

NATIONAL  
DNA  
DATABASE



## FOREWORD

LORD TAYLOR OF HOLBEACH



It is with great pleasure that I write this foreword as the new minister responsible for the National DNA Database. The coalition government is committed to protecting the privacy and human rights of British citizens, while maintaining an effective and powerful DNA database that protects the public and reduces crime. The excesses of the previous DNA retention regime had to be reined in. A system by which a child, arrested as a result of a misunderstanding or misidentification and later found to have been completely innocent of any involvement in any crime, would still have their DNA retained for the rest of their life has to be wrong.

Of equal importance is the decision of the government to destroy the DNA samples of everyone. Governments should not hold the entire genome of a significant proportion of their population. The DNA samples contain all of your genetic information, not simply the twenty numbers that make up your DNA profile. As biological science develops rapidly, so the genetic and medical information that can be read from a person's DNA is growing year upon year. With this increased knowledge and information, the dangers of a government holding collections of DNA samples increases too.

For these reasons the government has brought in the Protection of Freedoms Act. This act completely resets the balance between individual privacy and government knowledge held on biometric databases. The implementation of the Protection of Freedoms Act is not a simple matter, involving significant preparatory work and complex reprogramming of databases to ensure that each person's DNA and fingerprints are removed or retained correctly and at the right time. Destruction of DNA samples and profiles has now begun.

The government has fundamentally changed the principles behind the operation of biometric databases. From being databases that collected DNA profiles and fingerprints from every person possible and retained them indefinitely, they will now operate proportionately, considering issues of guilt and innocence and of the rights of children. In this way, they will operate effectively while rebuilding the trust of the people of this country. This report is the first step in rebuilding that trust.

**1**  
Foreword

**5**  
Introduction

**6**  
DNA and National  
DNA Database profiles

**10**  
National DNA  
Database process

**12**  
The National DNA  
Database and crime  
investigation

**14**  
What information  
does the National  
DNA Database hold?

**22**  
Matching DNA profiles

**24**  
Governance  
and operation

**28**  
Financial

**30**  
Data sources

## INTRODUCTION

AMANDA COOPER



In December 2011 I was fortunate to be appointed as the Chair of the National DNA Strategy Board, taking over from Mr Gary Pugh OBE. This foreword gives me an opportunity to publically acknowledge and thank Gary Pugh for all of the work he has done and the achievements whilst Chair of the Board, many of which are detailed in this report.

I have taken on this role at a time of considerable change within the forensic DNA environment. These changes have been legislative, technical, operational and governance. On its own each would be significant, but altogether has at times been challenging. The staff of the NPIA, the Home Office, the Police Service and the Forensic DNA Suppliers have all risen to these challenges and ensured that we have developed and continued the integrity and operability of the DNA database. Their efforts and achievements are to be acknowledged and appreciated by us all. During this period the NPIA have been planning for its closure and the movement resources to other organisations. Despite this distraction staff have remained focus on the delivery of critical services and change and we should commend them for this.

The Protection of Freedoms Act has instigated change in the world of DNA at an unprecedented rate. As a result there are a number of technical and process changes within the National DNA Database (NDNAD) which are required in order to fulfil the aims of the legislation. My colleagues in the NDNAD Unit have worked extremely hard to ensure they have anticipated the required technical changes, whilst also managing their own move into the Home Office. I would like to thank the team, led by Kirsty Faulkner for their commitment and professionalism. I would also like to thank my colleagues who are represented on the National DNA Database Strategy Board; their input to the governance of the NDNAD has been invaluable.

You will be able to see from the data in this report, the improvements that have been made as a result of the hard work from all of those involved. You will also be able to identify the significant contribution that the NDNAD makes to the detection of crime in the UK. The report focuses upon ensuring we have proportionality, transparency and accountability for the NDNAD. I certainly hope you find the report informative and interesting, having useful additions such as the hyperlinks to further supporting data.

With the impending commencement order for the biometric provisions of the Protection of Freedoms Act, there are busy and interesting times ahead. I will continue to work closely with colleagues on the NDNAD Strategy Board to ensure good governance and successful implementations.

**AMANDA COOPER**

*Assistant Chief Officer, Thames Valley Police  
Chair of the National DNA Strategy Board*

## DNA AND NATIONAL DNA DATABASE PROFILES

Deoxyribonucleic acid (DNA) is a complex molecule found in almost all cells of the human body as well as other living organisms.

DNA carries the genetic code that is needed for our cells and the organism as a whole. It is also the means by which genetic information is passed from one generation to the next. Half our DNA is inherited from our mother and half from our father.

Non-identical siblings will inherit different combinations of DNA from the same parents and are therefore similar but different. Except for identical siblings, each person's DNA is unique.

Our DNA is exactly the same as each others except for slight variations in the code which are responsible for different physical characteristics such as height, eye colour, skin tone and hair colour, for example.

These differences are critical for the use of DNA in forensic science.

National DNA Database profiling does not examine all variations between individuals. Instead, the technique is designed to target areas of DNA that are known to differ widely between individuals.

Other than gender, the areas of DNA targeted by National DNA Database profiling do not contain information that could be attributed to physical characteristics – such as eye colour – or enable definitive determination of medical conditions.

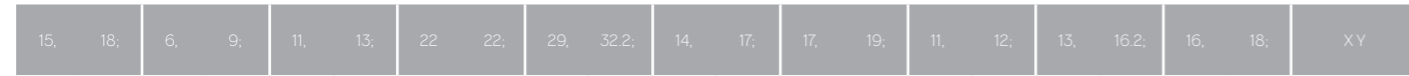
It is possible to identify a person very precisely but the DNA area used to show a match contains virtually no genetic characteristic information.

The current DNA profiling method used for the National DNA Database – known as SGM Plus – analyses ten areas of a person's DNA and the gender marker.

The areas analysed represent less than 0.000084% of a person's DNA – equivalent to the area occupied by the red dot within this double-page spread.



The resulting DNA profile is a series of up to twenty numbers – with a maximum of one pair for each of the ten regions analysed – plus the gender marker. Here is an example to illustrate;



The numerical values in each of the ten pairs are inherited: one from the mother and one from the father.

It is the inherited nature of DNA that means that identical siblings will share the same DNA profile and – as at 31 March 2012 – there were 6,053 sets of identical twins and ten sets of identical triplets on the National DNA Database. A comparison of fingerprints, which are not identical, is carried out in order to differentiate identical siblings.

The limited number of numerical values that comprise a DNA profile means it is possible that two unrelated individuals could share the same complete DNA profile.

However, the chance of a complete profile match is less than one in a billion – that is, a thousand million to one. The National DNA Database has never identified two unrelated individuals who share the same DNA profile.

Two DNA profiles are considered a complete match if the corresponding numbers – as well as the result of the male and female gender test – are the same.

DNA profiling of material from a crime scene can result in a partial profile where all twenty numbers are not found due to degradation. The significance of a partial DNA match will be less than that for a complete DNA match. Partial crime scene DNA profiles are added to the National DNA Database but not partial subject DNA profiles.

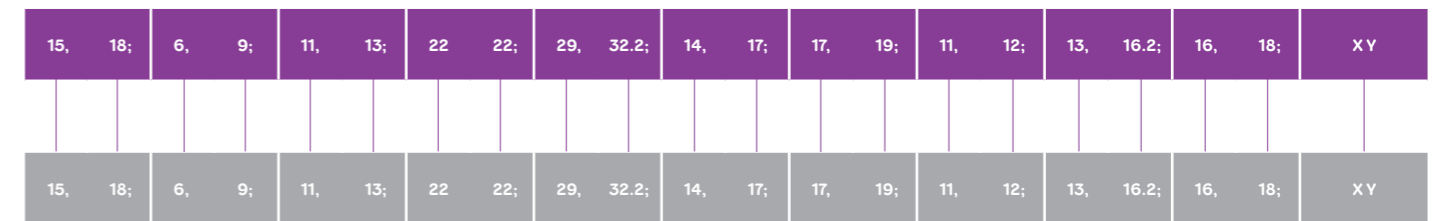
If two people leave their DNA together at a crime scene, and this DNA is recovered, a mixed DNA profile may be obtained.

If the DNA profile of an individual who has contributed to a mixed DNA profile is known, it may be possible for this profile to be removed from the mixed profile, revealing the DNA profile of the other individual. This may be possible in cases where both a victim's DNA and that of an assailant are mixed together. An elimination DNA profile from a victim can be sufficient to identify the DNA profile of an assailant. If neither person is known and they have left similar amounts of DNA, it may be very difficult to separate the DNA profiles of each person who has contributed to the mixed profile.

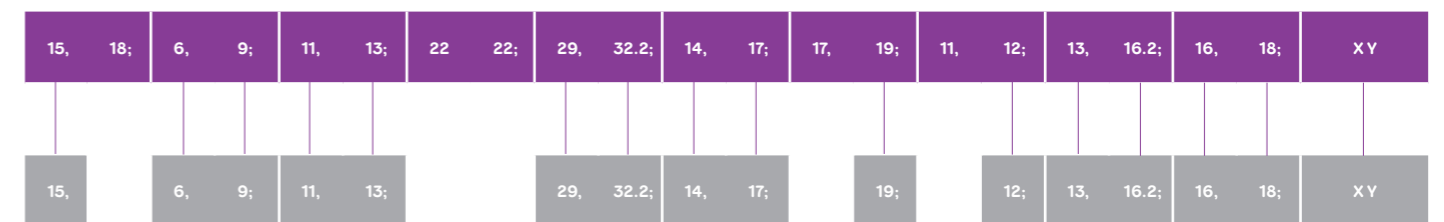
Subject profile  
Crime scene profile

Fig.1

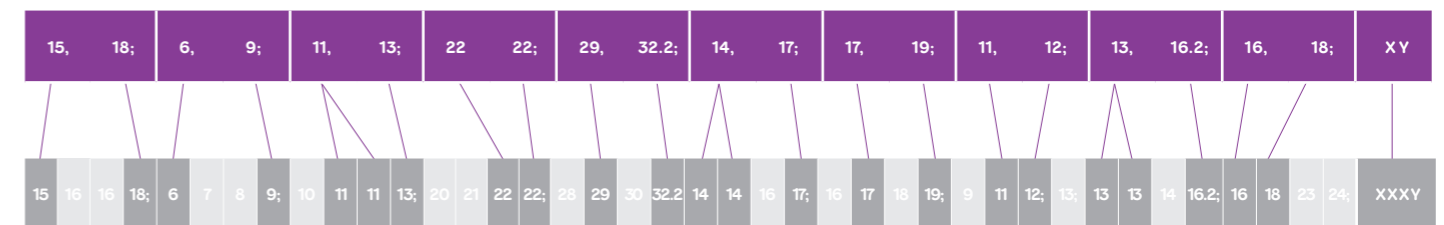
**COMPLETE**



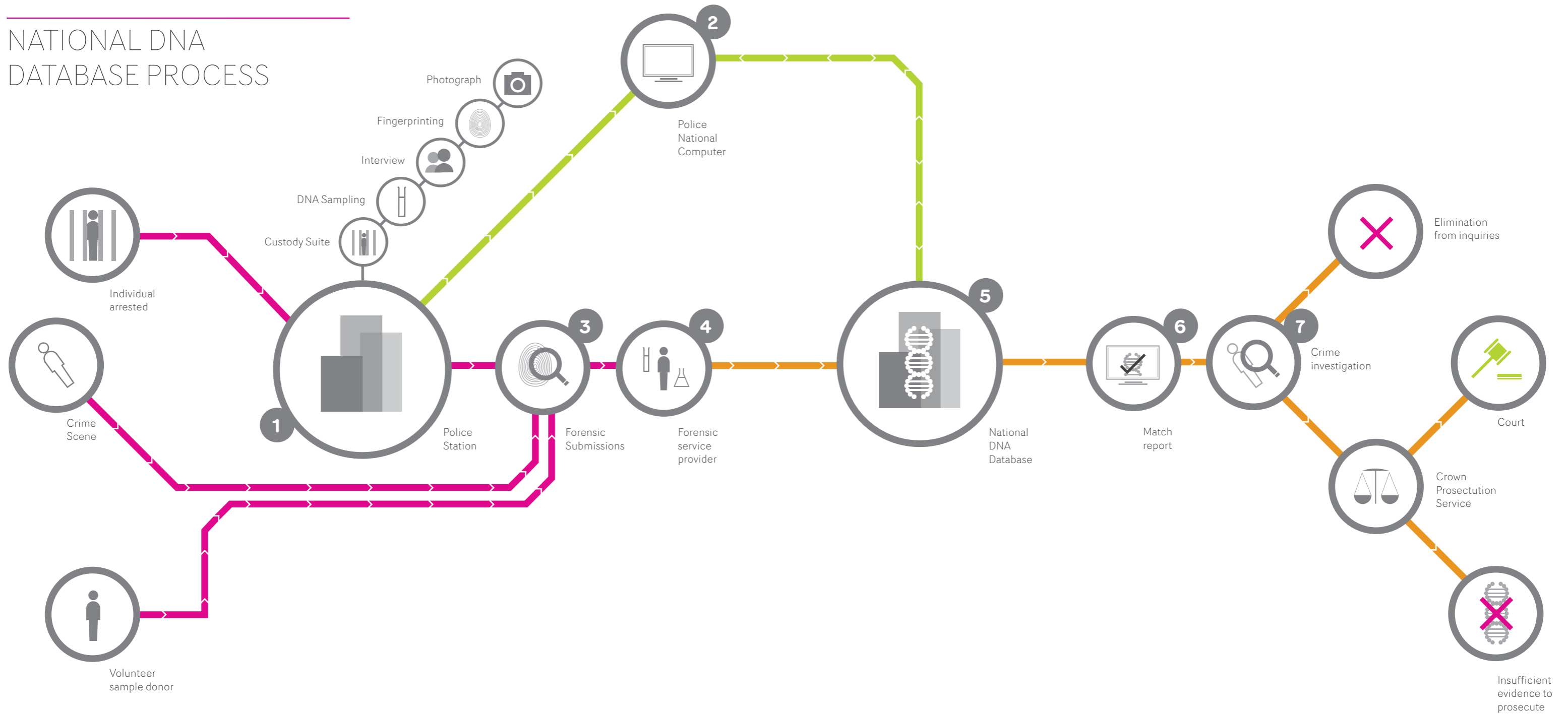
**PARTIAL**



**MIXED PROFILE**



# NATIONAL DNA DATABASE PROCESS



**KEY**

- █ DNA Samples
- █ DNA Information
- █ Arrest Information

**1 POLICE STATION**  
Following arrest for a recordable offence the detainee will be taken to a Force custody suite that provides the controlled environment to interview the suspect, establish identity, generate a record on the Police National Computer and obtain a DNA sample.

**2 POLICE NATIONAL COMPUTER**  
The Police National Computer record that is generated includes unique reference numbers for the individual and the arrest, and confirms if a DNA profile is currently held.  
  
In parallel, creation of the Police National Computer record also generates a skeleton record on the National DNA Database which includes these unique references. The unique references generated will accompany the profile and any subsequent match report throughout the remainder of the process.

**3 FORENSIC SUBMISSIONS**  
Within police forces a dedicated DNA unit provides quality assurance checks on the samples and coordinates the dispatch of samples to forensic suppliers used by the force.

**4 FORENSIC SERVICE PROVIDER**  
DNA analysis is provided by selected forensic science provider laboratories which are accredited against quality standards set by the Forensic Science Regulator.  
  
Profiles obtained by forensic service providers from sample analysis are sent to the National DNA Database for loading.

**5 NATIONAL DNA DATABASE**  
An individual's profile is stored and compared against all other profiles retained on the Database. Profiles loaded to the Database are linked with a confirmed identity on the Police National Computer.

**6 MATCH REPORT**  
Matches between individuals and crime scenes, or crime scenes and crime scenes, generate a report which is securely transmitted to the relevant police force. When a DNA profile matches a record that is already held on the National DNA Database all other profiles of individuals are eliminated.

**7 CRIME INVESTIGATION**  
On receipt of a match report, investigating officers assess whether the resulting DNA profile provides a direct link to evidence, the individual and the crime scene.

# THE NATIONAL DNA DATABASE AND CRIME INVESTIGATION

The National DNA Database exists to support the investigation of crime by either matching a DNA profile – obtained from forensic samples gathered during the examination of a crime scene or following an arrest – with an individual whose DNA profile is already held on the database; or by enabling the police to eliminate all individuals on the National DNA Database as potential suspects in a crime.

Physical contact between the perpetrator of a crime and either their victim or items at a crime scene has the potential to result in the transfer of DNA which is contained in saliva, blood, semen, skin or other cell-bearing material.

It is the significance and degree of physical contact in cases of violent and sexual crimes, or acquisitive crime such as burglary and vehicle crime, which can increase the significance of DNA evidence in the successful detection – and subsequent prosecution – of criminal cases.

In comparison to the overall detection rate for the same crimes, there is evidence which suggests that cases involving DNA evidence improve the likelihood of a successful detection.

A survey of Senior Investigating Officers in 35 of England and Wales's 44 police forces conducted in 2012 found that, of 391 murder cases dealt with by their forces in 2011-12, where a search of the National DNA Database had been carried out (96 cases) the resulting matches had contributed to the outcome of 65 (68 per cent) investigations.

In addition, the role of DNA profiling used by the Metropolitan Police following public disorder in August 2011 contributed to the ability to identify and arrest individuals with existing DNA records held on the National DNA Database as swiftly as possible.

However, in the majority of cases of recorded crime, DNA profiling is not used. This is because in incidents of minor theft, illegal drug use, fraud and traffic offences, for example, the transfer of DNA is less likely to occur and, because of the nature of the offence, DNA evidence is unlikely to be relevant.

In 2011-12 the volume of crimes detected or taken into consideration in which there was a profile match by the National DNA Database was 21,524 – 0.54% of all recorded crime.

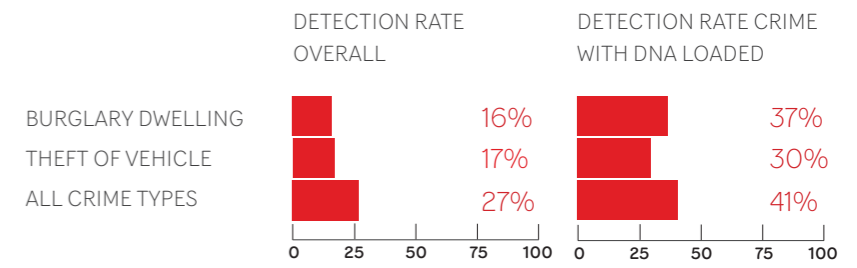
The Database's role is not limited to the identification of suspects. Its ability to eliminate individuals with existing DNA records from enquiries can play a significant role in criminal investigations.

Each time a new DNA profile from either an individual or a crime scene is added to the Database, it is compared with every record held on the database. It may match with a profile on the database but it will eliminate every other person on the database as a donor of that crime scene DNA profile. It is estimated that, in 2011-12, this resulted in an elimination rate of 800,000 profiles per minute.

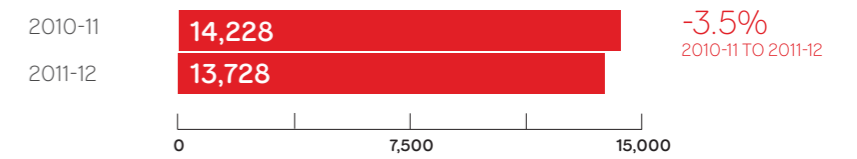
The loading of a crime scene profile to the National DNA Database, following forensic examination in a sexual offence case, for example, will lead to the elimination of all individuals' records held on the National DNA Database - which includes all individuals on the sex offenders register - or the identification of potential suspects. In January 2012 the number of records held on the sex offenders register was 53,501.

Fig. 2

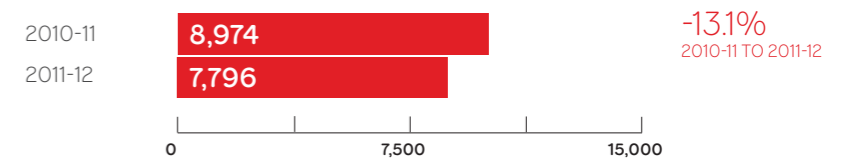
## DETECTION RATES WITH AND WITHOUT DNA EVIDENCE 2011-12



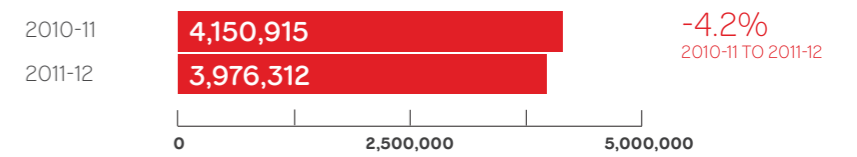
## CRIMES DETECTED FOLLOWING NDNAD MATCH



## ADDITIONAL CRIMES TAKEN INTO CONSIDERATION FOLLOWING DNA DETECTION



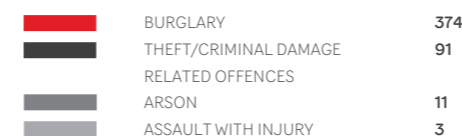
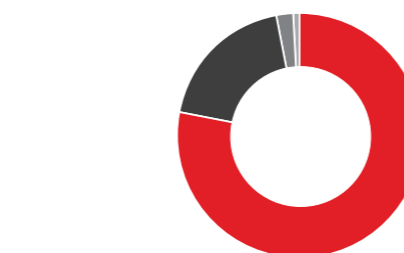
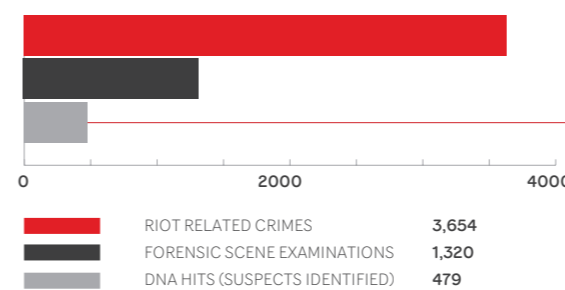
## RECORDED CRIMES



Total DNA detections 2011-12 (DNA Detections + TICs) = 21,524  
Total DNA detections as % recorded crime = 0.54%

Fig. 3

## METROPOLITAN POLICE: APPLICATION OF DNA SEARCHES FOLLOWING SUMMER DISORDER 2011



### James Citro jailed for life

A DNA profile obtained following a drink-driving offence helps convict James Citro of the murder of Nijole Siskeviciene in London in 1998. Citro's DNA matched with a crime scene profile retained on the National DNA Database. Citro was sentenced to life imprisonment in December 2011.

<http://www.bbc.co.uk/news/uk-england-london-16108077>



# WHAT INFORMATION DOES THE NATIONAL DNA DATABASE HOLD?

DNA profiles held on the National DNA Database are obtained from samples which fall into two categories:

- A DNA profile collected from an individual – a subject DNA profile; or
- a DNA profile of an unidentified individual gathered from a crime scene or victim.

### SUBJECT DNA PROFILES

These are obtained from samples which are either taken from individuals arrested for a recordable offence, or voluntarily provided in order to eliminate people from an investigation.

Technically, recordable offences are those set out in the National Police Records (Recordable Offences) Regulations 2000. In practice they include any offence punishable with imprisonment and some additional offences specified in the schedule to the regulations.

A total of 6,969,396 subject profiles were held on the National DNA Database at 31 March 2012 including 398,845 subject profiles which have been added between 1 April 2011 – 31 March 2012.

This represents 15 per cent fewer new profiles added in comparison to the 474,193 additions in 2010-11, and continues a pattern of reducing total numbers of new subject profiles being added annually to the National DNA Database.

DNA profiles that have been provided voluntarily were only retained on the National DNA Database with written consent or – if a person is under 18 years of age – a parent or guardian has given their consent in writing.

The independent National DNA Database Ethics Group (see page 27) has played a significant role in influencing the sampling, processing and retention of volunteer DNA subject profiles.

Since 2009-10, following a change in national policy, volunteer samples are not loaded to the National DNA Database.

A review of legacy volunteer profiles, begun in 2012, has led to the removal of DNA samples obtained for elimination purposes. In 2011-12 4,463 volunteer profiles were deleted and, by 31 March 2012, 39,450 were retained on the National DNA Database of which 1,636 are sex offenders. Changes in policy adopted by the NDNAD strategy board are expected to lead to significant further reductions in the volume of volunteer profiles that are retained on the National DNA Database by the end of 2012.

Changes in policy adopted by the NDNAD strategy board are expected to lead to a significant reduction in the volume of volunteer profiles that are retained on the National DNA Database over the next 12 months.

### HOW ARE SUBJECT PROFILES OBTAINED?

Samples containing DNA are usually taken from cells lining the inside of a person's mouth using swabs.

Two samples are taken, but only one is normally required to obtain a DNA profile. After a DNA profile has been obtained from the sample, all remaining sample material is stored in freezers by the laboratory that profiled the sample.

Fig. 4

### DNA PROFILES ON NATIONAL DNA DATABASE AS AT 31 MARCH 2012

#### AS AT 31 MARCH 2012

SUBJECT PROFILES		
ARRESTED INDIVIDUALS		6,929,946
VOLUNTEERS		39,450
CRIME SCENE PROFILES		405,848

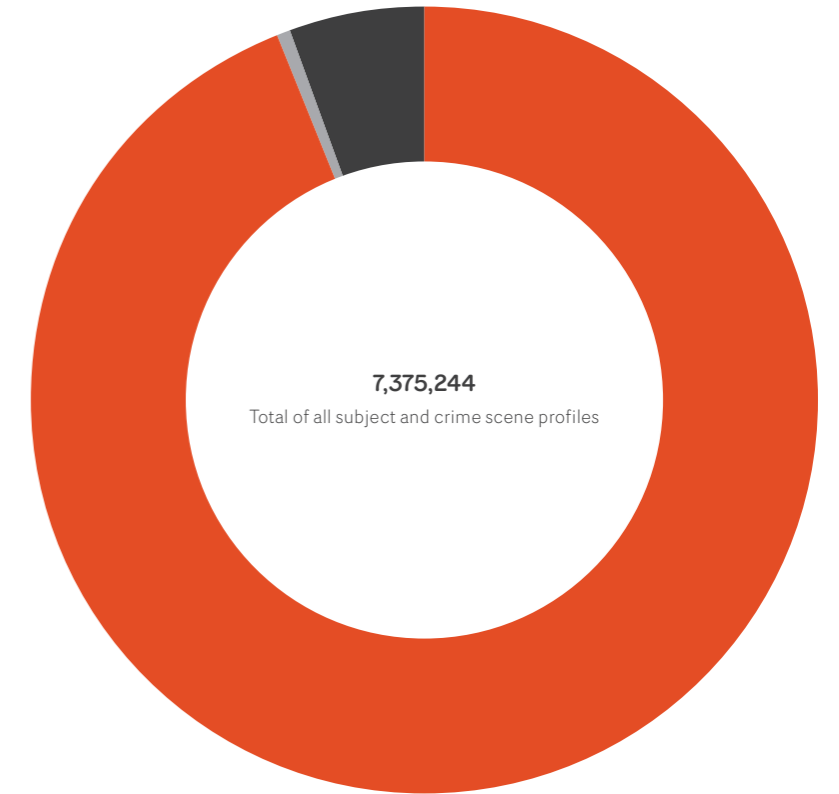
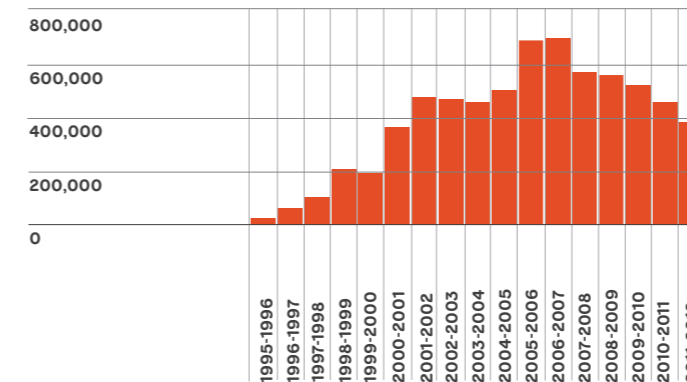


Fig. 5

### SUBJECT PROFILES LOADED TO THE NDNAD PER YEAR SINCE 1995



A total of 187,687 of all subject profiles have no load date

### Relief as club cash street robber jailed

DNA analysis helps convict Marcus Richards who attacked and robbed two pensioners delivering £24,000 of Christmas Club cash to former work colleagues. Richards was sentenced to three years and four months imprisonment in February 2012.

[http://www.kentonline.co.uk/kentonline/news/2012/february/20/robber\\_jailed.aspx](http://www.kentonline.co.uk/kentonline/news/2012/february/20/robber_jailed.aspx)

### CRIME SCENE PROFILES

These are obtained from samples of cellular material – such as blood, hair, semen and saliva – which are collected during a forensic examination of the scene of a crime or a victim and may belong to perpetrator of a crime.

In 2011-12 38,869 crime scene profiles were loaded to the National DNA Database. This is a 3 per cent decrease in comparison to the number loaded in 2010-11.

Crime Data for England and Wales may offer some insight into this reduction: the number of crime scene examinations carried out over the past year fell by 7 per cent while overall levels of recorded crime fell by 4.2 per cent.

### DELETIONS

Across all law enforcement agencies, a total of 25,375 DNA subject profiles were deleted from the National DNA Database in 2011-12. Deletions are carried out for the following reasons:

- the law in Scotland governing the retention and removal of samples results in a higher volume of deletions;
- at the request of a Chief Officer in England and Wales following an individual claiming deletion of their profile is applicable under the Exceptional Case Procedure. In 2011-12, 390 subject profiles were deleted from the National DNA Database following these cases compared with 503 deletions in 2010-11;
- National DNA Database Unit deletions of verified duplicate profiles; and
- automated deletions of a DNA profile driven by the Police National Computer record being set for deletion.

The total number of crime scene profiles deleted in 2011-12 was 34,876 - a marked increase compared to the 16,316 deleted the previous year.

A significant factor in the rise in deletions in 2011-12 is a review of crime scene profiles obtained using the second generation multiplex (SGM) profiling technique, a method that has been succeeded by the current second generation multiplex plus (SGM Plus) method of profiling.

Advances in technology mean that forensic laboratories are capable of extracting more precise DNA profiles from samples than was possible prior to 2000. The current technique – SGM Plus – has allowed the analysis of 10 pairs of numbers contained in a DNA sample rather than six pairs of numbers using SGM. This increase in the numbers that are targeted by analysis has significantly reduced the likelihood of false matches.

Fig. 6

### CRIME SCENE PROFILES LOADED TO THE NDNAD IN 2011-12, BY OFFENCE

OFFENCE	PROFILE LOADS
BURGLARY (INCLUDING AGGRAVATED)	18,056
VEHICLE CRIME	5,202
CRIMINAL DAMAGE	4,074
THEFT	2,090
VIOLENT CRIME	1,915
DRUGS	1,838
ROBBERY	1,668
RAPE	683
MURDER, MANSLAUGHTER AND ATTEMPTED MURDER	526
TRAFFIC OFFENCES NON-FATAL	321
ARSON	311
OTHER SEXUAL OFFENCES	246
FIREARMS	238
FRAUD	222
PUBLIC ORDER	219
ABDUCTION AND KIDNAPPING	96
BLACKMAIL	16
EXPLOSIVES	6
OTHER	1,142
<b>TOTAL</b>	<b>38,869</b>

Fig. 7

### SUBJECT PROFILES DELETED FROM THE NDNAD, BY COUNTRY OF FORCE THAT SUBMITTED PROFILE, 2011-12

COUNTRY	PROFILES DELETED
SCOTLAND	18,212
ENGLAND	5,917
NORTHERN IRELAND	123
WALES	69
OTHER (INCLUDING BRITISH TRANSPORT POLICE)	1,054
<b>TOTAL</b>	<b>25,375</b>

Fig. 8

### ALL RECORDED CRIME COMPARED WITH CRIMES WITH SCENE EXAMINATIONS 2011-12

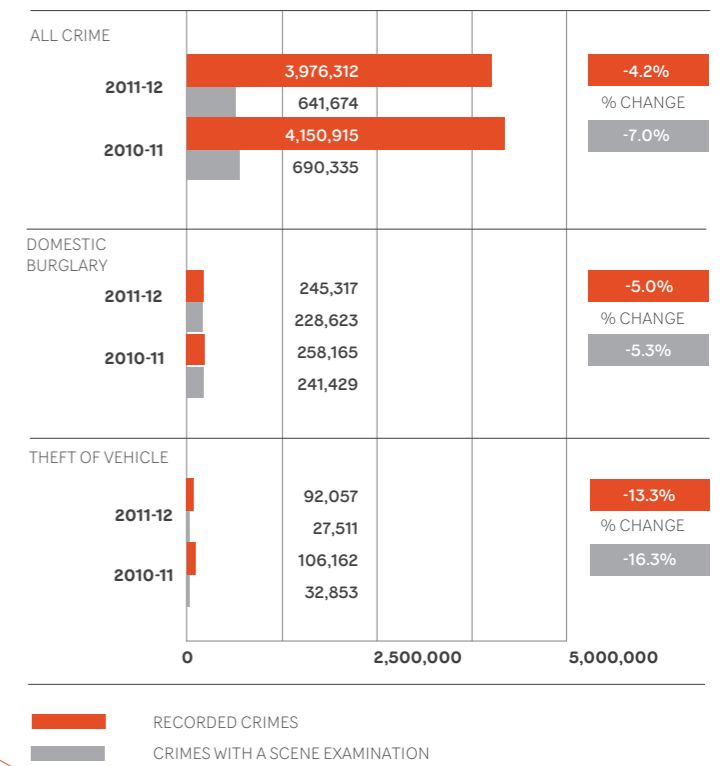
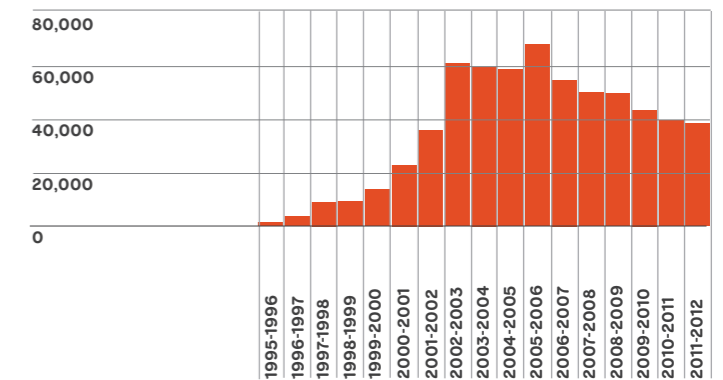


Fig. 9

### CRIME SCENE PROFILES LOADED TO THE NDNAD PER YEAR SINCE 1995



A total of 55,222 of all crime scene profiles have no load date

**INDIVIDUALS ON THE NATIONAL DNA DATABASE AND DUPLICATE SUBJECT PROFILES**

The number of subject profiles held on the National DNA Database is greater than the number of individuals on the National DNA Database because some of the DNA profiles held are duplicated. An estimated 14.6% of the subject profiles held on the entire National DNA Database are duplicates.

Duplicates occur when an individual has provided a DNA sample on more than one occasion. This may occur for the following reasons:

- a person may give different names – or variations of their name – when they provide their DNA sample;
- an individual has both a DNA subject profile that was obtained using the second generation multiplex (SGM) profiling technique, and a more recent profile gathered using SGM Plus method.
- prosecuting authorities may require that another DNA sample is taken following the relevant arrest, in particular for serious offences;

Allowing for duplication, the number of individuals on the National DNA Database has increased by 5.4% to 5,950,612 on the 31 March 2012 compared with 5,644,680 on the same date in 2011.

**ETHNIC APPEARANCE, GENDER AND AGE**

When an individual provides a DNA sample, their ethnic appearance, gender, and age are recorded on the sampling kit in which their sample is contained. Either an individual providing a sample for DNA analysis will confirm their ethnicity or police officers apply their judgment about which of the seven categories of ethnic appearance an individual most closely resembles. Where no ethnic appearance is recorded, the record is categorised as 'Unknown'. Ethnic appearance is recorded solely to help the subsequent identification of a suspect identified via a match on the National DNA Database. Ethnic appearance has only been recorded for volunteer samples since 2005.

Fig. 10

**SUBJECT PROFILES RETAINED ON THE NDNAD BY AGE ON LOAD AT 31 MARCH 2012**

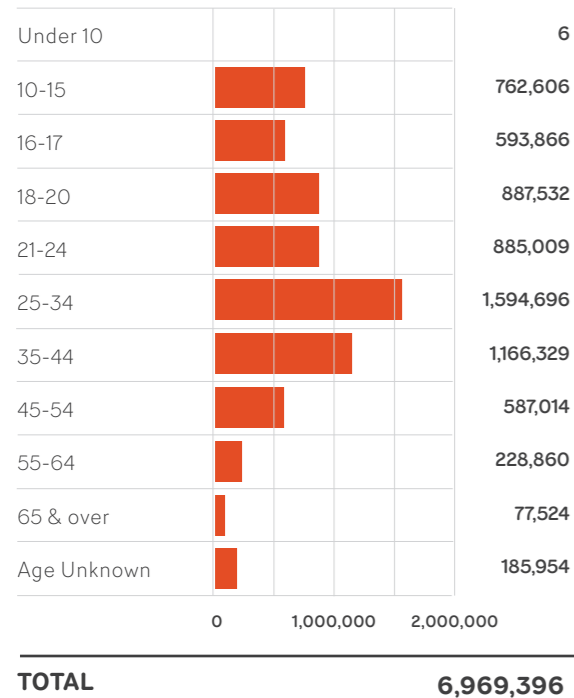
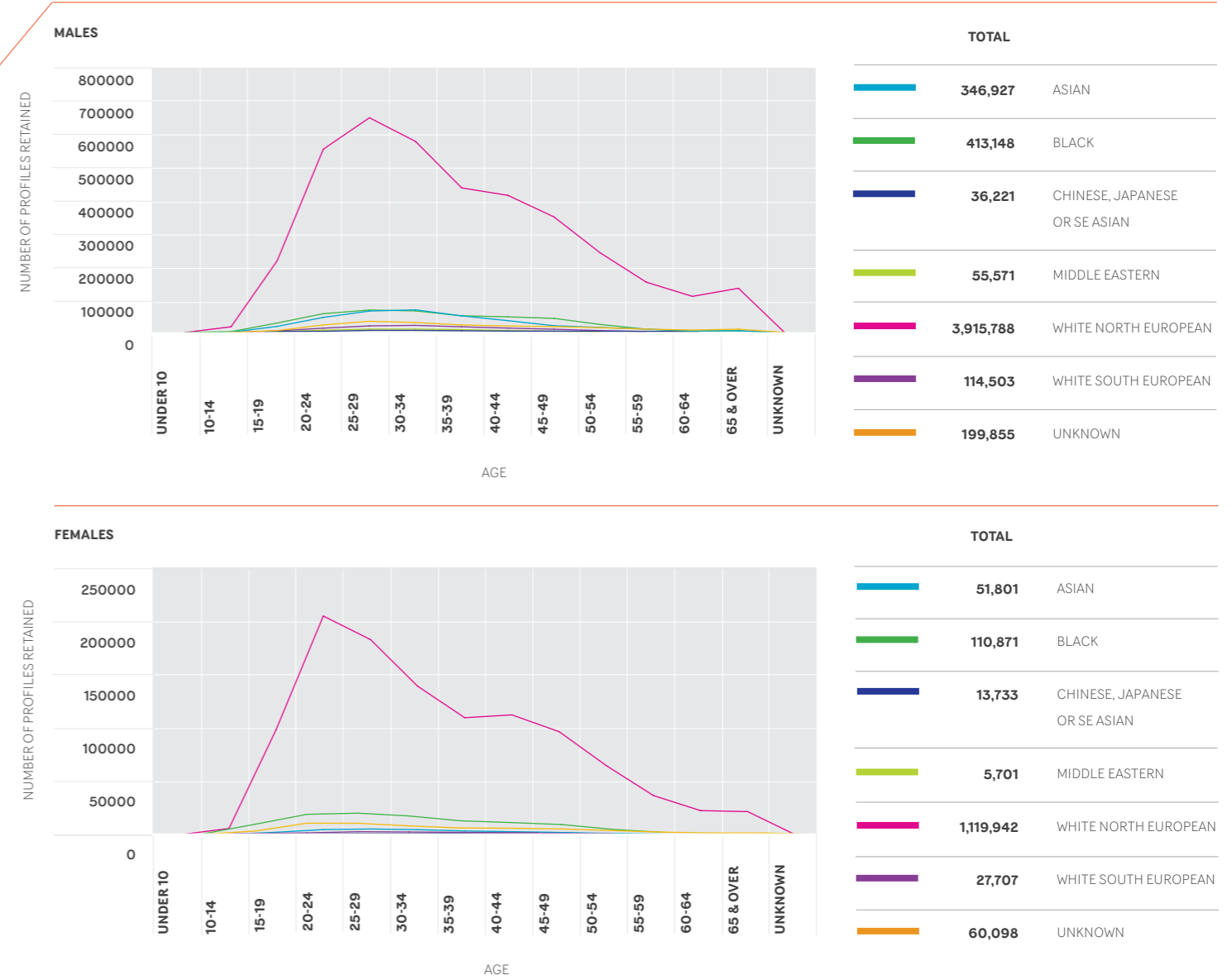


Fig. 11

**SUBJECT PROFILES RETAINED ON THE NDNAD, BY ETHNIC APPEARANCE, GENDER AND AGE (CURRENT AGE AT 31 MARCH 2012: ENGLAND AND WALES ONLY)**



Please note: Detailed data is available and has been published with this report.

### UNCONVICTED INDIVIDUALS

The conviction history of individuals is not held on the National DNA Database but are retained on the Police National Computer. By comparing data held on the Police National Computer with profiles that are retained on the National DNA Database, it is possible to determine whether an individual has been convicted of a crime.

On 31 March 2012, there were 1,253,289 individuals without a current recorded conviction whose profiles had been added to the National DNA Database by English and Welsh police forces.

This total includes individuals who have been arrested for a recordable offence and where investigations are shown as ongoing.

### MISSING PERSONS DNA DATABASE

Since May 2010 the National DNA Database Delivery Unit has operated and maintained a Missing Persons DNA Database to support the Missing Persons Bureau.

The database holds DNA profiles obtained from personal items belonging to missing persons as well as profiles gathered from unidentified bodies and body parts.

These profiles are held on a database that is separate from the National DNA Database and is used solely for checking potential matches between missing persons and unidentified bodies at the request of the police.

On the 31 March 2012, there were a total of 443 profiles retained on the Missing Persons DNA Database and no matches resulting from routine loading of profiles to the database in 2011-12.

### VULNERABLE PERSONS DNA DATABASE

The Vulnerable Persons DNA Database, which has been operational since March 2011, holds DNA profiles provided by vulnerable individuals who are considered to be at some risk of harm, where consent has been given to add their profile to the database.

Individuals whose DNA profiles are held on the Vulnerable Persons DNA Database can ask for their profile to be removed from this database at any time.

Vulnerable Persons DNA profiles are not routinely searched against the subject and crime scene DNA profiles held on the National DNA Database. However, if a police force has reason to believe that an individual has come to harm, the National DNA Database Strategy Board may authorise a vulnerable person's profile to be made searchable against the National DNA Database.

A review of DNA profiles held on the Vulnerable Persons DNA Database is carried out on or soon after the second anniversary of their loading to the database in order to establish whether an individual remains at risk of harm and their profile should, therefore, be retained.

On 31 March 2012, there were 821 profiles retained on the Vulnerable Persons DNA Database compared to 129 on the same date in 2011. There were no requests to compare records held on the Vulnerable Persons DNA Database with records on the National DNA Database between 1 April 2011 and 31 March 2012.

### VULNERABLE INDIVIDUALS

Vulnerable people are children and adults who may be potential victims of, for example, hate crime or anti social behaviour, sexual abuse, domestic violence - including honour based violence and forced marriage - and rape and sexual assaults. Potential victims may have identified themselves, or been identified by police and partner agencies such as schools, health and social services, as being at risk of significant harm or exploitation. This may be because of disability or mental illness, or age or illness, and/or because they are unable to care for themselves or protect themselves.

#### 'Double rapist trapped by DNA gets 18 years'

Advances in DNA analysis techniques help identify Paul Roger White as the rapist in two unsolved attacks carried out in Leicester in 1993 and 1994. White was imprisoned for 18 years in January 2012.

<http://www.thisisleicestershire.co.uk/Double-rapist-trapped-DNA-gets-18-years/story-15062151-detail/story.html>

# MATCHING DNA PROFILES

Two DNA profiles are considered a match if the corresponding numbers – as well as the result of the male and female gender test – are the same. So if a person leaves blood at a crime scene, and their DNA subject profile is already held on the National DNA Database, a search of the National DNA Database will confirm a match between the DNA crime scene profile and the existing subject profile, as well as the result of the gender test.

When a DNA subject profile matches a DNA crime scene profile, a DNA match report is sent by the National DNA Database to both the police force where the crime occurred and to the police force that obtained the DNA sample from the person.

The National DNA Database operates continuously so the moment a DNA subject or crime scene profile is loaded, it is compared with existing profiles held on Database. This may lead to a number of results:

- a new crime scene profile may match with an existing DNA subject profile retained by the Database;
- a new subject profile may match with an existing DNA crime scene profile held on the Database;
- a new subject profile may reveal a duplicate of an individual's DNA profile; and
- a new crime scene profile may match with another crime scene profile revealing that an individual has committed more than one crime.

In 2011-12 there were 2,635 crime-scene-to-crime-scene matches.

In addition to the matches resulting from automatic loading and comparison of new and existing DNA profiles, a one-off search of a crime scene profile – known as a speculative search of the National DNA Database – may also be carried out. There are two reasons for carrying out a speculative search:

- **Urgency:** the National DNA Database Delivery Unit provides a round-the-clock service to carry out urgent searches in cases of the most serious violent crimes such as murder and rape. These are conducted where DNA has been recovered from the victim or crime scene in order to identify or eliminate suspects in an unsolved crime; and
- **Quality:** to search partial or incomplete crime scene profiles that do not meet the load criteria of the National DNA Database.

Since its launch in 1995, crime scene DNA profiles which have not matched with any subject DNA profiles have been retained on the National DNA Database. On 31 March 2012, 158,191 crime scene profiles remain unmatched.

## FAMILIAL SEARCHES

Familial searching is used in cases of serious crime where a DNA profile of a suspect has been gathered from a crime scene but does not match an existing subject profile on the National DNA Database.

The use of this technique is relatively rare – a total of 29 familial searches were carried out in 2011-12 – and is subject to specific guidance produced by the Association of Chief Police Officers (ACPO) and may only be conducted with the approval of a chief police officer. This is because familial searching involves the identification of individuals who are innocent of the crime under investigation but who may be closely related to the perpetrator whose DNA has been retrieved from a crime scene profile. In addition, a successful match may reveal a familial connection that either – or both – the perpetrator and the other individual were not previously aware.

The technique has resulted in identification of individuals that are subsequently convicted of previously unsolved murders and violent crimes and relies on the fact that closely related individuals are more likely to have DNA profiles with common components.

Crime scene profiles may result in a number of familial matches that enable crime investigation teams to establish new lines of enquiry.

### 'Pot-bellied rapist is jailed at last after 28 years'

A familial search in a cold case review by Humberside Police helps convict Michael Acey for the rape of a 10-year-old schoolgirl in 1984. Acey was sentenced to 10 years imprisonment in February 2012.

<http://www.yorkshirepost.co.uk/news/at-a-glance/main-section/pot-bellied-rapist-is-jailed-at-last-after-28-years-1.4202812>

Fig. 12

## NUMBER OF CRIMES MATCHING A SUBJECT PROFILE BY OFFENCE, 2011-12

OFFENCE	CRIMES WITH A MATCH
BURGLARY	13,422
VEHICLE CRIME	4,453
CRIMINAL DAMAGE	3,498
THEFT	1,660
VIOLENT CRIME	1,519
DRUGS	1,400
ROBBERY	1,071
RAPE	522
TRAFFIC (INCLUDING FATAL)	298
ARSON	236
MURDER, MANSLAUGHTER AND ATTEMPTED MURDER	195
FIREARMS	161
OTHER SEXUAL OFFENCES	152
FRAUD	150
PUBLIC ORDER	108
ABDUCTION AND KIDNAPPING	53
EXPLOSIVES	10
BLACKMAIL	8
OTHER	776
<b>TOTAL</b>	<b>29,692</b>

Fig. 14

## UNMATCHED CRIME SCENE PROFILES ON THE NDNAD AT 31 MARCH 2012

OFFENCE	UNMATCHED PROFILES RETAINED
BURGLARY (INCLUDING AGGRAVATED)	65,994
VEHICLE CRIME	45,549
CRIMINAL DAMAGE	10,242
ROBBERY	7,400
VIOLENT CRIME	3,975
THEFT	3,891
RAPE	2,755
MURDER, MANSLAUGHTER AND ATTEMPTED MURDER	3,312
DRUGS	2,927
TRAFFIC (INCLUDING FATAL)	1,501
ARSON/FIRE INVESTIGATIONS	1,437
OTHER SEXUAL OFFENCES	994
FIREARMS	695
FRAUD	527
PUBLIC ORDER	459
ABDUCTION AND KIDNAPPING	446
EXPLOSIVES	227
BLACKMAIL	68
OTHER	5,792
<b>TOTAL</b>	<b>158,191</b>

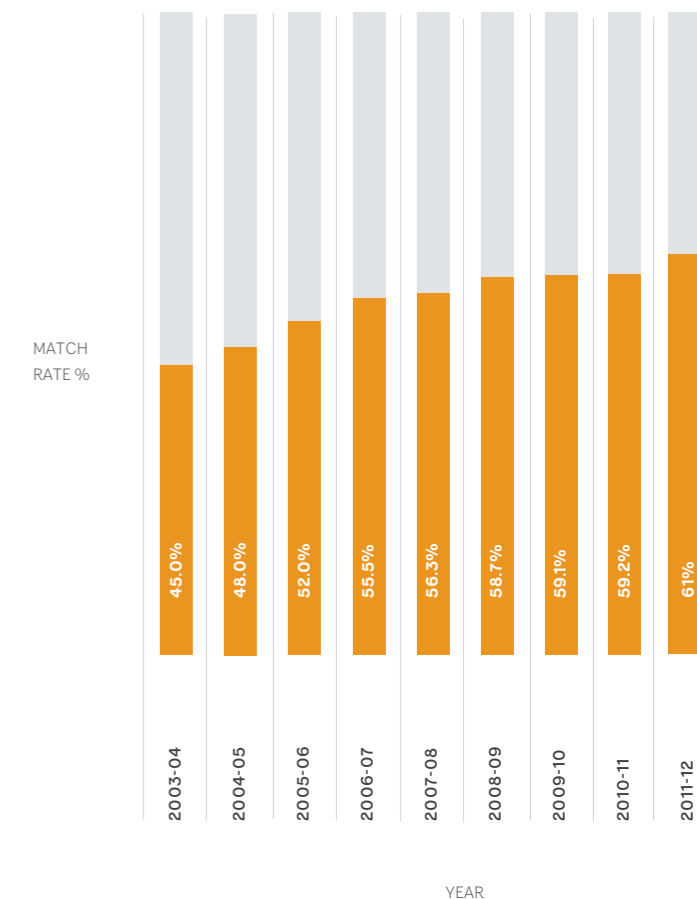
Fig. 13

## URGENT SPECULATIVE SEARCHES, MATCHES AND MATCH RATE BY OFFENCE 2011-12

OFFENCE	NUMBER OF SEARCHES	NUMBER OF MATCHES	MATCH RATE%
RAPE	84	61	73
MURDER, MANSLAUGHTER AND ATTEMPTED MURDER	79	53	67
BURGLARY	23	18	78
ROBBERY	24	16	67
FIREARMS	10	7	70
OTHER SEXUAL OFFENCES	11	6	54
VIOLENT CRIME	4	4	100
FRAUD	4	4	100
ARSON	5	4	80
ABDUCTION AND KIDNAPPING	5	3	60
VEHICLE CRIME	2	2	100
CRIMINAL DAMAGE	1	1	100
DRUGS	2	1	50
EXPLOSIVES	2	1	50
BLACKMAIL	1	0	0
OTHER	44	16	36
<b>TOTAL</b>	<b>301</b>	<b>197</b>	<b>68 (AVERAGE)</b>

Fig. 15

## MATCH RATE ON LOADING A CRIME SCENE PROFILE TO THE NDNAD - APRIL 2003 TO MARCH 2012



## GOVERNANCE AND OPERATION

The National DNA Database Strategy Board is responsible for governance and oversight of the National DNA Database. Board members include representatives of the Association of Chief Police Officers, the Home Office, National Policing Improvement Agency and the Association of Police Authorities.

In addition, the Board includes representatives from the independent National DNA Database Ethics Group, Information Commissioner's Office and the Forensic Science Regulator.

Day-to-day operation of the National DNA Database service is the responsibility of the Database's National Delivery Unit. The Unit is tasked with making sure that operational activity meets the standards for quality and integrity established by the National DNA Database Strategy Board.

In total, fewer than 50 vetted staff have access to the National DNA Database. No police officer or police force has direct access to the information held on the National DNA Database but they are informed of matches made by the database. Similarly forensic science providers, who undertake DNA profiling under contract to the police service and submit the resulting crime scene and subject profiles for loading, do not have direct access.

Significant legislative, regulatory and governance and operational changes have been a feature of 2011-12 with preparation for the implementation of measures contained in the Protection of Freedoms Act, the closure of the Forensic Science Service (FSS) and subsequent transfer of forensic services to alternative providers, and the publication of Codes of Practice for forensic service providers by the Forensic Science Regulator.

In terms of governance, the Act will place the National DNA Database Strategy Board and, therefore, the operation of National DNA Database itself, on a statutory footing.

The current practice of the participation of representatives of non-police bodies on the National DNA Database Strategy Board is made formal by the Act: Board Members will include independent bodies such as the Information Commissioner and the National DNA Database Ethics Group. In future, the Biometrics Commissioner – who will be responsible for oversight of the retention of DNA and fingerprints for national security purposes as a result of the Act – will be represented on the National DNA Database Strategy Board.

The presence of non-police representatives ensures that the Board benefits from regulatory, legislative and ethical expertise and perspectives. The participation of independent Board members is influential in both strategic policy and decision-making, as well as day-to-day operation of the National DNA Database – supporting the Board's ability to conduct its primary role to support criminal investigation in a way that is proportionate and transparent, and encourages public confidence.

### FORENSIC SCIENCE SERVICE CLOSURE

In 2010, following an independent review of police forensics market place, and considering a range of other evidence, the UK government announced plans to close the Forensic Science Service in March 2012.

At the time of the announcement, most forensic laboratory services were delivered to forces under either the National Forensic Framework Agreement or the West Coast Consortium contract, involving 11 private sector forensic service providers and the government-owned Forensic Science Service.

The government's announcement required a comprehensive transition project – involving re-tendering activities, contractual novation, clarifying and amending local contract agreements and the close management of laboratory submissions – to enable the migration of work from the Forensic Science Service to alternative forensic service providers.

This transition project was led by the Association of Chief Police Officers and involved staff from the Home Office, NPIA and police forces throughout the UK.

In order to retain public confidence in the criminal justice system, the transition required no disruption to the continuity of forensic supply to forces.

The transition of all Forensic Science Service services – which included the transfer of DNA profile data, and the handover of records related to cold case reviews and appeals against convictions – to alternative forensic service providers and the NPIA was completed by March 2012. In addition work to prepare for the transfer of responsibility for the raw DNA results produced by Forensic Science Service to National DNA Database's National Delivery Unit in 2012-13 has been carried out during 2011-12.

Despite the scale of the changes to the provision of forensic services to police forces, there was no disruption to the Criminal Justice System as a result of the initial closure stage project. The NPIA's Forensic Marketplace Management Team is managing and monitoring performance of forensic service providers and the capacity, quality and standards of services in order to anticipate any risk of post-transition disruption to criminal justice.

### PROTECTION OF FREEDOMS ACT: SUBJECT PROFILES OF UNCONVICTED INDIVIDUALS

Throughout 2011-12 the National DNA Database Strategy Board has been focused upon the provisions of the Protection of Freedoms Bill and its amendments while ensuring oversight of the operation of the National DNA Database governed by existing law.

The provisions of the Act are expected to lead to the deletion of a significant number of the DNA profiles of unconvicted individuals that are currently held on the National DNA Database. As this report described earlier (page 20 'Unconvicted individuals'), information about the conviction status of DNA subject profiles is not held by the National DNA Database but stored on the Police National Computer. To successfully identify and remove subject profiles of unconvicted individuals, a comparison must be made between the conviction status of a record held on the Police National Computer and a corresponding subject profile held on the National DNA Database.

A new Police National Computer process is being developed in order to fulfil the requirements of the Protection of Freedoms Act which, in addition to enabling compliance with the provisions for retention of DNA samples and profiles in future, will also enable the retrospective identification and deletion of DNA subject profiles of unconvicted individuals held on the National DNA Database.

### THE NATIONAL DNA DATABASE AND THE FORENSIC SCIENCE REGULATOR

The significant role that DNA evidence can play in the criminal justice system means that the conduct and integrity of the National DNA Database Strategy Board, the database itself and organisations with a role in its operation, such as forensic service providers, are essential in safeguarding the confidence of the public.

Quality standards for forensic science are monitored by the independent Forensic Science Regulator. As a member of the National DNA Database Strategy Board, the Regulator provides an essential perspective on quality and regulation and the development of Board strategy on operational matters.

During 2011-12, the Forensic Science Regulator's Codes of Practice have been tested, amended and published with the United Kingdom Accreditation Service (UKAS), police forces and forensic service providers. This offers robustness of the quality of input to the National DNA Database.

### RESOLVING OPERATIONAL RISKS IN PARTNERSHIP WITH THE FORENSIC SCIENCE REGULATOR

In March 2012 Greater Manchester Police informed the Chair of the National DNA Database Strategy Board that a suspect in a rape case had been incorrectly identified as a result of contamination during a laboratory DNA examination at a UK-based forensic service provider.

The Chair of the National DNA Strategy Board immediately initiated a Gold command structure – involving the Forensic Science Regulator, the ACPO Crime Lead, Greater Manchester Police, the Crown Prosecution Service and the National DNA Database Unit – to investigate the cause of the incident and establish whether similar contamination incidents had occurred which could pose a risk to the criminal justice system. In addition, the structure was vital in ensuring safeguards were in place to prevent a similar incident occurring in future. The Crown Prosecution Service withdrew the case against the suspect.

The Gold group established that the incident resulted from the cross-contamination of one crime scene sample and another because of the incorrect re-use of plastic trays in the robotic extraction process. Corrective actions were immediately put in place. 26,000 profiles that had been processed since the adoption of the robotic process in March 2011, were analysed and re-checked. No further cases were identified. This process was then subject to audit by the Forensic Science Regulator who confirmed that no further cases were affected. The Regulator published a report about the case in October 2012.

### ETHICS

The National DNA Database Ethics Group is a non-departmental body that was established in 2007 by the Home Office and exists to provide independent advice on ethical issues to both Home Office ministers and the National DNA Database Strategy Board.

As independent members of the Strategy Board, Ethics Group members are actively involved in Strategy Board work-streams and operations so that ethical considerations are brought to the fore from the early stages of projects.

In its Annual Report published in 2011, the Ethics Group set out three key recommendations.

- All databases containing DNA information including the counter terrorism database held by the police service should be subject to a robust statutory governance framework, appropriate systems and controls, and should be transparent and only be used for statutory purposes.
- The governance around the international exchange of DNA data should be strengthened with clear and transparent accountability mechanisms. The National DNA Database Strategy Board should monitor the use of 'Gillick competence' which will be used selectively to ensure children consent when they are deemed capable of doing so (rather than have an adult consent for them).

The Strategy Board should encourage the adoption of good practice. The National DNA Database Strategy Board regards its statutory footing as a result of the Protection of Freedoms Act, as addressing the Ethics Group's concerns over governance. The Board has oversight of operation of the National DNA Database and reports to the Home Secretary, who is accountable to Parliament and must lay the Strategy Board's Annual Report before Parliament.

## FINANCIAL

Fig. 16

	2011-2012	2010-11
<b>INCOME</b>	<b>£1,288,471</b>	<b>£1,232,706</b>
<b>EXPENDITURE</b>		
Operating costs	£1,831,390	£1,864,107
Hosting of the National DNA Database system <sup>1</sup>	£334,179	£1,329,172
Development costs, Transition project and National DNA Database enhancements	£322,821	£385,095
<b>TOTAL</b>	<b>£1,199,919</b>	<b>£2,345,668</b>

<sup>1</sup> Hosting costs of the National DNA Database have reduced significantly between 2010-11 and 2011-12 following renegotiation of business system licence agreements.



## DATA SOURCES

**COMPLETE NDNAD DATASETS HAVE BEEN PUBLISHED ALONGSIDE THIS REPORT.****Fig.2 Detection rates with and without DNA evidence 2011-12**

Data source: forensic data collected from police forces as part of the Annual Data Requirement and ONS Crime in England and Wales report 2011-12.

**Fig.3 Metropolitan Police: application of DNA searches following Summer disorder 2011**

Data source: Metropolitan Police.

**Fig.4 DNA profiles on National DNA Database as at 31 March 2012**

Data source: NDNAD Management Information.

**Fig.5 Subject profiles loaded to the NDNAD per year since 1995**

Data source: NDNAD Management Information.  
*The number of profiles loaded per year is a snapshot taken at the end of 2011-12. Figures will change due to profiles being reloaded and overwriting the original load date.*

**Fig.6 Crime Scene profiles loaded to the NDNAD in 2011-12, by offence**

Data source: NDNAD Management Information.  
*Offence types are recorded by forensic staff processing the DNA sample and do not correspond to ONS recorded crime categories.*

**Fig.7 Subject profiles deleted from the NDNAD, by country of force that submitted profile, 2011-12**

Data source: NDNAD Management Information.  
*'Other' consists of non-aligned forces such as the British Transport Police, Channel Islands and military police forces*

**Fig.8 All recorded crime compared with crimes with scene examinations 2011-12**

Data source: forensic data collected from police forces as part of the Annual Data Requirement and ONS Crime in England and Wales report 2011-12.

**Fig.9 Crime Scene profiles loaded to the NDNAD per year since 1995**

Data source: NDNAD Management Information  
*The number of profiles loaded per year is a snapshot taken at the end of 2011-12. Figures will change due to profiles being reloaded and overwriting the original load date.*

**Fig.10 Subject profiles retained on the NDNAD by age on load at 31 March 2012**

Data source: NDNAD Management Information.  
*Age is calculated from date of birth provided by the individual arrested to the police officer at the time of arrest.*

**Fig.11 Subject profiles retained on the NDNAD, by ethnic appearance, gender and age (Current age at 31 March 2012: England and Wales only)**

Data source: NDNAD Management Information.  
*Data is for profiles taken by England and Wales forces only. Ethnic appearance is recorded based on the judgment of the police officer taking the DNA sample. Age is calculated based on the date of birth provided by the individual arrested to the police officer at the time of arrest.*

**Fig.12 Number of crimes matching a subject profile by offence, 2011-12**

Data source: NDNAD management information  
*If one crime scene profile matches to several subject profiles, only one match is counted. Where several crime scene profiles are obtained from one crime, resulting in several matches, only one crime with a match is counted. Offence types are recorded by forensic staff processing the DNA sample and do not correspond to ONS recorded crime categories. These are matches from routine searches. Matches from urgent searches are recorded separately.*

**Fig.13 Urgent speculative searches, matches and match rate by offence 2011-12**

Data source: NDNAD speculative search log.  
*Match rate is the percentage of profiles speculatively searched that match to a profile already on the database. Offence types are recorded by forensic staff processing the DNA sample and do not correspond to ONS recorded crime categories.*

**Fig.14 Unmatched crime scene profiles on the NDNAD at 31 March 2012**

Data source: NDNAD management information.  
*Offence types are recorded by forensic staff processing the DNA sample and do not correspond to ONS recorded crime categories.*

**Fig.15 Match rate on loading a crime scene profile to the NDNAD - April 2003 to March 2011**

Data source: NDNAD management information.  
*Match rate is the percentage of crime scene profiles loaded to the NDNAD that match immediately to a subject profile already on the database*