Robert Green OBE – Written evidence (FRS0031)

Declaration of interest

I am currently an academic member of staff in the School of Physical Sciences at the University of Kent. Formerly I was a member of the Forensic Science Service and led a number of national initiatives during an extended period at the Home Office. Most significantly was to lead the national programme aimed at understanding and leveraging productivity from the significant investment (at the time) in forensic science. This program is referred to as Scientific Work Improvement Modelling (SWIM) and was delivered by means of extensive and detailed consultancy in almost every police service across England and Wales. Along with other initiatives and experiences this has provided us with the most detailed appreciation of the costs and benefits of forensic science. This may help to inform the committee and stakeholders of the payback derived from the investment and the extent of the opportunities lost through underinvestment.

The call for evidence extends across a number of areas dealing with the contributions and understanding of forensic science within the criminal justice system as well as standardisation and regulation of the commercial landscape. My response will not cover the complete series of questions posed by the committee but instead will focus on those areas I feel abler and experienced to comment upon.

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

The simple answer here is yes although perhaps, from the beginning I can take members back to the scope of the enquiry on page number two. In part of this you ask how (digital ‘forensics’) helps with the investigation and prosecution of crimes. We should be very clear before embarking further that forensic science is and should always be considered to benefit the delivery of justice and not necessarily “…the prosecution of crimes”. I make this point at the beginning of my submission as it becomes rather necessary to remind ourselves of this principle when we deal with commercialisation and the internalisation (within the police service) of large volumes of forensic activity.

From our experiences, the tangible nature of forensic science can be used to show the expected benefit from the investment. An example of this substantial and visible contribution is summarised in the chart below and is taken from the learning derived from the SWIM program undertaken by the Home Office several years ago. Although the volumes may now of course have changed – the matching efficiency and contribution of forensic science and associated databases is well understood. Of course, this efficiency increases along with the size of the databases and the utilisation of forensic science. There are few forms of government investment where the, outputs, costs and benefits are so well understood as those of forensics science.
In order to illustrate the point further perhaps we could take a look at burglary offences reported as 438,971 (ONS 2017). It is well understood that the rate of forensic intervention (by Crime Scene specialists) for this particular crime type could be in the order of 90%. Accepting fully the challenges of austerity in the police service there is, nevertheless no reason to suggest that this is unattainable. So, from the 438,971 burglaries we would anticipate that 395,073 of these would be visited by Crime Scene Investigators with a view to undertaking forensic recovery. An example of this attrition model is further summarised below and, although the data may now need some updating – nevertheless the indicative proportions remain similar.

**Table 1**

<table>
<thead>
<tr>
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<th>438,971</th>
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<tbody>
<tr>
<td><strong>Reported offences</strong></td>
<td>438,971</td>
</tr>
<tr>
<td><strong>Attended</strong></td>
<td>395,073</td>
</tr>
<tr>
<td><strong>DNA material collected</strong></td>
<td>23,704</td>
</tr>
<tr>
<td><strong>Fingerprints collected</strong></td>
<td>110,620</td>
</tr>
<tr>
<td><strong>Combined recovery</strong></td>
<td>134,324</td>
</tr>
<tr>
<td><strong>Matching efficiency (fingerprints)</strong></td>
<td>27,655</td>
</tr>
<tr>
<td><strong>Matching efficiency (DNA)</strong></td>
<td>10,429</td>
</tr>
<tr>
<td><strong>Combined matches</strong></td>
<td>38,084</td>
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There is no shortage of metrics to demonstrate the impact of forensic science and, from these two biometrics alone we would produce a little over 732 forensic identifications each week. We note, with interest that despite this level of productivity, burglary reports in England and Wales increased by 6% whilst criminal charges fell by 33% in line with the number of police officers available to investigate (BBC, July 2018). Used correctly, forensic science brings more offenders to justice and reassures communities providing the process is adequately resourced both in terms of science and investigation.

Of course, not all of these forensic clues will lead onto an offence detected but again we have a well developed understanding that the 'conversion' of forensic outputs into primary detections should be in the order of 6/10. Similarly, we have seen, where additional clear ups are 'taken into consideration' that this can add somewhere in the region of 33% to the overall rate of detection. What is most obvious from the clear up rates (2011 to 2016) is that forces solve between 6% and 10% of domestic burglaries – an apparent mathematical shortfall. Then again it is important to note that crimes are not prosecuted on forensic science alone but must be integrated through professional criminal investigations. The handoff between biometric identifications and detections has, for many years been the Achilles heel of the process. This is likely to be exacerbated by the austerity measures now being faced by the police service but of course lead to a significantly higher cost per detection which can sometimes be used as a justification for not maximising the contribution of forensic science in the first place.

Similarly, based upon a study of the effects of forensic science in murder and serious crime investigations (2009 – 10) carried out by the NPIA which can be summarised as follows. They (NPIA) cite the contribution of DNA evidence alone as contributing to murder investigations in more than five times a week. Similarly fingerprint evidence contributes to a murder investigation more than three times per week. They conclude that the contribution of forensic science is significantly greater than previously reported. DNA is utilised in greater than 95% of homicide enquiries. Fingerprints are utilised in 72% of murder enquiry is and footwear evidence in around 35% of all enquiries. A summary of their findings can be seen in table 2 below.

Table 2 the effect of forensic science on murder and serious crime investigations (NPIA 2009-10)

<table>
<thead>
<tr>
<th></th>
<th>DNA</th>
<th>Fingerprints</th>
<th>Footwear</th>
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<tbody>
<tr>
<td>Number of murders</td>
<td>420</td>
<td>403</td>
<td>402</td>
</tr>
<tr>
<td>Evidence collected</td>
<td>402</td>
<td>293</td>
<td>145</td>
</tr>
<tr>
<td>Profiles, prints, marks produced</td>
<td>296</td>
<td>225</td>
<td>95</td>
</tr>
<tr>
<td>Evidence contributed</td>
<td>229</td>
<td>153</td>
<td>52</td>
</tr>
</tbody>
</table>

I think the case is well made and clearly illustrates the contribution forensic science makes to the delivery of justice. Keep in mind that these are just two examples where forensic science would support the prosecution of suspects. Of course, the value of forensic science extends beyond the prosecution and must
also be viewed from the defence perspective. Given the significant amount of forensic science undertaken within the police service it may be of concern that forensic submissions are put together with a predisposition towards the prosecution. So to conclude:

a. Is forensic science contributing to the delivery of justice in the UK? - The answer is certainly yes but much more could be achieved. Very clearly we see (from the clear up rates which are regularly published) the contribution of forensic science appears much underutilised. We know what forensic science can deliver and can easily spot the shortfall.

b. Is forensic science contributing to the delivery of justice? Well certainly it is contributing to the prosecution of individuals but how do the defence avail themselves to the full range of tests in order to challenge the prosecution findings? Citing the Law Commission in 1972 who say “...that it is as much in the public interest that a guilty person should be convicted as it is that an innocent person should be acquitted”. It is of concern, particularly in light of the recent failures of disclosure that miscarriages of justice will be associated with (a) the non-submission of forensic material which may not overtly support the prosecution; (b) the focus on minimal submission of forensic material to forensic suppliers. To restate, forensic science is not purely an instrument available to the prosecution but must be made equally accessible for the defence.

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

The contribution of forensic science in support of justice is well made and understood. Similarly, the support and the impact of the private sector cannot be underestimated. From the prosecution/police perspective we have very efficient business processes for the speedy analysis of results. For example, the UK benefits from one of the most rapid turnaround times for DNA analysis worldwide. It is my experience that these private sector innovations and lean business processes are unlikely to be replicated within the public sector. We should not be convinced by any claims that all was well – prior to the closure of the Forensic Science Service.

We should however remind ourselves of the environment in which forensic science plays such a fundamental part. In more simple terms we do no good at all by discussing forensic science in isolation of either the investigative, judicial and/or defence setting. Similarly, the current financial pressures placed upon many stakeholders within the criminal justice process is well known and directly linked to the downturn in forensic submissions.

That aside, many police services have now resorted to in-sourcing increasingly broad aspects of their forensic science provision. Very often, this is on the basis of `best value’ and in response to budget cuts. However, the business case for in-sourcing has not been tested. Neither has it been put into the public domain for scrutiny. This means that we are arguably reverting to the ‘cottage industry’ pre FSS model and all that comes with it and this is being pursued without any full debate or scrutiny. The police service rhetoric is that in-sourcing is about saving money, being more efficient but is not challenged. Clearly if forensic service providers are to speak out in the interests of justice this is often put
down as ‘sour grapes’. Sadly, we have seen some suppliers who have gone out of business and some others narrowly averting financial catastrophe. Our highly experienced and respected Forensic Science Regulator, Dr Tully speaks most recently of “…cuts to forensic science that present an almost existential threat to the profession”. She speaks of a “…lack of trust which pervades the relationship between commercial providers and the police and a profession being strangled by cost-cutting and efficiency drives”. I think these few sentences speak volumes to illustrate the parlous situation we now find ourselves in. What is particularly distressing is that the United Kingdom, for many years was world leading in respect of forensic science.

Although corporate knowledge is now waning, it is interesting to look at some of the rationale behind the establishment of the Forensic Science Service many years ago. This was in response to the inefficiencies that were noted with forensic science being delivered by a collection of regional laboratories operating independently. The recognition that 43 different police forces all doing different things to a different standard was seen as inefficient and not necessarily the best way to maximise the contribution of forensic science. In 2012 the Forensic Science Service closed and the circle is almost now complete.

The underpinning ‘logic’ from the police service is that it is cheaper for forces to do it themselves and, therefore in-sourcing represents a saving. This actually leads to a situation where forces themselves become both competitors to the private sectors whilst at the same time customers. Of course, it is rather difficult to challenge any of this as there is rarely any available evidence to show how these savings are realised when balanced against the setup, ongoing running costs and the costs of quality. Typically, a police service will pay between 20% to 25% more salary then the private sector to encourage scientists to work within the policing sector so again the cost savings are not well made but, as the Regulator points out lacking metrics which demonstrate cost effectiveness. Clearly the commercialised private sector can apply economies of scale and cross-skill scientific specialists between footwear, glass or tool-mark cases. Hence they can be more efficient and keep resources utilised particularly in response to the unpredictability of submissions. Unless and until there is greater transparency on both the costs and benefits the economic debate will continue and the costs of external forensic science provision will be driven down further. It is not sensationalist to say that forensic science support in England and Wales has never been at a lower ebb.

We see examples where budget cuts significantly affect the delivery of justice. There is mounting concern about forensic science in England and Wales and how innocent people have narrowly avoided prison due to failures in investigation and in disclosure. For example, a year long investigation (highlighted in the murder of a schoolgirl in 2016) and the subsequent enquiry found several feelings in respect of a thorough testing of fibres; delayed blood and other tests of five months and, as Lady Justice King points out a delay and efficiency in the police investigation resulting in a loss of both DNA and fingerprint evidence.

Having pointed out the benefits of the commercial sector there are nevertheless risks associated with the combined impact of in-sourcing and budget cuts. Those within the profession cite examples of the negative impact on forensic science and the ever increasing risk (or occurrence) of prosecution bias. In response to
austerity measures, most police services employee very stringent (prosecution focussed) submission criteria and it is very rare these days that the forensic science provider has a full understanding of the case or is even aware of what exhibits have been recovered. In most cases the submissions are made piecemeal, staged and often weeks apart and decisions on what to submit, what order to examine in a predetermined order by the force submissions unit. These are often judged from a selection of product codes. Often, I'm led to believe items have been pre-examined within the police service and biological evidence has been recovered. In this sense, the forensic science provider may receive a swab taken from an item such as a knife. In these cases, the forensic scientist can offer nothing other than the results of the test. This is not, by any means best value and prevents the forensic scientist providing any advice or interpretation when the item itself has not been submitted or the scientist has no appreciation of what evidence has been recovered.

In the past, if forensic evidence was overlooked or if any other items in the case may support another version of events then one could reasonably rely upon the defence team identifying these and further work being commissioned on their behalf. With severe cuts to the LAA budgets the number of cases being submitted from defence lawyers has also been dramatically reduced. In effect, the private forensic science providers have the worst of both worlds. On the one hand very targeted and often limited prosecution evidence being submitted for testing with no opportunity for the defence to test their own theories. Furthermore, the forensic science provider is not aware of other evidence or the full circumstances so cannot comment on anything other than the results of the test they have been directed to conduct.

Perhaps I can give a few examples of what I would consider biased investigations. By way of illustration, forensic scientists sometimes see cases whereby a suspect clothing would be considered a good shedder of fibres. In this case, if contact had occurred between both parties then you would expect to find fibres to have been transferred. In putting the forensic submission together, the police service will no lunch submit items for fibre analysis due to a perception of cost and benefit. There is some anecdotal evidence to suggest that this non-submission is now influencing even the collection of fibres from the crime/incident scene. If fibre analysis was undertaken and it was shown that no fibres had been transferred, then the findings could well support the defence hypothesis.

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 McCloud-Grove theory of offending (2003) uses evidence to state that the interventions that increase the efficiency of arrest and conviction (of which forensic science is one) are more likely to reduce crime than incarceration or reducing reoffending interventions. This study alone found that the rate of reoffending remains constant regardless of the type of disposal (for example, fine or prison sentence) given by the court. Therefore, it is the process of bringing an offender to justice and their contact with the criminal justice system rather than the disposal which creates the decision-making point for the offender to cease committing crime.
Given that we are able to accurately map the contribution of forensic science (as outlined above), we can point with some conviction to the contribution being made. The process from report of crime through to the offence being detected is well-established. What is less clear though is the remainder of the ‘value-chain’ in terms of inputs, spend, outputs and the investigative value. This is particularly so given the extended period of austerity and our experience points to the significant ‘performance leaks’ at the handoff from one organisation/function to another. From data collected on behalf of the insurance industry we get some insight into the costs associated with reoffending (particularly by persistent and prolific offenders) but often these are not taken into consideration when reviewing the cost of forensic submission.

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?

Not for the first time, the Home Office has found itself at the centre of criticism in respect of forensic science delivery. This situation is no different and reflects a staggering lack of leadership and interest. The Home Office strategy (I refer to this loosely) has been repeatedly criticised by the Science and Technology Committee as being vague – particularly at times where leadership is needed. If we are to exit this predicament, then one first step would be for the government to give direction rather than (for all the reasons I’ve mentioned already) take the view "...it’s up to the police to decide". As I’ve said previously these resources are for the benefit of the criminal justice system and not necessarily prosecution agencies. Likewise, a response from the National Police Chiefs Council that it is "...for local Police Chiefs and PCC’s to decide“ takes a particularly parochial view of a situation which is worsening and requires national leadership.

Perhaps we need to go back to the drawing board. Embracing the very best of what the private sector has brought and continues to bring and ever mindful that the prosecution and defence have full access to forensic science. We need to have the insourcing debate better and more openly scrutinised and ensuring that services are truly procured on the basis of best value to the criminal justice system and not necessarily the lowest cost. We must look again at the procurement model which, in my view is fundamentally and fatally flawed. One simply cannot procure forensic services in the same way as you can for office consumables. The way in which contracts are awarded is primarily based upon the lowest cost. Similarly, we need to make a clear differentiation between cost and value. Furthermore, it is rather unfortunate that those professional forensic scientists who are best able to make the most professional assessment of value are, for the most part not consulted and just presented with a series of items which are often submitted piecemeal and weeks apart.

8. 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?
Most recently we have seen some ‘narrow escapes’ in respect of companies ceasing to trade and similarly, a number have folded. One cannot underestimate the impact that the closure of a major forensic supplier will have. Simply one cannot take a major resource from the market and think that it will be ‘business as usual’. The impact is likely to be the lengthening of contractual turnaround times and, essentially the work will take longer. The Forensic Science Regulator and others are repeatedly warning of the dangers associated with combined in sourcing and budget cuts which will continually undermine the contribution of forensic science left unaddressed. Unless properly addressed the forensic science market will continue to lurch towards ever increasing unsustainability.

13 September 2018