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The future of forensic science standards

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ABSTRACT

In 2010 the Australia New Zealand Policing Advisory Agency National Institute of Forensic Science (NIFS) established a project to set up a sustainable mechanism for the development and maintenance of standards, across a broad science and technology base that is relevant to general law enforcement, and the forensic science community. The project includes four core forensic standards covering the collection, analysis, interpretation and reporting of forensic evidence and discipline specific standards. One specific standard identified covers specifications regarding the manufacture of products used to collect biological material for forensic analysis. This is significant as contamination events caused by staff during the manufacturing process have resulted in investigations being hampered by non-case related DNA profiles obtained during case work analysis. The core standards continue to be developed as Australian Standards, however the contamination minimisation standard is being progressed through ISO. The development of the standards and potential impact is discussed.

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1. Introduction

Although many forensic laboratories comply with or are accredited against the International Organization for Standardization (ISO) Standard 17025, this Standard is not specifically designed for forensic applications, in that it provides general requirements for laboratories to carry out tests and calibrations, with an emphasis on policy and documentation. To address this, the National Association of Testing Authorities (NATA), Australia developed a Field Application Document (FAD) which provides guidance to NATA accredited forensic laboratories, in the application of ISO 17025, particularly in relation to analytical processes but again leaves many forensic processes insufficiently addressed. The American Society for Testing and Materials Standards and Scientific Working Group (SWG) Guidelines also provide guidance for specific forensic disciplines.

The National Academy of Sciences report in 2009 [1] highlighted problems that exist for forensic science in the US and called for the development of forensic science specific standards, that are more enforceable than guidelines. The development of internationally recognised standards will provide consistency and a required level of practice at all stages of forensic work from sample recognition at a scene to reporting evidence in courts of law and will help ensure that data collected is reliable and

results and interpretations are based on comparable technologies, processes and techniques.

2. Forensic standards development framework

A strategic framework for the development of forensic science standards has been developed (Fig. 1), which consists of four core standards: Forensic Analysis Part 1: Recognition, recording, recovery, transport and storage of material; Forensic Analysis Part 2: Analysis and examination of material; Forensic Analysis Part 3: Interpretation of results; and Forensic Analysis Part 4: Reporting results and conclusions.

The core standards are based on the practices and procedures currently employed in accredited forensic laboratories in Australia and New Zealand. They are intended to provide a comprehensive framework applicable to a majority of forensic science disciplines for the universal aspects of forensic science practice. These can then be supplemented by the development of discipline specific forensic science standards in the future. The development of standard drafts is supported by a working group comprised of practitioners from a range of jurisdictions and with expertise covering relevant disciplines. Developed drafts are submitted to the Standards Australia (SA) Forensic Analysis Committee, which comprises representatives from stakeholder organizations, including law enforcement, forensic facilities, consumer advocacy, educators (both scientific and legal), SA and NIFS. SA is recognised by the Australian Government as the peak, non-government standards body in Australia and is a participating member of ISO. The key objective of the Committee is to develop forensic science draft standards to be published as Australian Standards. To this end

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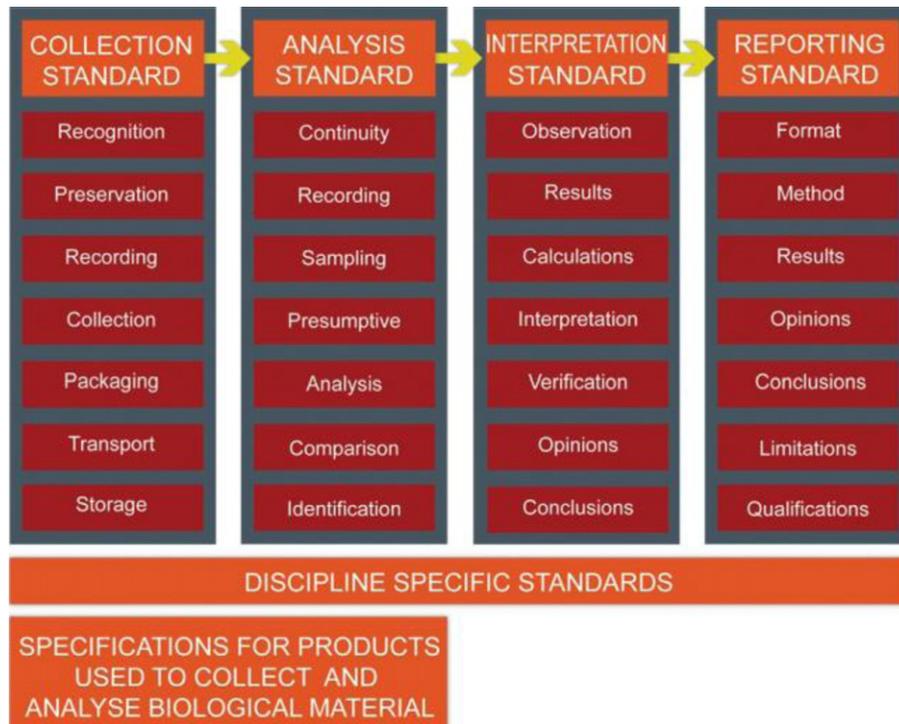


Fig. 1. The forensic science development framework model.

the Committee resolves competing interests to maximise consensus and consults with all interested constituencies through an open process to ensure transparency and acceptance. Once the standard has reached maturity it is made available for public comment after which it is then published.

3. Standard: specifications for products used to collect and analyse biological material for forensic purposes

Over a seven year period, millions of Euros and hundreds of thousands of police hours were spent searching for a suspected female serial killer in Europe. The suspect was linked through DNA matches to a series of 40 crime scenes in Germany, Austria and France, such as the murder of a female church warden in 1993, the murder of a 22 year old policewoman in 2007 and the execution-style killings of three Georgian car dealers. Suspicions regarding the possibility of contamination arose when the number and diversity of linked crimes increased. Many of the cases were solved, but no female suspect with a matching DNA profile could be located. Investigators began to suspect that batches of cotton swabs used by police forces in several European countries had been contaminated with DNA from staff during the manufacturing process. The initial doubts were confirmed when the same female DNA profile was found during an investigation into the identity of a male burned body in France. Further products have since been identified as being contaminated by staff associated with the manufacturing process, such as plastic ware in Europe, the United States and New Zealand [2].

'Specifications for products used to collect and analyse biological material for forensic purposes' is proposed to be developed as an international standard, via the ISO process. This standard will set the criteria around which consumables used in forensic DNA collection and analysis should be manufactured to ensure the consumables are free of amplifiable and detectable human DNA. Based on feedback by practitioners, three possible focus areas have been identified to be included in the standard: consumables at collection point, consumables used during analysis and personal protective equipment.

The ISO process is consensus-based involving end-users and key stakeholders including the manufacturing industry. Australia

is suggested to lead the project's development with ISO, with representation by Standards Australia. The American Society of Crime Lab Directors, the European Network of Forensic Science Institutes, the United Kingdom and the Asian Forensic Science Network have nominated representatives to form part of the Committee to develop the standard.

4. Conclusion

It is expected that all core standards will be published, or submitted to SA by July 2012. The standard for specifications for products used to collect and analyse biological material is expected to be ready for submission to ISO by the same time. Although guidelines and protocols covering forensic methods do exist (such as SWG and ASTM guidelines), there are currently no published international standards in forensic science. The forensic standards being developed in Australia have the potential for international adoption or may form the basis for the development of international standards.

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Conflict of interest

None.

References

- [1] Committee on Identifying the Needs of the Forensic Sciences Community, National Research Council, Strengthening Forensic Science in the United States: A Path Forward, The National Academies Press, Washington, D.C., 2009.
- [2] P. Gill, D. Rowlands, G. Tully, I. Bastisch, T. Staples, P. Scott, Letter to the Editor: manufacturer contamination of disposable plastic-ware and other reagents—an agreed position statement by ENFSI, SWGDAM and BSAG, Forensic Sci. Int. Genet. 4 (2010) 269–270.