University of Strathclyde, Centre of Forensic Science – Written evidence (FRS0060)

Principal Authors:

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**Dr Penny Haddrill** – a researcher with over 20 years of experience working in population and molecular genetics, a track record of attracting research funding and publishing high-impact, peer-reviewed research papers, now leading a research programme in forensic genetics. Currently Teaching Fellow at the University of Strathclyde, responsible for the delivery of forensic biology and forensic genetics teaching across undergraduate and postgraduate forensic courses, including the flagship MSc Forensic Science degree. Has also completed extensive training in operational forensics and second opinion forensic casework methods, and has undertaken defence reviews of scientific evidence.

**Dr Felicity Carlysle-Davies** – Following a PhD focusing on characterisation of explosive materials, spent three years as co-ordinator of the Forensic Science Special Interest Group, part of the Knowledge Transfer Network; during this time oversaw the creation of the UK Forensic Science Innovation Database and helped foster collaboration between practitioners and academia. In 2017 took up a teaching role at the University of Strathclyde on the forensic science MSc and undergraduate courses with responsibilities including co-ordinating the three-month student MSc research projects.

**Professor Angela Gallop** – former FSS scientist, established companies to assist both police, and defence legal teams to make best use of forensic science, draw in science from the wider scientific community, ensure a proper balance and promote understanding at court, and improve forensics overseas (1986 Forensic Access, 1997 Forensic Alliance, 2005 LGC Forensics, 2010 Axiom International). Also established and led the scientific teams who helped solve many complex cases including eg. Damilola Taylor, Rachel Nickell and Stephen Lawrence. Current roles include Strategic Director of the Centre for Forensic Science at Strathclyde University.

Q1. **Is forensic science contributing to the delivery of justice in the UK?**

1. Forensic science is making a very definite contribution to delivering justice. But the real question is whether it is doing this as effectively as it could or should, owing to the lack of co-ordination between those delivering front line services, and those managing them. This applies both within and between different supplier organisations. Effectiveness is being sacrificed in the name of
efficiency where efficiency is about how many tests can be pushed through in a
given time period, with little time left to think about what benefit, or otherwise,
those tests might actually be delivering.

Q2. What are the current strengths and weaknesses of forensic
science in support of justice?

2. The strengths of forensic science are that it provides a potentially very
powerful, objective form of evidence. The weaknesses are that, unless it is used
properly and interpreted in the context of individual cases, it can be misleading.
But this may not be obvious, hidden behind a façade of scientific precision and
accuracy, and fragmented between one forensic science supplier – police and
otherwise, and another. Research in forensic science is also so chronically
underfunded that it is difficult for practitioners and researchers to scan the
scientific horizon for relevant new technology and approaches. This means that
forensic science is often out of date and less helpful than it could be.

Understanding and use of Forensic Science in the Criminal Justice System

Q3. What is the scientific evidence base for the use of forensic
techniques in the investigation and prosecution of crimes? Are
there any gaps in that evidence base?

3. There are a large number of historic reports on the use of forensic
techniques, and a great deal of anecdotal evidence has accumulated over the
years. But, despite several attempts, none of these deals effectively with value
for money and how spending on forensic science can dramatically reduce the
cost of other traditional aspects of investigation. It would seem to be critically
important for an authoritative study to be commissioned so that we can properly
understand this, particularly as digital forensics starts to become such a large
and powerful resource for fighting crime and ensuring criminal justice.

Q4. How can the Criminal Justice System be equipped with robust,
accurate and transparent forensic science? What channels of
communication are needed between scientists, lawyers and the
judiciary?

4. The Association of Forensic Science Practitioners (AFSP) identified four key
characteristics that forensic evidence needed to exhibit if it was to be relied
upon: it needed to be robust, logical, transparent and balanced. Robustness can
assisted, for example, by using accredited systems and processes, logic by using
a structured framework for case assessment and interpretation (CAI),
transparency by properly recording and being able to demonstrate everything
that has been done and found, and balance by considering the results in the
context of both prosecution and defence hypotheses or perspectives.

5. Anything that gets in the way of any of this automatically means that
there could be question marks over forensic evidence. For instance, if it is
produced by an unaccredited laboratory, if the wrong items, or too narrow a
selection of items or tests are chosen for close scrutiny, if there are gaps,
inconsistencies or inaccuracies in the written record, or, for example, if only the
prosecution’s view of what is likely to have happened is taken into account. This
means that forensic science needs to be produced by accredited laboratories, properly funded for the work, who are independent, able to use up-to-date technologies, and whose work is subject to separate peer review where it really matters ie. if it represents particularly critical evidence in the case.

6. And all stakeholders need to understand the evidence which means there need to be strong and clear channels of communication between them and, importantly, that these are used. These will involve everything from training and continuing professional development to structures within the court process, such as mini presentations on the nature of the evidence, and pre-trial conferences between experts to agree common ground so only matters in dispute need to be aired in any detail.

Q5. What is the level of understanding of forensic science within the Criminal Justice System amongst lawyers, judges and juries? How can it be improved?

Q6. Is the current training available for practitioners, lawyers and the judiciary appropriate?

7. Understanding of forensic science amongst members of the legal profession is very varied. While there are a number of initiatives underway to improve this – including, for example, training and awareness sessions, and the development of primers, these tend to be isolated initiatives which limits their effectiveness. What is required is a comprehensive review of what is needed, what works and what doesn’t, what is available, and then plans drawn up to plug the gaps. Various organisations including the Association of Forensic Science Providers (AFSP), Chartered Society of Forensic Sciences (CSFS), and the Forensic Regulator’s office should be involved, supported by other practitioners and academic departments specialising in forensic science. Solutions will almost certainly include on-line learning combined with some ‘hands-on’ experience which universities are ideally placed to help with.

Standards and Regulation

Q7. Is the current market for forensic services in England and Wales sustainable? Are changes needed to ensure forensic provision is maintained at the level required? What are the risks of a market approach, for example what happens if a provider goes out of business? And what is the impact on quality?

8. There must be considerable doubt about the sustainability of the forensic science market in its current form in England and Wales. We have recently seen dramatic changes to each of the three main suppliers to the industry – one went into administration before being rescued by a private equity firm, another was released by its US parent company and went through a management buy-out, and the third, was acquired by an overseas company. We have also seen a number of smaller firms in the sector go out of business and others are clearly experiencing difficulty.

9. This is partly due to turmoil within the market which went from a monopoly – dominated by a single supplier, the FSS, to a monopsony –
dominated by a single customer, the police, in the space of a few years. And the fact that the police do not necessarily understand what makes for a healthy competitive market. and, when under financial pressure as through austerity, may make counterproductive decisions.

10. There are advantages and disadvantages to both public and private forms of forensic delivery. Public service provides more security but is prone to complacency and arrogance – ‘you get what you’re given’. Private enterprise is inherently less stable but provides better value for money and innovation through competition – as was demonstrated when the market first really began to open up – in the late 1990s/early 2000s.

11. Both need the right environment to thrive. Our current market is being destroyed by the large and relatively rapid reduction in size – partly fuelled by in-sourcing by police, and by procurement which has been encouraging over-competitiveness for what work remains – to the extent that it is becoming very difficult to deliver this at the required quality for prices quoted.

12. So we either need to improve the market, or to move to a new model. Improving the market will require a new procurement framework – the old one simply lapsed, and sufficient funding to ensure that this encourages new suppliers and enables them to provide the level of quality – both of science and service delivery, required by our Criminal Justice System. If we opt for a new model, we must remember and learn from the problems that developed with the FSS, and we must not sleepwalk into allowing the police to dominate a major tool for ensuring criminal justice.

Q8. Is the system of accreditation working successfully to ensure standardised results and the highest quality analysis and interpretation of significance of evidence?

Q9. What role should the Forensic Regulator have? If the Forensic Science Regulator is to have statutory powers, what should these be?

13. The role of the Forensic Regulator is to ensure that the quality of forensic science in our Criminal Justice System is high and remains so. Quality accreditation is an important part of this. Accreditation is complex and very expensive to achieve and maintain which makes it unpopular with suppliers to the extent that some still do not have it – this commercially disadvantages those that do. Without statutory powers, there is not much the Regulator can do about this, so being granted these powers is essential and urgent.

14. The situation might be eased slightly if more than one body were allowed to award accreditation as competition would inevitably streamline the process and certainly reduce the cost. At the moment UKAS can name their price. This would mean that more suppliers would become accredited including eg. university departments and others who provide specialist support for the Criminal justice system.
Q10. What lessons can be learned from the use of forensic science in Scotland and Northern Ireland? What can be learned from the use of forensic science overseas?

15. The delivery of forensic science in Scotland has undergone considerable change in recent years. This has reflected some of the change within the police service and the need for forces to share, and therefore reduce costs. It has included moving from a series of four regional laboratories, each serving one of more individual, local police forces, to a more centralised system where specific types of expertise, now also including scenes of crime examination, are shared between the four laboratory sites. The laboratory network has been transferred to the Scottish Police Authority, out of direct control by police. There is currently some debate about a return to a geographical basis for the laboratories to improve responsiveness, decrease cost and reduce fragmentation of effort in individual cases.

16. Lessons learned have included the facts that:
   - there is no perfect delivery system with pros and cons for both single, and multiple provider models
   - the same issues surround the balance between responsiveness, quality and cost as affect England and Wales
   - bringing scenes of crime activities and laboratory work under one roof is a good idea professionally – the latter is an extension of the former, and fails if it fails
   - removing forensic science from direct control by the police has been important for independence and the perception of independence, and for giving staff more confidence to speak out on matters of concern
   - good communication and collaboration is an essential ingredient if change is to be successful
   - it is important to maintain a good range of techniques because new technology can transform the use of traditional expertise and provide unexpected ‘quick wins’

Q11. Is the ‘Forensic Science Strategy’ produced by the Home Office in 2016 suitable?

17. The strategy describes some aspirations but with no clear idea about how this will be achieved. It also put the emphasis on a police-led system contributing to further destabilisation of the forensic supplier market, and risking impartiality and objectivity. Undermining the development and achievement of strategy is the rapid staff changes within the Government’s forensic portfolio where no-one has stayed in placed sufficiently long to bring about tangible and lasting change.

Forensic Science research landscape

Q12. How should further research funding for forensic science be justified? What should be the focus of such research? What is the role of UK Research and Innovation, especially considering the inter-disciplinary nature of much of forensic science?

18. There have been serious and continuing issues with research funding for forensic science over a long period of time and research is always the first thing
to be cut in times of austerity. Compared with the research landscape in other, even quite closely related and similarly sized fields, there is minimal research funding for forensics, and minimal access to the funding that there is. Forensic science is not mentioned in any of the Research Councils’ remits – they tend to focus on pure science and blue sky projects, rather than the smaller, more applied questions for which forensic science needs to find answers and where the nature of the work necessarily tends to involve relatively small numbers of poor quality samples, and a lack of clear, well-structured research questions. Although larger funding calls – such as the European Horizon 2020 funding, do have some forensic element, these are huge collaborative programmes which are complex and very expensive to bid for and now have the added uncertainty of Brexit.

19. As a result of this, forensic science has been much slower to adopt new approaches and technologies than arguably it should have been. There are obviously the additional requirements for thorough validation before these can be used within the Criminal Justice System, but this shouldn’t get in the way of exploiting the latest science can offer. This might currently include, for example – next generation sequencing of DNA, imaginative combinations of spectroscopy and imaging for trace evidence, and artificial intelligence to mine and analyse huge amounts of digital data. Operational laboratories certainly cannot support anything much more than the most critical case-related research, and university departments require grants to fund all of their efforts.

20. The FSS used to have a Central Research Laboratory (CRE) funded by the Home Office but this closed down well before the FSS itself was closed. This is not to say that a CRE type establishment would meet today’s needs. We now understand that collaborations between operational forensic scientists and academic forensic departments are by far the best way to ensure good quality research and which is focused on the real needs of criminal justice, and it is therefore on these that we need to focus our attention.

21. One Initiative which is very relevant here and beginning to make a difference in Scotland is the Scottish Institute for Policing Research (SIPR). This is bringing together operational and academic scientists, police and lawyers to discuss and identify key issues and areas of research, and then providing some of the funds for this.

22. What funding is currently available from the Home Office in England and Wales seems to go directly to the police, with much of it apparently being used to implement the Transforming Forensics Programme, including supporting further in-sourcing of forensics by the police in line with the Home Office strategy. Innovate UK provides some funding but this is for products that can then be sold and support UK plc, and most forensic science research cannot be translated into commercial products. Dundee University was able to attract a £10m fund from Leverhulme but this was a one-off grant to one institution – albeit they are involving some others, and a drop in the ocean of what would be required.

23. There is one resource which should be made far better use of, and that relates to the research projects of particularly post graduate students on forensic courses run by a number of universities around the Country – including our own. If these projects could be properly co-ordinated, and the results made searchable
and more widely available, they could be used to identify and explore key themes of current and critical importance to criminal justice, ensure these were built on by the next round of students, and avoid unnecessary duplication. The first attempt at such co-ordination, failed when the initial funding ran out. A second attempt is currently underway but, again, it is only funded for a limited period of time. This is certainly not the whole answer but would make a useful contribution.

24. There are some clear foci for research with digital forensics at the top of the list. This is partly to ensure that law enforcement can keep up with the pace of change of digital devices and criminal activity which increasingly relies on them, and partly because, like all other aspects of forensic science, bad work, or incomplete work can actively promote miscarriage of justice as several newspaper reports in recent months have testified.

25. Overall then, the current underfunding/misdirection of forensic science research monies is not working. What is required is a properly structured, co-ordinated and funded framework of research grants from Government – and not just the Home Office, with the funding favouring collaborative partnerships between operational and academic scientists and others. It seems clear that there would be a major role for UK Research and Innovation in this.

Q13. Where are the gaps in research and understanding of forensic science? How and by whom should the research questions be articulated to fill these gaps?

26. This is a difficult question to answer as there are gaps in most areas. These include: the relevance and application of new technology across all areas of forensic science; compiling modern frequency of occurrence databases to assess the strength of evidence of suggested links; and related to this, studies on the transfer and persistence of forensic traces for more accurate assessments of expectations -v- findings and likely significance of evidence in specific case contexts; assessing the influence of item/test selection strategies, and nature and extent of reporting the results on the safety of conclusions drawn, and perceptions of others. These research questions should be articulated by stakeholders in the Criminal Justice System, joint organisations to which representatives belong, and specialists and others with whom they work. The police will obviously be important but research programmes should not be left just to them to devise.

Q14. How can a culture of innovation in forensic science be developed and sustained?

27. A culture of innovation can be cultivated in a number of way including, for example, by ensuring that primary users of forensic science – the police, and lawyers and the judiciary, understand it and can question it effectively; by encouraging and facilitating research partnerships between operational and academic forensic scientists; and not least by funding such research properly; co-ordinating research through the various bodies with joint stakeholder representation; and by insisting that forensic science contracts include a requirement for research provided that funding is made available or there are realistic margins in contracts to pay for this.
Q15. Are there current or anticipated skills gaps? Who should have responsibility for and/or oversight of training?

28. Knowledge and skills gaps have appeared in several areas most notably, in traditional forensic chemistry disciplines such as textile fibres and other types of particulate trace. These are inevitably required from time to time even if at a lower level than hitherto. In addition, experience in how to combine different types of forensic expertise to solve some of the more complex cases is being lost. For instance, it was through searches for textile fibres that the DNA evidence in both the Coastal Path, and Stephen Lawrence murders was found, and it wouldn’t have been found otherwise.

29. Other newer areas such as digital forensics are also painfully short of skill and expertise compared with demand. This is compounded by over-competitiveness in the market which keeps salaries low and leads, in turn, to a high turnover of staff. This is a critical growth area for forensic science and is worthy of separate and urgent investigation.

30. The AFSP should be developed and become central to ensuring that the necessary training and CPD is provided. They should be supported by the CSFS, and universities will also have an important part to play. Indeed, universities could take some of the initial training, and more advanced education of staff off suppliers if they were properly set up to do this.

Digital Forensics

Q16. Are there gaps in the current evidence base for digital evidence detection, recovery, integrity, storage and interpretation?

Q17. Is enough being done to prepare for the increasing role that digital forensics will have in the future? Does the Criminal Justice System have the capacity to deal with the increased evidence load that digital forensics generates?

31. No. We have suggested above that this is worthy of a separate and urgent investigation.

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