

ANSI/ASB Best Practice Recommendation 037, First Edition  
2019

**Guidelines for Opinions and Testimony  
in Forensic Toxicology**



## **Guidelines for Opinions and Testimony in Forensic Toxicology**

ASB Approved October 2018

ANSI Approved January 2019



410 North 21st Street  
Colorado Springs, CO 80904

This document may be downloaded for free at: <http://asb.aafs.org/>

*This document is provided by the AAFS Standards Board for free. You are permitted to print and download the document and extracts from the document for your own use, provided that:*

- *you do not modify this document or its related graphics in any way;*
- *you do not use any illustrations or any graphics separately from any accompanying text; and,*
- *you include an acknowledgement alongside the copied material noting the AAFS Standards Board as the copyright holder and publisher.*

*You expressly agree not to reproduce, duplicate, copy, sell, resell, or exploit for any commercial purposes, this document or any portion of it. You may create a hyperlink to <http://asb.aafs.org> to allow persons to download their individual, free copy of this document. Your 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. You may not use our trademarks as part of your link without our written agreement for you to do so.*

*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.*

## Foreword

It is common that forensic toxicologists are called to testify in criminal and civil matters to discuss analytical results and offer their expert toxicological opinion. In these legal matters, it is important that expert testimony be constrained to areas that are based upon sufficient facts or data, be a product of reliable principles and methods, and that those principles and methods are consistently applied to the facts of the case at hand. This document provides one way of ensuring that proper toxicological testimony is allowed in legal matters by defining the general areas of forensic toxicology that are viewed as reliable by other experts in the field.

This document was revised, prepared, and finalized as a standard by the Toxicology Consensus Body of the AAFS ASB. The initial draft document was developed by the Toxicology Subcommittee of the Organization of Scientific Area Committees (OSAC).

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

**Keywords:** *Opinions, Testimony, Forensic Toxicology*

**Abstract:** This document was developed to provide general guidance to expert witnesses called to testify on the topic of forensic toxicology, to include the expert toxicological opinions they may offer.

## Table of Contents

1	Scope.....	1
2	Normative References.....	1
3	Terms and Definitions.....	1
4	Written and Oral Opinions.....	2
5	Expert Toxicological Opinions and Testimony.....	2
5.1	General.....	2
5.2	Appropriate Opinions and Testimony by a Toxicologist.....	3
5.3	Inappropriate Opinions and Testimony by a Toxicologist.....	3
	Annex A (informative) Bibliography.....	5

# Guidelines for Opinions and Testimony in Forensic Toxicology

## 1 Scope

This document delineates guidelines for best practices in forensic toxicology opinions and testimony. Specifically, it is intended for the subdisciplines of human performance toxicology (e.g., driving-under-the-influence of alcohol or drugs and drug-facilitated crimes), postmortem forensic toxicology, non-regulated employment drug testing, court-ordered toxicology (e.g., probation and parole, drug courts, child services), and general forensic toxicology (e.g., non-lethal poisonings or intoxications).

## 2 Normative References

The following references are indispensable for the application of the standard. Only the editions cited apply.

*Scientific Working Group for Forensic Toxicology (SWGTOX) Standard for Laboratory Personnel.* J Anal Toxicology (2015) 39 (3): 241-250

*Scientific Working Group for Forensic Toxicology (SWGTOX) Standard for Breath Alcohol Personnel.* J Anal Toxicology (2015) 39 (3): 231-240

## 3 Terms and Definitions

For purposes of this document, the following definitions apply.

### 3.1

#### **body burden calculation**

An estimate of the total drug in the body based on quantitative analysis of blood, urine, and/or tissue samples.

### 3.2

#### **expert toxicological opinion (or “opinion”)**

A coherent, scientifically sound statement or statements regarding the meaning of analytical findings in a forensic case that is formulated from a consideration of the synthesis of analytical data, pre-analytical factors, case history, and other relevant information.

### 3.3

#### **extrapolation calculation**

An estimation of a drug concentration (e.g., ethanol) at a time other than the time of the sample collection. There are two types of extrapolation: back (retrograde) and forward (anterograde) extrapolation.

### 3.4

#### **toxicologist**

An individual (however named) who provides factual information and/or interpretive opinions related to the results of toxicological tests for court or investigative purposes. May be further defined by role (e.g., Toxicologist (General), Toxicologist (Alcohol), Toxicologist (Breath Alcohol)).

## 4 Written and Oral Opinions

**4.1** Written expert toxicological opinions regarding the interpretation of analytical toxicology findings should not be part of the basic analytical toxicology report. A separate expert report should be used to convey such opinions.

**4.2** Written expert toxicological opinions should include a comment that states that the opinions may be subject to change based upon new information that becomes available (e.g., case history, additional analytical testing, new research findings and publications, etc.).

**4.3** An expert toxicological opinion, whether written or oral, should:

- a) be expressed in a clear, coherent manner;
- b) be based on established scientific principles and foundations;
- c) be based on the totality of information available, including case history, observations, circumstances, and other relevant information, and not based solely on analytical results;
- d) include information on case specific documents and records reviewed;
- e) have references that support the opinion<sup>1</sup>;
- f) clearly state any assumptions made; and
- g) clearly state any known limitations of the opinion

## 5 Expert Toxicological Opinions and Testimony

### 5.1 General

**5.1.1** See the *SWGTOX Standard for Laboratory Personnel* and *SWGTOX Standard for Breath Alcohol Personnel* for recommended education, certification, and training/work experience for providing interpretive opinions related to the results of toxicological tests for court or investigative purposes.

**5.1.2** A toxicologist may be asked to express an expert opinion or to testify as a fact or expert witness.

**5.1.2.1** Fact witnesses typically testify to the work performed in the laboratory that includes scientific principles, instrumentation, quality assurance procedures, and/or chain of custody.

**5.1.2.2** Expert witnesses typically testify to their own interpretation of results and/or opinions.

---

<sup>1</sup> References should be provided either in the expert report or made available upon request

## 5.2 Appropriate Opinions and Testimony by a Toxicologist

Through testimony and offering an expert toxicological opinion, it is generally appropriate for a toxicologist to:

- a) discuss a laboratory report and any analytical work that supports that report. Applicable limitations should also be addressed.
- b) qualify a reported concentration in the context of a given case as subtherapeutic, therapeutic, toxic or lethal when that statement can be backed by appropriate references, databases and/or other relevant information.
- c) address the pharmacokinetics/toxicokinetics, as well as the pharmacodynamics/toxicodynamics of drugs or other chemicals.
- d) discuss the toxicological impact of the presence, absence and/or stability of drugs or other chemicals.
- e) address impairment for the average individual to the extent that effects are consistent with documented pharmacodynamic and toxicodynamic properties of the substance and within the context of a given case.
- f) perform or discuss toxicological calculations that are generally accepted in the field and can be supported by research and references, provided appropriate limitations are cited. For example, ethanol back extrapolation calculations may be performed.

## 5.3 Inappropriate Opinions and Testimony by a Toxicologist

The following are considered to generally be inappropriate opinions and/or testimony for a toxicologist to offer, as they currently lack consensus within the scientific community or are generally beyond the scope of the toxicologist's expertise.

- a) A toxicologist should not opine as to the absolute cause of death of an individual. This does not preclude a toxicologist from addressing the toxicological impact of any substances found in the toxicological analysis of specimens from the case.
- b) A toxicologist should not address behavioral intent based solely upon a drug concentration.
- c) A toxicologist should not opine as to a specific individual's degree of impairment based solely on a quantitative result.
- d) A toxicologist should not imply impairment of an individual based on analytical findings from urine, hair or other matrices unless supported by the literature.
- e) A toxicologist should not opine as to the absolute cause of an accident.
- f) A toxicologist should not perform extrapolation calculations for drugs other than ethanol.
- g) A toxicologist should not calculate the dose of a drug based on a postmortem drug concentration in blood.

- h) A toxicologist should not calculate the dose of a drug (with the exception of ethanol) through body burden calculations.
- i) A toxicologist should not opine as to the effects of a drug or combination of drugs on a specific individual without context of a given case. This does not preclude a toxicologist from addressing general effects of drugs at varying concentrations (Section 5.2.).
- j) A toxicologist should not use words such as “scientific certainty” or “reasonable degree of scientific certainty”, unless required by jurisdictional regulations.



**Annex A**  
(informative)

**Bibliography**

- 1] *The Federal Rules of Evidence*. Michigan Legal Publishing Ltd.; 2017 edition



Academy Standards Board  
410 North 21st Street  
Colorado Springs, CO 80904  
[www.asbstandardsboard.org](http://www.asbstandardsboard.org)