STANDING COMMITTEE
FOR QUALITY AND COMPETENCE (QCC)

GUIDANCE ON THE PRODUCTION OF BEST PRACTICE MANUALS WITHIN ENFSI

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Introduction

'Best Practice' is not absolute. It can best be described as the means by which the optimal outcome can be achieved for a particular requirement under a given set of circumstances **(1)**. It follows from this that the best approach to use for any given forensic examination could differ according to the circumstances of the offence, the questions being asked and the intended use of the output.

It is also recognised that what any particular laboratory is asked to do and how they have to present their reports will depend on who its customers are, the nature and extent of their requirements and the legal systems of the country. However, the principles that apply to the way they carry out their forensic examinations should be the same. Therefore a Best Practice Manual should be considered a valuable aid in preparing guidelines and standard operations procedures for accreditation of an individual laboratory.

This is the proposed guide for 'Best Practice'manuals, and contains guidance on the issues that might be addressed under each heading. The extent to which each aspect will apply may vary from one area of forensic science to another, but in all cases, thought should be given to its importance in achieving the fit for purpose approach to the customer's request.

The law enforcement framework and the legal systems within which a forensic laboratory is working will determine the degree of direct control that an individual in a particular forensic laboratory has over each stage of a process, but even where the individual from the laboratory is not directly involved in any particular stage he/she should still be in possession of comprehensive advice on best practice.

It is the policy of ENFSI that all member laboratories should have achieved or should be taking steps towards ISO/IEC 17025 accreditation for their laboratory testing activities. The ILAC Guideline for Forensic Laboratories ILAC-G19: 2002 can be used as a guidance to implement ISO/IEC 17025 in Forensic Science Laboratories. For activities other than the testing part of the forensic process e.g. work at the scene of crime, ISO/IEC 17020 can be implemented as the standard used to achieve accreditation. The scope of accreditation should aim to include the frequently performed examinations at the individual member laboratories.

This document will provide advice to member laboratories that will assist them to put into place a quality system that will provide a systematic approach to examinations so as to establish and maintain working practices that will provide reliable and fit for purpose results. The approach should also ensure that the quality of the derived information is maximised and therefore provide robust evidence. Adherence to the guidelines should also provide a greater degree of consistency across laboratories, which will, in turn, facilitate the interchange of data and the construction of meaningful databases.

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1 Aims

1.1 To provide a framework of standards, quality principles and approaches for the detection, recovery, examination and use of evidence for forensic purposes in compliance with the requirements of ISO 17025, as interpreted for forensic science laboratories.

1.2 To provide a systematic approach for Member laboratories of ENFSI and other forensic science laboratories to establish and maintain working practices in the field of forensic examination that will deliver reliable results, maximise the quality of the information obtained and produce robust evidence.

1.3 To encourage more consistent methodology and hence the production of more comparable results, so as to facilitate interchange of data between laboratories.

2 Scope

2.1 The manual should address the entire forensic process for evidence; from the scene of crime to the presentation of evidence in the courts and encompass the systems, procedures, personnel, equipment and accommodation requirements for the whole spectrum of the forensic process.

2.2 A Best Practice Manual (BPM) can be used in conjunction with Quality Management System documents. It may be practical to confine the content of a Best Practice Manual to the specific aspects pertinent to the area of Forensic Science to which the Best Practice Manual refers and reference in the BPM general areas that are dealt with in the Quality Management System documents.

3. Establishing the Customer Requirement

3.1 It is essential before starting any examination at a scene or in the laboratory to understand, or agree with the customer, the purpose of the examination requested. This should be expressed in terms of what the customer is seeking to establish rather than a menu of tasks to be carried out. This could be done in a simplified way with routine customers.

3.2 Protocols should be in place therefore to determine:

- What information is being requested in respect of scene examinations and/or submissions to the laboratory
- The customer’s priorities for the information
- What other information is or may be available from the customer
- What constraints may exist (e.g. the need to preserve material for other purposes, cost)

3.3 It is important to have in place communication protocols for feedback to, and from, the customer as his/her requirements may change before, during or as a result of scene or laboratory examinations. Issues that may effect the requirement or priorities, will include:

- Changes in the direction of the investigation
- Changes in the status of a scene, e.g. weather conditions
- Changes in the status of suspects and victims
- Changes in the urgency for information

- New and significant information coming to light
- The impact of results already reported
- Contamination issues

4. Case Assessment

4.1 In general, case assessment should include the following:

4.1.1 Whether examining the scene of an incident, recovering evidential material from a suspect, from a victim or dealing with material to be examined in the laboratory, the first step should be to make an assessment of what is technically possible and what is worthwhile in order to meet the customer's requirement.

4.1.2 The general approach to case assessment will be the same regardless of the evidence types involved and an individual's involvement in an investigation. The manual should provide advice, therefore, not only on the general aspects but also on the detailed aspects that apply to individuals or particular facets of the examinations

4.1.3 Any work carried out will be to meet a particular customer requirement. At each stage, however, it is important that the course of action selected is based on an assessment of both the propositions put forward by the customer and the possible alternative(s) to this.

4.2 Assessment at the scene

4.2.1 There is normally only one opportunity to carry out an examination and recover relevant material from the scene of an offence or incident. It is vitally important that all the possible evidential avenues at the scene are considered before any practical work commences.

4.2.2 All relevant available information about the incident should be obtained before starting any examinations and an agreement should be reached with the customer as to what is required to be ascertained. All possible hypotheses, from all sources, should be considered as part of this process.

4.2.3 The expert should consult with the crime scene manager and any other experts and agree with them what examinations should take place, and in what order, so as to maximise the information that can be obtained from the scene.

4.2.4 It is best if the scene can be preserved until all the experts are available. Where this is not possible or practicable, each scene examiner should ensure that adequate records are made of the scene prior to any disturbance of the scene on their part and during their subsequent examinations.

4.3 Assessment at the laboratory

4.3.1 Before starting work on any case the expert should carry out an assessment of the information available and the items provided for examination in light of the agreed customer requirement. The expert should seek to redress any deficiencies through consultation with the customer.

4.3.2 The expert should also make an assessment of the risk of contamination, or any other issue that could affect the integrity of the items, before the items provided for examination are submitted to the laboratory, or before examination commences.

4.3.3 The expert should then consider to what extent the hypothesis put forward by the customer can be tested and should also frame at least one alternative hypothesis favourable to the 'defence'.

4.3.4 The expert should consider what he/she would expect to find if each hypothesis was correct and should make an assessment of the likely evidential value of the anticipated findings. It is necessary to include the factors to be considered for the particular type of evidence covered in the manual.

4.4 Information requirements

4.4.1 The type and extent of the information that will be required to make a proper assessment in cases involving forensic evidence will vary from case to case. The manual should contain specific advice on the likely information requirements for carrying out an adequate case assessment. The guidance in ***Appendix 1*** may be useful in drafting advice.

4.4.2 Where reference has been made to a particular requirement for case assessment then more details of the issues are covered in the Evaluation and Interpretation section (Section 9)

5. Examinations prior to the Laboratory

Examination of the scene, victims and suspects

This section of the manual should describe the recommended approaches for the recovery, preservation and recording of seized items and other material in relation to the type of analysis covered.

It must be remembered, however, that in most instances the scene will be a source of material from a number of evidential areas. It is essential, therefore, for full consultation between all interested parties to be undertaken before any work is commenced if the maximum information is to be extracted from the scene.

5.1 Avoidance of contamination

5.1.1 Particular emphasis should be given in the manual to the procedures for the avoidance of contamination and advice given to assist individuals to manage the specific risks associated with the analysis.

5.1.2 The guidance should be directed towards ensuring that nothing is done by anybody attending the scene of an incident, or by others responsible for taking samples from the victim(s) or suspect(s), that may lead to adventitious links being established between suspects and the scene, victims and suspects, or suspects with suspects through the mishandling of materials whilst in their possession.

5.1.3 Consideration of the anti-contamination precautions that are appropriate should be based not only on those for the examinations under discussion but for all evidence types that may be potentially available. If these include materials which may be required for subsequent DNA analysis, extreme caution should be taken because of the sensitivity of current DNA techniques, including the wearing of appropriate barrier clothing, including gloves and face masks (*refer to* ***Appendix 2***).

5.2 Search and recovery

Guidance covering search and recovery of evidence should be given. The following are the details which should be considered.

5.2.1 All scenes, indoor, outdoor or vehicles, should be protected at the earliest opportunity to reduce the risk of the loss of any material or post-incident movement or contamination.

5.2.2 Scenes should be searched systematically and thoroughly for the relevant materials, targeting and prioritising areas, which, in the context of what has been alleged, are most likely to yield significant material of evidential value.

5.2.3 Recovered material should be handled as little as possible and control/reference materials must be kept strictly separate from any surfaces, items, clothing or people with whom it might subsequently be significant to establish contact.

5.2.4 No-one who has attended the scene should be involved in examining suspects or victims for the recovery of trace evidence, or in the packaging of such evidence, unless they have thoroughly decontaminated themselves (e.g. by showering and changing their clothing).

5.2.5 Where multiple suspects are involved, in addition for the necessity for material from the victim(s) to be kept separate, material from each suspect should be recovered and kept separate from each other and from that of the victim(s)

5.3 Sampling

The actual sampling plan (30. ENFSI Guidance for Best Practice Sampling in Forensic Science) adopted will, depend on the question that is being asked, the techniques available for analysis and the nature and amount of material available for examination. Reference should be made in guidance manuals to the general approaches likely to be applicable to the evidence type in question. Consideration should be given to the following general points in the advice:

- identifying the right samples to take and how to ensure they are representative
- the minimum amount of material required to obtain meaningful results for interpretative purposes
- the amount and number of separate control samples required
- the need for ‘blanks’
- guidance on methods for sampling that aid/assure the prevention of cross contamination
- the need to preserve material for subsequent analysis by others (prosecution or defence)

Whilst sampling will to some extent be case specific, reference should be made in guidance manuals to the general approaches likely to be applicable to the evidence type in question.

5.4 Preservation and packaging

The manual should recommend the most appropriate packaging materials for given applications and the preservatives of choice where appropriate. General points that should be covered include the following:

5.4.1 All items should be packaged and sealed as soon as they are taken, using bags or containers of an appropriate size and material composition to avoid the packaging being damaged or the seals being broken

5.4.2 Packages should be sealed in such as way that all gaps are covered and secure, e.g. folded bags should be sealed with adhesive tape along all open edges.

5.4.3 Once sealed, packages should not be re-opened outside of the laboratory environment. If under exceptional circumstances they are re-opened then comprehensive documentation detailing the conditions under which they are opened must be made.

See ***Appendix 3*** for situations where additional guidance should be given.

5.5 Labelling and Documentation

For legal purposes, in order to maintain the chain of custody, it is essential to be able to prove who has handled which item and what he/she did with it. The manual should describe how items and evidential material recovered from an incident should be logged and labelled at the time of seizure, where appropriate. **(4)**

The manual should take account of the benefits and limitations of hand written notes, voice recorded notes, taking information directly onto computer, sketches and diagrams, photographs, video recordings, etc.

5.5.1 A record should be made, at the time of seizure of items from the scene, or from the suspect(s) or victims(s), describing the exact locations from where the items were recovered. It is also helpful to mark this location on a sketch/plan of the scene or person.

5.5.2 Labels should be attached to each package at the time of packaging. Whilst the legal status and use of labels can vary, the minimum details that should be recorded and be directly and unequivocally attributed to each package are:

- A unique identifying mark
- The name of the person and organisation (e.g. police force, pathology department, etc) responsible for collecting and packaging the material
- A concise and accurate description of the material
- The location or person from where or from whom the material has been seized
- The date and time the material was seized

5.6 Transport

The manual should refer to any constraints governing the movement of materials of interest. These should include:

- Local postal restrictions

- Regulations limiting the movement of ‘dangerous’ materials (e.g. flammable materials, compressed gases, pathogenic organisms, etc.)

- The need for import/export licences when moving materials (e.g. drugs) across national frontiers

- The mechanisms for maintaining full records of all involved in the transportation should also be covered, so that the chain of custody is complete.

5.7 Reconstruction of events

Where reconstruction of the events that may have led to an incident is required, the manual should describe the techniques available and their limitations.

6. Examinations at the laboratory

Quality Assurance

The general aspect of quality assurance can be covered by the laboratory’s Quality Management System as defined in ISO 17025 (2005), with only aspects specific to the particular area, being covered in the Best Practice Manual.

6.1 Given the precise and critical nature of forensic examinations, it is highly desirable that it can be demonstrated that there are effective quality control and quality assurance measures in place. The ENFSI Members wish to promote consistent and reliable evidence throughout the whole forensic process, from scene of incident to court.

6.2 Definitions

A list defining the quality terms used in the document should be given. The descriptions should be concise but also sufficiently comprehensive to enable unambiguous understanding of the terms. In order to provide a degree of consistency the terms used should wherever possible be those recommended by ISO/IEC 17025 **(5)**, UNODC **(6)**, ASTM **(7),** etc See ***Appendix 4*** for definitions relevant to this document.

6.3 Personnel

People are likely to be the most important resource in any forensic application and in order to allow staff to work effectively and efficiently everybody concerned in the process must understand the nature of the tasks and the human qualities required to perform them. Information is provided, therefore, in this guidance that defines the key responsibilities and also the competencies required.

Due to variations in the size of different laboratories and variability within different laboratory systems, absolute standardisation of staffing cannot be achieved. It is also accepted that an individual may be responsible for more than one of the defined areas of responsibility and the manual should state where this is the case.

6.3.1 Key Responsibilities

Key responsibilities recognised for laboratories performing forensic examinations are:

a) Responsibility in a particular case for directing the examination of the items submitted, coordinating the interpretation of the findings, writing the report.

b) Responsibility for providing fact and opinion and evidence for the court

c) Responsibility for the supervision of good working practice

d) Responsibility for performing the examination of the items submitted, interpreting the analysis results and writing the analysis report.

e) Responsibility for carrying out standardised casework examinations or analytical tests under the supervision of an expert

(See 6.3.2.2 for competencies)

6.3.2 Competence requirements

The qualifications, competencies and experience that individuals require to perform the various aspects of areas covered by the manual will depend on the intellectual and practical demands of the various aspects of the work. The manual should define the standards of competence required for individuals to undertake the particular responsibilities, the training required and the assessments that will be applied. For each area of responsibility therefore, the manual should specify requirements under the headings qualifications and experience, competencies, training and assessment and maintenance of competency.

6.3.2.1 Qualifications and Experience
Describe the qualification, experience and competencies for the different areas of responsibility.

6.3.2.2 Competencies
The manual should set out the recommended competence requirements for each of the areas of responsibility defining the acceptable standard to be attained for each (29) ENFSI Performance Based Standards for Forensic Practitioners

The following experience and areas of competence would be expected as the minimum standard for the key responsibilities defined above, in 6.3.1.

(a) Responsibility in a particular case for directing the examination of the items submitted, coordinating the interpretation of the findings, writing the report.– knowledge of the theories, analytical techniques and procedures (including health and safety requirements) applicable to a wide field of evidence types; competence in the evaluation and interpretation of findings several types of evidence; knowledge and experience of the requirements and procedures of the criminal justice system for the presentation of evidence, both written and oral

(b)Responsibility for providing fact and opinion and evidence for the court – knowledge of the theories, analytical techniques and procedures (including health and safety requirements) applicable to the examination; competence in the evaluation and interpretation of analytical data in relevant cases; knowledge and experience of the

requirements and procedures of the criminal justice system for the presentation of evidence, both written and oral

(c) ***Responsibility for the supervision of good working practice-*** knowledge of the theories, analytical techniques and procedures (including health and safety requirements) applicable to a wide field of evidence types; competence in the evaluation and interpretation of findings several types of evidence; knowledge and experience of the requirements and procedures of the criminal justice system for the presentation of evidence, both written and oral

(d) ***Responsibility for performing the examination of the items submitted, interpreting the analysis results and writing the analysis report -*** knowledge of the theories, analytical techniques and procedures (including health and safety requirements) applicable to the examination; competence in the evaluation and interpretation of analytical data in [ ] cases; knowledge and experience of the requirements and procedures of the criminal justice system for the presentation of evidence, both written and oral

(e)Responsibility for carrying out standardised casework examinations or analytical tests under the supervision of an expert– knowledge of the basic theories, analytical techniques and procedures applicable to the examination; the practical skills to operate specialist equipment and to carry out the forensic analysis safely and reliably in compliance with laboratory protocols; and a basic understanding of the requirements of the criminal justice system

6.3.2.3 Training and assessment and maintenance of competence

Laboratories should have written standards of competence for each area of responsibility
(6.3.1); a documented training programme; and processes for assessing that trainees have achieved the required level of competence. All training assessments should be documented on the individual's training records.
The assessment and reassessment of competence can be accomplished through: a combination of appropriate means, including:

- practical tests
- written and oral examinations
- role exercises, e.g. 'moot' court situations
- casework conducted under close supervision
- a portfolio of previous work

A trainee should be recognised as competent only when he or she has been assessed as meeting the defined standards of performance and only then be permitted to undertake casework, under the minimum of supervision, in the relevant area.
All personnel involved in the field of examination will also be required to demonstrate that they have maintained their competence at regular intervals.

6.3.2.4 Maintenance of Competence

Guidance should be provided on the measures required for the maintenance of competence(s) in any particular work area for each of the areas of responsibility defined in 6.3.1. There are a number of areas that should be covered including:

a) Level of active participation and the period of non-active participation after which re-assessment would be necessary

b) Periodicity of assessments where active-participation is not the major or only criterion of competence

c) Where appropriate the use of coaching and mentoring, training courses, workshops, seminars etc for maintaining required levels of competence

d) The following programme should be included in the laboratory's guidance to ensure that those with areas of responsibility defined in 6.3.1 maintain an adequate level of competence:

e) Participate actively and routinely in relevant aspects of casework-examination and management, including quality assurance trials (a period of time will constitute non-active involvement)

f) Be able to provide documentary evidence of their active participation in relevant casework

g) Actively maintain a current awareness of pertinent advances in the field

h) Actively maintain a current awareness of pertinent advances with respect to the interpretation of findings and the conclusions that can be drawn from them

i) Take part in appropriate workshops, seminars, meetings, training courses and research and development projects as necessary

Depending on the particular responsibilities all of these aspects may not apply. The manual should define the aspects that apply to particular roles.

6.4 Proficiency Testing

6.4.1 Proficiency testing assesses the systems within the laboratory, but may also provide some information on the performance of individuals participating in the tests.

6.4.2 The manual should specify the number of proficiency tests taken each year. Participants in the tests should follow the standard laboratory procedures for casework. They should not give the test any special treatment that would not be given in the same circumstances to routine casework. The test has to be completed and returned to the proficiency test co-ordinator, or other designated individual, for evaluation. The proficiency test co-ordinator should provide a written summary report for each proficiency test to the participants and/or other appropriate individuals as determined by laboratory policy.

6.4.3 The design and implementation of the proficiency tests should be carried out in accordance with the recommendations of the ENFSI Guidelines on the Conduct of Proficiency Tests and Collaborative Exercises. **(8)**

6.5 Documentation

6.5.1 The laboratory should have a documented Quality Management System for controlling all systems, processes and methods used in the examination and reporting of relevant casework.

6.5.2 The Quality Management System should include requirements for the following minimum documentation relating to the forensic analysis of interest to be maintained:

- Casework administration procedures:
- Details of systems for the safe storage of casework material
- Records of all transfers of possession of casework material, for proof of the chain of evidence
- Records of all communications within the laboratory and with external personnel
- Details and results of all examinations/analyses/calibrations carried out
- Use of validated methods
- The draft and final statements/reports
- Records of checking results and case file review
- Financial records and costing data (if applicable)
- Equipment: inventories of equipment held and those responsible for them, records of commissioning, suitability for purpose and validation records, maintenance schedules and records of breakdowns, work carried out etc *(if appropriate)* calibration records
- Materials and chemicals:
  records of preparation and/or acceptance testing
  (if appropriate) for the preparation of reagents
- Protocols and Standard Operating Procedures(SOP)
  for the examinations and analytical methods and processes used
  for calibration and quality control
  for recording and presenting results
- *(If appropriate)* Reference materials:
  records of their location, systems for their management and records of authenticity and traceability
- Training:
  competence standards, training programmes and assessment protocols
  training packages
  training/competence records for individuals

6.6 Equipment

The manual should refer to the Standard Operating Procedures, which should describe how to set up, calibrate, maintain and monitor the performance of all equipment used in the examination of evidential materials. Full details of the requirements can be found in ISO/IEC 17025 **(9).**

6.7 Materials and reagents (if appropriate)

6.7.1 All materials and reagents *(if appropriate)* used for the examination should be of a suitable quality and have been demonstrated as fit for purpose. The manual should refer to the SOP's which govern the quality requirements for materials and reagents.

6.8 Accommodation

6.8.1 All laboratory work should be carried out in suitable accommodation which should meet the standards of the ILAC G19 2002 Guidelines for Forensic Science Laboratories or other published guidelines from recognised authorities, e.g. ISO/IEC 17025. **(10)**

6.8.3 The manual should include information on the following issues relating to accommodation:

- The need to ensure segregation between incompatible activities in order to prevent cross contamination

- Details of any access control measures that are necessary, both from the point of view of anti-contamination control and security

- Recommendations on the measures required to ensure good housekeeping, detailing any special requirements as appropriate

6.9 Validation

6.9.1 Validation is the confirmation by examination and the provision of effective evidence that the particular requirements for a specific intended use are fulfilled **(11, 12, 13)**

6.9.2 For established technical procedures, reference should be made to the validation documents in the manual and to where they can be found.

6.9.3 The laboratory should use only–validated techniques and procedures for the examination and interpretation of results in casework when ever possible.

6.9.4 Validation requires as a minimum that*:*

- There is an agreed requirement for the technique or procedure
- The critical aspects of the technique or procedure have been identified and the limitations defined
- The methods, materials and equipment used have been demonstrated to be fit for purpose, robust and reliable in meeting the requirement
- There are appropriate quality control and quality assurance procedures in place for monitoring performance
- The technique or procedure is fully documented
- The results obtained are reliable and reproducible
- The technique or procedure has been subjected to independent assessment, and where novel, preferably also peer review
- The individuals using the technique or procedure have been trained and have demonstrated that they are competent

- Where the techniques or procedures adopted have been validated elsewhere, the laboratory is required to carry out a verification exercise to demonstrate that it can achieve the same quality of results in its own environment

6.9.5 Where the techniques or procedures adopted have been validated elsewhere, the laboratory is required to carry out a verification exercise to demonstrate that it can achieve the same quality of results in its own environment with its own staff.

6.10 Case review

It is particularly important in all forensic examinations for a protocol for case review to be established. The manual, therefore, should detail the requirements for reviews in the field including critical findings, together with both technical and management review aspects.

6.10.1 Review of Critical findings

Whilst the exact legal requirements may be different for different member countries, in general, findings of critical evidential value should be confirmed by a second scientist who has been authorised and is competent to carry out such checks. Findings are considered critical when:

They make a significant contribution to the findings in the case, and are incapable of being confirmed at a later time, or, are subject to possible differences in interpretation by different scientists. This is particularly so where observations are subjective e.g. cuts and tears in clothing, marks made by tools or footwear

The manual should list the critical findings that have to be cross-checked by a second competent expert.

A written record of these checks must be made on the case notes, bearing the signatures of both the reporting scientist and the reviewer

6.10.2 Review of Technical findings

Details should be provided in the manual of the requirements for checking analytical findings and the raw data used in the interpretation of the findings in a particular case prior to the authorisation of the report.
The findings in a case and the conclusions drawn from them should be checked to ascertain that they are justified and supported by documentation within the case file. Areas that should be covered by the technical review include:

- Is there adequate documentation for all the materials examined
- Have the appropriate examinations/analyses been carried out
- Have the relevant QA procedures been followed
- Have analytical identifications/comparisons been checked
- Is the statement/report accurate and does it refer to all items submitted
- Are the conclusions reached justified and appropriate

6.10.3 Management review

Management review requirements concern themselves with the correctness of the report and case file with respect to both editorial matters and to the adherence to laboratory procedures that cover case file management and business related matters. A

fundamental aim of management review is that the customer's requirements have been adequately addressed and that a value for money service has been provided.

Management review requirements, are generally, dealt with by the laboratories Quality Management System.

6.11 Audit

6.11.1 Audits covering all aspects of relevant casework (operational, research and development, training etc) should be conducted on a regular and planned basis by an appropriate individual in conjunction with the QA Manager

6.11.2 Where case files are reviewed in audits, they should normally be chosen randomly

6.11.3 Records of each audit must be kept. These must include the date of the audit, the name of the auditor, the findings and any corrective actions necessary.

6.11.4 All corrective actions must be designated to a nominated, appropriate individual for completion by an agreed specified date. The QA Manager should ensure that the action is completed as agreed.

Audit requirements, are generally, dealt with by the laboratories Quality Management System.

7. Prioritisation and sequence of examinations

7.1 General considerations

7.1.1 Where there is more than one item and/or evidence type involved in the examination of a case then priorities and sequences for the examinations will need to be considered. The manual should outline specific considerations for the area being considered.

7.1.2 Before commencing any examinations within a case the following matters should be considered:

- The urgency and priority of the customer's need for specific aspects of the information
- The other types of forensic examination which may have to be carried out and whether examination for a particular evidence type or by a given examination technique will compromise subsequent examinations
- What evidential types or items have the potential to provide the most information in response to the various propositions and alternatives
- The perishable nature of any material that may be present
- Health and safety and/or security considerations

7.2 Considerations for examinations

7.2.1 The manual should provide specific advice relating to the sequence of examinations in relevant cases, the implications of which will have to be considered in conjunction with :

- The availability of items for examination
- The amount of material, within the items, available for examination

- The number and nature of the different examination techniques that will be usable, dependent on the above
- The potential value of the information available from each technique and which will provide the most information in response to the various hypotheses

8 Laboratory examinations

8.1 Anti-contamination precautions

The minimum anti-contamination precautions are:
Care must be taken at all times when handling casework material to avoid the introduction of contaminants. Advice must be provided in the manual relating to the risks associated with contamination and the measures that can be applied to minimise such risks.

Whilst it is important to remain vigilant at all stages of the forensic process the following areas should be specifically covered in any advice:

- Condition of packaging on arrival at the laboratory e.g. damage, leaks etc
- Storage of materials, e.g. separation of controls from suspect materials etc
- Use of separate work areas where there are cross-contamination risks e.g. suspect to victim, suspect to suspect etc
- Cleanliness of work areas and equipment
- Use of protective and barrier clothing

8.2 Search and recovery

The manual should list the protocols available for the effective and efficient searching for and recovery of the evidential materials in question together with their respective advantages and limitations in particular applications.

Details of the methods should be included in the Technical Appendices and often they will/can be combined with the analytical protocols.

8.3 Sampling

Information relating to specific sampling requirements should also be included and should follow the general requirements given in section 5.3 of these guidance notes.

8.4 Analysis protocols

The manual should describe the systematic approaches to be followed in the examination of materials that will provide value for money, fit for purpose solutions to the customer’s problems. In addition it should outline recommended techniques and the minimum number of tests to be covered. These approaches should meet the requirements of ISO 17025, the ILAC Guidance for Forensic Science Laboratories G19 and the requirements of the criminal justice system prevailing. Details of particular methods can be detailed in the SOP’s.

8.5 Case records

All records generated during the course of forensic examinations must be in accordance with the requirements of the legal system operating in the member country and in sufficient detail to allow another competent forensic scientist to evaluate the quality and reliability of the work. **(14,15)**

Advice should be provided in the manual as to the minimum acceptable standard for the records, which should include:

- Information on the receipt, and subsequent return, destruction (where applicable) or storage of the casework material
- Details of packaging and condition of the seals on receipt
- Records of observations and test/examination results, including diagrams, print-outs, photographs etc
- References to procedures used and the operating parameters of any instrumentation employed
- Each page must bear the unique laboratory identifier, the signature/initials of the person carrying out the examination or test and the date
- Details of all correspondence relating to the work

9. Evaluation and Interpretation

It may or may not be necessary to interpret the results in the context of the particular circumstances of the case. The same type of information is required for the evaluation and interpretation of the information derived during the examination of a case as is required for the case evaluation prior to the commencement of examination. Indeed, if the case assessment has been carried out thoroughly the evaluation and interpretation of the case findings should be straightforward.
Where evaluation and interpretation is required the following information should be provided in the expert-report:

- The discriminating power of the analytical methods used
- The degree of certainty that can be attached to a result or identity
- The background case information available
- Information available in relevant databases

The manual should list the published validated data that is available and recommend approaches to be taken for the evaluation and interpretation of the results of examination.

10 Presentation of Evidence

The expert’s findings and opinion are normally provided in the first instance in written form, as a report or statement of witness, for use by the investigator and/or the prosecutor/court. Oral evidence, in addition, may be required subsequently.

10.1 Written

10.1.1 The purpose of the report is to provide the reader with all the relevant information in a clear, concise, structured and unambiguous manner, to make the task of assimilating the information as easy as possible.

10.1.2 Whilst formal advice **(16,17)** is available on the format of reports and statements the scope for consistency may be limited by the requirements of the criminal justice system for the country of jurisdiction. In general, however, the following should be included:

- The unique case identifier
- The name and address of the laboratory(s) where the witness is employed
- The identity of the (expert) witness, and evidence of his/her status and qualifications where this is a requirement
- The signature of the author-
- The date on which the report/statement of witness was signed
- The date of receipt of the material that has been examined
- The name and status of the submitter
- A list of the material submitted, identified by source
- A comment, where appropriate, relating to the condition of submitted material and its packaging when received, particularly where there is evidence of alteration, either by tampering, damage, contamination or any other means
- Details of all relevant information received with, or in addition to the material
- The purpose of the examination, as agreed with the customer
- Identification of the method used (if appropriate)
- Details of the examinations/analyses carried out
- The results of the examinations/analyses
- An assessment of the significance of the results in the context of the information provided
- The witness's expert opinion, where appropriate, and any findings which may influence it
- Comment covering any material that was not examined, and the reasons for this
- Details of any submitted material, or parts of such material, not being returned to the submitter, and the reasons why

10.1.3 The manual should identify other aspects that the report should specifically include.

10.1.4 Subjective or speculative information/observations should be avoided wherever possible

The use of a tabular format can be a helpful aid in presenting the information clearly, particularly analytical results

10.2 Oral

10.2.1 Persons expected to present oral testimony should have received instruction and/or mentoring in the procedural requirements of the particular criminal justice system in which the evidence is to be presented

10.2.2 Only information which is supportable by the examinations carried out should be presented, unless specifically directed by the court

Witnesses should resist responding to questions that take them outside their field of expertise unless specifically directed by the court, and, even then, a declaration as to the limitations of their expertise should be made. The manual may include specific guidance relating to the area covered.

11. Health and Safety

Health and safety considerations are extremely important in all aspects of the work and at all stages of the forensic process. The materials dealt with can be inherently hazardous and/or often found in hazardous circumstances but the exact facts are not always known or communicated to everybody in the process. Consideration also needs to be given to the fact that materials may have to be handed back to others with no scientific training or particular facilities for handling the materials. There is an obligation on those involved in the forensic process to ensure the safety of anyone handling materials that are inherently hazardous or rendered hazardous by the scientific examinations performed. Health and Safety considerations must be considered for each procedure in the Best Practice Manual.

11.1 In setting up any forensic process consideration must be given to these issues and as a minimum the following should be covered in the manual:

- An assessment of the hazards at the scene of incidents where examinations are to be carried out and how to minimise these
- An assessment of the risks involved in all the scientific processes, in the field and in the laboratory
- The safe systems of work (or equivalent) required, the details of which should be provided in the Standard Operating Procedures given in the appendices of the manual
- The appropriate protective clothing and equipment for all processes involved in the examination
- The mechanism for documenting and communicating the risks associated with any stage of the process and especially where materials may be brought into the public domain (eg courts)

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Appendix 1

In developing the guidance in the manual to assess contamination risks the following information may be useful in drafting the advice.

To establish:

- was there any opportunity for relevant evidence transfer between the suspect(s) and victims(s) prior to the incident?

- was there any opportunity for relevant evidence transfer between the suspect(s) and victim(s) and the scene, since the incident?

- was there any opportunity for relevant evidence transfer between items seized from the suspect(s) and victim(s) and the scene, since the incident?

- was their clothing, or were other items relating to the suspect(s) and victim(s), properly handled/packed in separate areas, by different people at different times?

- was there any opportunity for secondary transfer between suspect(s) and victim(s)?

- the likelihood of relevant evidence transfer and retention:

- what is suspected or known to have occurred before, during and after the incident and
- the persons involved

- the sequence and timings of events

- the nature and characteristics of the materials that may have come into contact

- the persons responsible for and the sequence and timing of events in the recovery of items submitted for examination.

- Where it is necessary to assess the potential significance of any findings, it will be a requirement to have:

- the distribution and frequency of occurrence of the different types of material in the case

- knowledge of transfer and persistence studies, where applicable, in relation to the materials involved in the case

Appendix 2

The manual should describe the measures that are required to reduce the possibility of cross contamination prior to the safe packaging of the materials in the particular examination type. The minimum preventative measures that should be considered and described include:

- the use of the correct protective clothing and disposable equipment
- the management, either by temporal or spatial means, of the collection of different items in the same case for which connections are being sought
- the use of different personnel for collecting material from the victim(s) and each suspect
- when suspects are transported or interviewed ensure different vehicles, rooms and officers are used
- having checks in place to ensure that recovered items, or materials obtained from them, cannot be mixed up with or transposed with other items or materials
- the preventative measures required to avoid cross-contamination due to local environmental conditions
- the principle that after material has been recovered, packaged and sealed it must only be re-opened under controlled conditions and preferably not before laboratory examination

Appendix 3

Additional guidance should be given where the packaging involves:

- wet or damp materials
- sharp or heavy objects
- volatile materials, both to prevent loss and avoid cross-contamination
- potentially dangerous materials (e.g. biohazards, corrosive, explosives etc)
- Precautions that may be taken to ensure the integrity of evidence may include:
- sealing containers such that any tampering will reveal evidence of such and that the prevention of accidental loss or contamination is assisted
- providing adequate protection to containers during transportation or storage to prevent damage and hence subsequent loss or contamination of samples
- checking items on receipt at the laboratory and before the commencement of any examination to ensure that their integrity has not been compromised

Appendix 4

Audit **-** a systematic and independent examination to determine whether quality activities and related results comply with planned arrangements and whether these arrangements are implemented effectively and are suitable to achieve objectives. *[ISO 8402: 1994 - 4.9]*

Calibration – a set of operations that establish, under specified conditions, the relationship between values and quantities indicated by a measuring instrument or measuring system, or values represented by a material measure or a reference material, and the corresponding values realised by standards *[International Vocabulary of Basic and General Terms Metrology : 1993 6-11 and ISO/IEC Guide 25: 1990 –3.6]*

Competence **-** a person's qualification for the job by virtue of their training and/or experience and demonstrated knowledge, skills and abilities.

Competence Assessment- a formal assessment to check whether or not an individual meets the standards of performance

Management/Administrative Review – a review of the case file and report, in each case, to ensure that the customer's needs have been properly addressed, compliance with laboratory policy and, for the report, editorial correctness.

Proficiency Test **-** the use of inter-laboratory comparisons to determine the performance of individual laboratories for specific tests or measurements and to monitor laboratories' continuing performance. *[ISO/IEC Guide 43-1 Proficiency test by interlaboratory comparison - part 1: Development and operation of proficiency testing schemes: 1997]*

Quality Assurance **-** All the planned and systematic activities implemented within the quality system, and demonstrated as needed, to provide adequate confidence that an entity will fulfil the requirements for quality *[ISO8402: 1994 - 3.5]*.

Quality Control **-** Operational techniques and activities that are used to fulfil the requirements for quality *[ISO8402: 1994 - 3.4]*.

Raw Data - the record of results of analyses and examinations in the form in which those results were interpreted by the original analyst.

Scientific/Technical Review - review of a case file and report for the reliability and interpretation of the scientific findings.

Systematic Error - any discrepancy due to improper instrument function or setting.

Trace Evidence/Material - referring to forensic examinations in which the following types of material, amongst others, are involved : fibres, hairs, glass, paint, soil, etc.

Validation **-** Confirmation by examination and provision of objective evidence that the particular requirement for a specific intended use is fulfilled *[ISO 8402: 1994 - 2.18]*.

Other relevant definitions can be added or superfluous ones removed as required by the particular evidence type but those given should cover most aspects.