

ASB Standard 205, First Edition
202X

**Standard for Methodology in Bloodstain Pattern
Analysis**



ASB
AAFS STANDARDS BOARD

Standard for Methodology in Bloodstain Pattern Analysis

ASB Approved Xxxxxx 202X

ANSI Approved Xxxxxxx 202X



410 North 21st Street
Colorado Springs, CO 80904

This document may be downloaded from: www.aafs.org/academy-standards-board

This document is provided by the AAFS Standards Board. Users are permitted to print and download the document and extracts from the document for personal use, however the following actions are prohibited under copyright:

- *modifying this document or its related graphics in any way;*
- *using any illustrations or any graphics separately from any accompanying text; and,*
- *failing to include an acknowledgment alongside the copied material noting the AAFS Standards Board as the copyright holder and publisher.*

Users may not reproduce, duplicate, copy, sell, resell, or exploit for any commercial purposes this document or any portion of it. Users may create a hyperlink to www.aafs.org/academy-standards-board to allow persons to download their individual free copy of this document. The hyperlink must not portray AAFS, the AAFS Standards Board, this document, our agents, associates and affiliates in an offensive manner, or be misleading or false. ASB trademarks may not be used as part of a link without written permission from ASB.

The AAFS Standards Board retains the sole right to submit this document to any other forum for any purpose.

Certain commercial entities, equipment or materials may be identified in this document to describe a procedure or concept adequately. Such identification is not intended to imply recommendations or endorsement by the AAFS or the AAFS Standards Board, nor is it intended to imply that the entities, materials, or equipment are necessarily the best available for the purpose.

Proper citation of ASB documents includes the designation, title, edition, and year of publication.

*This document is copyrighted © by the AAFS Standards Board, LLC. 202X All rights are reserved.
410 North 21st Street, Colorado Springs, CO 80904, www.aafs.org/academy-standards-board.*

Foreword

The American Academy of Forensic Sciences established the Academy Standards Board (ASB) in 2015 with a vision of safeguarding Justice, Integrity and Fairness through Consensus Based American National Standards. To that end, the ASB develops consensus based forensic standards within a framework accredited by the American National Standards Institute (ANSI), and provides training to support those standards. ASB values integrity, scientific rigor, openness, due process, collaboration, excellence, diversity and inclusion. ASB is dedicated to developing and making freely accessible the highest quality documentary forensic science consensus Standards, Guidelines, Best Practices, and Technical Reports in a wide range of forensic science disciplines as a service to forensic practitioners and the legal system.

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 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@aaafs.org or 410 N 21st Street, Colorado Springs, CO 80904.

All hyperlinks and web addresses shown in this document are current as of the publication date of this standard.

ASB procedures are publicly available, free of cost, at www.aaafs.org/academy-standards-board.

Keywords: *TBD*

Table of Contents *(to be updated when the document is finalized)*

1	Scope.....
2	Normative References
3	Terms and Definitions
4	Requirements
	Annex A (informative) Bibliography

DRAFT

Standard for Methodology in Bloodstain Pattern Analysis

1 Scope

This document provides the requirements for the methodology when conducting a bloodstain pattern analysis. This document addresses when to classify, but not how to classify patterns. The methodology in this document involves the examination of bloodstains and bloodstain patterns to determine the significance of their presence or absence, what potential forces or mechanisms could result in those bloodstains or bloodstain patterns, and the significance of those determinations in regard to the scope or reason for the examination.

The methodology in this document defines overall standardized and chronologically ordered steps to perform bloodstain pattern analysis. Each step provides direction for the development of data supported interpretations.

This document does not address specific methods for the analysis of bloodstain patterns, documentation, preservation, or collection at the scene or on items of evidence.

2 Normative References

There are no normative reference documents. Annex A, Bibliography, contains informative references.

3 Terms and Definitions

For purposes of this document, the following definitions apply.

3.1 bloodstain pattern analyst

A qualified individual who conducts or directs the analysis of forensic casework samples, interprets data, reaches opinions, or issues reports in the field of bloodstain pattern analysis.

3.2 assumption

The view that something is true, without adequate supporting evidence or certain knowledge.

3.3 cognitive bias

A set of influences that may affect the reliability and validity of one's observations, interpretations, and opinions.

3.4 event reconstruction

The incorporation of pattern classifications with task relevant information..

3.5 examination

The act or process of observing, searching, detecting, recording, prioritizing, collecting, analyzing, measuring, comparing, or interpreting.

3.6**interpretation**

An explanation for the observations, data, and calculations.

3.7**mechanism**

The action or event process resulting in the formation of a bloodstain or bloodstain pattern.

3.8**methodology**

The analytical procedures used to support bloodstain pattern analysis.

3.9**observed data**

The observable characteristics within a bloodstain or bloodstain pattern.

3.10**opinion**

A view, judgement, or belief that takes into consideration other information in addition to observations, data, calculations, and interpretations.

3.11**task-irrelevant information**

The information that is not necessary for making interpretations and opinions (e.g., criminal history).

3.12**task-relevant information**

The information that is necessary for making interpretations and opinions (e.g., scene photos, medical reports).

4 Pre-analysis Considerations

4.1 The information reviewed shall follow linear sequential unmasking expanded^[1].

4.1.1 Bloodstain pattern analysts shall:

- a) prioritize the review of task-relevant information;
- b) document the task-relevant information they are provided;
- c) document the order in which any information is provided and reviewed; and
- d) specify any investigative question posed.

4.1.2 Information that is provided but not reviewed should also be documented

4.2 The bloodstain pattern analyst shall document the task-relevant information they are provided and specify any investigative question posed.

4.3 The bloodstain pattern analyst shall render opinions based upon the quality and quantity of the information available for analysis.

4.4 A request for analysis may be defined or undefined.

4.4.1 Defined analysis focuses on a specific question or request (i.e., where did the assault occur).

4.4.1.1 A general analysis of the scene should be conducted prior to any statement evaluation (i.e., does the bloodstain pattern evidence support or negate an individual's statement).

4.4.2 Undefined analysis is broad and not focused on a specific question or request (i.e., what information can be learned from the bloodstains?)

5 Chronological Order of Analysis

5.1 Step 1: Observation and Data Collection

5.1.1 The bloodstain pattern analyst shall document observations of bloodstained items and bloodstained areas to characterize stain and pattern size, shape, distribution, appearance, and location.

NOTE Photographs, 3D scans, sketches, or diagrams may be utilized to aid documentation.

5.1.2 In addition, the bloodstain pattern analyst should locate all areas where blood is present and where blood is notably absent.

5.2 Step 2: Classification of Patterns from Observable Characteristics

5.2.1 A bloodstain pattern analyst shall evaluate observable characteristics to classify bloodstains and bloodstain patterns and note the mechanisms that cannot be excluded from creating the stain or pattern.

5.2.2 The bloodstain pattern analyst shall note all pattern types that will be given further consideration during the refinement process.

NOTE Pattern types can be assigned based on mechanism and can be as definitive as using the ASB BPA terminology or generally describing a mechanism which is associated with the creation of a bloodstain or bloodstain pattern.

5.2.3 Where applicable, the bloodstain pattern analyst may establish areas of spatter patterns to aid in determining flight path characteristics, area of origin, area of convergence, etc.

5.3 Step 3: Refinement of Interpretations Applying Task-relevant Contextual Information

5.3.1 The bloodstain pattern analyst shall consider task-relevant contextual information to refine bloodstain and bloodstain pattern classifications and mechanisms noted after the completion of Step 2.

NOTE Refinement is the logical exclusion of pattern types or mechanisms with the addition of additional knowledge (e.g., reports of forensic biology, DNA , medical, pathology, or post-incident EMT activity).

104 *Examples*

- 105 — *No pathological evidence of a gunshot injury, excludes backspatter and forward spatter as*
106 *possible pattern types.*
- 107 — *Forensic biology indicates it is not human blood.*
- 108 — *Presence of blood in the airways alerts the analyst to consider expiration as a spatter*
109 *producing mechanism.*

110 **5.4 Step 4: Assumptions and limitations**

111 **5.4.1** The bloodstain pattern analyst shall document all assumptions made that may have
112 influenced interpretation.

113 *Example assumptions:*

- 114 — *All red stains are considered blood if not tested.*
- 115 — *All bloodstains are from a single donor.*
- 116 — *The bloodstains are related to the event being investigated and not from a prior event.*
- 117 — *The crime lab and other scientific reports are accurate and reliable.*
- 118 — *The scene has not been altered if not reported in a police report or witness statement.*

119 **5.4.2** The bloodstain pattern analyst shall document all limitations that may have influenced
120 interpretation.

121 *Example limitations:*

- 122 — *Classification and interpretations were conducted via photographic evidence with no or*
123 *limited on-site evaluation.*
- 124 — *Lack of serological/biological sampling or identification*
- 125 — *Scene alteration prior to scene documentation*
- 126 — *Improper or limited documentation of scene and bloodstain patterns to include measurements,*
127 *sketches, photographs, scales, etc.*

128 **5.5 Step 5: Event Reconstruction**

129 NOTE 1 Bloodstain pattern analysis may be completed within the context of an event reconstruction and to a
130 broader extent within the investigation. Classification of bloodstain patterns may assist in determining what
131 events occurred. The ultimate goal in a reconstruction is to determine what events occurred and if possible, in
132 what sequence they occurred. A reconstruction, at most, is a series of snap shots in time and not a video of
133 the event or a full recreation of the actions.

134 NOTE 2 It is unrealistic to utilize all bloodstain patterns within a scene.

5.5.1 The bloodstain pattern analyst should evaluate the bloodstain evidence and scene in its totality prior to answering or evaluating any case specific questions to avoid a biased interpretation.

5.5.2 The bloodstain pattern analyst should evaluate any case specific questions and create a testable hypothesis.

5.5.3 If a bloodstain pattern analyst is posed with determining if an action occurred, they should also evaluate and determine if alternative explanations exist.

Event Reconstruction Examples

Example 1:

- *The pattern classification: drip trail.*
- *Task relevant information: tested positive for blood and DNA findings indicate the source as the suspect. Suspect has an incised wound to their right finger,*
- *Event reconstruction: bloodstain pattern evidence provides support for a source of the suspect's blood traversing the area in which the drip trail was located.*

Example 2

- *The pattern classification: drip trail.*
- *Task relevant information: tested positive for blood and no DNA testing was performed. Suspect has an incised wound to their right finger.*
- *Event reconstruction: bloodstain pattern evidence provides support for a source of blood traversing the area in which the drip trail was located.*

Example 3

- *The pattern classification: impact pattern*
- *Task relevant information: tested positive for blood and DNA findings indicate the source as the victim. Victim has blunt force trauma injuries to their face.*
- *Event reconstruction: bloodstain pattern evidence provides support for an impact to a fluid source of the victim's blood in this location.*

5.6 Step 6: Opinions

The bloodstain pattern analyst should provide clear statements of what the bloodstains and bloodstain patterns provides support for based on the factual data provided, the classification of the bloodstain patterns and the interpretation of the evidence.

Annex A
(informative)

Bibliography

The following bibliography is not intended to be an all-inclusive list, review, or endorsement of literature on this topic. The goal of the bibliography is to provide publications cited informationally, and publications relevant to the standard.

- 1] Dror, I. E, and J. Kukucka. "Linear Sequential Unmasking-Expanded (LSU-E): "A general approach for improving decision making as well as minimizing noise and bias." *Forensic science international. Synergy* vol. 3 100161. 13 Aug. 2021^a.
- 2] National Commission on Forensic Science, "Ensuring the forensic analysis is based upon task-relevant information^b."

^a Available from: <https://doi.org/10.1016/j.FSISYN.2021.100161>

^b available from: <https://www.justice.gov/archives/ncfs/page/file/641676/download>



Academy Standards Board
410 North 21st Street
Colorado Springs, CO 80904

www.aafs.org/academy-standards-board