Forensic Science Regulator

Overseeing Quality

Annual Report

November 2014 – November 2015

Dr Gillian Tully

4 December 2015

Contents

Foreword

The post of Forensic Science Regulator was established in order to ensure that the provision of forensic science and forensic pathology across the Criminal Justice System (CJS) of England and Wales is subject to an appropriate regime of scientific quality standards. In fulfilling this remit, I collaborate with the authorities in Scotland and Northern Ireland, which have expressed their willingness to be partners in the setting of quality standards that will be adopted within their justice systems.

My predecessor in the post, Andrew Rennison, established the *Codes of Practice and Conduct for Forensic Science Providers and Practitioners in the Criminal Justice System* (the Codes), which set out the required scientific quality standards for the majority of forensic science disciplines, with a timetable for achieving compliance. Much progress has already been made towards compliance, but significant areas of risk remain.

The aim of my first annual report is to inform stakeholders of my priorities, progress and plans. It will take stock and evaluate what has been achieved and where more work is required by all in the forensic science community.

My aim is that all forensic science and forensic pathology[1] provided to the CJS is of the required level of quality. This requires the following.

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

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.

3. There is a shared understanding of quality and standards by all stakeholders, including commissioners of forensic science, expert practitioners, researchers

[1] For ease, the term ‘forensic science’ shall be used from this point forward in the report to cover both forensic science and forensic pathology.

and all end users, including 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.

In my first annual report, therefore, I have set out the main risks to forensic science quality, followed by consideration of what has been achieved and work to be done in each of these main areas, accepting that some work overlaps between the aims.

My sincere thanks to all who have helped in any way with the work of forensic science regulation over the last year.

Introduction: Assessing the Risks to Forensic Science Quality

Most of the traditional laboratory forensic science processes used in the CJS, such as analysis of drugs, DNA, fibres and body fluids, are accredited to international standards. This provides assurance that the systems and processes necessary to minimise the risk of errors and continuously improve service provision are in place. However, adherence to standards cannot prevent errors completely and there is no room for complacence; maintaining quality requires constant vigilance and ongoing investment in the knowledge, understanding and competence of staff. There are also forensic science activities that should have reached the required standards, but where compliance is incomplete, particularly within policing. An example is the classification of firearms.

In newer areas such as digital forensics and in areas routinely carried out within policing, specifically fingerprint comparison and crime scene examination, there is further to go in order to achieve compliance with the relevant standards. Timescales for achieving accreditation have been set at:

a. 2017 for digital forensics;
b. 2018 for fingerprint comparison; and
c. 2020 for crime scene examination.

Achieving accreditation to the required standards by these dates requires concerted action now from all providers of the services.

In her first year in the post, the Forensic Science Regulator (the Regulator) has focused on the risks to quality, in order to prioritise activity where it is needed most. In setting out these risks, the Regulator is highlighting areas that need the most work to reach the standards. This should not be translated into an assumption that all of the science in these areas is flawed.

Mitigating actions are in place for most risks, but they will take some time to completely address the risks; residual risk therefore remains, including for previously heard cases. The most pressing risks include the following.

a. Digital forensics, where very little of the work is accredited to international standards, and the vast majority has still to be formally validated. The October 2017 deadline set by the Regulator for all providers to achieve accreditation will be challenging to meet, despite the extensive programme of work underway. Use of digital forensics is growing, and the risk of errors is significant; the most common error is the incomplete retrieval of data, which could delay or prevent justice for victims.
b. Ineffective forensic strategy being set in individual cases. This can result in forensic work not always optimally meeting the needs of the CJS.

c. No uniformly adopted interpretation standard is yet in place, and there is a paucity of structured data to interpret evidence most effectively. The interpretation standard is being developed, but a lack of research funding impacts on the availability of data.
d. Contamination, where full elimination databases to screen for DNA contamination are not yet in place. The potential for investigations and courts to be misled remains.
e. The commercial aspects of forensic science provision are unregulated and the market is declining in size. This creates quality risks such as insufficient underpinning investment in science, and insolvency of a supplier, with consequent risks to the CJS.

A wide range of stakeholders was consulted in preparing the risk overview, which has been sent to the Right Honourable Mike Penning, MP, Minister for Policing, Crime, Criminal Justice and Victims, and to Home Office officials, including those leading the preparation of the Home Office forensic science strategy. A number of the risks may be addressed, at least in part, by this strategy, which is due to be published by the end of the year.

The risk overview was used to inform the Regulator's priorities for action. The priorities identified are given below; whilst some will take more than a year to complete, progress and prioritisation will be reviewed annually. Progress against each of these priorities, together with the next steps required, is reviewed in sections 1–3 of this report. The sections mirror the aims and requirements for forensic science quality set out by the Regulator in the foreword to the report. In general, the high priority actions are well underway, while many of the medium priority actions will start during the coming year.

High Priority

a. Digital forensics: Support the digital community to improve standards and achieve accreditation by 2017, and pilot the process for accreditation of cell site analysis. This work includes completion of a guidance document on validating digital forensics methods and consideration of how delivery models such as 'kiosks' and triage by front-line officers are managed within the quality framework in the short and longer term.

b. Firearms: Work includes clarifying the precise scope of the accreditation requirement set out in issue 2 of the Codes and contributing to the Forensic Firearms Working Group, to ensure that future delivery model(s) meet the required standard.

c. Casework review: Undertake a pilot review of rape cases, to evaluate the effectiveness of the end-to-end, crime scene to court process, concentrating

on case strategy, decision-making and hand-overs, in collaboration with the National Crime Agency (NCA).

d. Work with the Crown Prosecution Service (CPS) to improve practical aspects of case management, including appropriate use of the Streamlined Forensic Reporting (SFR) process and ensuring meetings of experts are sought where they would be valuable (for example, complex DNA mixtures cases).

e. Develop an evaluative interpretation standard, working with the Association of Forensic Service Providers (AFSP) and leading academics, with input from the judiciary.

f. Standards for Sexual Assault Referral Centres (SARCs) and custody suites: complete a standard for collection of forensic evidence at SARCs and begin work on a standard for forensic recovery in custody suites. Work with the Care Quality Commission (CQC) and Her Majesty's Inspectorate of Prisons (HMIP), in order to minimise the burden of inspection on providers.

g. Work with the National DNA Database® Unit (NDU) to close the gaps between the current Central Elimination Database (CED), which was designed primarily for checking for contaminating DNA profiles from police officers, and the wider requirements of the Regulator's standards.[2]

h. Following from a collaborative exercise between providers of DNA services conducted under the auspices of the Regulator in 2014, work to provide further guidance on clarity of wording, interpretation and validation of software for interpretation of complex DNA mixtures.

i. Conduct annual pathology audit.

j. Provide ongoing support for adoption of the Fingerprint Comparison Standard.

k. Work with the United Kingdom Accreditation Service® (UKAS) and professional bodies to develop a more attractive route to gaining accreditation to the requisite international standards for small companies and sole traders.

l. Articulate quality-related research priorities to the research community and support the work of the Knowledge Transfer Network (KTN) Forensic Science Special Interest Group and forensic science professional bodies in enhancing collaboration across the field.

[2] Forensic Science Regulator (2014) *Protocol: DNA Contamination Detection – The Management and Use of Staff Elimination DNA Databases,* FSR-P-302.

Medium Priority

a. Support the adoption of the ISO 17020 standard[3] for crime scene examination, including fire investigation. This includes hosting workshops to disseminate the requirements of the standard and guidance on how to approach accreditation.

b. Work with the relevant professional bodies to complete the development of suitable quality standards for forensic podiatry and forensic anthropology.[4]

c. Address issues related to the handling and labelling of exhibits, to ensure that the risk of exhibits being incorrectly attributed to the wrong case is minimised.

d. Liaise with UKAS to examine the way in which organisations could be accredited to ISO 17020 for case review services, frequently performed by practitioners instructed by the defence.

e. Work with professional bodies, relevant experts and the Organization of Scientific Area Committees (OSAC),[5] to evaluate risk and put in place standards for emerging areas such as facial recognition.

f. Engage with the development of international standards through the technical committee of the International Organization for Standardization (ISO) to ensure that the UK has strong representation and that standards developed assist in strengthening the quality of forensic science provision without adding significant additional regulatory burden.

[3] BS/EN ISO/IEC 17020:2012 *General criteria for the operation of various types of bodies performing inspection*.
[4] Both of these draft standards had been initiated in discussions with the previous Regulator.
[5] OSAC is organised by the US National Institute of Standards and Technology (NIST), in support of the US National Commission on Forensic Science.

Section 1: Quality Standards in Place for all Forensic Science Disciplines

Requirement 1: that appropriate quality standards are in place for all forensic science disciplines, which apply equally whether the services are delivered by small or large organisations, private companies, public laboratories, police forces or individuals.

Forensic Science Quality Standards in the UK

Although the post of Forensic Science Regulator is specifically for England and Wales, the devolved administrations in Scotland and Northern Ireland have joined the advisory groups of the Regulator and adopted, with some exceptions due to differences in practice, the standards produced. The standards produced by the Regulator are therefore referred to in this section as applying to the UK. The current advisory groups are set out in Appendix 1.

The process of producing standards and guidance involves, in general, the following steps:

a. need for guidance or standard identified;

b. draft guidance/standard produced, usually by one of the Regulator's specialist groups, by the Forensic Science Regulation Unit (FSRU) or by a contractor;

c. technical review by the commissioning specialist group or a sub-group, and sometimes involving international expert groups;

d. revised draft agreed to be published for public consultation by the Quality Standards Specialist Group (QSSG);

e. public consultation, generally for 6–12 weeks;

f. technical review, evaluating comments and incorporating changes as required, by FSRU and the wider technical review group; and

g. final version approved by the QSSG and the Forensic Science Advisory Council (FSAC).

This process has the advantage of drawing on high quality advice from the specialist groups, and enabling comment from any interested party, but it is inevitably lengthy. During the year from November 2014 to November 2015, the standards and guidance documents in Table 1 have been published.

Publication	Date
FSR-C-102 *Bloodstain Pattern Analysis*	Published for consultation 26 November 2014
FSR-G-205 *Public Comment Guidance*	Published 19 December 2014
FSR-G-215 *Provision of Human Tissue to the Defence*	Published 30 December 2014
FSR-G-208 *The Control and Avoidance of Contamination in Laboratory Activities involving DNA Evidence Recovery and Analysis*	Published for consultation 14 January 2015
FSR-G-206 *The Control and Avoidance of Contamination in Crime Scene Examination involving DNA Evidence Recovery*	Published for consultation 14 January 2015
FSR-G-219 *Forensic Image Comparison and Interpretation Evidence: Guidance for Prosecutors and Investigators*	Published 19 February 2015, jointly with the Metropolitan Police Service (MPS), NCA and CPS
FSR-C-133 *The Analysis and Reporting of Forensic Specimens in Relation to s5A Road Traffic Act 1988*	Initial version circulated to relevant stakeholders in March 2015. Updated version circulated in September 2015
FSR-C-128 *Fingerprint Comparison*	Published 24 March 2015
FSR-I-402 *Fingerprint Examinations – Terminology, Definitions and Acronyms*	Published 24 March 2015
FSR-G-220 *Alcohol Back Calculation for Road Traffic Investigations*	Published 8 May 2015
FSR-G-221 *Section 5A Road Traffic Act 1988 Use of Limits*	Published 1 August 2015
FSR-G-217 *Cognitive Bias Effects Relevant to Forensic Science Examinations*	Published 30 October 2015

Table 1: Standards and guidance published November 2014 to November 2015

Evaluative Interpretation Standard

There is currently (November 2015) no clearly adopted interpretation standard, and a gap exists between approaches that scientists take to interpreting results and the reaction of courts to such methods. This was illustrated in a number of court cases, some of which were followed by extensive comment in the scientific literature.

The issue is particularly evident where data sets used in interpretation cannot be said to be statistically representative.

The Regulator has discussed the issue with the Lord Chief Justice of England and Wales and other senior members of the judiciary. Work is underway to develop an approach to interpretation that builds on work published by the Association of Forensic Service Providers (AFSP), but takes account of rulings from the Court of Appeal and discussions with the judiciary A number of senior academics and practitioners from the UK and Europe are contributing to the work, and the first draft will be reviewed on behalf of the Lord Chief Justice by senior members of the judiciary. A consultation draft of the guidance will be published within the next year.

Avoiding and Detecting Contamination: Standards for Sexual Assault Referral Centres and Custody Suites

Contamination can be defined as *"the undesirable introduction of substances or trace materials to exhibits at any point within the forensic science process."*[6] Given the highly sensitive performance of the DNA profiling kits used in forensic science, DNA anti-contamination measures are of particular importance.

The staff of sexual assault referral centres (SARCs) interact with traumatised people; this makes taking precautions against the potential for contamination more complex when recovering samples for forensic analysis. Some, but not all SARCs have suitable accommodation. The Regulator's Medical Forensics Specialist Group (MFSG) is working to finalise a standard for forensic medical examination of adult and child sexual assault complainants. The draft standard has undergone extensive technical review and will be published for public consultation early in 2016.

With the transfer of responsibility for SARC services from policing to the National Health Service in 2013, the CQC has taken on responsibility for registration and inspection of SARCs. The remit of the CQC is the quality of medical care and the remit of the Regulator is quality of forensic science services; both have responsibilities relating to the work of SARCs. The Regulator is therefore working with the CQC, and other inspection and regulatory bodies, to evaluate how the different aspects of service provision can be inspected without either duplication or gaps. An ideal outcome would be for joint inspections to be carried out, to minimise disruption and regulatory burden on the SARCs.

[6] International Laboratory Accreditation Cooperation (2014) *Modules in a Forensic Science Process*, ILAC-G19:08/2014. Available from www.ilac.org.

Intimate samples are collected from suspects in custody medical rooms. In general, these rooms are not built, maintained or cleaned to a sufficient standard to minimise the potential for contamination. The work of the MFSG will therefore widen over the coming year to encompass collection of samples from suspects in custody. A representative of the lead for custody from the National Police Chiefs' Council (NPCC) has been invited to join the MFSG. From April 2016 medical examination in custody also comes under the remit of the CQC, as well as HMIP and Her Majesty's Inspectorate of Constabulary (HMIC). The Regulator has begun a dialogue with these bodies, which will continue over the coming year, in order to minimise the inspection burden whilst ensuring that there are no gaps.

Toxicology

The introduction of the new offence, under s5A of the Road Traffic Act 1988, of driving, attempting to drive or being in charge of a motor vehicle while the concentration of certain drugs in a person's blood or urine is above specified limits[7] was introduced in March 2015. In order to allow for the prosecution of the offence to begin, an agreement – between the Regulator, the Department for Transport, Home Office, CPS and forensic service providers (FSPs) – regarding how to address uncertainty of measurement was reached. This involved analysis of validation data[8] from FSPs to centrally set expanded uncertainties and common reporting thresholds: the lowest analytical result at which a laboratory would report a sample as above the legal limit. Interim guidance was provided to FSPs on this basis. Because data were limited in March, a review was carried out in September, with the result that the vast majority of the uncertainties and hence reporting thresholds have reduced. No uncertainties increased. Revised interim guidance has been issued to FSPs, and more detailed guidance will be published shortly.

The Regulator has consulted on potential adoption of guidance produced by the UK and Ireland Association of Forensic Toxicologists[9] (UKIAFT) as an appendix to the Codes. The next steps will be to analyse the consultation responses and liaise with UKIAFT.

Development of Standards for Forensic Anthropology and Forensic Podiatry

A draft standard has been produced for forensic anthropology by the Royal Anthropological Institute (RAI) and the British Association for Forensic Anthropology (BAFA), following discussions with the previous Regulator. During the coming year,

[7] The Drugs Driving (Specified Limits) (England and Wales) Regulations 2014 [SI 2868 of 2014], subsequently modified by The Drugs Driving (Specified Limits) (England and Wales) (Amendment) Regulations 2015 [SI 911 of 2015].

[8] This work was carried out jointly between the Home Office Centre for Applied Science and Technology (CAST) and FSRU.

[9] Cooper, G. A. A. A., Paterson, S. and Ossleton, M. D. (2010) 'The United Kingdom and Ireland Association of Forensic Toxicologists Forensic toxicology laboratory guidelines', *Science and Justice*, 50, pp 166–76.

the Regulator will work with the authors of the draft, RAI and BAFA to assist in the further development of this guidance prior to it being made available for public consultation.

Similarly, a draft standard for podiatry has been produced by the College of Podiatry, and the Regulator will work with the College in refining the draft so that it can be made available for public consultation.

Exhibit Handling and Labelling

Following the report[10] in 2014 into an incident in which a human error was facilitated by the use of an exhibit identifier that was not unique, the Regulator wrote to the NPCC lead for forensic science, Chief Constable Chris Sims. Despite assurances that the issues would be considered fully via an expert network, on which the Regulator subsequently requested representation, no substantive progress was made. Whilst developing exhibit handling systems that use barcodes or other unique identifiers takes time and costs money, the current manual checking systems add cost and time to the process, without fully mitigating the risk of error. It is not clear whether the lessons undoubtedly learned by Bedfordshire Police have been fully assimilated by all police forces. This issue has recently been raised with the NPCC Performance and Standards Group within the forensic portfolio; a system for ensuring that the lessons learned from this incident (and other quality failures) are communicated across all forces is now to be implemented. This route will be used to provide assurance that interim measures to mitigate risk are in place in all police forces.

The National DNA Database® (NDNAD) data field for exhibit number will be expanded from 12 to 30 alphanumeric characters to accommodate various unique labelling configurations in the coming year.

Legal Obligations Guidance

A key aim of the standards for forensic science is for the work to meet the standards required by the CJS. This means that those providing the service must understand the obligations placed on expert witnesses. There was, however, no clear and comprehensive statement of those obligations. The Regulator therefore published guidance in the document *Legal Obligations*.[11]

The guidance is updated on a regular basis to reflect developments in the law. The current version is being updated to address recent case law and the changes to the Criminal Procedure Rules. To ensure the accuracy of the guidance it is also being reviewed by a barrister.

The new version will be published in the near future.

[10] Forensic Science Regulator (2014) *The Performance of Bedfordshire Police and Key Forensic Services Re Bedfordshire Submission* [A], FSR-R-628

[11] Forensic Science Regulator (2015) *Legal Obligations*, FSR-I-400.

Guidance for Emerging Forensic Science Disciplines

During the next year, the Regulator will engage with OSAC, as well as relevant academics and professional bodies where applicable to evaluate the current level of underpinning science and standards for emerging areas of forensic science such as facial recognition. Use of facial recognition is likely to grow markedly in coming years and the Regulator will initiate the development of a standard.

Revision of the Codes

The Regulator recognises that the changes to the Criminal Procedure Rules and Criminal Practice Directions, together with the update to the ILAC-G19 document[6] in 2014 and the more detailed accreditation requirements for digital forensics and firearms examinations necessitate an update to the Codes. This will be published early in 2016.

A number of draft appendices to the Codes have not been progressed beyond draft stages, due to diversion of the limited available resource to higher priorities. It is the Regulator's intention to tender for external services to enable these drafts to progress through the review and consultation stages to publication.

International Standards

Working with organisations that are developing standards in other countries can be useful in terms of maximising efficiency by sharing the effort in standards production. Also, the increasingly global nature of crime is likely to lead to more sharing of forensic science results across borders.

It is not uncommon for forensic experts to give evidence in multiple jurisdictions, and standards published in one country are produced in evidence in another. In order to maintain proportionality of the regulatory burden, it is critical that forensic science providers in the UK do not, by default, become required to comply with many layers of different standards, developed in different countries.

The Regulator has been engaging with efforts in the USA, led by NIST to develop standards and enhance good practice, through meeting with the vice-chair of the Commission on Forensic Science and through participating in the NIST first International Symposium on Error Management. Draft documents have been shared between the Regulator and OSAC as well as the Federal Bureau of Investigation (FBI)'s scientific working groups.

Draft standards have also been passed between the Regulator and standards organisations in Australia and Ireland, as well as international groups such as the International Society for Forensic Genetics (ISFG) and the European Network of Forensic Science Institutes (ENFSI).

On a formal level, the Regulator chairs the British Standards Institution (BSI) Mirror Committee for Forensic Science, which is the UK's voice in relation to development

of forensic science-related standards in Europe, through the European Committee for Standardisation (CEN), and internationally, ISO. This committee votes on behalf of the UK on relevant CEN and ISO ballots in relation to forensic science standards.

The Regulator is represented in the ISO Technical Committee developing forensic science standards, to ensure that resulting standards assist in strengthening the quality of forensic science provision without adding significant additional regulatory burden. Where appropriate, standards developed by the Regulator are shared with the ISO Technical Committee, to minimise duplication of effort.

Section 2: Full Compliance with Quality Standards

Requirement 2: that 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.

Digital Forensics

Supporting the digital forensics community to adopt appropriate quality standards has been a top priority, since so little of the current work is currently accredited and the majority of the methods used have not been formally validated to determine their limitations.

Much of the digital forensic work is carried out within policing, under disparate management structures. The NPCC forensic science portfolio has therefore established a digital forensics portfolio, led by Deputy Chief Constable (DCC) Nick Baker of Staffordshire Police and supported by a Digital Forensics Expert Network. DCC Baker has led coordination efforts across policing, resulting in engagement from all police forces, and the development of initial plans for achieving accreditation by 2017.

To support organisations in understanding the requirements, the Regulator held a workshop on 12 May 2015 for over 200 representatives from policing and private sector providers of digital forensics. At the workshop:

a. the case the for standards was set out by both the Regulator and DCC Baker;

b. the requirements of the ISO 17025 standard[12] were set out by the United Kingdom Accreditation Service® (UKAS); and

c. work carried out by the Digital Forensics Expert Network was presented.

The scope of accreditation required by 2017 has been defined (see Appendix 2).

[12] BS EN ISO/IEC 17025:2005 *General Requirements for the Competence of Testing and Calibration Laboratories*.

Cell site analysis has not previously been accredited by UKAS. Therefore, in order to bring this area into scope for accreditation, a pilot study is planned for early 2016, which will be part funded by the Regulator. A number of policing and private sector organisations have already expressed interest in being part of the pilot. The Digital Forensics Specialist Group (DFSG) is developing a standard for cell site analysis, to be trialled during the accreditation pilot. It is expected to go out for public consultation in December 2015.

Guidance on how to conduct validation in digital forensics provoked a large amount of comment during public consultation. The DFSG has reviewed the comments and an extensive re-write has been undertaken. The revised guidance will be available for public comment in December 2015.

Although digital forensics remains a high risk and support for the digital forensics community in moving towards accreditation remains a high priority over the coming year, the extensive work underway to support adoption of standards will result in a significant reduction of risk by October 2017.

Firearms

Much of the firearms classification provision, which sits largely with police force staff (for example, armourers), does not meet the current regulatory requirements. The lack of a consistent quality framework for such work across forces creates a significant risk to quality, in particular:

a. a lack of understanding among force staff of uncertainty of measurement and the requirement for regular, traceable calibration of velocity determination equipment; and

b. a variable level of expertise.

The scope of accreditation required for firearms has been defined and has recently been communicated to the NPCC lead for performance and standards, DCC Mark Hopkins of Cambridgeshire Constabulary. The requirements are set out in Appendix 3, and ensuring compliance will be a high priority.

The Regulator will provide support to the Forensic Firearms Working Group, as it develops the quality systems required for simple classification and triage, and considers future requirements for firearms services.

Avoiding and Detecting Contamination: Elimination Databases

Full elimination databases to identify DNA contamination are not yet in place. The risk of wasting a significant level of investigative resource on the basis of contaminating DNA profiles, or of the presence of an unknown DNA profile misleading a court are therefore not fully controlled.

A gap analysis between the first phase of the CED project run by NDU and what is required under the Codes was produced by the Regulator, working with NDU, and the second phase of the CED project has been expanded to cover the requirements under the Codes.

The approximate timescale for the CED to meet the most urgent requirements of the Regulator and therefore reduce the risks to an acceptable level is March 2017, with some improvements being implemented from March 2016. Full compliance is unlikely to be achieved ahead of a new National DNA Database® platform under the Home Office Biometrics Programme, due to be delivered by the end of 2017.

DNA Mixtures

Following a number of court cases such as *R v. Dlugosz & Ors,*[13] in which the interpretation of mixed DNA profiles, including issues of subjectivity and of validation of software were raised, the previous Regulator commissioned a mixtures collaborative study. In the study, analysis, interpretation and reporting of DNA mixtures were assessed. All FSPs in the UK participated on a voluntary basis and following a workshop in November 2014, a final report was provided to the Regulator in January 2015.

Overall the report concluded that whilst a high degree of consistency was observed in the designation of the DNA profiles, a high degree of inter-laboratory and some intra-laboratory variation was observed in the evaluation and reporting of results.

The report made a number of recommendations, which were considered by the DNA Specialist Group (DNASG), in order to advise the Regulator on the appropriate next steps. Following the advice of the DNASG, the Regulator is tendering for provision of:

a. DNA mixture interpretation software performance and validation guidance; and

b. DNA mixture interpretation guidance.

Draft standards are to be delivered by March 2016 for review by the DNASG prior to public consultation.

Forensic Pathology

A new Chair of the Forensic Pathology Specialist Group (FPSG) has been appointed to succeed Dr Harry Millward-Sadler. Dr Patrick Gallagher brings a wealth of experience from his role as a pathologist specialising in cardiac cases and extensive post-mortem practice.

[13] *R v. Dlugosz & Ors* [2013] EWCA, Crim 2.

The FPSG arranges the annual audit of the work of forensic pathologists, which supports the operation of the General Medical Council revalidation processes for pathologists. The audit reports from 2012 to 2014 will be published in December, together with a report into follow-up work relating to the 2012 audit. This year the audit will focus on deaths in custody and resulting from a fall from height.

The *Code of Practice and Performance Standards for Forensic Pathology*[14] is overseen by the FPSG in partnership with the Royal College of Pathologists. The current version was issued in 2012 so the FPSG has initiated a review of aspects of the standard (particularly those related to imaging). Specific strands of work are underway to produce guidance on sampling at post-mortem examinations and, in conjunction with the United Kingdom and Ireland Association of Forensic Toxicologists, consider the toxicology content of this Code.

The Regulator publishes guidance on legal issues in forensic pathology and tissue retention[15]. Recently a number of police forces have sought advice in relation to cases where an examination had to be undertaken on a foetus. The nature and basis of such an examination is a complicated matter and had not been addressed in the guidance. The FPSG advised on this matter and the guidance has been updated. It is now being checked with stakeholders before publication. The advice will also be reflected in police guidance on forensic pathology.

The Pathology Delivery Board is the responsible body in relation to the revalidation of forensic pathologists in England and Wales. It has appointed Professor Jack Crane as the Responsible Officer and established processes to implement a robust revalidation scheme. The Regulator provides independent oversight of the operation of that process. Having been provided with a report on the operation of the system and advice from the FPSG, the Regulator has advised the Board that she is content with the operation of the system.

Fingerprints

A new fingerprint comparison standard was launched by the Regulator in March, with a day's awareness event at which speakers included:

a. the Regulator

b. the NPCC lead for performance and standards, T/DCC Mark Hopkins;

c. the Chair of the Fingerprint Quality Specialist Group (FQSG), Gary Pugh, Director of Forensic Services for the MPS; and

d. the Lead Forensic Scientist for Fingerprints, Scottish Police Authority (SPA), Joanne Tierney.

[14] Home Office, The Forensic Science Regulator, Department of Justice and The Royal College of Pathologists. *Code of Practice and Performance Standards for Forensic Pathology*.
[15] Forensic Science Regulator. *Legal Issues in Forensic Pathology and Tissue Retention*. FSR-G-203.

The standard makes clear that evidence concerning fingerprint matches is opinion evidence, and not evidence of fact. Accreditation to ISO 17025 and the Codes is required for all fingerprint comparison by October 2018.

Two subsequent one-day workshops were held to assist police forces in understanding the requirements of ISO 17025 and the Codes, one in London and the other in Wakefield. The Regulator will continue to provide support for organisations as they progress in putting in place the required standards.

The FQSG, which advises the Regulator on matters of fingerprint quality standards, has initiated two new strands of work, both of which aim to publish standards for public consultation by summer 2016:

a. developing an image capture quality standard; and

b. developing a fingerprint enhancement standard.

A further strand of work, to evaluate how fingerprint search algorithms should be validated will be initiated in the near future. The FQSG will continue to review developments in the field of fingerprint comparison, and update the standard accordingly.

Adoption of ISO 17020 for Case Review

During the next year, the Regulator will engage with UKAS with a view to sponsoring a pilot to examine the way in which ISO 17020 could be used to accredit case review services, frequently performed by practitioners instructed by the defence. This is important to underpin the fundamental requirement that quality standards be applied across all forensic science in the CJS.

Cost of Accreditation for Sole Traders and Micro-Businesses

Very small businesses and sole traders need to operate at the same standards as larger businesses. To set lower standards would be illogical. However, the Regulator acknowledges that the costs of achieving accreditation to international standards can be proportionately higher for smaller companies. Therefore, drawing on previous work carried out by UKAS with sole traders in an unrelated field, the Regulator has initiated discussions between UKAS and the Chartered Society of Forensic Sciences (CSFS) with a view to establishing if a more attractive route to achieve the same standards can be defined. Progressing this work with UKAS and the CSFS will be a priority over the coming year.

Complaints and Investigations

A natural consequence of setting standards is that failures, and alleged failures, to maintain the appropriate standards are referred to the Regulator.

This year, 36 matters concerning quality have been referred to the Regulator. Of these, 10 were self-referrals; the others were referred by third parties. The issues are categorised as low, medium and high risk.

There were 23 issues categorised as medium or high risk (5 of which were self-referrals). The Regulator has addressed 8 of these, and is dealing with the other 15 (3 of which deal with related issues about one evidence type). The approach to each depends on the nature of the issues raised. These include:

a. seeking advice from relevant professional bodies and associations;

b. engaging with the organisations involved to determine what has occurred and whether steps have to be taken; and

c. commissioning independent reviews of the evidence.

Three of the issues raised were linked to loading or searching of the National DNA Database®; the Regulator is in discussion with the NDU and the relevant FSPs on these matters.

Statutory Powers

Officials from FSRU have produced a summary of the options regarding how the role of Regulator could be placed on a statutory footing. This paper has been submitted for Ministerial review and a decision on whether or not to proceed with legislation is expected in December. If a decision to grant statutory powers is made, preparing and enacting the necessary legislation is likely to take in the order of a year.

Section 3: Shared Understanding of Quality and Standards

Requirement 3: That there is a shared understanding of quality and standards by all stakeholders, including commissioners of forensic science, expert practitioners, researchers and all end users, including the police, the prosecuting authorities, defence and courts.

Promoting Adoption of Standards

In order to make the case for the adoption of standards, and to ensure that both the need for standards and the timetable required by the Regulator are clear to all forensic experts, practitioners and relevant managers, a priority has been speaking to as many groups of forensic scientists as possible. The Regulator has given numerous presentations to practitioners and stakeholders at conferences, meetings and seminars (Table 2), and has been represented by officials giving presentations at the meetings in Table 3.

Presentation Title	Event
The Need for Quality Standards	Surrey and Sussex Police Specialist Crime Command Continuing Professional Development Seminar, February 2015
The Development of Quality Standards for Fingerprint Examination	Fingerprint Society Annual Conference, March 2015
Strengthening Forensic Science in the Criminal Justice System	Forensic Science Regulator's Quality Conference, March 2015
Phenotype Inference: Regulatory Aspects	Forensic Science Special Interest Group Phenotype Workshop, March 2015
Forensic Science Quality and Regulation	University College London Jill Dando Institute Centre for the Forensic Sciences, March 2015
Forensic Science Quality and Innovation	Alec Jeffreys Institute, Leicester University, April 2015
Understanding the Regulatory Environment	Digital Forensics Seminar, April 2015
Regulator's Update	European DNA Profiling Group, April 2015 European Network of Forensic Science Institutes DNA Working Group, April 2015
Forensic Science Quality and Regulation	The Forensic and Policing Services Association Conference, May 2015
Issues and Challenges in Forensic Evidence Detection and Interpretation: A Quality Perspective	University College London Jill Dando Institute: International Crime Science Conference, May 2015
Forensic Science Quality and the Role of the Expert Witness	The Academy of Experts, June 2015
Quality Standards: Requirements and Benefits	MSAB Mobile Forensics Workshop, June 2015
Learning from Errors	NIST International Symposium on Forensic Science Error Management, July 2015

Presentation Title	Event
Forensic Science Quality from Crime Scene to Court	UK and Ireland Association of Forensic Toxicologists Conference, September 2015
Quality Standards for Fire Investigation	Chartered Society of Forensic Sciences Fire Investigation Conference, September 2015
Forensic Science Quality Standards: Application to Forensic Nursing	UK Association of Forensic Nursing Conference, September 2015
Fingerprint Quality Standards: Current Status and Future Perspectives	European Division of the International Association of Identification (IAI) Conference, October 2015
Research, Quality and Continuous Improvement in Forensic Science	Chartered Society of Forensic Sciences Autumn Conference, November 2015

Table 2: Presentations made by the Regulator

Presentation Title	Event
Forensic Regulation in Practice	UKIAFT, February 2015
Decontamination issues for SARCs	St Mary's SARC Conference Workshops, 26–28 February 2015
Forensic Regulation Development and Practice	University of Bournemouth, March 2015
Forensic Regulation in Practice	Metropolitan Police Service, April 2015
Introduction to Digital Forensics Accreditation	Forensic Science Regulator /NPCC Validation Workshop, April 2015
Forensic Regulation in Practice	South West Coroners Group, June 2015
Forensic Science Regulator, Quality Standards and ISO17025	Home Office Science and Engineering Conference 2015 on 'Digital Investigation and Intelligence', October 2015
Understanding the Regulatory Environment	F3 Annual Workshop, November 2015

Table 3: Presentations by FSRU officials representing the Regulator

A conference was hosted by the Regulator on 26 March 2015, the theme of which was 'Strengthening Forensic Science Quality'. The conference was attended by over 140 delegates from forensic service providers, the police and wider CJS stakeholders. The programme covered:

a. case preparation and presentation of evidence;
b. the path to accreditation for digital forensics and fingerprint comparison; and
c. the benefits to be gained from introducing standards in a time of austerity.

As discussed in relation to the specific disciplines, the following workshops were hosted by the Regulator.

Fingerprint Standard Launch Event	23 March 2015
Digital Forensics Workshop for Lead Forces	30 April 2015
Digital Forensics Workshop	12 May 2015
UKAS Fingerprint Accreditation Awareness Workshop (South)	12 June 2015
UKAS Fingerprint Accreditation Awareness Workshop (North)	22 June 2015
Scene of Crime Accreditation Introductory Workshop (North)	10 November

Table 4: Workshops hosted by the Regulator

Case Review Pilot: Quality Throughout the Commissioning and Supply Chain

Concerns have been raised by a number of sources (including practitioners and the House of Commons Select Committee on Science and Technology) about the impact of fragmentation and/or case strategy on the quality of forensic science provided to the CJS. This covers:

a. fragmentation of the examination process;
b. fragmentation of information (and exhibits) related to the case; and
c. variable quality of strategy and decision making process.

Such issues may result in:

a. poor service to the CJS;
b. failure to fully maximise the use of forensic science in such cases; and
c. cases being abandoned when the scientific evidence is challenged by defence experts.

Whilst a number of specific cases have been brought to the attention of the Regulator, it is not known if these cases are exceptional, or are part of a wider issue.

A case review to determine whether or not such issues impact on the quality of the forensic science provided to the CJS is therefore being piloted. The review will examine the following.

a. A number of cases from the scene of crime to the court.
b. The information provided to the CJS to assess whether this maximised the benefit to the CJS.
c. The passage of exhibits and information between different parties in the cases as they progressed, focusing on the following issues:
    i. the manner in which exhibits and information were handled throughout the case and the operation of the interfaces between different parties;
    ii. whether or not the decision making in the case was adversely affected by the manner in which information or exhibits were handled; and
    iii. whether or not the information provided to the CJS was less than the potential value as a result of issues related to handling.

The pilot is assessing cases from each of two police force collaborations. The cases are reports of rape. These have been selected as they tend to involve a range of scientific disciplines and often complex case assessment and interpretational issues, but do not have the dedicated resources available to homicide cases. The forces were asked to identify:

a. three cases where they believed the scientific issues were handled well;
b. three where they were not handled well; and
c. a further case that was not progressed to medical examination following a police decision.[16]

All the cases selected were complete from a CJS perspective, but processed within the last two years.[17]

The pilot commenced in September 2015; on completion, a report will be produced for the Regulator and all of the organisations involved in each case. It will be used to inform the Regulator whether or not a wider case review is warranted and if so, the resources required and any changes required to the terms of reference. Specific issues raised during the pilot will be followed up as appropriate.

Streamlined Forensic Reporting

The Regulator has received a number of complaints about aspects of the practical operation of the SFR process, and therefore met with representatives from CPS Policy section and the NPCC SFR Network to address the issues. New guidance has

[16] Where the allegation has been reported within two weeks of the alleged offence
[17] Ideally, cases are selected where the decision makers are still available to be interviewed, if required.

recently been issued to both the police and prosecutors, which should improve the way case management (including the SFR process) is operated. To date, the majority of the issues reported to the Regulator are as a result of individuals within the CJS (often in a local area) not applying the procedures appropriately and in accordance with the Criminal Procedure Rules, rather than being issues that would require amendment of policy.

An update on the specific points dealt with was provided in the Regulator's *Newsletter 26*, published on GOV.UK in October 2015.

Research Priorities from a Quality Perspective

Forensic science, like any other branch of science, cannot stand still; advances resulting from fundamental science can give rise to new opportunities for forensic science, whilst there is a continuing need to ensure that current services are supported by sufficient relevant data.

Considering the risk overview, outlined in the introduction of this report and relative to each stage of the forensic process from crime scene to court, enables quality-related priorities for innovation to be identified. These are outlined in Table 5.

Stage	**Quality-related innovation priorities**
Crime Scene	- Better, easier recording and unique tagging of exhibits - Better methods for targeting most relevant samples - Advanced anti-contamination methods
In the Forensic Science Laboratory	- Data and expert systems to support interpretation of evidence - Testing assumptions in models for complex interpretation (for example, relationship between variables) - Rapid processes for validating digital forensics methods - Advanced anti-contamination methods
Investigation	- Rapid, reliable information for investigators - Validated methods and tools to support digital investigations
CPS and Courts	- Data to support evaluation of evidential significance - Robust, data driven methods for interpretation

Table 5: Quality-related innovation priorities from crime scene to court

The personal perspective of the Regulator is that the highest priorities for innovation to drive up the quality of forensic science are the provision of data to support the evaluation of evidential significance, combined with robust interpretation methods.

Such data may include, for example:

a. structured studies on the transfer and persistence of trace evidence and the significant factors affecting such transfer;

b. the frequency of occurrence of patterns (for example, fingerprint characteristics or characteristics of gait), or the impact of wear on marks.

Interpretation methods can drive optimal structuring of required data collections, and enable combinations of factors such as class characteristics in a way that can be validated and demonstrated to be robust.

Development of Primers for Courts

In the judgement of the Court of Appeal in the case of *R v. Reed & Ors,*[18] a request was made for the production of primers, documents setting out the agreed science in a particular discipline in plain language, for the benefit of the courts. Following discussions with the judiciary and academics, Professors Sue Black and Niamh NicDaeid from the University of Dundee are leading engagement with the Royal Society and the Royal Society of Edinburgh regarding how such primers could be produced and agreed to be beyond scientific question. The Regulator has offered assistance as required, including from the specialist advisory groups (Appendix 1) and the Forensic Science Advisory Council, and awaits views from the Royal Societies.

Routine and Administrative Report

EU Data Protection Initiatives

The EU has a data protection initiative that aims to replace Directive 95/45/EC (which is implemented in the UK through the Data Protection Act 1998) with two new provisions. The first will be regulations that apply to most forms of data processing. The second will be a directive covering the processing of personal data as part of the investigation or prosecution of crime and related areas.

Officials within FSRU have contributed to the discussions of the new provisions and the detailed analysis of the text of the proposed directive.

Financial Information

The Home Office allocated the following resources to the Regulator for the financial years 2014/2015 and 2015/2016 (Table 6).

[18] *R v. Reed & Ors* [2009] EWCA Crim 2698.

	Financial Year 2014/2015	Financial Year 2015/2016
Administration budget (staff pay, travel, accommodation etc.)	£ 409,000	£ 363,000
Programme budget (developing standards and forensic pathology audits)	£ 265,000	£ 245,000
Total Budget	£ 674,000	£ 608,000
Staffing: Regulator (Full Time Equivalent (FTE))	0.4[19]	0.6
Officials: specialist scientific roles (FTE)	3	3

Table 6: Resources allocated to the Regulator

The small number of officials available to support the work of the Regulator is the main challenge to making progress against the stated aims. Whilst a level of shared administrative and secretariat support is available, further dedicated resource would enable more progress to be made. The Regulator is in discussions with the Home Office about how additional support can be provided.

Acknowledgements from the Forensic Science Regulator

I would like to record my thanks to all chairs and members of the specialist groups and to the Forensic Science Advisory Council. The advice I receive from these groups is critical to the work of regulation. I would also like to thank all of those who have brought to my attention matters of concern, and those who have provided specialist advice, including professional bodies, societies and individuals.

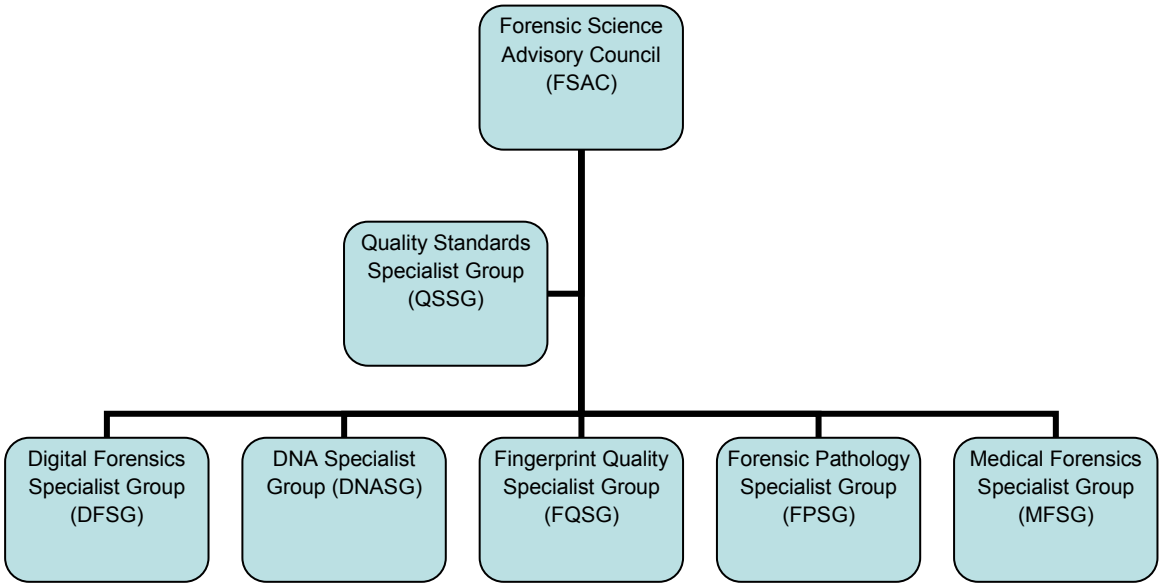
Thanks also to those who have led the work of implementing standards in their areas of responsibility, and to practitioners in all sectors who have provided leadership and improved quality.

I would like to record my personal thanks to officials from FSRU in particular, for their commitment and energy in supporting me as Regulator and the work of regulation. Finally, my thanks to officials from the Science Secretariat, the Forensic Pathology Unit and the wider regulation support area.

[19] The previous Regulator was available to cover the vacancy 0.2 FTE from May to August 2014; interim cover was provided by an official from September 2014 to mid-November 2014. The current Regulator took up the appointment from 17 November 2014, on a 0.6 FTE basis.

Appendix 1: Regulator's Advisory Groups

The current active groups advising the Regulator are shown below. The Quality Standards Specialist Group and the Forensic Science Advisory Council review new and significantly revised standards prior to implementation.



Appendix 2: Digital Forensics Scope of Accreditation	Accreditation to BS EN ISO/IEC 17025	Accreditation scope to include the Codes	Appendix/ Guidance	Notes
Digital forensics				Digital forensics is the process by which information is extracted from data storage media (e.g. devices, remote storage and systems associated with computing, imaging, image comparison, video processing and enhancement [including CCTV], audio analysis, satellite navigation, communications), rendered into a useable form, processed and interpreted for the purpose of obtaining intelligence for use in investigations, or evidence for use in criminal proceedings. The definition is intentionally wide and any exclusions will be explicit. Automatic number plate recognition, manual classification of indecent images of children, crime scene photography, eFit, recovery from a working CCTV system, CCTV replay for viewing with no further analysis (acknowledging that there may be quality limitations to the material viewed) all should be conducted by competent staff using methods approved by the organisation, but are excluded from the ISO/IEC 17025 requirement.
Imaging of hard drives and removable media	October 2017	October 2017		The Regulator expects any method used for imaging 'conventional' hard drives to be validated as required in the Codes by October 2015.
Screening or recovery of data from a device using an off the shelf tool for factual reporting	October 2017	October 2017		The use of tools and methods by frontline non-practitioners is permitted but the organisation must hold accreditation for at least one deployment. Further deployments of the method under central control may be permitted outside the scope of accreditation provided that the method chosen can be demonstrated to have adequate configuration control (e.g. locked down data recovery methods and control) and that staff are competent.
Extraction and analysis of data from digital media including remote storage	October 2017	October 2017		
Capture and analysis of social media and open source data	TBA			
Corporate network capture and analysis	TBA			
Cell site analysis and communications data	TBA			

Appendix 3: Firearms Scope of Accreditation	Accreditation to BS EN ISO/IEC 17025	Accreditation scope to include the Codes	Appendix/ Guidance	Notes
Triage and simple classification	Either ISO 17025 accreditation by 2012 and accreditation to the Codes by 2017 or Alternative framework implemented by October 2016			This is for triage (deciding to take no further action or that an accredited examination is required) and for possession cases,[20] where simple classification[21] does not require a full evidential statement and includes, in the circumstances defined below, preparing an SFR1. An SFR1 can be produced in cases involving the following: the classification of firearms including all functioning centre-fire and rim-fire handguns, rifles, sub-machine guns and shotguns manufactured after 1939 where the dimensions of the weapon are more than 1" or 2.54cm above or below the legal limits contained in the Firearms Act 1968 (e.g. a sawn off shotgun with a barrel length of less than 23" or a handgun with a barrel of less than 27.46cm or overall length 57.46cm); and the classification of ammunition including all centre-fire and rim-fire ammunition, where there is sufficient quantity to warrant test firing of the ammunition, or where the ammunition can be dismantled to demonstrate that all the components of ammunition were present.[22]
Firearms classification, firing marks, ballistics etc.	April 2012	Oct 2017	In draft	Accreditation is required for classification where the SFR1 is contested, where the firearm has been discharged during any criminal act other than the possession offence in relation to which the firearm is being examined, for determining kinetic energy of air weapons, for all guns bearing deactivation stamps that appear to have been modified, all blank firing guns that appear to have been modified, any blank firing weapons that are suspected of being easily convertible within the terms of the Firearms Act 1982, all homemade weapons, all firearms that appear to have been modified (with the exception of sawn-off shotguns covered above under simple classification or triage), military ammunition suspected of being loaded with specialist projectiles (e.g. armour piercing, incendiary tracer etc.), all irritant spray devices, all electronic stun-gun devices, and all items presumed to be a firearm or component part that are suspected of having been used in a serious offence (e.g. homicide, sexual offences, robbery, aggravated burglary etc.) or attempting such an offence.
Firearm Discharge Residue	April 2012	Oct 2017		

[20] Possession means any case where the *actus reus* for the offence is possession of a firearm only. This shall include cases where a firearm is discharged as long as this does not lead to a charge other than a possession offence.

[21] Simple classification means any classification not falling within the description in the sections below.

[22] Adequate facilities for test firing and/or dismantling the ammunition must be available.

Published by:

The Forensic Science Regulator

5 St Philip's Place

Colmore Row

Birmingham

B3 2PW

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

ISBN: 978-1-911194-11-8