Home Office

NPCC National Police Chiefs' Council

Forensic Information Databases Strategy Board Annual Report April 2021- March 2022

Forensic Information Databases Strategy Board Annual Report April 2021- March 2022

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Chair of the Strategy Board's Foreword

I am delighted to be able to present this report as Chair of the Forensic Information Databases (FIND) Strategy Board for 2021/22[1]. The report highlights the continued value of DNA and fingerprints in solving crimes and the part it plays in bringing offenders to justice and preventing future harm to victims. Several more DNA success story case examples are included to illustrate this.

The overall DNA match rate (crime scene to subject) following the loading of a crime scene DNA profile was 64.8% in 2021/22. Although slightly lower than last year, it continues to demonstrate the effectiveness of the national DNA database as a vital and effective tool in supporting the Criminal Justice System.

During this reporting period we have continued to align the governance and oversight of the Fingerprint and DNA databases in support of the Government's Forensic Science Strategy[2] through clear and transparent governance.

Key developments include the changes, through the Home Office Biometrics (HOB) Programme, to deliver improvements to biometric matching and identification services for the UK. Security and minor functional enhancements to the National DNA Database (NDNAD) are provided on a quarterly basis, including some functionality de-scoped from the initial NDNAD upgrade that went live on 23rd November 2020. HOB, working with the FINDS teams, are also scoping a replacement IT platform for the current Contamination Elimination Database (CED).

HOB have also continued to roll out the replacement strategic mobile biometric capability (rapid search for fingerprints) to police forces across England and Wales in technology and business process developments. Currently, 30 forces have joined the service with other agencies still in the pipeline.

Funding has been secured to enable the development of a Y-STR reference database. This project is a collaboration between FINDS and the Forensics Capability Network (FCN) to bring together key stakeholders from across police forces, forensic service providers, and criminal justice partners for the purposes of prioritising areas of work and development of a strategic plan for DNA service delivery.

During 2021/22 Prüm international DNA exchanges between the UK and EU Member States continued to grow. The UK is now connected to 15 EU Member States: Austria, Germany, France, the Netherlands, Spain, Romania, Poland, Czech Republic, the Republic of Ireland, Latvia, Sweden, Belgium and Malta with the addition of Lithuania and Finland for this reporting period. The UK's connection to Prüm DNA has produced positive results for both the UK and the EU partners connected to so far, receiving over 13,000 initial 'hits' from its Prüm DNA connections, including over 2,000 relating to particularly serious crimes. The UK also exchanges fingerprints via Prüm, connecting with Germany and now Austria, Belgium, Bulgaria, Czech Republic, Denmark, Hungary, and Lithuania with continued growth in connections expected in 2023.

[1] Apr 2021-March 2022.
[2] Forensic Science Strategy: Forensic science strategy - GOV.UK (www.gov.uk)

B D Snuggs

Deputy Chief Constable

National Police Chiefs' Council (NPCC) Chair of the Forensic Information Databases Strategy Board

The Forensic Information Databases Strategy Board

Governance and oversight of the National DNA Database[3] (NDNAD) and the National Fingerprint Database (IDENT1) is provided by the Forensic Information Databases (FIND) Strategy Board. This was originally established in statute[4] as the National DNA Database Strategy Board and expanded to fingerprints following the publication of the government's Forensic Science Strategy in 2016.

The strategic aim of the Strategy Board is to provide governance and oversight for the operation of the National DNA and Fingerprint Databases:

- it may issue guidance about the destruction of DNA profiles under the Protection of Freedoms Act 2012 (PoFA)[5];
- it may issue guidance about the circumstances under which applications for retention under PoFA[6] may be made to the Commissioner for the Use and Retention of Biometric Material ('The Biometrics Commissioner')[7] [8];
- it must publish governance rules which must be laid before Parliament[9]; and
- it must make an annual report to the Home Secretary about the exercise of its functions[10].

The governance rules[11,12] set out in more detail the way in which the Board operates, and include its objectives[13] which are to implement strategy and policy to ensure:

- the most effective and efficient use of DNA and fingerprint databases to support the purposes laid down in the legislation (and no other), these are;
    - the interests of national security;
    - terrorist investigations;
    - the prevention and detection of crime;
    - the investigation of an offence or the conduct of a prosecution; and
    - the identification of a deceased person.

- the public is aware of the governance, capability and limitations of the NDNAD and IDENT1 databases so that confidence is maintained in its use across all communities;
    - that the future use of the NDNAD and IDENT1 databases takes account of developments in science and technology (S&T) and delivers improvements in efficiency and effectiveness across the Criminal Justice System.

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[3] As set out under section 3 of the governance rules.
[4] Section 63AB of the Police and Criminal Evidence Act 1984 (PACE)
[5] Section 63AB(2), Police and Criminal Evidence Act 1984.
[6] Ibid 2, section 63G.
[7] Ibid 2, section 63AB(4).
[8] The Biometrics Commissioner's latest annual report is available at: Biometrics and Surveillance Camera Commissioner: report 2021 to 2022 - GOV.UK (www.gov.uk)
[9] Ibid 2, section 63AB(6).
[10] Ibid 2, section 63AB(7).
[11] The governance rules are published at: https://www.gov.uk/government/publications/national-dna-database-strategy-board-governance-rules.
[12] Reviewed and updated by the FIND Strategy Board in September 2021. These were published in April 2022.
[13] As set out under section 4 of the governance rules.

- the most proportionate, ethical and transparent use of the NDNAD and fingerprint databases across the Criminal Justice System.

- the most ethical and effective use of international searching of UK DNA profiles and fingerprints.

The core members of the Board are:

- a representative of the National Police Chiefs' Council;
- a representative of the Home Office;
- a representative of the Association of Police and Crime Commissioners;

Additional members[14] include:

- the Chair of the Biometrics and Forensics Ethics Group[15] (or representative);
- the Information Commissioner (or representative);
- the Forensic Science Regulator[16] (or representative);
- the Biometrics Commissioner (or representative);
- the Scottish Biometrics Commissioner (or representative);
- a representative from the Police DNA Operational Users;
- a representative from the Police Fingerprints Operational Users;
- representatives from the police and devolved administrations of Scotland and Northern Ireland; and
- such other members as may be invited.

The rules go on to specify:

- the responsibilities of the Board;
- the appointment of the Chair;
- rules around audits;
- the delegation of functions; and
- the proceedings of the Board.

They may be added to, repealed or amended with the agreement in writing of the Home Secretary.

[14] As set out under section 5 of the governance rules.
[15] The Biometrics and Forensics Ethics group annual report is available at The report is available at: Biometrics and Forensics Ethics Group: annual report 2020 to 2021 - GOV.UK (www.gov.uk)
[16] The Forensic Science Regulator's latest annual report is available at: https://www.gov.uk/government/publications/forensic-science-regulator-annual-report-2020

The Biometrics and Forensics Ethics Group

The Biometrics and Forensics Ethics Group (BFEG)[17], provides independent expert advice to Home Office ministers on ethical issues related to the use of biometrics, forensic science, and large data sets.

The remit of the group includes consideration of the ethical impact on society, groups and individuals, of the capture, retention and use of human samples and biometric identifiers. This includes DNA and fingerprints, as well as facial recognition and other biometric identifiers.

Current work streams for the BFEG include:

- Support policy development regarding the governance of powerful data driven technologies in the Home Office;
- Provide advice on the ethical issues in the use of novel biometric technologies, including gait and voice recognition;
- Support for the Home Office Biometrics (HOB) programme;
- Provision of advice on Home Office projects using advanced data processing techniques and/or large and complex datasets; and
- Advice on Policy relating to the digitisation of the services in the border, immigration, and citizenship system.

The group also provides support and advice on ethical matters to other stakeholders such as the Biometrics and Surveillance Camera Commissioner and the Forensic Science Regulator.

The Chair (or nominee) of BFEG sits on the FIND Strategy Board and provides advice in areas such as:

- Policy regarding the retention of biometrics from convicted individuals;
- Governance and ethical operation of police databases containing biometric information;
- Policy on access to and use of the FINDS Databases and other matters relating to the management, operation and use of biometric or forensic data;
- The ethical application and operation of technologies which produce biometric and forensic data and identifiers;
- Ethical issues relating to scientific services provided to the police service and other public bodies within the criminal justice system;
- Review of applications for research involving access to biometric or forensic data; and
- Review of the annual report from the FIND Strategy Board and other policy and consultation documents prepared by the Home Office.

[17] https://www.gov.uk/government/organisations/biometrics-and-forensics-ethics-group

1. The National DNA Database (NDNAD)

1.1 About NDNAD

1.1.1 Introduction

NDNAD was established in 1995. It holds electronic records of deoxyribonucleic acid (DNA), known as profile records, taken from individuals and crime scenes, and provides the police with matches linking an individual to a crime scene or a crime scene to another crime scene. Between April 2001 and March 2022 it produced **776,488** matches to unsolved crimes.

1.1.2 DNA profile records

NDNAD holds two types of DNA profile:

i. Individuals

The police can take a 'DNA sample' from every individual that they arrest. This consists of their entire genome (the genetic material that every individual has in each of the cells of their body) and is usually taken by swabbing the inside of the cheek to collect some cells. The sample is then sent to an accredited laboratory, known as a 'Forensic Service Provider' (FSP), which looks at discrete areas of the genome (which represent only a tiny fraction of that individual's DNA), plus the sex chromosomes (XX for women and XY for men[18]). A 'subject' profile is then produced consisting of 16 pairs of numbers (which correspond to the 16 areas within a person's DNA which are analysed) and a sex marker derived from the sex chromosomes. In unrelated individuals; the chance of two unrelated people having identical profile records is less than one in a billion[19].

An example DNA profile would be:

X,Y; 14,19; 9.3,9.3; 12,15; 22,23; 28,30; 11,14; 19,20; 9,12; 13,15; 18,18; 15,15; 10,13; 14,16; 18,21; 15,16; 24,29

The DNA profile is loaded to NDNAD where it can be searched against DNA profile records recovered from crime scenes.

ii. Crime scenes

DNA is recovered from crime scenes by police crime scene investigators (CSIs). Nearly every cell in an individual's body contains a complete copy of their DNA so

[18] An individual's DNA is contained within discrete structures within a cell known as chromosomes. Men have a copy of an X and Y chromosome whereas women have two copies of the X chromosome.

[19] As agreed with the Forensic Science Regulator and the Crown Prosecution Service, in order to give a conservative figure, routine statistical reporting of DNA evidence in court continues to be reported as 'one in a billion'. Certain cases might be reported with a more precise probability; this is assessed on a case-by-case basis.

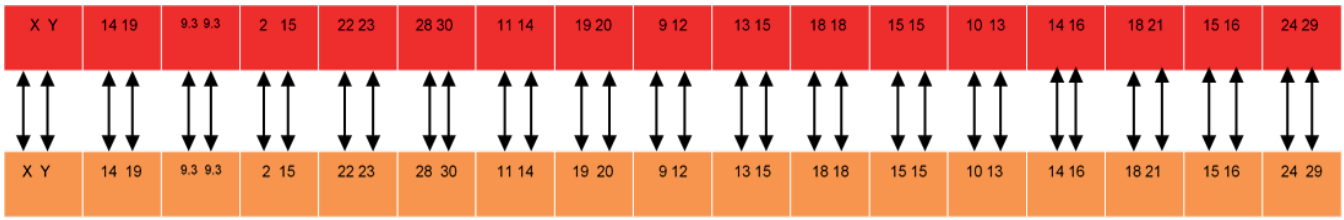
there are many ways in which an offender may leave their DNA behind at a crime scene (for example, in blood or skin cells left on clothing or surfaces), or by touching a surface. CSIs examine places where the perpetrator of the crime is most likely to have left traces of their DNA behind. Items likely to contain traces of DNA are sent to an accredited laboratory for analysis. If the laboratory recovers any DNA, it is likely to produce a crime DNA profile which can be loaded to NDNAD.

1.1.3 Matches

In NDNAD, searches are conducted of the DNA profile records from crime scenes against the DNA profile records from individuals or other crime scenes. A full match occurs when the 16 pairs of numbers (and sex marker), representing an individual's DNA profile are an exact match to those in the DNA profile left at the crime scene or when a crime scene DNA profile matches another crime scene DNA profile.

i. Full Match

The diagram below illustrates a full match between a subject DNA profile (top row) and a crime scene DNA profile (bottom row).

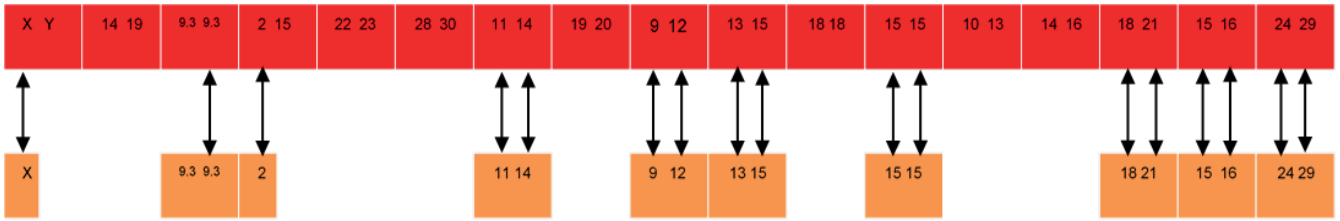


Where a match is made, this indicates that the individual may be a suspect in the police investigation of the alleged crime. It may also help to identify a witness or eliminate other people from the police investigation.

ii. Partial Match

Sometimes it is not possible to recover a complete DNA profile from the crime scene; for instance where the perpetrator has tried to remove the evidence or because the evidence has become degraded. In these circumstances, a partial crime scene DNA profile may be obtained, and searched against individuals on NDNAD, producing a partial match.

The diagram below illustrates a partial match between a subject profile (top row) and a crime scene profile (bottom row).



Partial matches provide valuable leads for the police but, depending on how much of the information is missing, the result is likely to have lower evidential weight than a full match.

1.1.4 Familial searches

One half of an individual's DNA profile is inherited from their father and the other half from their mother. As a result, the DNA profile records of a parent and child, or two siblings, will share a significant proportion of the 16 pairs of numbers which make up the DNA profile of the individual. This means that, in cases where the police have found the perpetrator's DNA at the crime scene, but they do not have a profile on NDNAD, a search of the database, known as a 'familial search', can be carried out to look for possible close relatives (parents, children, or siblings) of the perpetrator. Such a search may produce a list of possible relatives of the offender. The police use other intelligence, such as age and geography, to narrow down the list before investigating further. The search is computerised and involves only the DNA profile records on NDNAD.

Due to the cost and resource needed to carry out familial searches, they are used only for the most serious of crimes. All such searches require the approval of the FIND Strategy Board chair or their nominee. A total of **27** familial searches were carried out in 2021/22.

1.1.5 Identical siblings

The inherited nature of DNA means that identical siblings will share the same DNA profile, and the DNA profiling system currently used for NDNAD cannot differentiate between identical siblings. However, identical siblings have different fingerprints so these can be used to differentiate between them. Fingerprints may be taken by the police electronically from any individual that they arrest. They are then scanned into IDENT1. Unlike DNA (where samples have to be sent to a laboratory for processing) fingerprints can be loaded rapidly to IDENT1 allowing a fingerprint comparison to be undertaken and a person's identity verified (or not) at the police station, thereby ensuring that their DNA profile and arrest details are stored against the correct record.

1.1.6 Who runs NDNAD?

Since 1st October 2012, NDNAD has been run by the Home Office on behalf of UK police forces.

Police forces own the DNA profile records on the database, and receive notification of any matches, but they do not have access to it.

1.2 Who is on NDNAD?

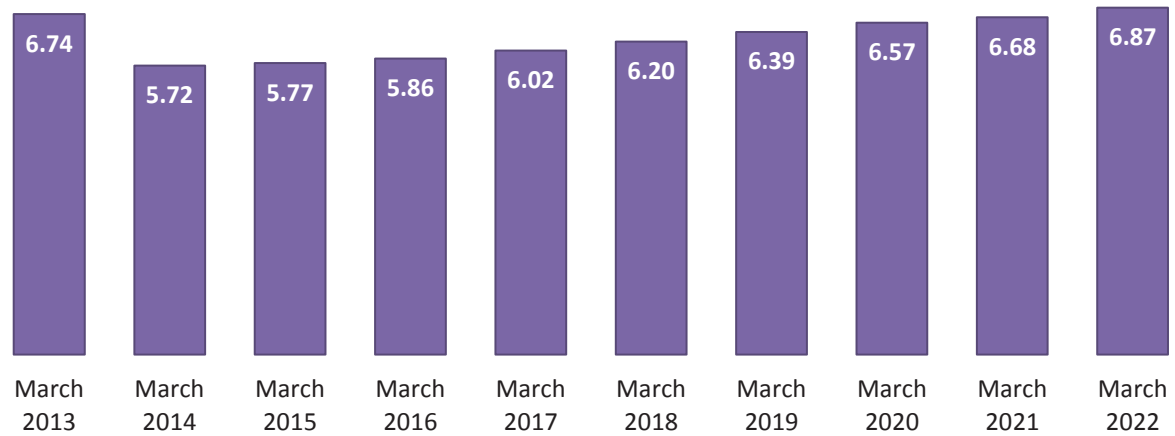
1.2.1 Number of DNA profile records held on and deleted from NDNAD

As at 31st March 2022, NDNAD held **6,870,705** subject profile records and **685,063** crime scene DNA profile records. The number of subject records held on the NDNAD over time is shown in Figure 1. In Financial Year 2021/22, **314,071**[20] new subject DNA profile records were loaded to NDNAD, together with **25,973** new crime scene DNA profile records. Figures 2a and 2b show the number of DNA profile records loaded to NDNAD per year. Table 1 shows the breakdown of crime scene records loaded in 2021/22 by offence type.

Some individuals have more than one DNA profile on NDNAD. This can occur where the police force chooses to load another record or where they are sampled twice under different names. Approximately **15.6%**[21] of the DNA profile records on NDNAD are duplicates of an individual already sampled. Allowing for these duplicates, the estimated number of individuals on NDNAD as at 31st March 2022 was **5,795,790.**

In 2021/22 **125,387** subject DNA profile records were deleted from NDNAD. This includes **310** under the 'Deletion of Records from National Police Systems' guidance ('the Record Deletion Guidance'); see '3.3 Early Deletion'. Additionally, **6,879** crime scene profile records were deleted.

Figure 1: Number of subject DNA profile records held on NDNAD (in millions) (2012/13 to 2021/22)[22] [23]



[20] This figure is higher than in previous years due to the reload of a number of records.
[21] This figure is based on the assumption that a subject profile record that matches a further subject profile record(s) is sourced from just one individual.
[22] Source: NDNAD management information.
[23] The deletion of profiles which did not meet the retention criteria for profile records brought in by PoFA was completed by 30th September 2013 hence the drop in the number of profile records.

Figure 2a: Number of subject profile DNA records loaded onto NDNAD per year (in thousands) (2012/13 – 2021/22)[24] [25] [26] [27]

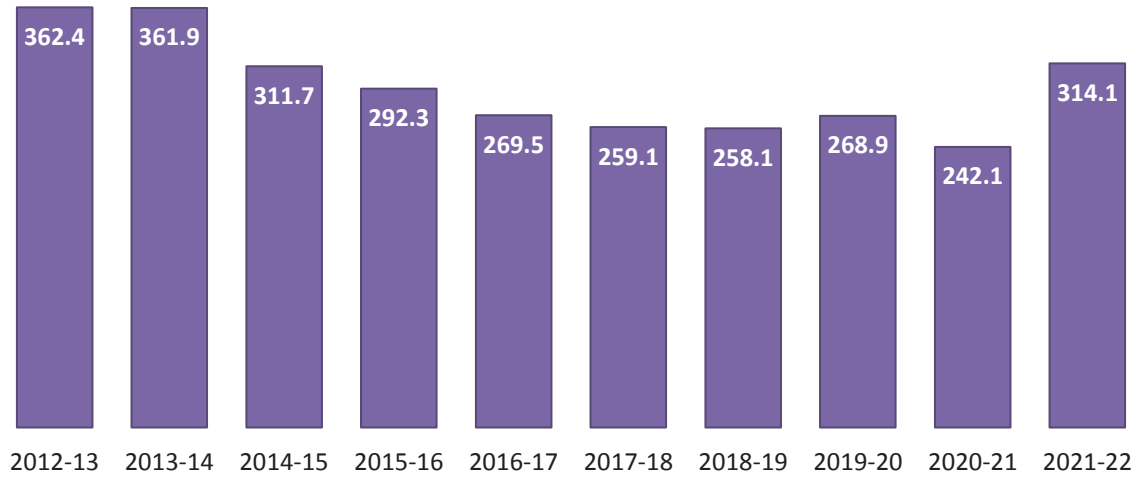
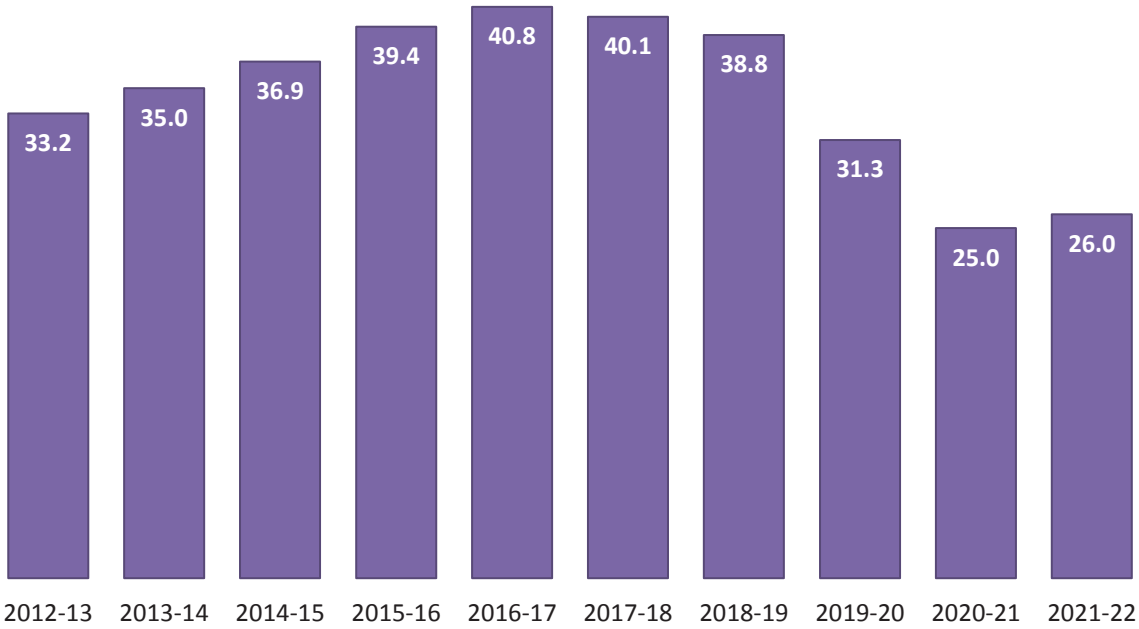


Figure 2b: Number of crime scene DNA profile records loaded onto NDNAD per year (in thousands) (2012/13 – 2021/22) [28] [29]



[24] Due to technical difficulties accessing the management information system used to record data on NDNAD the figures for 2014/15 onwards have been calculated using a different methodology from previous years.
[25] There are some NDNAD profile records held for which the load date is unknown; these are not included in these figures.
[26] Source: NDNAD management information.
[27] This figure (relating to 2021/22), is higher than in previous years due to the reload of a number of records.
[28] Source: NDNAD management information.
[29] Due to technical difficulties accessing the management information system used to record data on NDNAD the figures for 2014/15 onwards have been calculated using a different methodology from previous years and are not directly comparable with the figures used in Table 1.

Table 1: Number of crime scene DNA profile records loaded by crime type (2021/22)[30] [31] [32]

Crime type	Number of crime scene profile records loaded	Proportion of total number of crime scene profile records loaded
Burglary (including aggravated)	10,252	39.5%
Vehicle Crime	3,576	13.8%
Criminal Damage	1,502	5.8%
Violent Crime	389	6.7%
Drugs	1,741	10.9%
Robbery	2,838	4.1%
Theft	1,063	1.5%
Rape	586	2.3%
Homicide (including attempted) and manslaughter	829	3.2%
Traffic (including fatal)	510	2.0%
Firearms	565	2.2%
Other sexual offences[27]	200	0.8%
Arson and fire investigations	180	0.7%
Fraud	70	0.3%
Public Order	106	0.4%
Abduction and kidnapping	184	0.7%
Blackmail	7	<0.1%
Explosives	5	<0.1%
Other	1,370	5.3%
TOTAL	**25,973**	**100%**

[30] Source: NDNAD management information.
[31] Offence types are recorded by forensic staff processing the DNA sample and do not correspond to police recorded crime codes.
[32] Due to technical difficulties accessing the management information system used to record data on NDNAD, these figures have been calculated using a different method to the methodology used prior to 2014/15 and are not directly comparable to the figures used in Figures 2b.

1.2.2 Geographical origin of subject DNA profile records on NDNAD

NDNAD holds profile records from all UK police forces (as well as the Channel Islands and the Isle of Man) but only profile records belonging to England and Wales forces are subject to PoFA[33]. Scotland and Northern Ireland also maintain separate DNA databases; however, due to the likelihood of offenders moving between UK nations, profile records loaded to these databases are also loaded to NDNAD.

Table 2: Number of subject and crime scene DNA profile records retained on NDNAD by nation (as at 31st March 2022)[34]

Nation	Subject profile records	Crime scene profile records	TOTAL
England[35]	5,864,266	627,163	6,491,429
Scotland	383,279	19,845	403,124
Wales	385,296	27,609	412,905
Northern Ireland	192,551	7,893	200,444
Other[36]	45,313	2,553	47,866
TOTAL	**6,870,705**	**685,063**	**7,555,768**

1.2.3 Sex, age and ethnicity of individuals on NDNAD

The subject profile records held on NDNAD all come from people who have been arrested for an offence, so the composition is different from that of the general population. For example, around half the UK population is male but the majority of DNA profile records belong to men, because the majority of those arrested were male[37].

[33] Scotland and Northern Ireland have their own retention regime.
[34] Source NDNAD management information.
[35] Includes the British Transport Police
[36] Includes Isle of Man, Guernsey, Jersey, Channel Islands, Ministry of Defence police forces, Criminal Records Office, National Crime Agency, Her Majesty's Revenue and Customs, and the Prisoner Sampling Programme
[37] 51.0% women and 49.0% men in England and Wales) - Population and household estimates, England and Wales - Office for National Statistics (ons.gov.uk)

Figure 3a: Proportion of subject DNA profile records on NDNAD by sex (as at 31st March 2022)[38] [39] [40] [41]

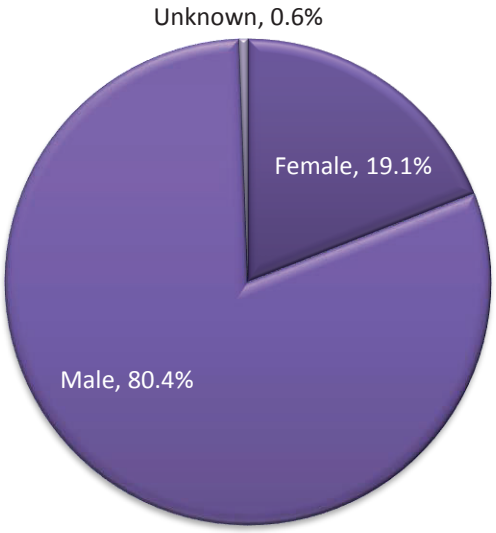
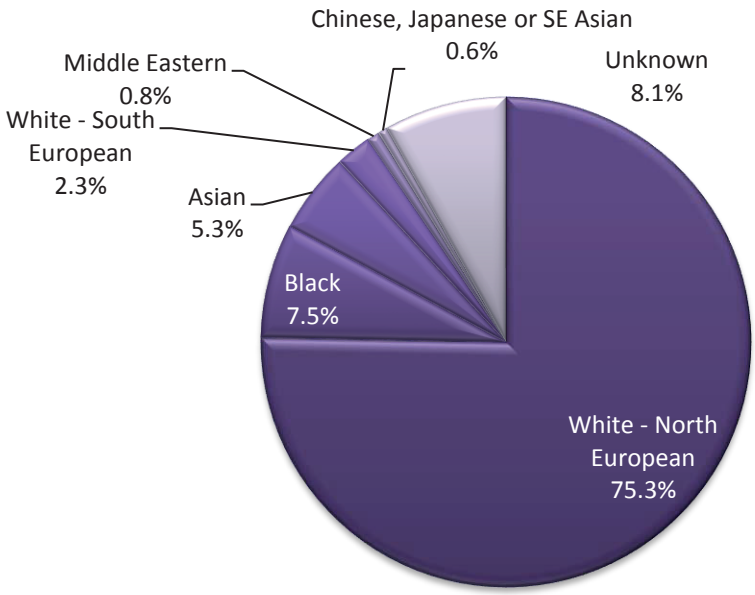
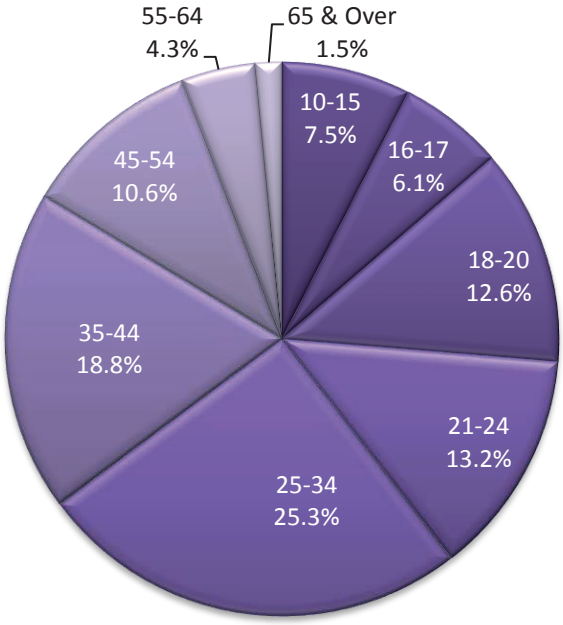


Figure 3b: Number of subject DNA profile records on NDNAD by ethnicity, as determined by the sampling officer (as at 31st March 2022)[42]



[38] Source: NDNAD management information.
[39] Due to rounding, the figures do not equal 100%
[40] Source: NDNAD management information.
[41] Unknown is where the sex was recorded as unknown on the Police National Computer (PNC) or on the sampling DNA kit card.

Figure 3c: Number of subject DNA profile records by age at time of loading onto NDNAD (as at 31st March 2022)[43] [44]



These data are published quarterly on the NDNAD web page[45]. The age of criminal responsibility in England and Wales is 10; there were 11 profiles from children aged under 10 on NDNAD. These were all Scottish samples which were taken from 'Vulnerable Persons' (an individual who was believed to have the potential to come to harm and / or go missing) and were loaded with appropriate consent and authorisation for retention and searching on the NDNAD[46].

[43] Source: NDNAD management information
[44] This was calculated from the date of birth provided by the individual to the police officer at the time of arrest.
[45] www.gov.uk/government/organisations/home-office/series/dna-database-documents
[46] The age of criminal responsibility in Scotland is 12 years of age Age of Criminal Responsibility (Scotland) Act 2019 (legislation.gov.uk)

1.3 How many crimes does NDNAD help solve?

1.3.1 Introduction

NDNAD matches crime scene DNA profile records against subject DNA profile records and other crime scene DNA profile records, providing the police with invaluable information that helps them to identify possible suspects and solve crimes (albeit that a DNA profile match in itself is not usually sufficient to secure a conviction so not every DNA profile match will lead to a crime being solved).

1.3.2 Types of searches

i. Routine loading and searching

As described at paragraph 1.1.2, samples are usually profiled and the DNA profile records are then loaded to NDNAD for routine searching. Routine matches made from DNA profile records loaded to NDNAD are shown in table 3a below.

ii. Non-routine and urgent searches

In order for a DNA profile to be uploaded to NDNAD, it must consist of a minimum of four pairs of numbers and a sex marker (for crime scene profile records) and a full DNA profile[47] (for subject DNA profile records). Where this criterion is not met, for crime scene records, it is nonetheless possible to carry out a non-routine search of NDNAD.

Matches made following non-routine searches are shown in Tables 3b and those made following urgent searches in Tables 3c.

1.3.3 Match rate

i. Overall match rates

In 2021/22, the chance that a crime scene DNA profile, once loaded onto NDNAD, matched against a subject DNA profile stored on NDNAD was **64.8%**[48]**.** Figure 4 shows the yearly match rate on loading a crime scene DNA profile to the NDNAD.

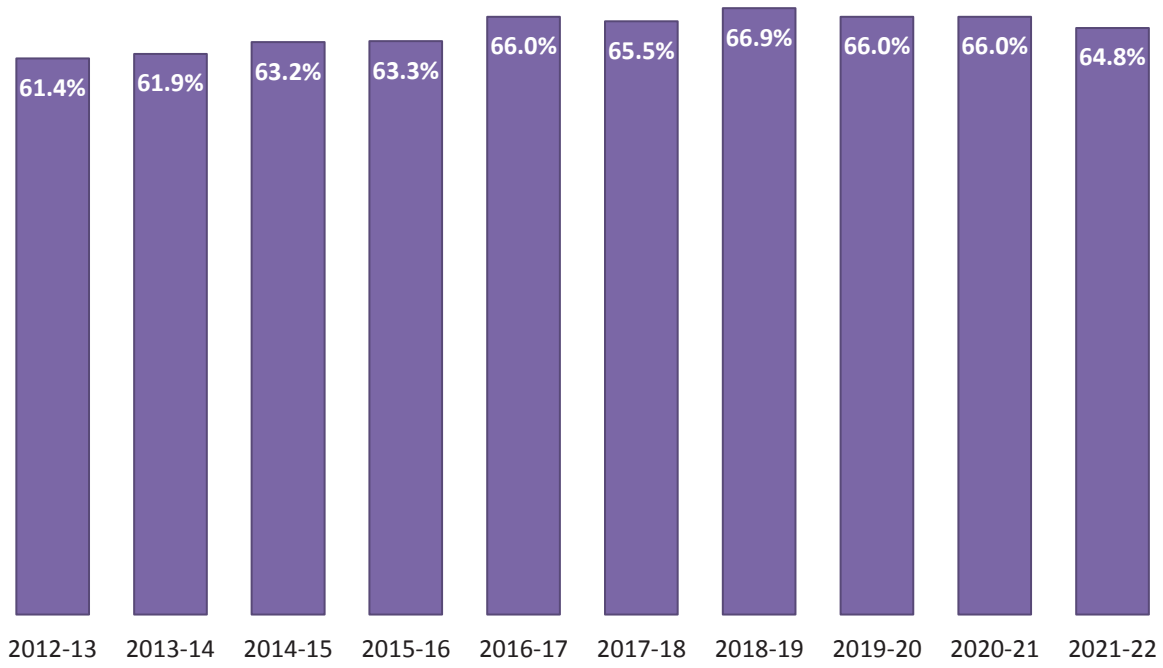
These do not include crime scenes that match another crime scene on loading, or where a DNA profile was deleted in the same month as it was loaded.

Further DNA profile matches will occur when a new subject DNA profile is added to NDNAD and matches to a crime scene DNA profile already on the database. As at

[47] The profile record may either be from DNA-17 (i.e. 16 numbers plus a sex marker) or from the previous system SGMPlus (i.e. 10 numbers plus a sex marker).
[48] Excludes crime scene to crime scene matches. This figure has decreased slightly (1.2%) on the previous reporting year. Due to the number of contributing factors affecting the match rate, it is not possible to provide an explanation for the observed reduction.

31st March 2022, there were **221,531** crime scene DNA profile records on NDNAD that had not yet been matched. The crimes relating to these crime scenes might be solved if the perpetrator's DNA was taken and their DNA profile added to NDNAD. Every individual who is arrested will have their DNA profile searched against existing crime scene DNA profiles on NDNAD, even if their DNA profile is subsequently deleted.

Figure 4: Match rate on loading a crime scene DNA profile (2012/13 to 2021/22)[49]



ii. Number of matches[50]

In 2021/22, NDNAD produced **22,477** routine subject to crime scene matches, including to 644 homicides and 550 rapes; the offence breakdown of these routine matches is shown in Table 3a[51]. It provided 1,052 crime scene to crime scene matches (this information is useful in helping to identify serial offenders). It also provided **4,375** matches following a non-routine search. A large number of the non-routine searches will produce a partial match. Although a partial match has less evidential value than a full match, it can nonetheless provide the police with useful intelligence about a crime. The offence breakdown of these non-routine searches can be seen in Table 3b.

[49] Source: NDNAD management information.
[50] Due to issues with the NDNAD Management Information system in 2014/15, since then matches have been counted at sample rather than case level.
[51] Enhancements in reporting matches' partiality are planned for the 2022-23 Annual Report

Table 3a: Number of routine subject to crime scene matches made by crime type (2021/22)

Crime	Matches
Burglary (including aggravated)	8,472
Vehicle crime	3,409
Criminal damage	1,529
Violent crime	1,593
Drugs	2,108
Robbery	990
Theft	397
Rape	550
Homicide (including attempted) and manslaughter	644
Traffic (including fatal)	505
Firearms	134
Other sexual offences	644
Arson and fire investigations	473
Fraud	57
Public order	100
Abduction and kidnapping	168
Blackmail	10
Explosives	3
Other[52]	1,149
TOTAL	**22,477**

[52] Forces define the category of the offence. 'Other' denotes where forces have classified an offence that does not automatically fit into one of the defined offence codes.

Table 3b: Number of non-routine search matches made by crime type (2021/22)

Crime	Searches	Matches	Matches (%)
Burglary (including aggravated)	1,349	1,221	90.5%
Vehicle crime	388	362	93.3%
Criminal damage	54	51	94.4%
Violent crime	252	235	93.3%
Drugs	490	438	89.4%
Robbery	293	265	90.4%
Theft	38	32	84.2%
Rape	475	362	76.2%
Homicide (including attempted) and manslaughter	375	265	70.7%
Traffic (including fatal)	34	32	94.1%
Firearms	247	226	91.5%
Other sexual offences	112	102	91.1%
Arson and fire investigations	40	35	87.5%
Fraud	7	6	85.7%
Public Order	15	9	60.0%
Abduction and kidnapping	37	33	89.2%
Blackmail	1	0	0.0%
Explosives	0	0	0.0%
Other[53]	1507	701	46.5%
TOTAL	**5714**	**4375**	**76.5%**

1.3.4 Outcomes

The number of offenders convicted with the help of DNA evidence is not recorded. However, DNA evidence has been found to be significant[54] in the conviction of the perpetrators of many serious crimes. For example:

Case 1 – Gloucestershire Constabulary

DNA was the sole link in solving a historical sexual assault case carried out over 30 years ago. A DNA match led to the arrest in August 2021 of a 66-year-old male who raped a teenage victim more than 30 years ago in Cheltenham. The offender has been jailed following his arrest and sentencing, to now serve time in prison. Initial investigations carried out by the Gloucestershire Constabulary (the investigating force) at the time of the offence in 1990, created many lines of enquiry over the years, but did not lead them to the suspect. A full DNA profile was recovered from the sample collected at the time of the historic offence and stored on the NDNAD. A match report

[53] Includes other volume, serious and terrorism offences.
[54] Prosecutions are very rarely based on DNA evidence alone.

to this sample was received by Gloucestershire Constabulary in June 2021, which led to the out-of-county arrest of the suspect who was charged with possession of a weapon (a DNA swab being submitted and added to the NDNAD for the offence on this occasion). Following receipt of the match report, a marker was placed on this case on the Police National Computer (PNC) to preserve the available biometrics whilst the force continued investigating the crime. Further scrutiny into the suspect's life at the time of the offence started to bring the case together. This case showed that without DNA, it would not have been possible to identify and convict the suspect and allow justice to be served for this historic crime.

Case 2 – Thames Valley Police

DNA helped to link and solve two historical cases involving serious offences; a murder and a rape.

A 26 year old female was murdered in April 1987. Her body was found in shallow water at Taplow Lake, Berkshire, approximately 6 miles from her home address

The victim had been found bound and gagged. Death was from drowning, and it was investigated as a murder but no one was ever charged. The case remained open and was the subject of a re-investigation in 1998 and further forensic examinations in 2007 and 2010, which did not lead to any new evidence.

In 2019 further forensic work was commissioned. This concentrated on the gag, and material from the victim's underwear taken in 1987. A full DNA profile was extracted from the gag. This matched a convicted rapist, who had no legitimate connection with the victim. Further work on the material produced a partial profile, which again matched the same male offender, with a match probability of 1:27 million.

The suspect was charged and stood trial in April 2022 where he was convicted of the victim's murder receiving a life sentence with a minimum term of 30 years.

Prior to this, the offender's DNA profile had also matched to a historical rape that had occurred in June 1987. The offender stood trial in 2010 for this rape offence and received a life sentence with a minimum term of 9 years. He was still serving this sentence when the DNA match for the murder case was obtained.

DNA matches linked the two offences helping to secure the convictions.

Case 3 –EMSOU-FS / Derbyshire Constabulary

A DNA match led to the identification of a suspect and his subsequent arrest and conviction for murder for which he was jailed for more than 30 years.

The offender admitted breaking into the pensioner's home January 2022. He had heard that the occupants had a significant amount of money at the home but when they didn't give the offender any money, he brutally assaulted them. The offender was caught on CCTV leaving the house where he had left the female victim fatally wounded and her husband fighting for his life.

Police traced the offender from a cap they found at the scene, which contained traces of his DNA. The cap contained apparent skin flakes which were recovered for DNA profiling.

1.4 Missing and Vulnerable Persons Databases

NDNAD holds DNA profile records generated from DNA samples taken from arrested individuals and crime scenes. In order to separate DNA profile records for individuals who have been arrested from records for missing people and vulnerable people at risk of harm (which are given with consent), there are now separate databases for missing and vulnerable persons.

1.4.1 Missing Persons DNA Database (MPDD)

The MPDD holds DNA profile records obtained from the belongings of people who have gone missing or from their close relatives. If an unidentified body is found that matches the description of a missing person, DNA can be taken from the body and compared to the relevant record on the MPDD to see if there is a match. This assists with police investigations and helps to bring closure for the family of the missing person. Profile records on the MPDD are not held on NDNAD.

As at 31st March 2022, there were **2,085** records on the MPDD. In 2021/22, the MPDD produced **28** matches[55].

1.4.2 MPDD Cases

Below are some examples of cases involving the MPDD.

Case 1 – Sussex Police

In April 2021, human remains were located in a Nature Reserve in Sussex. There was clothing with the body and some personal items but nothing else that could assist with DNA. A DNA profile was taken and loaded to the MPDD and a match was identified as belonging to a man who had been reported missing in October 2014. This was subsequently confirmed as the missing person.

Case 2 – Metropolitan Police

In April 2021, human remains were found in a large wooded area on a private estate in the South London area. Due to the decomposition of the remains, only DNA was

[55] During 2018/19 MPDD procedures were changed so they no longer require matches to be confirmed by the Forensic Service Providers – the number of matches reported in previous annual reports has been the number of confirmed matches.

retrievable. The DNA profile was loaded to the MPDD and the remains were identified as a medium-risk female who had been missing from Kent since 2014.

Case 3 – Sussex Police

In August 2021, the National Crime Agency (NCA) Missing Persons Unit were notified of the case of a male body which had been recovered from the sea in Sussex. The male had been in the water for some time and consequently fingerprints could not be recovered. There were no additional identifying features or clothing. A DNA profile was obtained from the deceased and loaded to MPDD, and identified as belonging to a male who was reported missing from Sussex earlier that month. Without DNA, there would have been no other means of identifying this individual.

1.4.3 Vulnerable Persons DNA Database (VPDD)

The VPDD holds the DNA profile records of people who are at risk (or who consider themselves at risk) of harm (for instance due to child sexual exploitation or honour based assault) and have asked for their profile to be added. If the person subsequently goes missing, their profile can be checked against NDNAD to see if they match to any biological material (such as blood or an unidentified body found at a crime scene) helping the police to investigate their disappearance. The taking of fingerprints and DNA samples is a key protective measure advised by NPCC guidance. This is aimed at addressing identification issues in potential investigations and to protect potential victims from serious acts of violence, abduction and homicide.[56] Profile records on the VPDD are not held on NDNAD.

As at 31st March 2022, there were **6,611** records on the VPDD. In 2021/22, there were **no** requests to compare records held on the VPDD with records held on NDNAD.

1.5 Contamination Elimination Database

FINDS administers a Contamination Elimination Database (CED) from which regular, national searches[57] of crime stain profile records submitted to the NDNAD are checked against elimination profile records. These elimination profiles are generated from DNA samples provided by police officers and police staff, and from other individuals with potential to introduce contamination into the DNA supply chain, such as staff at manufacturers of products used in the DNA process. This searching allows identification of those crime stain records with potential to relate to contamination (rather than the crime scene material actually sampled) for further integrity investigation to establish whether the DNA profile should be deleted from the NDNAD.

[56] 1.5 – ACPO Guidance on Taking of Fingerprints, DNA & Photographs of Victims / Potential Victims of Forced Marriage – Handling Procedures

[57] This change was brought in via The Police (Amendment) Regulations 2015 and The Special Constables (Amendment) Regulations 2015. The regulations were signed off on 1st April 2015.

On load to the CED, a check is made for matches against all newly submitted crime scene profile records added to the NDNAD. Following any necessary quality assurance checks by the FSPs which processed the crime scene DNA sample, matches are investigated by police forces and any crime scene DNA profile records concluded to originate from contamination by, for example, police officers or police staff, are then deleted from NDNAD. As at 1st April 2022, **2,680** potential contamination events had been identified for investigation. Police forces have investigated these matches and **1,953** have been concluded. This has resulted in the removal of **1,748** crime stain profile records from the NDNAD[58]. As Law Enforcement Agencies (LEAs) conclude their investigations the number of crime stain records deleted from the NDNAD will increase.

DNA profile records taken from serving police officers, special constables and police staff are able to be retained for elimination purposes for up to 12 months after they leave a police force (except where they transfer to another force)[59]. In line with the Police and Criminal Evidence Act 1984 (PACE), DNA samples will be destroyed within 6 months of the sample being taken.

With the re-platforming of the NDNAD in November 2020 and the corresponding changes of interfaces for CED searching, activities during 2021-22 have continued to focus on ensuring the maintenance of regular CED searching capabilities. As part of the HOB Programme, the CED is also planned to be upgraded to an improved platform.

The Police Elimination Database (PED) is a legacy database used for intelligence purposes, to identify potential contamination incidents and remains functional for specific checks. Where a police force suspects that a crime scene sample may have been contaminated with DNA from a police officer or police staff, they can request that a direct comparison is made of DNA obtained from the crime scene against the PED profile. Each incident must be reported separately; FINDS are not permitted to carry out full searches of the PED. In February 2018 system changes were made to cease loading new records to the PED, as it has been superseded by the CED.

1.6 Technology and business process developments on the NDNAD in 2021/22

NDNAD is regularly adapted to incorporate new developments in technology. This involves significant work to develop and test changes to ensure they meet the standards required. The Home Office also responds to any scientific and technological developments that could impact on its effectiveness.

1.6.1 Home Office Biometrics (HOB) Programme

The HOB is a programme in the Government Major Projects Portfolio. HOB is delivering changes and improvements to biometric matching and identification

[58] Forces deemed that following investigation the remaining 205 crime stain records could remain on the NDNAD.
[59] This change was brought in via The Police (Amendment) Regulations 2015 and The Special Constables (Amendment) Regulations 2015. The regulations were signed off on 1st April 2015.

services for the UK. The HOB Programme focuses on three biometric modes: fingerprints, DNA, and facial matching. These services enable the capture, authentication, verification, and searching and matching of individuals' biometrics for the purposes of identifying criminal offenders, protecting the border, and preventing terrorism.

HOB continue to support the NDNAD application and platform. In 2021/22, security patching and minor functionality enhancements to the NDNAD were delivered on a quarterly basis. The enhancements covered some of the functionality de-scoped from the initial NDNAD upgrade which went live on 23rd November 2020. Throughout the year, HOB and FINDS continued activities to provide a replacement IT platform for the current CED.

1.6.2 DNA Futures

The 'DNA Futures' project is led by FINDS and the FCN and brings together key stakeholders from across police forces, FSPs, and criminal justice partners for the purposes of prioritising areas of work and development of a strategic plan for DNA service delivery.

DNA Futures are leading the development of a UK Y-Chromosome reference database that will enable the estimation of the frequency of Y-STR profiles specifically in the UK population. This reference database will enhance the UK's capability in the investigation of sexual offences as well as other serious/major criminal offences, where often the male DNA profile is masked due to a mixed DNA profile. A collection exercise of approximately 10,000 buccal samples to obtain Y-STR profile data for the reference database will commence by FINDS and FCN in 2023.

1.7 Security and Quality Control

1.7.1 Access to NDNAD

Day-to-day operation of NDNAD is the responsibility of FINDS. Data held on NDNAD are kept securely and the laboratories that provide DNA profile records to NDNAD are subject to regular assessment.

FINDS is responsible for ensuring that operational activity meets the standards for quality and integrity established by the FIND Strategy Board. There were 27 vetted staff who had access to the NDNAD at the time of writing and there were 9 accounts which do not have direct access to the NDNAD but are used to facilitate the sending of reports to police forces[60]. No police officer or police force has direct access to the data held on NDNAD but they are informed of any matches it produces. Similarly, FSPs who undertake DNA profiling under contract to the police service and submit the resulting crime scene and subject profile records for loading, do not have direct access to NDNAD.

[60] As at 13/09/22.

1.7.2 Compliance to international quality standards

The Forensic Science Regulator's Codes of Practice and Conduct (version 7) states that the NDNAD is to be certificated to the IT standard, TickITplus, that its operation should be certificated to the management standard ISO 9001 and its proficiency testing scheme to the technical standard ISO 17043. FINDS holds certification to ISO 9001 and accreditation to ISO 17043 and whilst the hosting and maintenance of the IT systems do not currently hold the required certification to TickITplus, FINDS are looking to align with ISO 27001, the cornerstone of TickITplus in the coming year. FINDS are subject to regular assessments by accrediting bodies such as UKAS to maintain these standards.

1.7.3 Error rates

Police forces and FSPs have put in place a number of safeguards to minimise the occurrence of errors in the sampling and processing of DNA samples and the interpretation of generated DNA profiles. FINDS carry out daily integrity checks for the DNA profile records loaded to the NDNAD. Despite these safeguards, errors do sometimes occur for samples taken from individuals and from crime scenes. The CED, which contains the profile records of police officers, police staff and people in the wider DNA process, helps to reduce errors by highlighting DNA profiles that are potentially sourced from contamination.

There are four types of errors which may occur on the NDNAD; these are explained below:

i. Force sample or record handling error:

This occurs where the DNA profile is associated with the wrong information, the source of the error in these cases could be either a physical DNA sample swap in the custody suite or the DNA record being attached to the incorrect PNC record. For example, if person A and person B are sampled at the same time, and the samples are put in the wrong bags with incorrect forms, person A's sample would be attached to information (PNC ID number, name etc.) about person B, and vice versa. Similarly, crime scene sample C could have information associated with it which relates to crime scene sample D and vice versa. These are all errors which have occurred during police force process. They could also relate to instances where a sample has been taken contravening PoFA.

ii. Forensic Service Provider sample or record handling error:

As above, this occurs where the DNA profile is associated with the wrong information during FSP process. Sources of this error include samples being mixed up as described above, or contaminating DNA being introduced during processing.

iii. Forensic Service Provider interpretation error:

This occurs where the FSP has made an error during the analysis/interpretation of the DNA profile.

iv. FINDS (DNA) transcription or amendment error:

This occurs where FINDS has introduced inaccurate information to the record on the NDNAD.

Table 4 shows the error rate for subject and crime scene profile records loaded to the NDNAD for each type of organisation in 2021/22. These errors have been identified through FINDS integrity checks. No known miscarriage of justice arose from these errors; they were detected by the routine integrity checks in place. However, had they remained undetected, they could have affected the integrity of the NDNAD.

Table 4: Error rates 2021/2022

Organisation	Error types	Sample Type	April to June 2021	July to September 2021	October to December 2021	January to March 2022
Profile records loaded		Subject	67,410	72,710	73,303	74,324
		Crime scene	6,256	6,207	6,492	7,018
Police Forces	Sample or record handling	Subject	47	49	49	69
		Subject (%)	0.07%	0.07%	0.07%	0.09%
Forensic Service Providers	Sample or record handling	Subject	0	0	2	0
		Subject (%)	0.00%	0.00%	0.00%	0.00%
		Crime scene	1	3	2	2
		Crime scene (%)	0.02%	0.05%	0.03%	0.03%
	Interpretation[61]	Subject	3	2	5	1
		Subject (%)	0.00%	0.00%	0.01%	0.00%
		Crime scene	14	12	17	13
		Crime scene (%)	0.22%	0.19%	0.26%	0.19%
FINDS (DNA)	Transcription or amendment	Subject	0	0	0	0
		Subject (%)	0.00%	0.00%	0.00%	0.00%
		Crime scene	0	0	0	0
		Crime scene (%)	0.00%	0.00%	0.00%	0.00%

[61] It should be noted that the percentage error rates for record/sample handling are not directly equivalent to those for interpretation: a record/sample handling error will affect a complete DNA profile while an interpretation error will affect (generally) one area of the DNA analysed by the Forensic Service Provider (i.e. a single allele or locus).

1.7.4 Forensic Service Provider accreditation

Any FSP carrying out DNA profiling work for loading to NDNAD must be approved by FINDS (DNA) and the FIND Strategy Board; and must hold accreditation to ISO17025 as defined in the Forensic Science Regulator's Codes of Practice and Conduct. This involves regular monitoring of standards. As at 31st March 2022, **16** laboratories were authorised to load profile records to NDNAD from standard processing. In addition to these, the RapidHit Units (under one authorised laboratory) are housed at a number of police custody suites for processing samples authorised for NDNAD loads. There are currently **14** machines authorised for this purpose.

1.7.5 Forensic Science Regulator

In late July 2022, the Forensic Science Regulator published a newsletter[62] setting out the work that had been undertaken to produce the draft statutory Code of Practice[63] and some initial views on the enforcement and compliance processes. As required by the Forensic Science Regulator Act, a statutory consultation on the draft Code of Practice was launched on the 8th August and finished on the 31st October 2022.

The newsletter outlined the approach to enforcement and compliance processes in that they should be;

a. Proactive and reactive - Through information provided by a Senior Accountable Individual, there can be a proactive approach to identifying risk, alongside the reactive approach of referrals brought to the attention of the Regulator.

b. Proportionate - The use of the enforcement powers must be proportionate to the risk posed and based on escalation, with the full enforcement powers under the Act being used in general as a last resort.

c. Fair, transparent, and consistent - The enforcement and compliance process must be fair and transparent, with consistency across Forensic Units and Forensic Science Activities.

d. Supportive - The enforcement and compliance process must assist forensic units in producing accurate and reliable forensic science evidence, maintaining and encouraging the culture of self-referrals and near-miss reporting that exists in forensic science.

Work continues on the development of the processes and these will be published following the finalisation of the Code of Practice.

To provide a starting point for understanding compliance and potential risk across forensic science activities that are subject to the Code of Practice, the Forensic Science Regulator undertook a Code of Practice Baseline Compliance Survey

[62] FSR newsletter: Forensic Science Regulator newsletter: number 1 - GOV.UK (www.gov.uk)

[63] FSR Draft code of Practice: Forensic science: draft statutory code of practice - GOV.UK (www.gov.uk)

between 17th October and 11th November 2022. The survey results will be used to inform the enforcement and compliance processes.

1.8 Finance 2021/2022

In 2021/22, the Home Office and policing spent **£1.98m**[64] running NDNAD on behalf of the Criminal Justice System.

2. National Fingerprint Database

2.1 Introduction

The National Fingerprint Database and National Automated Fingerprint Identification System (NAFIS), now collectively referred to as IDENT1, was established in 1999 and holds fingerprint images obtained from persons and crime scenes by law enforcement agencies of the United Kingdom. It provides the ability to electronically store and search fingerprint images to manage person identity and compare fingerprints from known individuals with fingermarks from unsolved crimes.

2.1.1 Fingerprint records

The skin surface found on the underside of the fingers, palms of the hands and soles of the feet is different to skin on any other part of the body. It is made up of a series of lines known as ridges and furrows and this is called friction ridge detail.[65]

The ridges and furrows are created during foetal development in the womb and even in identical siblings the friction ridge development is different. It is generally accepted that friction ridge detail is unique to each individual, although this cannot be definitively proved.[66]

Located at intervals along the top of the ridges are pores which secrete sweat. When an area of friction ridge detail comes into contact with a receptive surface, an impression of the friction ridge detail, formed by sweat residue, may be deposited on that surface[67].

These impressions are often not visible in their natural form and require the application of an appropriate powder or chemical treatment to allow the impression to be developed (made visible) and subsequently lifted and/or photographed for fingerprint examination. [68]

[64] This does not include IT costs.
[65] Cited from Forensic Science Regulator Codes – Fingerprint Comparison FSR-C-128 25.4.1
[66] Cited from Forensic Science Regulator Codes – Fingerprint Comparison FSR-C-128 25.4.2
[67] Cited from Forensic Science Regulator Codes – Fingerprint Comparison FSR-C-128 25.4.3
[68] Cited from Forensic Science Regulator Codes – Fingerprint Comparison FSR-C-128 25.4.4

Visible impressions may also be made by contact of friction ridge skin with contaminants such as paint, blood, ink or grease. [69]

The analysis of friction ridge detail is commonly known as fingerprint examination.[70]

Friction ridge detail persists throughout the life of the individual without change, unless affected by an injury or deliberate action causing permanent damage to the regenerative layer of the skin (dermis) for example, a scar. The high degree of variability between individuals coupled with the persistence of the friction ridge detail throughout life allows it to be used for identification purposes and provides a basis for fingerprint comparison as evidence[71]

The National Fingerprint Database holds two types of fingerprint record:

i. Individuals.

UK LEAs routinely take a set of fingerprints from all persons they arrest.

Fingerprints are usually obtained electronically on a fingerprint scanning device but are occasionally obtained by applying a black ink to the friction ridge skin and an impression recorded on a paper fingerprint form.

A set of fingerprints is known as a Tenprint and comprises:

- Impressions of the fingertips taken by rolling each finger from edge to edge.
- An impression of all 4 fingers taken simultaneously for each hand and both thumbs
- Impressions of the ridge detail present on both palms.

ii. Crime scenes

CSIs examine surfaces which the perpetrator of the crime is most likely to have touched and use a range of techniques to develop latent (not visible) fingermarks to make them visible. Fingermarks developed and recovered from crime scenes are searched against the Tenprints obtained from arrested persons to identify who touched the surface the fingermarks were recovered from. Latent marks can also be developed by subjecting items (exhibits) potentially touched by the perpetrator through a series of chemical processes in an accredited laboratory by sufficiently trained and competent laboratory staff.

2.1.2 Fingerprint Matches

Fingerprint examination is a long-established forensic discipline and has been used within the Criminal Justice System in the UK since 1902. It is based on the comparison of friction ridge detail of the skin from fingers and palms[72].

[69] Cited from Forensic Science Regulator Codes – Fingerprint Comparison FSR-C-128 24.5.6
[70] Cited from Forensic Science Regulator Codes – Fingerprint Comparison FSR-C-128 24.5.6
[71] Cited from Forensic Science Regulator Codes – Fingerprint Comparison FSR-C-128 25.5.1
[72] Cited from Forensic Science Regulator Codes – Fingerprint Comparison FSR-C-128 25.3.1

The comparison of fingerprints is a subjective cognitive process that relies on the competence of the practitioners to perform examinations and form conclusions based on their observations and findings. The results following an examination are communicated in the form of an opinion and not a statement of fact.[73]

i. Fingerprint Examination

The purpose of fingerprint examination is to compare two areas of friction ridge detail to determine whether they were made by the same person or not.[74]

The declared outcomes of a fingerprint comparison process rely on the observations and evaluation of a competent fingerprint practitioner. The practitioner gives an opinion based on their observations, it is not a statement of fact, nor is it dependent upon the number of matching ridge characteristics.[75]

The fingerprint examination process consists of stages referred to as analysis, comparison and evaluation, known as ACE-V. These stages are descriptors of the process undertaken by the practitioners in determining their conclusions. Although the process sets out the stages sequentially, it is not a strictly linear process. ACE can be followed by a verification stage (and the process called ACE-V). Verification is conducted by another practitioner using the ACE examination process to review the original conclusion and the examination records made by a previous examiner.[76]

There are four possible outcomes that will be reported from a fingerprint examination *Insufficient, Identified, Excluded or Inconclusive*.[77]

a) Analysis

The fingerprint practitioner conducts an examination of the general ridge flow of an impression and the shapes or patterns formed by the ridges. They observe the location of the naturally occurring deviations within the ridge flow which form features or characteristics, such as ridge endings and bifurcations. The fingerprint practitioner evaluates the quality and quantity of the ridge flow together with the features and the specificity of the characteristics to determine its suitability for further examination.

[73] Cited from Forensic Science Regulator Codes – Fingerprint Comparison FSR-C-128 25.3.2
[74] Cited from Forensic Science Regulator Codes – Fingerprint Comparison FSR-C-128 25.6.1
[75] Cited from Forensic Science Regulator Codes – Fingerprint Comparison FSR-C-128 25.6.4
[76] Cited from Forensic Science Regulator Codes – Fingerprint Comparison FSR-C-128 25.7.1
[77] Cited from Forensic Science Regulator Codes – Fingerprint Comparison FSR-C-128 25.7.2

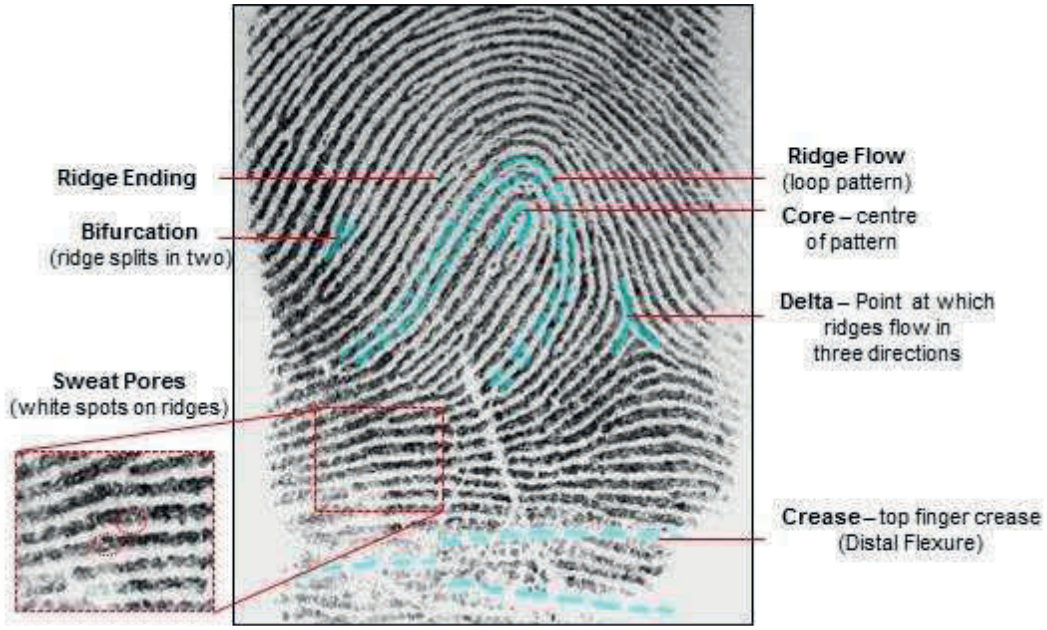


Image courtesy of Lisa J Hall, Metropolitan Police Forensic Science Services; permission to reproduce granted.

Figure 5: Friction ridge detail observable at the top of a finger. The black lines are the ridges and the white spaces are the furrows. The ridges flow to form shapes or patterns. This is an example of a loop pattern exiting to the left. There are natural deviations within the ridge flow known as characteristics such as ridge endings or forks/bifurcation. There are white spots along the tops of the ridges known as pores and there are other features present for example creases, which are normally observed as white lines.[78]

Using a holistic approach to review the detail observed within the mark and other external variables for example, the surface on which the mark was left or any apparent distortion, the fingerprint practitioner establishes whether they can progress the examination and comparison process.[79]

b) Comparison

The fingerprint practitioner will systematically compare two areas of friction ridge detail, for example one area from a fingermark against one from a fingerprint. This process generally consists of a side-by-side comparison to determine whether there is agreement or disagreement between the ridge flow, features and characteristics. The fingerprint practitioner examines the features on the fingermark first to minimise bias.

The fingerprint practitioner compares the type, specificity, sequence and spatial relationship of all the observed ridge characteristics, whilst considering the tolerance(s) they have allowed, based on their experience, for any issues relating to clarity or distortion of the ridge detail.

[78] Cited from Forensic Science Regulator Codes – Fingerprint Comparison FSR-C-128 25.7.3
[79] Cited from Forensic Science Regulator Codes – Fingerprint Comparison FSR-C-128 25.8.1

The fingerprint practitioner will establish an opinion as to the level of agreement or disagreement between the sequences of ridge characteristics and features visible in both the fingermark and fingerprint.[80]

c) Evaluation

The fingerprint practitioner will review all of their previous observations and come to a final opinion and conclusion about the outcome of the examination process undertaken.[81]

The outcomes determined from the examination will be one of the following:[82]

Identified: A practitioner term used to describe the fingermark as being attributed to a particular individual. (The term will be replaced in the future when an evaluative interpretation method for fingerprint comparison is further developed).

Excluded: There are sufficient features in disagreement to conclude that two areas of friction ridge detail did not originate from the same person

Inconclusive**:** The level of agreement and / or disagreement is such that, it is not possible to conclude that the areas of friction ridge detail originated from the same person, or exclude that particular individual as a source for the unknown friction ridge detail.

Insufficient: The ridge flow and / or ridge characteristics revealed in the area of friction ridge detail are of such low quantity and/or poor quality that a reliable comparison cannot be made.

d) Verification

Is the process to demonstrate whether the same outcome is obtained by another competent fingerprint practitioner or fingerprint practitioners who conduct an independent analysis, comparison and evaluation, thereby confirming the original outcome.[83]

2.1.3 Outcomes using Fingerprints.

The number of offenders convicted with the help of fingerprint evidence is not recorded.

Within IDENT1 it is possible to search Tenprints and fingermarks to investigate links between a person and unidentified scene of crime fingermarks. During the period 2021/22 there were **424,124** scene of crime fingermark to Tenprint searches resulting in **15,138** matches.

[80] Cited from Forensic Science Regulator Codes – Fingerprint Comparison FSR-C-128 25.9.1
[81] Cited from Forensic Science Regulator Codes – Fingerprint Comparison FSR-C-128 25.10.1
[82] Cited from Forensic Science Regulator Codes – Fingerprint Comparison FSR-C-128 25.11
[83] Cited from Forensic Science Regulator Codes – Fingerprint Comparison FSR-C-128 25.12.1

For all Tenprint records obtained from persons arrested in the UK, there is a search of the arrestee Tenprint collection to confirm whether a person has a previously obtained fingerprint set on the database. This search confirms a person's identity and is linked to the person's arrest event and biometrically validating a person's arrest history.

2.1.4 Who runs IDENT1?

Since 2012 IDENT1 has been operated by the Home Office. LEAs have direct access to the system and they own the data they enrol within it.

The Home Office is responsible for assuring the quality and integrity of policing data held on IDENT1. To discharge this function, FINDS identify and correct data errors and unexpected results on IDENT1. The activities of the agencies that provide the inputs to the fingerprint database and its supply chain are monitored by FINDS and included in the FINDS performance monitoring framework and data assurance strategy.

2.1.5 Access to IDENT1

The number of IDENT1 active users was **905** as at 7th October 2022[84]. Fingerprints are captured electronically on a device called Livescan and electronically transmitted to the fingerprint database for search. The number of active Livescan accounts was **2,592** as at 7th October 2022.

2.2 Who is on IDENT1?

2.2.1 Number of profile records held on IDENT1 System[85]

As at 31st March 2022, IDENT1 held **27,168,685** fingerprint forms relating to **8,562,878** individuals. Figure 5 shows the yearly number of individuals on IDENT 1. Figure 6 shows the yearly number of fingerprint forms on IDENT1.

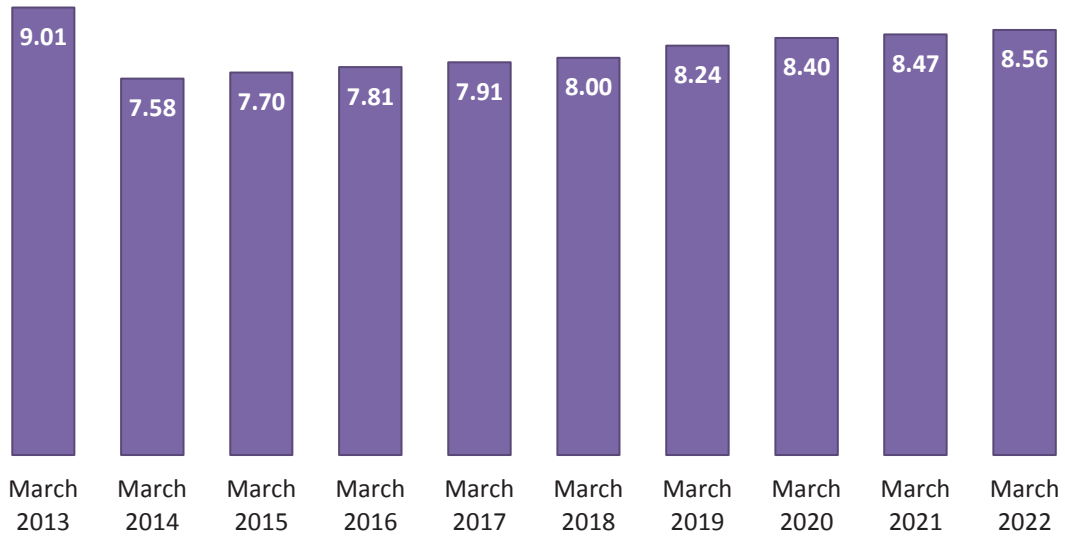
As at 31st March 2022, IDENT1 held **2,009,989** unidentified crime scene marks. Figure 7 shows the yearly number of unique unidentified mark submissions held on IDENT 1.

[84] This figure covers a period outside of the reporting year i.e. up to October 2022 due to the systems in place, used to collect the data.
[82]Source: FINDS - National Fingerprint and PNC Office in consultation with the IDENT1 supplier.

Table 5. Records held on IDENT 1

Month End and Year	Number of Individuals on IDENT1	Number of Fingerprint Identification Forms held on IDENT 1	Number of unidentified crime scene marks held on IDENT1
March 2011	8,471,960	19,906,978	1,896,885
March 2012	8,759,820	21,303,201	1,971,938
March 2013	9,006,957	22,508,260	2,029,028
March 2014	7,578,717	21,702,050	2,110,962
March 2015	7,695,129	22,571,529	2,303,565
March 2016	7,814,041	23,364,390	2,318,576
March 2017	7,905,419	24,059,907	2,285,669
March 2018	8,012,521	24,822,939	2,259,139
March 2020	8,397,761	26,298,205	2,203,279
March 2021	8,468,335	26,651,175	2,060,567
March 2022	8,562,878	27,168,685	2,009,989

Figure 5: Number of individuals on IDENT1 (in millions) (March 2013 to March 2022)[86] [87]



[86] Source: FINDS - National Fingerprint and PNC Office in consultation with the IDENT1 supplier.
[87] The deletion of records which did not meet the retention criteria for records brought in by PoFA was completed during 13/14 hence the drop in the number of criminal records held for subjects on IDENT 1.

Figure 6: Number of Fingerprint Forms Held for all Subjects on IDENT1 (in millions) (March 2013 to March 2022)[88]

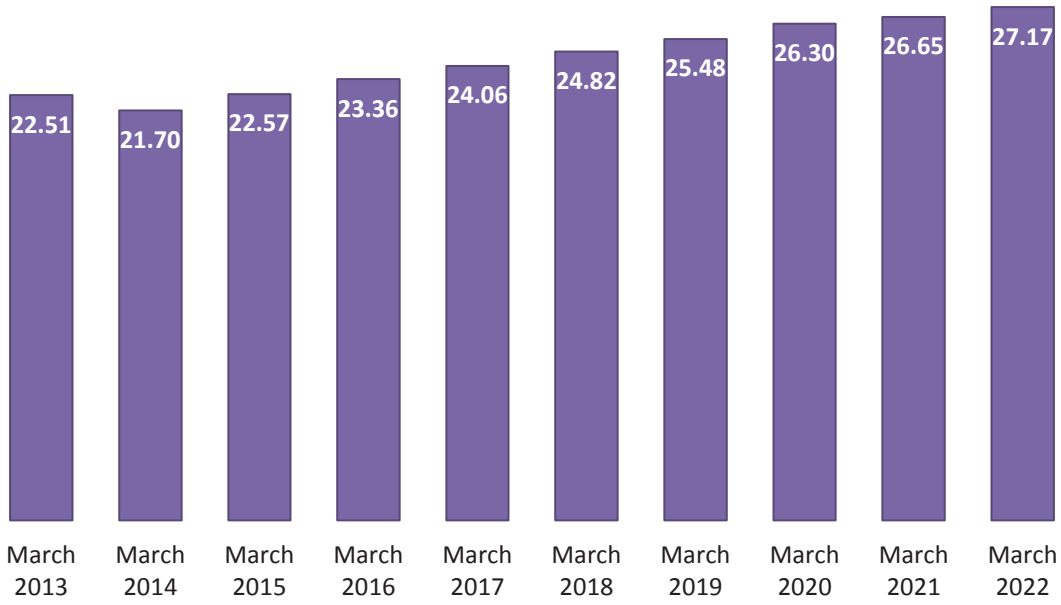
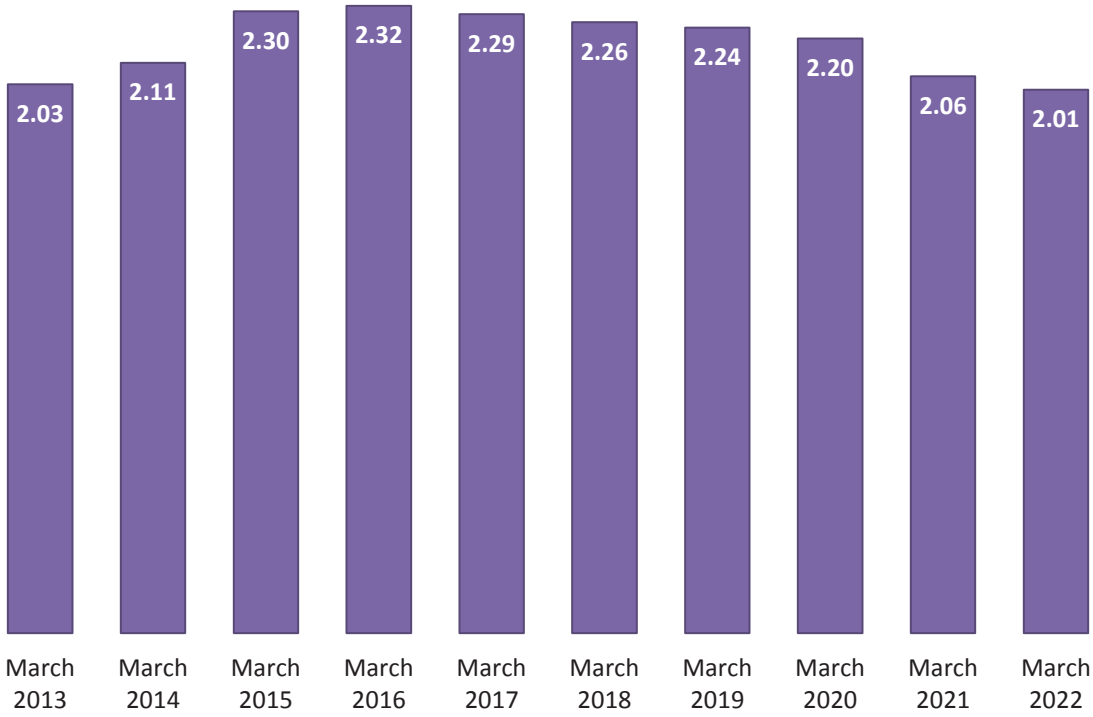


Figure 7: Number of unique unidentified mark submissions held on IDENT 1 (in millions) (March 2013 to March 2022) [89]



[88] Source: FINDS - National Fingerprint and PNC Office in consultation with the IDENT1 supplier
[89] Source: FINDS - National Fingerprint and PNC Office in consultation with the IDENT1 supplier

2.3 Vulnerable persons

IDENT1 also contains fingerprints obtained with consent from vulnerable persons, specifically those defined at risk of honour based assault, forced marriage or female genital mutilation. The taking of fingerprints (like that of DNA) is a key protective measure advised by the NPCC guidance. This is a two-fold measure, aimed at addressing identification issues in potential investigations and to protect potential victims from serious acts of violence, abduction and homicide.[90] Fingerprints donated by vulnerable persons are stored on IDENT1 and as such provide means to identify a vulnerable person when they come to police notice.

There were **8,056**[91] sets of fingerprints relating to vulnerable people held on the database as at 31st March 2022.

2.4 Missing persons

Fingerprints relating to unidentified bodies, and unidentified or missing persons investigations are searched on the IDENT1 in an attempt to establish identity or locate a missing person. Where the investigation allows the fingerprints obtained are stored in the Missing Persons Fingerprint Collection and as such are only searchable by request. Fingerprints obtained from the belongings of a missing person are also searched against both the National Fingerprint Collection and the Missing Persons Fingerprint Collection to assist with police investigations and to help to bring closure for the family of the missing person.

There were **72** sets of fingerprints relating to missing persons held on the database as at 31st March 2022. There were **3** Fingerprint identifications for Missing Person Unit cases during 2021/22.

2.5 Technology and business process developments on the National Fingerprint Database in 2021/22

As discussed in section 1.6.1, HOB is delivering biometrics matching and identification services for the UK.

Programme highlights in relation to fingerprints over the last year include:

- HOB have continued to roll out the replacement strategic mobile biometric capability (rapid search) to police forces across England and Wales as mentioned in the 2018/19 and 2019/20 reports. Currently, 30 forces have joined the service with other agencies in the pipeline.
- In October 2020 the UK began exchanging fingerprint data through the Prüm treaty. Currently, there are connections established with Germany, Belgium, Austria and Czech Republic. The UK will continue to connect to further EU Member

[90] 1.5 – ACPO Guidance on Taking of Fingerprints, DNA & Photographs of Victims / Potential Victims of Forced Marriage – Handling Procedures
[91] Strategic Central & Bureau Platform (SCBP) Service Performance Monitoring Report (April 2022 Service Period)

States throughout 2022/23 and is planning to make further country connections following a recent evaluation of the UK's access to the data sharing mechanism following EU Exit and the enactment of the European Union (Future Relationship) Act 2020.

- HOB have supported a number of police organisations to move their IDENT1 equipment or assisted configuring IDENT1 hardware to allow police organisations to collaborate when processing fingerprint data.
- The first major software release under the new supplier was the Image Request capability to support the Transforming Forensics platform as mentioned in the 2018/19 and 2019/20 reports. This capability is now live and being used by the NCA.
- Work on planning and designing IDENT1 Cloud Transformation continues to advance and, whilst the legacy IDENT1 system still provides operational service, a degree of technical refresh is also being undertaken to ensure service continuity. Work also progresses on delivering more bureau server upgrades, focusing on collaborations.

2.5.1 Future developments

- Also as mentioned in the 2018/19 and 2019/20 reports, a new fingerprint matching algorithm will improve performance of the IDENT1 automated fingerprint identification system and continues to be refined. The new fingerprint matcher platform is being developed and expected to be operational during 2022/23.
- A Proof of Concept for an upgrade to IDENT1 bureau desktop is underway which is a short-term deliverable, whilst longer-term, there will be a move to a Cloud-based system which may enable a move off dedicated IDENT1 desktops to Force supplied ones.
- Work to deliver a mobile biometric enrolment capability for law enforcement is currently paused, although it is still progressing for Immigration purposes. This will work with Force mobile applications and allow fingerprint data to be captured digitally (removing the need for wet ink printing) and more flexibly including outside of the police custody environment and enrolled into IDENT1. The same mobile biometric capture capability will also be available for use by Immigration Enforcement with an ability to enrol digital prints (removing the need for wet ink prints) into the Immigration and Asylum Biometric System (IABS) as permitted and provide greater flexibility in enrolment location.

An individual's biometric information is very sensitive personal information and is handled in accordance with the Data Protection Act 2018. To ensure transparency, HOB completes Data Protection Impact Assessments for all areas of the Programme, these are subject to independent ethical review by the Biometric and Forensic Ethics Group (BFEG) which continues to review the assessments already published on GOV.UK.[92]

[92] https://www.gov.uk/government/publications/home-office-biometrics-hob-programme-privacy-impact-assessments

2.6 Finance 2021/2022

In 2021/22, the Home Office and policing spent **£1.26m**[93] running IDENT1 on behalf of the Criminal Justice System.

3. International Data exchange

3.1 Overview

DNA and fingerprints are exchanged with other countries to aid criminal investigations and in connection with missing person or unidentified body investigations. All exchanges must abide by national and international law and all exchanges of DNA and Fingerprint data are made via the NCA UK International Crime Bureau.

3.2 International requests for DNA and Fingerprint exchange excluding Prüm exchange.

i DNA

FINDS – DNA Unit recorded **394** requests from other countries for DNA profiles from their jurisdictions to be searched against the NDNAD during 2021/22. Of these **204** were in connection with a criminal investigation and **190** were in connection with missing person or unidentified body part(s) investigations.

ii Fingerprints

FINDS has recorded **104** requests from other countries for search of fingerprints from their jurisdictions during 2021/22. All of these requests were in connection with missing persons or identification/unidentified body investigations.

3.3 Prüm

Title III of the UK-EU Trade and Cooperation Agreement (TCA) provides for the continued exchange of biometric data with EU Member States to improve cross-border cooperation between law enforcement agencies to combat terrorism and cross-border crime. Cooperation prior to EU exit was governed by the Prüm Council Decisions and the biometric exchange mechanisms and governance framework continue to be referred to as 'Prüm'.

Prüm allows the sharing of biometric data (DNA profiles and fingerprints) with EU Member States on a reciprocal basis through a two-step process. Step one is an

[93] This does not include IT costs.

anonymised search of biometric data against national databases providing a 'hit/no hit' result. Step two involves the sharing of demographic data (e.g. name, date of birth) and policing intelligence where there has been a verified match against the anonymised data.

DNA Profile Exchange

The UK began sharing DNA profiles in July 2019 and is now connected to 15 EU Member States: Austria, Germany, France, the Netherlands, Spain, Romania, Poland, Czech Republic, the Republic of Ireland, Latvia, Sweden, Belgium, Malta, Lithuania and Finland. The UK's connection to Prüm DNA has produced positive results for both the UK and the EU partners connected to so far. From searches of historical data held on the UK's national DNA database, as well as searches of current profiles, the UK has received over 13,000 initial 'hits' from its Prüm DNA connections, including over 2,000 relating to particularly serious crimes. In turn, EU Member States have received approximately 47,000 initial hits from their connections with the UK.[94]

Fingerprint Exchange

The UK began exchanging fingerprints with Germany in October 2020 and the UK is now also connected with Austria, Belgium, Bulgaria, Czech Republic, Denmark, Hungary and Lithuania. The UK will continue to connect to EU Member States throughout 2023.

[94] Figures provided are between going live and November 2022.

4. Legislation governing DNA and Fingerprint retention

4.1 Overview

For England and Wales the Protection of Freedoms Act 2012 (PoFA) and the Anti-Social Behaviour, Crime and Policing Act 2014 (ASBCPA), amended the Police and Criminal Evidence Act 1984 (PACE) to establish the current retention framework for DNA and fingerprints. The NDNAD also contains profiles from Scotland and Northern Ireland.

The enabling legislation for Scotland is:-

- Part 2 of the Criminal Procedure (Scotland) Act 1995
- Section 56 of the Criminal Justice (Scotland) Act 2003 [voluntary samples]
- Chapter 4 of Part 4 of the Age of Criminal Responsibility (Scotland) Act 2019

The enabling legislation for Northern Ireland is:-

- Police and Criminal Evidence (Northern Ireland) Order 1989 (PACE NI)

4.2 Protection of Freedoms Act 2012

4.2.1 Introduction

PoFA includes detailed rules on how long the police may retain an individual's DNA sample, profile and fingerprints.

4.2.2 DNA profile records and fingerprints

Depending on the circumstances, a DNA profile and fingerprint record may be retained indefinitely, held for three to five years and then destroyed, or destroyed immediately.

4.2.3 DNA samples

PoFA requires all DNA samples taken from individuals to be destroyed as soon as a profile has been obtained from them (or in any case within 6 months) unless it is retained under the Criminal Procedure and Investigations Act 1996 (CPIA)[95]. This allows sufficient time for the sample to be analysed and a DNA profile to be produced and uploaded to NDNAD.

[95] Under the Criminal Procedure and Investigations Act 1996 (CPIA) (and its associated code of practice) evidence can be retained where it may be needed for disclosure to the defence. This means that, in complex cases, a DNA sample may be retained for longer. This sample can only be used only in relation to that particular offence and must be destroyed once its potential need for use as evidence has ended.

For DNA samples which are taken with informed consent, but not in connection with the investigation of an offence, such as DNA samples taken for research purposes or from vulnerable volunteers or from relatives of missing persons (who are not suspected to be the victims of offences), there is no legal requirement for destruction. For vulnerable persons the sample must be reviewed by the police force every 2 years and must be destroyed if it becomes apparent that there is no good reason for them to be retained. For missing persons the DNA sample can be retained until any investigation into the missing person has concluded.

4.2.4 Biometrics Commissioner

PoFA also established the position of Commissioner for the Retention and Use of Biometric Material ('the 'Biometrics Commissioner')[96]. The position is independent of Government. At the time of writing, the current Biometrics Commissioner is Professor Fraser Sampson.

As indicated in Table 6b, one of the Biometrics Commissioner's functions is to decide whether or not the police may retain DNA profile records and fingerprints obtained from individuals arrested but not charged with a qualifying offence. He also has a general responsibility to keep the retention and use of DNA and fingerprints, and retention on national security grounds, under review.

4.2.5 Scottish Biometric Commissioner

The Scottish Biometrics Commissioner Act 2020 established the office of the Scottish Biometric Commissioner and the role of the Scottish Biometrics Commissioner in exercising independent oversight of biometric data used for policing and criminal justice purposes in Scotland.[97] At the time of writing current Scottish biometric commissioner is Dr Brian Plastow.

4.2.6 Extensions

Where an individual has been arrested for, or charged with, a qualifying offence and an initial, three year period, of retention, has been granted, PoFA allows a chief constable to apply to a district judge for a two year extension of the retention period if the victim is under 18, a vulnerable adult, is associated with the person to whom the retained material relates or if they consider retention to be necessary for the prevention or detection of crime.

[96] For more information on the work of the Biometrics Commissioner see https://www.gov.uk/government/organisations/biometrics-commissioner.
[97] Scottish Biometrics Commissioner Act 2020 (legislation.gov.uk)

4.2.7 Speculative searches

PoFA allows the DNA profile and fingerprints taken from arrested individuals to be searched against NDNAD and IDENT1, to see if they match any subject or crime scene profile already stored. Unless a match is found, or PoFA provides another power to retain them (for example because the person has a previous conviction) the DNA and fingerprints are deleted once the 'speculative search' has been completed. If there is a match the police will decide whether to investigate the individual or not.

Table 6a: Retention periods for convicted individuals

Situation	Fingerprint & DNA Retention Period
Any age convicted (including given a caution or youth caution) of a qualifying offence	Indefinite
Adult convicted (including given a caution) of a minor offence	Indefinite
Under 18 convicted (including given a youth caution) of a minor offence	**1st conviction:** five years (plus length of any prison sentence), or indefinite if the prison sentence is for five years or more. **2nd conviction:** indefinite

Table 6b: Retention periods for un-convicted individuals

Situation	Fingerprint & DNA Retention Period
Any age charged with but not convicted of a qualifying[98] offence	Three years plus a two year extension if granted by a District Judge (or indefinite if the individual has a previous conviction for a recordable[99] offence which is not excluded)
Any age arrested for but not charged with a qualifying offence	Three years if granted by the Biometrics Commissioner plus a two year extension if granted by a District Judge (or indefinite if the individual has a previous conviction[100] for a recordable offence which is not excluded[101])
Any age arrested for or charged with a minor[102] offence	None (or indefinite if the individual has a previous conviction for a recordable offence which is not excluded)
Over 18 given a Penalty Notice for Disorder	Two years

[98] A 'qualifying' offence is one listed under section 65A of the Police and Criminal Evidence Act 1984 (the list includes sexual, violent, terrorism and burglary offences).
[99] A 'recordable' offence is one for which the police are required to keep a record. Generally speaking, these are imprisonable offences; however, it also includes a number of non-imprisonable offences such as begging and taxi touting. The police are not able to take or retain the DNA or fingerprints of an individual who is arrested for an offence which is not recordable.
[100] Convictions include cautions, reprimands and final warnings.
[101] An 'excluded' offence is a recordable offence which is minor, was committed when the individual was under 18, for which they received a sentence of fewer than 5 years imprisonment and is the only recordable offence for which the individual has been convicted.
[102] A minor offence is a 'recordable' offence which is not also a 'qualifying' offence.

4.3 Early Deletion

PoFA requires the FIND Strategy Board to issue guidance about the destruction of DNA profile records[103]. This guidance, known as the 'Deletion of Records from National Police Systems', covers DNA profile records and samples, fingerprints and PNC records and it was first published in May 2015[104]. The guidance is only statutory in relation to DNA profile records and only applies to those:

- with no prior convictions, whose biometric material is held because they have been given a Penalty Notice for Disorder;
- who have been charged with, but not convicted of, a qualifying offence; or
- who receive a simple or conditional caution.

The guidance states that Chief Officers may wish to consider early deletion if applied for on specified grounds. These include:

- a recordable offence has not taken place (e.g. where an individual died but it has been established that they died of natural causes);
- the investigation was based on a malicious or false allegation;
- the arrested individual has a proven alibi;
- the status of the individual (e.g. as victim, offender or witness) is not clear at the time of arrest;
- a magistrate or judge recommends it;
- another individual is convicted of the offence; and
- where it is in the public interest to do so.

The Record Deletion Process provides an application form and specifies the evidence that the Chief Officer should consider; this application form is available on GOV.uk.[105]

[103] As set out under section 63AB(4) of the Police and Criminal Evidence act 1984 (PACE) as inserted by section 24 of PoFA.
[104] Deletion of Records from National Police Systems guidance is available at https://www.gov.uk/government/publications/dna-early-deletion-guidance-and-application-form
[105] The Record Deletion Process is available at https://www.gov.uk/government/publications/dna-early-deletion-guidance-and-application-form.

Glossary

Accreditation: This is the independent assessment of the services that an organisation delivers, to determine whether they meet defined standards. Forensic Service Providers and laboratories which process DNA samples and fingerprints are required to be accredited to ISO/IEC 17025; a standard set out by the International Standard Organisation which requires that samples are processed under appropriate laboratory conditions and that contamination is avoided.

Anti-Social Behaviour Crime and Policing Act 2014 (ASBCPA): ASBCPA amended PACE to make three changes in the operation of PoFA, namely in relation to retention of samples under the Criminal Procedures and investigations act (CPIA), retention of profile records not linked to the offence for which a DNA sample was taken and resampling. See 'Protection of Freedoms Act 2012'.

Biometrics and Forensics Ethics Group[106]: The DNA Ethics Group was established in 2007 and in July 2017 it was replaced by the Biometrics and Forensics Ethics Group.

Contamination Elimination Database: A database held within FINDS containing reference profile records from individuals who work within the DNA supply chain, such as police officers, police staff, manufacturers and others who come into regular contact with crime scenes or evidence, so that any DNA inadvertently left at a crime scene can be eliminated from the investigation.

Commissioner for the Retention and Use of Biometric Material ('the Biometrics Commissioner'): The Biometrics Commissioner is responsible for keeping under review the retention and use by the police of DNA samples, DNA profile records and fingerprints; and for agreeing or rejecting applications by the police to retain DNA profile records and fingerprints from persons arrested for qualifying offences but not charged or convicted for up to three years.

Crime scene investigator (CSI): A member of police staff employed to collect samples which may contain DNA and other forensic evidence left at a crime scene.

Deoxyribonucleic Acid (DNA): Genetic material contained within most of the cells of the human body which determines an individual's characteristics such as sex, eye colour, hair colour etc.

DNA-17: The current method used to process a DNA sample in the UK which analyses a sample of DNA at 16 different areas plus a sex marker.

DNA profile: A series of pairs of numbers (16 pairs where the DNA-17 method is used) plus a sex marker which are derived following the processing of a DNA sample. There are two types of DNA profile records:

- **crime scene DNA profile:** this is a DNA profile derived from a crime scene sample
- **subject DNA profile**: this is a DNA profile derived from a subject sample

[106] https://www.gov.uk/government/organisations/biometrics-and-forensics-ethics-group

Once derived, DNA profile records are usually loaded onto the National DNA Database. See 'DNA sample'.

DNA sample: There are two main types of DNA sample:

- **crime scene sample:** this is a sample of DNA taken from a crime scene e.g. from a surface, clothing or bodily fluid (such as blood) left at a crime scene.
- **subject sample:** this is a sample of DNA taken from an individual, often from their cheek, by way of a 'buccal swab' though it can be taken from hair or a bodily fluid such as blood, urine or semen.

In the case of missing persons, DNA samples may also be taken from the belongings of that person or their family for the purposes of identifying a body should one be found.

Early deletion: The Record Deletion Guidance sets out certain, limited, circumstances under which an individual whose DNA profile is being retained by the police can apply to have it destroyed sooner than normal.

Excluded offence: Under the retention framework for DNA and fingerprints, an 'excluded' offence is a recordable offence which is minor, was committed when the individual was under 18, for which they received a sentence of fewer than five years imprisonment and is the only recordable offence for which the individual has been convicted.

Familial search: A search of NDNAD to look for relatives of the perpetrator carried out where DNA is found at a crime scene but there is no subject profile on NDNAD. Such a search may produce a list of possible relatives of the offender. The police use other intelligence, such as age and geography, to narrow down the list before investigating further. Because of the privacy issues, cost and staffing involved in familial searches, they are only used for the most serious crimes. All such searches require the approval by the Chair of the FIND Strategy Board (or a nominee of the Chair).

FINDS transcription or amendment error: This occurs where FINDS have introduced inaccurate information.

Force sample or record handling error: This occurs where the DNA profile is associated with the wrong information. For example, if person A and person B are sampled at the same time, and the samples are put in the wrong kits, so person A's sample is attached to information (PNC ID number, name etc.) about person B, and vice versa. Similarly, crime scene sample C could have information associated with it which relates to crime scene sample D.

Forensic Archive Ltd. (FAL): A company established following the closure of the Forensic Science Service (FSS), to manage case files from investigation work which it had carried out. (The FSS was the body which used to have responsibility for most forensic science testing in relation to forensic evidence).
In March 2012, the FSS closed and its work was transferred to private Forensic Service Providers and in-house police laboratories.

Forensic Information Database Service (FINDS): The Home Office Unit responsible for administering NDNAD, Fingerprint Database and Footwear database.

Forensic Information Databases (FIND) Strategy Board: The FIND Strategy Board provides governance and oversight over NDNAD and the Fingerprint Database. It has a number of statutory functions including issuing guidance on the destruction of profile records and producing an annual report.

Forensic Service Provider (FSP): An organisation which provides forensic analysis services for the criminal justice system.

FSP interpretation error: This occurs where the FSP has made an error during the processing of the sample.

FSP sample and/or record handling error: As above, this occurs where the DNA profile is associated with the wrong information. It could involve samples being mixed up as described above or contaminating DNA being introduced during processing.

Forensic Science Regulator (FSR)[107]: Responsible for ensuring that the provision of forensic science services across the criminal justice system in England and Wales is subject to an appropriate regime of scientific quality standards. The Scottish and Northern Irish authorities collaborate with the FSR in the setting of quality standards.

Law Enforcement Agencies (LEAs): Any organisation authorised to take samples under PACE. Agencies participating in law enforcement which can generally be categorised into 3 different types:

Match: There are three types of matches:

- **crime scene to subject:** Where a crime scene DNA profile matches a subject DNA profile

- **crime scene to crime scene:** Where a crime scene DNA profile matches another crime scene DNA profile (i.e. indicating that the same individual was present at both crime scenes).

- **subject to subject:** Where a subject profile matches a subject profile already held on NDNAD (i.e. indicating that the individual already has a profile on NDNAD).

Match rate: The percentage of crime scene DNA profile records which, once loaded onto NDNAD, match against a subject DNA profile (or subject DNA profile records which match to crime scene DNA profile records).

Minor offence: Under the retention framework for DNA and fingerprints, a minor offence is a 'recordable' offence which is not a 'qualifying' offence.

[107] https://www.gov.uk/government/organisations/forensic-science-regulator

Missing Persons DNA Database (MPDD): The MPDD holds DNA profile records obtained from the belongings of people who have gone missing or from their close relatives (who will have similar DNA). If an unidentified body is found DNA can be taken from it and run against that on the MPDD to see if there is a match. This assists with police investigations and helps to bring closure for the family of the missing person. DNA profile records on the MPDD are not held on NDNAD.

National DNA Database (NDNAD): A database containing both subject and crime scene DNA profile records connected with crimes committed throughout the United Kingdom. (Subject DNA profile records retained on the Scottish and Northern Irish DNA Databases are copied to NDNAD; crime scene DNA profile records retained on those databases are copied to NDNAD if a match is not found).

Non-Routine search: A search made against a DNA profile which has not been uploaded onto NDNAD.

Partial match: Where, for instance, the perpetrator has tried to remove the evidence, or DNA has been partially destroyed by environmental conditions, it may not be possible to obtain a complete DNA profile from a crime scene. A partial DNA profile can still be used to obtain a partial match against profile records on NDNAD. Partial matches provide valuable leads for the police but, depending on how much of the information is missing, the result is likely to be interpreted with lower evidential weight than a full match. See *'*Match*'.*

Police and Criminal Evidence Act 1984 (PACE): PACE makes a number of provisions to do with police powers, including in relation to the taking and retention of DNA and fingerprints.

Protection of Freedoms Act 2012 (PoFA): Prior to the coming into force of the DNA and fingerprint sections of PoFA on 31st October 2013, DNA and fingerprints from all individuals arrested for, charged with or convicted of a recordable offence were held indefinitely. PoFA amended PACE to introduce a much more restricted retention schedule under which the majority of profile records belonging to innocent people were destroyed. See 'Police and Criminal Evidence Act 1984 (PACE)*'.*

Qualifying offence: Under the retention framework for DNA and fingerprints, a 'qualifying' offence is one listed under section 65A of the Police and Criminal Evidence Act 1984 (the list comprises sexual, violent, terrorism and burglary offences).

Recordable offence: A 'recordable' offence is one for which the police are required to keep a record. Generally speaking, these are imprisonable offences; however, it also includes a number of non-imprisonable offences such as begging and taxi touting. The police are not able to take or retain the DNA or fingerprints of an individual who is arrested for an offence which is not recordable.

Routine search: A search made against a DNA profile uploaded onto NDNAD.

SGMPlus: The previous method used to process a DNA sample which analysed a sample of DNA at ten different areas plus a sex marker. In July 2014, SGMPlus was upgraded to DNA-17.

Urgent match: A search made using FINDS' urgent speculative search service which is available 24 hours a day. This service is reserved for the most serious of crimes.

Y-STR: Y-STR analysis is a method which can be used when processing complex casework samples to aid the detection of male DNA where there may be trace amounts, in the presence of high levels of female DNA (for example in sexual offences and violent crime). Y-STRs are taken specifically from the male Y chromosome and are transmitted along the paternal lineage. Due to the nature of this analysis, Y-STR is often used in paternity and genealogical DNA testing and can also be used to identify missing persons and familial searches.

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