

ASB Best Practice Recommendation 037, First Edition
20172018

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

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Guidelines for Opinions and Testimony in Forensic Toxicology

ASB Approved Xxxxx ~~2017~~2018

ANSI Approved Xxxxx ~~2017~~2018



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Foreword

~~Forensic toxicology includes human performance toxicology, postmortem toxicology, non-regulated employment drug testing and court ordered toxicology. In some circumstances, a forensic toxicologist is asked to testify to analytical results and offer expert opinions. This document delineates the guidelines for offering such testimony and opinions.~~

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.

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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 ~~reference is~~references are indispensable for the application of the standard. Only the ~~edition~~editions cited ~~applies~~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 ~~definition applies~~definitions apply.

3.1

back-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.

3.2

body burden calculation

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

3.13.3

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, ~~etc~~and other relevant information.

3.4

toxicologist

An individual (however named) who provides 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.).

4.2.4.3 An expert toxicological opinion ~~reflects an individual's assessment of the findings. Therefore, expert opinions should, 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, ~~etc., and other relevant information,~~ and not ~~based~~ solely ~~based~~ on analytical ~~findings~~results;
- ~~— have references that support the opinions; these citations should be provided either on the report or made available upon request;~~
- ~~— include a comment that states that the opinions may be subject to change based upon new information that becomes available;~~
- d) ~~include a listing of on~~ case specific documents and records reviewed; ~~and~~
- e) ~~have references that support the opinion~~¹;
- e)f) clearly state any assumptions made; ~~and~~
- g) ~~Toxicology~~ 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* ~~for~~ and SWGTOX Standard for Breath Alcohol Personnel for recommended education, certification, and training/work experience ~~required to provide~~ 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.

¹ References should be provided either in the expert report or made available upon request.

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 issues.

5.1.2.2 Expert witnesses typically testify to their own interpretation of results and/or opinions. ~~These results or opinions may be their own or someone else's.~~

5.2 Appropriate Opinions and Testimony by a Toxicologist

Through testimony and offering an expert toxicological opinion, it is appropriate for a toxicologist to offer the following. may:

- a) A toxicologist should discuss a laboratory report and any analytical work that supports that report. ~~Any~~ Applicable limitations should also be addressed.
- b) A toxicologist should 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) A toxicologist should address the pharmacokinetics/toxicokinetics ~~and/or, as well as the~~ pharmacodynamics/toxicodynamics of drugs or other chemicals.
- d) A toxicologist should discuss the toxicological impact of the presence ~~or~~ absence and/or stability of drugs or other chemicals.
- e) A toxicologist should 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) A toxicologist should 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 ~~or addressed if a range of elimination rates is used and if that extrapolation is supported by research and references, and applicable limitations are cited.~~

5.3 Inappropriate Opinions and Testimony by a Toxicologist

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

A toxicologist should not opine as to the absolute cause of death of an individual. ~~However,~~ This does not preclude a toxicologist from addressing the toxicological impact of ~~the any~~ substances found ~~in the toxicological analysis of specimens from the case. A toxicologist should not perform back extrapolation calculations of a drug concentration (other than ethanol).~~

- a) A toxicologist should not address behavioral intent based solely upon a drug concentration. ~~For example, a toxicologist should not offer an opinion as to a person's suicidal ideation versus accidental intoxication.~~

- b) A toxicologist should not opine as to ~~an~~ a specific individual's degree of impairment based solely on a quantitative result.
- c) A toxicologist should not imply impairment of an individual based on analytical findings from urine, hair or other matrices ~~when not~~ unless supported by the literature.
- d) A toxicologist should not opine as to the absolute cause of an accident.
- e) A toxicologist should not ~~address~~ perform back-extrapolation calculations for drugs other than ethanol.
- e)f) A toxicologist should not calculate the dose of a drug ~~consumed~~ based on a postmortem drug concentration in blood.
- f)g) A toxicologist should not ~~perform~~ calculate the dose of a drug (with the exception of ethanol) through body burden calculations ~~to determine dose.~~
- g)h) A toxicologist should not opine as to the effects of a drug or combination of drugs on a specific individual ~~or~~ without context of a given case. ~~However,~~ This does not preclude a toxicologist from addressing general effects of drugs at varying concentrations ~~as mentioned in~~ (Section 5.2.).
- i) A toxicologist should not use words such as "scientific certainty" or "reasonable degree of scientific certainty", unless required by jurisdictional regulations.

Annex A **(informative)**

Foundational Principles

~~It is common that expert witnesses are called in criminal and civil matters to discuss the topic of forensic toxicology, to include their expert opinions, when asked. 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 reliably applied to the facts of the case at hand. One way of ensuring that proper toxicological testimony is allowed in legal matters is to define the general areas of forensic toxicology that are viewed as reliable by other experts in the field.~~

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Annex B
(informative)

Bibliography

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

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