Forensic Science Regulator
Overseeing Quality

Annual Report

17 November 2019 – 16 November 2020

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Foreword

This is my last Annual Report as Forensic Science Regulator. It is time for me to move on and for a new Regulator to bring their ideas and perspectives to the role. It has been an enormous privilege to have held this role for the last six years and I have learned a great deal in the process. In particular, it has allowed me to meet and speak with a vast range of people and to act as a conduit between people with different backgrounds and perspectives.

The Criminal Justice System (CJS) in England and Wales is highly dispersed, and we each have very different roles within that System. I firmly believe that greater understanding of each other's challenges, boundaries of expertise and roles would lead to a more effective overall system, characterised by:

a. Good forensic case strategies being set;
b. The right submissions choices and processes;
c. Effective use of case management procedures so that there is proportionate commissioning of scientific analyses and robust evaluation of findings, considering both prosecution and defence propositions;
d. Good prioritisation in forensic units; and
e. Clear communication of the outcomes, with the basis for any differences in opinion being straightforward to identify.

If we are to achieve a fully functioning system, with enough capacity to ensure timely delivery, there is also an urgent need for more fundamental change. It is inexcusable that the primary impacts of the shortfalls in capacity for toxicology and digital forensics, which have been clear for many years, still fall on the front-line forensic science practitioners. They bear the brunt of the stresses in the system, with consequent risks to their well-being and, potentially, to quality. The impact on justice is even more inexcusable. Rationing of toxicology services over years has led Her Majesty's Inspectorate of Constabulary, Fire and Rescue Services to consider that [1]:

> "The inescapable conclusion is that offenders who are suspected of driving while under the influence of drugs are being tolerated and allowed to present a continuing threat to communities. We don't believe that this is acceptable".

Delays in digital forensics impact on complainants, suspects and witnesses: it is in nobody's interest for justice to be delayed.

Concerted Government action is needed to bring about effective governance and decision-making to strengthen forensic science provision for all parties, rather than quarterly cross-CJS discussion of entrenched problems without a clear route to effect change. Constructive and collaborative police procurement practices and changes to the legal aid system are required, as is investment in research and development.

As well as looking at weaknesses in the system, it is also good to reflect on what has been collectively achieved. It is easy to fall back on the narrative of 'forensic science in crisis' but the science has improved and is continuing to improve. Many more disciplines now have documented scientific validation of their methods, demonstrating their reliability and highlighting any limitations. We need to build further on this work, ensuring there is transparency where limitations may affect findings and that there are ongoing efforts to enhance the data and expertise on which we rely in interpreting those findings. More practitioners and experts now have objective evidence of their competence rather than a reliance on years in post or persuasiveness, neither of which is necessarily a good gauge of expertise. There is ongoing work to standardise interpretation of findings according to robust scientific principles, within the legal context of this jurisdiction. There are efforts to improve provision of proficiency tests, which provide comparative evidence of performance against peers and there is more collaboration between police forces, to help those who are lagging behind to catch up with implementation of quality standards.

Legislation [2] is making its way through Parliament which, if enacted, will provide statutory enforcement powers for the next Regulator. Although a last resort, the potential for enforcement action is an important driver for proactive improvement. It will also mean that those who fail to follow robust scientific methodology and the legal requirements on experts can be prevented from continuing to pose a risk to the CJS.

So, it is with a mixture of confidence in the improvements underway and concern about structural and governance failures that I leave this role. My thanks go to all in the forensic science community who work so hard to deliver good quality forensic science, sometimes in the most difficult of situations.

My final report is in two parts. Part A gives an overall ‘State of the Nation’ review of forensic science, considering progress and change during the last six years. Part B reports on progress since my last Annual Report. I am sure my successor will set out their priorities for the future in due course and I wish them every success.

Dr Gillian Tully CBE

Forensic Science Regulator

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Abbreviations and Acronyms

Abbreviations and acronyms used in this report are listed below in alphabetical order.

ACC	Assistant Chief Constable
Admin	Administrative Court within the High Court
AFSP	Association of Forensic Science Providers
APCC	Association of Policing and Crime Commissioners
BS	British Standard
bsi	British Standards Institution
CBE	Commander of the Most Excellent Order of the British Empire
CC	Chief Constable
CCTV	Closed Circuit Television
CED	Contamination Elimination Database
CEO	Chief Executive Officer
CJB	Criminal Justice Board
CJS	Criminal Justice System
[The] Codes	Forensic Science Regulator's Codes of Practice and Conduct
CPD	Continuing Professional Development
CPS	Crown Prosecution Service
CQC	Care Quality Commission
CrimPD	Criminal Practice Directions
CrimPR	Criminal Procedure Rules

CSE	Child Sexual Exploitation
CSFS	Chartered Society of Forensic Sciences
CSI	Crime Scene Investigator
DFSG	Forensic Science Regulator's Digital Forensics Specialist Group
DMI	Digital Media Investigator
DNA	Deoxyribonucleic acid
DNASG	Forensic Science Regulator's DNA Specialist Group
DPP	Director of Public Prosecutions
Dstl	Defence Science and Technology Laboratory
EFS	Eurofins Forensic Services
EMSOU	East Midlands Special Operations Unit
ENFSI	European Network of Forensic Science Institutes
EPSRC	Engineering and Physical Sciences Research Council
EU	European Union
EWCA	Court of Appeal of England and Wales
EWCA Civ	Court of Appeal in England and Wales (Civil Division)
EWCA Crim	Court of Appeal of England and Wales (Criminal Division)
EWHC	High Court of England and Wales
FCIN	Forensic Collision Investigation Network
FCN	Forensic Capability Network
FINDS	Forensic Intelligence Databases Service
FRS	Fire and Rescue Services
FSAC	Forensic Science Advisory Council
FSM/1	Forensic Science Mirror Committee (of bsi)

FSR	Forensic Science Regulator
FSRU	Forensic Science Regulation Unit
FTE	Full Time Equivalent
GTD	Ground Truth Data
HO	Home Office
HOB	Home Office Biometrics Programme
IEC	International Electrotechnical Commission
III	Internet Intelligence and Investigation
ILAC	International Laboratory Accreditation Cooperation
ISO	International Organization for Standardization
ISO/CD	Committee Draft of an International Organization for Standardization standard
ISO/TC	International Organization for Standardization Technical Committee
km	Kilometre
LR	Likelihood Ratio
m	Metre
MFSG	Forensic Science Regulator's Medical Forensics Specialist Group
MoJ	Ministry of Justice
MP	Member of Parliament
MPS	Metropolitan Police Service
NCA	National Crime Agency
NDNAD	National DNA Database
NFCC	National Fire Chiefs' Council

NHS	National Health Service
NHSE&I	National Health Service England and National Health Service Improvement
NPCC	National Police Chiefs' Council
NWP	North Wales Police
PACE	Police and Criminal Evidence Act 1984
PAS	Publicly Available Standard
PED	Police Elimination Database
PSC	Police Staff Council
QC	Queen's Council
QSSG	Quality Standards Specialist Group
R	Regina
RAM	Random Access Memory
RCPath	Royal College of Pathologists
Regulator	Forensic Science Regulator
ROCU	Regional Organised Crime Unit
Rt Hon	Right Honourable
s22 agreement	An agreement made under section 22 of the Police Act 1996
SARC	Sexual Assault Referral Centre
SEROCU	South East Regional Organised Crime Unit
SFR	Streamlined Forensic Report
SFR1	Stage 1 Streamlined Forensic Report
SI	Statutory Instrument
STR	Short Tandem Repeat
TF	Transforming Forensics

UAAS	United Kingdom Accreditation Service Assisted Application Scheme
UK	United Kingdom
UKAS	United Kingdom Accreditation Service
UKIAFT	United Kingdom and Ireland Association of Forensic Toxicologists
UKRI	United Kingdom Research and Innovation

Part A:

Quality – 'State of the Nation' Review 2014 - 2020

As this is my final Annual Report, this section reflects on progress since the start of my tenure in November 2014 and considers what remains to be addressed.

My stated aim throughout my tenure has been that all forensic science and forensic pathology provided to the Criminal Justice System (CJS) in England and Wales is of the required level of quality. To achieve this, three requirements were defined as follows.

Requirement 1

That appropriate quality standards are in place for all forensic science disciplines, and those standards apply equally whether the services are delivered by small or large organisations, private companies, public laboratories, police forces or individuals and whether instructed by the prosecution or defence.

Requirement 2

There is full compliance with the quality standards requirements across all forensic science disciplines, from crime scene to court and in all sectors, and that the quality culture has matured such that:

a. No procedures are static, but that all are continually improving;
b. Quality failures are appropriately reported, investigated and lead to improvements in practice; and
c. The benefits of fully implementing quality systems are realised, in efficiency and effectiveness of practice.

Requirement 3

There is a shared understanding of quality and standards by all stakeholders, including commissioners of forensic science, experts, practitioners, researchers, the police, the prosecuting authorities, defence, and courts, so that:

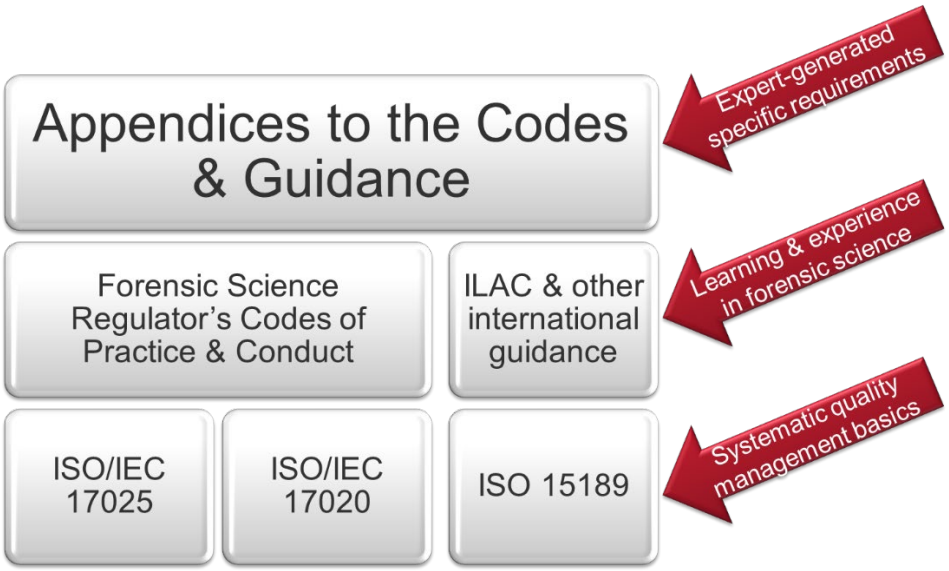
a. Practitioners who have not adopted the relevant quality standards are no longer routinely instructed;

b. The work commissioned supports the overall aims of the CJS and not solely the aims of the commissioning party;
c. The forensic science quality standards are integrated into the requirements for expert witnesses;
d. There is an expectation in court that experts will have complied with the relevant quality standards; and
e. Forensic science is supported by ongoing research to increase quality and capability.

A1. Quality Standards in Place

Figure 1 illustrates the quality standards framework for the majority of disciplines. Systematic quality management is about putting in place auditable systems to ensure the basics that underpin high quality science are in place, because just 'hoping for the best' can never be good enough in the CJS.

Figure 1: Quality Standards Framework



Although there are frequent complaints about form-filling and bureaucracy, the requirements are of critical importance to ensure that evidence (or intelligence) can be substantiated. A recent example, where a Crime Scene Investigator (CSI) deviated from the requirement to complete all sample documentation from one scene prior to moving to the next resulted in samples from one scene being wrongly attributed to the subsequent

scene. The affected samples could not be used in the case because their evidential integrity had been compromised. Another example of the importance of the requirements in quality standards is the requirement for equipment to be appropriately maintained and calibrated to traceable standards. Weighing drugs on uncalibrated scales cannot be demonstrated to produce reliable results. The requirements are not themselves bureaucratic, but the manner in which a particular organisation chooses to implement them may be bureaucratic. All organisations have the opportunity and responsibility to think innovatively about their quality systems and how they can concurrently support quality and timely delivery of services appropriate to the issues in each case. Some organisations have been extremely effective in their implementation of quality standards and have, as a result, measurably improved efficiency. By way of example, implementation of ISO 17025 [3] for computer forensics in West Midlands Police led to standardisation of workflows, methods and training. This has resulted in fewer Crown Prosecution Service (CPS) requests for additional work, fewer defence challenges and fewer court appearances. The time released has enabled the unit to acquire and process more exhibits within their service level agreements, release staff to attend scenes and release staff into other areas of digital forensics [4].

The Forensic Science Regulator's Codes of Practice and Conduct (the Codes) [5] are based, in part, on learning from what has gone wrong and building on good practice. A failure to learn from this experience is unacceptable. The established methodology for demonstrating scientific validity set out in the Codes [5], supplemented by specific guidance documents [6, 7], has assisted with relatively smooth adoption of probabilistic methods for DNA mixture interpretation in this jurisdiction. In a more prosaic example, the value of the business continuity planning requirements in the Codes [5] was demonstrated with the outbreak of COVID-19, where plans that had already been tested could be put into practice quickly to minimise disruption.

Publication and updates of standards, guidance, information and protocol documents are illustrated in Annex 1. There will be ongoing publication and updating of standards, guidance and information as science and knowledge evolve. Current standards and guidance under development include the following.

a. A standard for development of evaluative opinion, which has undergone several rounds of expert consultation, resulting in a draft being sent for judicial consultation (section B1.4).
b. The standard for analysis of blood samples in relation to drugs driving allegations, which has been through a number of draft iterations with forensic units providing the service and is now being finalised after consultation (section B1.11).
c. Guidance for rapid DNA analysis, which is being developed by a sub-group of the DNA Specialist Group (DNASG) (section B1.3).
d. Guidance for Y chromosome Short Tandem Repeat (STR) analysis, which is being developed by a second sub-group of the DNASG (section B1.3).
e. Guidance for relationship testing, which is being developed by a third sub-group of the DNASG (section B1.3).
f. Network forensics, which is being considered by a sub-group of the Digital Forensics Specialist Group (DFSG) (section B1.2).
g. Internet Intelligence and Investigation (III), which is being considered by a second sub-group of the DFSG (section B1.2).

A2. Compliance

In 2014, 50 organisations held some level of accreditation to ISO 17025 [3] for forensic science methods. That number now stands at 70, and the range of accredited methods has increased substantially.

Only two organisations had demonstrated adherence to the Codes [5] as part of their accreditation in 2014. This has now increased to 48 organisations.

Numbers, of course, tell only part of the story and it is necessary to consider the impact that gaining accreditation has had on compliant forensic units and the reasons for, and impact of, non-compliance among other forensic units.

A2.1 Disciplines With Low Levels of Compliance

Image Comparison

There has been little improvement in the position on compliance among image comparison experts, none of whom hold the requisite accreditation; one provider has applied for accreditation for its technical processes, although not for evaluation of comparisons. Before accreditation can be considered for evaluation, fundamental shortcomings in the approach to evaluating the outcome of comparisons must be addressed. To this end, I am pleased that the Chartered Society of Forensic Sciences (CSFS) has held a pilot training session for a subset of its Digital Media Working Group members in the principles of evidence evaluation. Such training will assist in preparing the community for adopting the formalised scientific approach to evaluation being developed as an appendix to the Codes (section B1.4).

It is crucial that image comparison, which is frequently used in evidence, is conducted on a sound scientific basis; examples of poor practice are numerous and the risk of miscarriages of justice remains.

Work of Digital Media Investigators (DMIs)

DMIs conduct a range of digital forensics activities within police forces, both at scenes and in fixed facilities, but have not yet made any significant steps towards implementing the required quality standards. Indeed, in some police forces, DMIs appear to have aimed to remain separate from their digital forensics colleagues, presumably, in some instances at least, in an attempt to avoid the adoption of quality standards. Both the National Police Chiefs' Council (NPCC)'s digital forensics portfolio and I have engaged with the DMI community, presenting the need for quality standards [8, 9]. DMIs are now represented on the digital scene sub-group of the DFSG and I have requested that training for DMIs by the College of Policing includes the requirement for and basis of forensic science quality standards.

Digital Forensics

The level of compliance in the broader digital forensics field is increasing slowly, with another 14 extensions to scope (three of which were related to expanding accommodation to enable ongoing working during the pandemic) and two successful new grants of

accreditation in the last year. In reality, the current level of fragmentation of digital forensics service provision and the shortage of capacity mean that policing is unlikely to be able to catch up with compliance until wider changes have been made. A digital forensic science strategy has been published [10] but although its aims are laudable, there is a substantial amount of work to do before the delivery model is agreed upon, let alone implemented.

As a first step, the Forensic Capability Network (FCN) plans to develop an automated digital forensic service for child sexual exploitation (CSE) cases. With a 12-16% rise in submissions during the three months to June 2020 [11], there is substantial unmet demand for this service. Three alternative approaches will be trialled by lead forces; these will include building in open interoperability standards and assessing approaches to automating validation of the CSE workflow.

There are many challenges in handling and utilising large volumes of data appropriately and in keeping up with rapidly changing technology. Nonetheless, there is also advanced technology already in existence which, if it can be appropriately adapted, tested and deployed, has the potential to make relatively rapid improvements to efficiency, effectiveness and quality (see for example the collaboration between the East Midlands Special Operations Unit (EMSOU) and Amazon Web Services discussed in section A3.3).

A2.2 Disciplines With High Levels of Compliance: Effectiveness and Remaining Gaps

The highest level of compliance with the required quality standards is where there is a legal requirement (fingerprints and DNA analysis) for accreditation, arising from the transposition into UK law of European Union (EU) requirements [12], to facilitate data sharing between EU Member States [13].

DNA

Analysis of DNA

Given the high level of compliance with quality standards in relation to DNA analysis, it is worth considering the impact of that compliance and what remains to be done. The quality culture among forensic units providing DNA analysis and interpretation is mature, with an

ongoing process for improvement and a good understanding of the frequency and type of errors occurring. This understanding is, in part, due to near-miss analysis and other data assurance measures in place within the Forensic Information Databases Service (FINDS) unit of the Home Office (HO), which manages the National DNA Database (NDNAD). FINDS, United Kingdom Accreditation Service (UKAS) and I together undertake a quarterly review of the performance of forensic units engaged in the process of providing DNA profiles to the NDNAD. Over the last six years, the process for data assurance and the level of challenge provided by proficiency trials have been improved, enabling forensic units to evaluate their performance against other similar units and take improvement action accordingly. Implementation of the standard for development of evaluative opinion (section B1.4) will fill a remaining gap in standardisation and assurance, particularly in relation to evaluation of the activity by which DNA has been deposited on an item.

DNA Sampling

An error reduction strategy is required for the process of sampling and recording mouth swab samples from suspects within police custody suites, since it is at this point where the majority of errors that result in a DNA profile being associated with the wrong person are made. FINDS is in the early stages of working with police forces towards understanding the sources of error, the accuracy of error rate data and any ways in which the occurrence of errors could be reduced.

Detecting Contamination

The Contamination Elimination Database (CED), which is managed by FINDS, is an important component of ensuring the integrity of DNA results held on the NDNAD and used in casework, in line with my requirements [14]. Thus far, all but two of the territorial police forces in England and Wales have completed the transition of police officer samples from the Police Elimination Database (PED), which was not routinely searched, to the CED, which is searched against unidentified crime scene DNA profiles from the NDNAD weekly, in order to proactively identify any potential contaminants. The remaining two forces are making progress with their transition to the CED. As has been noted in previous reports, the Police Staff Council (PSC) maintained that participation in the CED is voluntary for staff in post prior to August 2018, although it became mandatory for new staff joining after that date. The PSC had undertaken to review the efficacy of this voluntary

approach after 12 months, but only asked human resources departments in all forces in July 2019 if there were any implementation issues around the policy. Unfortunately, it is not the human resources department that would be aware of the level of compliance with the policy. This leaves an unacceptable gap in assurance, but the FCN is seeking to gather information on the extent of the issue. To illustrate the effectiveness of the CED in identifying contamination events, as of the end of May 2020, [1] 2,405 matches between crime scene DNA profiles and profiles on the CED (from police officers and staff, with a few consumables manufacturing staff) had been generated for investigation. Investigations of those potential contaminants have resulted in the removal of 1,440 crime scene DNA profiles from the NDNAD, where the source of the DNA profile was concluded to be contamination. Another 200 crime scene DNA profiles were identified for retention on the NDNAD, with there being a valid reason for the match generated, such as there being a chance match; chance matches generally relate to partial DNA profiles. The residual 765 remain under investigation with the 'owner' of the crime scene DNA profile record. Some of the identified contamination events date from many years ago, when both the sensitivity of the DNA profiling systems in use and the awareness of the potential to contaminate were lower. Looking solely at figures since July 2018, when the operation of the CED moved from historic purges to 'business as usual', 457 matches have been generated for investigation. Investigations have resulted in the removal of 199 crime scene DNA profiles from the NDNAD; 3 crime scene DNA profiles have been retained on the NDNAD and 255 remain under investigation. Currently, the mean time taken to complete an investigation is 4 months, in contrast to the required time for completion, set by FINDS, of 1 month; an improvement in timeliness will be sought in the coming months.

NDNAD Non-Compliance

Last year, I reported that there had been more constructive discussions with HO officials responsible for hosting and maintaining the NDNAD, in relation to the need for external assurance; I expected to see substantial progress during the year. However, a combination of the impact of the pandemic, delays to the implementation of the first phase of the upgrade to the NDNAD, and staff changes within the HO, means progress has been

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[1] Figures provided by FINDS.

slower than planned. HO officials have undertaken to provide me with a review of risks and proposed means of assurance. When the proposal is received, I will consider whether this proposal is a suitable alternative to the standard currently set, TickITplus [15]. In the interim, the unsatisfactory position of NDNAD non-compliance with the standard persists.

Fingerprints

There is much further to go in refining the manner of implementation of quality standards and achieving a mature quality culture within fingerprint bureaux. This will, in part, be facilitated by introduction of an electronic work management system [2] to streamline the way in which the required records and notes can be made and retained. Adoption of quality standards for fingerprint comparison has resulted in a number of significant improvements including, but not limited to, the following.

a. There is objective evidence of the competence of experts, and a requirement for ongoing evaluation of that competence, rather than competence being determined as it was previously, on a one-off basis, rarely if ever revisited.
b. Validation studies have been undertaken using known marks (Ground Truth Data (GTD)) and each accredited bureau has an understanding of its performance on comparisons of varying complexity. It is important to continue to build on this understanding and to be transparent, particularly when reporting more complex (challenging) marks, about the variation that would be expected between experts presented with the same comparison.
c. Notes are made to record the basis of each comparison and the expert's interpretation. In 2011, the Scottish Fingerprint Inquiry [16] recommended that note-taking should become general practice for fingerprint comparison. The judgment of the Court of Appeal in R v Smith [17] concluded that "No competent forensic scientist in other areas of forensic science these days would conduct an examination without keeping detailed notes of his examination and the reasons for his conclusions". Yet there was little or no movement towards routinely making notes in most

[2] Under development, led by the FCN.

fingerprint bureaux until it became clear that accreditation to ISO 17025 [3] and the Codes would not be granted unless contemporaneous notes were taken.

Many in the community still see standards as a blocker to delivering an efficient service. In the way in which the standards have been implemented, which is in part due to a failure to act earlier on note-taking, they undoubtedly are. But this is an early stage of adoption and, with creative thought, effort, and technology adoption, efficiency will increase alongside quality assurance; there are certainly improvements remaining to be made in note-taking. The potential to automatically 'blind' the examiner to the source of the marks for comparison within the workflow, including whether the comparison is a new one or a peer review, will greatly reduce the potential for cognitive bias. While it is undoubtedly an interesting element of the role of fingerprint expert to look at case details, it is unnecessary for the purpose of the comparison stage and compromises efficiency as well as raising the risk of bias. Where the 'activity' by which the marks may have been deposited is relevant, case details are of course required and care should be taken to properly sequence and record this disclosure of case details.

A2.3 Disciplines Working Towards Compliance

Incident Scene Investigation: Volume and Serious Crime

The progress towards compliance with standards for incident scenes has been slow, but it is good to note the first police collaboration (Bedfordshire Cambridgeshire and Hertfordshire) being granted accreditation for volume crime scene examination. Experience to date has shown that while it has taken significant time and cost to build, test, implement and maintain the quality system, it delivers an improved framework for management of CSI services, improved consistency and accuracy of output and improved technical processes. This results in enhanced professional standing, more consistent training and better understanding and minimisation of contamination. That understanding of contamination has led to rejection by forensic services teams of poorly seized or handled items from police customers. Although rejection of items can make police customers feel that they are being less well served, it serves the interests of justice overall. Crime scene investigators themselves have found the process of adapting to standardised processes challenging and the processes for note-taking lengthy and awkward. Adapting

to formal competence assessment, in which errors or sub-optimal practice are part of the development and learning process has been stressful and frustrating for experienced practitioners. Taken as a whole, the feedback from Bedfordshire Cambridgeshire and Hertfordshire is that the steps taken to implement quality standards and gain the requisite accreditation represent a positive step forward. There will inevitably be further improvement over time.

Incident Scene Investigation: Digital Scenes

The FCN is supporting the South East Regional Organised Crime Unit (SEROCU) as part of the NPCC National Cybercrime Programme sub-group Team Cyber UK, towards accreditation for on-scene examination of routers, Random Access Memory (RAM) capture and logical recovery of files from live systems to the requirements of ISO 17020 [18] and the Codes [5]. The aim is to achieve first accreditation in early 2021 and once accreditation is attained by the SEROCU the suite of documentation that supports the accredited methods will be rolled out in a staged approach across the National Cybercrime Network and made available to the wider police community. Collaborative approaches such as this should greatly increase the efficiency with which the standards can be attained.

Forensic Collision Investigation

Forensic collision investigation is one of the disciplines which has embraced the adoption of standards with most enthusiasm, seeing it as an opportunity to improve and professionalise the service provided. There is a long way to go before all collision investigation meets the required standards but a number of significant improvements in practice have already been achieved. It has been encouraging to see the community pulling together to conduct validation of its methods and, where weaknesses were found, drawing on innovation from small businesses to assist with design and production of improved equipment. Adoption of quality standards should be like this: it should stimulate improvement and innovative thought. Where it is not doing so, organisations need to think again about their approach to the challenge.

Sexual Assault Examination

Six Sexual Assault Referral Centres (SARCs) have joined the UKAS pilot for accreditation of the forensic science elements of sexual assault examinations. This is an encouraging level of participation. UKAS has developed a novel Assisted Application Scheme (UAAS), which has been live since 1 October 2020. The UAAS includes eLearning modules to develop awareness of the accreditation process and the requirements of ISO 15189 [19] and the Codes [5]. As well as the eLearning modules, registered organisations will be able to submit documentation to the UKAS project team for review when each module has been successfully completed and discuss any issues arising. I am following the development of this approach with interest, as it may provide benefits for other organisations new to accreditation.

I am continuing to liaise with the Care Quality Commission (CQC) and UKAS to ensure that CQC inspections and UKAS assessments do not either duplicate effort or leave gaps in assurance. I welcome the position statement from National Health Service (NHS) England and NHS Improvement (NHSE&I), which includes the following wording [20].

> NHSE&I acknowledge and welcome the introduction the quality standard and associated FSR Codes of Practice for SARCs. We support the process of accreditation by which SARCs are expected to work toward demonstrating technical competence and in doing so provide confidence in the forensic standards delivered. […]
>
> NHSE&I expects all bidders for SARC services being commissioned from now on to be able to evidence how they will work toward meeting the requirements of these quality standards in the timescale set by the Forensic Science Regulator.

Despite the encouraging progress, I remain concerned that some of those conducting the examinations do not yet have the full range of competence to do so. In particular, the ability to evaluate findings in the context of the case is of critical importance; when examiners do not have the skills to provide an opinion, case outcomes can be compromised.

A2.4 Improving the Realisation of Benefits from Quality Standards

Organisational Culture

Looking more broadly at the implementation of quality standards, there is a spectrum of maturity in culture and the benefits of fully implementing quality systems have not yet been

realised by many organisations. However, there are signs of changing attitudes and it has been encouraging to note a few police forces improving the senior officer oversight of quality in the past year, in an aim to spread quality culture beyond the forensic services department. Police officers have likened the changes required to those when the Police and Criminal Evidence Act 1984 (PACE) was first introduced, noting that although those changes were difficult to embed, nobody would want to go back to pre-PACE days now. Others note that they would not expect an officer to be responsible for an armed response if they did not hold the right accreditation to do so, so there is no excuse for forensic science failing to hold the appropriate accreditation.

Proficiency Trials

Work is needed in many disciplines to improve the efficacy and availability of proficiency trials. It is a requirement of ISO 17025 [3] accreditation that proficiency trials are undertaken where they are available, but not all available trials provide sufficient challenge. Where they adequately approximate to the challenge of casework samples, proficiency trials offer significant opportunities to identify good practice and to improve poor performance. The FCN has undertaken to develop a plan for improving access to effective proficiency trials and has liaised with the Association of Forensic Science Providers (AFSP), which represents the larger forensic units outside policing. A collaborative approach would provide good value from proficiency trials as the more participants there are in a given trial, the better the opportunity to evaluate variability in performance across the sector. This work remains at an early stage, but I encourage all concerned to prioritise this important element of improving quality assurance.

A3. Shared Understanding of Quality and Standards

There has been some progress with ensuring that there is a shared understanding of quality and standards across the CJS, but much remains to be done.

A3.1 Court Expectations for Forensic Science

The effective use of forensic science in the CJS is dependent on (a) the work being done correctly in the forensic unit and (b) the results of the work being properly reported and used in the CJS. The standards I set address, to varying degrees, both of these issues. It must, however, be recognised that the second is heavily dependent on compliance with

the Criminal Procedure Rules (CrimPR), Criminal Practice Directions (CrimPD) and other legal obligations [21]. The CrimPR and CrimPD are not static; they have developed significantly since their introduction.

The CrimPR were introduced in 2005. Content relating to expert evidence was introduced in 2006 in Part 33 and amendments were made in 2009. In 2011 the Law Commission published Report No. 325, entitled 'Expert Evidence in Criminal Proceedings' [22] which made a number of recommendations. In 2014 the CrimPR were amended to give effect to a number of those recommendations [23]. These changes included the following.

a. Altering the wording of 33.1 to make clear Part 33 covered all expert opinion evidence.
b. Expanding the definition of the expert's duty to the court.
c. Introducing a new Part 33.3 setting out procedural requirements about expert evidence.
d. Introducing a new Part 33.3, an obligation to disclose information which may undermine the credibility of an expert.
e. Introducing a new 33.4(h) requiring a report to include information about the reliability of the evidence.

The changes to the CrimPR were supported by changes to the CrimPD [24].

In 2015 the CrimPR were issued as a reformatted document and Part 33 became Part 19 [25]. At the same time 19.2 was modified to make clear expert witnesses had to assist the court in case management.

In 2017 the CrimPD were again amended [26] to further support the operation of Part 19, and in particular Parts 19.4(j) and 19.4(k). This modification created an obligation for experts to make a series of declarations in their reports; see also [21, 27-28].

The 2018 update to the CrimPR [29] modified the requirements of Part 19.4(e) in relation to what the expert had to declare about assistance.

In 2019 the CrimPR were modified [30] to require expert witnesses to disclose information which may undermine their credibility to the party that instructed them. Further modifications were made, related to the restriction of information about expert evidence provided to the other party.

This history of evolution suggests the CrimPR and CrimPD can support the use of expert evidence and protect the CJS. However, this is critically dependant on courts applying the Rules consistently. There are indicators that the implementation of the Rules may not be rigorous in all courts.

There are few references in appeal cases to CrimPR 33 (as it was) and the current CrimPR 19. [3] Exceptions include the following.

a. The Queen on the application of Nutricia Limited v. The Secretary of State for Health [31]: a judicial review case where CrimPR 33 was merely mentioned in the civil context in relation to the ability of the courts in general to assess expert competence.
b. The Queen on the application of Wright v. Crown Prosecution Service [32]: where CrimPR 33 was discussed, but in a straightforward example of lack of competence.
c. R (Hassani) v. West London Magistrates' Court [33], where there was a reference to CrimPR 19 in the context of a decision to refuse permission to apply for judicial review.
d. DPP and another v. Walsall Magistrates' Court and another [34]. This case concerned judicial review of two court orders relating to disclosure of material relating to the operation of Lion Intoxilyzer 6000's. In deciding that the orders should be quashed the court referred to CrimPR 19 when calling into question the reliability/admissibility of expert reports like those that were produced in the two cases before it.

When technical changes to the law of evidence (e.g. silence, hearsay and bad character) were introduced, where there were numerous appeals initially, whilst lawyers came to terms with the changes. In contrast, there have been few admissibility challenges relating to CrimPR 19 considered on appeal before the Court of Appeal (and very little before the Divisional Court [4]). This does not in itself prove that Part 19 is not being effectively

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3 From a search of Lexis and Westlaw, kindly undertaken by Professor Michael Stockdale, Head of Law and Director of the Centre for Evidence and Criminal Justice Studies, Northumbria University.

4 The Divisional Court is a court with at least two judges, within the High Court of England and Wales.

deployed in the Crown Court and Magistrates' Courts. Professor Stockdale hypothesises that the lack of case law in relation to Part 19 may be indictive of one, or more, of the following.

a. Part 19 is well understood by lawyers, is easy to apply and is being applied effectively (either by discouraging lawyers from attempting to adduce evidence of dubious reliability and/or by facilitating the exclusion of such evidence when it is adduced).
b. Lawyers find competence challenges relatively easy to make but find challenges to underlying methodology more challenging/more difficult to identify and are not making such challenges when evidence of dubious reliability is adduced.
c. Limited funding has reduced the likelihood that lawyers will be able to adduce expert evidence from less well-established areas of expertise, so there isn't too much to challenge.

From referrals to me and consideration of judgments relating to the boundary of what constitutes expertise (e.g. R v Turner [35]) a further two hypotheses are that:

d. Scientific reports are insufficiently transparent regarding the limitations of the analysis or conclusions to enable effective challenge; and
e. Reports are being presented in such a way as to appear factual, when in fact there is a great deal of inference, uncertainty and opinion behind what is concluded.

I am in full agreement with Professor Stockdale that this is an area that calls for empirical research to understand which of these suggestions may have an impact and to ensure that the Rules are being deployed as effectively as possible.

In relation to the ability to mount effective challenges to any dubious evidence, it is interesting to note that a suggestion from the Winton Centre for Risk and Evidence Communication to the Bar Standards Board that all Bar courses should contain a module on statistics [36] was, as far as can be ascertained, taken up by only one of the 9 education and training organisations currently authorised by the Board to deliver the vocational stage of training. Without the appropriate training, it is unlikely that the level of knowledge and confidence in challenging expert evidence will improve. It is encouraging

that a Massive Open Online Course is being developed by the Winton Centre, the Leverhulme Centre for the Forensic Sciences at Dundee and the Centre for Evidence and Criminal Justice Studies, Northumbria University, which will be freely available and will enable open access to statistics training material suited to all levels of professional training in the law.

Despite the CrimPR requirement for expert witnesses to disclose information which may undermine their credibility to the party that instructed them, experts who have been repeatedly, and seriously, criticised by the courts and experts who have failed to meet the required quality standards continue to be instructed in a substantial number of cases. This risks undermining the value of case-specific scrutiny of scientific evidence. Breath alcohol determination is a notable area in which some experts appear to be acting in an adversarial manner rather than providing unbiased evidence to the court (see B2.11).

A3.2 Notable Decisions from the Court of Appeal in Relation to Forensic Science

Reliance on DNA Evidence

The Court of Appeal (EWCA) has upheld several cases based almost entirely on DNA evidence. However, the position across a number of cases in which this issue has been considered by the EWCA, is not entirely clear. The risks of a conviction based on DNA alone, or in combination with little other information (e.g. location [5]), need to be fully understood.

Courts have indicated that, under certain conditions, a conviction can be based on DNA evidence alone, but it has been recognised that this is an approach which can present serious difficulties [37-40]. In R v. FNC [41] the Court considered whether an application of “no case to answer” should have succeeded when the prosecution case was based primarily on DNA evidence. The judgment suggested the Court may reconsider the

[5] Incidents in the same location would tend to be investigated by the same police force and go to the same forensic science laboratory. Therefore, contamination or sample handling issues may be a higher risk than for crimes at opposite ends of the country. Although these risks are small, they do indicate that location is not a completely independent factor to rely on.

position set out in the cases above. In R v. Tsekiri [42] the Court suggested more reliance could be placed on DNA evidence. In R v. Bech [43] the Court showed a degree of reservation on relying too heavily on DNA evidence. The matter has since been considered in R v. Lewis [44], R v. Jones [45] and R v. Killick [46].

There are many thousands of DNA cases analysed each year and there is a good understanding of the errors encountered within the end to end process from identification and collection of DNA at a scene or from a suspect to the interpretation of evidence.

The most serious errors result in the erroneous association of a DNA profile with an individual. Examples include the following.

a. Sample and/or demographic switches between individuals sampled in police custody. This occurs in the order of 100 times per quarter. [6]
b. Sample handling issues within a forensic science laboratory. There have been fewer than ten instances reported to me since 2014.
c. Contamination events, including at SARCs (e.g. body fluid contamination between complainants, leading to the identification of a suspect from one case in relation to another), in forensic science laboratories and at crime scenes (see section A2.2 in relation to the Contamination Elimination Database, which describes the incidence of contamination from personnel; another 15 instances of laboratory or consumables-related contamination have been reported to me since 2014).

In many cases, the issue is less about whose DNA is present than about how it came to be there, i.e. it is an activity level question rather than a source level question; a notable exception is R v FNC [41]. Whilst activity level questions can be addressed by forensic scientists, they do not generate likelihood ratios (LRs) of anything approaching the magnitude commonly reported at source level (typically one billion [7]).

Whilst DNA analysis and interpretation are extremely reliable overall, risks remain in relation to its use in isolation from other substantive corroborative evidence.

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6 Figures collected by FINDS.

7 1 billion is defined here as 1000 million.

Digital Data

The recent Court of Appeal judgment in R v. Bater-James [47], helpfully set out matters of principle relating to when, and how, to examine data belonging to an individual such as a complainant or witness and held on a device. To maintain confidence in the process, the Court recognised the need to avoid undue invasion of the individual's privacy while also achieving the overriding aims of the CJS.

At paragraph 88 of the judgment, the Court commented on the practical aspects of an examination of data. Those comments, at the level of questions to be asked or issues to be considered are, undoubtedly, correct. However, at the level of individual steps to be taken, they should not be taken as more than a statement of potential options. In every case, there must be an assessment, by the investigator, as to the nature of the examination to be undertaken and how this will fit in the wider investigative and forensic strategies. There are significant risks in assessing "whether it is sufficient simply to view limited areas (e.g. an identified string of messages/emails or particular postings on social media)" or in "simply looking at the relevant material and taking screenshots or making some other record, without taking possession of, or copying, the device". The risk of not capturing the correct information or not being able to undertake further analysis if new issues come to light during an investigation would need to be understood throughout the CJS. Information recorded as screenshots would need to be carefully caveated that authenticity, accuracy and completeness could not be guaranteed. Investigators would need to understand the point at which they require input from a specialist; capture of screenshots by an investigator is not forensic science and a jury would need to be clear on its limitations.

Boundaries of Expertise

The boundary between scientific or technical factual evidence and expert opinion evidence is not always immediately obvious. This issue has recently come to the fore in cases where cell site evidence was adduced.

In the case of R v. Calland [48] (a) the boundary between what was fact and what was opinion and (b) where expert opinion may be required was summarised very clearly. The Court recognised the importance of the limitations of the analysis and how an expert may

be required to comment on, for example, the directionality of mobile phone masts and topographical features such as hills or tall buildings.

In the case of R v. Turner [35], there were differences in case management and identification of the key issues, but one of the grounds considered in the appeal was whether the evidence given by one of the witnesses was admissible, since she was not an expert. I make no comment on those specific issues of admissibility. However, some of the evidence given by the witness in question would require expertise and inference in order to reach what I would describe as an opinion and not a fact. An example was whether a simple analysis of data could show that a phone had travelled between two villages, separated by 7km. Such a statement could only be true if the cell at the start of the sequence of calls considered only served in one village (and nowhere else) and likewise the last cell in the sequence only served in the second village; the area in which these cells serve is not provided in the records and would be the result of an assessment. The Court concluded that this was neither expert evidence nor evidence of coverage. Experts in this field, however, have pointed out that cells in rural areas can often cover over 5km and that mast location, height (mast height and terrain height, and their relationship with the locations of interest), azimuth, and cell density will all affect a view on whether the data would be expected if the phone moved between these villages. It is also of concern that the witness, in evidence, stated that:

> “I just show the mast on my maps in relation to the home address. So it’s up to yourselves to kind of draw that conclusion”.

A mast will usually contain many aerials pointed in different directions. Understanding whether a specific cell of interest might serve an area including, for example, a home address will depend on more than just the mast location relative to that address. For example, the most commonly used cell might be based on a close mast but pointed away from the address and, as a result, not serve there, or a cell based on a different mast might dominate service at the address to the exclusion of other cells. There is interpretation required to give an opinion on the data if a cell based on a particular mast was a serving cell, but when presented as a map, there is perhaps a danger that a jury may reach its conclusion without being aware of the technical issues affecting such an interpretation. Indeed, it is difficult to distinguish this situation from the objection in Calland [48] when the prosecution was deemed to have:

> "unhelpfully conflated the location of a particular mast with the question of what safe inferences can be drawn about the location of a telephone using it".

I have raised this issue with the senior Judiciary and have asked the Criminal Procedure Rules Committee whether it considers that there is any merit in a requirement, for those submitting scientific or technical factual evidence, to highlight any limitations of their analysis and anything which might undermine that evidence. It may be that some of the requirements applying to expert evidence by virtue of case law and Part 19 of the CrimPR could helpfully apply to all scientific evidence, regardless of whether it is considered to be opinion or factual.

A3.3 Forensic Science Research

The forensic science research landscape is mixed. There are projects addressing some of the gaps in knowledge to enable more effective evaluation of evidence, where the issue of interest to the court relates to the activity by which a trace has been deposited [49]; there is a growing level of collaboration between multiple institutes, again with the aim of improving evaluation of evidence [50]; and the FCN is developing a research and development strategy for police use of forensic science.

Alongside these efforts, the HO is working with UK Research and Innovation (UKRI) to identify research needs in forensic science and funding for those needs. However, progress has been slow and it is inevitable that the pandemic will result in even greater pressure on research funds.

There remains a tendency to accept a paucity of data to support interpretation. It is true that each case is different and there will never be a data set that answers every question. However, it is feasible, and indeed essential, to design and conduct studies to assist forensic scientists with evaluating evidence in relation to common scenarios and to understand the extreme ends of what is possible, for example in terms of transfer and persistence of trace evidence. Forensic scientists should be pressing for such research through their employing organisation and their professional body and should be ensuring that any current shortcomings are highlighted in their reports.

The research landscape is wider than academia and, particularly in relation to digital forensics, technology companies have a great deal to offer. It is encouraging to note the collaboration between the EMSOU and Amazon Web Services, which is developing ways

of consistently ingesting data for analysis using a cloud platform allowing the interchange of forensic software solutions and removing duplication and silo working to improve performance and quality. While funding is pending awaiting the outcome of the Comprehensive Spending Review, law enforcement organisations in several jurisdictions are watching with interest, hoping to learn from this initiative.

A3.4 Governance

Forensic Science Sub-Group of the Criminal Justice Board

In last year's Annual Report [51], I acknowledged the establishment of the Forensic Science Sub-Group of the Criminal Justice Board (CJB) but noted that it would require vision and determination on behalf of Government to bring about a situation where policy rather than persuasion dictates the sustainability and quality of forensic science in England and Wales.

Policy leads in the HO and Ministry of Justice (MoJ) have set out a 'forensic science reform programme' but progress to date has been mixed.

Statutory Powers for the Regulator

Significant progress against one strand of this programme has been brought about by Darren Jones MP, through the introduction of his Private Member's Bill [2] to establish statutory enforcement powers for the role of Forensic Science Regulator. In this effort, he has had the support of the Government and the Bill [2] was unopposed at its second reading in the House of Commons (on 25 September 2020 [52]) after which minor amendments were made at committee stage (on 11 November 2020 [53]). I have suggested further minor amendments to the Bill [2], primarily in relation to data handling. Although increasing transparency among public bodies is desirable, there is a need to ensure that making the Regulator subject to the Freedom of Information Act 2000 does not inadvertently cause organisations to become wary of disclosing information to the Regulator, resulting in learning and improvement opportunities being lost. To date, I have promoted a culture where any serious errors and near misses are reported and investigated to identify learning and improvement opportunities, which can be cascaded across the sector. This has resulted in issues being dealt with effectively rather than 'brushed under the carpet'.

Value of Forensic Science

As part of the reform programme, HO officials, working with academics and police forces, have started a project to establish the value of forensic science to the CJS. Although delayed by the pandemic, several pilot studies looking at the points where forensic science has impacted the CJS are due to be completed in the coming months. These studies, which include forensic science impact in homicide, child sexual exploitation, domestic burglaries, suspicious death and rape, should give an initial view on the value and impact of forensic science. The aim is to use the pilot studies to help establish a methodology for measuring impact more broadly in the future. Being able to quantify the impact of forensic science in the end-to-end CJS will assist in making future funding decisions, so is very welcome.

Transforming Forensics and the FCN

Another strand of the reform programme has been the establishment of the FCN as the ‘business as usual’ delivery arm of the Transforming Forensics (TF) Programme.

The FCN has delivered support to forces as they work towards implementing quality standards and is planning delivery of several tools and processes to assist practitioners including a fingerprint workflow tool, a centralised quality management system, a national system for procuring consumables of the appropriate quality and a national approach to testing fingerprint powders. It has also commissioned national work to improve the efficiency and effectiveness of processes for decision-making about what items should be submitted for scientific analysis. These are undoubtedly helpful developments. TF is also aiming to stabilise the delivery of forensic science services in the commercial sector and policing and to deliver against the NPCC’s Digital Forensic Science Strategy [10], of which it led the development.

Last year, I noted that it remained unclear how fully forces would sign up to the FCN. A year on, this appears still to be the position. A collaborative approach is clearly preferable to a fragmented one, but some police forces have expressed concern that they will merely be supporting those which are less advanced and that the approaches proposed, for example in the digital forensics field, are insufficiently well developed.

Much remains to be done to stabilise procurement and provision of forensic science and expansion of capacity in relation to digital forensics and toxicology in particular. Although

there is often reference to the issues at Randox Testing Services in 2017 as the start of the problems with toxicology capacity, in reality there have been warnings about toxicology skills on the record since 2013 [54]. It is a failure of the systems of governance and procurement that in 2020 the problems are worse rather than better. When service provision is insufficient to meet day-to-day operational demand, it should be no surprise when there is insufficient resilience to respond quickly to any quality issues arising.

Legal Aid

There has been no significant progress on addressing the thorny issue of legal aid payments for experts and how the system could be altered to support introduction of quality assurance for those offering expert review services to the defence. It is clear that some individuals who claim to be experts in one or more disciplines, despite repeated judicial criticism, continue to be instructed, almost certainly funded by legal aid. All parties in the CJS deserve high quality scientific advice and the limited amount of public money available should not be spent on individuals who do not comply with their legal obligations.

Support for Small Businesses

I have also raised with the Home Office and the CJB Forensic Science Sub-Group the issue of how to support small businesses with the costs and abstraction of implementing quality systems, when margins on forensic science in the CJS are so low, particularly for work funded through legal aid. It is disappointing that the CJB sub-group has not yet given serious consideration to this issue. If a scheme to assist with establishing a quality management system and quality assurance, such as that developed by the CSFS, were centrally funded, then there is the potential to significantly reduce costs to small providers. This would cost a tiny fraction of the amount allocated to policing through TF and the FCN, but as yet, the Government has not allocated any funds to support small businesses to achieve the requisite standards.

Biometrics Governance

In my 2019 Annual Report [51], I expressed concern about the Law Enforcement Facial Images and New Biometrics Modalities Oversight and Advisory Board and noted that I, together with the Commissioner for the Retention and Use of Biometric Material (the ‘Biometrics Commissioner’) and the Surveillance Camera Commissioner would seek a

meeting with the Policing Minister to determine how a governance framework could be developed.

The Law Enforcement Facial Images and New Biometrics Modalities Oversight and Advisory Board was subsequently disbanded, and a National Biometrics Strategy Board was convened, jointly chaired by Chief Constable (CC) Andy Cooke from Merseyside Police and Christophe Prince, Director for Data and Identity at the HO.

In common with the Law Enforcement Facial Images and New Biometrics Modalities Oversight and Advisory Board, the National Biometrics Strategy Board has no statutory remit, and is seeking to address operational issues as well as development of plans and policies. I have provided comments on the Terms of Reference for this Board and have offered assistance, critical review and/or discussions where forensic science and biometrics overlap. I am not a member of the Board.

An independent review of the governance of biometric information was commissioned by the Ada Lovelace Institute [55] and is being led by Matthew Ryder QC (Queen's Council). I gave evidence to that review in November 2020.

I am supportive of the 'Three Laws of Biometrics' recently published by the Biometrics Institute [56].

1. Policy – comes first: Any use of biometrics is proportionate, with basic human rights, ethics and privacy at its heart.
2. Process – follows policy: Safeguards are in place to ensure decisions are rigorously reviewed, operations are fair and operators are accountable.
3. Technology – guided by policy and process: Know your algorithm, biometric system, data quality and operating environment and mitigate vulnerabilities, limitations and risks.

Such an approach protects against the risks of deploying technology before the legal, policy and procedural safeguards are in place and would help to avoid situations such as an operational deployment of automated facial recognition by police being ruled unlawful [57].

A4. Summary

The last six years have been fraught with financial, reputational and capacity problems for forensic science in this jurisdiction. The vast majority of the forensic science in the CJS has been of the appropriate quality, but there continue to be exceptions.

Alongside those difficulties, there have been significant steps forward. Where problems have been found, they have been dealt with. There are quality standards in place and evolving over time; there has been a significant upturn in compliance with those standards; and whilst it would be premature to say that there is a shared understanding of quality and standards throughout the CJS, there has been progress towards that position.

Quality has a higher profile. There is broad, although not universal, appreciation of the need for quality to be an integral part of the way forensic science is delivered, not an optional add-on. Standards and guidance have assisted organisations in adopting new technologies in a manner that is demonstrably reliable for the CJS. They have paved the way for greater international data sharing and have enabled better investigation of, and learning from, failings.

Forensic science has a higher profile in the CJS and although there is a long way to go, there is more effort by Government to understand and seek to address shortcomings in the system. There is closer working between academics, practitioners and end users in the CJS, including police and the Judiciary.

The vast majority of individual forensic scientists continue to contribute their expertise to the CJS with integrity and diligence despite the pressures of time, workload, the global pandemic and there being limited opportunity for them to participate in the wider development of their professional field.

I would like to thank all those who continue to deliver high quality forensic science and all those who contribute to its advancement, whether through quality management, research, or policy. This is an ongoing effort, which the next Regulator will guide through the coming years.

Part B:

Report on Progress 17 November 2019 – 16 November 2020

B1. Quality Standards in Place for all Forensic Science Disciplines

B1.1 Quality Standards, Guidance, Information Documents and Protocols Published in the Reporting Year

During the year from 17 November 2019 to 16 November 2020 the standards, guidance, information documents and protocols in Table 1 were published. The table excludes updates where the only changes were to meet the requirements of The Public Sector Bodies (Websites and Mobile Applications) (No. 2) Accessibility Regulations 2018 (see section B4.2).

Table 1: Standards and Guidance Published, 17 November 2019 to 16 November 2020

Publication	Date	Link
Code of practice for forensic gait analysis FSR-C-137 Issue 1 [8]	12 December 2019	www.gov.uk/government/publications/forensic-gait-analysis-code-of-practice
Codes of Practice and Conduct for forensic science providers and	22 April 2020	www.gov.uk/government/collections/forensic-science-providers-codes-of-practice-and-conduct#codes-of-conduct-and-practice

[8] Issue 2 was published in September 2020, as part of the work to meet accessibility regulations.

Publication	Date	Link
practitioners in the Criminal Justice System FSR-C-100 Issue 5		
Legal Obligations FSR-I-400 Issue 8	30 April 2020	www.gov.uk/government/publications/legal-obligations-issue-8
Expert Report Guidance FSR-G-200 Issue 3	17 April 2020	www.gov.uk/government/publications/expert-report-content-issue-3
Expert Report Guidance FSR-G-200 Issue 4	15 May 2020	www.gov.uk/government/publications/expert-report-content-issue-4
Non-Expert Technical Statement Guidance FSR-G-225 Issue 2	15 May 2020	www.gov.uk/government/publications/non-expert-technical-statements-issue-2
Guidance for the Assessment, Collection and Recording of Forensic Science Related Evidence in Sexual Assault Examinations FSR-G-212 Issue 1	27 May 2020	www.gov.uk/government/publications/sexual-assault-examination-guidance-for-forensic-science-related-evidence

Publication	Date	Link
Sexual Assault Examination: Requirements for the Assessment, Collection and Recording of Forensic Science Related Evidence FSR-C-116 Issue 1	27 May 2020	www.gov.uk/government/publications/sexual-assault-examination-requirements-for-forensic-science-related-evidence
Fingerprint Research and Development Considerations FSR-I-409 Issue 1	19 June 2020	www.gov.uk/government/publications/fingerprint-research-and-development-considerations
Proficiency Testing Guidance for DNA Mixture Analysis and Interpretation FSR-G-224 Issue 1	29 June 2020	www.gov.uk/government/publications/proficiency-testing-guidance-dna-mixture-analysis-and-interpretation
Information to be Included in the 'History' Section of a Forensic Pathologist's Report FSR-G-210 Issue 2	31 August 2020	www.gov.uk/government/publications/completing-the-history-section-of-a-forensic-pathologists-report

Publication	Date	Link
The Control and Avoidance of Contamination in Forensic Medical Examinations FSR-G-207 Issue 2	1 September 2020	www.gov.uk/government/publications/sexual-assault-referral-centres-and-custodial-facilities-dna-anti-contamination
Allele Frequency Databases and Reporting Guidance for the DNA (Short Tandem Repeat) Profiling FSR-G-213 Issue 2	1 September 2020	www.gov.uk/government/publications/allele-frequency-databases-and-reporting-guidance-for-the-dna-17-profiling
Friction Ridge Detail (Fingermark) Visualisation and Imaging FSR-C-127 Issue 2	9 September 2020	www.gov.uk/government/publications/fingermark-visualisation-and-imaging
Friction Ridge Detail (Fingerprint) Comparison FSR-C-128 Issue 3	9 September 2020	www.gov.uk/government/publications/fingerprint-comparison
Friction Ridge Detail (Fingerprint) Examination –	9 September 2020	www.gov.uk/government/publications/fingerprint-examination-terminology-definitions-and-acronyms

Publication	Date	Link
Terminology, Definitions and Acronyms FSR-C-126 Issue 2		
The Control and Avoidance of Contamination in Scene Examination involving DNA Evidence Recovery FSR-G-206 Issue 2	11 September 2020	www.gov.uk/government/publications/crime-scene-dna-anti-contamination-guidance
DNA Analysis FSR-C-108 Issue 2	14 September 2020	www.gov.uk/government/publications/dna-analysis-codes-of-practice-and-conduct
Bloodstain Pattern Analysis FSR-C-102 Issue 2	16 September 2020	www.gov.uk/government/publications/bloodstain-pattern-analysis-codes-of-practice
The Interpretation of DNA Evidence (Including Low-Template DNA) FSR-G-202 Issue 2	17 September 2020	www.gov.uk/government/publications/the-interpretation-of-dna-evidence

B1.2 Standards for Digital Forensics

Cell Site Analysis

The pilot to evaluate accreditation standards for cell site analysis and communications data was relaunched. One hurdle identified in the original pilot was validation, specifically accessing GTD. For cell site analysis, GTD comprises call data records for calls made at known locations. There are tight controls on requesting call data records for any given phone number to ensure that the data is supplied for a specific purpose; the requests are made under the Investigatory Powers Act 2016 process using the Test Data Statutory Purpose. The Regulator secured agreement and assistance from the NPCC's Communications Data Professional Oversight Board in obtaining test call data for the pilot. The pilot participants were supplied with call data generated by test calls in realistic scenarios; this was supplied as a 'blind trial', with the known locations of the calls being revealed once the findings had been submitted.

Unfortunately, the timing of the work coincided with the beginning of the pandemic lockdown period in March 2020; the survey work for the blind trial was considered non-essential and the pilot was put on hold until greater freedom of movement was possible. In early September restrictions lifted sufficiently to reset the timeline. To allow participants to fit validation studies around casework commitments including any possible backlogs, a date of January 2021 was given for the submission of findings. Once the findings have been considered and the true locations are fed back to the pilot participants to complete that aspect of their validation, the pilot will then proceed through 2021. Successful completion of this pilot will enable the new Regulator to determine an accreditation requirement and timeline.

Incident Scene and Network Forensics

A sub-group of the DFSG to discuss digital incident scene investigation met in the first part of 2020 and decided that 'screening, capture and preservation or analysis of data from a device conducted at scene (including but not limited to routers)' was the best description of what most practitioners were doing at scenes.

In contrast the 'network forensics' category in the Codes referred to situations where conventional data capture techniques could not be deployed and was originally identified

because system administrators are generally required to assist with data acquisition from corporate servers. The optimal method to provide quality assurance if the acquisition is undertaken by system administrators is still under discussion. The sub-group advocated that practitioners performing this activity should adopt a risk-based forensic strategy, which deals with the limitations of co-opting others in the recovery process and with staff competent to oversee the acquisition stages. There have been discussions with non-police law enforcement agencies, which mainly deal with corporate and financial data, so the intention is for the sub-group to progress with formalising the quality assurance mechanism for this activity during 2021.

Internet Intelligence and Investigation

The activity of internet intelligence and investigation, also known as open source intelligence needs to be performed by competent staff, using valid methods, working to a written forensic/investigative strategy; the actions taken need to be recorded in sufficient detail to enable a similarly competent practitioner to understand how the information captured was derived. Clearly the internet is searched for many purposes, but even simple map queries could result in the wrong house being raided, so anything that is for intelligence or evidential use should fall into this category. The question of how to gauge compliance against the Codes and whether more specific detail on how the Codes apply in an appendix or guidance document remains under review and will be progressed by the III sub-group of the DFSG in 2021.

Closed Circuit Television (CCTV) Recovery, Analysis and Interpretation

The Regulator has continued to support the NPCC's Specialist Capabilities Programme in its wide-ranging work on CCTV as well as the CSFS Forensic Digital Media Working Group. As with all workstreams, the pandemic initially curtailed planned work and events, however, as new ways of working were developed to collaborate online, some lost time was pulled back.

The NPCC's Specialist Capabilities Programme work aims to cover the end-to-end process of recovery, handling and reporting of imagery within policing. The Regulator has previously identified risks in image handling; the Specialist Capabilities work aims to deal with the fact that guidance for front line police officers has not kept pace with the move from analogue to digital imagery. The early work has focussed on the 'front end' and

refreshing guidance for technical specialists; further work is required on later stages in the process, including reporting of results in court. Understanding the rules and limits of how material is to be reported dictates the skills, training and any limits to the type of image handling permitted for specialists versus those for front line staff. For instance, the boundaries of what is a factual statement rather than opinion evidence needs better definition. The Programme has been working hard to define the whole end-to-end process, and the Regulator will continue to support the work as it aims to provide guidance and commission the College of Policing to deliver training packages that address the risks and improve capability.

B1.3 DNA Standards

The DNASG has advised on updates to current standards during the year (see Table 1: Standards and Guidance Published, 17 November 2019 to 16 November 2020). It is continuing to develop guidance on Y chromosome STR Profiling, Relationship Testing and Rapid DNA devices. It is anticipated that these will be finalised and published in the Spring of 2021.

The Forensic Science Advisory Council (FSAC) asked the DNASG to provide guidance on cases where massively parallel sequencing and generation of phenotypic indicators would be critical or useful. For genetic genealogy, a further requirement was for quality standards for the evaluation of a candidate sample suitability. These requests have been incorporated into the workplan for the Group and will be progressed during 2021.

B1.4 Evaluative Opinion Standard

The evaluative opinion standard has been subject to focussed consultation during the year and at the time of writing (November 2020) is with a broader group for further consultation. The following have been asked to contribute to the consultation.

a. Forensic science experts specialising in interpretation of evidence.
b. Experts in a range of disciplines including DNA, digital forensics, fingerprints, fire investigation, marks and traces, sexual assaults (body fluids and forensic medical examination).
c. A range of Fellows and/or Chartered Practitioners from the CSFS (selected by the President of the Society).

d. Representatives of the Royal Statistical Society.
e. Members of the Judiciary.
f. Legal academics.
g. Academic scientists.
h. Police forensic leaders.
i. The AFSP.
j. The FSAC.
k. UKAS.

The Regulator does not intend to hold a public consultation, as the subject matter is highly specialised. A focussed consultation including representatives from relevant groups is more effective and more manageable. It will include a sufficiently broad base of consultees to ensure that the standard, when published, will be scientifically robust, acceptable to the courts and achievable.

B1.5 Fingerprint Standards

As well as being reformatted to meet the Regulator's obligations under The Public Sector Bodies (Websites and Mobile Applications) (No. 2) Accessibility Regulations 2018, the Regulator's suite of fingerprint documents has been subject to significant updates. In particular the updated documents refer to friction ridge detail more generally than just in the context of fingerprints. These documents were published in September 2020, and details of where they can be found are in Table 1.

B1.6 Fire Investigation Standards

The 2019 Annual Report [51] highlighted that ISO 17020 [18], ILAC G19 [58] and the Codes [5] are applicable for the assessment of fire investigation activities and that the assessment 'dry run' identified that an appendix to the Codes [5] should be developed. The process of commissioning an external contractor to draft the appendix is complete and it is the intention for a draft appendix to be ready for consultation for mid-2021. A specialist group to oversee the work has been established.

B1.7 Updated Legal Guidance

The document 'Legal Obligations' [21] was updated to reflect some changes in case law and developments in the Crown Prosecution Service requirements. The related document

[27] on expert report requirements was updated to clarify the position with regard to electronic signatures following a number of enquiries. The document [28] on non-expert technical reports was similarly modified to address electronic signatures.

B1.8 Standards Relating to Forensic Science Elements of Medical Forensics

Sampling in Sexual Assault Examination

A standard setting out the requirements for the assessment, collection and recording of forensic science related evidence in sexual assault examinations was published in May 2020 as an appendix [59] to the Codes [5]. The standard requires organisations delivering these services to gain accreditation to ISO 15189 [19] and the Codes [5] by October 2023 and set interim milestones around development of a quality management system (by October 2020), competence and procedures (by April 2021), validation of methods (by October 2021) and implementation of internal audits and other quality management practices (by April 2022).

Guidance was published [60] alongside the standard, to assist organisations in understanding how they can meet the standard.

Update on Standard for Sampling in Custodial Settings

The development of a standard and guidance for sampling during forensic medical examination in routine custodial settings is part of the work program for the Medical Forensics Specialist Group (MFSG) and the membership of the MFSG has been expanded to include representation from experienced custody practitioners and the NPCC's custody lead.

The guidance document 'Control and Avoidance of Contamination in Forensic Medical Examinations' [61] already applies to sampling in custody. Development of a standard will be based on an assessment of risks to the quality and integrity of evidence collected in custodial settings, and consideration of how those risks can be mitigated. The poor level of compliance in custodial settings with the current anti-contamination guidance indicates that there will need to be an inspection mechanism. The nature of this compliance mechanism has not yet been established but will be considered in discussion with inspection bodies.

B1.9 Forensic Pathology Standards

Code of Practice for Forensic Pathology

The Code [62] has been rewritten but one section, that dealing with less invasive post mortem examinations, is contentious and as such is still under discussion at the time of writing.

History Document

The document ‘Information to be Included in the ‘History’ Section of a Forensic Pathologist’s Report’ [63] has been republished to take account of issues of privacy.

Excited Delirium

The use of the term ‘excited delirium’ as the cause of death has been a matter of debate. Guidance has been issued that this term should not be used as a cause of death [64].

Sampling At Post Mortem Examinations

A guidance document on sampling at post mortem examination remains under discussion with the Royal College of Pathologists (RCPath).

Legal Issues in Forensic Pathology and Tissue Retention

The document ‘Legal Issues in Forensic Pathology and Tissue Retention’ [65] has been updated. Changes were made to address issues raised in cases related to the stillborn and foetuses.

Accessibility

The documents ‘Provision of Tissue to the Defence’ [66] and ‘The Use of Time of Death Estimates Based on Heat Loss from the Body’ [67] were republished in an updated format to improve accessibility but without substantive changes.

B1.10 Review Standard

No substantive progress has been made towards establishing what standard should apply for review of work previously carried out, aimed primarily at defence review. This is because of the issues with legal aid funding and allocation, discussed in section A3.4.

However, the standard for evaluative opinion should apply to all scientists and deals with arguably the area of highest risk.

B1.11 Toxicology Standards

Standard for the Analysis and Reporting of Forensic Specimens in Relation to s5A Road Traffic Act 1988

The draft of the document on analysis for the purposes of s5A Road Traffic Act 1988 (FSR-C-133) has been the subject of a number of consultations with those involved in the work, the United Kingdom and Ireland Association of Forensic Toxicologists (UKIAFT), and UKAS. There have also been a series of discussions with UKIAFT and UKAS.

On each consultation a number of issues were raised but the vast majority of those have now been addressed. Views on the outstanding issues have been sought from UKIAFT and UKAS and the document should be published soon.

B1.12 International Standards

The British Standards Institution (bsi) Forensic Science Mirror Committee (FSM/1) continues to be the UK's voice in relation to the development of forensic science related standards internationally, through the ISO; Geoffrey Morrison took over as Chair of the Committee in late November 2019, following the Regulator's decision to stand down as Chair in order to focus on domestic quality standards.

During the last year, the ISO Technical Committee (ISO/TC) 272 has continued to work on three standards at Committee Draft (ISO/CD) stage; the FSM/1 Committee has provided comments and attended the review meetings for:

ISO/CD 21043-3 Forensic Sciences - Part 3: Analysis;

ISO/CD 21043-4 Forensic Sciences - Part 4: Interpretation; and

ISO/CD 21043-5 Forensic Sciences - Part 5: Reporting.

In parallel terms and definitions are considered with the aim to update 'Part 1: Vocabulary' on the completion of these standards.

The UK quality standards framework for forensic science is set out in the Codes. The Regulator has no plans to require organisations to be certified against the new standards.

It was noted last year that the development, by ISO/TC 272, of the standard for forensic grade consumables, ISO 20964 [68], had been discontinued. It had been hoped that this standard would eventually replace Publicly Available Standard (PAS) 377:2012: 'Specification for consumables used in the collection, preservation and processing of material for forensic analysis' [69]. The future of PAS 377 [69] is yet to be determined. In the interim, the requirements therein continue to be applicable for assessing the provision of consumables that are fit for use, with the exception of appendix A. The requirements in appendix A of PAS 377 [69] have been superseded by BS ISO 18385:2016 'Minimizing the risk of human DNA contamination in products used to collect, store and analyse biological material for forensic purposes' [70].

B1.13 Regulatory Notices Issued

During the Reporting period, Regulatory Notices as detailed in Table 2 were issued.

Table 2: Regulatory Notices Published, 17 November 2019 to 16 November 2020

Publication	Date	Link
Regulatory Notice 01/2020 Effect of COVID-19 pandemic on accreditation	20 March 2020	www.gov.uk/government/publications/effect-of-covid-19-pandemic-on-accreditation
Regulatory Notice 02/2020 Planned update for the "Control of Data" section of the Forensic Science Regulator Codes of Practice	1 August 2020	www.gov.uk/government/publications/update-to-the-control-of-data-section-of-the-codes-of-practice
Regulatory Notice 03/2020 Deadline for accreditation of incident scene investigation	2 October 2020	www.gov.uk/government/publications/regulatory-notice-032020-deadline-for-accreditation-of-incident-scene-investigation

B2. Section 2: Full Compliance with Quality Standards

The broad picture of compliance with the required quality standards is considered in Part A of this report. This section updates on specific progress through the reporting year and any outstanding issues.

B2.1 Collision Investigation

The Forensic Collision Investigation Network (FCIN) has continued to make substantial progress during the year, with North Wales Police (NWP) being identified as the host force. Assistant Chief Constable (ACC) Sacha Hatchett from NWP took on the roles of

NPCC lead for forensic collision investigation and Senior Responsible Officer for the FCIN. A section 22 (s22) collaboration agreement [9] to govern the FCIN has been drafted and sent to forces; at the time of writing, 33 forces have signed the s22 agreement. The roles of head of FCIN, performance and standards manager, quality manager, quality support officer, 8 regional managers, 8 regional technical managers, a business manager and administrative support officer have been filled.

Validation was delayed by the pandemic but, with the exception of the method for determining speed from CCTV, is now complete for the first set of methods to be assessed.

NWP has submitted its application for accreditation to ISO 17020 [18] and has completed a pre-assessment. The initial assessment date will be set once a plan for witnessing collision investigation activities has been agreed. A highly ambitious plan for accreditation has been drawn up, involving 60 assessments between July 2021 and October 2022. The scope of accreditation for the first tranche of assessments includes the methods used in the majority of collision investigations but further extensions to scope are being planned to cover the full range of methods. Because the plan has so little scope for time slippage, it is unlikely that all forensic collision investigation units will be accredited by the deadline of October 2022, but the amount of progress in improving the quality of forensic collision work already is substantial and by that date, will be even more so.

The FCIN is working with partners including Cranfield University to develop a central testing facility comprising 600m of motorway quality road surface, to enable ongoing validation work. It is anticipated that this facility will become a home for competency assessments, continuing professional development (CPD) events and research and development. Alongside these activities, an ambitious ten-year programme of training has been developed.

B2.2 Digital Forensics Compliance

As noted in Section A2.1, structural change is needed in order for full compliance with the standards to be achieved for police digital forensics. However, there are several projects

[9] An agreement made under section 22 of the Police Act 1996.

within the FCN in which a national approach is being taken and which are likely to have an impact on compliance. Automating the CSE workflow (Section A2.1) and assisting with Regional Organised Crime Unit (ROCU) scene investigation accreditation (Section A2.3) were considered earlier in this report.

Kiosk Project

The FCN is now leading an update of the national kiosk validation package with Staffordshire Police and the Defence Science and Technology Laboratory (Dstl). This includes addressing the remaining issues concerning quality assurance, prior to seeking accreditation for one example deployment of the technology in the first half of 2021.

Ground Truth Databases

Dstl reported back to the DFSG on the first phase of work commissioned by the Regulator to establish how GTD could be prepared for digital forensics and made available to police and commercial digital forensics practitioners. The Regulator and the DFSG facilitated feedback from the digital forensics community on the priority of the various types of GTD to assist with method validation. The feedback was collated and discussed between DFSG and Dstl in early November 2020 and the next stage is for Dstl to plan for delivery of the highest priority datasets.

B2.3 Fingerprint Compliance

The final unaccredited fingerprint bureau has now booked an assessment for January 2021; it is to be hoped that the bureau will have taken learning from others and from its previous unsuccessful assessment and will gain accreditation soon thereafter.

To assist fingerprint enhancement laboratories with maintenance of their quality standards, the FCN is undertaking collaborative work with Dstl and Portsmouth University to centrally test fingerprint powders. Collaborative work such as this is to be welcomed, as it enables maintenance of quality with lower cost and abstraction from operational delivery.

B2.4 Fire Investigation

The FCN has established a fire investigation project and has recruited a National Fire Investigation Accreditation Technical Lead to lead the work for the remainder of this financial year. This will provide welcome assistance to Fire and Rescue Services (FRS)

working towards accreditation. In addition to engagement with interested parties, a central repository of information (Knowledge Hub) has been created and work has commenced on defining national methods for fire investigation, initiating Failure Modes and Effects Analysis for risk analysis of the methods and considering ways to review the existing scientific basis of the methods. Consideration is also being given to training and competence assessment as well as method validation.

B2.5 Firearms Classification

In her 2019 Annual Report, the Regulator noted that firearms classification is an area where there is little compliance in policing. The Regulator congratulates South Wales Police on gaining accreditation to the standards during the year; this brings the number of compliant forces to only five.

B2.6 Forensic Pathology Compliance

Audit

The audit of the wok of forensic pathologists undertaken in 2018/2019 will be published by the end of 2020.

B2.7 Home Office Biometrics Programme (HOB)

In last year's Annual Report, it was noted that implementation of the first phase of the upgrade to the NDNAD had been delayed until approximately April 2020; further delays were encountered, and the implementation is now due to happen towards the end of November 2020. It was important to delay implementation when insufficient time remained for testing, but the upgrade will provide greater stability and operational effectiveness.

The Regulator has continued to provide guidance on the validation requirements for forensic science methods to the HOB Programme and FINDS teams to ensure that risks to the CJS are controlled by appropriate testing prior to implementation.

The NDNAD non-compliance with the standard set by the Regulator was considered in Part A of this report (section A2.2).

Delivery of the new search algorithm for the fingerprint database has also been delayed and is now due for delivery late in 2021.

B2.8 Image Enhancement and Comparison

Five organisations hold accreditation for aspects of their image capture and enhancement work, but no organisation yet holds the requisite accreditation for image comparison.

The Forensic Digital Media Working Group of the CSFS work aims to revise the reporting methodologies for image comparison, in line with the Regulator's 'Development of Evaluative Opinions' appendix to the Codes, which is currently in the consultation phase (see section B1.4). After delays caused by the pandemic, a pilot training workshop was delivered. This workshop prompted a great deal of discussion and is the start of a longer process of reform, which will continue through 2021.

B2.9 Incident Scene Investigation

The deadline for Investigation of Simple or Complex Incident Scenes by CSIs (October 2020) was suspended in March this year, because UKAS was unable to perform on-site assessments during the pandemic lockdown. When assessments re-started in October, the deadline was reset to October 2021.

The Regulator is pleased that the first police force collaboration (Bedfordshire, Cambridgeshire and Hertfordshire) has gained accreditation for investigation of volume crime scenes, for which it should be congratulated. The projection is that around 30% of forces will have at least one of their CSI hubs accredited by the revised deadline. While such a low projected figure is disappointing, learning gained during the process of achieving accreditation at those hubs will have been spread to the majority of CSI hubs and so the level of improvement should be higher than the 30% figure suggests.

As with many disciplines implementing quality standards for the first time, inefficiencies will have been introduced; over time, more efficient ways of working to the quality standards will be developed. The moves forward, particularly in terms of reduced contamination risks and better documentation of scenes, more than justifies the increased time taken per scene.

B2.10 Procedural Issues and Streamlined Forensic Reports (SFR)

New SFR guidance was published by the FCN in July 2020 [71] and emphasises the need for clear, succinct language to be used, to enable the parties to understand the significance of the findings and the defendant to understand what it is they are being

asked to agree. The guidance reiterates that any issues raised by the defence do not have to be scientific or technical in nature, but that it would assist the process if some context as to the nature of the disagreement were provided.

The Regulator is pleased to note that the incidence of experts being called to court to give evidence when they have only prepared a stage 1 Streamlined Forensic Report (SFR1) has reduced sharply.

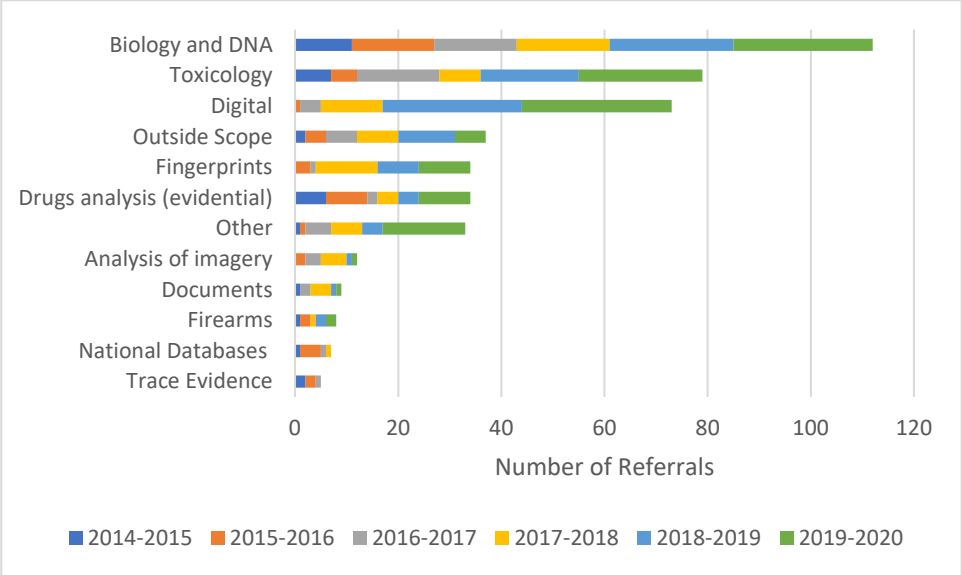
As yet, there has been no indication that, where there is a disputed issue, defence experts are being appointed in a more timely fashion to enable them to review the evidence in good time before trial. The Regulator was contacted recently by a defence team searching for an accredited provider of digital forensics services, which would be able to conduct a large volume of work in a short timescale. Compressed timescales are not generally conducive to high quality review, particularly when it involves a large volume of digital material.

B2.11 Complaints and Referrals

General Pattern

The number of referrals has again increased. As noted in previous reports this should not be taken as evidence of a worsening situation. Rather, as quality standards are embedded in more areas there will be a tendency for issues to be escalated to the Regulator when that would not have occurred before. Figure 2 illustrates the trends in referrals over time for disciplines where there have been more than five referrals.

Figure 2: Referral Trends by Discipline over Time



The number of referrals in relation to biology and DNA is high in absolute terms but is not high in proportion to the number of samples processed.

Digital forensics has, in the last year, overtaken the number of referrals for biology and DNA. The adoption of standards that require escalation of quality issues has increased and the number of examinations performed has grown markedly, so this is to be expected.

The number of toxicology referrals has also grown, but again, so has the number of samples processed since the introduction of testing in relation to s5A of the Road Traffic Act 1988.

The number of referrals in relation to fingerprints is still perhaps lower than would be expected, given the number of items processed. It may be that escalation of quality issues has not yet fully embedded for fingerprints, or that the number of quality issues is low; it will be interesting to note the pattern of change as the standards embed and the automated workflow, which will enable experts to check the work of their colleagues in a ‘blind’ manner is implemented.

Over recent years the number of referrals which have been assessed at high or severe has reduced both in actual numbers and as a proportion of the referrals made. It is too early to say whether this is a reliable trend or to comment on the reason for it but it is worth highlighting as a welcome position.

Table 3: Categorised Complaints Received from November 2014 to November 2020

Classification	2014–2015	2015–2016	2016–2017	2017–2018	2018–2019	2019-2020
Severe risk	0	0	0	0	1	0
High risk	7	9	14	6	4	3
Medium risk	15	33	25	44	60	65
Low risk	9	9	14	27	29	65
Outside scope	3	4	6	8	11	0
Total	**34**	**55**	**59**	**85**	**105**	**133**

Impact

The figures above compartmentalise the referrals into reporting years. It must, however, be recognised that the impact of quality issues do not fit neatly into time periods. The response to a quality issue can take a considerable period of time. For example, the issued raised with regard to Randox Testing Services in 2017 are still being dealt with today. Further, as noted below, the response to the cyber-attack on Eurofins Forensic Services (EFS) in 2019 is still being dealt with.

EFS Cyber Attack

In the last Annual Report [51], there was a discussion of the cyber-attack on EFS and the response to that event.

Following the attack, the Regulator worked closely with the National Cyber Security Centre to develop requirements for cyber security which could be incorporated into the Codes [5]. This resulted in a draft section on ‘control of data’ to be inserted in the Codes [5].

The text was the subject of a public consultation over the period 14 August to 21 October 2019. The result of the consultation was discussed at the FSAC and Quality Standards Specialist Group (QSSG).

The text of the proposed section was published as Regulatory Notice 02/2020 [72] on 1st August 2020. The text will, subject to any need for modification, be incorporated in the next issue of the Codes [5].

Impact of the Pandemic

The response to the pandemic required forensic units to modify their processes. There have been a small number of referrals where, at least in part, the modifications introduced as a result of the pandemic have contributed to the quality issue. However, the number is small and the impact of these cases is also very limited.

It is to the credit of forensic units that the impact of the pandemic has not led to a far higher number of referrals.

Toxicology – Alcohol

A number of referrals have related to the work of persons giving, or purporting to give, expert evidence in relation to drink driving offences.

It is disappointing to note that there are some persons acting as expert witnesses in this area who:

a. Do not appear to be experts in relation to the subject matter of their evidence;
b. Do not seem to appreciate that their role as an expert witness is as an independent adviser to the court;
c. Do not appear to understand that their duty to the court overrides their obligations to the instructing party; and
d. Do not understand the obligations placed on expert witnesses in the CJS.

The Regulator is communicating with individual practitioners to raise the issues and seek improvement.

Anonymous Reporting

In the last Annual Report [51], the launch of an anonymous reporting line operated by CrimeStoppers was noted.

The line has now operated for a year and there have been five reports through this route. The number is relatively small, but it was always anticipated that this would be the case. The nature of forensic science in the UK means that most people, and organisations, feel confident about reporting issues in person. This route acts as a method for those who feel unable to report a concern in person. If the profession operates as desired this should be a small number.

These anonymous reports raised significant concerns, which the Regulator reviewed; any necessary action was taken.

B3. Section 3: Shared Understanding of Quality and Standards

B3.1 Promoting Adoption Of Standards

The pandemic resulted in the cancellation of many conferences and CPD events from mid-March, but as adjustments were made to an online way of working, events re-started. The Regulator continued to engage as much as possible with those engaged in forensic science and participated in the events shown in Table 4. Officials from the Forensic Science Regulation Unit (FSRU) representing the Regulator presented at the events shown in Table 5.

Table 4: Presentations delivered by the Regulator, 17 November 2019 to 16 November 2020

Presentation Title	Event
Why Quality Matters	Warwickshire and West Mercia Scientific Support Meeting West Mercia Police Headquarters, 23 January 2020
Forensic Science Quality	Meeting of the NPCC Homicide Working Group New Scotland Yard, 29 January 2020
Cloud Opportunities for Digital Forensics	Amazon Web Services Community and Partner Day London, 3 February 2020
Forensic Science and Miscarriages of Justice	All Party Parliamentary Group on Miscarriages of Justice Palace of Westminster, 4 February 2020
Risk, Quality Assurance and Innovation in Digital Forensics	Royal Statistical Society Digital Forensics Seminar 5 May 2020, online
Risk, Quality Assurance and Innovation in Digital Forensics	Digital Forensics Research Workshop Conference

Presentation Title	Event
	4 June 2020, online
Improving the Quality of Forensic Science in the CJS	Westminster Legal Policy Forum 28 September 2020, online
Providing quality expert assistance to the courts: what psychiatry can learn from forensic science?	The Grange Conference 30 September 2020, online
Role of the Forensic Science Regulator	Medical Protection CPD 8 October 2020, online
Cell Site Analysis: Quality Issues	FCN: Opinion Evidence in Cell Site Analysis Seminar 14 October 2020, online
Panel Discussion – Managing biometric system outputs in Counter Terrorism situations especially 1:N applications and live processing	Biometrics Institute Congress 21 October 2020, online
Stuart Kind Memorial Lecture	Chartered Society of Forensic Sciences Annual Conference 6 November 2020, online

In addition, the Regulator contributed to the Israeli public committee for preventing and amending wrongful convictions on 7 May 2020. She spoke about assuring forensic science quality to the Albanian forensic science laboratory on 29 July 2020, as part of a UK-Albania collaboration.

Unfortunately, a planned presentation on expert evidence in a Judicial College training day was cancelled due to the pandemic.

Table 5: Presentations by FSRU officials representing the Regulator, 17 November 2019 to 16 November 2020

Presentation Title	Event
Forensic Science Regulation	CPS Drugs Prosecutors Network 30 January 2020 Jeff Adams
A Review of the Interpretation Standard	EPSRC Big Ideas Workshop 18 September 2020, online

Presentation Title	Event
	Jeff Adams
Forensic Science Quality: Now and in the Future	International Security Expo 2019 3 December 2019 June Guiness
Rapid DNA: UK Position	ENFSI Rapid DNA Workshop 21 January 2020 June Guiness
Fingerprint Quality: Post Accreditation 2020 update	The Chartered Society of Forensic Sciences Annual Conference 6 November 2020, online June Guiness

B3.2 Lessons Learnt Publications

When quality issues are referred to the Regulator, the first priority is ensuring the immediate issue is appropriately dealt with. In some instances, there may be learning for forensic units other than the immediately affected organisation. This is particularly the case where several referrals have been made and the cumulative learning would be of benefit to the forensic science community. In such instances, the Regulator publishes 'Lessons Learnt' documents, to assist organisations in assessing whether they might be at risk of a similar issue or could make an improvement.

Table 6: Lessons Learnt documents published between 17 November 2019 and 16 November 2020

Title	Publication Date	Link
Lessons Learnt Issue 6: Dip Sampling Fingerprint Results	26 November 2019	www.gov.uk/government/publications/forensic-science-lessons-learnt-issue-6
Lessons Learnt Issue 7: Exhibit Handling for Submission to a Forensic Unit	26 November 2019	www.gov.uk/government/publications/forensic-science-lessons-learnt-issue-7

Title	Publication Date	Link
Lessons Learnt Issue 8: Data Audit Findings	26 November 2019	www.gov.uk/government/publications/forensic-science-lessons-learnt-issue-8
Lessons Learnt Issue 9: Case Submission and Staff Elimination Databases	26 November 2019	www.gov.uk/government/publications/forensic-science-lessons-learnt-issue-9

B3.3 Regulator's Annual Quality Conference 2020

The Regulator's annual conference took place on the 10th of March 2020, returning to Villa Park stadium. The event followed Government guidance in relation to the pandemic at the time and was attended by approximately 190 professionals despite the pandemic and the collapse of the regional airline, Flybe. The central topic of this year's conference was looking at lessons from the past and how to take that learning forwards to shape the future of high-quality forensic science provision.

Christophe Prince, Director of the HO Data and Identity Directorate, commented on the continued commitment of the HO to support the delivery of high-quality forensic science and on the ongoing support of the call for statutory powers for the Regulator.

CC James Vaughan highlighted the important role of forensic science in policing, in protecting the public and supporting justice in all types of crime. CC Vaughan described the challenges facing police forces in forensic science including: cyber security; market place fragility; the examination of digital devices; and a shortage of skills in both digital forensics and toxicology. CC Vaughan spoke on the FCN, a national capability providing support for police forces.

Rupert Shute, Deputy Chief Scientific Advisor to the HO, spoke about the establishment of the Forensic Science Subgroup of the CJB, which aims to provide high-level leadership and oversight of forensic science in the CJS. He also described the work of UKRI, which brings together research councils and Innovate UK. Rupert stated that forensic science was an excellent example of this, showing the benefits of a cross-cutting view. Investigation of research needs in forensic science was currently in the early stages of a six-month review. It was announced that there would be a Chief Scientific Advisor who

would be dedicated to the police forces and would sit within the wider Chief Scientific Advisor community. This advisor would provide more focus on scientific issues in policing.

Anya Hunt, Chief Executive Officer (CEO) of the CSFS, gave a presentation on how competence, effective training and continued professional development are critical. Anya highlighted that while no one would intentionally set out to do a bad job there remain challenges to providing a consistent, high-quality forensic service. Where these challenges prevent forensic scientists from doing their best job, we should be honest about what changes are needed to ensure both professionalism and public confidence.

Mark Pearse and ACC (as he then was) Paul Gibson spoke on the events that occurred when EFS discovered that it had been the victim of a cyber-crime. ACC Gibson spoke on the significant impact that this event had on the delivery of forensic science in the UK. The presentation covered the seven weeks from the discovery of the crime to recommencing forensic casework, and the steps that EFS and the NPCC took to maintain confidence in the integrity of analyses and results. ACC Gibson reflected on the challenges of providing direction and leadership in a situation with many uncertainties. Both presenters spoke on the need for a co-ordinated, open response and the importance of communication with staff and stakeholders.

Louise Shorter, CEO of Inside Justice, spoke on the frustrations that those working for her charity had encountered when reinvestigating cold cases and being unable to locate evidence because it had been lost or destroyed. The intention of the presentation was to raise awareness of the evidence retention requirements within policing.

Jan de Koeijer (Interdisciplinary Forensic Investigator, Netherlands Forensic Institute) gave a presentation on the multidisciplinary approach to casework and reporting in major crime cases, where alternative scenarios from prosecution and defence could be considered. Using a fictional case to demonstrate the technique, Jan explained how LRs from activity level and source level results across a range of items and evidence types could be combined to compare the likelihood of the scientific findings under different scenarios. Jan also spoke about training judges in this approach.

The Right Honourable (Rt Hon) Sir Norman Lamb, who was Chair of the House of Commons Science and Technology Committee during the previous Parliament, spoke, via video, on the need for consistent high standards in forensic science because the system of

justice depended on it. He highlighted that there continued to be unacceptable variation in standards between commercial and public sectors and across the country. The Rt Hon Sir Norman Lamb stated that Darren Jones MP would be presenting a statutory powers bill as a Private Members Bill and he hoped that the Government would take this up. As noted in section A3.4, the Government has supported the Bill.

B3.4 Parliamentary Scrutiny of Forensic Science

House of Commons Science and Technology Select Committee

It was noted last year [51] that Parliament was dissolved prior to a Government response to the House of Commons Science and Technology Committee's Report of 18 July 2019 [73]. The current Government is not obliged to respond to the report.

The Regulator wrote to the new Chair of the House of Commons Science and Technology Committee in November 2020, stating her support for the Bill [2] introduced by Darren Jones MP and setting out minor amendments she believes would assist with effective implementation.

Forensic Science Regulator Bill

Section A3.4 noted that the Bill [2] had passed its Second Reading in the House of Commons on 25 September [52]. This followed a debate of over four hours, during which a number of Members quoted from reports by the Science and Technology Committees of both Houses of Parliament and from previous Annual Reports by the Regulator. In particular, Darren Jones MP, the Bill's sponsor, Chris Green MP, sponsor of the previous Forensic Science Regulator Bill [74], [10] Kit Malthouse MP, Minister of State for Crime and Policing and Bambos Charalambous MP, the Shadow Policing Minister made substantive contributions to the debate. A money resolution in the House of Commons was passed on 10 November and minor amendments to the Bill were made at Committee Stage on 11 November. The Report Stage in the House of Commons has been scheduled for 26 February 2021.

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[10] This Bill failed to complete its passage through Parliament before the end of the 2017-2019 parliamentary session.

B3.5 Engagement Across the CJS

One of the Regulator's priorities has always been to support and promote high quality forensic science. While opportunities for face to face interaction have dramatically reduced since March, the Regulator has continued to engage with a broad range of those with the potential to influence policy strategy or practice of forensic science. In addition to the many experts from across the CJS who are members of the Regulator's advisory groups, the Regulator has maintained communication with a wide range of interested parties, including the following.

a. Professional bodies and learned societies.
b. Collaborative groups such as the AFSP.
c. Policing, including:
    i. The NPCC Forensic Science portfolio and its sub-groups;
    ii. The TF programme and FCN;
    iii. The Roads Policing Review Governance Board; [11]
    iv. The National Ballistics Intelligence Database Governance Board;
    v. The Communications Data Professional Oversight Board;
    vi. The Specialist Capabilities Programme, particularly in relation to CCTV; and
    vii. The Homicide Working Group.
d. Police and Crime Commissioners, primarily via the Association of Police and Crime Commissioners lead for forensic science.
e. The College of Policing.
f. FRS, through the fire investigation group of the National Fire Chiefs' Council (NFCC).
g. The Criminal Cases Review Commission.
h. The senior Judiciary.
i. Scientific and legal academics.

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[11] The Roads Policing Review Governance Board provides oversight for a joint review of roads policing by the Department for Transport, the HO and the NPCC to explore models to increase road traffic compliance, reduce casualties and improve capability.

j. The CPS.

k. A range of other regulators and inspectorates, including:

   i. Her Majesty's Inspectorate of Constabulary, Fire and Rescue Services;

   ii. The CQC; and

   iii. UKAS.

l. HO Ministers and officials.

m. Parliament.

B3.6 Research Priorities from a Quality Perspective

There is always a need for research to support the quality of forensic science. The areas in which the Regulator continues to encourage research include the following.

Research to underpin the scientific basis of facial comparison.

a. Research to underpin the scientific basis of methods such as gait analysis, where understanding of independence (or linkage) between class characteristics is limited.

b. Further data collation, to underpin evaluation of evidential significance.

c. Application of automated approaches to software testing to contribute to elements of method validation for digital forensics.

d. Development of reliable approaches to assist with effectively mining data from digital sources, such that reasonable lines of enquiry can be followed efficiently and with reduced risk of missing critical information.

e. Research to understand how forensic scientists can more effectively communicate their findings, and the significance of those findings, to juries.

f. Research into the reasons why scientific evidence is rarely challenged (see Section A3.1).

In addition, the Regulator has published an overview of research opportunities in relation to fingerprints [75].

B3.7 Encouraging Research in Forensic Science

This year, the Regulator has supported and encouraged research by:

a. Providing letters of support for a number of UK and EU research funding project proposals during the year;
b. Advising members of the Steering Committee of the HO and UKRI-led project, which aims to assist with identifying ways to improve coordination (and potentially funding) of research in forensic science;
c. Providing input to the ethnographic study of digital forensics at Exeter University;
d. Providing input to the team at the University of South Wales analysing data from the 'Forensic Science in Homicide Investigation' project;
e. Liaising with the FCN Research and Development Manager;
f. Commenting on planned research proposals from a range of academics;
g. Linking academics from different institutes who may have shared interests;
h. Assisting with making links between academic outputs and potential users of those outputs;
i. Acting as a mentor to a researcher on the UKRI Future Leaders programme; and
j. Continuing in her role as a Visiting Professor at Northumbria University.

B4. Routine/Administrative Report

B4.1 Data Protection

There have been no issues affecting the Regulator's use of personal data in this reporting period. Several of the referrals to the Regulator involved data protection issues.

B4.2 Accessibility

Towards the end of 2019, the Regulator was made aware of The Public Sector Bodies (Websites and Mobile Applications) (No. 2) Accessibility Regulations 2018. A review of documents published to GOV.UK which would be affected by these Regulations revealed that, to meet the Regulator's obligations under those regulations, a wholesale reformatting of documents was necessary. The Regulator took this opportunity to refresh her catalogue,

carrying out 'passage-of-time' updates to outdated references and so forth in documents where no significant update was required. Where more significant update was in order, working groups were convened and relevant changes were discussed and agreed. Documents with significant updates were published as they were completed whilst those with only passage-of-time updates were made ready for publishing in a block release on the 22nd September 2020. These documents were published on or shortly after that date.

An accessibility statement describing the extent to which the Regulator is compliant with the Regulations, and the criteria employed to meet the obligations under those Regulations, has been published to GOV.UK.

B4.3 Resources

Table 7: Resources allocated to the Regulator, 2014/15 and 2020/21

	Financial Year 2014/2015	**Financial Year 2015/2016**	**Financial Year 2016/2017**	**Financial Year 2017/2018**	**Financial Year 2018/19**	**Financial Year 2019/20**	**Financial Year 2020/21**
Administration budget (staff pay, travel, accommodation, etc.)	£409,000	£363,000	£290,000	£374,684	£470,000	£474,000	£474,000
Programme budget (developing standards and forensic pathology audits)	£265,000	£245,000	£257,170	£150,000	£100,000	£25,000	£90,000
Total Budget	**£674,000**	**£608,000**	**£547,170**	**£524,684**	**£570,000**	**£499,000**	**£564,000**
Staffing: Regulator (full time equivalent [FTE])	0.4	0.6	0.6	0.6	0.75	0.75	0.75
Officials: Specialist scientific roles (FTE)	3	3	3	3.0 plus 1 vacancy	5	5	4.5
Secretariat support	Ad hoc support from 1 x FTE	Ad hoc support from 1 x FTE	Ad hoc support from 1 x FTE	Ad hoc support from 2 x FTE's	Ad hoc support from 2 FTE's	Ad hoc support from 2 FTE's	Ad hoc support from 2 FTE's

The Regulator notes that staffing and budget will need to increase substantially to prepare for and implement the provisions of the Forensic Science Regulator Bill, if it becomes law.

B5. Acknowledgements From The Regulator

I start by thanking those in the Forensic Science Regulation Unit for their hard work, support and challenge. Without them, I could have achieved very little. So, thank you to Jeff Adams, June Guiness, Simon Iveson and Lee Parkes; thanks also to Graeme Willmott, who left us in September and Severine Demaude, who recently joined the Unit for a year. My thanks to those from the Home Office who have provided secretariat and administrative support, in particular, Mark Greenhorn, Jen Guest, Nadine Roache, Priscilla Richards and Mike Taylor.

The Advisory Council and Specialist Groups are essential to the work of regulation and I offer each member my personal thanks. I offer particular thanks to the Chairs of the groups: Sue Pope, Gary Holcroft, Alex MacDonald, Bernadette Butler and Patrick Gallagher. My thanks also to the ad hoc group which has advised me in relation to evaluative opinion; Graham Jackson, Sheila Willis and Ian Evett have been particularly generous with their time.

It has been extremely useful to have input from legal professionals and a constructive working link to the Criminal Procedure Rules Committee, with particular thanks to The Honourable Mr Justice Wall, Lord Hughes of Ombersley, Mark Bishop (of the CPS) and Jonathan Solly (Secretary to the Criminal Procedure Rules Committee), who have all contributed significantly throughout my tenure.

I am grateful to Chris Green MP and Darren Jones MP for introducing Private Member's Bills to establish statutory enforcement powers for the role of Forensic Science Regulator. I am also grateful to the Chairs and Members of the Science and Technology Committees of both Houses of Parliament for their insightful consideration of the issues facing forensic science.

In the foreword to this report, I thanked forensic scientists and do so again here – thank you for your dedication, hard work, commitment and expertise. I would also like to thank those who represent forensic scientists and allied professionals from various parts of the

system, including the CSFS, the AFSP, the NPCC Forensic Science portfolio, the FCN and FCIN, the NFCC's Fire Investigation group, the Faculty of Forensic and Legal Medicine, the Royal College of Paediatrics and Child Health, the RCPath, the UK Association of Forensic Nurses and Paramedics, British Association in Forensic Medicine, the UK and Ireland Association of Forensic Toxicologists and individual forensic leaders from all sectors. Perhaps above all, the Quality Managers from each organisation, who have worked tirelessly, facing challenges from within their organisations and from me, in setting what has sometimes seemed like an endless stream of requirements. There are too many of you to mention by name here, but I do appreciate all your input over the years.

I have benefitted from working with other regulators, commissioners and inspectorates, and would like to thank the Biometrics Commissioner, Paul Wiles; the Surveillance Camera Commissioner, Tony Porter; the Care Quality Commission, in particular Lynn Davinson; and Her Majesty's Inspectorate of Constabulary, Fire and Rescue Services, in particular Sir Tom Winsor. Thanks also to Esther Silva from NHSE&I and Hong Tan and Andy Hunt in their former NHSE&I roles.

Despite my sometimes critical comments in relation to Government policy, I have enjoyed constructive relationships with policy officials in the Home Office and thank them for their openness in discussion. I have also been privileged to work with John Aston, Chief Scientific Advisor to the Home Office and a source of wise counsel. Dean Jones and Martin Allix have supported my work in relation to forensic pathology, as has the NPCC's Homicide Working Group, and I am grateful to them. Thanks also go to Chloe Chapman, who has provided me with support and advice in dealing with press enquiries.

My interactions with the academic community have greatly enriched my time as Regulator, and although many academics contributed, I must mention Itiel Dror from University College London; and Michael Stockdale, Emma Piasecki, Sophie Carr and Adam Jackson from the Centre for Evidence and Criminal Justice Studies at Northumbria University, where I have been a Visiting Professor.

Finally, to all those who have supported me over the years by providing advice, challenge, support or even a medicinal drink, I can't name you all here, but I am most grateful - you know who you are.

Dr Gillian Tully

17 November 2020

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Annex 1: Publication and Updates of Standards and Guidance by the Regulator

Publications before the current Regulator's term of office began in 2014 are included for completeness.

	Year of First Publication (P) Update (U) or Withdrawal (W)									
Standard, Guidance or Code	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Codes of Practice and Conduct	P			U		U	U			U
Cross-Discipline Guidance										
Guidance: validation				P						U
Protocol: using casework material for validation purposes						P				U
Protocol: forensic science service archive complaints			P							U
Guidance: public comment			P							U
Guidance: cognitive bias effects relevant to forensic science examinations					P					U
Bloodstain pattern analysis: codes of practice					P					U
Digital Forensics Standards and Guidance										
Codes Appendix: digital forensic services				P						U
Codes Appendix: video analysis				P						U
Guidance: method validation in digital forensics						P				U
Codes Appendix: speech and audio forensic services						P				U
Guidance (jointly with NCA and MPS): Forensic image comparison and interpretation evidence						P				W
Codes Appendix: cell site analysis						P				U
Regulatory Notice: Image enhancement and image comparison: provision of opinion									P	U
DNA Standards and Guidance										

	Year of First Publication (P) Update (U) or Withdrawal (W)									
Standard, Guidance or Code	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Guidance: Interpreting DNA evidence		P								U
Codes Appendix: DNA analysis				P						U
Guidance: DNA contamination detection				P						U
Guidance: allele frequency databases and reporting for DNA profiling				P						U
Guidance: laboratory DNA anti-contamination					P					U
Guidance: crime scene DNA anti-contamination						P				U
Guidance: DNA mixture interpretation								P		U
Guidance: software validation for DNA mixture interpretation								P		U
Proficiency testing guidance: DNA mixture analysis and interpretation										P
Friction Ridge Detail Standards and Guidance										
Fingerprint examination: terminology, definitions and acronyms					P [12]		U			U
Fingerprint comparison					P		U			U
Fingermark visualisation and imaging							P			U
Validation: friction ridge detail (fingerprint) search algorithm									P	U
Fingerprint research and development considerations										P
Forensic Pathology: some documents are published jointly with the Royal College of Pathologists, the Home Office and the Department for Justice, Northern Ireland										
Guidance: legal issues in forensic pathology and tissue retention		P		U						U

[12] The document: “Friction Ridge Detail (Fingerprint) Examination - Terminology, Definitions and Acronyms” was initially published in 2015 as document FSR-I-402. That document was superseded by Issue 1 of FSR-C-126 in 2017. That document Is currently at Issue 2.

	Year of First Publication (P) Update (U) or Withdrawal (W)									
Standard, Guidance or Code	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Guidance: provision of human tissue to the defence				P						U
Guidance: time of death estimations				P						U
Guidance: the use of 'excited delirium' as a cause of death										P
Guidance: completing the 'history' section of a forensic pathologist's report				P						U
Legal Guidance & Information										
Information: legal obligations		P		U	U	U	U	U	U	U
Guidance: expert report content							P		U	U
Guidance: non-expert technical statements							P			U
Medical Forensics Standards and Guidance										
Guidance: sexual assault referral centres and custodial facilities: DNA anti-contamination						P				U
Codes Appendix: sexual assault examination: requirements for forensic science related evidence										P
Guidance: sexual assault examination: guidance for forensic science related evidence										P
Toxicology Guidance										
Guidance: drug driving: use of legal limits					P					U
Guidance: alcohol back calculation for road traffic investigations					P					U
Standalone Codes of Practice, issued in collaboration with others										
Royal Anthropological Institute code of practice for forensic anthropology								P		
Code of Practice for Forensic Pathology, issued in collaboration with Home Office, Department of Justice		P								U

	Year of First Publication (P) Update (U) or Withdrawal (W)									
Standard, Guidance or Code	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Northern Ireland and The Royal College of Pathologists. Published on the Royal College of Pathologists website.										
Chartered Society for Forensic Sciences and College of Podiatry code of practice for forensic gait analysis									P	

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