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Standard for a Bloodstain Pattern Analyst's Training Program

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Standard for a Bloodstain Pattern Analyst's Training Program

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Foreword

A bloodstain pattern analyst training program is necessary to ensure the competency of the analyst and the quality of the work product. This standard provides guidance to forensic service providers (FSP) that provide bloodstain pattern analysis services for the establishment and maintenance of such a program. The additional documents are in development to provide further guidance in select topic areas addressed in this summary treatise.

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This document was revised, prepared, and finalized as a standard by the Bloodstain Pattern Analysis Consensus Body of the AAFS Standards Board. The draft of the first edition of this standard was developed by the Bloodstain Pattern Analysis Subcommittee of the Organization of Scientific Area Committees (OSAC) for Forensic Science.

Questions, comments, and suggestions for the improvement of this document can be sent to AAFS-ASB Secretariat, asb@aafs.org or 410 N 21st Street, Colorado Springs, CO 80904.

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Standard for a Bloodstain Pattern Analyst's Training Program

1 Scope

This document provides minimum educational requirements for an individual currently in, or entering into, a bloodstain pattern analyst training program, and the minimum training requirements that a trainee successfully completes prior to practicing as a bloodstain pattern analyst. This document also provides the required components of a mentorship program: mentoring and evaluation of casework, mock casework, preparing for and providing testimony.

NOTE This standard does not apply to bloodstain pattern analysts that have already completed a training program, passed competency testing and are an active bloodstain pattern analyst.

2 Normative References

The document contains no normative references.

3 Terms and Definitions

For purposes of this document, the following definitions apply.

3.1
assessment
A method used to evaluate an individual's knowledge, skills, and abilities in BPA.

3.2
bloodstain pattern analysis trainee
An individual who is working toward meeting the requirements in this document.

3.3
bloodstain pattern analyst
An analyst that has completed training, demonstrated competency in bloodstain pattern analysis, performs BPA casework, writes BPA reports, and can testify as an expert witness in BPA.

3.4
competency
The demonstration of an individual's knowledge, skills, and abilities necessary to perform forensic analysis successfully.

3.5
competency test
A method used to demonstrate—incrementally, cumulatively, or both—successful completion of a bloodstain pattern analysis (BPA) trainee's course of study.

4 Personnel and Qualifications

4.1 Educational Requirements

The bloodstain pattern analyst trainee shall have a Bachelor's degree and coursework in trigonometry, biology, physics, and chemistry from an accredited institution.

4.2 Minimum Training Requirements

4.2.1 At the completion of training, the bloodstain pattern analyst trainee shall comply with the requirements in 4.1.

4.2.2 The training program shall be reviewed and guided by someone who qualifies as a mentor (see Section 5).

4.2.3 The trainee shall be able to recognize and describe the health and safety issues associated with BPA including:

a) bloodborne pathogens and other health hazards;

b) biohazard safety equipment and procedures; and

c) chemical safety hazards, procedures for protection, and remediation of chemical hazards.

4.2.4 The trainee shall be able to describe the elements of the forensic service provider's (FSP) quality system.

4.2.5 The trainee shall be able to describe important milestones in the history of, and people that contributed to the advancement of, BPA including:

a) Eduard Piotrowski;

b) Victor Balthazard;

c) Paul Kirk;

d) Herbert MacDonell;

   1) first training workshop;

   2) formation of the IABPA;

e) IAI certification testing;

f) Scientific Working Group on Bloodstain Pattern Analysis (SWGSTAIN);

g) National Academy of Sciences: *Strengthening Forensic Science in the United States: A Path Forward* report;

h) Organization of Scientific Area Committees (OSAC) for Forensic Science; and

i) AAFS Standards Board (ASB).

4.2.6 The trainee shall be able to describe the application of the scientific method, to the development of experiments and record keeping, and the principles relating to BPA including:

a) problem identification;

b) hypothesis formation;

c) data collection;

d) data analysis/evaluation; and

e) theory/conclusions.

4.2.7 The trainee shall be able to describe the various principles and factors relating to or affecting BPA, including:

a) blood components:

1) composition of blood (solids and liquids),

2) red blood cells,

3) white blood cells:

4) clotting factors,

5) plasma,

6) serum;

b) human anatomy and physiology:

1) circulatory system,

2) blood volume of the human body,

3) wound pathology as it relates to pattern creation;

c) effects of surface characteristics on the resulting bloodstain patterns:

1) blood deposited on smooth surfaces,

2) blood deposited on rough surfaces,

3) blood deposited on absorbent surfaces,

4) blood deposited on non-absorbent surfaces,

5) blood deposited on textile surfaces; and

d) factors affecting the drying time of bloodstain patterns:

1) air flow,

2) humidity,

3) ambient temperature,

4) substrate temperature,

5) substrate characteristics,

6) volume of blood.

4.2.8 The trainee shall be able to describe the principles of physics—particularly fluid dynamics —relating to BPA, including but not limited to:

a) Newton's Laws of Motion;

b) surface tension;

c) viscosity;

d) gravity;

e) air resistance;

f) flight path;

g) velocity;

h) kinetic energy; and

i) characteristics of blood in motion:

1) drop formation,

2) accompanying drop,

3) wave cast-off,

4) distribution of blood drops,

5) oscillation.

4.2.9 The trainee shall be able to demonstrate methods of documentation for bloodstain pattern evidence, including:

a) sketches;

b) notes;

c) measurement;

d) road mapping:

1) utilization and placement of scales and axis lines; and

2) photography.

4.2.10 The trainee shall be able to explain the following other methods of documentation for bloodstain pattern evidence:

a) video

b) computer programs; and

c) laser scanning.

4.2.11 The trainee shall be able to demonstrate and describe the documentation process and mathematical principles related to BPA, including:

a) methods for stain selection and the measurement of individual bloodstains;

b) trigonometric functions as they relate to BPA:

1) angle of impact determinations; and

2) area of origin determinations;

c) methods for area of convergence determination; and

d) methods of area of origin determination.

4.2.12 The trainee shall be able to recognize and describe the physical characteristics of bloodstains and bloodstain patterns relating to the mechanism by which they were created, including:

a) appearance;

b) size;

c) shape;

d) distribution;

e) quantity; and

f) location.

4.2.13 The trainee shall be able to recognize the effects of textiles and clothing on bloodstain pattern formation including:

a) composition;

b) construction;

c) treatment;

d) condition; and

e) effect of fabric movement during interaction with blood.

4.2.14 The trainee shall be able to demonstrate using characteristics of bloodstain patterns to classify the patterns and to understand the limitations of the classification process including:

a) bloodstains with limited characteristics;

b) bloodstains with characteristics which are shared by multiple mechanisms;

c) limited case-specific information.

4.2.15 The trainee shall be able to recognize and describe clotting as it relates to BPA.

4.2.16 The trainee shall be able to recognize and describe stain dilution as it relates to BPA.

4.2.17 The trainee shall be able to describe the methods for the preservation and collection of bloodstain pattern evidence that allow for future examinations.

4.2.18 The trainee shall be able to recognize and describe the role of other forensic analyses available to BPA including but not limited to:

a) forensic biology analysis findings;

b) medical/pathology findings; and

c) pattern evidence:

    1) fingerprints,

    2) footwear patterns.

4.2.19 The trainee shall be able to recognize and describe chemical testing and enhancement techniques relating to bloodstains including:

a) presumptive tests:

    1) saliva (amylase),

    2) blood,

    3) human origin;

b) blood searching options:

1) chemical methods,

2) physical methods:

i) Infrared (IR)

ii) Alternate Light Source (ALS)

c) blood enhancement chemicals.

4.2.20 The trainee shall be able to recognize and describe the limitations and assumptions that can affect the analysis.

4.2.21 The trainee shall be able to demonstrate how to develop and evaluate reconstruction events using BPA, including:

a) developing multiple opposing reconstructive scenarios for evaluation,

b) developing scenarios to evaluate based on specific case questions,

c) developing conclusions which address multiple aspects of the incident:

1) locations and movement

2) position and orientation

3) sequencing,

4) time components.

4.2.22 The trainee shall be able to demonstrate the ability to accurately, effectively, and objectively communicate findings, conclusions, and opinions, using:

a) written methods; and

b) verbal methods.

4.2.23 The trainee shall be able to describe important published BPA standards, guidelines, and technical reports.

4.2.24 The trainee shall be able to describe types of bias that can affect analysis, opinions, and conclusions, including:

a) contextual bias;

b) confirmation bias;

c) motivational bias; and

d) expectation bias.

4.2.25 The trainee shall be able to describe methods for minimizing bias (e.g., linear sequential unmasking).

5 Mentorship Components and Assessment

5.1 General

5.1.1 The FSP training coordinator shall identify and assign an individual to serve as a mentor.

5.1.2 The mentor shall be assigned at the time the FSP decides the trainee will complete the required educational requirements prescribed in this standard.

5.1.3 The length of the mentorship program may vary based upon the skills and abilities of the trainee.

5.2 Qualifications of a Mentor

5.2.1 A BPA mentor shall only mentor in the BPA sub-disciplines in which they are qualified and experienced as a practitioner.

5.2.2 A mentor shall have the following qualifications:

a) has testified and provided an opinion in BPA;

b) has authored and technically reviewed BPA reports;

c) participation and successful completion of proficiency testing;

d) follows the criteria in Section 8.

5.3 Mentorship Program Requirements

5.3.1 A FSP shall establish a documented mentorship program.

5.3.2 Prior to the trainee entering a mentorship program, the mentor shall evaluate the trainee's training records.

5.3.3 The mentor may designate a bloodstain pattern analyst to assist with the mentorship program. The bloodstain pattern analyst may complete tasks such as observing, documenting performance, and providing guidance to the trainee.

5.4 Review and Examination of Completed Casework

5.4.1 The mentor shall identify completed cases for the trainee to review and examine.

5.4.2 The mentor shall mask/unmask the case data in a manner consistent with current casework methodologies to allow for the mentee to develop their own interpretations and opinions.

5.4.3 The completed cases should be representative of the range of difficulty of BPA casework the trainee is likely to encounter and expose the trainee to the limitations of bloodstain pattern analysis.

5.4.4 A minimum of 10 completed cases of varied levels of complexity and scope should be completed.

5.4.5 In aggregate, the completed case files to be reviewed should include the following components:

a) photographs;

b) notes, sketches, diagrams etc.;

c) supporting reports (e.g., autopsy, DNA);

d) additional documentation (e.g., interviews, 911 call, etc.); and

e) original pattern characteristics, classifications, opinions, and interpretations that are provided after the mentee has completed their evaluation of the case.

5.4.6 The examination of completed cases shall involve the trainee independently examining and documenting part or all of a completed case and preparing a written report of observations and case conclusions.

5.4.7 The trainee shall review the completed cases with their mentor to gain an understanding of the methodology and workflow process of a BPA investigation.

5.4.8 The mentor shall evaluate and compare the trainee's work product to the previously completed cases.

5.5 Mock Evidence and Scene Examination

5.5.1 Mock evidence should be representative of the range of BPA patterns the trainee is likely to encounter.

NOTE 1 Mock evidence assesses the trainee's ability to appropriately document and classify the patterns within a mock case, which was prepared using known mechanisms.

NOTE 2 Mock evidence can be done in-person or through remote means.

5.5.2 The trainee shall document, classify, and provide a written report of the reconstructed events using BPA.

5.5.3 The mentor shall evaluate and compare the trainee's work product to the known mechanisms used in the creation of the mock evidence and cases for sufficient documentation and rendering of conclusions.

5.6 Mentored Casework

5.6.1 Mentored casework shall be a component of the mentorship and the main factor in determining the length of the program.

NOTE 1 Mentored casework assesses the trainee's ability to evaluate cases that have not been previously analyzed.

NOTE 2 Mentored casework may be done in person or through remote means.

5.6.2 The mentor shall conduct the analysis with the assistance of the trainee. The trainee may take on responsibilities (e.g., documenting specific pattern types, articulating certain tasks to be performed) where the mentor defines, reviews, and approves the work performed by the trainee.

5.6.3 Mentored cases should reflect the range of BPA casework the trainee is likely to encounter.

5.7 Courtroom Practices

5.7.1 The trainee shall review BPA expert witness courtroom practices (e.g., the review of BPA expert testimony transcripts, direct observation of BPA expert testimony).

5.7.2 The mentor shall participate in the creation of a mock courtroom scenario where the trainee demonstrates the ability to appropriately communicate their observations and case conclusions, while testifying competently in a mock court setting.

6 Criteria for Acceptable Performance

6.1 The mentor and FSP shall establish standard criteria for the successful completion of each component of the mentorship program.

6.1.1 A trainee shall be evaluated on all components of the agency's training program (see Section 7).

6.1.2 The criteria shall be documented and cover the spectrum of anticipated tasks related to BPA analysis.

6.1.3 The criteria should include the establishment of the length of the program based in part on the number and range of cases/samples the trainee is likely to encounter.

6.1.4 The FSP shall establish procedures to address trainee errors and/or deficiencies.

7 Completion of Training

Completion of training shall be demonstrated by:

a) oral examination;

b) written examination; and

c) competency testing.

8 Continuing Education and Training

8.1 A minimum of eight hours of documented continuing education and training related to BPA shall be completed annually. This may include attending professional conferences, seminars, webinars, or workshops.

8.2 Analysts shall stay abreast of current BPA literature, advances, and technologies.

8.3 A bloodstain pattern analyst should belong to a professional organization(s) related to BPA.

9 Training Files

9.1 All training—training program and continuing education—shall be documented, and copies of the documentation shall be maintained by both the FSP and the analyst.

9.2 If the analyst is not employed by a FSP, they shall maintain the records.



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