



Biometrics and Forensics Ethics Group

Annual Report

2017

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Chair's Introduction



This annual report marks a period of transition in which the remit of the National DNA Database Ethics Group (NDNAD EG) has expanded to meet current needs for ethical review. The NDNAD EG was established ten years ago to provide Home Office Ministers with independent ethical advice on the operation of the National DNA Database. Those ten years have seen a rapid increase in the availability and sophistication of forensic technologies used to identify individuals who have committed a crime and to secure justice for those who fall victim to crime.

Developments in technological capability have facilitated the uptake of techniques traditionally used in a forensic setting (such as fingerprinting) by public services and businesses alike to identify people quickly and accurately according to their unique biometric identifiers. Given the rapid widespread adoption of these technologies, it is vital that ethical oversight is maintained to ensure that the social, legal and moral benefits that these technologies offer can be obtained without the potential harms to individuals, such as the loss of the right to a private life. As such, in 2017 the Home Office took the decision to extend the remit of the NDNAD EG to cover all forensic identification techniques including, but not limited to, facial recognition technology and fingerprinting. This is a decision that I welcome wholeheartedly.

I am pleased then, to present the tenth and final annual report of the NDNAD EG, and the first annual report of the Biometrics and Forensics Ethics Group (BFEG).

Commensurate with its expanded remit, the BFEG took a first look at a range of new technologies including live facial recognition, which is currently being trialled by police forces across the UK as a means of identifying wanted individuals in public spaces. It will be vital to develop an understanding of the societal impacts related to the deployment of new technologies in policing. Open and transparent communication is necessary surrounding such initiatives to support the principles of informed policing by consent.

Discourse by the BFEG this year was underpinned by the use of a set of ethical principles, developed during 2017 by Professor Jennifer Temkin with the assistance of a sub-committee, to ensure consistency and transparency when assessing a new proposal. Notably, these principles were proposed as a framework for ethical considerations relating to the use of biometric data and technologies in Scotland by an independent advisory group set up by Scottish Ministers.

The transformation of the NDNAD EG into the BFEG required an extensive recruitment campaign to enable a matching of expertise with the BFEG's remit. Applications were from a diverse range of professional backgrounds, including genetics, forensic science, biometric data, political science, data protection, the ethics of consent, the police service, social science and legal services. I look forward to welcoming our new colleagues in 2018.

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

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

Christopher Hughes, OBE

Chair, Biometrics and Forensics Ethics Group

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

Background

The Home Office Biometrics and Forensics Ethics Group (BFEG) is an advisory non-departmental public body (NDPB). The BFEG provides strategic independent support, advice and challenge ensuring that the evidence underpinning biometrics¹ and forensics policy development within the Home Office is robust. 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: <https://www.gov.uk/government/organisations/biometrics-and-forensics-ethics-group>

In line with recommendations made within the Triennial Review of Home Office Science Bodies,² the National DNA Database Ethics Group (NDNAD EG) was replaced by the BFEG on 20 July 2017.

The triennial review found that:

“reviewing the public call for evidence results and the interviews³ it became clear that the work of the BFEG is seen as essential”.

The BFEG has retained the active work programmes of the NDNAD EG as well as providing advice on a range of new biometric and forensic topics.

Remit

The BFEG’s focus is strategic and broad, complementing the legal and regulatory functions of the Biometrics Commissioner⁴ and the Forensic Science Regulator⁵. The BFEG’s remit includes consideration of the ethical impact on society, groups and individuals of the capture, retention

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- 1 Biometric attributes are generally universal and permanent. They can be measured and analysed to produce a digital signature that is sufficiently distinctive to an individual to enable their identification. Some commonly measured characteristics for identification of an individual include fingerprints, face and voice.
 - 2 Available from: <https://www.gov.uk/government/publications/home-office-science-non-departmental-public-bodies-ndpbs-triennial-review>
 - 3 The review was conducted on behalf of the Secretary of State and was overseen by Chris Batchelor, Head of the Home Office Cross Cutting Team, who is independent of the body and sponsorship function
 - 4 The Biometrics Commissioner provides independent oversight of the Protection of Freedoms Act 2012 and keeps under review the retention and use by the police of DNA samples, DNA profiles and fingerprints.
 - 5 The Forensic Science Regulator ensures that the provision of forensic science services across the criminal justice system is subject to an appropriate regime of scientific quality standards.

and use of human samples⁶ and biometric identifiers⁷ for purposes that fall within the purview of the Home Office, including the differentiation between, or identification of, individuals.

The remit for the BFEG includes, but is not limited to consideration of the ethical aspects of:

- the application and operation of technologies that produce biometric and forensic data and identifiers;
- biometric and forensic services currently provided, techniques employed and proposals for new services and techniques;
- applications for research involving access to biometric or forensic data; and
- other matters relating to the management, operation and use of biometric or forensic data.

The BFEG may also, at the request of Ministers, consider other ethical issues relating to scientific services provided to the police service and other public bodies within the criminal justice system.

Mission

The BFEG aims to ensure that the culture of the operational frameworks to support the provision of biometric and forensic services in England and Wales place ethical considerations at the forefront of activities at all times.

Values

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

- that there are clear, detailed, open and transparent rules governing the everyday operations of the BFEG to ensure that processes are just and lawful;
- that the collection and retention of biometric identifiers should be appropriate and proportionate and should not discriminate against members of any section of society;
- that the operations of the BFEG are always 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 BFEG 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 provide a biometric identifier are treated fairly with dignity and respect, and that there is an established independent appeals process to guarantee their right to an effective remedy;

6 Human samples include biological samples of cells or tissues that originate from the human body and include, but are not limited to skin, blood, hair, saliva and semen.

7 These include, but are not limited to, DNA, fingerprints and facial images.

- that the public is fully informed about all aspects of the BFEG in ways that are understandable;
- that research using Home Office biometric databases is only permitted after full consideration that it is fully compatible with these principles and has been submitted to independent scientific and ethical scrutiny; and
- 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.

Standards in Public Life

BFEG members are expected to operate in accordance with the seven principles of public life.⁸ The principles state that holders of public life should act with selflessness, integrity, objectivity, accountability, openness, honesty, and leadership.

8 Available from: <https://www.gov.uk/government/publications/the-7-principles-of-public-life>

Chapter 2: Membership of the Biometrics and Forensics Ethics Group

Current members of Biometrics and Forensics Ethics Group (BFEG) as of January 2017.

Chair: Christopher Hughes OBE

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

The biographies of members can be found in Appendix A.

The following individuals/organisations are represented at BFEG meetings in the capacity as observers:

- the Home Office;
- the Forensic Information Databases Service;
- the Forensic Science Regulator;
- the Biometrics Commissioner.

Chapter 3: Activities of the Biometrics and Forensics Ethics Group

Meetings

This year there were four plenary meetings of the group; two as the National DNA Database Ethics Group (NDNAD EG) and two as the Biometrics and Forensics Ethics Group (BFEG). The minutes of these meetings were published and can be found on the gov.uk website via the web links:

<https://www.gov.uk/government/publications/national-dna-database-ethics-group-meeting-minutes>

<https://www.gov.uk/government/organisations/biometrics-and-forensics-ethics-group/about/membership#meeting-minutes>

At these meetings the BFEG was provided with presentations by:

- The Metropolitan Police Service on their Y-STR pilot please see chapter 4 for more information;
- The Home Office Crime, Policing and Fire Group on the Home Office Strategic Data Board;
- The Home Office International Biometric Exchange policy team, on Prüm, a European Union (EU) Directive please see chapter 3 for more information;
- The Independent Advisory Group (IAG) on the Use of Biometric Data in Scotland;
- The Home Office National Law Enforcement Data Programme (NLEDP);
- The National Police Chief's Council (NPCC) on the Transforming Forensics programme; and
- The Metropolitan Police Service on police use of technology for live facial recognition.

Home Office Business

The BFEG was asked to provide strategic input to a variety of Home Office business work-streams. A number of these are highlighted below.

- **Forensic Information Databases Service Strategy Board**

The BFEG continued to work closely with the Forensic Information Databases Service Strategy Board (FINDS SB), previously known as the National DNA Database Strategy Board. The FINDS SB provides governance and oversight over the operation of the National DNA Database (NDNAD) and the national fingerprint database. The BFEG Chair sits on the FINDS SB as an *ex-officio* member and the BFEG has been invited to advise on FINDS SB work programmes. The BFEG was asked for views on a range of issues presented by FINDS, such as the development of a Y-STR database international exchange policy. For more information see Chapter 4.

- **Home Office Biometrics Programme**

The Home Office Biometrics (HOB) programme has been designed to deliver a unified biometric service for the Government that is effective, adaptable, efficient, proportionate and lawful. The programme consists of three main modalities: DNA; fingerprint identification; and facial recognition. The programme will run until 2020, and provides continuity of existing services and cost savings while developing future capabilities. In 2016 the BFEG established a working group to provide ethical and privacy advice on a range of privacy impact assessments (PIAs) that are integral to the HOB programme. The group met on four occasions during the year to consider PIAs for the programme, assisting the production of more complete and robust PIAs. For more information see Chapter 4.

- **Review of Custody Images**

In February 2017 the Home Office published its review of custody images.⁹ The review did not align with the BFEG'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. After considering the Home Office review, the BFEG published new advice¹⁰ to Ministers and made two key recommendations.

These recommendations and further details on the BFEG's work on custody images, including the Home Office's response to the recommendations, are provided in Chapter 4.

- **Retention of custody images, DNA profiles and fingerprints from convicted persons until they are 100 years old**

The BFEG was also invited to consider the ethical issues associated with retaining the biometric data of individuals convicted of a crime until an individual was 100 years old. Currently the police retain Police National Computer (PNC) records along with associated biometric data from convicted individuals indefinitely. The BFEG recognised that the issue of retention periods, and the possible need to revisit them in a systematic fashion, will require consideration of the available data and the modelling of possible alternative approaches. Further details on the BFEG's work on retention regimes is provided in Chapter 4.

- **National Law Enforcement Data Programme**

The BFEG was provided with a presentation on the Home Office National Law Enforcement Data Programme (NLEDP). The NLEDP was established to replace the Police National Computer (PNC) and the Police National Database (PND). The NLEDP sits within a wider portfolio within the Home Office, which also includes the HOB programme and programmes to upgrade the emergency services network and the Automatic Number Plate Recognition system. In future there would be the possibility for these systems to interact with each other and therefore it would be necessary to explore the aggregated implication of these interactions. The BFEG provided some initial observations on the NLEDP and agreed to provide ongoing ethical oversight and scrutiny in the future.

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

10 Available from: <https://www.gov.uk/government/publications/bfeg-response-to-the-home-office-custody-images-review>

- **Prüm**

The BFEG was provided with an update on Prüm, a European Union (EU) Directive that allowed the fast and efficient exchange of DNA, fingerprints and vehicle registration data between EU Member States. In July 2013 the UK Government opted out of all police and criminal justice measures agreed before the Lisbon Treaty¹¹ came into force. Following the production of a business and implementation case,¹² including a small-scale pilot of Prüm, the UK Parliament voted to re-join Prüm. The UK's request to re-join was accepted by the EU in May 2016. The BFEG is formulating advice to Home Office Ministers on the implementation of Prüm. This advice is expected to be published in 2018.

BFEG Chair Representation at Other Meetings

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

- The Chair met the Biometrics Commissioner Professor Paul Wiles to discuss ongoing issues concerning biometrics. These included:
 - the use made of National Security Determinations (NSDs) which are recommendations made on the grounds of national security;
 - arguments that all biometrics have the same governance and retention framework;
 - the transparency of matching algorithms used in biometrics;
 - concerns that young people who have their DNA taken might not be informed that they have the right to request that their DNA be destroyed;
 - how best complex forensic evidence could be presented in courts so that it could be understood by a jury;
 - the requirement for a cost–benefit analysis of DNA evidence and statistics; and
 - the proportion of those cases involving DNA that led to a criminal justice action.
- The Chair met Baroness Williams, Home Office Minister of State for Countering Extremism and Parliamentary Under Secretary of State, to discuss the retention of custody images, and the priorities for the BFEG for the year.

11 See: <http://www.lisbon-treaty.org/wcm/the-lisbon-treaty.html>.

12 See: <https://www.gov.uk/government/publications/prum-business-and-implementation-case>

Chapter 4: Work of the Biometrics and Forensics Ethics Group during 2017

Ethical Principles

During 2016 the Biometrics and Forensics Ethics Group (BFEG) commenced development of a set of high-level ethical principles for the consideration of ethical issues in relation to biometrics and forensics. A working group, led by Professor Jennifer Temkin, was established to undertake this work.

The BFEG agreed that the principles should be broad and provide a degree of structure, but not be prescriptive or restrain thinking. The group also agreed that the principles should be accompanied by a set of open questions to facilitate discussions. The principles were designed:

- to provide a framework to embed ethical considerations into project, policy and research work; and
- to enhance public trust in biometric and forensic services.

An extensive literature review from a variety of disciplines and philosophies was undertaken to underpin the work.

Retention of DNA Profiles, Fingerprints and Custody Images From Convicted Persons Until They Are 100 Years Old

In the commissioning letter for the BFEG for 2017, the group was invited to consider the ethical issues in relation to the retention of DNA profiles, fingerprints and custody images from convicted persons until they are 100 years old. When an individual is arrested, a Police National Computer (PNC) record is created. This record contains information about the arrest, personal details of the suspect and links to biometric data including DNA profiles on the National DNA Database (NDNAD) and fingerprint records on IDENT1. Pictures of a suspect's face are taken whilst the suspect is in a custody suite. These facial images are stored on local computer systems. Many are uploaded to the Police National Database (PND) – a system used to support cross-force cooperation in the detection, investigation and prosecution of crime.

Previously, deletion of police records and therefore biometrics occurred when an individual reached 100 years of age. Powers to allow the indefinite retention of biometrics from convicted individuals were introduced in 2001 and 2003, and were permitted to continue under the Protection of Freedoms Act 2012 (PoFA).¹³ In order to provide clarity to the police, and to address potential disproportionality within the current system, it was recommended that a

13 The Protection of Freedoms Act 2012 (PoFA) required the deletion of DNA profiles and fingerprints from people who were not charged or who were acquitted but permitted the continued indefinite retention of biometric data from convicted individuals.

specific limit on the retention of biometric data from convicted individuals should be established; 100 years was suggested based on the historic limit that previously applied to PNC records.¹⁴

The BFEG was asked to provide advice specifically in relation to the retention of biometrics. At its meeting in June 2017, the BFEG held a preliminary discussion of these issues and published its advice in a letter to its policy sponsor.¹⁵ The key points of the discussion are summarised below.

- The majority of members of the BFEG favoured a fixed retention period for biometric data from convicted offenders rather than an indefinite retention period. They held the view that 100 years of age was a suitable period of retention that encompassed the entire life span of most individuals whose records were held on the PNC. In contrast a minority of members favoured an indefinite retention period for biometric data for all convicted offenders. A key element of the argument was that introducing fixed retention periods would divert resources away from areas of higher priority and that indefinite retention would assist with the investigation of historic offences.
- The majority of members thought that there would be value in considering differential retention periods for certain individuals, specifically, those convicted at a relatively young age (but above 18 years of age), of offences that, whilst relatively minor, were sufficiently serious to allow for their biometrics to be retained indefinitely under the current legislation.
- In their considerations members highlighted that research into patterns of reoffending was limited, making it difficult to understand the utility of retaining an individual's biometric data to identify a reoffender either indefinitely or for long periods of time since their last conviction. Members proposed that research should be undertaken to examine patterns of reoffending.

The BFEG was thanked for its advice by the Home Office policy sponsor¹⁶ and informed that the sponsor would be submitting observations to the European Court of Human Rights (ECHR) concerning the ongoing appeal case of *Gaughran v. Chief Constable of the Police Service of Northern Ireland*¹⁷. The BFEG agreed that it would establish a working group to consider the matter further if the ECHR ruled that a significant change in government policy was required.

Custody Images Review

As of February 2018 there were 21 million images on the PND including facial images (some duplicates), as well as images of marks, scars and tattoos. In February 2017 the Home Office published a review of custody images to provide specific guidance to police forces as to how long they should retain custody images.¹⁸ The review recommended that:

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- 14 The retention of PNC records is regarded as a separate matter to biometric retention, given the additional information contained within PNC records and the wider purposes for which PNC records are retained, for example, to support criminal investigations, for safeguarding and for disclosure to employers (subject to rehabilitation of offenders legislation).
 - 15 Available from: <https://www.gov.uk/government/publications/ethical-advice-on-the-retention-of-biometrics-from-convicted-persons>
 - 16 Response available from: <https://www.gov.uk/government/publications/home-office-response-on-the-retention-of-biometrics-from-convicted-prisoners>
 - 17 The appellant in this case was convicted for driving whilst under the influence of excess alcohol, but claimed that retention of his biometric data indefinitely was contrary to Article 8 of European Convention on Human Rights.
 - 18 Available from: <https://www.gov.uk/government/publications/custody-images-review-of-their-use-and-retention>
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- there should be no PoFA-style automatic removal of custody images from police records;
- individuals should be able to request the deletion of their custody image; and
- deletion should be moderated by the nature of the offence and the age of the offender.

The review recommended the presumption of deletion for non-convicted individuals but at the discretion of the relevant chief police officer. The review further recommended the regular review of images to facilitate deletion and that the retention of custody images should be considered again in 2020.

At its meeting in June 2017, the BFEG considered the ethical implications of the retention regimes for custody images detailed within the Home Office review. The group took into account the need for the retention regimes proposed to strike the correct balance between the rights of individuals and the operational needs of the police and the criminal justice system. Consideration was given to the constraints imposed on many police forces by use of legacy police information technology (IT) systems without automated search or delete functionality.

The BFEG published its advice in a letter to its Home Office policy sponsor.¹⁹ The group noted:

- that the current retention regime was not fit for purpose and potentially disadvantaged certain groups, such as those less likely to engage in the criminal justice system and those for whom English was not their first language;
- there was insufficient published evidence to establish the position that the use of facial images was less intrusive than DNA profiles;
- that a public consultation would be required in advance of the formulation of future policy concerning the use and retention of custody images; and
- that an IT system with the capability to automatically delete custody images was required.

The following recommendations were made.

- Recommendation 1: A public consultation should be undertaken, prior to the next scheduled custody images review, to ascertain the views of the public in relation to the retention and use of custody images.
- Recommendation 2: Future IT systems should allow for the centralised storage and automatic deletion of custody images, and the retention regime governing these IT systems should be agreed prior to the development of new technology.

The Home Office responded that the decision to hold a public consultation rested with the Minister and could not be taken ahead of the next Custody Images Review in 2020.²⁰ The response noted that the current phase of the Home Office Biometrics (HOB) programme involved replacing the facial matching element of the existing PND system and that work was proceeding to determine future functional IT needs.

19 Available from: <https://www.gov.uk/government/publications/ethical-advice-on-the-retention-of-biometrics-from-convicted-persons>

20 Home Office response on the retention of biometrics from convicted prisoners available from: <https://www.gov.uk/government/publications/home-office-response-on-the-retention-of-biometrics-from-convicted-prisoners>

Biometric Data in Scotland

The BFEG was informed that the police use of biometric data in Scotland was not overseen or regulated by an independent body and that the Scottish Government had established an advisory group to review this position. In June 2017 the Scottish Government appointed John Scott QC to chair the Independent Advisory Group (IAG) on the use of biometric data in Scotland. The group was asked:

- to consider the recommendations contained in the report of Her Majesty's Inspectorate of Constabulary in Scotland's Audit and Assurance Review of the use of the facial search functionality; and
- to provide recommendations to Ministers on a policy and legislative framework.²¹

The BFEG welcomed the suggestion to establish independent oversight of biometrics in Scotland, but cautioned that there was inherent value in establishing separate oversight organisations. It was noted that the Biometrics Commissioner (BC), the Forensic Science Regulator (FSR) and the BFEG had distinct roles in overseeing legal compliance by the police, scientific standards within forensic science providers (FSPs) and broader ethical and societal considerations, respectively.

BFEG members also cautioned against combining ethical and technical oversight in one organisation, highlighting that this had reduced the time devoted to ethical considerations within existing groups that had adopted this approach. Members emphasised that the remit of the new oversight organisation should be broad enough to encompass all current biometrics, as well as future biometric technologies, and that broad ethical principles applied across different biometric and forensic disciplines. The role of digital forensics in police investigations was cited as an example of a discipline that would need increased ethical scrutiny in the future.

Y-STR: Metropolitan Police

Y-STR profiling is a technique that is increasingly 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 are present.

The BFEG was provided with a briefing paper on Y-STRs that had been prepared by the Metropolitan Police Service (MPS) for the Forensic Information Databases Service Strategy Board (FINDS SB). The paper recommended:

- agreement for the continuation of the MPS Y-STR pilot and the storage of Y-STR profiles on a locally held MPS Y-STR database;
- the HOB programme to develop a national Y-STR database; and

21 Terms of reference available from: <https://www.gov.scot/About/Review/biometric-data/termsreference>

- the development of a UK-focused statistical tool for use by all FSPs to evaluate the weight of Y-STR evidence.

The BFEG was asked if it would assess the requirements for the inclusion of Y-STRs within the HOB programme if this were to go ahead. It was noted that it would be a policy decision as to which records would be retained for Y-STRs. Once this had been decided the HOB programme would be asked to construct a Y-STR database based on those requirements. The BFEG agreed to assess the requirements for the inclusion of Y-STRs within the HOB programme at the appropriate time.

The BFEG discussed the continuation of the MPS pilot. Members were broadly supportive of the Y-STR pilot and its potential use in the investigation of sexual assault cases. Concerns were raised that without proper evaluation the pilot would, in effect, become the implementation of Y-STR profiling and a locally held Y-STR database by the MPS. The importance of having a centrally managed and governed database, which provided transparency both for autosomal DNA and Y-STRs, was emphasised.

The BFEG was supportive of the extension of the MPS Y-STR pilot for a defined period of time, such as a further 12 months, with the caveat that details on the criteria for the evaluation of the pilot should be shared with the BFEG.

Forensic Information Databases Service

The BFEG was informed that the NDNAD SB would be changing its name to FINDS SB after taking on oversight of the criminal fingerprint database, IDENT1. This consolidation would ensure that the same rigorous processes were implemented both for the fingerprint and the National DNA databases.

National DNA Database Delivery Unit research form

The BFEG was asked to review a form completed by researchers when submitting requests to access DNA samples, profiles and/or data held on the NDNAD. The form was used alongside questions developed by the BFEG requiring researchers to compile ethical information in relation to their research. It was agreed that signposting to the BFEG's more recently developed ethical principles should replace the questions on the NDNAD Delivery Unit (NDU) form and that the form should be modified to incorporate ethical issues rather than their being in a distinct section. Additionally, the NDU form should include a link to the data management plan rather than listing all the legal, security and ethical issues. It was agreed that the NDU form should be updated to incorporate the entire remit of the FINDS SB.

The BFEG recommended that any application to undertake research on information held on the NDNAD should be reviewed by a committee with the appropriate expertise. It was agreed that a sub-group of the BFEG should be established to undertake ethical reviews of research proposals.

Safeguarding

An outline of the role of FINDS in safeguarding²² was presented to the BFEG. The databases supported safeguarding by:

- maintaining appropriate governance structures to support the use of data;
- reassuring the vulnerable (through the Missing Persons Database); and
- providing closure to families through the Missing Persons Database.

In future, broader consideration needed to be given to the appropriate and proportionate use of databases for safeguarding and determination of how the police could be supported to promote safeguarding.

The BFEG welcomed the proposals, which provided the opportunity to enhance the benefits of safeguarding and decrease the risk of unintended negative consequences. It was noted that safeguarding hinged upon the recognition of the value of information and that for the maximum impact there was a need to ensure that both appropriate and adequate information were made accessible to individuals when making decisions. In relation to the detection of crime, a distinction should be made between information that was certain and information that was based on 'guesswork'. It was also noted that challenges would include:

- false positives and outliers where the observation point was distant from other observations within the dataset; and
- that it would be important to ensure that outliers and limitations of the data were understood.

Y-STR Database

The BFEG heard that FSPs in the UK were using a worldwide, subscription-free Y-haplotype reference database (YHRD) to facilitate Y-STR analysis. The database was populated with profiles from across the world, and although a large number of UK profiles had been added recently, these still represented a relatively small proportion of the total database resulting in restricted utility. Furthermore, the worldwide YHRD lacked independent validation and did not allow for the UK to validate functionality nor to develop new applications, such as alternative statistical interpretation modules. Consequently, there was interest amongst FSPs for a UK-specific YHRD to be developed.

BFEG members expressed concerns regarding the establishment of a new database that would allow paternal lineages via the Y-chromosome to be determined (and the potential for the criminal acts of male individuals to result in the disproportionate implication of their male relatives in investigations). Y-STR data had the potential to be used for intelligence purposes to predict characteristics such as presumed ethnicity, and so proper regulation and safeguarding of the data would be necessary.

Members emphasised the importance of maintaining public confidence in the use of the NDNAD, and the need for public consultation was discussed. It was emphasised that governance structures specific to the oversight of Y-STR data would have to be introduced

²² Safeguarding as a general concept is the protection of individuals from harm by putting appropriate measures in place.

into the NDNAD to ensure that proper safeguards are in place. In addition, it was highlighted that the establishment of Y-STR intelligence databases, which would hold personal information, presented a separate and potentially greater need for robust ethical consideration.

Forensic Science Regulator

The 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 BFEG during 2017.

The FSR sought feedback and ethical advice from the BFEG on two guidance documents regarding DNA mixture interpretation. A consultation had been launched on two guidance documents developed by the FSR on DNA mixture interpretation (FSR-G-222)²³ and software validation for DNA mixture interpretation (FSR-G-223)²⁴. Whilst the documents were technical guidance and primarily aimed at the scientists who worked in this area, they could be referred to in court. The BFEG decided that it would not comment further on these documents but welcomed them as providing a clear scientific standard across all FSPs.

Biometrics Commissioner

The BC was established following the Protection of Freedoms Act 2012 and the role includes the oversight of the retention and use of DNA samples, DNA profiles and fingerprints. In terms of the Police and Criminal Evidence Act 1984 (PACE), the BC had oversight of the indefinite retention of data of those people convicted in England and Wales, and managed the limited retention of information related to those who were charged.

The BFEG was presented with the 2016 annual report of the BC, published on the 13 September 2017,²⁵ and asked to note the report and highlight areas of mutual interest that it wished to discuss further with the BC. The BFEG shared the BC's concern regarding the reported unacceptably high error rates in DNA sampling by police forces. Sources of error included:

- two samples being placed in the same tube;
- the wrong person's details entered on the sample bag;
- the sample being lost.

The NDNAD SB had identified the problem as being in need of urgent investigation and improvement. The BFEG indicated that it would continue to scrutinise this issue and collaborate with the BC in this area.

23 Available from: <https://www.gov.uk/government/consultations/dna-mixture-interpretation-draft-guidance>

24 Available from: <https://www.gov.uk/government/consultations/dna-mixture-interpretation-draft-guidance>

25 Available from: <https://www.gov.uk/government/publications/biometrics-commissioner-annual-report-2016>

Transforming Forensics Programme

The Transforming Forensics programme is funded by the Police Reform and Transformation Board. The programme aimed to improve forensic delivery in England and Wales by providing:

- modern, efficient and world-leading capabilities; and
- consistent and high-quality delivery, innovation, training and support.

BFEG members were informed that the programme was at an early developmental stage and that delivery would be staged with initial deliverables related to:

- fingerprint use;
- helping to improve sharing and networking of data and capabilities;
- improving front line digital technology and digital forensics; and
- assisting the police to achieve accreditation to the FSR standards.

Members were informed that the programme teams would proactively liaise with the BFEG as the Transforming Forensics programme was implemented.

Advice Sought From the Metropolitan Police Service

The BFEG had been asked for advice by the MPS regarding a DNA profile provided to them by a television company that suspected an individual of committing a murder. The murder had been committed in the UK, but the implicated individual was currently residing abroad. A representative of the television company had travelled to the country of residence of the individual, where UK laws on DNA theft did not apply. Here a covert sample of the individual's DNA was obtained from drinks container and used to generate a DNA profile. The MPS had been approached to compare the DNA profile of the suspect with a DNA profile obtained from the murder scene. The BFEG was asked whether it was ethical to make the comparison.

The BFEG held the view that if the MPS suspected the individual to be involved in a murder, they should work with officials in the country where the individual lived to legitimately obtain a DNA profile from the suspect. The BFEG considered the issue on the basis that this option was not available to the MPS.

Concerns were raised by BFEG members regarding the legitimacy of the process by which the DNA profile had been obtained. Members agreed that the DNA profile had been obtained deceitfully and voiced concerns as to whether this approach should be encouraged. The BFEG balanced these views against the potential to assist in a murder investigation and bring a person to trial or exonerate a suspect. Although there were two dissenting views, the BFEG agreed, by a majority, that the balance fell in favour of allowing the comparison. The BFEG made this decision on the basis that any extradition or trial would only come about if further legitimate DNA profiles were obtained and compared with the crime scene sample and on the basis that all other proportionate, alternative means, such as obtaining the DNA sample without deceit, had been ruled out by the MPS.

Live Facial Recognition

The BFEG was asked for its views on the preliminary findings of the MPS regarding its use of live facial recognition. To date trials of the technology had been conducted at the Notting Hill Carnival in 2016 and 2017, and at a Remembrance Day event at the Cenotaph in 2017 to determine if live facial recognition was operationally possible and useful to policing.

BFEG members were informed that the utility of facial imaging technology cut across the purviews of different regulators and advisory groups. It involved biometrics being used through surveillance in the public domain, with live access to a police watch list. It was noted that oversight of use was through the offices of the Information Commissioner, the Surveillance Camera Commissioner (SCC) and the BC.

Current work comprised trials of the live use of facial recognition in a static area in a public space and was wholly separate from conventional CCTV. The system was deployed using a camera with a fixed field of view. A watch list, bespoke to each deployment, was created; as individuals walked into the field of view their images were checked against the watch list. Leaflets and large dot matrix signs were deployed at the events to notify the public that the trial was occurring.

Members noted the importance of informing the public of the boundaries of this project and its future uses, and to be explicit, open and proactive in stating that it was not to be used to gather intelligence covertly or to generate a soft watch list using social media. It was concluded that a BFEG working group would be established in 2018 to consider the ethical issues associated with the deployment of live facial recognition in greater depth.

Home Office Biometrics Programme

The HOB programme was established to converge Home Office biometric systems into a single, shared service environment to enable the delivery of a unified biometric service. The programme comprised three main modalities: DNA; fingerprint identification; and facial recognition. The HOB programme was expected to conclude in 2020 and would provide continuity of existing services as well as developing future capabilities. In 2016 the BFEG established a working group, led by Isabel Nisbet, to provide ethical and privacy advice on a range of privacy impact assessments (PIAs).

In 2017 the working group provided advice on the overarching PIA for the HOB programme in addition to a range of pilots conducted by the HOB programme. These included the updated LiveScan system,²⁶ and the deployment of Mobile ID²⁷.

Throughout the year the working group identified a number of potential issues resulting from the programme. These included:

- the complexity and risk associated with the transfer of data from one system to another;
- the protection of the public when data were transferred;

26 LiveScan units are deployed in custody suites and allow for suspects' fingerprints to be instantly compared with a national database, IDENT1.

27 Mobile ID is a handheld scanner connected to a smartphone that allows frontline officers to confirm subject identities against the PNC and Immigration Asylum Biometric System (IABS) databases.

- whether the combination of datasets would result in individuals gaining greater access to data than was originally intended;
- the sensitivity of both data and metadata²⁸; and
- ensuring that checks were not skipped, despite tight deadlines.

28 Metadata are data that describe other data.

Chapter 5: Recommendations

Below is a summary of recommendations made by the Biometrics and Forensics Ethics Group (BFEG) in this report.

1. A public consultation should be conducted, prior to the next scheduled custody images review, to ascertain the views of the public in relation to the retention and use of custody images.
2. Future IT systems should allow for the centralised storage and automatic deletion of custody images. The retention regime governing these IT systems should be agreed prior to the development of new technology.
3. It will be necessary to explore the aggregated implication of interactions between the Home Office National Law Enforcement Data Programme (NLEDP), the Home Office Biometrics (HOB) programme, and programmes to upgrade the emergency services network and the Automatic Number Plate Recognition system as these may interact with each other in the future.
4. The majority of members of the BFEG favoured a fixed retention period for biometric data from convicted offenders over an indefinite retention period. They held the view that 100 years of age was a suitable period of retention given that it encompassed the entire life span of most individuals whose records were held on the PNC. A minority of members of the BFEG favoured an indefinite retention period for biometric data for all convicted offenders. A key element of the argument against a fixed retention period was that it would divert resources away from areas of higher priority and that indefinite retention would assist with the investigation of historic offences.
5. Most members of the BFEG also thought that there would be value in considering differential retention periods for certain individuals. Specifically, those convicted at a relatively young age (but above 18 years of age) of offences which, whilst relatively minor, were sufficiently serious to allow for their biometrics to be retained indefinitely under the current legislation.
6. The BFEG highlighted that research into patterns of reoffending was limited which made it difficult to understand the utility of holding biometric data from an individual indefinitely or for long periods of time, following their latest conviction. The BFEG would be supportive of commissioning research that would provide evidence of patterns of reoffending.
7. Independent oversight of biometrics in Scotland is welcomed, but there is an inherent value in establishing separate oversight organisations, for example, in the UK the Biometrics Commissioner (BC), the Forensic Science Regulator (FSR) and the BFEG have distinct roles. The remit of the new oversight organisation should be broad enough to encompass all current biometrics, as well as future biometric technologies.

8. On the establishment of a national Y-STR database, Y-STR data had the potential to be used for intelligence purposes to predict characteristics such as presumed ethnicity, and so proper regulation and safeguarding of the data would be necessary. Public consultation ahead of implementation was advised. The BFEG was supportive of the extension of the Metropolitan Police Service (MPS) Y-STR pilot for a defined period, such as a further 12 months, with the caveat that details on the criteria for the evaluation of the pilot should be shared with the BFEG.
9. The public should be informed of the boundaries of MPS facial recognition trials project and its future uses. The MPS should be explicit, open and proactive in stating that it was not be used to gather intelligence covertly or to generate a soft watch list using social media.

Chapter 6: Update on the Implementation of Recommendations Made

Below is a table of recommendations in previous annual reports and the progress made on their implementation over the year. Recommendations set out in previous reports that have been implemented are not shown.

Report	Recommendation	Progress made	Date for completion
2016	The Biometrics and Forensics Ethics Group (BFEG) develops a set of high-level ethical principles to provide a common first step to frame its members' initial considerations of a new study or a new technology. They will also provide transparency, both to the Government and the public, as to the processes undertaken by the BFEG.	<p>A working group led by Professor Jennifer Temkin was established to undertake this work. The BFEG 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. 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.</p> <p>The principles were completed in 2017. After being trialled by both internal and external stakeholders, the principles were published in early 2018 and are available from: https://www.gov.uk/government/publications/ethical-principles-biometrics-and-forensics-ethics-group</p>	Complete
2016	Research was required to analyse the impact of rapid DNA technology on criminal investigations and outcomes. A cost-benefit analysis of the technology should also be undertaken.	This work was not progressed in 2017 and will be reassessed in future.	2019

2016	The group advised the Biometric Commissioner that it would be ethically acceptable for a Gillick-competent person ²⁹ to consent to have an elimination sample taken without their parents' knowledge.	This advice has now been incorporated into the Forensic Information Databases Service Strategy Board (FINDS SB) policy for access and use of DNA Samples, DNA profiles, fingerprint images, and associated data, which is located on the FINDS SB website at: https://www.gov.uk/government/publications/access-and-use-of-dna-samples-profiles-and-associated-data	Complete
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 <i>Custody Images Review</i> (CIR) was published in 2017 and 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 images, with the rules regulating this considering the nature of the offence and the age of the offender. The Biometrics and Forensics Ethics Group (BFEG) published its advice in a letter to Home Office Ministers. The majority of members of the BFEG favoured a fixed retention period for biometric data from convicted offenders over an indefinite retention period. They held the view that 100 years of age was a suitable period of retention that encompassed the entire life span of most individuals whose records were held on the Police National Computer.	Next CIR in 2020

29 It was determined that children under 16 can consent if they have sufficient understanding and intelligence to fully understand what is involved in a proposed treatment, including its purpose, nature, likely effects and risks, chances of success and the availability of other options. If a child passes the Gillick test, he or she is considered 'Gillick competent' to consent to that medical treatment or intervention

2015	<p>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.</p>	<p>The Biometrics and Forensics Ethics Group published its report <i>Ethical Dimensions of the application of Next Generation Sequencing technologies to criminal investigations</i> in March 2017 on its website at: https://www.gov.uk/government/publications/next-generation-sequencing-technologies-ethical-considerations</p> <p>The report 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.</p>	Complete
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Chapter 7: Future Work Plans

The Biometrics and Forensics Ethics Group (BFEG) received its 2018 commissioning letter in March 2018.³⁰ The following priority areas were outlined for the BFEG to consider.

1. Police use of facial recognition systems

- Several police forces are trialling live facial recognition software, including the Metropolitan Police Service, which will demonstrate a trial to the BFEG.
- The BFEG will be invited to sit on a new oversight board, which will oversee police use of facial recognition systems.

2. Retention of biometrics from convicted persons until they are 100 years old

- The UK Government submitted observations to the European Court of Human Rights (ECHR) in the case of *Gaughran* in December.
- The BFEG shared its initial views in a letter in November 2017.
- If the ECHR issues a ruling that requires a significant change in government policy, the BFEG would be asked to form a working group to provide advice on biometric retention periods.

3. Forensic Information Databases Service Strategy Board

- The Forensic Information Databases Service Strategy Board (FINDS SB) provides governance and oversight over the operation of the National DNA Database (NDNAD) and the national fingerprint database.
- The BFEG has been briefed and asked for views on issues presented by FINDS, such as the access and use policy and the international exchange policy.
- The BFEG is asked to continue to advise on ethical angles of ongoing projects that inform the FINDS work programme, which will be discussed at the Board, such as continued input on the piloting of rapid DNA technology by the police and work being carried out on Y-STR profiling.

4. Home Office Biometrics Programme

- In 2016 the BFEG established a working group that provides ethical and privacy advice on a range of privacy impact assessments (PIAs) that are integral to the Home Office Biometrics (HOB) programme. This has resulted in the delivery of multiple robust PIAs to date.

30 Available from: <https://www.gov.uk/government/publications/commissioning-letter-to-the-biometrics-and-forensic-ethics-group-work-programme-2018>

- The working group is providing a continued ‘support and challenge’ role to the HOB programme team to help to deliver the remaining PIAs and to revisit and refresh existing PIAs at key stages in the programme life cycle.
- The BFEG may wish to consider topics set out in the PIAs, such as questions around the data protection principles, external and internal information sharing, and whether the wider sharing or aggregation of data held poses a risk of injustice to groups or individuals

5. Transforming Forensics programme

- At the December 2017 meeting, programme leads stated that they would continue to liaise proactively with the BFEG. Further advice is sought directly from the group.

Chapter 8: Resources

Costs

The Biometrics and Forensics Ethics Group (BFEG) is sponsored by the Home Office budget. Expenditure for 2017 was £2,116.10 with costs associated with the provision of meeting facilities and expenses properly incurred by group members in undertaking their duties. Members are unremunerated for their activities on behalf of the BFEG.

Secretariat

The BFEG Secretariat support has been provided by the Home Office Science Secretariat, with costs for the Secretariat met from the Home Office Security, Science and Innovation budget.

Appendix A: Biographies of Biometrics and Forensics 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 Biometrics and Forensics Ethics Group (BFEG) 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 [Office of Qualifications and Examinations Regulation] 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 University College 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, 2012) and has edited a book on the governance of forensic DNA databases across various jurisdictions (with Richard Hindmarsh, 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 CBE

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	The Biometrics Commissioner is independently appointed 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 Biometrics Commissioner also has a UK-wide oversight function as regards their retention and use by the police on national security grounds.
Central Elimination DNA Database (CED)	The CED is 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.
Clear Years	The length of time since a person last came to the attention of the police as an offender or suspected offender for behaviour that can be considered a relevant risk factor.
College of Policing	The professional body for policing that operates in the public interest to find the best ways to deliver policing and support for the police service.
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, the CPS prosecutes criminal cases investigated by the police in England and Wales. It advises the police, reviews cases submitted by the police and prepares and presents papers for cases in court.
Custody Images Review (CIR)	Review by the Home Office to consider proportionality of the use and retention of images on a national database.
Dactyloscopy	The method of ridge analysis in human skin (typically fingers and palms). <i>[See also Fingerprints]</i>
Data Linkage	A process that 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 number of repeats at a set of sections of DNA (short tandem repeats [STRs]) obtained following the analysis of a DNA sample. STRs can be uploaded to a database and compared with other DNA profiles. <i>[See also Short Tandem Repeat]</i>
DNA 17 Profile	A profile produced using the latest system of DNA profiling technology that examines 16 sections of DNA, (short tandem repeats [STRs]) plus a sex 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 (SGM)+ methodology, and reduces the probability of chance matches between individuals. <i>[See also Second Generation Multiplex]</i>
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. <i>[See also Central Elimination DNA Database]</i>
Epigenetics	This is the study of (partly heritable) changes in gene expression due to external or environmental factors that affect how genes are read, rather than changes in the underlying DNA sequence.
Facial Recognition System	A computer application capable of identifying or verifying a person from a digital image or a live 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, etc.
Forensic Information Databases Service (FINDS)	The Home Office unit responsible for administering the NDNAD, National Fingerprint Database and Footwear Database.
Forensic Information Database Service Strategy Board (FINDS SB)	Formerly the National DNA Database Strategy Board (NDNADSB). The FINDS SB provides governance and oversight over the NDNAD and the National Fingerprint Database. It has a number of statutory functions including issuing guidance on the destruction of profile records and producing an annual report.
Fingerprints	The impression left by the epidermal ridges in a human finger. The print consists of a mixture of sweat and skin cells. <i>[See also Dactyloscopy]</i>

Forensic Science Regulator (FSR)	The 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.
IDENT1	IDENT1 is the name given to the UK's fingerprint system supporting law enforcement.
International Standards Organisation (ISO)	The ISO is an independent, non-governmental international organisation. It brings together experts to share knowledge and develop international standards that are voluntary, consensus-based and market relevant.
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 DNA profiling and improves the likelihood of obtaining a DNA profile. (LCN is not designed to 'detect DNA').
Metagenomics	Metagenomics is the study of the diversity of species in a microbial sample that has been recovered from the environment. It allows the study of all genes in all organisms that are present in a given complex sample.
Mixed DNA Profile	A profile where the number of observed sections of DNA (short tandem repeats [STRs]) is greater than that expected from a single individual, indicating that the DNA of more than one individual is present.
National Crime Agency	The National Crime Agency leads the UK law enforcement's fight to cut serious and organised crime. It has national and international reach and the mandate to work in partnership with other law enforcement organisations to tackle serious and organised criminals.
National DNA Database (NDNAD)	Established in 1995, the NDNAD is an electronic, centralised database holding the DNA profiles taken from both individuals and crime scenes. The database can be searched to provide the police with a match linking an individual to a crime scene and <i>vice versa</i> .
National Police Chiefs' Council (NPCC)	The NPCC brings together the 43 operationally independent and locally accountable chief constables and their chief officer teams to coordinate national operational policing. The NPCC works closely with the College of Policing.
Next Generation Sequencing (NGS) or Massively Parallel Sequencing (MPS)	These are terms used to describe a number of high throughput approaches to DNA sequencing that allow the sequencing of DNA much more rapidly and cheaply than previously.
Notifiable Offence	An offence where the police must notify the Home Office by completing a crime report form for statistical purposes.

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 five short tandem repeats (STRs) and a gender test and therefore the discrimination power provided from these profiles are much less than those obtained from full second generation multiplex (SGM)+ and DNA17 profiles. <i>[See also Rapid DNA Technology; Second Generation Multiplex; Short Tandem Repeats]</i>
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. This means that not all regions of DNA of interest are intact.
PCR	Polymerase chain reaction (PCR) is the targeted amplification of a specific DNA sequence or set of sequences, such as short tandem repeats (STRs) in human DNA to provide a DNA profile. <i>[See also DNA profile; Short Tandem Repeats]</i>
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. <i>[See also Short Tandem Repeats]</i>
Privacy Impact Assessment (PIA)	The PIA is a tool for identifying and reducing the risk that a project poses to an individual's right to privacy.
Protection of Freedoms Act 2012 (PoFA)	The PoFA is an Act of Parliament of the UK. It 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 Royal Assent.
Prüm Agreement/ Convention	A convention signed in May 2005 by Austria, Belgium, France, Germany, Luxemburg, the Netherlands and Spain. The Prüm Agreement is open to all Member States of the EU and enables the signatories to be able to exchange data regarding DNA, fingerprints and vehicle registrations of persons suspected to be co-operating 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 sample and a person needs to be treated with caution.
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.

Recordable Offence	An offence where the police must keep records of the conviction and the offender on the Police National Computer (PNC).
<i>S. and Marper</i>	This refers to a case where S. joined with Marper to bring a case to the European Court of Human Rights (ECHR) 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. <i>S. and Marper</i> relied principally on Section 8 of the European Convention of Human Rights, which protects the right to privacy. The ECHR 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.
Second Generation Multiplex (SGM, SGM+)	A system of DNA profiling that was used in the UK until July 2014. SGM/SGM+ 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.
Short Tandem Repeat (STR)	STRs are sections of DNA dispersed within coding and non-coding regions of the human genome that contain variable numbers of adjacent repeats 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. <i>[See also DNA]</i>
Single Nucleotide Polymorphism (also referred to as SNPs – pronounced ‘snips’)	This is a variation at the level of single nucleotide bases that occurs at a specific position in a sequence of DNA. <i>[See also DNA]</i>
United Kingdom Accreditation Service (UKAS)	UKAS is the national accreditation body for the UK recognised by the Government to carry out assessments of organisations that provide certification, testing, inspection and calibration services against internationally agreed standards.
Y-STR Profile	<i>See Short Tandem Repeat</i> but restricted to regions found only on the Y-chromosome (which is only present in males).



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