Standards
Bloodstain Pattern Analysis
(012.0)

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Contents

Part I. General Introduction to Standards ... 3

§ 1. Background to and aim of the Standards ... 3

§ 2. Types of applications ... 4

§ 3. Justification of Standards ... 5

§ 4. Validity of Standards ... 5

§ 5. Version management and formal revision history ... 5

Part II. Demarcation of Bloodstain Pattern Analysis ... 6

§ 1. Introduction ... 6

§ 2. Core activities and competencies ... 7

§ 3. Boundaries of the field of expertise ... 10

§ 4. Registration ... 10

Part III. Registration requirements for Bloodstain Pattern Analysis ... 11

§ 1. Article 12(2) sub-paragraph a ... 11

1.1 Application for initial registration: independent expert ... 11

1.2 Application for initial registration: expert without work of their own: other ... 12

§ 2. Article 12(2) sub-paragraph b ... 14

§ 3. Article 12(2) sub-paragraph c ... 14

§ 4. Article 12(2) sub-paragraph d ... 14

§ 5. Article 12(2) sub-paragraph e ... 15

§ 6. Article 12(2) sub-paragraph f ... 15

§ 7. Article 12(2) sub-paragraph g ... 16

§ 8. Article 12(2) sub-paragraph h ... 17

§ 9. Article 12(2) sub-paragraph i ... 17

§ 10. Hardship clause ... 18

Part IV. Assessment procedure for Bloodstain Pattern Analysis ... 19

§ 1. General ... 19

§ 2. Assessment procedure per type of application ... 19

1.3 Application for initial registration: independent expert ... 19

Annex A Summary of concepts Bloodstain Pattern Analysis ... 23

Annex B NRGD Glossary ... 25

Annex C Guidelines ... 27

Annex D Revision History ... 29

Part I. General Introduction to Standards

§ 1. Background to and aim of the Standards

Reporting forensic experts play a crucial role in the administration of justice. The NRGD aims to ensure justified confidence in forensic expertise for stakeholders. This confidence must be based on the demonstrable independently safeguarded quality of forensic investigators and their reports on the basis of (inter)national forensic-specific standards.

The NRGD is managed by the Court Experts Board (hereinafter: Board). The Board has the legal duty to manage a public register of forensic experts who do comply with the Board's registration requirements. The registration requirements have been laid down in concordance with the field of expertise and have been demarcated in specific Standards per field of expertise. This is important in order to inform applicants, assessors and users of the register (e.g. judge, public prosecutor and attorney) about the activities an expert in the field of expertise in question engages in and about the activities that fall outside the field of expertise. The demarcation of the field of expertise is set out in Part II of these Standards.

The Board also determines the criteria on the basis of which an assessment is made for each field of expertise as to whether an application complies with the quality requirements. The generic requirements are set out in the Register of Court Experts in Criminal Cases Decree (Besluit register deskundige in strafzaken). These requirements are elaborated further for each field of expertise. This elaboration is set out in Part III of these Standards.

Furthermore, the Board determines the assessment procedure. This procedure is described in Part IV of these Standards.

The NRGD has a system of periodic repeat registration. Court experts must demonstrate every five years that they still meet the requirements in force at that time. The Standards are dynamic and are being developed further in order to enhance the quality of the experts. These Standards set out the current state of the (sub-)field of expertise.

1.1. Factual vs Interpretive investigations

The Board of Court Experts uses the following conceptual framework. In line with the legal concept of 'expert', they distinguish between investigations with or without forensic interpretation of findings.

Factual investigation is a human observation (information) or instrumental measurement (data) during the investigation of a location, object, trace or person and that takes place according to an established protocol. Factual investigation does not require a (context-dependent) assessment or interpretation of findings.

Interpretive investigation involves a professional assessment/opinion/interpretation of the human observation (information) or instrumental measurement (data) that emerged from the factual investigation. This interpretation can be done by viewing the findings in the light of different hypotheses or scenarios or by providing a best explanation of events and activities.

The quality of factual investigation is usually assured by accreditation of the analytical methods, the method of the investigator/institute and the training of the investigator.

Professional assessment, opinion and interpretation of findings depend on the scientific knowledge and the expertise of the expert and the context information in relation to the case. The quality of interpretive investigations depends on the competencies of the individual expert. The quality of an expert who carries out such an interpretive investigation can be assured by an NRGD registration of that expert. The individual expert is assessed on competencies laid down in these standards based on international consensus.

§ 2. Types of applications

The NRGD distinguishes two types of applications: the application for initial registration and the application for reregistration. The application for initial registration is submitted by an expert who at the time of submission of the application is not yet registered in the register for the field of expertise to which the application relates. The application for reregistration is submitted by an expert who is already registered in the register for the field of expertise to which the application relates.

These two types of applications are subdivided as follows:

Application for initial registration:

(i) independent expert: an expert who has independently written and signed the required number of case reports;
(ii) expert without work of their own: an expert who has not independently written and signed the number of case reports required for registration.
If the assessment is favourable, the expert without work of their own will only qualify for provisional registration.

Application for reregistration:

(i) after full registration;
(ii) after provisional registration.

The application for initial registration is submitted by an expert who at the time of submission of the application does not have an NRGD registration. This might be:

- the independently reporting expert;
- the newly-trained expert;
- the expert whose earlier application has been rejected by the Board;
- the expert whose registration was previously stricken.

In respect of applications for initial registration, it is necessary to make a clear distinction between the independent expert and the expert without work of their own. An example of an expert without work of their own is the newly-trained expert. This expert has completed the forensic training (training on drawing up forensic reports), but has not yet been able to independently write the number of reports required for the assessment because these are written under the supervision of a tutor during the training. Another example of an expert without work of their own is the expert whose earlier application was rejected and who has been working (partly) under supervision following this rejection.

The Board adopts the following principle. Every applicant must draw up a List of Case Information. This list must include a specific number of cases in a period specified by the Board immediately preceding the application. If the List of Case Information includes one or more cases which have been prepared under supervision, the applicant will be qualified as an 'expert without work of their own'. Additional requirements apply to the applicant whose application was rejected earlier: the case reports must have been drawn up after the date of the Board's decision rejecting the earlier application (Policy Framework for Application after Rejection).

The distinction between the various types of applications for reregistration is important in the context of the assessment procedure, e.g. the documents an expert must submit, the composition of the Advisory Committee for Assessment and the assessment method.

§ 3. Justification of Standards

The draft of these Standards has been published on the NRGD website for public consultation. These Standards have been established by the Board in accordance with the Register of Court Experts in Criminal Cases Decree (Besluit register deskundige in strafzaken).

§ 4. Validity of Standards

The Standards are valid from the date shown on the cover. The validity runs until the moment of publication of a new version. In principle it will be checked annually as being up-to-date. This check can lead to a new version. The aim is to publish the new version no more than once a year. Intermediate alterations can be incorporated in an addendum, which will be published on the NRGD website as well.

§ 5. Version management and formal revision history

All changes made to the Standards lead to a new version. Newer versions of (parts of) the Standards are designated with a higher version number.

5.1. Version management

In the case of editorial changes, the version number is increased by 0.1. Editorial changes have no substantive impact. In the case of substantive changes, the version number is increased by 1.

5.2. Formal revision history

The revision history starts with version 1.0 as the first formally approved version. Substantive changes made are briefly described in the revision history (Annex C). This makes it possible to trace which Standards are valid at any given moment at all times.

Part II. Demarcation of Bloodstain Pattern Analysis

§ 1. Introduction

Bloodstain pattern analysis (BPA) is the study of the shapes, sizes, locations, orientations, visual appearance, and overall distribution of bloodstains. By observing visual features present it is attempted to identify and interpret bloodstains and subsequently infer blood shedding events that have taken place. Within BPA the classification of bloodstains and bloodstain patterns[1] is intrinsically coupled to the manner of creation. Consequently, a BPA expert provides explanations concerning past activities that took place before, during and/or after the blood shedding event. These findings can be used to assist in the investigation of a criminal event once blood loss has occurred. The investigation may focus on the event itself, or any post activities such as clean-up of blood or removal of a body by the investigative team. Observations and interpretations provided by the BPA expert may be provided in a written report and also during verbal testimony. These Standards apply to what is required in the Dutch (inquisitorial) legal system which differs from legal systems in many other countries (especially adversarial systems). Consequently, the required breadth of information recorded in expert reports may differ substantively between the Dutch system and other jurisdictions.
Experts within the field of BPA can be employed on crime scenes as well as in a laboratory setting investigating bloodstains and bloodied objects or photographs thereof.

BPA experts perform various tasks throughout the criminal investigation process, e.g., detecting, collecting and documenting evidence and bloodstains, examination of bloodstains, forming possible explanations regarding the activities that could have taken place during the alleged crime up to and including evaluating the findings in the light of propositions provided by the legal process parties. Therein a distinction can be made between technical reporting, investigative reporting and evaluative reporting[2]. Based on this distinction the tasks and competencies required of an expert can be divided into three stages.

Within this NRGD demarcation of BPA the following three stages of the forensic investigation are defined, containing tasks and competencies required of an expert:
Stage 1 – Initial examination and documentation
Stage 2 – Bloodstain classification and investigative reporting
Stage 3 – Evaluative reporting
Each stage will be demarcated with questions asked by the involved parties or aspects that may arise during that part of the investigation, and the corresponding tasks and competencies used to answer those questions. In these Standards the different stages have been clearly demarcated, however in practice the expert works in a setting where multiple stages might overlap.

During the **initial examination and documentation stage** experts aim to answer questions like, “Is the stain blood?”, “Which stains form a pattern”, and “Where are the bloodstains and patterns located?” They are expected to document if the detected bloodstains consist of blood by means of presumptive testing and record their locations/features with measurements and photographic images. The aim of the investigation at this stage

[1] In the rest of this document we refer to ‘bloodstains and bloodstain patterns’ simple by using ‘bloodstains’.
[2] https://enfsi.eu/wp-content/uploads/2016/09/m1_guideline.pdf

(technical reporting) is to objectively gather factual information regarding the features of the bloodstains present which can be used for investigations during the subsequent stages. Experts use training, personal experience and contextual information to detect, examine and document bloodstains and determine which bloodstains to sample for further analysis (e.g. DNA analysis for definitive testing of blood and to determine the donor).

During the **bloodstain classification and investigative reporting stage** experts try to answer questions such as, “What kind of bloodstain pattern is it?”, “What possible mechanisms could have created the pattern?” and “How many blood sources contributed to the blood shedding events?”. The expert gathers factual visual features of bloodstains and classifies patterns based on objective and measurable classification criteria. Experts assess and interpret the findings from the first stage and available relevant contextual information. Accordingly, experts may formulate one or multiple possible explanations/hypotheses of events that could have taken place. Based on their findings experts might also exclude certain classifications and may rule out specific activities. Other questions that may rise during this stage are:

- What are the possible locations, orientations and movements of blood sources, persons or objects at the time of or after a blood shedding event?
- What is the minimum number of impacts, shots, or events which took place creating the blood shedding event?
- What is the order of blood shedding events?
- What activities are responsible for the creation or absence of specific bloodstain patterns?
- Which activities caused the blood shedding events?

The main goal of this stage is to classify the bloodstain patterns and provide an investigative opinion, e.g. possible explanation(s) of events, based on the findings of the previous stage and available relevant contextual information.

During the **evaluation reporting stage** experts try to answer the investigative question of “What happened?” by evaluating the underlying question “What is the probability of the findings when one proposition is true, compared to when the other proposition is true?’. The expert interprets and evaluates the findings from the previous stages. The aim of investigation at this stage is to evaluate the findings within a framework of circumstances with respect to at least two competing propositions.

§ 2. Core activities and competencies

For each of the three stages the core activities have been described below. Note: The activities and associated competencies required for registration are documented under part III - registration requirements. In practice, various kinds of investigators, e.g., police officers, forensic researchers and BPA experts might perform one or several of the following tasks of the stages described below. However, NRGD registered experts are expected to be competent in all stages described below.

Stage 1 – Initial examination and Documentation

During the initial examination and documentation stage the bloodstains are documented. The documentation of the bloodstains should be performed according to the guidelines described in annex C (Selection of Test Methods) based on the Code of Practice and

Conduct for BPA[3]. Experts use presumptive testing to determine whether the detected stains are potentially blood. Experts are aware of the possibilities and limitations of the presumptive tests they use (e.g, phenolphthalein, Tetrabase, Hemastix, Hematrace). Experts determine which bloodstains to sample for DNA and/or RNA analysis based on a preliminary classification of patterns, the overall distribution of bloodstains and contextual information of the case. The expert works under the assumption that the stains are blood, if the stains exhibits the external characteristics of blood and a positive presumptive test of those stains. At this stage the expert does not infer any conclusions concerning the donor of the blood.
Tasks that fall under the scope of this stage are:

- Presumptive testing of blood, the expert should indicate in their report if the presumptive test is positive and if they assume the stains are blood;
- Observing and documenting the relevant features of bloodstains and patterns (the objective features, e.g., size, shape, distribution, visual appearance, and location in its environmental or physical context);
- Preliminary classification of bloodstain patterns, distinguishing bloodstain patterns from one another;
- Selecting and sampling of bloodstains and securing items with bloodstains, for further lab examination and/or DNA and/or RNA analysis;
- Provide a technical report.

Stage 2 – Pattern classification and investigative reporting
During this stage the bloodstains recorded in the previous stage are examined and interpreted. Accordingly, each bloodstain pattern is classified if necessary and possible. Experts try to answer the investigative question of “What could (not) have happened?” and can (help) formulate possible explanations of events based on the findings and relevant contextual information. Experts should be aware of the limitations of the formulated explanations and its dependency of contextual information.
Tasks that fall under the scope of this stage are:

- Classification of bloodstain patterns – identifying/classifying bloodstain patterns based on the documented features using objective criteria for this classification. Experts must be able to explain how they reached a classification (e.g. directly in the report, from case notes, or during an oral examination). Reports should contain definitions of the terminology used for the classification. Additionally, ambiguity concerning classifications of bloodstains should be accompanied by an explanation how the expert reached that particular classification (e.g. classifications based on an probability estimation);
- Selecting and sampling of bloodstains and securing items with bloodstains, for DNA and/or RNA analysis. Based on the findings of the DNA expert, the BPA expert can make an assumption concerning the donor(s) of the bloodstains. Such assumptions should be made explicit in the report;

[3] The Code of Practice and Conduct for BPA can be found here https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/917724/FSR-C-102_BPA_Issue_2.pdf

- Differentiating different patterns which may be adjacent to one another or overlapping;
- Determining direction of travel of bloodstains, areas of convergence and origin with either a physical or digital method;
- Determining the possible locations, orientations and movements of blood sources, persons or objects at the time of or after a blood shedding event;
- Determining what information is required for an assessment of the findings and to provide an investigative opinion (possibly with the aid of Contextual Information Management (CIM);Experts must be able to appropriately understand conclusions in reports from other relevant forensic science disciplines and combine them in their own report, including the appropriate references to the other disciplines;
- Provide an investigative report.

Stage 3 – Evaluative Reporting

During this stage propositions concerning the activities of specific individuals that underlie the creation of the bloodstain patterns are assessed by evaluating the findings given these propositions at activity level. Accordingly evaluative reporting involves the provision of a numerical and/or verbal strength of support for the probability of the findings given the truth of two competing propositions formulated at the
activity level. At this stage propositions are received from the involved parties or created by the involved parties, with assistance of the BPA expert, based on the various scenarios that are available. To do so, experts use all relevant information obtained from the prior stages and the relevant contextual information available (also known as the 'framework of circumstances').

Additional tasks that fall under the scope of this stage are:

- Case (pre) assessment – experts are able to discuss the relevant issue with the commissioning party and are able to structure case information in relevant propositions, assumptions and undisputed case information using CIM. Experts are able to communicate limitations, for example if no reasonable assessment is possible due to lack of information. Experts are able to translate a case assessment based on the case information into an examination strategy;
- Assigning probabilities – experts must be able to evaluate the likelihood of the findings in light of different propositions or scenarios given the assumptions and case information according to ENFSI guidelines[4]. Experts may use both verbal and numerical assignments of probabilities for evaluating likelihoods. Experts must be able to explain their reasoning for the assignment of probabilities and to make the boundaries of their expertise explicit. The basis for the assignment of probabilities should be transparent (e.g., substantiated expert knowledge, expert elicitation, case file data, published studies, case specific experiments, etc.)[5].
- Assumptions, undisputed case information, other sources of information, and the subjective nature of the analysis should be made explicit in the report;
- Experts are able to write a report on the evaluation of the findings given activity level propositions following internationally accepted guidelines, e.g., the ENFSI guidelines

[4] https://enfsi.eu/wp-content/uploads/2016/09/m1_guideline.pdf
[5] FSR-C-118 Code of Conduct, development of evaluative opinions, 7.2.7, page 20.

for evaluative reporting[4] or the Code of Practice and Conduct for Development of Evaluative Opinions[6].

In general
For NRGD registered experts the following applies:

- Experts have full knowledge of BPA terminology and are aware of the limitations and exceptions of the mechanisms of bloodstain patterns creation when identifying specific patterns. Furthermore, experts should use terminology consistently and preferably use ASB recommended BPA terminology[7]. The terminology used should be explained either directly in the report, or by referring to the used terminology, or by using an appendix containing the used terminology, or something similar.
- Experts are aware of the challenges and limitations of analysis of bloodstains on fabric.
- Experts are able to write a clear and concise report concerning the findings based on the blood shedding event.
- Experts are able to give courtroom testimony.
- Appropriately reporting of findings in relation to the investigative and/or evaluative question(s) provided by the involved parties, and within the context of the case, to an investigation team and to the Court.
- Experts should be aware of the different visualization techniques that can be used within BPA (e.g. IR photography, luminol, etc).

§ 3. Boundaries of the field of expertise

The following fields of expertise (as described by the NRGD), among others, fall outside of the field of BPA but the conclusions from these fields might be incorporated into a BPA report:

- Forensic Medicine
- Forensic Pathology
- DNA analysis and interpretation
- Weapons and Ammunition
- Gunshot residue

Any use of conclusions from other forensic, investigative, or medical reports, in the BPA experts report are to be considered summary statements only with the full conclusions and their context contained within referenced report.

§ 4. Registration

4.1 Registration

The register will record the name of the relevant expert as an expert in the field of bloodstain pattern analysis.

[6] The Code of Practice and Conduct for Development of Evaluative Opinions https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/960051/FSR-C-118_Interpretation_Appendix_Issue_1__002_.pdf
[7] https://www.aafs.org/asb-standard/terms-and-definitions-bloodstain-pattern-analysis

Part III. Registration requirements for Bloodstain Pattern Analysis

The general (repeat) registration requirements are given in the next paragraphs in italics with a reference to Article 12 paragraph 2 in the Register of Court Experts in Criminal Cases Decree (Besluit register deskundige in strafzaken).

An expert will only be registered as an expert in criminal cases upon submission of the application if, in the opinion of the Board, the expert:

a. has sufficient knowledge and experience in the field of expertise to which the application relates;
b. has sufficient knowledge of and experience in the field of law concerned, and is sufficiently familiar with the position and the role of the expert in this field;
c. is able to inform the commissioning party whether, and if so, to what extent the commissioning party's question at issue is sufficiently clear and capable of investigation in order to be able to answer it on the basis of their specific expertise;
d. is able, on the basis of the question at issue, to prepare and carry out an investigation plan in accordance with the applicable standards;
e. is able to collect, document, interpret and assess investigative materials and data in a forensic context in accordance with the applicable standards;
f. is able to apply the current investigative methods in a forensic context in accordance with the applicable standards;
g. is able to give, both orally and in writing, a verifiable and well-reasoned report on the assignment and any other relevant aspects of their expertise in terms which are comprehensible to the commissioning party;
h. is able to complete an assignment within the stipulated or agreed period;
i. is able to carry out the activities as an expert independently, impartially, conscientiously, competently, and in a trustworthy manner.

§ 1. Article 12(2) sub-paragraph a

(…) has sufficient knowledge and experience in the field of expertise to which the application relates.

1.1 Application for initial registration: independent expert

Basic requirements:

- work at the level of someone who has completed an academic Bachelor's Degree;
- The expert should either;
    - have successfully completed a training as bloodstain pattern analyst defined by the ASB Standards for a Bloodstain Analyst's Training Program[8] and/or,
    - have successfully completed a training as bloodstain pattern analyst equivalent to the Bloodstain Analyst's Training Program and/or;
    - be IAI[9] certified and/or;

[8] https://www.aafs.org/asb-standard/standards-bloodstain-pattern-analysts-training-program
[9] International Association of Identification - https://www.theiai.org/bloodstain_pattern.php

  - be NFI authorized to sign for BPA and/or;
  - have a proof and certification of competency in BPA from their employer or institute;
- have sufficient knowledge of the strengths and limitations of various techniques, specialisations and scientific methods used in the field of BPA, be aware and capable of explaining the possibilities and limitations of these techniques, specialisations and methods, and keep abreast of related recent developments;
- be familiar with the summary of concepts (see annex A) and keep abreast of state-of-the-art developments;
- be familiar with the training guidelines (see annex C, training);

Specific requirements:
- have drawn up at least 25 case reports not older than 5 years which have been subjected to collegial review and/or supervision and has spent at least 500 hours on BPA casework during the last 5 years. These case reports should preferably cover the full spectrum of BPA (at least stage 2 and 3), classification of bloodstain patterns, involving complex crime scenes/lab examinations/photograph examinations concerning for example, locations and orientations of individuals, sequence of blood shedding events and evaluation of findings given activity level propositions.
  In case the applicant is also acting as a supervisor or reviewer, at least 15 reports on the List of Case Information should be independently prepared reports;
- have spent an average of 40 hours a year over the past 5 years on forensically relevant professional development (e.g. publications, attending conferences, running or attending courses);

1.2 Application for initial registration: expert without work of their own

Basic requirements:
- work at the level of someone who has completed an academic Bachelor's Degree;
- have successfully completed a training as bloodstain pattern analyst under as defined by the ASB Standards for a Bloodstain Analyst's Training Program;
- have sufficient knowledge of the strengths and limitations of various techniques, specialisations and scientific methods used in the field of BPA, be aware and capable of explaining the possibilities and limitations of these techniques, specialisations and methods, and keep abreast of related recent developments;
- be familiar with the summary of concepts (see annex A) and keep abreast of state-of-the-art developments;
- be familiar with the training guidelines (see annex C, training).

Specific requirements:
- have drawn up at least 10 not older than 2 years which have been subjected to collegial review and/or supervision and has spent at least 200 hours on BPA casework during the last 2 years. These case reports should preferably cover the full spectrum of BPA (at least stage 2 and 3), classification of bloodstain patterns, involving complex crime scenes/lab examinations/photograph examinations concerning for example, locations and orientations of individuals, sequence of blood shedding events and evaluation of findings given activity level propositions.
- have spent an average of 40 hours a year over the past 2 years on forensically relevant professional development (e.g. publications, attending conferences, running or attending courses);

1.3 Application for reregistration: after full registration

Basic requirements:

- work at the level of someone who has completed an academic Bachelor's Degree;
- have sufficient knowledge of the strengths and limitations of various techniques, specialisations and scientific methods used in the field of BPA, be aware and capable of explaining the possibilities and limitations of these techniques, specialisations and methods, and keep abreast of related recent developments;
- be familiar with the summary of concepts (see annex A) and keep abreast of state-of-the-art developments;
- be familiar with the training guidelines (see annex C, training).

Specific requirements:

- have drawn up at least 12 case reports not older than 5 years which have been subjected to collegial review and/or supervision and has spent at least 250 hours on BPA casework during the last 2 years. These case reports should preferably cover the full spectrum of BPA (at least stage 2 and 3), classification of bloodstain patterns, involving complex crime scenes/lab examinations/photograph examinations concerning for example, locations and orientations of individuals, sequence of blood shedding events and evaluation of findings given activity level propositions.
  In case the applicant is also acting as a supervisor or reviewer, at least 8 reports on the List of Case Information should be independently prepared reports;
- have spent an average of 40 hours a year over the past 5 years on forensically relevant professional development (e.g. publications, attending conferences, running or attending courses);

1.4 Application for reregistration: after provisional registration

Basic requirements:

- work at the level of someone who has completed an academic Bachelor's Degree;
- have sufficient knowledge of the strengths and limitations of various techniques, specialisations and scientific methods used in the field of BPA, be aware and capable of explaining the possibilities and limitations of these techniques, specialisations and methods, and keep abreast of related recent developments;
- be familiar with the summary of concepts (see annex A) and keep abreast of state-of-the-art developments;
- be familiar with the training guidelines (see annex C, training).

Specific requirements:

- have drawn up at least 10 not older than 2 years which have been subjected to collegial review and/or supervision and has spent at least 200 hours on BPA casework during the last 2 years. These case reports should preferably cover the full spectrum of BPA (at least stage 2 and 3), classification of bloodstain patterns, involving complex crime scenes/lab examinations/photograph examinations concerning for example, locations and orientations of individuals, sequence of blood shedding events and evaluation of findings given activity level propositions.
- have spent an average of 40 hours a year over the past 2 years on forensically relevant professional development (e.g. publications, attending conferences, running or attending courses);

1.5 Application after rejection or after legally expired application

In accordance with the policy framework 'Application after Rejection', registration requirements listed above under *Application for Initial Registration* apply for experts whose registration has been rejected by the Board in an application procedure or for experts whose registration has legally expired within the previous two years. Exclusively reports written after the date of the rejection will be assessed. Additionally, reports of supervision and/or collegial review will be included in the assessment (see also paragraph Part IV).

§ 2. Article 12(2) sub-paragraph b

(…) has sufficient knowledge of and experience in the field of law concerned, and is sufficiently familiar with the position and the role of the expert in this field.

- In general an applicant should have adequate knowledge of Dutch criminal law:
  - context of criminal law:
    - Trias Politica, distinction between civil law, administrative law and criminal law.
  - criminal law procedure:
    - pre-trial investigation;
    - coercive measures;
    - stages of the proceedings;
    - actors in the criminal justice system (tasks/powers/responsibilities);
    - regulations concerning experts laid down in the Dutch Code of Criminal Procedure (position and powers of commissioning party, legal position of expert, position and powers of lawyer, forms of counter-analysis, register of experts in the context of criminal law);
    - legal decision-making framework of the court in criminal cases (decision-making schedule laid down in Section 350 of the Dutch Criminal Code of Procedure), also with a view to the relevance of the commission to the expert and to the question at issue;
    - course of the criminal trial;
    - position of the expert in the court procedure.
  - substantive criminal law:
    - sanctions and grounds for exemption from criminal liability (very basic).
  - knowledge of the legal context of safeguarding the quality of the expert and the analysis/investigation:
    - position and role of the co-operating organisations in the criminal justice system in safeguarding the quality of the reports;
    - professional codes and relevant regulations in relation to the NRGD Code of Conduct.

§ 3. Article 12(2) sub-paragraph c

(…) is able to inform the commissioning party whether, and if so, to what extent the commissioning party's question at issue is sufficiently clear and capable of investigation in order to be able to answer it on the basis of their specific expertise.

§ 4. Article 12(2) sub-paragraph d

(…) is able, on the basis of the question at issue, to prepare and carry out an investigation plan in accordance with the applicable standards.

- Case (pre) assessment – experts are able to discuss the relevant issue with the commissioning party and is able to structure case information in relevant propositions, assumptions and undisputed case information using Contextual Information Management (CIM). Experts are able to communicate limitations, for example if no reasonable assessment is possible due to lack of information. Experts are able to translate a case assessment based on the case information into an examination strategy.

§ 5. Article 12(2) sub-paragraph e

(…) is able to collect, document, interpret and assess investigative materials and data in a forensic context in accordance with the applicable standards.

- Presumptive testing of blood, the expert should indicate in their report if the presumptive test is positive and if they assume the stains are blood;
- Observing and documenting the relevant features of bloodstains and patterns (the objective features, e.g., size, shape, distribution, visual appearance, and location in its environmental or physical context);
- Preliminary classification of bloodstain patterns distinguishing bloodstain patterns from one another;
- Selecting and sampling of bloodstains and securing items with bloodstains, further lab examination and/or for DNA and/or RNA analysis. Based on the findings of the DNA expert, the BPA expert can make an assumption concerning the donor(s) of the bloodstains. Such assumptions should be made explicit in the report;

§ 6. Article 12(2) sub-paragraph f

(…) is able to apply the current investigative methods in a forensic context in accordance with the applicable standards.

An applicant should:

- possess general investigative knowledge and skills in the above area, including at least the following:
  - Experts have full knowledge of BPA terminology and are aware of the limitations and exceptions of the mechanisms of bloodstain patterns creation when identifying specific patterns. Furthermore, experts should use terminology consistently and preferably use ASB recommended BPA terminology[10]. The terminology used should be explained either directly in the report, or by referring to the used terminology, or by using an appendix containing the used terminology, or something similar.
- possess specific knowledge and skills relating to the question at issue, whereby at least the following is required:
  - Classification of bloodstain patterns – identifying/classifying bloodstain patterns based on the documented features using objective features for this

[10] https://www.aafs.org/asb-standard/terms-and-definitions-bloodstain-pattern-analysis

classification. Experts shall be able to explain how they reached a classification (e.g. directly in the report, from case notes, or during an oral examination). Reports should contain definitions of the terminology used for the classification. Additionally, ambiguity concerning classifications of bloodstains should be accompanied by an explanation how the expert reached that specific classification, e.g. classifications based on an probability estimation;

- Differentiating different patterns which may be adjacent to one another or overlapping;
- Determining direction of travel of bloodstains, areas of convergence and origin with either a physical or digital method;
- Determining the possible locations, orientations and movements of blood sources, persons or objects at the time of or after a blood shedding event;
- Assigning probabilities – experts must be able to evaluate the likelihood of the findings in light of different propositions or scenarios (i.e. for observed or absence of bloodstain patterns) given the assumptions and case information according to ENFSI guidelines[11]. Experts may use both verbal and numerical assignment of probabilities for evaluating the likelihood. Experts must be able to explain their reasoning for the assignment of probabilities and to make the boundaries of their knowledge explicit. The basis on which the assignment of probabilities is based should be transparent (e.g., substantiated expert knowledge, expert elicitation, case file data, published studies, case specific experiments, etc.)[12].

- be able to determine which investigative methods should be used and how. An applicant must be able to record, assess and interpret the results. An applicant must have an in-depth knowledge of all methods and be able to explain these methods; must have knowledge of the state-of-the-art developments in BPA;
- Specifically for investigative reports: determining what information is required for an assessment of the findings and to provide an investigative opinion (possibly with the aid of CIM);
- be aware of the possibilities and limitations of types of investigation which fall just outside their own field of expertise but which are relevant;
  - Experts must be able to appropriately understand conclusions in reports from other relevant forensic science disciplines and combine them in their own report, including the appropriate references to the other disciplines;
- be aware of the pros and cons of the various techniques, specialisations and scientific methods used in this field, be aware of and able to explain the possibilities and limitations of these techniques, specialisations and methods;
  - Experts are aware of the challenges and limitations of analysis of bloodstains on fabric;
  - Experts should be aware of the different visualization techniques that can be used within BPA (e.g. IR photography, luminol, etc);

§ 7. Article 12(2) sub-paragraph g

(…) is able to give, both orally and in writing, a verifiable and well-reasoned report on the assignment and any other relevant aspects of their expertise in terms which are comprehensible to the commissioning party.

[11] https://enfsi.eu/wp-content/uploads/2016/09/m1_guideline.pdf
[12] FSR-C-118 Code of Conduct, development of evaluative opinions, 7.2.7, page 20. https://assets.publishing.service.gov.uk/media/602407728fa8f5146f0769d9/FSR-C-118_Interpretation_Appendix_Issue_1__002_.pdf

An applicant should:
- be able to write a linguistically correct report which is also understandable and readable for laymen, using neutral, not unnecessarily disqualifying formulations;
- be able to apply the principles of the prevailing formats to the structure and layout of the report;
- be constantly aware of the scope of the report when reporting, such as the picture of the investigated person which the report could provide and the consequences of this for the court's decision (e.g. in terms of providing evidence);
- be able to provide clear information on the field of expertise and the findings of the investigation to the legal body that requests them;
- be able to report comprehensively to laymen on an interpretation and conclusion on the basis of the results (both verbally and in writing).
    - Experts are able to write a clear and concise report concerning the findings based on the blood shedding event.
    - be able to write a report on the evaluation of the findings given activity level propositions following internationally accepted guidelines, e.g., the ENFSI guidelines for evaluative reporting or the Code of Practice and Conduct for Development of Evaluative Opinions;
    - Appropriately reporting of findings in relation to the investigative and/or evaluative question(s) provided by the involved parties, and within the context of the case, to an investigation team and to the Court.
    - be able to give a courtroom testimony.

Alongside the required administrative data (name of commissioning party, date of commission, date of report, commissioning party's reference, own reference, number and type of appendices etc.) a report should, if applicable, contain the following elements:
- a description of the materials received, with information about the date and manner of submission, whether originals were received or copies. Any other conditions of the materials that might be relevant for the examination are mentioned as well (e.g. unreported damage to the item, evidence the item was previously chemically treated for biological or other forensic evidence);
- any relevant background information which could influence the evaluation of the findings in the light of given propositions;
- questions posed by the commissioning party, and where relevant what has been discussed between the commissioning party and the investigator in accordance with article 12 (2) c;
- the hypotheses/propositions evaluated by the expert;
- the investigation method(s) used;
- the evaluation of the materials under investigation;
- the results of the examination;
- the interpretation of the results of the examination;
- the conclusions (with the scale used and its explanation).

§ 8. Article 12(2) sub-paragraph h

(…) is able to complete an assignment within the stipulated or agreed period.

§ 9. Article 12(2) sub-paragraph i

(…) is able to carry out the activities as an expert independently, impartially, conscientiously, competently, and in a trustworthy manner.

An applicant should:

- comply with the NRGD Code of Conduct determined by the Court Experts Board and published on the website of the NRGD

§ 10. Hardship clause

The Board may decide not to apply or deviate from a registration requirement if application of such requirement would produce very unreasonable results. The hardship clause may only offer a solution in certain exceptional situations. It is up to the applicant himself to submit facts and circumstances showing that a certain registration requirement is unreasonable in his specific case.

Part IV. Assessment procedure for Bloodstain Pattern Analysis

§ 1. General

In all fields of expertise, the assessment will be based on the written information provided, including as a minimum requirement case reports and items of evidence, supplemented in principle with an oral assessment. However, such an oral assessment will not be necessary if the applicant's expertise has already been clearly demonstrated by the written information.

The assessment will in principle be carried out on the basis of the information provided by the applicant:

- general information as part of the application package
- documentary evidence of competence.

If it is felt necessary in the context of the assessment an additional case report and/or information, for example information about the way collegial review and/or supervision is organized within the organization, can be requested.

§ 2. Assessment procedure per type of application

2.1 Application for initial registration: independent expert

Documents to be submitted:
- NRGD application form;
- Certificate of Good Conduct (not older than 3 months);
- A clearly legible copy of a valid passport or identity card;
- Copies of documents relating to the highest level of professional qualification;
- A curriculum vitae (CV), preferably in English;
- Documentary evidence of the current academic working level, and proof of being an expert authorised to sign (if applicable);
- Overview Continuing Professional Development BPA form;
- Proof of knowledge concerning Dutch Criminal law (art. 12(2) sub b);
- List of Case Information BPA;
- 3 case reports, of which at least one investigative and one evaluative report, drawn up in the past 5 years selected by the applicant from the List of Case Information. If required for the interpretation of the findings, each report should be accompanied with the case notes and all case file photos. *These case reports should provide a clear and broad picture of the applicant's competencies*. *Subsequently, only independently written reports can be submitted;*
- if available a statement concerning the level of accreditation of the applicant's working environment.

Assessment method:
phase a. administrative, by the NRGD Bureau;
phase b. substantive, by an Advisory Committee for Assessment (ACA) made up of at least three people on the basis of the available written material, including possible supplementary written information. In principle this ACA consists of a legal assessor and two subject-matter assessors;

phase c. substantive, by the same ACA by means of an oral assessment. This oral assessment will be waived if the applicant's expertise has already been clearly established in phase b;
phase d. decision by the Board: registration, provisional registration or no registration.

2.2 Application for initial registration: expert without work of his own

Documents to be submitted:
- NRGD application form;
- Certificate of Good Conduct (not older than 3 months);
- A clearly legible copy of a valid passport or identity card;
- Copies of documents relating to the highest level of professional qualification;
- A curriculum vitae (CV), preferably in English;
- Documentary evidence of the current academic working level;
- Overview Continuing Professional Development BPA form;
- Proof of knowledge concerning Dutch Criminal law (art. 12(2) sub b);
- List of Case Information BPA;
- 3 case reports, of which at least one investigative and one evaluative report, drawn up in the past 2 years selected by the applicant from the List of Case Information. If required for the interpretation of the findings, each report should be accompanied with the case notes and all case file photos. *These case reports should provide a clear and a broad picture of the applicant's competencies;*
- If available a statement concerning the level of accreditation of the applicant's working environment, where applicable.

Assessment method:
phase a. administrative, by the NRGD Bureau;
phase b. substantive, by an Advisory Committee for Assessment (ACA) made up of at least three people on the basis of the available written material, including possible supplementary written information. In principle this ACA consists of a legal assessor and two subject-matter assessors;
phase c. substantive, by the same ACA by means of an oral assessment. This oral assessment will be waived if the applicant's expertise has already been clearly established in phase b;
phase d. decision by the Board: provisional registration or no registration.

2.3 Application for reregistration: after full registration

Documents to be submitted:
- NRGD application form;
- Certificate of Good Conduct (not older than 3 months);
- Copies of documents relating to the highest level of professional qualification (if changed);
- An updated curriculum vitae (CV), preferably in English;
- Overview Continuing Professional Development BPA form;
- List of Case Information BPA;
- 2 case reports drawn up in the past 5 years selected by the applicant from the List of Case Information. If required for the interpretation of the findings, each report should be accompanied with the case notes and all case file photos. *These case reports should provide a clear and broad picture of the applicant's competencies. Subsequently, only independently written reports can be submitted.*

Assessment method:
phase a. administrative, by the NRGD Bureau;
phase b. substantive, by an Advisory Committee for Assessment (ACA) made up of at least two people on the basis of the available written material. This ACA will in principle consist of a legal assessor and a subject-matter assessor;
phase c. substantive, by the same ACA to which one subject-matter assessor is added, drawn from the same field of expertise as the applicant, on the basis of the available written material. This will not be necessary if the ACA unanimously gives a positive recommendation to the Board in phase b;
phase d. substantive, by the ACA specified at phase c by means of an oral assessment. This oral assessment will be waived if the applicant's expertise has been clearly established in phase c;
phase e. decision by the Board: registration, provisional registration or no registration.

2.4 Application for reregistration: after provisional registration

Documents to be submitted:
- NRGD application form;
- An updated curriculum vitae (CV), preferably in English;
- Copies of documents relating to the highest level of professional qualification (if changed);
- Overview of Continuing Professional Development BPA form;
- List of Case Information BPA;
- 2 case reports, one investigative and one evaluative report, drawn up in the past 2 years selected by the applicant from the List of Case Information. If required for the interpretation of the findings, each report should be accompanied with the case notes and all case file photos. *These case reports should provide a clear and broad picture of the applicant's competencies. Subsequently, only independently written reports can be submitted.*

Assessment method:
phase a. administrative, by the NRGD Bureau;
phase b. substantive, by an Advisory Committee for Assessment (ACA) made up of at least three people on the basis of the available written material. In principle this ACA consists of a legal assessor and two subject-matter assessors;
phase c. substantive, by the same ACA by means of an oral assessment. This oral assessment will be waived if the applicant's expertise has already been clearly established;
phase d. decision by the Board: registration, provisional registration or no registration.

2.5 Application after rejection or after legally expired registration (fast-track)

Documents to be submitted:
- NRGD application form;
- An updated curriculum vitae (CV), preferably in English;
- Documentary evidence of the current academic working level, and proof of being an expert authorised to sign (if applicable);
- Overview Continuing Professional Development BPA form;

- List of Case Information BPA, exclusively listing reports written after the date of the rejection by the Board or the date of the legal expiration;
- 3 case reports, of which at least one investigative and one evaluative report, drawn up after the date of rejection by the Board or the date of the legal expiration, selected by the applicant from the List of Case Information. If required for the interpretation of the findings, each report should be accompanied with the case notes and all case file photos. *These case reports should provide a clear and broad picture of the applicant's competencies*;
- All reports of supervision and/or collegial review related to the submitted case reports. Supervision reports and collegial reviews should be drawn up in a format established by the Board and signed.

Assessment method:

phase a. administrative, by the NRGD Bureau;

phase b. substantive, by an Advisory Committee for Assessment (ACA) made up of at least three people on the basis of the available written material, including possible supplementary written information. In principle this ACA consists of a legal assessor and two subject-matter assessors;

phase c. substantive, by the same ACA by means of an oral assessment. This oral assessment will be waived if the applicant's expertise has been clearly established in phase c;

phase d. decision by the Board: provisional registration or no registration.

Annex A Summary of concepts Bloodstain Pattern Analysis

This document contains keywords for concepts of which an expert in the field of bloodstain pattern analysis should minimally have a basic knowledge.

The definitions below have been, among others, adopted from the OSAC (ASB) terminology, the FSR-C-118 Codes of Practise and Conduct - development of evaluative opinions and the ENFSI guidelines for evaluative reporting in Forensic Science.

Keywords
ASB - Academy Standards Board

Bloodstain pattern
A grouping or distribution of bloodstains that indicates through regular or repetitive form, order, or arrangement the manner in which the pattern was deposited.

Context information management
Managing context information in forensic casework aims to minimise the task irrelevant information while maximising the task-relevant information that reaches the practitioner.

Evaluative reporting (Evaluative opinion)
Evaluative reporting evaluates the forensic findings in the light of at least one pair of propositions. It is based on a likelihood ratio and conforms to the principles of evaluation. Most of the time, evaluative reporting will follow from comparative examinations between material of unknown source and reference material from one or more potential source(s) and/or associated activities. An evaluative report is any forensic expert report containing an evaluative reporting section.

Expert elicitation
In science, engineering, and research, expert elicitation is the synthesis of opinions of authorities of a subject where there is uncertainty due to insufficient data or when such data is unattainable because of physical constraints or lack of resources.

Framework of circumstances
A summary of all of the case-specific information known to the expert about the alleged offence and suspect(s) that is relevant to the assessment and interpretation of the observations. This framework must always be regarded as provisional because it depends on the evidence of others (police, crime scene managers or crime scene investigators, pathologists, eye witnesses, victim, suspect etc).

Investigative reporting (Investigative opinion)
Investigative reporting provides explanations for technical/factual findings. The investigative approach is used when it is not possible to formulate a pair of competing propositions. This happens when there is insufficient background (conditioning) information or when the investigators requested explanations for findings at a scene and there is no obvious alternative. The absence of an alternative proposition when for example one party makes “no comment” may also lead to investigative reporting

Likelyhood ratio (LR)
This is the ratio of two probabilities; the probability of the evidence given that the prosecution proposition is true divided by the probability of the evidence given that the alternative proposition is true. These probabilities are assigned on the basis of the scientist's expectation of the outcomes of the examinations, given that each of the propositions is true.

Objective features (of a bloodstain or pattern)
Observable and measurable physical features of bloodstains (e.g., size, location, distribution, shape, edge characteristics) used to distinguish between bloodstains and bloodstains pattern and used to classify them.

Proposition (hypothesis) – a formal hypothesis that is generated, in part, from the background information but may also depend upon the observations that have been made. In the context of a criminal trial there will most often be a pair of propositions — one representing the prosecution position, the other representing the defence's. Propositions are mutually exclusive (i.e. if one is true then the other must be false) and exhaustive (i.e. they cover all possibilities within the framework of circumstances). In the forensic context propositions contain the so-called forensically testable parts of a scenario that can then be expressed in hypotheses (propositions).

Scenario
Within the forensic context a scenario describes all events and/or activities that took place prior or during or after the crime.

Technical (factual) reporting
In most cases, technical reporting precedes investigative or evaluative reporting. In a strict sense, purely technical or factual reporting amounts to a descriptive account of findings. In certain situations, the descriptive statement of observations may lead to particular conclusions, such as a statement about the nature of particular physical matter, or - more formally - the assignment of an object to a class (i.e., classification). Technical reporting is often restricted to the results associated with the observations of items. It can involve the reporting of quantitative measure(s) of an attribute (such as weight or concentration) associated with the item. These measure(s) are generally reported together with some indications of their associated uncertainties (precision, accuracy of the technique). Examination methods and analytical sensitivities will often be major constituents of technical reports. Even though such reports may contain elements of statistical evaluation, they remain descriptive and do not constitute evaluative reports as defined in this document. A technical report does not involve a formal evaluation, under a pair of competing propositions, expressed in terms of a likelihood ratio.

Transposed conditional statement (prosecutor fallacy)
In legal contexts, a fallacious transposed conditional statement is one that equates (or, confuses) the probability of particular findings given a proposition with the probability of that proposition given these findings.

Annex B NRGD Glossary

Advisory Committee for Assessment	A committee appointed by the Board which advises the Board on the (repeat) applicant's (degree of) suitability for (repeat) registration.
Applicant	Natural person submitting an application to the NRGD in order to be (re)registered in the register.
Application for initial registration	An expert who submits an application to be entered in the register and does not or not yet have an NRGD registration at the time when the application is made.
Application for reregistration	An application submitted by an expert who at the time of submitting the next application already has a NRGD registration, possibly for a provisional registration.
Assessor	A member of an Advisory Committee for Assessment.
Board	The Court Experts Board is the body as referred to in Section 51k(2) of the Code of Criminal Procedure and is charged with managing the register.
Brdis	Register of Court Experts in Criminal Cases Decree (Besluit register deskundige in strafzaken).
Bureau	The NRGD Bureau that supports the Board.
Collegial review	The assessment of another person's work for the purpose of continuous quality control of a person's expertise. There is thereby not a hierarchical but a horizontal relationship between colleagues specialised in the same subject area. The reviewer does not sign the report.
Continuing professional development	All (training) activities that contribute to the ongoing development of knowledge and skills, which is desirable and necessary in order to be able to continue performing the role of court expert in a professional manner.
Expert	An individual who issues a report for the administration of justice and/or gives testimony in court.
Expert without work of their own	An expert who has not independently completed and signed the number of case reports required for registration.
Forensic training on reporting	A coherent and structured arrangement of organised training activities in which the necessary knowledge and experience are acquired to report as a court expert in criminal law proceedings and that is completed by an exam.

Independent expert	An expert who has independently prepared and signed the required number of case reports
Intervision	A structured (interdisciplinary) meeting between people who are working or training in the same professional area, not being an operations meeting. The subject of discussion is in any case the forensic work carried out and the associated problems. The aim is to enhance the expertise of those involved and improve quality of work. Unlike supervision, there is no hierarchical relationship between the participants.
NRGD	The Netherlands Register of Court Experts of which the Board and the Bureau form part.
Provisional registration	The registration of an expert for a period specified by the Board and possibly under certain conditions which must be met within that period. In principle the period to be specified by the Board is two years.
Register	The national public register as referred to in Section 51 k(1) of the Code of Criminal Procedure, which lists the court experts which the Board deems suitable.
Registered expert	An expert who is entered in the register.
Registration	Entry in the register.
Supervision	The assessment of another person's work, the joint consideration of the work and the supervision of a supervisee as part of a training or additional training process. Supervisor and supervisee are thereby in a hierarchical relationship. The supervisor will observe the subject of the investigation (the investigated person) in such a way that they can check the supervisee's investigation, and can endorse and take responsibility for the conclusions thereof. The supervisor will sign the report in all cases.
User	Someone who uses the register in order to find and potentially engages a registered expert.

Annex C Guidelines

The following guidelines have been adopted (where applicable) from the Code of Practice and Conduct for Bloodstain Pattern Analysis from the Forensic Science Regulator (FSR-C-102 issue 2).

Training

Training should include the following:

a) Recognise and describe the elements of their quality system.
b) Understand accreditation as it relates to BPA, including validation processes and proficiency testing (PT).
c) Health and safety issues associated with BPA.
d) The history of BPA.
e) Scientific principles as they relate to BPA.
f) The scientific method and its application to BPA experimentation.
g) The principles of physics and fluid mechanics as they relate to BPA.
h) Bloodstain classification and terminology.
i) Bloodstain pattern principles and their application to BPA.
j) Blood composition and related human anatomy and physiology.
k) Injury and wounding, and their relationship to bloodstain pattern formation.
l) The effects of surface characteristics on the resulting bloodstain patterns.
m) The effect of environmental factors on the formation and/or drying time of bloodstain patterns.
n) The characteristics of blood dynamics, including drop formation, oscillation, droplet flight paths, accompanying drops and secondary spatter.
o) The relationship between the physical appearance of bloodstain patterns (size, shape, distribution, and location) and the mechanism by which they were created.
p) The potential impact of searching methods, chemical testing, and enhancement techniques on BPA and other evidence types.
q) Methods of documenting bloodstain pattern analysis, for example, video, photography, sketching and note taking.
r) Methods for the preservation, collection and representative sampling of bloodstain pattern analysis.
s) The relationship between bloodstain pattern analysis and other types of evidence.
t) Development of examination and search strategies.
u) Mathematical methods in BPA.
v) Methods for the measurement of individual bloodstains.
w) Trigonometric methods for impact spatter origin determination.
x) The application of BPA to the reconstruction of bloodletting events.
y) The reporting of BPA findings, conclusions, and opinions by written and/or verbal methods including the limitations of BPA and the application of experiments and reconstruction where necessary.
z) How to review case information in order to aid BPA, understanding the limitations of that information, such that some may be missing or incorrect.
aa) Hypothesis testing and evaluation of hypotheses using reconstructive experiments (hypothesis testing should be unbiased and attempt to test both prosecution and any reasonable defence hypotheses, either known or unknown).
bb) An awareness of cognitive effects that may influence case assessment, interpretation and opinions, and procedures available to minimise effect of contextual bias on interpretation and evaluation, for example, blind assessment.
cc) Laboratory experimentation and various BPA case scenarios factoring in error rates, limitations / reliability.

Selection of Test Methods

Techniques and strategies for examining BPA allow the scientist to:

a) Devise and develop the examination strategy taking into account other evidence types;

b) Preserve bloodstain evidence, for example, the management of fragile or vulnerable bloodstain patterns;
c) Accurately record any items that will not be available for future examination or be altered during testing;
d) Complete records to enable a full independent review of the findings and to facilitate any future case review.

Methods that can be used for documenting blood patterns include:

a) Photography;
b) Sketching;
c) Measurements;
d) Note-taking;
e) Image capture (for example, video, 3D imaging).

Methods to identify individual patterns include:

a. Determining the basis for classification (OSAC Bloodstain Pattern Classification Process Map);
b. The use of ASB recommended terminology;
c. Determining the relationship between an individual bloodstain pattern with its causal mechanism;
d. The recognition of physical, physiological, wetting and chemical altering effects;
e. The determination of directionality;
f. The interpretation of voids, shadowing and limiting angles;
g. The determination of valid conclusions from bloodstain pattern boundaries;
h. Calculating an area of origin of blood spatter by:
    a. string method;
    b. tangent method;
    c. directional analysis;
i. Consideration of the limitations of attempting to determine the sequence, aging and drying times of bloodstains;
j. Using BPA as a basis for sample selection for testing (for example, DNA profiling);
k. Use of assistive technology, such as, microscopy, specialist lighting and scanning to examine and evaluate bloodstains;
l. Securing wetted items to minimise alteration of bloodstain patterns; and
m. Awareness of the difficulties commonly encountered in the examination of bloodstain patterns (for example, bloodstains on dark surfaces, small bloodstains) and the consideration for additional searching.

Enhancing or revealing bloodstaining requires:

a) An awareness of the range of techniques available to use (for example, luminol, leuco crystal violet, amido black, leucomalachite green, acid yellow);
b) An understanding of what other biological/chemical material other than blood is revealed; and
c) consideration of any specialised conditions, such as substrate, temperature or lighting required and limitations or effect when sub optimal conditions exist.

Annex D Revision History

Version	Date	Revisions made
2.0	2025-10-07	Version made final
1.5	2024-10-07	Version revised by board
1.4	2024-09-12	Version for the Board
1.3	2024-09-09	Version after pilot assessment
1.2	2023-12-14	Version for publication
1.1	2023-12-01	Version adapted after public consultation
1.0	2023-10-05	Def concept
0.9	2023-09-28	After feedback Board of Court Experts
0.8.1	2023-09-20	Reviewed and adapted concept
0.8	2023-09-01	Concept to be reviewed