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Effective use of forensic science in volume crime investigations: Identifying recurring themes in the literature

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ABSTRACT

New scientific, technological and legal developments, particularly the introduction of national databases for DNA and fingerprints, have led to increased use of forensic science in the investigation of crime. There is an assumption, and in some instances specific assertions, that such developments bring improvements either in broad criminal justice terms or more narrowly in terms of economic or practical efficiencies. The underlying presumption is that the new technological opportunities will be understood and effectively implemented. This research investigates whether such increases in activity have also been accompanied by improvements in the effective use of forensic science. A systematic review of thirty-six reports published (predominantly in England and Wales) since the 1980s, which have considered the use of forensic science in the investigation of volume crimes, was carried out. These reports have identified a number of recurrent themes that influenced how effectively forensic science was used in investigations. The themes identified included forensic knowledge and training of investigators, communication and information exchange between specialists and investigators, timeliness of forensic results, interagency relationships and deployment of crime scene examiner resources. The research findings suggest that these factors continue to hinder the effective use of forensic science despite technological advances and this paper considers their potential causes.

1. Introduction

The reliance on forensic science in police investigations to help identify and prosecute individuals responsible for criminal activities has increased in the last century [1–4]. This paper focuses on volume crime investigations which involve the use of forensic science. The interaction of the various interdependent criminal justice agencies (police, forensic service providers, prosecution authorities) can make these investigations relatively complex [5–8]. It has previously been stated that the effective use of forensic science and its contribution to investigative outcomes is influenced by a number of factors (for example timeliness of results and laboratory submissions, available resources, organisational cultures) [5,7,9,10]. It is these factors and their influence on the effective use of forensic science that will be considered in this paper.

A systematic review of the academic literature, government reviews, non-academic sources and other published reports, primarily from England and Wales, was carried out to investigate how effectively forensic science was used and how it contributes to the investigation of volume crime. The published literature from the past 30 years has identified a number of recurrent factors which have been shown to hinder the effective use of forensic science and other processes associated with the investigation of volume crimes. Undoubtedly forensic techniques and technologies have changed significantly since some of the first studies were carried out in the 1980s. However, the issues identified within this paper appear to be independent of the technology used, given that they continue to persist.

Although a significant body of literature has been published on this topic, these publications are not systematic research studies with robust experimental designs. Few of the reports[1] discussed above used formal or systematic research methods and therefore care is required in evaluating their findings in the context of this review. Particular limitations included: methodological approaches, lack of statistical analysis and evaluation, collection periods of data used, as well as demographic factors including the number and geographic locations of the study sites. Furthermore, most of the studies made opportunistic use of available data as opposed to data specifically collected for research. Only primary sources of information were utilised (results published in secondary reports were excluded). A number of search terms (keywords) were chosen to identify the available literature from databases, library catalogues, relevant reviews, and government and policing websites. Notwithstanding, when considered as a corpus these publications

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[1] For convenience, 'reports' is used as a collective term for this literature (i.e. audits, reviews, inspections, consultations).

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highlight systematic deficiencies in the use of forensic science both in England and Wales and in other parts of the world.

2. Themes identified in the literature

The majority of the literature originates from official publications (reviews, audits, reports, inspections, consultations, etc.) and research studies predominantly carried out by the Home Office or the Police Research Group in England and Wales. Similar work which has been carried out in other jurisdictions (predominantly from the USA and Australia) has also been considered. The thirty-six reports reviewed identified a number of recurrent themes affecting an investigation and the use of forensic science [1–9,11–37]. In summary these included:

- Twenty-one reports emphasising limited forensic knowledge (the value of evidence and uncertainty of the capabilities of forensic science),
- Twenty-one reports identifying limited forensic training of investigators,
- Twenty-eight reports identifying poor communication,
- Nineteen reports emphasising poor interagency collaboration and inadequate relationships,
- Thirty reports commenting on poor use and deployment of resources (particularly crime scene examiners), and
- Twenty-two reports identifying poor timeliness and slow turn-around-times from laboratories.

Many of these themes, as well as the recommendations for improvements, were identified in the first reviews undertaken in the 1980s. However, Table 1 (publications from England and Wales) and Table 2 (international publications) clearly demonstrate that these issues remain prominent in more recent work as well.

One of the first attempts to measure the 'effectiveness' and 'efficiency' of forensic support within the police forces of England and Wales resulted in the Home Office commissioning the Touche Ross Management Consultants, to review how forensic science was being utilised and implemented by police forces [7]. Regarded by many as **the** pioneering report, a number of subsequent publications refer to it extensively and support its recommendations and reasoning [1,23,38,39]. The Touche Ross report [7] also identified many of the themes which recur in subsequent publications and are discussed in detail in this paper. Similar explorations of the use of forensic science began around the same time in the United States of America (USA), with research by Greenwood et al. [27] and Peterson et al. [26] assessing the clearance rates for volume crime offences (mainly burglaries) when forensic evidence was available.

2.1. Collaboration between police organisations and forensic service providers[2]

The availability of scientific support [7] and the effectiveness of the Home Office Forensic Science Service (FSS) [5] were investigated in the late 1980s by two landmark studies. Both of these reports were highly critical of the poor relationship and quality of collaboration between police forces and forensic service providers[3] [5,7]. The first of these two reports, the Touche Ross report, assessed the management and use of scientific support [7]. It stated that "[forensic] laboratories and police [forces] must […] ensure that each is aware of the problems and requirements of the other" [7]. The second complementary study by Ramsay [5] identified that police officers had limited knowledge of the role and use of forensic science. Ramsay also stated that "to make informed judgements about [the] value" of forensic science, effective collaboration was necessary [5].

Further work in the 1990s reiterated the need for a much closer partnership between investigators, crime scene examiners (CSEs), and police officers to aid the effectiveness of the investigation [6]. It has been suggested that to obtain the maximum impact from forensic science, relationships between investigative organisations as well as the degree of integration and collaboration must reflect the objectives and aims of all of the parties involved [20]. If several individuals (or organisations) are to work together effectively, each must have a clear understanding of their responsibilities, accountability and authority to achieve their common goal [40]. For systems and processes to work effectively, the individuals involved must have an understanding of the interconnected nature of their activities as well as how their actions can affect the system as a whole [41].

The thematic inspection by Her Majesty's Inspectorate of Constabulary (HMIC) in 2000 identified that case turn-around-times, the efficiency of case progression to court and the accurate interpretation of forensic evidence can be considerably improved when the different organisations involved in the investigation of crimes work collaboratively [17]. As well as a stable and effective partnership, this requires a shared commitment and mutual ownership between participating groups in what is effectively, a complex interconnected system [42,43]. Collaborations between users and suppliers of forensic services are based on the assumption that both are working together to achieve effective outcomes [5,6]. Efficient criminal investigations work not only towards identifying (and consequently prosecuting) offenders but also the rapid elimination of witnesses and other innocent individuals [9,44].

Effective use of forensic science is therefore dependent on the collaboration of all of the stakeholders and organisations involved in the investigation and "without a detailed understanding of their mutual roles, processes, epistemologies and expertise, the hope of developing a productive relationship seems unachievable" [45].

2.2. Communication

Communication and the sharing of information is important to the criminal justice system as a whole, not just to specific aspects such as the effective use of forensic science [5,8,9]. The communication between investigating officers and the FSS was limited which was first shown by Ramsay in 1987 [5]. He found that the poor flow of information had a negative effect on the number of criminal cases referred for forensic analysis by police forces [5].

Touche Ross [7] found that direct communication between forensic scientists and police officers in the form of case reports did not contain clear evaluations of evidential strengths which investigating officers could easily understand. They stated that reports produced by the FSS were "vague or obscure" with officers having to "read between the lines", and that "the style of reports led to a blunting of their impact" and meaning due to technical 'jargon' [5]. This issue has seen a great deal of improvement since the 1980s, and evidential strength of results are more clearly defined and explained, but as reports have become increasingly complex, their true effectiveness remains unclear in the absence of further research.

In 1993, Roberts and Willmore [12] found that often investigative officers did not update forensic laboratory staff with any changes of circumstances occurring in the case under investigation. In one major police force it was found that 30% of cases which no longer required work were still being worked on by scientists [46]. In the USA, Roman et al. [33] found similar issues of disconnected communication between police officers and the forensic laboratory over ten years later. One interviewee in their study stated that "officers and investigators had

[2] FSP is a comparatively recent term, which designates any organisation that delivers forensic services.

[3] For the majority of the reports reviewed, the term Forensic Service Provider will refer to the Forensic Science Service (FSS). The FSS has undergone a number of changes since the early studies. The FSS was part of the Home Office until 1991 when it became an Executive Agency of the Home Office (an independent but non-profit making organisation). Simultaneously, the FSS introduced a 'fee-for-service' model as a way of managing resources. In 1999 the FSS became a Trading Fund and could retain the income from its operating activities. In 2005, after an extensive review, the FSS became a government-owned company [46]. It remained a fully commercial company (FSS Ltd.) until its closure in March 2012.