



# Jurisprudence Section - 2015

## F48 The Validity of Enzymatic Assay for Blood Alcohol Content (BAC) Determinations

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The goal of this presentation is to focus on the scientific issues concerning the limitations of Enzymatic Immunoassay (EIA) -based ethanol testing as well as the legal sufficiency and admissibility challenges that have occurred across the United States.

This presentation will impact the forensic science community by further spurring discussion in the legal community about the continued suitability of this assay when other, more specific assays are available.

BAC testing is crucially important in a Driving Under the Influence (DUI) prosecution. It is one of the fundamental pieces of, and often the only, evidence against a citizen who has been accused of a DUI. In the United States, there are three different types of methods used to provide for a BAC: breath testing, gas chromatography, and EIA (sometimes referred to simply as “hospital blood”).

Scientifically educated DUI defense attorneys have been successfully challenging the admissibility and the sufficiency of EIA evidence to form a conviction on a *per se* DUI BAC offense. These successful challenges simply point out the known limitations of the assay. The publication of these successful challenges has led many hospitals that offered EIA-based testing for BAC purposes to stop. In other jurisdictions, district attorney’s offices have ceased using EIA-based evidence due to various reasons such as an increase in costs due to the need to employ an expert to try to interpret and defend the EIA-based BAC evidence, a sense of justice and ethics, as well as the lack of expertise in their offices in successfully prosecuting such cases.

Mean ratio	± SD	Range	Sample Number	Reference
1.11	± 0.02	1.08-1.16	4	Hodgson, et al. 1985
1.14	± 0.02	1.09-1.18	50	Winek, et al. 1987
1.10	± 0.03	1.03-1.24	17	Jones, et al. 1990
1.15	± 0.041	0.88-1.59	211	Rainey 1993
1.14	± 0.04	1.04-1.26	235	Charlebois 1996
1.16	N/A	1.08-1.21	N/A	Iffland, et al. 1999

Table 1. Summary of alcohol concentration ratios for plasma and serum comparisons to whole blood

This chart shows the wide range of conversion factors. Such a wide range illustrates the difficulty in attempting to convert non-whole blood results to whole blood expressions. Additionally, it demonstrates that there is insufficient agreement in the scientific community as to an acceptable range of values.

It is incumbent upon the legal and medical communities to begin to understand the fundamental differences in the uses of BAC testing. In situations that require high degrees of confidence in the measures of BAC, such as in the case of criminal trials, only the most accurate and selective methods should be used to ensure that the guilty are not needlessly acquitted nor are individuals falsely convicted.

### Enzymatic Assay, DUI, BAC