A

ACCREDITATION

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Forensic Specialties Accreditation Board

G R Jones, Office of the Chief Medical Examiner, Edmonton, AB, Canada

Introduction

The Forensic Specialties Accreditation Board (FSAB) is an independent board established in 2000 to accredit professional bodies that certify forensic scientists and other forensic specialists. The term "specialty" was used because not all forensic disciplines are strictly science-based, but rather they are based on learned knowledge, skills, and abilities. Assistance in developing the FSAB program was provided by the American Academy of Forensic Sciences (AAFS) and the US National Institute of Justice (NIJ).

Accreditation versus Certification

Before going further, it is necessary to clarify the difference between certification and accreditation. In a professional context, the term "certification" is applied to individuals who submit to some process of evaluation and/or examination. It establishes whether individuals have the minimum knowledge, skills, and abilities as defined by the certification body to perform their jobs adequately. In a professional context, certification is often voluntary, although in a regulatory context it may be mandatory to perform a specific task or job.

The term "accreditation" is normally applied to an institution or program. In forensic science that institution is normally a laboratory, but it may be a program such as a professional certification program. An accreditation program evaluates the structure and performance of the institution against a set of standards. If those standards are met or exceeded, accreditation is granted.

Why Accredit the Certifiers?

It is not unreasonable to conclude that a professional certification program should be able to stand on its own without being accredited. Many could. However, there has been a marked increase in the number of forensic certification bodies over the past 10 years or so, some of which apply reasonable program standards, but some of which have few standards. This has become a problem since the courts and the legal system are not readily able to scrutinize every single expert that comes before them in enough detail to establish their credibility as an expert in the field. The courts therefore rely on board-certified credentials; these credentials are a useful baseline if the forensic expert is able to establish that he/she is certified by a reputable certification board and if the standards and reliability of that board can be established. However, determining which certification boards have acceptable programs is not easy.

Many of the mainstream forensic certification boards were established with the help of a US NIJ grant in 1976. However, even though they grew out of the same initiative, some lack components that are considered important today. For example, some have no requirement for a minimum amount of continuing education. Some certification programs do not require periodic recertification. An even greater problem is that some of the less reputable certification programs that have sprung up in recent years do

not even have a meaningful examination that evaluates the competency of the individual, but rather are fee-based membership organizations.

Background to FSAB

The FSAB started as a committee of the AAFS in 1996. The AAFS was starting to receive requests to list the certification of forensic boards in its membership directory, but had no means of assessing which certification boards were credible, and which were not. It soon became clear that some type of evaluation or accreditation process needed to be established. At the time, there were only two main programs in North America that accredited certification bodies. The best-known is the American Board of Medical Specialties (ABMS), which is an umbrella organization that accredits most medical certification boards in the USA. These include the American Board of Pathology, which recognizes forensic pathology as a defined subspecialty. In addition, forensic psychiatry is a subspecialty certification under the American Board of Psychiatry and Neurology. However, the ABMS only accredits recognized medical certification boards and cannot accredit nonmedical specialties.

The other accrediting agency offering accreditation of certifying bodies in 1996 was the National Commission for Certifying Agencies (NCCA). The NCCA is a well-established accreditation board with published standards that has accredited over 50 certification boards in various paramedical and other areas. However, most forensic certification boards are very small and would find it difficult or impossible to meet the criteria and financial requirements of NCCA.

More recently, the USA-based American National Standards Institute (ANSI) has offered an accreditation program based on the standard ISO/IEC 17024. However, similar to the NCCA, the ANSI program is cost-prohibitive for the forensic specialty boards, most of which are relatively small. Furthermore, neither the NCCA nor ANSI programs would address some of the difficult issues related to the forensic arena (such as multiple certification boards for the same discipline). While accreditation by NCCA and ANSI remains an option, it was judged that formation of a new accreditation program, based primarily on internationally accepted standards, was the only practical course to follow.

What are the FSAB Accreditation Standards?

The accreditation standards used by FSAB are based primarily on the international ISO/IEC 17024 standards. Additional standards have been added to strengthen the FSAB accreditation program for the forensic specialties, and are readily available. There are two main components to the FSAB program: (1) those standards that apply to the certification body itself; and (2) those that the applicant certification body applies to evaluation and certification of its applicants. Standards applied to the certification body include: (1) a requirement that the certification granting entity be independent and impartial in granting or denying certification; (2) that they have written policies and procedures; (3) that they have a quality management program; and (4) that the structure, scope, and security for examinations are adequate. Standards must be in place that adequately assess the applicant. These are outlined below.

FSAB Standards that Apply to the Certificants

The FSAB program requires that the forensic certifying body have a meaningful credentialing process that stipulates the minimum standards for education, training, and experience, and inquires into the ethics of the applicant. There is also a requirement to conduct a meaningful assessment of the knowledge, skills, and competency of the applicant. Depending on the discipline, part or most of that requirement may be satisfied by a validated examination.

Validation of the examination is required to ensure that the questions are clear, unambiguous, unbiased, and properly cover the scope of the forensic discipline. Part of the examination may be oral or practical. The program must also require mandatory, periodic recertification, not to exceed every five years. Recertification must require continued involvement in the forensic discipline, plus a minimum amount of continuing education (also more broadly called continued competency), and reaffirmation of a commitment to uphold ethical and professional standards.

One other critical feature of the program is that "grandfathering" is not allowed. "Grandfathering" can be defined as the process where people are granted certification by virtue of the fact that they practiced in the profession before or for a defined time after the certification program was instituted.

The Problem of Multiple Certification Boards

One of the biggest problems in accrediting forensic certification bodies is that, for some disciplines, multiple certification boards exist. Different certification programs for the same discipline may be aimed at different levels of forensic practice (e.g., technical

versus professional), but in some instances they may have evolved because of differences in philosophy over some aspect of professional practice or qualification.

At the present time, perhaps arguably, true standards for what an individual in a specific professional discipline must know do not exist for any forensic discipline. As a result, arguments abound as to whether the program with the most extensive and stringent standards is the only permissible one. Even if a professional consensus is reached for a given forensic discipline, certification programs may legitimately differ because they are directed at different levels or types of forensic practice. For example, in forensic toxicology, many "bench-level" toxicologists are never required to interpret toxicology results and therefore do not require the education and training in pharmacology that would be required for forensic toxicologists who do give opinion evidence in court. Because of these differences, the FSAB program cannot impose discipline-specific standards (because they do not exist), but does require that each certification program publish and have readily available (e.g., on a website) the standards (including the education, training, knowledge, skills, and abilities) that applicants are required to have to become certified under that program. The rationale is that, even though programs in the same forensic discipline may differ (often for legitimate reasons), anyone can readily determine the nature and scope of the program.

Scope of the FSAB Program

There is no geographic limit to the FSAB program, although for practical reasons it is currently limited to programs that operate in the English language. Any forensic specialty certification program that meets the published FSAB standards can apply for accreditation.

At the time of writing, the FSAB board has representatives from 10 different organizations, covering most of the major forensic disciplines. The first forensic board was accredited in March 2004. A list of current board members and program documents is available through the FSAB website (http://www.thefsab.org).

Further Reading

FSAB *Standards for Accrediting Forensic Specialty Certification Boards*. Available online at: http://www.thefsab.org/standards.html

ISO/IEC 17024 *General Requirements for Bodies Operating Certification Systems of Persons*. Available online at: http://www.iso.ch/iso/en/commcentre/pressreleases/2003/Ref847.html

Crime Scene Investigators

J Horswell, Forensic Executives, Upper Mt. Gravatt, QLD, Australia

History

During the 1980s Australians were subjected to a media frenzy surrounding the disappearance of Azaria Chantel Loren Chamberlain at Ayers Rock in the Northern Territory of Australia on August 17, 1980. The circumstances surrounding the disappearance and the Chamberlain family were subjected to media scrutiny like no case in living criminal history of the Northern Territory, or for that matter many other jurisdictions in Australia.

It was during a Royal Commission of Inquiry conducted by His Honour Justice Trevor Morling that the legal fraternity in Australia and forensic science practitioners sued for changes in the structure, function, and practice of forensic science in Australia. Justice Morling in his report highlighted some deficiencies in forensic science that contributed to the problems encountered in the Chamberlain case and suggested remedies for future practice. Specific areas of concern were the lack of communication between police, experts, and lawyers that resulted in an exaggerated importance being placed on expert evidence. He was also concerned about the absence of uniform and reliable practices throughout Australia which meant that the court could not be sure that "reasonably certain" results were being obtained, reported, and depended upon.

The Commissioner attributed these problems to the lack of infrastructure within forensic science in Australia and advocated the development of a National Institute of Forensic Science (NIFS). His vision for NIFS was to unite experts within Australia and connect them with experts from overseas. The Institute would be responsible for establishing and maintaining standards, facilitating the exchange of information, and research and education. The Commissioner stressed that the onus for funding NIFS should rest with government. It is pleasing to see that NIFS came into operation during the 1990s, funded by the state and federal governments of Australia, with the mandate to do just what the Commissioner had envisaged.

It was during the early 1990s that the Senior Managers of Australian and New Zealand Forensic Laboratories (SMANZFL), representing the forensic science management community in Australia and New Zealand, provided the vital leadership and pressed the newly formed NIFS for the creation of an Australian forensic science accreditation program,

which would be managed by the National Association of Testing Authorities (NATA), through its newly formed Forensic Science Accreditation Advisory Committee (FSAAC).

The first third-party forensic science laboratory accreditation program in Australia relied in part on the forensic science laboratory accreditation program already in existence in North America, which was managed by the American Society of Crime Laboratory Directors Laboratory Accreditation Board (ASCLD-LAB), a program ASCLD had been offering to laboratories throughout the world for a number of years. In fact, Melbourne's Victoria Police Forensic Science Center had successfully gained forensic science accreditation through this scheme.

The first Australian program consisted of the American program's forensic science criteria, which basically centered on a quality systems approach to forensic science laboratory management. This, combined with assessment against criteria from the International Guide, International Organization for Standardization (ISO) Guide 25, for testing and calibration laboratories, which had been offered to participating testing and calibration laboratories throughout Australia, by NATA, Australia for some years, was offered as the first Australian program.

With the introduction of ISO 17025 and NATA's new supplementary requirements for forensic science laboratories in Australia, managers of Australian laboratories reviewed the necessity for continuation with ASCLD-LAB's accreditation for their respective laboratories.

It was, however, the foresight of NATA's FSAAC when formulating the classes and subclasses of tests that would come under the umbrella of NATA's forensic science accreditation program that, for the first time anywhere, an accreditation program for forensic science would include crime-scene investigation.

The Field and Identification Specialist Advisory Group (F&ISAG), a committee of SMANZFL, consisting of senior crime-scene investigators, forensic ballistics specialists, and fingerprint specialists, was tasked with coming up with an accreditation program for crime-scene investigators. The F&ISAG formed a smaller group of senior crime-scene investigators into a committee titled the Crime Scene Accreditation Committee (CSAC) to work through the conceptual and development issues surrounding the proficiency testing of crime-scene investigators, which is an integral part of the accreditation process.

Accreditation Criteria for Forensic Science

NATA's ISO 17025 supplementary requirements for accreditation in the field of forensic science application document require that crime-scene investigators be competent in the application of the principles of crime-scene photography, scene examination and exhibit handling, safety, and have an appreciation of the capabilities of other disciplines.

Being part of the overall accreditation regime requires that, even though a facility may go forward seeking accreditation for crime-scene investigation only, it must conform with the International Standard ISO 17025 – general requirements for the competence of testing and calibration laboratories – as well as NATA's supplementary requirements for accreditation in the field of forensic science application document.

The specific aspects of NATA's forensic science accreditation program as it applies to the discipline of crime-scene investigation is outlined below.

Court Testimony Monitoring

The presentation of testimony is the culmination of the work performed by a forensic scientist. It is therefore vitally important that the effectiveness of each examiner in the presentation of oral evidence be reviewed at least once annually. The following are acceptable methods by which monitoring may be carried out:

- observation of the testimony by a supervisor or a peer and completion of the pro-forma testimony evaluation form or
- the completion by officers of the court of a testimony evaluation form or
- a member of the laboratory's technical management team or a supervisor may request responses by telephone from one or more officers of the court. The responses would be used to complete the testimony evaluation form.

The testimony evaluation form allows for personal impressions such as voice volume, tone and fluency, eye contact, demeanor, and etiquette. The testimony of the witness is also evaluated for confidence, responsiveness to questions, preparation and subject knowledge, clarity and conciseness, objectivity, and impartiality. The witness having referenced the case file, diagrams, and photographs as well as the length of time the witness underwent evidence in chief, cross-examination, and reexamination would be included in the evaluation.

The monitoring procedure must also prescribe the remedial action that is to be taken should the evaluation be less than satisfactory and each analyst/examiner must be given timely feedback on the evaluation.

It is a requirement of the accreditation program that there is a documented procedure whereby the

testimony of each analyst/examiner is monitored during each year testimony is given. Records of the actual monitoring must be kept for each examiner as a record of the evaluation having taken place.

Figure 1 gives an example of a court testimony monitoring form.

Duties and Competencies of Crime-Scene Investigators

The following is a summary of the main duties of a crime-scene investigator. These seven criteria were developed from information provided to CSAC by each jurisdictional representative on this committee. They were used to develop the competency and internal proficiency testing instrument, and the external proficiency test, which form the crime-scene component of NATA's program.

Initial Assessment of the Scene

1. Assess health and safety risks and take adequate safety precautions.
2. Ascertain the circumstances regarding the incident.
3. Define/redefine the scene boundary to optimize the recovery of physical evidence.

Case Reference Number

COURTROOM/WITNESS EVALUATION FORM

The purpose of this questionnaire is to provide information that will help staff present more effective court testimony.
***Constructive** evaluation of courtroom performance is encouraged.*

Name of witness: ..... **Date:** .....
Matter of: .....

☐ Coronial: ☐ Magistrates ☐ Trial:

			1	2	3	4	5
PERSONAL IMPRESSIONS:	1.	**VOICE (volume, tone, fluency)**					
	2.	**EYE CONTACT**					
	3.	**DEMEANOUR**					
	4.	**DRESS**					
	5.	**ETIQUETTE**					
TESTIMONY:	1.	**CONFIDENT (forceful, direct)**					
	2.	**RESPONSIVE TO QUESTIONS**					
	3.	**PREPARED & KNOWLEDGEABLE**					
	4.	**CLEAR & CONCISE**					
	5.	**OBJECTIVE**					

		1	2	3	4	5
CASE FILE (referred to in court?)	**YES/NO**					
COURTROOM AIDS (diagrams/photos)	**YES/NO**					

LENGTH OF TIME: EVIDENCE IN CHIEF .....
CROSS EXAMINATION .....

COMMENTS:

.....

.....

Your comments would be appreciated on any of the above aspects of witness performance, which in your view could be improved. As a guide, "5" would be considered improvement needed and "1" no improvement required. If appropriate, indicate how witness performance could be improved.

COMPLETED BY:..... DATE:.....

Figure 1 Courtroom/witness evaluation form. Reproduced with permission from Horswell J (ed.) (2004) *The Practice of Crime Scene Investigation.* Boca Raton, FL: CRC Press.

Control of the Scene

1. Ensure that a log of all persons entering and leaving the scene is established and maintained.
2. Preserve the scene during the examination.
3. Advise those entering and leaving the scene of an access and exit path to minimize loss of evidence.
4. Adopt appropriate procedures to prevent contamination and loss of evidence.

Examination of the Scene

1. Identify and apply an appropriate search pattern.
2. Accurately record details of the scene.
3. Locate physical and trace evidence.
4. Make appropriate arrangements to collect evidence from victims and suspects.
5. Seek assistance from other specialists where appropriate.

Interpretation of the Evidence

1. Establish the possible significance of the evidence.
2. Establish the possible sequence(s) of events, where appropriate.
3. Communicate the significance and interpretation of the evidence to the officer in charge of the incident.

Recording the Scene

1. Record time, date, and location of the scene.
2. Make a thorough and accurate record of the scene.

Exhibit Collection

1. Collect and package exhibits in a manner, which will prevent contamination.
2. Ensure exhibits are identified by appropriate labeling.
3. Establish a record of exhibits collected.

Case Management

1. Ensure continuity and security of exhibits, items, and records.
2. Maintain liaison with the officer in charge of the case and other specialists.
3. Prepare relevant statements, reports, and other documentation.

Competency and Proficiency Testing Crime-Scene Investigators

The emphasis inherent in internal and external proficiency tests is one of continual improvement. Proficiency testing is an integral part of an effective quality assurance program, to monitor performance and to identify areas where improvement may be needed. Hence a critical element in NATA's forensic science accreditation program has been the development of proficiency tests for crime-scene investigation.

Internal Competency and Proficiency Test Instrument

A proficiency-testing program is an essential criterion for accreditation of a facility. Both the internal and external proficiency tests measure the capability of a facility's investigators, thus ensuring their competency and therefore the reliability of any results produced. Each crime-scene investigator must complete an internal proficiency test instrument and each facility must complete an external proficiency test using CD-ROM as a medium annually.

The instrument for internal competency and proficiency testing replicates what is required from a crime-scene investigator undertaking the external (CD-ROM) proficiency test.

See Figure 2 for an example of the competency and internal proficiency test instrument.

Crime-scene investigation, because of its subjective nature, presented a definite challenge in developing the concept of how to test crime-scene investigators. The initial committee of crime-scene investigators (CSAC), after considerable thought and discussion, came up with strategies in dealing with external proficiency tests for crime-scene investigators covering:

- concept
- platform
- management
- development
- delivery.

The conceptual stage of developing external proficiency tests was a challenge for CSAC and it was decided to produce the first proficiency test using video (analog) format and at the same time task a media development company to develop the concept of CD-ROM (digital). It was also decided to set up an independent committee, the Crime Scene Proficiency Advisory Committee (CSPAC), which was tasked with managing the external proficiency testing program, leaving the marketing and distribution to NIFS, and the work of shooting the actual mock crime-scene scenarios to a subgroup of CSPAC entitled the Proficiency Test Working Party (PTWP). Since its inception, CSPAC has become a standing committee of NIFS and is an accredited NATA proficiency test provider.

This involves assessment at an actual crime scene.

A. INITIAL ASSESSMENT OF THE SCENE

The crime scene investigator should establish if the crime scene guard at the scene has:

DESCRIPTION	Achieved	Not Achieved	Not Applicable	Comment
1. Assessed hazards, physical, electrical, gas, chemical, and biological				
2. Supplied first aid or medical attention as required				
3. Determined nature and size of the scene				
4. Determined entry and exit points that may have been used by suspect/s				
5. Removed all persons from the scene and recorded details of anyone who may have unintentionally or deliberately contaminated the scene				
6. Called for assistance (if required) to coordinate the scene				
7. Called any other experts (e.g., fingerprints, police surgeon, forensic pathologist, and plain clothes investigators) if required				
8. Defined the scene boundary with tape and guards				
9. Protected any endangered physical evidence				
10. Recorded details of all actions in an official notebook and maintained a log of persons who entered and left the scene				

Has the crime scene investigator:

DESCRIPTION	Achieved	Not Achieved	Not Applicable	Comment
1. Ascertained the circumstances of the incident				
2. Re-assessed scene boundary and protection				
3. Re-assessed health and safety risks				
4. Taken adequate safety precautions, additional checks, and protective clothing				
5. Determined if anyone else may have entered or left the scene (e.g. ambulance officers, witnesses, other victims or suspects)				

B. CONTROL OF THE SCENE

Has the crime scene investigator:

DESCRIPTION	Achieved	Not Achieved	Not Applicable	Comment
1. Identified an appropriate entry point to the crime scene				
2. Monitored cordon(s)				
3. Ensured a log is maintained				
4. Arranged to obtain a copy of log of events recorded by the first officer				

Figure 2 Competency and proficiency test crime scene investigation. Reproduced with permission from Horswell J (ed.) (2004) *The Practice of Crime Scene Investigation*. Boca Roton, FL: CRC Press.

5. Adopted appropriate procedures to prevent contamination and loss of evidence				
6. Ensured that the scene is adequately guarded				
7. Determined an entry and exit path for the investigator to commence examinations whilst minimizing loss of evidence				

C. EXAMINATION OF THE SCENE

Did the crime scene investigator:

DESCRIPTION	Achieved	Not Achieved	Not Applicable	Comment
1. Demonstrate an appropriate search pattern such as lane, grid, zone, or spiral *NB: At least one of these techniques must be demonstrated*				
2. Make detailed observations of the scene				
3. Consider and assess trace evidence during the search				
4. Consider possible contamination of evidence during the search				
5. Make arrangements to later search victims and/or suspects for evidence (if applicable)				
6. Assess the need for:				
a. Fingerprinting				
b. Forensic ballistics				
c. Forensic pathologist/police surgeon				
d. Video				
e. Photogrammetry/plan drawing				
f. Other experts or assistance				

D. INTERPRETATION OF THE EVIDENCE AT THE SCENE

Has the crime scene investigator:

DESCRIPTION	Achieved	Not Achieved	Not Applicable	Comment
1. Assessed the significance of evidence at the scene				
2. Considered possible sequences of events				
3. Determined the most probable scenario				

E. RECORDING THE SCENE

Photography

Has the crime scene investigator:

DESCRIPTION	Achieved	Not Achieved	Not Applicable	Comment
1. Taken adequate photographs: a. General				
b. Mid-range				
c. Close-up				
d. Technical				

Figure 2 Continued.

2. Taken adequate notes regarding: a. Times, dates, locations				
b. Description of scene				
c. Location of items				
d. Persons in attendance				
e. Lighting conditions				
f. Condition of locks, windows, doors				
g. Condition of items and objects				
h. Any other relevant details				

Plan

Has the crime scene investigator:

DESCRIPTION	Achieved	Not Achieved	Not Applicable	Comment
1. Arranged for appropriate plans: a. Completed a sketch plan which is a reasonable representation of the scene				
b. Taken adequate measurements for CAD/sketch plan				

F. EXHIBIT COLLECTION

Has the crime scene investigator:

DESCRIPTION	Achieved	Not Achieved	Not Applicable	Comment
1. Collected all relevant exhibits				
2. Packaged all items according to procedures				
3. Labeled all items collected in accordance with procedures				
4. Maintained a log of all items collected				

G. CASE MANAGEMENT

Scene Aspects

Has the crime scene investigator:

DESCRIPTION	Achieved	Not Achieved	Not Applicable	Comment
1. Maintained close liaison with first officer and investigator so as to process the scene effectively				
2. Maintained control				
3. Organized and planned the scene examination				
4. Evaluated options available				

Post Scene

Has the crime scene investigator:

DESCRIPTION	Achieved	Not Achieved	Not Applicable	Comment
1. Entered details of examination in the case management system				
2. Entered collected items in relevant recording system/s				
3. Obtained any other relevant paperwork for inclusion in the case folder				

Figure 2 Continued.

4. Examined items for evidence potential in an appropriate manner to avoid contamination and/or cross contamination				
5. Assessed items for further laboratory examination including possible options				
6. Completed all relevant forms and reports for items requiring further examination and forwarded them to the appropriate laboratory				
7. Secured exhibits for further examination				
8. Attended at case conference				
9. Ensured continuity is maintained for all exhibits				
10. Ensured appropriate quality assurance procedures have been adopted				
11. Prepared relevant statements and other documentation covering the following:				
a. Included an opening paragraph stating relevant qualifications and experience				
b. Presented the evidence in chronological order				
c. Explained the nature and extent of the examination				
d. Provided a detailed description of the scene				
e. Described details before presenting photographs in series				
f. Presented the information in a way that can be understood				
g. Labeled/captioned photographs appropriately				
h. Introduced exhibits appropriately				
i. Produced any charts, plans, etc. of scene				
j. Presented opinion evidence appropriately				

ADDITIONAL COMMENTS SECTION

Any other matters arising from this assessment which should be considered in the final assessment:

Figure 2 Continued.

Has the crime scene investigator carried out additional specific procedures?

DESCRIPTION	Achieved	Not Achieved	Not Applicable	Comment
1.				
2.				
3.				
4.				
5.				
6.				
7.				
8.				
9.				
10.				
11.				
12.				
13.				
14.				
15.				

Crime Scene Investigator being assessed: .....
(name)

Assessor: .....
(name)

..... **Date:** .....
(signature)

Figure 2 Continued.

Crime-Scene Proficiency Advisory Committee

This committee was formed under the auspices of NIFS and initially comprised five senior crime-scene investigators from jurisdictions throughout Australia. CSPAC is responsible for the development of all external proficiency tests relating to crime-scene investigation.

Crime-Scene Proficiency Test

CSPAC develops one external proficiency test annually, which covers any or all of the following performance criteria:

- initial assessment of the crime scene
- control of the crime scene
- examination of the crime scene
- interpretation of evidence at the crime scene
- recording of the crime scene and evidence
- evidence collection
- case management.

The scenarios conceptualized by the Committee are representative of those encountered in normal crime-scene operations and reflect any jurisdictional-specific roles of crime-scene investigators throughout Australia.

The scenarios are mock crime scenes, which allow crime-scene investigators to carry out normal procedures as near to the real thing as possible. These crime scenes are fabricated by PTWP and photographed using still photography. The photographs are sequenced and overlapped using a special photographic camera mount on a tripod. They are then entered into the program by stitching the images together to provide a panorama of the scene, with the ability to move from one point in the scene to another, allowing zoom ability for close-up views of evidential material which has been seeded within the mock scene by PTWP. The resulting interactive CD-ROM program is known as "After the Fact." The concept of interactive CD-ROM technology is not new, as it has been available in animated games for

some time. The application, for this purpose, is a first anywhere in the world, which has been followed by others in Australia in relation to the recording of actual crime scenes for replication as virtual reality used during investigations and courtroom presentations. The concept has also surfaced in North America in relation to testing fire investigators.

After several draft versions, the first CD-ROM external proficiency test was distributed to 110 facilities throughout Australia in August 1999.

There are three aspects to the crime-scene proficiency test:

1. the crime scene
2. the investigation tools
3. the written test.

Each aspect is fully explained in detail on the program and it is important that all investigators representing the participating facility equate themselves fully with the functions of the program before attempting the assessment phase.

"After the Fact" allows the investigator to "walk through" a virtual crime scene and provides for realistic scene processing, including the following:

- photography
- notes
- collection and packaging of evidence.

Questions, predeveloped by the Committee and relevant to that particular scene, are presented to the investigator in accordance with the seven key performance criteria of crime-scene investigation.

Crime-Scene Investigation

The identification, recording, and retrieval of potential evidentiary material is practiced worldwide by individuals from a variety of backgrounds who possess a variety of qualifications and who have undertaken a variety of education and training programs.

Some countries employ bench scientists as crime-scene examiners, some countries employ uniformed or plain-clothed police, who have very little training as crime-scene examiners, and some countries employ professional scientists as crime-scene investigators.

Some jurisdictions have recently embarked on employing graduate scientists who are then trained as crime-scene investigators. The author has been a strong advocate in the past for the provision of scientific and forensic education and training to police officers who carry out the functions of crime-scene investigators. This has had varying degrees of success in Australia; however, it has worked particularly well in the author's own jurisdiction. What one needs to avoid is a bench scientist undertaking crime-scene investigation duties in addition to his/her bench duties – these are two very distinct vocational activities, laboratory science and field science. Like all specialties, those who practice within a given specialty must practice their discipline to maintain current competencies and be in a position to provide evidence to a court of law that they have the expertise required to present evidence of "interpretation" or what is known in scientific circles as "hypothesis testing." It is only by carrying out many and varied crime-scene investigations that a crime-scene investigator will remain current and be in the position alluded to above. However, there are instances when laboratory scientists should be called to scenes to assist their field scientist colleagues. This would normally relate to the way in which the laboratory scientist would want the item or sample collected and handled given a particular set of circumstances. There is always room for other specialists to assist at the scene, such as fingerprint and forensic ballistics examiners. To take away the "interpretation" aspect of a crime-scene investigator's duties is to demean the practice of crime-scene investigation and those dedicated individuals who practice in the discipline.

The value of accreditation in crime-scene investigation cannot be understated. The old adage "rubbish in, rubbish out" applies when there is not an appropriately educated, trained, and equipped crime-scene investigator undertaking crime-scene investigation duties. There is another universally held view: "it does not matter how well equipped or qualified the staff are at the forensic science laboratory, if the material they are asked to analyze or examine is not relevant to the case, was not appropriately collected or packaged, or, indeed was not collected at all, then the forensic science laboratory will not be able to 'make it right' and provide useful information as the evidential value of such material is lost forever."

It is only by routine quality systems auditing and proficiency testing the individual crime-scene investigator and the system that the crime-scene investigation facility will be able not only to say that they are delivering a quality product, but be able to prove it.

A crime-scene investigation facility must be staffed with appropriately educated and trained scientists, who carry out their field science discipline, by not only attending the very complex crime scene, but also by attending the everyday routine crime scene. The crime-scene investigation facility should also possess quality systems forensic science accreditation which will indicate to their client, the courts, and hence the public, that the product they produce is a "quality" product that is backed up by a rigorously tested "quality system."

The addition of crime-scene investigation to the Australian forensic science accreditation program is an international achievement that has only come about through a persistent team effort.

One last closing comment: third-party quality systems accreditation, even though it is administratively hard work, is good management practice.

See Also

Accreditation: Forensic Specialties Accreditation Board

Further Reading

American Society of Crime Laboratory Directors, Laboratory Accreditation Board (ASCLD-LAB) (2000) *Laboratory Accreditation Manual*. Garner, NC: American Society of Crime Laboratory Directors.

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Toxicology

G R Jones, Office of the Chief Medical Examiner, Edmonton, AB, Canada

Introduction

When the results of analysis by a forensic laboratory are reported or presented in court, there is an obvious expectation that the testing was performed by a competent laboratory and that the results are reliable and accurate. At one time, there was an assumption that testing performed by a police or government laboratory was necessarily accurate. However, unreliable testing in several high-profile cases throughout the world has shown that government or police laboratories are just as capable of using "bad science" as any other laboratory (Dingo Baby case (Australia), Birmingham Six bombers (UK), Guy Paul Morin (Canada), FBI whistleblower Whitehurst (USA)). So, how do the courts know whether any laboratory is competent enough to get "the right answer"? The short answer is, there is no way to guarantee any laboratory will perform flawlessly. However, accreditation of the laboratory following administrative review and on-site inspection is a major step toward ensuring reliability and setting minimum standards.

Why are there Several Accreditation Programs?

There are several subdisciplines within forensic toxicology, some of which overlap, and some of which have their own distinct accreditation programs. The subdisciplines include postmortem forensic toxicology (medical examiner/coroner deaths), impaired driving cases (so-called driving under the influence (DUI)), drug-facilitated sexual assault cases, alleged attempted poisonings, so-called workplace-related drug testing (employment or preemployment testing for drugs of abuse in urine, hair, or saliva), methadone treatment-related testing, court-mandated forensic testing such as in child custody cases, and sports-related testing for both amateur and professional athletes. The design and focus of an accreditation program will depend partly on the specific area of forensic toxicology; the scope of testing may vary considerably and the standards applied may be different for the subdisciplines. For example, while fairly strict standards can be applied to the analysis of a small number of drugs of abuse in a simple and relatively consistent specimen like urine, it is not practical

to apply exactly the same standards to a diverse range of postmortem specimens such as blood and tissues, some of which may be in a state of decomposition.

What do Most Accreditation Programs Have in Common?

By their nature, all accreditation programs have written standards with which the laboratory must comply in order to become accredited and remain so. The process starts with a comprehensive application that will assess whether the laboratory appears to meet at least the basic requirements. If that review is satisfactory, the laboratory must submit to an on-site inspection of its facilities, procedures, and personnel records by volunteer or paid personnel who have no connection with the laboratory. This process is usually aided by use of a comprehensive checklist that reflects the standards set by the accrediting organization. If the minimum standards are met, the laboratory will be awarded accreditation for a finite period of time (usually no more than 5 years), after which the laboratory must be reassessed by at least an on-site inspection. Many accreditation programs will also monitor laboratory performance between on-site inspections by review of proficiency test results and/or by requiring a documented internal audit of the laboratory's operations using its own staff.

What do Accreditation Programs Assess?

The specific nature of the different programs varies significantly, particularly between the USA and Europe, Canada, and Australia. However, they all generally assess the administrative operation of the laboratory, qualifications of personnel and adequacy of their training, existence and adequacy of standard operating procedures, adequacy of the chain of custody, review of the analytical procedures used, quality assurance (including quality control), reporting procedures, and safety. Individual programs differ in their approach and focus.

How do Accreditation Programs Differ?

Most of the forensic accreditation programs in Europe, Canada, and Australia are based on International Organization for Standardization (ISO) standards, primarily ISO 17025, usually supplemented by additional peer-written standards or guidelines. ISO standards are internationally accepted, at least by the very large number of signatory countries, and therefore have wide acceptance. They include widely accepted principles and standards of analytical laboratory practice, quality assurance, and quality control. Examples of ISO 17025-based programs include that of the National Accreditation of Measurement and Sampling (NAMAS) in the UK, the National Association of Testing Authorities (NATA) in Australia, and the Forensic Science Accreditation program of the Standards Council of Canada. The disadvantage of the existing ISO-based programs is that specific standards for forensic toxicology are lacking or limited. ISO-based programs are very dependent on the existence of a fundamental infrastructure, the cornerstone of which is a strong quality-assurance program. The vast majority of these programs cover forensic science "in general" and are not focused toward forensic toxicology. Specifically for forensic toxicology, especially postmortem and some other areas, the disadvantage is that the nonroutine nature of such testing is sometimes difficult to fit into the "ISO mold." For example, ongoing quality monitoring is difficult for a drug assay that may only be performed once or twice a year. However, forensic toxicology laboratories in Canada, Australia, and the UK, and at least one in the USA have been accredited under ISO 17025 with appendices that include standards for the forensic sciences.

While at least one forensic science accreditation program in the USA is performed according to ISO standards, most forensic laboratories in the USA are based on peer-developed standards, although they invariably encompass many of the principles contained in the ISO standards. One advantage of the programs developed within the discipline is that they necessarily address some of the unique problems of that discipline.

Specific Accreditation Programs Covering Forensic Toxicology

There are five nationally available accreditation programs currently in the USA, only three of which are specific for forensic toxicology. Two of those programs are specific for so-called forensic urine drug testing (FUDT).

National Laboratory Certification Program (NLCP)

The NLCP is perhaps the most prominent program, mandated by the US Substance Abuse and Mental Health Services Administration under contract to Research Triangle Institute in North Carolina. The program stemmed from the "mandatory guidelines" published in the Federal Register in 1987, and subsequent revisions. However, this regulatory "certification" program has a very narrow focus, dealing with only five drug groups in urine (covering only eight drugs), in addition to integrity testing (to determine whether a urine sample has been adulterated or

substituted); it does not cover the broader aspects of forensic toxicology. There have been discussions to include oral fluids and hair testing, although there are no plans to expand the list of drugs covered. This regulatory program covers the mandated testing of specific federal government employees and testing mandated by the US Department of Transportation. Laboratories must maintain a satisfactory score in quarterly proficiency tests and satisfactory performance in on-site inspections held every 6 months.

College of American Pathologists (CAP)

The CAP offers several accreditation programs in the clinical area, although only one is specific for forensic toxicology – specific for FUDT. It is broader than the NLCP program in that it covers a larger range of drugs of abuse in urine. Unlike the NLCP program, the CAP FUDT program is voluntary, unless mandated by local or state authorities. Satisfactory performance in the CAP FUDT proficiency test program, plus on-site inspections every 2 years, is required. (CAP also has a more general clinical chemistry accreditation program that covers clinical toxicology, including testing such as emergency drug screening and therapeutic drug monitoring. A broader range of drugs is covered than for FUDT, as is analysis in serum or plasma, in addition to urine. However, forensic toxicology is not specifically covered.)

While some aspects of each program are applicable to the broader aspects of forensic toxicology, these programs are otherwise inadequate for, for example, postmortem toxicology. Two other US programs are offered by the American Society of Crime Laboratory Directors Laboratory Accreditation Board (ASCLD/LAB) and the American Board of Forensic Toxicology (ABFT).

American Society of Crime Laboratory Director/Laboratory Accreditation Board

The ASCLD/LAB program has currently accredited over 250 forensic laboratories of various sizes. Some are limited in scope, but many are broad-based forensic science laboratories that include forensic toxicology laboratories. The ASCLD/LAB program covers most of the conventional forensic science disciplines, of which forensic toxicology is one. The program checklist focuses on management of the laboratory, supervision, training, and quality assurance. However, very few questions in the ASCLD/LAB program checklist are specific to forensic toxicology. The program relies heavily on the judgment of individual on-site inspectors. The ASCLD/LAB program cycle is currently 5 years. However, laboratories are required to conduct periodic self-audits and maintain satisfactory performance in a designated twice-yearly forensic toxicology proficiency test.

American Board of Forensic Toxicology

The ABFT laboratory accreditation program is designed specifically for medical examiner, coroner, police, private, and other laboratories performing postmortem toxicology and so-called human-performance toxicology. (Human-performance toxicology encompasses areas such as the detection and measurement of drug in drivers and other vehicle operators, as well as drug-facilitated sexual assault and similar testing.) It is the only program that was peer-designed and run specifically for laboratories performing broad-based forensic toxicology and is based on the *Forensic Toxicology Laboratory Guidelines*, first jointly published in 1991 by the Society of Forensic Toxicologists (SOFT) and the Toxicology Section of the American Academy of Forensic Sciences (AAFS). Those guidelines have subsequently been revised on at least three occasions; the latest version is available on the SOFT website. The ABFT program was first offered in 1996 and has slowly grown since that time, with a total of 16 laboratories accredited at the time this article was written. In order to maintain accreditation, laboratories must submit to an on-site inspection every 2 years and provide copies of all relevant proficiency test results annually. The 160-question checklist has sections covering laboratory administration, personnel, chain of custody and security, standard operating procedures, quality assurance and quality control, reporting, and safety, in addition to specific sections on all of the major analytical techniques. All questions are categorized as "essential," "important," or "desirable." Currently, laboratories must meet 100% of essential questions, at least 80% of important questions, and at least 50% of desirable questions.

Voluntary versus Regulatory or Mandatory Accreditation

For the most part, forensic toxicology testing is unregulated throughout the world, although there are some notable exceptions. The NLCP program for specific US federal employees and US Department of Transportation-regulated individuals has already been mentioned. However, for more general forensic testing, the state of New York passed legislation in 1996 requiring all public-sector forensic laboratories to be accredited. The ASCLD/LAB and ABFT programs are recognized for that purpose. Following some high-publicity failures in forensic testing, two other states, Texas and Oklahoma, have recently

passed legislation requiring all forensic laboratories to become accredited; undoubtedly other states will follow. (It should be noted that many states and local authorities have regulatory programs for breath alcohol and the determination of blood alcohol, and even sometimes for laboratories performing urine drug testing (e.g., so-called workplace drug testing), but very few have legislation or regulations that cover the broader aspects of forensic testing and forensic toxicology specifically.)

The main advantage of mandatory accreditation is that it forces laboratories to upgrade their methods, procedures, and all aspects of laboratory operation. Even a conscientious laboratory director may delay these tasks if not forced to as a result of accreditation inspections, if there is a large and unrelenting backlog of casework. The secondary benefit of mandatory accreditation is that usually the state or local authority is forced to provide the necessary resources to allow facilities and equipment to be upgraded to the minimum standards required by the accrediting body. (A frequent excuse of laboratory directors for not pursuing voluntary accreditation is that they do not have the resources or time, because they are overworked and underfunded.) A local benefit is that preparing for initial accreditation and maintaining it can serve as a common goal for the entire staff of the laboratory, as well as instilling a sense of professional pride and accomplishment once accreditation is awarded.

Does Accreditation Ensure Acceptable, Error-Free Testing?

The short answer to this question is "no." The nature of any accreditation program is that it takes a "snapshot" of a laboratory's operations at a specific point in time. It cannot guarantee that the quality of work produced by the laboratory will continue at the same level (it may stay the same, deteriorate, or improve). Staff may change between on-site accreditation visits. Accreditation certainly cannot guarantee that mistakes won't happen and bad practice won't creep in. However, accreditation, especially over a period of several cycles, should ensure that a minimum standard of practice is established, and that methods are properly documented, properly performed, and reliably reported.

See Also

Accreditation: Forensic Specialties Accreditation Board

Further Reading

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Accreditation *See* **Death Investigation Systems:** China; Japan; Nordic Countries; Certification of Death and the United Kingdom System; United States of America; **Forensic Psychiatry and Forensic Psychology:** Forensic Psychology, Education, Training and Certification; Forensic Psychiatry, Education, Training and Certification