Scottish Biometrics Commissioner
Coimiseanair Biometrics na h-Alba

Joint Assurance Review

of the Acquisition, Retention, Use and Destruction of Fingerprints for Criminal Justice and Police Purposes in Scotland

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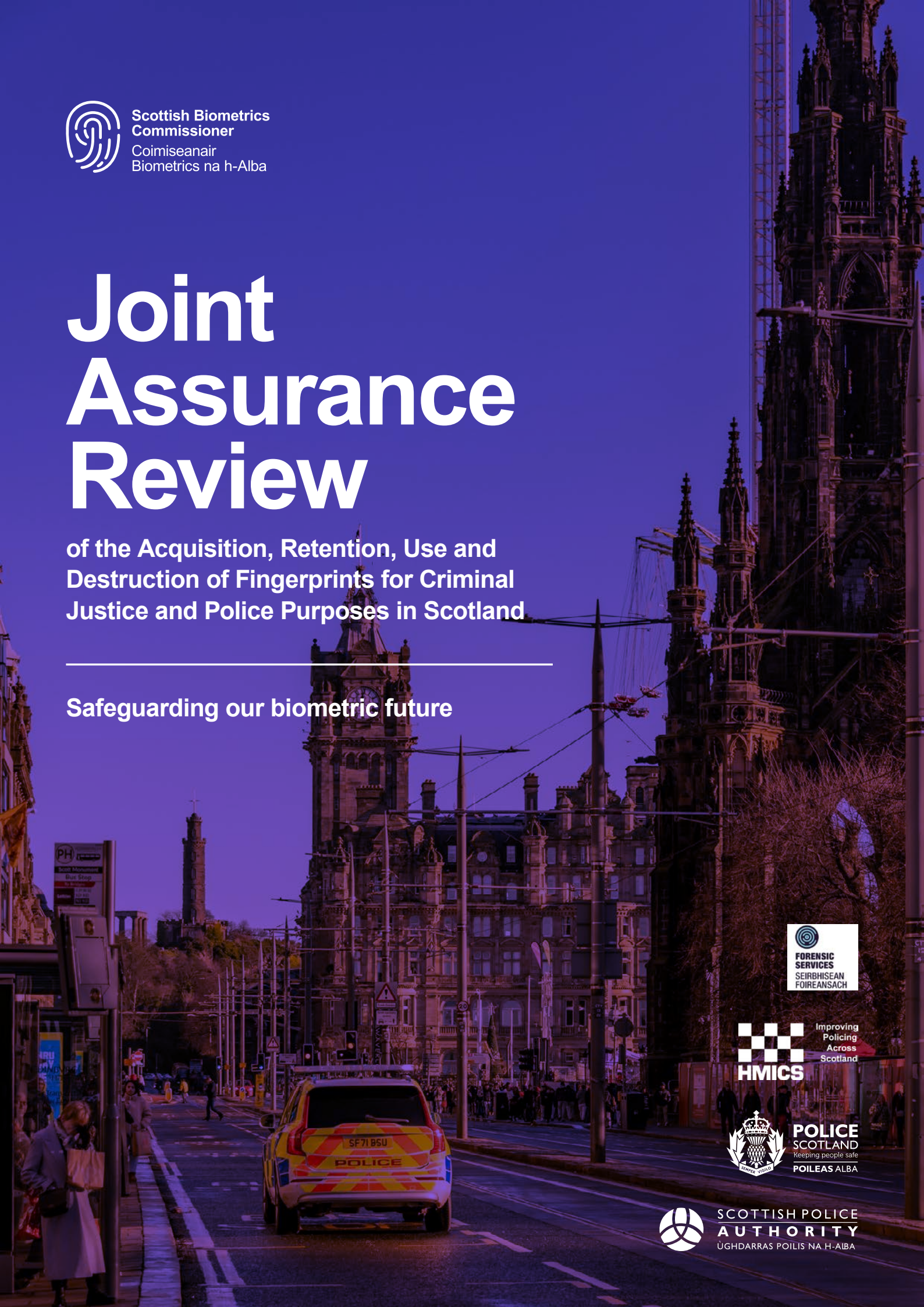
Safeguarding our biometric future



FORENSIC SERVICES
SEIRBHISEAN FOIREANSACH

Improving Policing Across Scotland
HMICS

POLICE SCOTLAND
Keeping people safe
POILEAS ALBA

SCOTTISH POLICE AUTHORITY
ÙGHDARRAS POILIS NA H-ALBA

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Key Facts

Fingerprinting arrested persons is a critical step in the criminal justice process, providing the police with strong physical evidence of identity that ties suspects to evidence and crime scenes.

Fingerprinting compliant arrested persons on a Livescan fingerprint machine is a quick and straightforward process for an appropriately trained operator.

Police Scotland has authority in law to take fingerprints without consent from any person detained following arrest for a recordable offence regardless of their officially accused or not officially accused status. However, Police Scotland policy only makes it mandatory for staff to fingerprint officially accused persons. This is at odds with policing practice in other parts of the UK and carries significant risk.

Not fingerprinting persons arrested and brought into custody as not officially accused (or as officially accused) precludes Police Scotland from using the Non-Verified Live Identification (NVLID) function available to them through the Livescan fingerprint terminal that can verify identity in real time preventing misidentification and attempts to defeat the ends of justice.

Not doing so, also results in lost investigative opportunities, now and in the future, including to search arrestee prints against unidentified marks from UK crime scenes and renders them unavailable for any international (non-UK) search. It also results in criminal justice inefficiencies - for example if the arrestee subsequently becomes an officially accused but cannot then be traced to acquire criminal justice samples.

Unlike DNA custody sampling, there is a need to take fingerprints on each occasion a subject is detained as there are variations in quality and quantity of ridge detail captured each time fingerprints are taken and the best images on IDENT1 provide increased opportunity to identify. It also captures new scars or injuries such as a missing fingerprint.

There is nothing in the Lord Advocates guidelines relating to not officially accused persons and liberation from custody to prevent the police from fingerprinting those individuals. The specific duty in Section 50 of the Criminal Justice (Scotland) Act 2016 to ensure that a person is not unreasonably or unnecessarily held in police custody does not preclude the taking of biometric samples, albeit such samples will not be retained if no charges are forthcoming.

The use of fingerprints for policing and criminal justice purposes is not a feature of most criminal investigations but makes a significant contribution towards solving the most serious crime types.

Fingerprint evidence presented to the Courts is highly dependable, but it should always be regarded as evidence of opinion rather than evidence of fact.

In November 2025, Police Scotland held 831,014 fingerprint forms relating to 455,040 people on the UK law enforcement fingerprint database IDENT1.

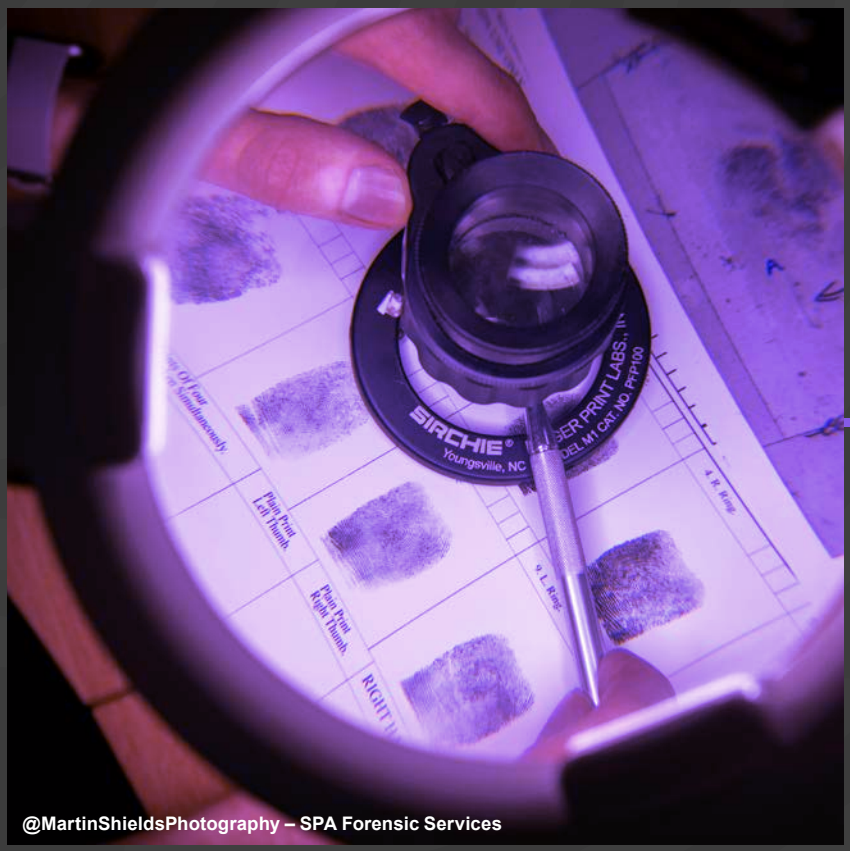
In November 2025, Police Scotland also held 1.1 million fingerprint forms 'off database' in a national collection of paper records including those from legacy policing structures. As a manual collection, some of these records may not be lawfully held as some may not have been subject to periodic review.

The UK Home Office has a published biometrics strategy1 and supports the operationalisation of its written strategy with significant capital expenditure for multi-modal biometrics. It also part-funds the Police Digital Service and has been investing heavily in providing additional capital funding to individual forces, for example to support live facial recognition.

[1]Home Office Biometrics Strategy

Although Scotland benefits from and contributes to the funding of UK law enforcement databases, Scottish Government has no written strategy in relation to biometrics and accordingly there is no multi-year capital allocation to Police Scotland or the Scottish Police Authority (SPA)

Scottish Government does fund technological developments, for example the Digital Evidence Sharing Capability (DESC), but it does not do so as part of a longer-term holistic strategy. This means that (unlike England and Wales) there is no Scottish Government vision of where it wants Police Scotland and the SPA to be with biometrics in the next 10 years



@MartinShieldsPhotography – SPA Forensic Services

Key Findings

All pertinent recommendations from the Scottish Fingerprint Inquiry 2011 have been successfully discharged by the Scottish Police Authority Forensic Services who provide a world leading forensic science capability to Police Scotland and the wider Scottish Criminal Justice system.

In developing fingerprints in the laboratory from items recovered at crime scenes, most of the scientific techniques and those relating to identification are accredited to international scientific standards by the UK Accreditation Service (UKAS) affording confidence to the Justice System in Scotland.

Through the establishment of a Biometrics Oversight Board and Head of Biometrics, Police Scotland has significantly improved its strategic governance around biometric data as well as improving the granularity of management information. That has led to the 'measurement effect' meaning that through better management information, Police Scotland is now more aware of when official policy is not being followed.

In a 3-month sample period conducted by Police Scotland, there were 3,202 instances of officially accused persons being arrested but not being fingerprinted, suggesting that over a 12-month period Criminal Justice Services Division (CJSD) custody staff might be failing to fingerprint more than 12,000 arrested persons with officially accused status including those arrested for serious crimes and offences. This is contrary to Force policy and results in lost investigative opportunities now and in the future including to properly verify identity and to search arrestee prints against unidentified marks from UK or international crime scenes.

In 144 of those 3,202 instances, the subject had no fingerprints on file from previous arrest episodes meaning that all investigative opportunities, including future opportunities, have been lost.

Although not the subject of this review, Police Scotland Criminal Justice Services Division are also failing to photograph significant volumes of officially accused persons in even higher volumes exposing the Force to unnecessary risk.

We found that there is inadequate supervision of staff working within Police Scotland Criminal Justice Services Division (CJSD) custody settings with regards to adherence to Force policy. We also found that there was no structured training programme for Livescan operators meaning that Force policy was often not being followed and fingerprints taken were sometimes then being deleted from the Livescan terminal resulting in unauthorised data loss.

We also found significant problems with lack of supervision and quality control meaning that the SPA Forensic Services were having to return 24% of all fingerprint forms to Police Scotland Criminal Justice Services Division because of various factors including missing or inaccurate information.

During our fieldwork in autumn 2025, some ancillary custody centres in Scotland, especially in Orkney and Shetland, still lacked access to Livescan. This is symptomatic of a wider issue of lack of appropriate capital funding by Scottish Government to the SPA and Police Scotland since inception in 2013 as exacerbated by poor management by Police Scotland as spare machines exist due to recent closures of former custody centres.

Ethnicity data on fingerprints held by Police Scotland cannot be compared reliably with Scottish Census data due to differing counting conventions and so we were unable to empirically establish whether any protected characteristic groups are over-represented in police records.

There is an opportunity for Police Scotland and the SPA Forensic Services to jointly produce an Annual Report on Biometrics to a relevant SPA Committee to enhance oversight and scrutiny.

The nature and extent of access given to defence fingerprint experts through the rules of disclosure in Scotland cannot be reconciled with the recommendations from the Fingerprint Inquiry Scotland 2011, as the nature of full access precludes the recommended 'blind examination' component to remove the possibility of confirmation bias and additionally there is then no independent verification of the conclusions of the defence examiner. We make no recommendation on this aspect but would encourage the SPA Forensic Services to have further discussions with COPFS on this issue.

There is a need for Police Scotland and the SPA Forensic Services to jointly assess and clarify in writing their mutual relationships and respective roles under the Data Protection Act 2018 in relation to the law enforcement processing of fingerprints associated with criminal procedure in Scotland. They should use the findings of this assessment as the basis for review and revision of the governance and relevant policy documentation around fingerprints.

Recommendations

No.1
Police Scotland Criminal Justice Services Division (CJSD) should significantly improve operational practices to ensure that the current Police Scotland policy requiring officially accused persons to be fingerprinted following arrest is followed. The Assistant Chief Constable (CJSD) should establish a structured system of controls to drive the necessary improvements and should report on progress internally to the Police Scotland Biometrics Oversight Board, and externally to a relevant SPA Committee

No.2
Police Scotland Criminal Justice Services Division (CJSD) should ensure that an appropriate level of management presence is maintained at custody centres to improve the quality and consistency of operational practice and to ensure compliance with approved protocols and standards relating to the acquisition of biometric data from officially accused persons

No.3
Police Scotland should consider the pros and cons of a ‘take all’ policy for fingerprints and custody images from adults who have been arrested for any offence

No.4
Criminal Justice Services Division (CJSD) should restrict Livescan administrative ‘deletion’ permissions to CJSD supervisory staff to ensure that there is no unauthorised deletion of biometric data

No.5
Criminal Justice Services Division (CJSD) should develop a consistent training plan for Livescan operators and keep central and local records of who has been trained and when. Such training should ensure that operators understand Force policy

No.6
Criminal Justice Services Division (CJSD) should establish central or local Livescan terminal deletion audits to ensure that fingerprints are not being deleted in the custody environment through unauthorised practice and to ensure logging requirements are being met (Data Protection Act 2018, Part 3 Section 62). Any non-recoverable data losses deemed high risk should be reported to the UK Information Commissioner (ICO)

No.7

Police Scotland Criminal Justice Services Division (CJSD) should review the potential risks associated with the lack of available modern fingerprint identification equipment at all ancillary custody centres throughout Scotland and address any deficits identified

No.8

Police Scotland and the SPA Forensic Services should jointly assess and clarify in writing their mutual relationships and respective roles under the Data Protection Act 2018 in relation to the law enforcement processing of fingerprints associated with criminal procedure in Scotland. They should use the findings of this assessment as the basis for review and revision of the governance and relevant policy documentation around fingerprints

No.9

Police Scotland and the SPA Forensic Services should seek to digitise the paper records within the National Fingerprint Collection (1983 – 2011), conduct legality checks on each record and remove any forms not lawfully held. All biometric records should then be digitally held on IDENT1 and governed by automated weeding

No.10

Police Scotland and the SPA Forensic Services should produce an Annual Report on its acquisition, retention, use and destruction of biometric data to assist oversight and scrutiny by a relevant SPA Committee

Introduction

About the Scottish Biometrics Commissioner

The Scottish Biometrics Commissioner is established under the Scottish Biometrics Commissioner Act 2020. The Commissioner's general function is to support and promote the adoption of lawful, effective, and ethical practices in relation to the acquisition, retention, use and destruction of biometric data for criminal justice and police purposes by:

- The Police Service of Scotland (Police Scotland)
- Scottish Police Authority (SPA)
- Police Investigations and Review Commissioner (PIRC)

The Commissioner has wide ranging general powers and may do anything which appears to the Commissioner to be necessary or expedient for the purposes of, or in connection with, the performance of the Commissioner's functions, or to be otherwise conducive to the performance of those functions[2].

Our Power to Work with Others

Section 3 of the Scottish Biometrics Commissioner Act 2020 confers a power on the Commissioner in the exercise of their functions to work, assist and consult with other named bodies. This includes amongst others, Police Scotland, the Scottish Police Authority and His Majesty's Inspectorate of Constabulary in Scotland.

This Assurance Review was conducted by the Scottish Biometrics Commissioner working in partnership with HM Inspectorate of Constabulary in Scotland (HMICS), the Scottish Police Authority, the Scottish Police Authority Forensic Services and Police Scotland.

The Commissioner may prepare and publish a report about any matter relating to the Commissioner's functions, and any such report must be laid before the Scottish Parliament. This joint assurance review was conducted under the provisions of Sections 2 and 3 of the Scottish Biometrics Commissioner Act 2020 and is laid before the Scottish Parliament under Section 20(2) of the Act.

Meaning of biometric data

The term 'biometric data' is defined differently in different UK legislation. However, under Section 34 of the Scottish Biometrics Commissioner Act 2020 it means ***'information about an individual's physical, biological, physiological or behavioural characteristics which is capable of being used, on its own or in combination with other information (whether or not biometric data), to establish the identity of an individual'.*** Section 34(2)(c) and (d) of the Act specifies that such data may include samples taken from any part of an individual's body from which information can be derived, and the information subsequently derived from such samples. Therefore, in relation to fingerprints, the definition of biometric data within the Scottish Biometrics Commissioner Act 2020 includes both the source fingerprint impression if taken on paper or recovered at a crime scene as well as the computerised representation of the fingerprint itself and any associated information relating to the identity of an individual acquired or retained.

[2]Scottish Biometrics Commissioner Act 2020, Section 4

Exercising our general function

In exercising our general function, the Commissioner is required to keep under review the law, policy and practice relating to the acquisition, retention, use and destruction of biometric data by or on behalf of Police Scotland, the Scottish Police Authority (SPA) and the Police Investigations and Review Commissioner (PIRC). The Commissioner must also promote public awareness and understanding of the powers and duties these persons have in relation to the acquisition, retention, use and destruction of biometric data, how those powers and duties are exercised, and how the exercise of those powers and duties can be monitored or challenged.

Details of how we exercise our general function can be viewed in our Strategic Plan 2025/29. When discharging our statutory functions, we use our National Assessment Framework to consider strategic direction, execution and results in relation to biometric data used for criminal justice and policing purposes by the bodies to whom our functions extend. Our framework can be found as an Appendix to our Code of Practice.

About HMICS

HM Inspectorate of Constabulary in Scotland (HMICS) is an independent scrutiny body, which has been in existence since the nineteenth century. Its role was reaffirmed by the Police and Fire Reform (Scotland) Act 2012, which gave HMICS wide ranging powers to investigate the "state, effectiveness and efficiency" of both Police Scotland and the Scottish Police Authority.

HMICS has a statutory duty to ensure that the Chief Constable and the SPA meet their obligations in terms of best value and continuous improvement. If necessary, HMICS can be directed by Scottish Ministers to investigate anything relating to the SPA or Police Scotland as they consider appropriate and has an established role in providing professional advice and guidance on policing in Scotland.

HMICS collaborates with other inspectorates and agencies across the public sector to share specific expertise or jointly examine key areas where Police Scotland works in partnership and contributes to shared outcomes by coordinating activities to reduce the burden of inspection and avoid unnecessary duplication. HMICS also inspects other UK police services that operate in Scotland and are members of the National Preventive Mechanism, inspecting police custody centres to monitor the treatment and conditions for detainees.

About the Scottish Police Authority & SPA Forensic Services

The Police and Fire Reform (Scotland) Act 2012 created the Scottish Police Authority (SPA) and set out its five core functions:

- to maintain the Police Service
- to promote the policing principles set out in the 2012 Act
- to support and promote continuous improvement in the policing of Scotland
- to keep under review the policing of Scotland
- to hold the Chief Constable to account for the policing of Scotland

These five functions demonstrate the dual, integrated responsibilities of the SPA: its oversight role in scrutinising policing in Scotland and holding the Chief Constable to account; and its supportive role in maintaining and improving the police service.

The SPA is also responsible for the management and delivery of Forensic Services in Scotland, and it is worthy of note that the SPA Forensic Services is the largest public sector provider of forensic services in Europe. The Authority aims to increase public trust and confidence in the policing of Scotland in the way it discharges its functions and through the quality of its governance arrangements. Further information can be found on the SPA website.

About Police Scotland

Police Scotland was established on 1 April 2013 and is responsible for policing across the whole of Scotland, some 28,168 square miles, covering a third of the United Kingdom's landmass with a unique range of urban, rural, island and remote communities. It is the second largest force in the UK with 22,000 officers and staff working together for the people of Scotland.

The Service is led by a Chief Constable, supported by a command team of Deputy Chief Constables, Assistant Chief Constables and Directors. There are thirteen local policing divisions, each headed by a Chief Superintendent who ensures that local policing in each area is responsive, accountable and tailored to meet local needs. Each division encompasses response officers, community officers, local crime investigation, public protection and local intelligence.

The local policing divisions are supported by national specialist divisions. The Specialist Crime Division (SCD) provides investigative and intelligence functions such as Major Crime investigation, Public Protection, Organised Crime, Counter Terrorism, Intelligence and Safer Communities.

The Operational Support Division (OSD) provides specialist support functions such as Road Policing, Firearms, Public Order, Air Support, Marine Policing, Dogs and Mounted Branch as well as Emergency and Events Planning. These national divisions ensure every community in Scotland has access to specialist policing services.

Calls from the public are managed by Contact, Command and Control Division with Area Control Rooms at four locations across the country which deploy resources. Criminal Justice Services Division (CJSD) delivers police Scotland's custody operations. This division is responsible for managing custody centres across Scotland, ensuring the safety and welfare of persons in custody, and maintaining operational standards in relation to the acquisition of biometric data from people arrested by the police.

Foreword

by the Scottish Biometrics Commissioner

The strategic aim of this joint review is ***"to provide assurance to the Scottish Parliament that the acquisition, retention, use and destruction of fingerprints for policing and criminal justice purposes in Scotland is lawful, effective, and ethical."***

The review has considered the nature and extent of the uses of fingerprints for policing and criminal justice purposes in Scotland including the impact of such use in terms of outcomes. This included, but was not limited to examining:

- the law and Police Scotland policy
- the lawful use of fingerprints for policing and criminal justice purposes in Scotland
- process, including assessing the effectiveness of fingerprints both in verifying and confirming identity, also in terms of match rates, its exculpatory value, and in contributing towards overall crime solvency in Scotland
- the ethical considerations around the current and future use of fingerprints including whether the current retention regimes are proportionate and necessary. This aspect was linked to the joint Scottish review of the laws of retention in Scotland published by Scottish Government and the Commissioner in October 2024

The specific methodology for this review, including matters excluded from scope, was outlined in a Terms of Reference agreed between partners and published on our website in October 2025. Our judgements are based on our National Assessment Framework for biometric data outcomes which ensures a consistent and objective approach to our work.

Our National Assessment Framework considers six overarching themes, namely:

- Leadership and governance
- Planning and process
- People
- Resources
- Partnerships
- Outcomes

My expectation as Commissioner is that any recommendations from our assurance reviews will result in an action plan by the organisation(s) to whom they are directed and taken forward to enable relevant good practice to be disseminated across Scotland to promote continuous improvement. I will monitor actions to address the ten recommendations made from this review and will report on progress and outcomes in my Annual Report to the Scottish Parliament. Where a recommendation is made to Police Scotland, the SPA will also monitor progress through normal mechanisms for holding the Chief Constable to account.

I wish to extend my thanks and appreciation to HMICS, the Scottish Police Authority, the SPA Forensic Services and Police Scotland our strategic partners in this Joint Assurance Review. I also wish to thank colleagues at the Scotland Headquarters of the UK Information Commissioner's Office (ICO) and to all members of my professional Advisory Group maintained under Section 33 of the Scottish Biometrics Commissioner Act, and to Karen McBride a Senior Fingerprint Examiner temporarily seconded to my office to afford essential subject matter expertise.

Dr Brian Plastow
Scottish Biometrics Commissioner
March 2026

Antecedents

In any criminal investigation, whether a case of serious crime (such as murder and rape) or volume crime (such as housebreaking), fingerprint evidence can play a vital role. As a result, fingerprint evidence constitutes one of the most important categories of biometric data constituting physical evidence. It is widely accepted within the forensic science community and the courts and has become an invaluable tool to the criminal justice system in Scotland, the UK, and internationally.

In this initial antecedent's chapter, this assurance review explains the physical properties of fingerprints including how they are formed and their evidential value and lawful basis for use for policing and criminal justice purposes in Scotland and the UK. The chapter also reflects on the pre-reform policing landscape in Scotland and the use of fingerprints in criminal prosecutions prior to the establishment of a sterile corridor between the police and scientific investigations relating to fingerprint evidence. Finally, it explains the circumstances leading to HM Advocate v. McKie (1999) and The Fingerprint Inquiry Scotland (2011), with the recommendations from Sir Anthony Campbell paving the way for new quality assurance systems and the independent validation and accreditation by the UK Accreditation Service (UKAS) of the majority of scientific techniques which now underpin the forensic examination of fingerprints in Scotland and the UK.

What are fingerprints?

If you look at the skin on the palm of your hand and the inner surface of the fingers, you will see that it is covered in a system of fine lines made up of ridges and furrows. It is not smooth like the skin on the rest of the body, nor is there any hair present. In general, the ridges and furrows flow parallel to each other, from the tips of the fingers to the heel of the palm, but in some areas, they twist and turn to form patterns (such as loops and whorls) – most notably on the top joint of the fingers.

If you look more closely, you will see that the ridges themselves are not continuous but there are frequent breaks where a ridge ends (ridge ending), or where a single ridge forks and becomes two (bifurcation). We call these features characteristics, and their arrangement is unique. No two humans, including identical twins, have ever been found to have the same fingerprints.

The structure of the ridges is present at birth having formed through environmental factors in the womb and remains fixed and unchanging throughout life (unless damaged by disease or a deep-seated injury). They are one of the last recognisable features to disappear after death. The arrangement of the ridges and their characteristics can therefore be used to identify an individual at any time in their life.

The arrangement of the ridges can be easily and permanently recorded using a variety of physical and electronic methods. Along the tops of the ridges are minute pores from which sweat is exuded. When a suitable surface is touched, an invisible impression of the ridges and the characteristics may be left in sweat and naturally secreted oils. This invisible (or latent) mark can be revealed by a suitable developing agent and then recorded by photography or lifting. It is then possible to discover if an individual has touched a particular surface which is a valuable method of detecting crime.

Fingerprint patterns are the arrangement of friction ridges formed during foetal growth. The pattern is classified into one of several types of patterns. Every pattern type into which fingerprints are divided has a definition. The definition is a carefully worded specification of the attributes the fingerprint must possess to belong to that pattern type. There are three 'families' of pattern: Loop, Arch and Whorl – examples are shown below:

Image No 1: Fingerprint pattern types.
Source: Fingerprint images property of SPA Forensics staff - permission to reproduce granted

A delta is a triangular type of formation in the friction ridge flow, where ridges flowing in three different directions meet. Deltas are usually found in the bottom half of the finger impressions, offset to either the left or right (or both). Two of the 'branches' of the delta will usually open out to enclose the core area. Deltas appear in all patterns except arches and appear on various parts of the palm. Deltas can be classified as either Open or Closed.

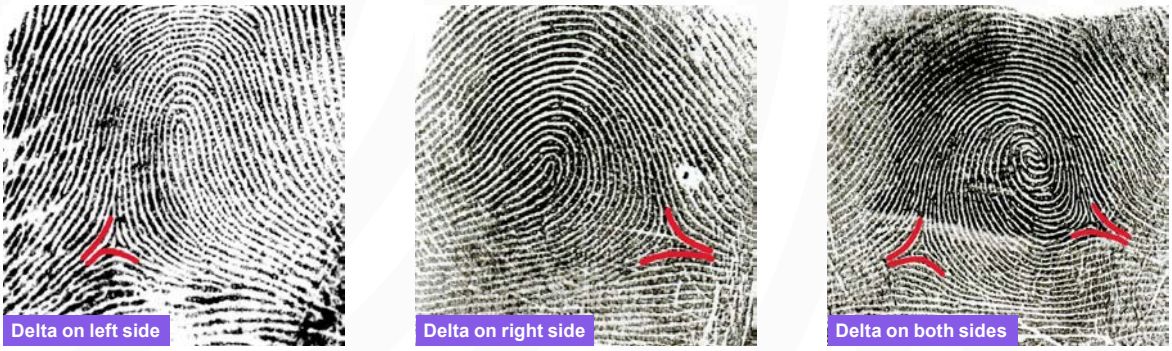


Image No 2: Deltas.
Source: Fingerprint images property of SPA Forensics staff - permission to reproduce granted

Fingerprints are complex patterns formed by ridges and valleys of the skin on the fingertips. The **core** is the central point of the fingerprints, where the ridges converge. **Creases** are white lines or scars that can appear on a fingerprint image, and they are often influenced by genetic factors. **Scars** are areas where the skin has been damaged, leading to the absence of ridges and valleys. These features are important for fingerprint identification and can be used in forensic science to detect altered prints. New scarring is just one reason why it is so important that fingerprints are taken from persons arrested by the police on every arrest episode.

Skin function & structure

Skin covers the surface of the body and is the largest organ. It varies in thickness across the body with the thinnest on the lips and thickest on the scalp. Skin comprises of three main layers – the epidermis, dermis, and hypodermis. The outer layer of the skin is the epidermis which itself is formed of several layers, the innermost regenerating new skin cells and the outermost renewing cells, healing and shedding dead cells. The dermis is the middle layer where hair follicles, blood vessels, sweat glands and nerves are found. The inner layer, the hypodermis (subcutaneous fat layer) acts as a cushion, protecting internal organs and muscles, and connects skin to muscles and bones.

Skin functions

- provides a tough barrier to protect the body from physical injury and infection
- nerve endings provide sensory awareness for touch, temperature and pain
- helps regulate temperature through secretion of sweat

The skin on the hands and feet accounts for around 5% of the total surface area and differs from the skin on the rest of the body. It has a greater concentration of nerve endings than other parts of the body heightening sense of touch, and the fine ridges assist with grip. Minute pores secreting sweat are found along every ridge and contribute to body temperature control.

The formation and renewal of friction ridges give rise to their uniqueness and persistence. New cells are formed in the deepest part of the epidermis, the basal cell layer, and on the hands and feet they are linked through dermal pegs (papillae) in the dermis to form a strong stable structure that persists throughout life. The minute papillae trace the arrangement of the ridges bringing nerves closer to the surface. They are guided by the underlying contours of the ridges and because the cells can only move vertically, they will continuously regenerate in the same configuration. Injuries to the epidermis will repair and may only result in a temporary scar due to the skins restorative properties. Major injury to the skin may disrupt the dermal layer which will impact the appearance of ridge flow on the surface of the skin however this appearance or scarring can be valuable in the identification process.

Formation of friction ridge skin

Friction ridges are formed in the womb. The foetus develops volar pads (bulges on the epidermal surface) firstly on the palms of the hands and soles of the feet around the sixth week of embryonic growth, followed by pads on the fingers and toes. These bulbous pads are affected by movement in the womb and in terms of their shape – raised, flattened or off to one side, this can be hereditary and can influence the broad pattern that is formed on the surface of the area. However, there is no evidence of hereditary influence on ridge formation.

The volar pad area is made up of building block like units of tissue that react to their environment as they develop, and over the period of formation individual units will fuse together to form the friction ridges. The arrangement of primary ridges begins to from in the basal layer around 13 weeks (as the volar pads begin to regress) and are fully formed by around 16 weeks. During formation of the ridges as the ridge units' fuse, they may break, forming a ridge ending or short independent ridge, or fuse with a neighbouring ridge forming a bifurcation.

Secondary ridges begin to develop following the primary ridge system and they indicate the furrow between the ridges eventually bridging the primary and secondary ridges with peg structures known as dermal papillae. By twenty-four weeks friction ridges are in their final configuration and are visible on the volar surface.

As the development of friction ridge skin is based on physical variances and differential growth, the random nature of this is responsible for the uniqueness of friction ridge skin and the reason therefore that no two people, not even identical twins, have the same fingerprints.

Image No 3: Volar Pads
Source: Creative Commons

Fingerprints in criminal investigations

When an area of friction ridge skin meets a suitable surface, it may leave behind an impression, and in relation to crime scenes this is often referred to as a *mark*. This mark may be a sweat residue, not obviously visible, known as a latent impression. It can be made visible following powder and/or chemical treatment, depending on the surface on which it has been left, and subsequently photographed and/or lifted.

Alternatively, it may already be visible to the naked eye having been left in a contaminant such as blood, dust or grease, or an impression moulded into a surface such as putty or paint or imprinted in dust. Once photographed and/or lifted the marks can be submitted for comparison against known sets of fingerprints.

Fingerprint examiners are trained in the analysis, comparison and evaluation of friction ridges and can use the intrinsic unique detail found in a small area of this skin to establish if the same person has made two impressions. The relationship that ridge characteristics have to one another is referred to as their coincident sequence and this is unique in every individual.

When ridge characteristics in two impressions are found in identical coincident sequence and agreement, it can be reliably established that they are from the same person and identity can be confirmed. However, as highlighted by the Fingerprint Inquiry Scotland, 2011, this is evidence of opinion and not evidence of fact.

Lawful basis for acquisition & use of fingerprints in Scotland

Criminal procedure legislation in Scotland (and corresponding legislation in other parts of the UK) permits the police to obtain fingerprints without consent from any person detained following arrest for a recordable offence. The Criminal Procedure (Scotland) Act 1995, Sections 18 and 19 as amended, sets out the law relating to the taking of such samples in Scotland.

This includes provisions for samples to be taken from certain categories of individuals. Section 18A of the 1995 Act provides that for criminal proceedings in respect of a relevant sexual or violent offence that conclude other than with a conviction, that the destruction date for any relevant data taken under Section 18(2) or any sample or any information derived from the sample is the date of expiry of the period of three years following the conclusion of the proceedings; or such later date as an order under subsection (5) may specify. Subsection (5) provides that the Chief Constable of the Police Service of Scotland can apply to the Sheriff Court within the period of three months before the destruction date to have the destruction date amended. As the process is subject to judicial oversight, this affords transparency and accountability to the decision-making.

Under Section 18B of the 1995 Act, if a person accepts an offer under Sections 302 to 303 of the 1995 Act (conditional offer, compensation offer, combined offer, work offer), then any relevant physical data or sample that they have provided, or information derived from such a sample, must be destroyed within either two or three years beginning on the date on which the offer was issued (depending on whether a relevant sexual or violent offence was involved) or (in the case of a relevant sexual or violent offence only) any later date as an order may specify. Such an order may be sought by summary application by the Chief Constable under Section 18C.

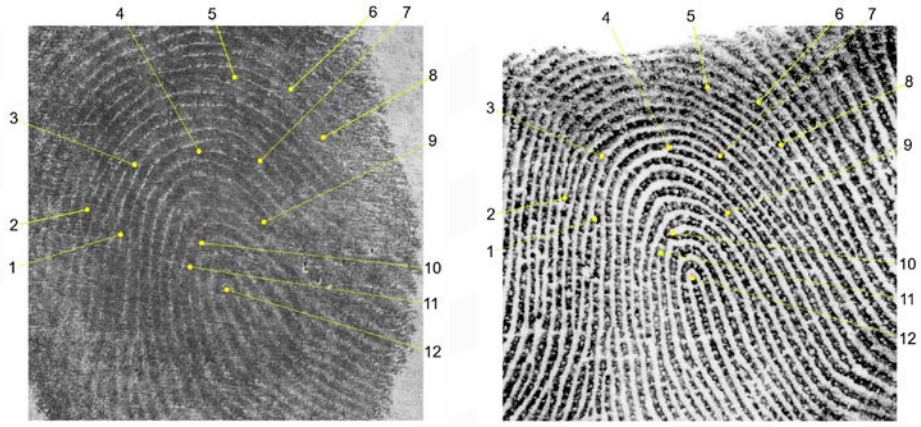


Image No 4: Friction ridge characteristics found to be in coincident sequence and agreement[3]

[3]Fingerprint images property of SPA Forensics staff - permission to reproduce granted

Section 18D of the 1995 Act provides that when a person is arrested in relation to a fixed penalty offence and the matter is dealt with by fixed penalty notice that any relevant physical data taken in connection with that offence must be destroyed within two years of the day on which the fixed penalty notice was given to the person. The difference is explained by the nature of the offence to which each provision relates – Fixed Penalty Notices (FPN) (issued by Police Scotland) are for minor public nuisance offences, whereas Fiscal Offers (issued by COPFS) are for a higher degree of offending but not for serious (public safety) offences.

Section 19AA of the 1995 Act also makes provision around the taking of relevant physical data or samples from sex offenders subject to notification requirements under the Sexual Offences Act 2003 or an order under Section 27 of the Abusive Behaviour and Sexual Harm (Scotland) Act 2016.

Section 19A of the 1995 Act makes supplementary provision principally around the provision of an offence where a person fails, without reasonable excuse to attend a police station to provide a sample or whilst in custody at a police station fails to allow a sample to be taken. Section 19B makes provision in relation to the powers of a constable to take relevant physical data or to secure a person's compliance to take such data.

The Criminal Justice (Scotland) Act 2003, Section 56, facilitates the taking of fingerprint samples for recording on the volunteer database. The investigation of crime in Scotland is also covered by common law and other legislative acts.

The Criminal Justice (Scotland) Act 2016, and some of its provisions were developed from the recommendations of two independent reviews:

- Lord Carloway's review of criminal law and practice
- Sheriff Principal Bowen's review of sheriff and jury procedure

The 2016 Act introduced a distinction between those persons arrested by the police as either officially accused or not officially accused. In Scotland, a person is considered not officially accused when they have not been charged with a crime or when they are treated as a suspect without having been formally charged. This status allows for certain rights and procedures to apply, such as the right to be informed of the nature of the offence and the right to see a solicitor. The Act outlines the legal framework for the treatment of such individuals, ensuring they are not held in police custody unreasonably or unnecessarily. The 2016 Act did not amend Sections 18 and 19 of the Criminal Procedure (Scotland) Act 1995, meaning that Police Scotland has authority in law to take fingerprints without consent from any person detained following arrest for a recordable offence regardless of their officially accused or not officially accused status.

During our joint assurance review fieldwork in the autumn of 2025, we examined the Police Scotland and SPA Biometrics (DNA, Fingerprints, Facial Images) Standard Operating Procedure (Version No 1.00 published on 22/9/2022). Section 3 sets out the joint policy whereby fingerprints must be taken from all officially accused persons arrested for any crime on every occasion they are charged with an offence.

The policy explains that even if the Police Scotland Criminal History System (CHS) or the UK Police National Computer (PNC) record states that prints from a previous arrest episode are held, fingerprints must still be taken for the charge, as the existing fingerprints held on record could be due to be weeded. The policy also explains how Non-Verified Live ID (NVLID) software within Livescan which is the UK law enforcement fingerprint system provides non-verified machine generated identity confirmation within 20 seconds via an AI enabled algorithm. The NVLID helps UK police quickly spot false identities given at arrest and often reveals a person's real identity and criminal history.

In Scotland, the fingerprints taken from a person who is charged are then submitted via the Livescan terminal for follow-up human verification which is conducted by SPA Forensic Services Identification Officers (IO). This step is required to ensure that the individual's criminal record is updated, or created if new to the system, and the lawfully held fingerprints are then added to the UK IDENT1 fingerprint database including those relating to pending cases following caution and charge. The policy also makes clear that an additional reason for taking fingerprints on every occasion is to capture as much ridge detail as possible, including detail that may not have been visible or captured in a previous set of prints. This could also include new detail such as a scar and this small detail could assist in solving a serious crime.

Police Scotland policy states that fingerprints must only be taken when a Not Officially Accused (NOA) person is suspected of being involved in a crime, but a sufficiency of evidence is not yet available. This is a Police Scotland policy decision and not a legal requirement and means that if such an NOA person who is not fingerprinted whilst under arrest has given false identity information it cannot be immediately detected through NVLID.

Not fingerprinting an NOA person may be seen as proportionate but unless they subsequently become an officially accused and are fingerprinted at that stage it denies the investigative opportunity to search their fingerprints against unsolved crime scene marks on the UK IDENT1 system meaning that important investigative opportunities will be missed. However, the policy does allow some discretion for (NOA) persons to be fingerprinted if an investigation is still live, as this negates the need to re-arrest a person purely to obtain biometric data if they subsequently become officially accused.[4]

Police Scotland has a policy in place to ensure weeding if charges are not forthcoming and if there are no proceedings.[5] Police Scotland also have arrangements and policy for obtaining fingerprints from certain vulnerable persons on a voluntary basis, for example when there is a significant risk that such a person may be abducted or become a victim of crime. The Crown Office and Procurator Fiscal Service (COPFS) will also sometimes issue a warrant for the arrest of an accused person with powers to take fingerprints that come from the Criminal Procedure (Scotland) Act 1995. This could be in circumstances where Police Scotland has been unable to trace a person following a fingerprint match to obtain evidential samples, or in other circumstances such as where a person wanted in Scotland is arrested in another part of the UK and is brought to Scotland for appearance in court.

As previously described, fingerprints taken in custody as a criminal justice sample are taken on a Livescan optical scanning device and after caution and charge are loaded to IDENT1 which is the UK law enforcement fingerprint database and are then used in speculative searches for matches to pre-existing or new crime scene profiles.

[4]See Criminal Justice (Scotland) Act 2016 for further information on persons not officially accused
[5]Police Scotland Records Retention SOP version 8.0

The Criminal Procedure (Scotland) Act 1995 provides that such samples shall be destroyed as soon as possible following a decision not to institute criminal proceedings but otherwise they may be retained on conviction. However, it is important to note that indefinite retention without periodic review is not permitted by the UK Data Protection Act 2018, or by the Scottish Biometrics Commissioner's statutory Code of Practice which requires adherence to UK data protection law.

In October 2024, the Commissioner and Scottish Government published a joint Review of the Laws of Retention in Scotland which included a recommendation for Police Scotland to complete a review of retention policies by October 2025. The Commissioner and Scottish Government recommended that any revised policy must include periodic review. Police Scotland are still working on this recommendation from 2024 and a solution involving a policy change and associated upgrade to the Scottish Criminal History System (CHS) is anticipated in late 2026.[6]

In Scotland, Police Scotland may only retain and use fingerprints from non-convicted persons or in cases of non-finding of guilt under the provisions of Section 18A of the Criminal Procedure (Scotland) Act 1995 (prosecutions for sexual and violent offences), or Sections 18B and D (alternatives to prosecution) for up to three years. The Act also makes provision for retention beyond three years on summary application by the Chief Constable to a Sheriff. In England and Wales, the provisions of the Protection of Freedoms Act 2012 directs that the fingerprints of persons innocent of any offence must be destroyed within 6 months of being taken.[7] The only exception to this is, if the sample is required for use as evidence in court, in which case it may be retained for the duration of the proceedings, under the Criminal Procedure and Investigations Act 1996.

The ability to retain and use a convicted person's fingerprints indefinitely regardless of the gravity of offending in the UK is highly controversial. IDENT1, is both the oldest and largest state collection of citizens fingerprint data in the world when the numbers of profiles on retention is expressed as a percentage of the domestic population when excluding countries with national biometric identity card systems.

The longstanding practice in the UK of adding more fingerprints to national policing databases and sometimes also keeping manual forms 'off database' and keeping these for extraordinarily lengthy periods of time, helps to explain why the volumes of data on retention continue to increase. However, it should be noted that in Scotland, fingerprint weeding is a mixture of both automated and manual weeding and does not fully align to Criminal History System (CHS) retention periods. CHS retention periods are adopted when they mirror, or closely mirror, prescribed periods under S18-18H CP(S)A95, and for convicted persons due to the silence in primary legislation and the statutory SBC Code of Practice (CoP) re maximum retention periods. Manual weeding is undertaken where CHS retention periods do not align with requirements under S18-18H CPS(S)A95 (e.g. juveniles, warnings, etc.).

The exponential growth of data within such databases also means that governance and administrative arrangements around retention increasingly becomes difficult for humans to manage because of the sheer volume. Recognising that volumes of data in IDENT1 are also increasing exponentially because of lengthy retention periods, there are questions to be asked about how best to administer 'big data' that is so complex that is becomes difficult using traditional data-processing applications. This is exactly the sort of area where UK policing and Police Scotland should invest in a non-generative AI solution in future (AI that does not create added content) to administer retention regimes that reflect policing policy, triggering a weed on the UK Police National Computer (PNC) and IDENT1.

[6]See Section 39 of UK Data Protection Act 2018 re requirement for appropriate time limits for periodic review
[7]Independent oversight of DNA retained in England and Wales is conducted by the Biometrics and Surveillance Camera Commissioner

Although beyond the scope of this review, it is also worth mentioning for completeness that the Chief Constable of Police Scotland may retain fingerprints (and DNA) from an un-convicted person as part of a National Security Determination (NSD) under the Protection of Freedoms Act 2012. The Home Office publishes Guidance on the making or renewing of national security determinations. NSD's (including those made by Police Scotland) are independently reviewed by the Biometrics Commissioner for England and Wales, Professor William Webster who is also a member of the SBC Advisory Group.

Fingerprints recovered from crime scenes

Fingerprints can also be recovered from materials at crime scenes as part of a forensic investigation and can be used in criminal investigations and in a range of other policing activities such as missing person investigations, or in seeking to identify human remains. Police Scotland and the SPA Forensic Services have power at common law in Scotland to seize evidential materials for the purposes of the investigation, prevention and detection of crime. The general duties of a constable to prevent and detect crime and protect life and property are also made explicit in Section 20 of the Police and Fire Reform (Scotland) Act 2012.

Fingerprints also have an important exculpatory (exclusionary) value and can quickly eliminate innocent persons from police investigations. There are also various other circumstances where the police might obtain fingerprints from a person on a voluntary basis. This could include samples taken from victims of crime or witnesses for elimination purposes, to assist in missing person or unidentified body investigations.

Importantly though, readers should understand that fingerprints are not used routinely in police investigations in Scotland and most crimes reported to the police are not the subject 6of a forensic crime scene examination. Instead, it is usually only a feature of more serious crimes such as murders, serious assaults, housebreakings, and sexual offending. Where fingerprint evidence exists at such crime scenes and is recovered in sufficient quality, it can identify potential suspects with incredible accuracy.

The use of fingerprints in policing in Scotland and the UK

Fingerprints have been used in police investigations in Scotland and the UK for more than 120 years and are the most established form of biometric data. In July 1901, the Metropolitan Police established the first fingerprint bureau in the UK with the first dedicated bureau in Scotland being established by Glasgow City Police in December 1931. By the onset of the second world war in 1939, it is understood that all police forces in Scotland at that time had established fingerprint bureaux.

The first recorded case where fingerprints were used in a criminal trial in Scotland as the sole basis for conviction stems from ninety-one years ago in 1933 as recorded in the case of HMA v Hamilton 1934 where following a housebreaking the fingerprints of the accused had been recovered from an unwrapped glass bottle inside the shop. The next authority of note is HMA v Rolley in 1944 where a palm print was found on the sideboard of the house that had been broken into. In this authority it was accepted that a palm print identification alone with no other evidence was sufficient to secure a conviction if the court accepts the evidence.

Fingerprints in the pre policing reform period in Scotland

In 1960, the Scottish Criminal Records Office (SCRO) had been established in Glasgow. With the establishment of Strathclyde Police in 1975, SCRO began providing fingerprint identification services to both Strathclyde Police and Dumfries and Galloway Constabulary with other legacy forces also maintaining their own fingerprint bureaux.

Such bureaux were typically managed by a senior police officer and were staffed under differing models often involving both police officers and civilian fingerprint staff working together. This was typical of the policing landscape of the period where police officers were assigned various duties that we would now regard as forensic, except without relevant scientific qualification.

Significantly, at this stage there was typically no separation between the police investigation and the scientific investigation, an issue which would be noted as significantly problematic by the time of the Scottish Fingerprint Inquiry in 2011. Not least because of the potential for confirmation bias where information might be sought to support an initial police investigative hypothesis with lesser attention given to the consideration of contradictory or exculpatory evidence.

The former SCRO was discontinued on 31 March 2007 and on 01 April 2007 the former Scottish Police Services Authority (SPSA) was established under the Police, Public Order and Criminal Justice (Scotland) Act 2006 until it in turn was also dissolved on 31 March 2013 and replaced on 01 April 2013 with the Scottish Police Authority and the SPA Forensic Services.

HM Advocate v. McKie (1999) and The Fingerprint Inquiry, Scotland 2011

Background to the case

In January 1997, Marion Campbell Ross was found dead in her home in Kilmarnock having been stabbed multiple times. A Strathclyde Police Detective Constable Shirley McKie was part of the murder investigation team for a few days. One of the fingerprints recovered from the murder scene (Y7), in Miss Ross's house was identified by fingerprint experts working in the then Scottish Criminal Records Office (SCRO) as having been made by Detective Constable McKie.

In June 1997, Mr David Asbury was prosecuted and convicted of the murder with fingerprint evidence forming part of the prosecution case against him. During the trial, no issue arose with any of the fingerprint identifications presented against Asbury, however Detective Constable McKie did not accept that the mark attributed to her was in fact hers as she denied having entered the murder scene beyond the front porch.

Following the trial, Ms McKie was subsequently prosecuted for perjury on the basis that she had lied, whilst under oath, about her presence in the home of Miss Ross. During her trial in 1999, American fingerprint experts, Pat Wertheim and David Grieve, disputed the identification of the mark and the jury unanimously found Ms McKie not guilty.

After her acquittal, Mr Iain McKie, Ms McKie's father who was a retired senior police officer, raised several concerns with various Scottish Authorities concerning the prosecution and the nature of the fingerprint evidence. He also raised concerns about the work of the fingerprint experts involved and the quality of service provided by the Scottish Criminal Records Office (SCRO) at that time.

The case generated significant global media interest, and in the following years numerous inquiries and investigations were conducted into the identifications associated with both cases and the work conducted within SCRO. Ms McKie continued to claim that SCRO staff had "negligently, or recklessly or deliberately" stated and maintained an erroneous identification of Y7 whilst the SCRO fingerprint experts who originally made the identification remained convinced that the identification was correct.

In February 2006, Ms McKie accepted an out of court settlement from the then Scottish Executive of £750,000 with no admission of liability. However, the matter remained unresolved for all involved and continued to generate intense media interest amongst the public resulting in increasing polarisation of opinion within the international fingerprint profession. This set the scene for what subsequently became colloquially known as the "Shirley McKie Fingerprint Scandal" and represented a major failure of forensic science in Scotland. Asbury who was initially convicted of the murder of Marion Ross was acquitted after serving three years in prison due to the unreliability of the fingerprint evidence presented by SCRO staff against Ms McKie in the perjury case and against Asbury in the murder case itself. The murder of Ms Ross in 1997 is one of more than 1100 unresolved homicides recorded by legacy police forces in Scotland in the period between 01 January 1960 and the establishment of Police Scotland on 01 April 2013.[8]

The Fingerprint Inquiry, Scotland 2011

On 14 December 2011, and less than two years before the establishment of Police Scotland and the Scottish Police Authority, Sir Anthony Campbell and his team published the Scottish Fingerprint Inquiry.[9] The report was the culmination of a two-year Inquiry set up by the Scottish Government under the Inquiries Act 2005 to look at the steps which were taken to identify and verify the fingerprints associated with the case of HM Advocate v McKie in 1999. It resulted in eighty-six recommendations (pages 741 to 752) for improvement. It also resulted in public apologies being made by the then Chief Constable of Strathclyde Police and the then Director of Forensic Science at the former Scottish Police Services Authority (SPSA) to Ms McKie and her father who had led the campaign for justice for his daughter.

The Scottish Fingerprint Inquiry and the circumstances which gave rise to it was also a watershed moment for forensic science in Scotland and the report by Sir Anthony Campbell served as the catalyst to revolutionise the crime scene to court model in Scotland paving the way for new quality assurance systems and the independent validation and accreditation by the UK Accreditation Service (UKAS) of the majority of scientific techniques which now underpin the forensic examination of fingerprints in Scotland and the UK. It is also pertinent to note that at the time of writing, every one of the more than six hundred recorded homicides in Scotland since the establishment of Police Scotland and the SPA on 01 April 2013 has been claimed as solved by Police Scotland often assisted by the analysis of crucial forensic evidence by the SPA Forensic Services. This is an astonishing statistic not matched by any country in Western Europe.[10]

Significantly, the monetary cost to the public purse in Scotland from the Scottish Fingerprint Inquiry alone was £4.8 million pounds.[11] When added to the cost of compensation payments, criminal cases and other investigations by other public authorities including HMICS, the true cost will be significantly higher.[12] The case also had significant and unmeasurable non-monetary human costs that are impossible to quantify. This demonstrates how failures of forensic science, albeit exceptionally rare, can have serious societal, reputational, political, and financial repercussions and simultaneously highlights the importance of rigorous forensic science and independent oversight mechanisms to enhance public confidence and trust.

[8] Source: Police Scotland
[9] The report has been archived by the National Records of Scotland and is not available online
[10] 'Solved' can mean different things in different policing contexts. Police Scotland base this claim on persons charged with homicide regardless of whether the subject is then found not guilty or in circumstances where COPFS decide that there is insufficient evidence to proceed
[11] Scottish Parliament, SPICe briefing on cost of Scottish inquiries, 29 May 2025
[12] Primary Inspection of the SCRO Fingerprint Bureau (HMICS) 2000 (Archived)

Findings

This chapter summarises the evolution and revolution of forensic science including fingerprints in the post policing reform landscape and concludes that the SPA Forensic Services provide a world leading forensic science service to the criminal justice system and the people of Scotland. It also notes that all pertinent recommendations from the Scottish Fingerprint Inquiry 2011, have been successfully implemented.

It also makes several observations and recommendations relating to the acquisition of fingerprints by Police Scotland in the custody environment highlighting that significant volumes of criminals are not being fingerprinted on arrest when they should be.

The chapter also explores demand and data volumes and touches briefly on crime scene and laboratory work in relation to fingerprint development techniques and the process of comparing fingerprints recovered at crime scenes to those already on police record. The chapter also explains the governance and accountability framework between Police Scotland and the SPA Forensic Services and the role of SPA oversight committees.

Ten recommendations arise from this findings chapter, the majority of which are directed to Police Scotland Criminal Justice Services Division. We also include some management information and case studies to highlight the importance of fingerprints in criminal investigations.

The post-reform policing landscape

On 1 April 2013, Police Scotland and the Scottish Police Authority were established and the SPA Forensic Services commenced providing forensic services to the entire criminal justice system in Scotland. SPA Forensic Services (FS) are the largest public sector provider of forensic services in Europe and in the view of the Commissioner, provide a world leading and cost-effective service to the people of Scotland.

In June 2025, the Westminster Commission Report on Forensic Science in England and Wales: Pulling out of the Graveyard Spiral was published written by forensic experts Angela Gallop and Baroness Sue Black. The report sets out its diagnosis of a deep crisis in forensic science in England and Wales describing the system as 'in a graveyard spiral.' It attributes key failings to significant policy shifts since 2012 and the closure of the Forensic Science Service, reliance on in-house police laboratories and the near monopoly created through the recent acquisition of Cellmark by Eurofins. The Scottish model of delivery is cited as publicly governed, multi-disciplinary and scientifically rigorous in comparison to the fragmentation and decline laid out in England and Wales.

SPA FS have 602 highly trained and skilled scientists and staff operating from five main laboratory sites in Aberdeen, Dundee, Edinburgh, Glasgow and at the Scottish Crime Campus in North Lanarkshire with Search and Recovery Scenes teams based throughout Scotland. The unique SPA Forensic Services crime scene-to-court model (**See Appendix A**) provides robust support to the delivery of justice. A 'sterile corridor' is also in place between Forensic Services SPA and Police Scotland – which ensures impartiality and independence – key values in delivering forensic services throughout the criminal justice system.

In June 2018, Forensic Services achieved UKAS 'multi-site' accreditation, demonstrating that all parts of Forensic Services operate under a single, harmonised management system that meets the requirements of ISO 17025. It is also pertinent to note that some aspects of accreditation pre-date police reform in Scotland with DNA accredited for more than 20 years.

Forensic science in Scotland is assured through compliance with this documented regulatory framework, as well as independently assured through assessment and audit by third parties. This ensures that the technical scientific activity, the management and governance of Forensic Services, the monitoring and self-assurance activity, the legal and human rights requirements are met and that, where necessary, independent review of process, governance and financial value for money can be demonstrated.

In relation to fingerprints, the SPA FS laboratory techniques and the fingerprint identification techniques currently accredited by UKAS can be viewed on the UKAS website. The United Kingdom Accreditation Service (UKAS) also provides accreditation services for UK crime scene investigation service providers to ISO17020. SPA Forensic Services operates in compliance with the requirements of ISO17020 in respect of crime scene examination.

The recommendations from the 2011 Fingerprint Inquiry

Key Findings

There were ten key findings in The Fingerprint Inquiry Scotland by Sir Anthony Campbell published in December 2011 (now archived). Chapter 42, page 739 lists the ten key findings. This included that the mark (Y7) was not made by Shirley McKie and that it had been misidentified by fingerprint examiners. There was also another mark (Q12) that was wrongly identified as belonging to the deceased Miss Ross.

Sir Anthony Campbell concluded that there was no impropriety and that both misidentifications were solely due to human error and that there was nothing sinister about both errors occurring in the same case. However, a key finding was that the misidentification of both prints exposed significant weaknesses in the methodology of fingerprint comparison and especially where it involved complex marks. He concluded that there is no reason to suggest that fingerprint comparison is an inherently unreliable form of evidence, but practitioners and factfinders alike require to consider the limits of the discipline.

It should be noted that although exceptionally rare, there have been other high profile international examples of fingerprints from crime scenes being misidentified. One such notable case relates to the 2004 Madrid terrorism train bombings where the FBI wrongly identified a fingerprint from the crime scene as belonging to an American lawyer Brandon Mayfield. Mr Mayfield was arrested and held in custody for two weeks by the FBI before the Spanish authorities intervened enabling the misidentification to be confirmed by the FBI.[13]

[13] FBI Forensic Science Communication, January 2005: Volume 7 number 1

Key Recommendations

Sir Anthony Campbell made a total of eighty-six recommendations and those of which are pertinent can be confirmed from this joint assurance review as having been successfully discharged. An example of a recommendation which has not yet been discharged is recommendation 83 (page 752) which was that the use of probabilistic analysis for fingerprint identification should continue to be developed.

In forensic science, fingerprint identification relies on subjective opinion, not on objective science. In other words, a fingerprint expert giving evidence in court can only give their professional opinion that two different sets of print match but with no calculation of match probability. By contrast, DNA experts are required to give probabilities. For example, the DNA expert might say in court that "we have estimated that this result is greater than 1 billion times more likely if the DNA was from… rather than another individual unrelated to…". Therefore, DNA experts are *required* to give probabilities whereas fingerprint experts are *forbidden*.[14]

In the immediate future, the Commissioner does not see the current courtroom practice of presenting fingerprint evidence as 'evidence of opinion' changing. However, in the longer term it is reasonable to predict an evolution towards a framework like that which underpins DNA. Further information on the use of DNA in police investigations can be found in the Scottish Biometrics Commissioner Joint Assurance Review of DNA published in 2025.

The ten key recommendations from the inquiry were as follows:

1	Fingerprint evidence should be recognised as opinion evidence, not fact, and those involved in the criminal justice system need to assess it as such on its merits.
2	Examiners should discontinue reporting conclusions on identification or exclusion with a claim to 100% certainty or on any other basis suggesting that fingerprint evidence is infallible.
3	Examiners should receive training which emphasises that their findings are based on personal opinion; and that this opinion is influenced by the quality of the materials that are examined, their ability to observe detail in mark and print reliably, the subjective interpretation of observed characteristics, the cogency of explanations for any differences and the subjective view of 'sufficiency.
4	Differences of opinion between examiners should not be referred to as 'disputes'.
5	Standard Operating Procedures should set out in detail the ACE-V process that is to be followed.
6	Features on which examiners rely should be demonstrable to a lay person with normal eyesight as observable in the mark.
7	Explanations for any differences between a mark and a print require to be cogent if a finding or identification is to be made.
8	A finding of identification should not be made if there is an unexplained difference between a mark and a print.
9	The development of a process to ensure that complex marks (such as Y7 and Q12 Ross) are treated differently. The examination should be undertaken by three suitably qualified examiners who reach their conclusions independently and make notes at each stage of their examination. The substantive basis for the examiners' conclusions should be reviewed. The reasons why they have reached their respective conclusions should be explored and recorded, even where they agree that an identification can be made
10	An emphasis needs to be placed on the importance not only of learning and practising the methodology of fingerprint work, but also of engaging with members of the academic community working in the field.

[14] See paragraph 155: House of Lords - Forensic science and the criminal justice system: a blueprint for change - Science and Technology Select Committee

The Commissioner can provide independent assurance that all these recommendations have been satisfactorily progressed and implemented. One minor point of variation on number nine is that the current processes for the identification of crime scene marks involve two qualified examiners rather than three. This is an adequate and proportionate safeguard and where opinions differ no identification is now reported. On number ten, there is significant engagement with the academic community, but unlike forensic DNA analysis where there is a judicial primer produced by the Royal Society and the Royal Society of Edinburgh, no such judicial primer exists for fingerprints. Whilst beyond the scope of this assurance review, the SPA FS may wish to support any future initiatives or academic collaborations to contribute towards such a judicial primer against the legacy of the Fingerprint Inquiry Scotland, 2011.[15]

Fingerprints taken for criminal justice purposes

Adherence to Force policy

During our joint review, a specific line of enquiry as outlined in the Terms of Reference was to establish whether Police Scotland was adhering to its own written policy requiring fingerprints to be taken from all officially accused persons at custody centres following arrest regardless of whether they have a previous criminal offending history.

We were also aware that Police Scotland has significantly improved its strategic governance of biometric data in response to recommendations made by the Commissioner in earlier years for example in our assurance reviews relating to vulnerable adults and children in 2023.

Police Scotland now also has a Head of Biometrics with a small team who have significantly improved the availability and quality of key management information and who should be highly commended.

The significant improvements in the availability of key management information in relation to biometrics has also seen the emergence of what the Commissioner would describe as the 'measurement effect.' The measurement effect is a phenomenon that drives management and quality improvement. This is because the act of simply measuring something often leads to more issues and problems being identified. This does not necessarily mean that such problems are getting worse but rather is an indicator of better tools and processes for detection. Robust measurement is therefore crucial for identifying problems and improvement opportunities that were previously unseen. The initial perception might be that things are worsening, when in fact it is the visibility of the problems that has increased.

As part of the joint review, Police Scotland were asked to provide data for a 3-month sample period to enable an assessment to be made of adherence to Force policy and data was provided covering June, July, and August 2025. The Police Scotland data confirms that in that 3-month period the total Livescan throughput was 18,339. From cross tabulation with the Police Scotland National Custody System, Police Scotland were able to confirm that a fingerprint decision 'not required' had been recorded in 3,367 cases relating to officially accused persons meaning that fingerprints were not taken.

[15]The COPFS internal 'Forensic Network' advise the Commissioner that such a primer would be helpful

When examining the root cause of non-compliance with Police Scotland policy by CJSD staff, it was noted that a total of 165 instances were recorded as attributable to Livescan being unavailable or offline due to technical issues. All other reasons for not taking fingerprints were found to be inconsistent with policy leaving a residual figure of 3,202. This means that in the 3-month sample period, more than 3000 officially accused persons were not fingerprinted (18.66%), suggesting that over a 12-month period CJSD custody staff might be failing to fingerprint more than 12,000 arrested persons with officially accused status including those arrested for serious crimes and offences. In 144 of the 3,202 instances, the subject had no previous fingerprints on file meaning that all current and future investigative opportunities have been lost. We also heard evidence from SPA fingerprint identification staff about sometimes receiving a Standard Fiscal Instruction to examine prints in pending cases only to then discover that the arrest set had been bulk-deleted from Livescan by Police Scotland Criminal Justice Services Division staff.

If fingerprints are completely lost through unauthorised deletion and are not recoverable, this may mean that an investigation cannot progress and may have a significant impact on the victim or offender if the fingerprints could have cleared them. This would be considered a reportable breach under UK data protection law. In September 2024, the Scottish Police Authority published the ICO's follow up data protection audit report for Police Scotland, which contains several recommendations around data breach management and reporting. In the report, data breach reporting is listed as one of the outstanding risks areas requiring action. It was also noted that *'Training packages for Personal Data Breach reporting has been delayed.'* Accordingly, there is a need for Police Scotland to ensure that any non-recoverable data losses that could result in a high risk to individuals' rights and freedoms are reported to the ICO and for the SPA Audit, Risk and Assurance Committee to keep this matter under ongoing review.

Whilst this review was about fingerprints, we also received data confirming a more significant problem with the non-sampling of officially accused persons in respect of custody images. This exposes Police Scotland to numerous risks and vulnerabilities, for example should the subject then make an allegation of mistreatment whilst in custody.

Fingerprints	Jun 25	Jul 25	Aug 25
Total OA arrests	5,777	6,015	5,878
FP Decision: Not Required (Volume)	1,182	1,168	1,017
FP Decision: Not Required (% OA of Arrests)	20%	19%	17%
Potential Missed Sampling Opportunitites (Volume)	515	567	398
Potential Missed Sampling Opportunitites (% OA of Arrests)	9%	9%	7%
From Subjects With No Fingerprint Marker on CHS*	55	52	37

Table No 2: Officially accused arrest volumes vs FP not taken June to August 2025: Source Police Scotland

Fingerprinting arrested persons on a Livescan fingerprint machine is a quick and straightforward process for an appropriately trained operator where the prisoner is cooperative. Not fingerprinting persons arrested and brought into custody as officially accused (or not officially accused) precludes Police Scotland from using the Non-Verified Live Identification (NVLID) function available to them through the Livescan fingerprint terminal that can verify identity in real time (20 seconds) preventing misidentification and attempts to defeat the ends of justice. Not doing so, also results in lost investigative opportunities including to search arrestee prints against unidentified marks from UK crime scenes. It also results in criminal justice inefficiencies, for example if the arrestee subsequently becomes an official accused but cannot then be traced to acquire criminal justice samples.

During our review we visited a busy city custody centre for a walkthrough of the fingerprinting processes. From that visit several issues became apparent, such as problems with staff familiarisation with Police Scotland policy on taking fingerprints. It was also clear from our visit that there was inadequate management supervision of adherence to Force policy with no visible 'police' presence to guide civilian custody staff. We also learned that there was little or no audit activity on fingerprints being done by Police Scotland Custody Cluster Inspectors who manage and oversee custody operations across several centres. We also learned that such Inspectors mostly work from home on a laptop, do not work 24/7, and have little or no visible presence in the custody environment.

A Police Inspector enforces policies and promotes improvements in policing. A Cluster Inspector (Custody) has responsibility to ensure adherence to national policies including fair treatment of arrested persons and upholding detention standards including compliance with the Criminal Procedure (Scotland) Act 1995 and the Criminal Justice (Scotland) Act 2016.

With evidence of more than 3,000 officially accused persons not being fingerprinted in the 3-month sample period, there is a need for Police Scotland CJSD to ensure that an appropriate level of police officer management presence is maintained at custody centres in order to improve the quality and consistency of operational practice and to ensure compliance with approved protocols and standards. An almost identical recommendation relating to supervisory visibility has previously been made to Police Scotland by HMICS in the Custody Inspection Report for Greater Glasgow published by HMICS in March 2025. However, as Cluster Inspectors do not work 24/7, this may best be discharged at Sergeant level given that it is not being achieved by civilian supervisory staff.

Accordingly, the Commissioner recommends that Police Scotland Criminal Justice Services Division (CJSD) should significantly improve operational practices to ensure that the current Police Scotland policy requiring officially accused persons to be fingerprinted following arrest is followed. The Assistant Chief Constable (CJSD) should establish a structured system of controls to drive the necessary improvements and should report on progress internally to the Police Scotland Biometrics Oversight Board, and externally to a relevant SPA Committee.

It is also recommended that Police Scotland CJSD should ensure that an appropriate level of police officer management presence is maintained at custody centres to improve the quality and consistency of operational practice and to ensure compliance with approved protocols and standards relating to the acquisition of biometric data from officially accused persons.

[16]For further discussion on Police Scotland's DNA Confirmed (DNAC) Policy please see the Commissioner's 2025 Assurance Review on DNA.

It is further recommended that Police Scotland should consider the pros and cons of a 'take all' policy for fingerprints and custody images but not DNA.[16] Such a 'take all' policy for all adult arrested persons would allow fingerprints to be run against NVLID whilst the subject was in custody to confirm identity and subsequently ascertain if their prints reveal a suggested match to an unsolved crime scene. Such a take all policy is common throughout UK police forces when persons are arrested and takes into account data protection obligations including that such data collection is justified and is proportionate to the aims of the collection. Taking photographs would have a similar investigative value including as a mitigation against any subsequent suggestion of mistreatment during arrest or whilst at the custody centre.

Recommendation No.1

Police Scotland Criminal Justice Services Division (CJSD) should significantly improve operational practices to ensure that the current Police Scotland policy requiring officially accused persons to be fingerprinted following arrest is followed. The Assistant Chief Constable (CJSD) should establish a structured system of controls to drive the necessary improvements and should report on progress internally to the Police Scotland Biometrics Oversight Board, and externally to a relevant SPA Committee

Recommendations No.2

Police Scotland Criminal Justice Services Division (CJSD) should ensure that an appropriate level of management presence is maintained at custody centres to improve the quality and consistency of operational practice and to ensure compliance with approved protocols and standards relating to the acquisition of biometric data from officially accused persons

Recommendation No.3

Police Scotland should consider the pros and cons of a 'take all' policy for fingerprints and custody images from adults who have been arrested for any offence

During our fieldwork visit to a busy city custody centre we observed that although there were only three persons in custody, there were two hundred and two 'open' cases on the local Livescan terminal reflecting cases with incomplete mandatory information. We also learned of instances where the Livescan terminal would 'hang' and stop responding to inputs because local terminal drive space is no longer available.

Image No 5: Livescan Terminal

We also heard some evidence of fingerprint records being bulk deleted by staff from the terminal in rare instances to reboot the terminal for use in the live environment resulting in the permanent loss of lawfully acquired fingerprints. This is not authorised Police Scotland practice and could potentially breach Part 3 of the Data Protection Act 2018 and in particular Section 37 on data minimisation, Section 40 on security, Section 62 on logging and Section 66 on technical and organisational measures.

We also established that there was no formal training programme for Livescan meaning that practice inconsistent with Force policy could be handed down through ad hoc on the job training. There was also no record available during our fieldwork to establish which local staff were trained and when. Accordingly, it is recommended that Livescan system administrative 'deletion' permissions need to be limited to CJSD supervisory staff, and it is also recommended that a consistent training plan be developed for Livescan operators with records kept of who has been trained and when.

Recommendation No.4

Criminal Justice Services Division (CJSD) should restrict administrative 'deletion' permissions for Livescan to CJSD supervisory staff to ensure that there is no unauthorised deletion of biometric data

Recommendation No.5

Criminal Justice Services Division (CJSD) should develop a consistent training plan for Livescan operators and keep central and local records of who has been trained and when. Such training should ensure that operators understand Force policy

We were unable to assess the nature and extent of the issue of unauthorised deletion of fingerprints, but it needs addressed to ensure that fingerprint records are not being destroyed through unauthorised practice. As part of our review, we were subsequently advised that it is possible to run a search known as a 'TTrace deletion audit' from each Livescan terminal or by logging in remotely to the Livescan terminal from an IDENT1 base unit. This allows for a full log of all manual deletions to be established across a date range. It is understood that the audit will reveal any deletion event, the user, timestamp, Fin/Lana number, and the name of the person fingerprinted.

We also understand that such a search will not distinguish between authorised deletions such as immigration elimination prints and those not authorised for deletion but that the necessary separation can be achieved by reconciling the deletion log against IDENT1.

Accordingly, we recommend that Criminal Justice Services Division (CJSD) establish a central or local system TTrace deletion audit to ensure that fingerprints are not being deleted in the custody environment in an unauthorised way. Should such audits reveal any non-recoverable loss of fingerprint data when there is risk to individuals' rights and freedoms, it should be reported to the UK Information Commissioner (ICO) as required by UK data protection law.

Recommendation No.6

Criminal Justice Services Division (CJSD) should establish central or local Livescan terminal deletion audits to ensure that fingerprints are not being deleted in the custody environment through unauthorised practice and to ensure logging requirements are being met (Data Protection Act 2018, Part 3 Section 62). Any non-recoverable data losses deemed high risk should be reported to the UK Information Commissioner (ICO)

During our review, we established that Police Scotland are still taking around 1,000 manual paper and ink sets of fingerprints each year and primarily at custody centres not equipped with Livescan such as Orkney and Shetland. The manual collection of impressions is thereafter mailed to the Scottish Crime Campus often taking days to be processed. The approach is prone to error and poor-quality impressions and causes a delay in alerting custody to errors. It does not afford the significant benefits associated with the Livescan, which enables officers to immediately and confidently identify detainees who either fail to disclose or deliberately seek to conceal their identity.

It can also elevate risk levels as the establishment of a person's identity can provide access to relevant information held on databases pertaining to a risk profile or vulnerabilities, both critical components regarding officer safety and accurate care planning for detainees.

Accordingly, the Commissioner wishes to endorse and align himself with Recommendation No 2 recently made by HMICS in a Custody Inspection report for Highlands and Islands published in November 2025 and recommends that Police Scotland Criminal Justice Services Division (CJSD) should review the potential risks associated with the lack of available modern fingerprint identification equipment at all ancillary custody centres throughout Scotland and address any deficits identified.

Recommendation No.7

Police Scotland Criminal Justice Services Division (CJSD) should review the potential risks associated with the lack of available modern fingerprint identification equipment at all ancillary custody centres throughout Scotland and address any deficits identified

Routing of tenprints to SPA Forensic Services

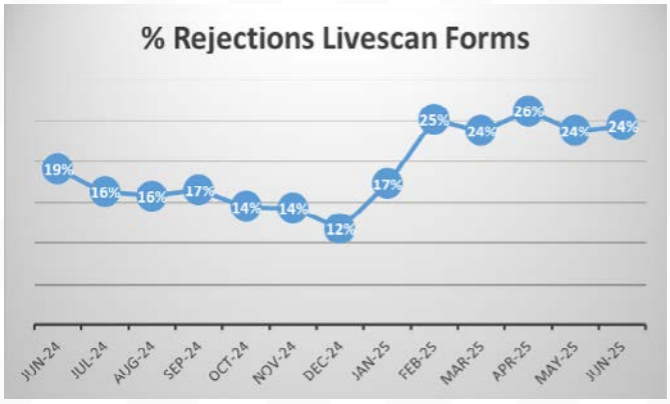
The term 'tenprints' is a generic reference to a controlled recording of an individual's fingers and palms using ink, electronic imaging, or other medium.[17] It is the responsibility of Police Scotland (CJSD in liaison with arresting officers) to ensure that all mandatory information is submitted on Livescan and missing information such as a crime reference number or Police Service of Scotland (PSS) number does not preclude NVLID from taking place.

The next stage in the process is for the record to be sent via Livescan to SPA FS Identification Officers (IO) for quality assurance purposes. Once submitted, the IO picks up the transaction from a queue and completes a manual identity confirmation. The IO may also choose to update some, or all of the digits or palms, if parts, or all of the form is deemed of better quality than a record that already exists on IDENT1.

Where identity is confirmed, the IO must check that the existing tenprint on IDENT1 is legally held. The IO then completes a data reconciliation between the form and the Scottish Criminal History System (CHS). They will also verify that demographic information such as the name and date of birth match exactly. Forms will be rejected and sent back to Police Scotland if personal details do not mirror information on CHS for example if the charge is not identical. Rejections also include forms that cannot be added to the IDENT1 database for various reasons such as those taken for the purpose of warrants, visas or police warnings.

[17] Friction Ridge Detail (Fingerprint) Examination – Terminology, Definitions and Acronyms

Rejected transactions are returned to the Livescan terminal (now highlighted in blue) and in significant volumes. To tackle this issue a Police Scotland Biometrics Unit and SPA FS collaborative approach has been developed enabling the Police Scotland biometrics team in Dundee to access all the queues and progress transactions. Once a tenprint is resubmitted, the IO goes through the whole process again prior to accepting the transaction and only at this stage is an 'F' (fingerprint) marker added to the pending case on CHS which updates the UK Police National Computer (PNC) and links directly to the record on IDENT1. Ensuring the accuracy of all data is essential for sound governance including for the subsequent weeding of data. In June 2025, the SPA FS were having to reject 24% of all forms submitted due to missing or incorrect data, however this had improved significantly by the time of our fieldwork in November 2025. By January 2026, the rejection rate had decreased to 16.2%.



Graph No 1: Tenprint rejection rates June 2024 to June 2025. Source SPA FS

Controller & Processor Obligations

Our review established that there are significant issues around accountability causing non-compliance throughout the entire process. UK data protection law sets separate requirements depending on whether there is a controller and processor relationship or a joint data controller relationship. A controller means the natural or legal person, public authority, agency or other body which, alone or jointly with others, determines the purposes and means of the processing of personal data.[18] A processor means a natural or legal person, public authority, agency or other body which processes personal data on behalf of the controller.[19]

During our review we were advised by several interviewees that Police Scotland is the data controller and that the SPA FS is the data processor. In such circumstances, the advice that we have received from the ICO is that a processor contract should be in place, but we were unable to confirm from Police Scotland that one was. Requirements for this are set out in Section 59 of the DPA and in ICO guidance on processor contracts. However, if Police Scotland and the SPA FS are joint controllers for fingerprint data, they will need a joint controller agreement. After our fieldwork, and when our draft report was sent to Police Scotland and the SPA for factual accuracy checking, data governance staff in both organisations confirmed that in fact it was a joint data controller agreement. We also learned that a joint controller agreement has been in place since 2021 and is due for review this year. This reinforces the need for those arrangements to be in writing as they were apparently not understood by all staff.

An organisation can also be a controller based on an enactment of law. Section 32 of the DPA says ***"the competent authority on which the obligation to process the data is imposed by [an] enactment (or, if different, one of the enactments) is the controller".***

The SPA may be a joint controller or controller of forensic services provided to Police Scotland because of their statutory function set out under the Police and Fire (Reform) Scotland Act 2012. Section 31 of the Act states that the SPA *"must provide forensic services to the Police Service, the Police Investigations and Review Commissioner and the Lord Advocate and procurators fiscal"*.

[18] Article 4(7) UK GDPR
[19] Article 4(8) UK GDPR

While the obligation to have a written arrangement is waived in Section 58 of the DPA ***"to the extent that those responsibilities are determined under or by virtue of an enactment"***, joint controllers must have an arrangement in place that clearly and transparently sets out each of their other responsibilities, including how they deal with Subject Access Requests; and specify a contact point that is one of the joint controllers. ICO best practice for joint controllers is set out in more detail in our Part 3 Joint Controller Guidance.

Whilst ensuring adherence to UK data protection law is a matter for the ICO, the Commissioner is aware that in June 2021, the ICO produced an investigation report into Mobile phone data extraction (MPE) by Police Scotland. Recommendation No 1 from the investigation report was that ***"Police Scotland, the Crown Office and Procurator Fiscal Service and the Scottish Police Authority should jointly assess and clarify their mutual relationships and respective roles under the Data Protection Act 2018 in relation to law enforcement processing associated with criminal investigation. They should use the findings of this assessment as the basis for review and revision of the governance and relevant policy documentation around MPE."*** It is understood that there is no such written agreement in place in relation to fingerprints, and accordingly, the Commissioner now makes a similar recommendation.

Recommendation No.8

Police Scotland and the SPA Forensic Services should jointly assess and clarify in writing their mutual relationships and respective roles under the Data Protection Act 2018 in relation to the law enforcement processing of fingerprints associated with criminal procedure in Scotland. They should use the findings of this assessment as the basis for review and revision of the governance and relevant policy documentation around fingerprints

Scenes of crimes & fingerprint development techniques

The specific circumstances that a Forensic Scene Examiner encounters at a crime scene dictate the approach required. The forensic strategy to a volume crime scene varies from that of a serious crime scene. The processes implemented, however, are similar. In serious or major cases, a formal strategy is developed by an appointed Crime Scene Manager (CSM) and the Senior Investigating Officer (SIO) in liaison with relevant Forensic Services representatives.

Items may be examined at the scene for fingerprint and other evidence and/or may be recovered and submitted to the laboratory for processing. Such items may be subjected to a range of visual, physical, and chemical processes to visualise and recover further fingerprint evidence. When warranted by the investigation, Forensic Services staff may attend crime scenes to conduct search, enhancement and recovery.

The oversight of the Scottish Biometrics Commissioner does not extend to the regulation of forensic science techniques conducted by the SPA FS and the delivery of forensic services in Scotland per se falls within the statutory oversight of HMICS. However, it is useful to give readers of this report a brief general overview.

Forensic Services may deploy a range of fingerprint development techniques depending on a range of factors. As many types of forensic science come under increased scrutiny, it is essential that there is confidence in the scientific validation of the methods used to develop forensic evidence and how that evidence is correctly and scientifically interpreted within a case-specific context so that it can be submitted within our criminal justice system with confidence.

Common techniques deployed in the laboratory in relation to fingerprint development techniques include optical enhancement, superglue fuming, and the use of powders and amino acid reagents to name just a few. In approximately eighty percent of casework, powder suspensions in detergents are used to develop fingerprints left on items. They can be applied to various surfaces, including non-porous, semi porous, and adhesive sides of tapes. Some commentary on new and emerging technologies will be given later in this report.

Further information on the various different types of available fingerprint development techniques can be found within the Fingerprint Visualisation Source Book.

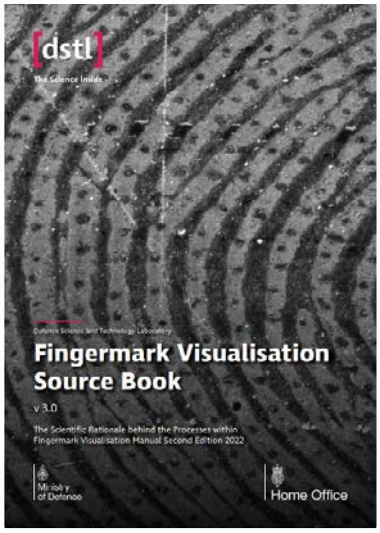


Image No 6: The Home Office Fingerprint Visualisation Manual

As previously mentioned, the Scottish model for the delivery of forensic science is 'Crime Scene to Court.' Science starts at the scene, and these standards need to be set through the entire end to end process.

This provides the greatest opportunity to support the delivery of justice as those in attendance at the scene can cascade information which may shape case strategy and prioritisation once evidence has been submitted.

The model in England and Wales, because of commercialisation of the forensic marketplace and the structure of procurement frameworks, drives a commodity approach to the delivery of forensic science. This divides cases into smaller parts, allowing for quicker and more affordable outcomes instead of treating the case holistically. While improved timeliness adds process value, it overlooks the final value contributed within the court. The value of a scientist having the oversight to be able to address activities that may have happened at a crime scene must not be underestimated. Commoditisation delivers benefits in terms of saving money and timeliness however it is hugely detrimental to the value that forensic sciences offer the ultimate customer, the court.

Fingerprint examination and identification techniques

Processing Casework

Scottish Police Authority Forensic Services fingerprint teams are in Aberdeen, Dundee, Edinburgh and at the Scottish Crime Campus (SCC) with the Livescan and Tenprints team at the SCC where the National fingerprint collection is located.

Fingerprint casework is received from Search and Recovery, Laboratory or Search and Recovery Scenes via the Visual Evidence Unit. Cases are either investigative, therefore submitted with an Evidence Request Form (ERF), or instructed by the Crown Office and Procurator Fiscal Service and accompanied by a Standard Forensic Instruction (SFI). In either scenario the case routing to fingerprints is the same and case files are received into the department with hard copy photographs (and lifts) whilst the digital images are stored on a secure networked folder.

A nominated person will perform a clerical quality assurance check of the casefile and envelope contents containing the photos and/or lifts prior to case allocation. Cases are self-allocated and progressed in order of due date or may be allocated by a manager to ensure that there is proportional distribution of casework. The examiner will follow the **ACE-V** process (Analysis, Comparison, Evaluation, Verification) to examine the crime scene marks received.

Using a fingerprint eyeglass, with a magnification of between 3 and 5 times, the examiner determineswhether there is ridge detail suitable for comparison on each photo. Each mark considered to be sufficient quality will be annotated and individually marked alphabetically with a permanent marker on the photo – A, B, C etc., beneath the impression and indicating orientation. Where it is determined that there is no comparable ridge detail, the photo is classed as insufficient and is not annotated.

The analysis results are recorded on the Fingerprint Examination Results (FER) document and classed at this time as 'insufficient;' 'suitable for manual comparison' meaning for manual comparison only; or 'IDENT1' meaning suitable for both manual comparison and search through the computerised system. Any additional note taking at the analysis stage is recorded on the technical notes.

In general, the case strategy will involve comparison of the crime scene marks against nominals known or suspected to be connected to the crime scene. It may also include a search through the computerised system, IDENT1. Any case strategy limiting examination must be documented and clearly communicated to Police Scotland (for example when many marks have been found on the same item) and any strategy will not compromise providing Police Scotland with sufficient evidence to report an individual to the Crown Office and Procurator Fiscal Service (COPFS).

The next stage of the examination process will normally involve a manual physical comparison of the marks against any suspects or elimination prints submitted in relation to this specific case. Elimination prints are taken via Livescan or using paper and ink and once received they are indexed and filed until they are matched with corresponding scene of crime casework. Elimination finger and palm prints will be recorded, maintained, and monitored in line with retention period policy.

Fingerprints held on IDENT1 relate to a crime or offence for which an individual has been arrested and charged including for pending cases. Legally held finger and palm prints may be used in the detection of crime, and more than one set of fingerprints may be held depending on the number of times biometric data has been obtained. If details of a suspect or accused has been submitted, once established that the person has fingerprints held, a copy of their finger and palm prints will be printed from one of the High-Quality Printers (HQP). More than one alternative set of fingerprints may be printed if the examiner believes that it is beneficial to use friction ridge detail visible on additional forms and they are available.

Using two fingerprint eyeglasses a manual comparison of the marks against the named individuals will occur. Findings are recorded on the FER and will document whether the comparison concluded with a negative result or an identification. If identified, the details of which digit(s) or palm(s) were identified and to whom will be recorded. Should the examiner decide at this stage that under review a mark does not contain sufficient detail for individualisation then this will also be recorded on the FER with an explanation on the technical notes page clarifying why this is the case.

Unidentified marks may be of suitable quality for search through the IDENT1 database. Marks may be searched regionally (Scotland), nationally (UK) or, in certain circumstances, if they remain unidentified, a search of the immigration database and/or Prüm may be undertaken.[20] The IDENT1 system allows examiners to search unsolved marks against hundreds of thousands of sets of finger and palm prints held on its database in a matter of minutes. Using an algorithm which 'looks' at the positioning and the ridge characteristics (ridge endings and bifurcations), the system codes their positioning relative to one another and searches for the same sequence on the stored tenprints. The examiner is presented with a list of candidates from which they will decide whether the mark is identified. Unidentified marks are retained on the unsolved marks database for a period in line with the case retention.

It is standard practice for every set of tenprints taken in Scotland to be sent for a search against the unsolved marks database (known as a print to mark search), and 'hits' are frequently obtained. An on-screen IDENT1 evaluation resulting in an identification is followed up with a manual comparison (as described previously) again using a printout of the tenprint form from the HQP.

In every case with an individual identified, note taking must include a screen print of an illustration of the lead identification. This is recorded using forensic comparison software and involves scanning the printed tenprint into software which has the functionality to allow the examiner to 'mark-up' features in sequence and agreement and record any additional features they class as relevant. A demonstration for elimination prints identified is not compulsory.

Once comparison and evaluation have concluded and case notes are complete, the case will progress for verification. Case verification involves a blind verification process to allow an independent analysis, comparison, and evaluation free from any contextual bias, in line with quality procedures. Any variance in opinion is managed in accordance with the Management of Variance in Examiner Opinion Standard Operating Procedure (SOP).

Once the case has been fully verified and consistent end results established the findings are recorded on a Fingerprint Comparison Examination Results form and emailed to Police Scotland and (where required) COPFS. Upon instruction from the Procurator Fiscal and on receipt of a charge set of fingerprints, a joint report and book of evidence will be prepared and submitted which may be presented as evidence in court.

In this context, it is useful to note that plantar (footprints) can also be examined if evidence is left as a crime scene, for example an unclothed footprint left in blood. We heard of instances where such recoveries had been matched to an accused following arrest but that the identification was excluded from the report as evidence by COPFS due to plantar not being validated within SPA Forensic Services. This may be an area for future development as certain other UK bureaux have validated and now hold UKAS accreditation for the plantar comparison method.

[20]Prüm is a framework which enables participating States to exchange anonymised DNA and fingerprint data, certain vehicle registration data, and associated policing information for the prevention and investigation of criminal offences. Exchanges between EU Member States are currently governed by the Prüm Council Decisions; the UK participates under similar terms through Part 3, Title II of the UK-EU Trade and Cooperation Agreement (TCA)

SPA Forensic Services aim to implement a digital workflow to allow for on screen comparison of crime scene marks against known sets of fingerprints. Benefits include:

- no longer necessary to print tenprints from IDENT1 – time and energy saved
- no requirement to scan a tenprint into comparison software for onscreen comparison or illustration of features
- forms not printed for single use – less waste
- better quality images viewed as no degradation from printing photos and/or tenprints

A full digital solution would see crime scene marks sent electronically from Search and Recovery, and tenprints imported directly from IDENT1. However, due to differences in configuration centred around CHS/PNC/IDENT1 reconciliation, this is not currently an option in Scotland.

The Home Office fund the Police Digital Service to support England and Wales Fingerprint Bureaux and they have recently produced a software app, the Digital Fingerprint Capability (DFC) that enables digital tenprint images to be exported from IDENT1 and compared against digital mark images on screen without the need to print hard copy photos and tenprint forms. Several forces have already taken advantage of this capability and are working through the necessary validation and UKAS accreditation requirements to implement use of the DFC as the new standard working practice for fingerprint examination.

The DFC is not currently available in Scotland however SPA is currently exploring options with the Home Office to develop tenprint export capabilities for use in the existing digital software app(s) in Scotland and to establish if the DFC could be configured for use within the SPA.

Defence Access

One area of potential concern uncovered during our assurance review was the extent of access given to independently employed fingerprint identification experts acting on behalf of the defence in criminal prosecutions as it relates to the rules of disclosure. One of the key recommendations (No 9) made by Sir Anthony Campbell from the Fingerprint Inquiry Scotland 2011, was that fingerprint comparison evidence in criminal prosecutions should be exposed to independent examination in order that those conducting such examinations reach their conclusions ‘independently’ and make notes at each stage of the examination explaining the reasons why they have reached their conclusions.

However, when fingerprint evidence is disclosed in Scotland as part of the rules of disclosure the defence expert is naturally given full access to everything in the SPA FS Senior Fingerprint Examiner notes meaning that she/he cannot truly conduct a blind verification or challenge. Thus, the confirmation bias that Sir Anthony Campbell sought to address may at least theoretically be reintroduced through the rules of disclosure. We understand that this process is currently under review.

Any examination by the defence will also not adhere to the ACE-V process (without the verification component) and a truly independent examination/re-examination is not possible as defence independent experts currently have access to the forensics report prior to their visit to view materials. Furthermore, defence experts will have no ISO/IEC 17025 accreditation which is also theoretically at odds with the recommendations from the Scottish Fingerprint Inquiry. We make no recommendation in this regard, other than to highlight the issue as a potential topic for exploration in any future judicial primers produced in respect of fingerprints.

The National Fingerprint Collection & manual records

The National Fingerprint Collection (NFC) consists of records held on the national UK digital platform IDENT1, and physical records held by SPA FS. At the time of our fieldwork in the autumn of 2025 there were 831,014 Scottish fingerprint records, from 455,040 different people currently retained on IDENT1. These fingerprints are made available for searching by EU member states, as part of the UK-EU Trade and Cooperation Agreement (TCA), as well as shared internationally via Interpol as necessary as part of a criminal investigation. At the time of our fieldwork, there were 91,850 unidentified fingerprint marks retained on the UK IDENT1 database obtained from Scottish crime scenes.[21]

There is also a physical collection of paper records spanning from 1945 to 2023, containing over 1.1 million physical fingerprint forms. Records are filed by a Unique Reference Number (URN), with pre 1983 records filed within the 1983 year. Arrestee fingerprint data is subject to the retention and weeding requirements of S18-S18H of the Criminal Procedure (Scotland) Act 1995 and data should also be managed as per the principles of the Scottish Biometrics Commissioner's Code of Practice, and UK Data Protection regulations. Neither the digital nor physical collection is fully compliant with these requirements as highlighted in the joint review of the laws of retention report conducted by Scottish Government and the Scottish Biometrics Commissioner and published in October 2024.

The compliance and operational risks associated with Scotland's national collection stem from legacy design during the migration to IDENT1. During this transition only one 'collection copy' tenprint form per nominal was scanned and uploaded to IDENT1 to function as a permanent national reference. These were coded and assigned generic arrest summon numbers to prevent automatic weeding from CHS.

While the intention was to ensure complete UK-wide biometrics records, the design created a structural flaw. They sat outside the automated weeding cycle that removes fingerprints when their retention period expires (as per Police Scotland policy). As a result, all these records have remained searchable on IDENT1 although the corresponding CHS/PNC record has been lawfully deleted creating a mismatch between the databases. Thousands of older forms including those containing palms and ridge detail never scanned into IDENT1 are still not digitised meaning that they are not automatically searchable and there is no automated means of knowing which records are lawfully held and which are not.

Despite the presence of formal weeding policies, legacy manual practice, resource constraints, and technical gaps between CHS, PNC, and IDENT1, full compliance has never been achieved. The risks surrounding the NFC are both legal and operational, arising from the legacy collection copy records and the incomplete linkages between CHS, PNC, and IDENT1. Until these records are cleansed and verified, Scotland remains at risk of processing biometric data in a manner that is not compliant with the Data Protection Act 2018, the Criminal Procedure (Scotland) Act 1995, and the Scottish Biometrics Commissioner's Statutory Code of Practice. Responsibility for resolving this issue is shared. Police Scotland and SPA FS as data controllers conducting manual weeding in line with Police Scotland instruction.

From discussion with the UK Information Commissioner (ICO), it has been confirmed that fingerprint records held in paper form relating to living people fall within the scope of UK data protection law. Section 29 of the Data Protection Act 2018 (DPA) states that the law applies to "the processing by a competent authority otherwise than by automated means of personal data which forms part of a filing system".

[21] Source: Home Office

Therefore the 1.1 million paper forms held within the filing system falls within the scope of DPA and all obligations relating to disposal and retention apply.

At the conclusion of our fieldwork in December 2025, a strategic paper had been drafted for the ACC Major Crime and Public Protection who is the strategic lead on biometrics for Police Scotland.

The Commissioner recommends that Police Scotland and the SPA Forensic Services should seek to digitise the paper records within the National Fingerprint Collection (1983 – 2011), conduct legality checks on each record and remove any forms not lawfully held. All biometric records would then be digitally held on IDENT1 and governed by automated weeding.

Recommendation No.9

Police Scotland and the SPA Forensic Services should seek to digitise the paper records within the National Fingerprint Collection (1983 – 2011), conduct legality checks on each record and remove any forms not lawfully held. All biometric records should then be digitally held on IDENT1 and governed by automated weeding

How fingerprints assist police investigations

Unlike with DNA, Scotland does not have a fingerprint database of its own but instead uses the UK law enforcement database known as IDENT1. This database is the UK central repository for holding, searching, and comparing biometric data relating to fingerprints and palm prints for individuals who encounter the police either through arrest or in certain other circumstances.

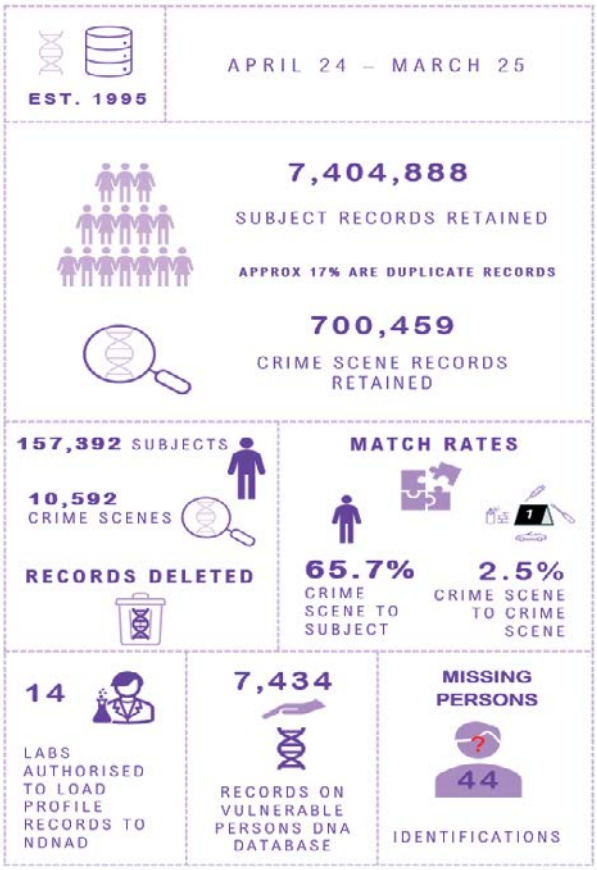
@MartinShieldsPhotography – SPA Forensic Services

IDENT1 is one of two linked biometric databases for fingerprints with the other being the UK Immigration and Asylum Biometric System (IABS) which contains the fingerprints of all processed asylum seekers and is used to check the biometric information of individuals suspected of being undocumented immigrants.[22] Both systems are accessible via Livescan, meaning that the police can compare the fingerprints of an arrestee against both IDENT1 and IABS should they have the need to do so.

The Home Office is currently transitioning these systems to a unified Biometric Matcher Platform, which aims to enhance performance, security, and the resilience of biometric services. The modernisation is part of the Home Office Biometrics Programme, which focusses on improving the effectiveness and efficiency of biometric services across various UK Government departments.

[22] IABS contains 91.9 million fingerprints and images

On 31 March 2025, IDENT1 held 28,995,971 fingerprint forms relating to 8,875,582 people. This figure included over 825,000 Scottish fingerprint records, relating to more than 400,000 people with the UK and Scottish figures including foreign nationals who have offended in the UK. Between 1 April 2024 and 31 March 2025, IDENT1 matched 11,472 tenprints taken following arrest to fingerprints recovered at UK crime scenes. Fingerprints on IDENT1 also helped to identify five people in missing person enquiries. The ways in which IDENT1 assists with UK policing investigations is illustrated by the following graphic:

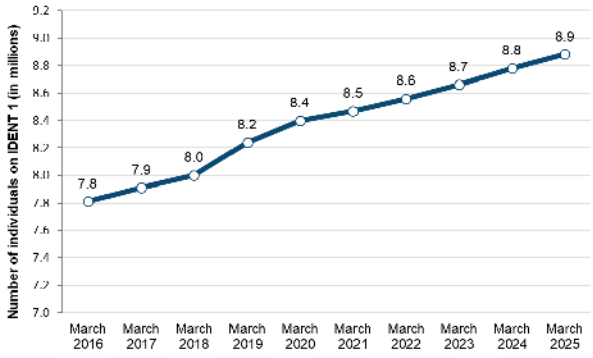


Graphic No1: The UK Fingerprint Database IDENT1.
Source: Home Office[23]

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 fingerprints from unsolved crimes.

Because IDENT1 is one of the oldest national fingerprint databases in the world, and because fingerprints are retained by UK policing for lengthy periods including because of prominent levels of recidivism, the size of that database continues to grow exponentially. In the decade between 2016 and 2025, it has grown from holding the fingerprints of 7.8 million people to 8.9 million people which is an increase of 11.4% over a ten-year period. Should that trajectory continue, then by 2036, the UK would hold 9.7 million people.[24] The exponential growth is illustrated as follows:



Graph No 2: Growth in number of people on IDENT1 2016 to 2025
Source: FINDS

Missing Persons

Fingerprints relating to unidentified bodies, and unidentified or missing persons investigations are searched on the National Fingerprint Database 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

[23] UK Forensic Information Database Service (FINDS) Annual Report 2024 to 2025
[24] To note – in contrast to the rest of the UK, using data from Q1 2024/25 versus the most recent data obtained in November 2025, Scotland's trajectory appears to be different in that volumes have declined

the Missing Persons Fingerprint Collection to assist with police investigations and to help bring closure for the family of the missing person. There were 65 print sets received and searched relating to missing persons held on the database as of 31st March 2025. During the reporting period (1st April 2024 to 31st March 2025), there were 5 positive identifications for Missing Persons Unit cases.

Vulnerable Persons

The National Fingerprint Database contains fingerprints obtained with consent from vulnerable persons, specifically those defined at risk of honour-based abuse, forced marriage or female genital mutilation. The taking of fingerprints and DNA samples is a key protective measure advised by the National Police Chiefs' Council (NPCC) guidance to practitioners. 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 murder.

Fingerprints donated by vulnerable persons are stored on the national fingerprint database and as such provide means to identify a vulnerable person when they come to police notice. There were 9,526 sets of fingerprints relating to vulnerable people held on the database as of 31st March 2025.

Outcomes

The number of offenders convicted with the help of fingerprint evidence is not recorded but it is estimated that fingerprints and DNA each help to solve one in every two hundred crimes in the UK (0.5%). When considering that most crimes reported to the police are not the subject of a forensic investigation then the value of fingerprint evidence becomes apparent.

During the period 2024/25, there were 411,989 scenes of crime mark to tenprint searches resulting in 11,472 matches.

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, biometrically validating a person's arrest history.

The match rate achieved by Police Scotland for tenprint taken on arrest to tenprint within IDENT1 from a previous arrest episode is 64.8%. In 2024 to 2025, tenprint records also matched to 170 fingerprints recovered from crime scenes and 387 suspects were identified from searching crime scene marks.

Fingerprint records & ethnicity

In the Scottish Biometrics Commissioner's Joint Assurance Review of DNA published in February 2025, the Commissioner recommended that Police Scotland should review its procedures for recording the ethnicity of persons who have biometric data held on SDNAD following arrest with a view to fully recording and publishing such data in support of equality duties and to promote public confidence and trust.

In relation to IDENT1, it is known that citizens with darker skin tones are significantly over-represented in the UK database. The Equality Act 2010 (Specific Duties) (Scotland) Regulations 2012 as amended, apply to Scottish public authorities listed in the Schedule to the Act including the Chief Constable of Police Scotland and the Scottish Police Authority. Listed authorities who are subject to the Scottish specific duties are required to do several things including to assess and review the equality impact of policies and practices. It is against the law to discriminate against someone because of a protected characteristic.

Accordingly, we sought to ascertain ethnicity data in relation to Scottish fingerprint records held on IDENT1. According to the 2022 Census, 5,440,000 people lived in Scotland; of these, Asian groups were the largest minority ethnic group in Scotland, making up 4% of the total population. This was followed by Black ethnic and Asian ethnic groups, who made up 1.2%. The way that ethnicity is recorded differs in the 2011 and 2022 Scottish Census and in the way that it is recorded by the police making direct comparison prohibitively difficult or not useful. Nevertheless, the Commissioner welcomes Police Scotland being able to source 'indicative' data to assess and review the equality impact of policies and practices.

Fingerprint Records - Associated CHS Record Ethnicity	Fingerprints - Volume (Nov 25)	Fingerprints - % (Nov 25)
Volume of CHS Records with "FP' Marker	417,871	N/A
Volume & of CHS Records with 'FP* Marker & ethnicity recorded	364,714	87.28%
Asian	8,409	2.31%
Black	4,740	1.30%
Dark European	3,833	1.05%
East or Southeast Asian	1,906	0.52%
Middle Eastern	1,488	0.41%
White European	344,338	94.41%

Image No 7: Fingerprint ethnicity data.
Source: Police Scotland

Case Studies

Fingerprint evidence in common with DNA is not a feature of most criminal investigations in Scotland meaning that it can have a low quantitative value in terms of its overall contribution to crime solvency. However as with DNA, it is equally the case that it has a high qualitative value especially when applied to the investigation of serious and major crime as illustrated by the following two case studies.

Case Study No 1:
UK's largest drug seizure in Scotland

On the evening of 20 April 2015 French police advised the UK's National Crime Agency (NCA) that a Tanzanian-registered boat 'Hamal' was somewhere off the coast of Scotland - and that they believed it was carrying drugs. The NCA then co-ordinated activity to search a huge area of the Atlantic and the North Sea. The boat was located and brought to Aberdeen with the assistance of the Royal Navy. Cocaine with a street value of more than £500 million and weighing 3.2 tonnes was seized. The volume of drugs was so large that it took days to recover. The single recovery was the largest in UK history and the weight of the drugs from this single recovery was equivalent to the total annual seizures in England and Wales. Forensic examination revealed fingerprint evidence directly implicating two Turkish men. The two men were found guilty in July 2016 and were jailed for 40 years

Case Study No 2:
Cold Case Murder

In November 1997, Tracey Wylde aged 21 years was found dead at her flat in Barmulloch, Glasgow having been strangled. The police had been unable to solve the case, but fingerprints and DNA had been recovered from the crime scene that did not match anyone on record. A cold case review in 2013 had also revealed no new lines of investigation. The murder remained unsolved for more than 20 years until the arrest of Zhi Min Chen by Police Scotland on an unrelated minor matter in 2019. Once arrested, the fingerprints of Mr Chen taken in custody quickly suggested a match to those recovered from the crime scene more than 20 years previously. In turn, there was also a DNA match. Mr Chen pled guilty due to the overwhelming forensic evidence found against him and was sentenced to a minimum of 20 years. This case highlights the importance of fingerprints being taken on every occasion that someone is arrested for a criminal offence as those taken for minor offences can (and do) help to solve the most serious of crimes

Scottish demand volumes & related issues

In 2024/25, the SPA FS Fingerprint Unit received 2,076 cases from crime scenes. 1,557 of these were investigative cases and 519 were Standard Forensic Instruction cases. 60,000 Livescan Tenprint forms were received and were searched against unsolved crimes with 170 matches in total. A total of 2,745 cases were received from crime scenes into the SPA FS Search and Recovery Laboratory.

Backlogs increased during 2024/25 due to demanding projects such as a drugs pilot and training staff for opening the Edinburgh and Aberdeen Search and Recovery Laboratories but had decreased by conclusion of our fieldwork in December 2025. There are also some ongoing issues with procuring some of the chemicals used in reagents. Finally, ventilation problems arose at a main site meaning that certain chemical treatments must be done at other Scottish Forensic Services laboratories.

Governance & Accountability

The use of biometric data and technology spans across the entire Police Scotland organisation, under numerous executive portfolios and as part of many business areas. To ensure a comprehensive approach to governance, Police Scotland have centralised roles and responsibilities in respect of biometric governance and engagement.

In January 2024, Police Scotland implemented new biometric governance structures within the Specialist Crime Division's Local Crime portfolio. This consists of the Head of Biometrics, a Biometrics Data Lead and 6 x Biometric Data & Sample Officers. A Detective Inspector provides additional temporary support. Police Scotland plan a review of the biometrics portfolio in 2026 to ensure structure and roles are fit for purpose having a better understanding of demand and stakeholder expectations.

From the first 12-18 months of operation, there are four key service provision requirements emerging:

1. Governance (e.g. stakeholder engagement, strategy, policy, organisational awareness, public trust & confidence, etc.)
2. Biometrics Samples & Submissions (legal, operational and data quality assessment of samples)
3. Biometrics Data Insights, Audit & Analysis (including externally available Management Information)
4. Biometrics Technology (e.g. DNA profiling, fingerprint comparison, facial matching, image capture, etc.)

The Assistant Chief Constable (ACC) for Major Crime is the 'Data Owner' and decision-maker in respect of Police Scotland biometric data, physical samples, and technology. The Detective Chief Superintendent for Local Crime is the 'Delegate Data Owner,' with the Police Scotland Head of Biometrics as 'Tactical Data Owner.' The ACC leads two dedicated governance forums, namely:

- PS Biometrics Data Owner Group – an internal forum for discussion, escalation of key risks & issues and decision making
- PS Biometrics Oversight Board – a stakeholder forum for discussion, collaboration of joint initiatives and decision making

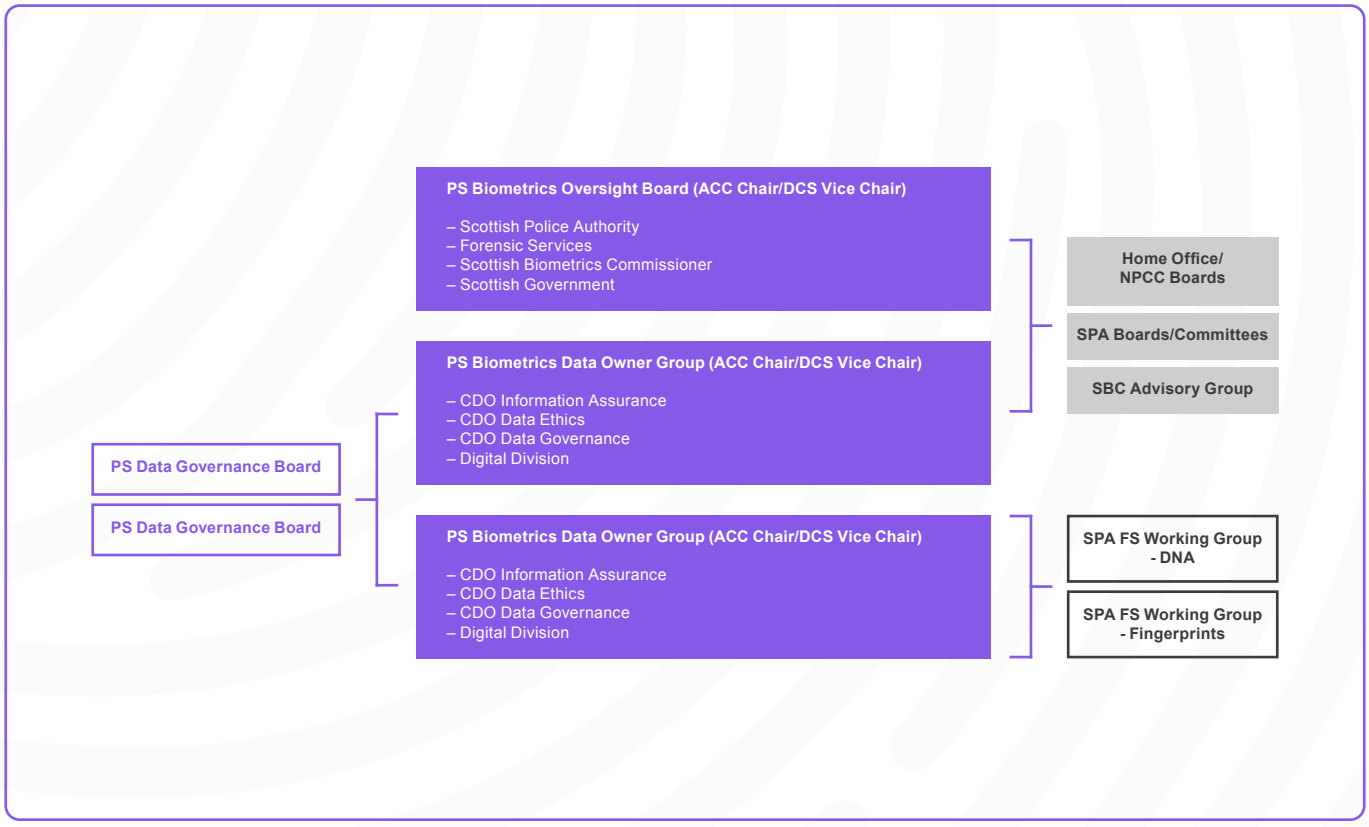
Police Scotland are also represented at numerous UK policing biometrics forums, such as the Forensic Information Databases Strategy (FINDS) Board, the Home Office International Biometrics Board, the NPCC Facial Recognition Board and the Scottish Biometrics Commissioner's (SBC) advisory group.

As indicated earlier in this report, Police Scotland now also has a Head of Biometrics with a small team who have transformed the availability and quality of key management information and who should be highly commended for doing so.

The Police Scotland governance structure for biometrics is illustrated as follows:

Role of Police Scotland

- data owner for custody & Registered Sexual Offender (RSO) fingerprint data and setting custody biometric data retention policy
- acquisition of fingerprint data, ensuring data quality & onward submission to Forensic Services
- managing rejected Livescan records from Forensic Services
- data & asset owner of the Scottish Criminal History system (CHS) and setting criminal record case retention policy
- provide Forensic Services with case outcome data to manage weeding and retention decisions



Graphic No 3: Police Scotland governance structures for fingerprints and other biometrics.

Role of SPA Forensic Services

- joint data controller of custody & RSO fingerprint data and crime scene marks
- supplier engagement and partnership working with Leidos (Livescan Terminals) and IDENT1 (HOB)
- align fingerprint submissions to the relevant Nominal & Event (prosecution) on CHS to facilitate IDENT1 upload
- managing fingerprints markers on CHS
- accessing IDENT1 and collating IDENT1 management information
- weeding custody & RSO data from IDENT1 and hard copy collections as per PS policy
- undertake fingerprint subject to scene match comparison
- legality check prior to PS issue
- collating fingerprint match management information, crime scene mark case assessment, forensic strategies and reporting of results

Biometric governance within SPA FS lies within the portfolio of a Head of Function and an Operations Crime Manager. The Head of Function leads on strategic direction via the PS oversight board, whilst the Operations Crime Manager leads at an operational level and oversees the Tactical groups for DNA and FPs. The Biometric tactical groups include Forensic Leads and Service Delivery Managers, and working closely with the PS biometrics team, they progress actions and coordinate policies and procedures that pertain to biometric data. Biometric related activity data is reported to the FS Performance Board and SPA Forensics committee.

Because biometrics span so many different Chief Officer portfolios within Police Scotland and the SPA Forensic Services not all biometrics are overseen by the same Scottish Police Authority Committee. For example, where DNA and Fingerprints sit on the SPA FS side of the fence, the Scottish Police Authority Forensic Services Committee exercise oversight with the SPA Director of Forensic Services and other senior managers in attendance.

By contrast, anything to do with the investigative use by Police Scotland tends to be discussed at the SPA Policing Performance Committee with the ACC Major Crime and other Chief Officers in attendance. This means that no single SPA Committee has a holistic oversight of biometric data in its entirety. Added to this, the Police Scotland Biometrics Oversight Board meets in private meaning that minutes are not produced or published and accordingly are not available for SPA scrutiny.

To ensure that the SPA may exercise the best possible oversight and scrutiny over the non-forensic aspects of biometric data use by Police Scotland, the Commissioner recommends that Police Scotland should produce a high-level strategic Annual Report for biometrics in a similar manner to the type of report that is produced by the UK FINDS Strategy Board. The report should be presented to and scrutinised by a relevant SPA Committee and should include information on data volumes and use as well as information on compliance with Force policy and progress with recommendations. It is understood that Police Scotland already plan to produce such a report in 2026 and therefore this recommendation simply endorses that policy intention.

Recommendation No.10

Police Scotland and the SPA Forensic Services should produce an Annual Report on its acquisition, retention, use and destruction of biometric data to assist oversight and scrutiny by a relevant SPA Committee

Future Directions

In the concluding chapter of this Joint Assurance Review we provide information in relation to the future direction of travel concerning the police and forensic science use of fingerprints. Firstly, we explain several UK Home Office initiatives to improve efficiency and enhance capability in relation to fingerprints and multi-modal biometrics. In doing so we note that the Home Office supports the operationalisation of its written strategy with significant capital expenditure in fingerprint and other policing biometric capabilities and that some of these developments also benefit Scotland because of shared UK databases to which Scotland makes a financial contribution.

We contrast this with the approach in Scotland, where Scottish Government has no written strategy in relation to biometrics and no multi-year capital allocation to Police Scotland or the Scottish Police Authority to support the delivery of biometric solutions in support of such a strategy. Against this context, we reflect on the Chief Constable having urgently requested another £140 million in Scottish Government support for 2026/27 to help with issues such as the national Body Worn Video rollout.

Finally, we explore some advances in forensic technologies pertaining to fingerprint development techniques which will only be possible with additional capital funding to improve efficiency and enhance capability and thereby provide a return on investment.

There are several ongoing and planned technological and scientific developments that will impact on the police use of fingerprints and multi-modal biometrics in the immediate years ahead. Many of these developments come against the context of significant capital investment programmes by the Home Office and on a scale that is not replicated by the funding given to policing in Scotland, albeit Scotland contributes financially to many UK policing systems.

Home Office Biometrics Programme: technical enhancements & refreshes

From a UK policing perspective, the Home Office Biometrics Programme (HOB) is supporting the following future developments to improve efficiency and enhance capability in relation to fingerprints and multi-modal biometrics:

- Strategic Matcher Platform will continue to roll out enhanced mark to print search performance to all fingerprint bureaux throughout 2025/26. The upgraded fingerprint matcher will provide more accurate fingerprint search results to users
- collaborating with practitioners on the design phase for the IDENT1 bureau desktop refresh to ensure the system will enhance user experience and opportunities for improvement are identified and prioritised
- collaborating with Police Digital Services to explore the benefits of integration of the Digital Fingerprint Capability with IDENT1. Integration of the two systems would streamline fingerprint bureau workflow and allow a digital ‘end to end’ user journey offering time saving efficiencies
- additional technical refreshes are planned for IDENT1 to ensure continuity of service until a full replacement of the IDENT1 bureau desktop and central architecture is completed

Multimodal biometrics

At the September 2022 FIND Strategy Board meeting, it was agreed that there should be a national data controller for the proposed retention of facial custody images on IDENT1, and that the governance should sit with the FIND Strategy Board. This year, a NPCC-sponsored programme delivering on behalf of policing recommended retention criteria that should be consistently applied to facial custody images. It is expected that this work will inform the wider UK Government ambitions to govern the collection, retention, and use of facial images as a biometric. The same technological platform will be used to house custody images and fingerprints. A new collection, with tight access and use rules, was under development in 2024/25. Once fully delivered, this will include the ability to automate the retention and deletion of custody images that have been taken at arrest in England and Wales. The aim is to enable these images to be loaded to this newly developed collection and for them to be searched by a national Home Office facial recognition searching service.

Digital Fingerprint Capability

In England and Wales, the Home Office Transforming Forensics Programme and the Police Digital Service has delivered a networked, end-to-end digital fingerprint capability enabling forensics teams to send captured images from crime scenes to fingerprint bureaux, analyse and compare prints digitally, and import and export data from biometrics databases. The capability is managed as a service by the Police Digital Service.

The new capability will speed up fingerprint processing, enabling victims/offenders to be identified in hours, not days. It will increase the quantity and quality of evidence and data available to investigators, improve consistency and standardisation, reduce costs, and help to balance demand and capacity.

Although the take up by Forces in England and Wales is currently small, the principle of having a digital fingerprint capability that can transfer digital images of fingerprints from the crime scene direct to the bureau and to use fingerprint enhancement software to allow laboratory images to be transferred direct to the bureau raises the prospect of quicker and more effective and efficient capabilities.

CSI Mobile, CSI Web: transfer digital images from crime scene to Bureau

Bureau: receives images in real-time and digitally manages fingerprint examination and comparison process

Fingerprint Enhancement: enables fingerprint enhancement lab staff to upload digital images into Bureau

Image No 8: Transforming Forensics Programme and the Police Digital Service Digital Fingerprint Capability

On-street solutions

In Scotland, Police Scotland officers dealing with any matter involving the presence of a motor vehicle on a road currently have the capability to view the drivers UK driving licence from their Personal Digital Assistant notebook (PDA). This is supported by a clear lawful basis in terms of powers within road traffic legislation requiring the holder of a driving licence to produce it to the police on demand if asked to do so in circumstances relating to the presence of a motor vehicle on a road.

In England and Wales, the police use mobile fingerprint scanners under legislation designed to reduce the requirement to arrest in circumstances where the identity of a minor offender is not known or where the subject is suspected of providing false particulars. These are known as Identity Not Known (INK) technologies.

Such technologies enable the police to use their smartphone linked to a plug-in portable scanner to instantly check individuals' identities against national fingerprint databases such as IDENT1/ IABS. The specific legal authority for use is conditional on specified criteria being met and is contained within Section 61(6A) of the Police and Criminal Evidence Act 1984 PACE Code D.

Such mobile fingerprinting technology allows frontline officers across England and Wales to use their smartphones to identify people in less than a minute – saving police time and reducing costs. To ensure the information accessed from the Biometric Services Gateway remains secure, fingerprints are not stored and are automatically deleted from the device once they have been checked. As well as identifying a person of interest who may be withholding their name, the technology enables officers to rapidly identify someone experiencing a medical emergency and contact their next of kin. These technologies are not without controversy and have often been described as 'Stop and Scan.'

Image No 9: Mobile fingerprint verification
Source: UK Government

UK & Scottish Government Strategy

There are both legal and policy reasons to explain why Scotland does not have such capability. The first relating to mobile solutions is that there is no specific legal basis in Scotland for the police to acquire fingerprints from a potential suspect who has not been arrested and afforded their rights. In this context, it is also important to note that Police Scotland has a weeding policy for fingerprints whereas they are retained indefinitely on conviction in England and Wales. Therefore, better legal safeguards exist in Scotland to protect citizens rights. The policy dimension is the lack of a forward-looking biometric strategy set by Scottish Government.

At a UK level, the Home Office has a biometric strategy which sets out the government objectives in relation to UK policing databases such as IDENT1 and the UK National DNA Database (NDNAD). The Home Office also provides grants to the Police Digital Service for example to support the Digital Fingerprint Capability. More recently, the Home Office has been investing significantly in facial biometrics including the announcement of funding 50 Live Facial Recognition (LFR) vans in total, and the creation of a new National Centre for AI for England and Wales. Therefore, the Home Office supports the operationalisation of its written strategy with significant capital expenditure.

By contrast, Scottish Government does not have a biometric strategy for Scotland and accordingly there is no multi-year capital allocation made to Police Scotland or the Scottish Police Authority to support the delivery of such a strategy. Scottish Government does invest in biometric technology for Police Scotland but in a way not aligned to holistic strategy. This is exemplified by the current national role out of Body Worn Video (BWV) and what the Commissioner has previously described as the 'national embarrassment' of Police Scotland (the UK's second largest force) being the last UK force to be equipped with such technology.

Scottish Government has invested £33 million in the Digital Evidence Sharing Capability (DESC), but this project is not about biometrics per se. Having a biometrics strategy for Scotland would seem a sensible approach not just to support policing but also in terms of Scotland's network of public safety cameras and the opportunities to ensure the coordinated, lawful, ethical, and effective use of such technologies in support of community safety and achieving the national outcomes for Scotland including targeting County Lines drug dealers and addressing the national emergency of male violence towards women and girls.

At the time of writing the Commissioner is also mindful that the Chief Constable has urgently requested another £140 million in Scottish Government support for 2026/27 to help with issues such as the national BWV rollout. Although Police Scotland funding has increased year on year, there has been an under allocation of capital funding since police reform in 2013, which in parallel with an annual budget setting process and no borrowing powers is problematic. As highlighted by the Convenor of the Parliament's Criminal Justice Committee in the Scottish Parliament on 27 November 2025, the Justice sector in Scotland faces 'unacceptable' cuts without £400 million more in 2026/27.

The Commissioner has previously given written evidence on such matters to the Parliament's Criminal Justice Committee as part of its pre-budget scrutiny and has publicly highlighted that it is essential that Police Scotland are properly funded to support capital investment in technology such as body worn video. Doing so would provide 'best evidence' from a range of critical operational incidents, and as a corollary offers the potential to save millions of pounds in investigations and other public enquiries. A broader discussion on capital investment can be found in HM Chief Inspector of Constabulary in Scotland's pre budget submission for 2026/27 to the Parliaments Criminal Justice Committee.

Furthermore, in his Annual Report for 2024/25, the Chief Inspector of Constabulary highlights how Police Forces in England and Wales have better access to funding recovered under proceeds of crime legislation than exists in Scotland. This is an area of police funding for consideration by Scottish Government and reinforces the need to ensure policing continues to have the resources and technology required to protect communities across Scotland from those who seek to cause the greatest harm.

Contactless biometrics: remote fingerprint capture & analysis

The performance of software and smartphone cameras for remote and contactless fingerprint capture and analysis is promising enough to look towards a launch of the technology for UK policing in the next 5 years.

The potential for contactless fingerprint capture and analysis was highlighted by a high-profile case in the UK following the arrest of a high-profile drug dealer Carl Stewart. In the case in question, the drug dealer had posted an image of himself holding a block of Stilton cheese on the encrypted messaging service EncroChat used widely by members of Serious and Organised Crime Groups (SOCG). Law enforcement had managed to infiltrate the platform as part of a major international investigation known as Operation Venetic. Stewart was using the EncroChat handle 'Toffeeforce' and engaged in the supply of enormous amounts of Class A and B drugs (heroin, cocaine, MDMA, and ketamine). He was able to be identified through his fingerprints after police analysed the image he posted in an online chat.[25]

He was sentenced to 13 years in jail after pleading guilty to multiple charges and it was noted by the lead Detective that '…his love of Stilton cheese ultimately led to his downfall'.[26]

[25] EncroChat was a Europe-based encrypted platform used by organised crime. Europol infiltrated it
[26] Feeling blue: drug dealer's 'love of stilton' leads to his arrest. The Guardian: 24 May 2021

Fingerprint Laboratory technology advances

Another area of future advances (funding permitting) is in relation to high-tech fingerprint enhancement laboratory capability. There are three principal areas where future investment may enhance the efficiency of fingerprint processing. These include:

1. All in one forensic search, detection, and capture tools
2. Enhanced ultraviolet and infra-red capability to expand contactless fingerprint searching
3. Fingerprint development instruments that improve the health, safety and sustainability of fingerprint processing

Each of these powerful tools could represent a major leap forward in fingerprint search and recovery detection technology and efficiency.

All in one forensic search, detection, & capture tools

Portable devices that combine the functionality of various light source instruments with integral filtration and high-resolution digital camera also offer new crime scene possibilities.

Enhanced ultraviolet & infra-red detection capability

Equipped with various light sources and AI technology, such devices detect and distinguish fingerprints on complex backgrounds, eliminating the need for protective eyewear and dark rooms, streamlining the fingerprint detection process whilst improving health and safety in the laboratory. They can dramatically increase the speed and accuracy of fingerprint visualisation in items of porous/semi-porous evidence using a fully integrated detection and imaging system with intelligent AI Assisted Ridge Detection software. Such instruments excel at revealing hard-to-spot fingerprints, even on patterned surfaces or super glue-treated items. It shortens detection time, making it a valuable tool for forensic investigators.

Fingerprint development instruments

Often, 'traditional methods,' which rely on chemical reactions to reveal fingerprints, can often fail on items exposed to high temperatures, like bullets or explosion fragments. However, latent fingerprint development instruments are now available allowing a cutting-edge chemical vapor fuming process to develop fingerprints on a range of difficult surfaces including those that have been exposed to extreme heat (discharged bullet casings, for example) and items that have been washed 'clean' to prevent identification.

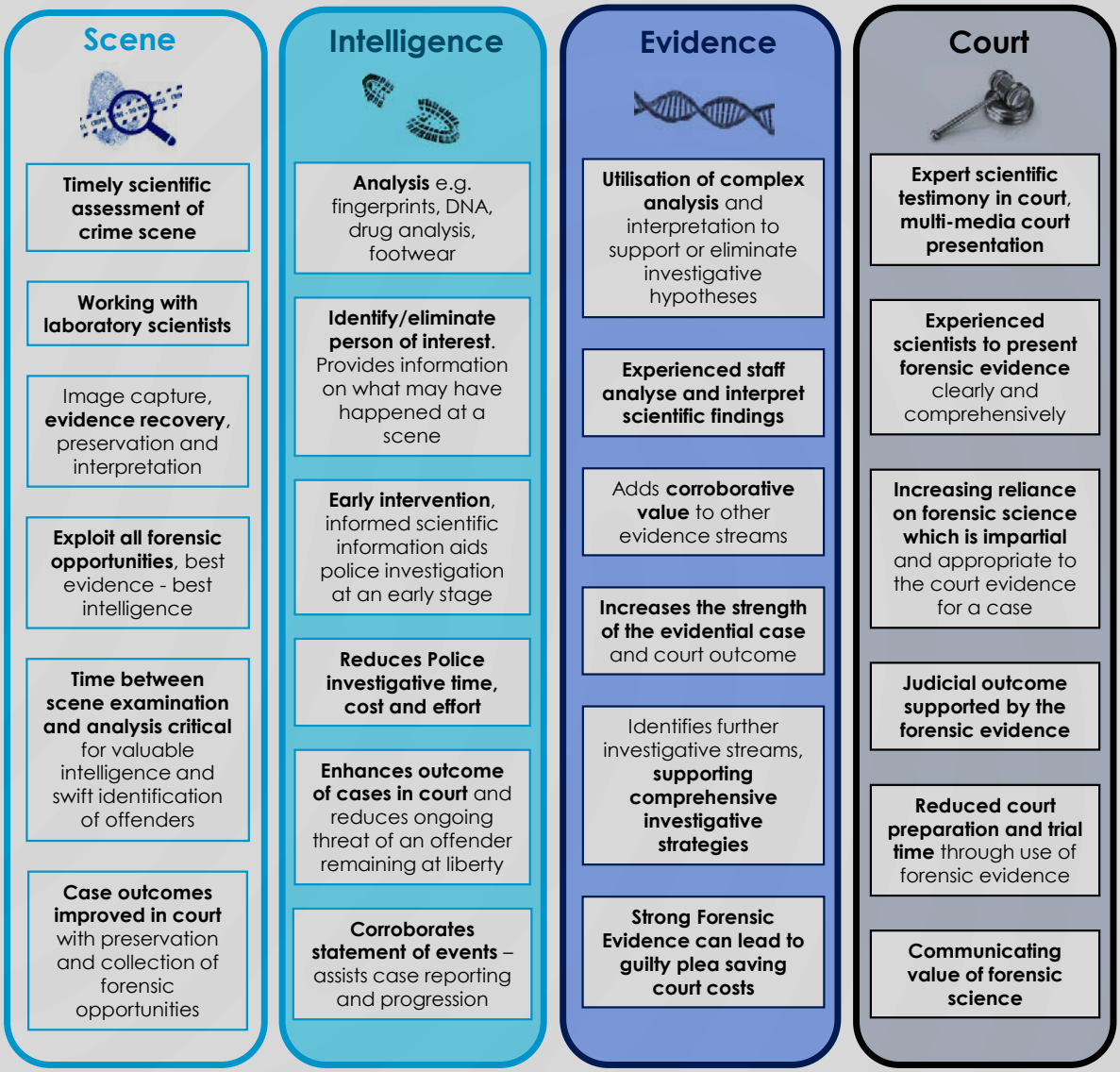
A forerunner in the procurement of such technologies is the Hong Kong Police Forensics Bureau.

Other matters arising: Senior Fingerprint Examiners & succession planning

Becoming a Senior Fingerprint Examiner in Scotland with the SPA Forensic Services involves several years of direct training and experience. Typically, starting as a new examiner then 3 to 5 years training. Once qualified, they become a 'Senior Fingerprint Examiner.' Therefore, the journey of training, development, and building experience, requires continuous and ongoing assessment, a good foundation in science (often a degree or HND) and structured training and skills assessment.

Whilst beyond the terms of reference from this review, it was apparent that many of the Senior Fingerprint Examiners in Scotland have enormous skills and experience commensurate with many having served for decades. For reasons of operational sensitivity, we are not disclosing the number of Senior Fingerprint Examiners in Scotland, but against the context of length of service and length of required training, the question of succession planning will be an area requiring careful monitoring by the SPA Director of Forensic Services.

Appendix A: The Crime Scene to Court model for Scotland



The **Crime Scene to Court** model maximises the value which can be driven from the application of forensic science as it improves speed and coordination across the entire forensic process.

Forensic science continues to develop so being able to join all forensic processes together and co-ordinate functions within one organisation gives Forensic Services a leading edge in Scotland providing the best possible service to the public we serve.

Continued investment in forensic science will provide considerable downstream benefits across the justice system. Working with justice supporting organisations to identify better ways forensic evidence can be realised will further strengthen outcomes and the level of value delivered.

Our communities are safer places from the timely application of forensic science and services.

Appendix B: Glossary

ACC	Assistant Chief Constable
ACE-V	Analysis, Comparison, Evaluation, Verification
AI	Artificial Intelligence
DFC	Digital Fingerprints Capability
CHS	Criminal History System
CJSD	Criminal Justice Services Division
COPFS	Crown Office and Procurator Fiscal Service
CSM	Crime Scene Manager
DFC	Digital Fingerprint Capability
DNA	Deoxyribonucleic Acid
DPA	Data Processing Agreement
ERF	Evidence Request Form
FBI	Federal Bureau of Investigation (USA)
FER	Fingerprint Examination Request
FINDS	Forensic Information Databases Strategy
IABS	Immigration & Asylum Biometric System
HOB	Home Office Biometrics Programme
HMICS	His Majesty's Inspectorate of Constabulary in Scotland
HQP	High Quality Printer
ICO	Information Commissioner
IDENT1	The UK law enforcement fingerprint database
INK	Identity Not Known
IO	Identification Officer
Livescan	The UK automated fingerprint capture device for law enforcement
MDMA	Methylenedioxymethamphetamine
NAFIS	National Automated Fingerprint Identification System
NDNAD	National DNA Database
NFC	National Fingerprint Collection
NOA	Not Officially Accused
NPCC	National Police Chiefs' Council
NSD	National Security Determination
NVLID	Non-Verified Live Identification
OSD	Operational Services Division
PACE	Police and Criminal Evidence Act 1984
PDA	Personal Digital Assistant
PIRC	Police Investigations and Review Commissioner
PNC	UK Police National Computer
SBC	Scottish Biometrics Commissioner
SCD	Police Scotland Specialist Crime Division

SCRO	Scottish Criminal Records Office
SFI	Standard Forensic Instruction
SIO	Senior Investigating Officer
SOCG	Serious Organised Crime Group
SOP	Standard Operating Procedure
SPA FS	Scottish Police Authority Forensic Services
SPSA	Scottish Police Services Authority
TCA	Trade and Cooperation Agreement (EU and UK)
UKAS	UK Accreditation Service
UK GDPR	UK General Data Protection Regulations
URN	Unique Reference Number

Scottish Biometrics Commissioner
Coimiseanair Biometrics na h-Alba

Safeguarding our biometric future