when more than two copies of DNA are observed at a region. [See also DNA profile]
National DNA Database (NDNAD)	Established in 1995, it is an electronic, centralised database holding the DNA profiles taken from both individuals and crime scenes. The database can be searched to provide police with a match linking an individual to a crime scene and <i>vice versa</i> .
National DNA Database Delivery Unit (NDU)	A department within the Home Office responsible for overseeing the running of the National DNA Database.
National DNA Database Strategy Board (NDNAD SB)	A board comprising representatives from the Association of Chief Police Officers (ACPO, now replaced by the National Police Chiefs Council [see below]), the Home Office, the DNA Ethics Group and the Forensic Science Regulator as well as representatives from other bodies that provides governance and oversight for the operation of the NDNAD.
National Police Chiefs' Council (NPCC)	The NPCC bring together the 43 operationally independent and locally accountable chief constables and their chief officer teams to coordinate national operational policing. They work closely with the College of Policing.
Next Generation Sequencing (NGS) or Massive Parallel Sequencing (MPS)	These are the terms (often used interchangeably) to describe a number of high throughput approaches to DNA sequencing that allow the sequencing of DNA much more rapidly and cheaper than earlier technologies.
ParaDNA® Instrument	An instrument that can be used at a crime scene and is able to produce a DNA profile from a sample within 75 minutes. ParaDNA® profiles include 5 short tandem repeats (STRs) and a gender test and therefore the discrimination power provided from these profiles are much less than obtained from full Second Generation Multiplex plus (SGM+) and DNA17 profiles. [See also DNA profile; DNA 17 profile; Rapid DNA technology; Second Generation Multiplex; Short tandem repeats]
Partial DNA Profile	This is the term used to describe a profile when results have been obtained at some but not all of the sections of DNA that were analysed. Partial profiles are often obtained from samples recovered from crime scenes as the DNA may have been subject to conditions that have degraded it, which means that not all regions of DNA of interest are intact. [See also DNA profile]

Phenotype	The physical manifestation of an individual's genotype combined with the effects of exposure to environmental factors (e.g. the hair colour, facial features, or personality traits of a person).
Phenotypic profiling	The use of DNA analysis in order to obtain information about externally visible traits, and/or the likely ethnic background, of a person. The information cannot be obtained from traditional short tandem repeat (STR) profiles but requires a special type of analysis. [See also Short tandem repeat]
Protection of Freedoms Act (PoFA)	An Act of Parliament of the UK that was introduced by the Home Secretary in 2011 and sponsored by the Home Office. In May 2012 the Bill completed its passage through Parliament and received the Royal Assent.
Prüm Agreement/ Convention	A convention that was signed in May 2005 by Austria, Belgium, France, Germany, Luxemburg, the Netherlands and Spain and is open to all EU Member States. It enables the signatories to be able to exchange data regarding DNA, fingerprints and vehicle registrations of persons suspected to be cooperating in terrorism, cross-border crime and illegal migration.
Random Match Probability	The probability that a DNA profile matches a randomly drawn person from the general population. If the random match probability is high, then any suspected link between the DNA and a person needs to be treated with caution. [See also DNA profile]
Rapid DNA Technology	Technology that has the ability to produce a DNA profile much faster than can be done using conventional technology, and is also portable. [See also DNA profile]
S and Marper	This refers to a case where S joined with Marper to bring a case to the European Court of Human Rights after their applications to the English courts had failed. They objected to the retention by the police of their DNA samples, profiles and fingerprints as they had not been convicted of any offence. The police were entitled to retain them under the law then in force. S and Marper relied principally on Article 8 of the European Convention on Human Rights, which protects the right to privacy. The Court found in their favour. It held that the margin of appreciation had been exceeded and their right to privacy had been infringed. This decision led eventually to the passing of the Protection of Freedoms Act 2012, which changed the law on the retention of samples, profiles and fingerprints. This in turn led to the removal of millions of profiles from the National DNA Database. [See also National DNA Database; Protection of Freedoms Act 2012]

<p>Second generation multiplex (SGM, SGM+)</p>	<p>A system of DNA profiling that was used in the UK until July 2014. It examines ten sections of DNA plus a gender marker to produce a numerical DNA profile that can be loaded onto the National DNA Database. At each of the ten areas an individual has two copies of DNA, one inherited from each of their parents. [See also DNA profile; National DNA Database]</p>
<p>Short Tandem Repeat (STR)</p>	<p>Sections of DNA dispersed within coding and non-coding regions of the human genome that contain hundreds of repeats of a short sequence of DNA (two to six nucleotides). Different people have different numbers of repeats and when a number of regions are analysed, the chance of two people having the same number of repeats at all loci is small. This is the underlying principle of DNA profiling. [See also DNA profile]</p>
<p>Single Nucleotide Polymorphism (also referred to as SNPs – pronounced “snips”)</p>	<p>This is a variation at the level of single nucleotide bases that occurs at a specific position in a sequence of DNA.</p>
<p>Y-short tandem repeat (STR) profile</p>	<p>See Y-STR profile but restricted to regions found only on the Y-chromosome (which is only present in males). [See also Short tandem repeat]</p>

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