Professor Dame Sue Black – Written evidence (FRS0008)

Questions

1. Is forensic science contributing to the delivery of justice in the UK?
   Forensic science continues to be a vital and integral part of the criminal justice system, serving both the prosecution and the defence but more heavily weighted to the direction of the former than the latter. In his 2014 Kalisher lecture, the Lord Chief Justice of England and Wales expressed firmly, the importance of robust forensic science to justice [https://www.judiciary.uk/wp-content/uploads/2014/10/kalisher-lecture-expert-evidence-oct-14.pdf](https://www.judiciary.uk/wp-content/uploads/2014/10/kalisher-lecture-expert-evidence-oct-14.pdf) and I believe that this holds true.

2. What are the current strengths and weaknesses of forensic science in support of justice?
   The current strength is the honesty with which practitioners and expert witnesses provide their evidence to the courts resulting in their opinions being considered to have credibility and relative impartiality, thereby servicing justice as best as they are able. The weaknesses focus around the relative lack of high quality research to keep the science current and cutting edge. The science is generally led by investigative drivers and the solid underpinning by scientific principles is often not well addressed and can occur in an ad hoc and post implementation manner. This can lead to stressful court room interrogation of the experts where the case can collapse as a result of the lack of scientific rigour or indeed where experts choose to no longer continue in the field and there is a reduction in the capabilities available to the courts. Forensic science appears to serve two 'masters' – providing tools for the investigative forces (police) and providing evidence to the court to assist the jury as the triers of fact. This duality has led to tension in the system.

Understanding and use of Forensic Science in the Criminal Justice System

3. 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?
   The scientific evidence base for validity (rather than the use) of forensic science is fragmented. Those sciences that arose in other disciplines e.g. DNA analysis have a very strong scientific foundation but have largely failed to keep pace with the advances in the discipline occurring in other areas specifically in relation to life sciences and medicine. Those disciplines which were largely derived from police driven need e.g. fingerprints have very little scientific robustness and they have not advanced markedly in the more recent history of the subject. There are two reports that consider this issue in detail. The National Academy of Sciences (NAS) report in 2009 [https://www.ncjrs.gov/pdffiles1/nij/grants/228091.pdf](https://www.ncjrs.gov/pdffiles1/nij/grants/228091.pdf) and the Presidential Council of Advisors on Science and Technology (PCAST) report in 2016 [https://obamawhitehouse.archives.gov/sites/default/files/microsites/ostp/](https://obamawhitehouse.archives.gov/sites/default/files/microsites/ostp/)
Whilst these are US based reports, it is generally recognised within the forensic community that the sentiments are globally valid.

The gaps lie primarily in the level of scientific robustness of data interrogation and also in the ability of science to fund the necessary high quality research to keep the field ahead of criminal trends.

4. 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?

The forensic science ecosystem is comprised of many parts and differs in the component countries of the UK. Therefore it is a very patchwork community. Most research in the area is now undertaken in universities but with no direct research funding source and no specific UoA in the REF, there are few large research grants in this area and it is therefore somewhat *ad hoc*. Most research arises from student dissertation projects which are of limited value in terms of scientific sustainability and rigour. Forensic service provision on the other hand, is undertaken by commercial companies in England and Wales where research tends to be understandably driven by potential financial return and so blue skies research is almost non-existent. In Scotland and in Northern Ireland where forensic service provision remains within the remit of government laboratories, some research does occur but without centralised focus there are inevitable budgeting restrictions.

Many Universities no longer teach forensic science or forensic medicine in their law undergraduate courses and so lawyers may have limited grounding in the sciences and are therefore not well informed or comfortable with scientific principles. This may also be true for some Judges although the Judicial Colleges and the Judicial Institutes do provide training in areas to which the judiciary are most likely to be exposed e.g. DNA, statistics. Members of the public who are jurors and therefore the ultimate triers of fact, may consider themselves to be forensically aware because they watch television, but in the main, the public understanding of science and therefore forensic science can be somewhat unrealistic.

This fragmentation has not resulted in a cohesive environment where each party in the process has a full understanding of the limitations and capabilities of science and so encouraging communication and training is essential. The Royal Society and the Royal Society of Edinburgh have a rolling programme of Judicial Primers [https://royalsociety.org/about-us/programmes/science-and-law/](https://royalsociety.org/about-us/programmes/science-and-law/) These are simple pieces of prose, written by leading scientific experts, that aim to allow the Judiciary to better understand the current state of the art for specific scientific disciplines that are admitted into their courts. So far these have included primers on DNA and gait analysis and they have been very well received by the Judiciary. Road traffic collisions and statistics primers are in production. In 2016, the Leverhulme Trust awarded an unprecedented £10M grant to establish the Leverhulme Research Centre for Forensic Science at the University of Dundee [https://www.dundee.ac.uk/leverhulme/](https://www.dundee.ac.uk/leverhulme/) The scientists leading this project
realised that a weakness lay in the level of communication, interaction and understanding between the various players in the CJS and their principal remit is to disrupt the current forensic science ecosystem to better provide engagement across the community. They are attempting to achieve this in many ways but specifically by hosting ‘strategic conversations’ which bring together members of the judiciary, legal profession, police offices, scientists, forensic scientists and the public. Greater integration across the system will lead to a more realistic understanding of the capabilities of science that can be distanced from the myths of the past and the fiction that is portrayed in various media outlets.

5. What is the level of understanding of forensic science within the Criminal Justice System amongst lawyers, judges and juries? How can it be improved?
I have largely covered this above. I would suggest that the level of understanding is lowest in the general public and most influenced by media portrayal of the subject. I believe the lawyers are probably next and whilst some do pick up the nuances of the science either through their own interest or simply repeated exposure through cases, most have no training in the subject and pick it up in an ad hoc manner. The information for Judges is certainly improving and this can be attested to by Lord Anthony Hughes and Lady Justice Anne Rafferty who chair the Judicial Primers initiative at the Royal Society and the Royal Society of Edinburgh.

6. Is the current training available for practitioners, lawyers and the judiciary appropriate?
No I do not believe that it is. Training for scientists in communication skills in the court is expensive and of varied quality. It is also not mandatory. Training for lawyers in forensic science is not well co-ordinated and many universities no longer give even introductory lectures on the subject. Training for the Judiciary is better and is regularly incorporated into the curricula of the Judicial Colleges and Institutes. Also the provision of the Judicial Primers seeks to assist in this regard.

Standards and regulation

7. Is the current market for forensic services in England and Wales sustainable? Are changes needed to ensure forensic science 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?
The UK needs to consider the disparity across its country members. There is a more traditional system operational within Scotland and Northern Ireland and this seems to serve the Criminal Justice System well. The system within England and Wales has become fragmented where service is either through commercial providers or re-established police laboratories. It is therefore at greater risk from market fluctuations and demands. That forensic services in E&W are provided to many forces as a result of a tendering process, means that whilst service costs may be driven down, this has on occasion forced companies to bid unrealistically to secure contracts that they cannot sustain and so they run the risk of going out of business. When this occurs, there is a vacuum in the provision of forensic services for that police force in relation to their
current investigations and those that are archived. The strategy adopted for an investigation will have an eye on cost, as it should, but there may be an impact then on the direction of the case and ultimately its presentation in court. A financially driven model for forensic provision also results in a loss of scientific expertise from the UK as senior (and therefore more expensive) staff are a greater cost burden and so there is an undeniable brain drain of experience. The current market in England and Wales unquestionably has an impact on research, an impact on frontline service provision and an impact on quality. There is a Forensic Science Regulator but the post remains without statutory powers and so cannot enforce adherence to standards.

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

The system of accreditation is laudable but it is not mandatory as the Regulator does not have statutory powers. ISO accreditation is an expensive component and this impacts significantly on the ability of smaller companies to compete with larger multi nationals. Many laboratories have retreated back into Police operation again and until the Regulator has statutory powers they cannot be mandated to maintain the necessary quality assurance standards.

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

It is essential that the Forensic Science Regulator be given the statutory powers that have been promised to the post since it was set up. Without these, the post can only advise on best practise and cannot mandate. There will need to be a realistic environment for accreditation as some areas of forensic science rely on sole expert providers who will not be able to meet the costs associated with ISO accreditation or any other expensive system and there is the risk that the CJS loses the niche experts who are not regularly involved in the system but may be crucial to singular cases. The strength of a service provision is that it caters across all areas from high volume disciplines to sole providers of expertise.

10. 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?

There are some important comparator lessons to be learned. The retention of state laboratories as seen in most countries in the world, are not as vulnerable to market changes. The closure of the Forensic Science Service in England and Wales, pushed the ecosystem into a commercial and competitive market which has worked well in some areas but less so in others. We are one of the few countries in the world who do not have state forensic laboratories and some have argued that it makes justice vulnerable. However, the biggest problem with forensic science lies not necessarily in its provision but in its lack of robust scientific underpinning and its research investment. The withdrawal of a centralised state led capability has meant that the level of investment in forensic science research funding was not only negatively affected in England and Wales,
but it impacted significantly therefore on Scotland and Northern Ireland too as part of a UK wide knock-on effect.

   I found the strategy to be underwhelming and not directly addressing where the weakness in the system lie.

**Forensic Science research landscape**

12. 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 interdisciplinary nature of much forensic science?
   Justification for research lies in the fact that justice lies at the heart of trust between citizens and those who govern and justice relies on forensic science to provide impartial expertise. At present, the forensic science community is weakened due to years of financial disinvestment, unfocussed core strategic leadership and fragmented communication across the ecosystem. The distance between partners in the ecosystem e.g. scientists and the judiciary, is one of the key factors at the core of the current siloed community which does not encourage interdisciplinarity.
   In the 2015 annual report from the Government Office for Science, https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/506461/gs-15-37a-forensic-science-beyond-report.pdf it was very clear that forensic science was recognised as an interdisciplinary bright spot, that can operate across most sectors of the scientific domain and by maintaining a rigid and siloed approach, I believe we are missing opportunities to lead in scientific discoveries which should impact positively on crime investigation and successful judicial outcomes. This interdisciplinarity that forensic science offers, operates at intersections of siloed disciplines and it is where advances can be made.

13. 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?
   The PCAST report confirmed that many of the existing forensic sciences have a limited robustness of scientific underpinning. It is essential that if these tools are to continue to be used by the investigative forces and to be presented as evidence in court, that they are confirmed to be fit for purpose. There is no reservation by the courts to accept new science as long as it is presented within the safe boundaries of its capabilities. There needs to be greater debate across all the main stakeholders about what is required and how to achieve it – whether that relates to existing methodologies and their development or the research and implementation of new methodologies. It is a community discussion but as it is about science, then the scientist needs to be at the core of the drive and not a passive responder to the needs of either the investigative forces or the judicial system.

14. How can a culture of innovation in forensic science be developed and sustained? Are there current or anticipated skills gaps? Who should have responsibility for and/or have oversight of training?
A change in culture or the development of a new culture, needs a genuine openness, honesty and transparency about what can be done and what needs to be done. It needs to have secured and sustainable funding and it needs to have strong quality control. As the digital world continues to explode around us, there is no doubt that the police require greater assistance with digital technology to try to cope with the volume of material they face. Within the courts, it is generally stated that the area with the lowest level of understanding across the players is within the digital arena. Therefore there seems to be a commonality of requirement across both recipients of forensic science in this regard. It is a different form of science though to that previously attributed to forensic science i.e. laboratory based analysis (drugs, DNA etc) and will require a different operational model. My concern though lies beyond that horizon which is already here. We are struggling to cope with the current environment but we are not preparing for the one which lies ahead and we are not horizon scanning for our future requirements and issues. Unless we can research ‘ahead’ of the modern day requirements, our investigative forces and courts will always be playing catch up to the criminal. What do we have in place for example that will allow us to address AI in crime? Do we have the technology to be able to detect and investigate it and are our existing laws fit for purpose in this area? Some areas of research are even looking beyond AI to the next technology and forensic science and the interaction between the community players needs to be operating at this level too.

**Digital Forensics**

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

I am not qualified to comment here but would reiterate that digital is a current problem and whilst it is extremely important it is a current operational issue. Research needs to be working with the police and the courts to address the problems that are coming down the criminal pipeline in the future so that we are better prepared and do not find ourselves in 10 years’ time, facing the same limitations as we have today with digital, or we will never catch up with the advances in the criminal fraternity.

17. 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?

The preparation for this work should have been done 10 years ago or more when it was clear that the digital explosion was imminent. It is essential that we try to meet the demands of the current day investigative and CJS requirements but we need to be more strategic and prepare for what lies ahead.

*1 September 2018*