The Top 20 Myths Of Breath, Blood, And Urine Tests — Part 2

By Leonard R. Stamm

Myth #10: Breath Test — Dentures Cannot Cause A False High Reading

Although many scientists contend that dentures do not trap alcohol that can contribute to a false high reading, a leading study on this remains controversial.

> Data was excluded from one female subject (#23) who had particularly poor fitting dentures and was unable to avoid swallowing during the dosing period.

Patrick Harding, et. al., *The Effect of Dentures and Denture Adhesives on Mouth Alcohol Retention*, 37 JOURNAL OF FORENSIC SCIENCE 999, 1002 (July 1992).

> Under these stringent experimental conditions, positive apparent BrACs occurring more than 15 min after alcohol expectoration were observed in 9 of the 24 subjects. Two subjects showed trace BrACs beyond 20 min.

Id. at 1006.

One of the individuals in another study had a breath sample of 70*u*g/100mL (Å .15) and a blood sample showed .05.

> Dental examination of the defendant showed that he had extensive work carried out, including three bridges. A possible explanation, therefore, for these anomalous results is that the excessive breath-alcohol concentrations might be due to mouth alcohol retained in the bridges or periodontal spaces. . . .

D.J.H. Trafford & H.L.J. Makin, *Breath Alcohol Concentration May Not Always Reflect the Concentration of Alcohol in Blood*, 18 (4) JOURNAL OF ANALYTICAL TOXICOLOGY 225, 225 (Jul.-Aug. 1994).

> Unless the law is concerned with convicting the many, while ignoring the few, this case demonstrates the desirability of offering all defendants the chance to have their breath-alcohol concentrations checked by analysis of blood or urine.

Id. at 228.

Myth #11: Breath Test — Slope Detectors Protect Against Mouth Alcohol Influencing A Result

Our experience with the Intoxilyzer 5000 has shown that its residual mouth alcohol

Editor's Note: This is the second and final part of this series. Part 1 appears in the August 2005 issue.

flagging program (that is, the slope detector) is not entirely reliable under the extreme experimental conditions employed in the present study. In this experiment we were able to obtain apparent BrACs as high as 0.18 g/210 L in spite of this feature. The slope detector was never intended to be a substitute for residual mouth alcohol detection and prevention protocols such as a pretest alcohol deprivation period and requiring agreement within 0.02 g/210 L for successive BrACs taken 2 to 10 min apart.

Patrick Harding, et. al., *The Effect of Dentures and Denture Adhesives on Mouth Alcohol Retention*, 37 JOURNAL OF FORENSIC SCIENCE 999, 1006 (July 1992). Translation: according to this author, slope detectors, designed to detect mouth alcohol, don't work.

Myth #12: Breath Test — Hematocrit Is Irrelevant To The Result

So you ask, what is hematocrit?

The hematocrit represents the fraction of whole blood composed of red cells and is correlated with the aqueous content of blood. The higher the hematocrit, the lower the concentration of water in blood, and vice versa. The average hematocrit for normal, healthy males is 47%, with a range of 40-54%; for females the average is 42% and the range is 36-47%. Since ethanol dissolves almost entirely in the aqueous component of blood, two individuals with identical actual BAC's but with different hematocrits would be expected to produce different Breathalyzer results. The person with the higher hematocrit, and therefore lower blood-water content, would necessarily be characterized by a higher concentration of ethanol in the aqueous component of his/her blood and consequently, by a higher Breathalyzer reading. Given that the Breathalyzer uses only one partition ratio, Smith and Payne et al. have predicted that the normal variation in hematocrit can produce errors in breath test results in the 10 to 14% range.

Dominick A. Labianca, *The Chemical Basis of the Breathalyzer*, 67 (3) JOURNAL OF CHEMICAL EDUCATION 259, 261 (March 1990).

Myth #13: Breath Test — Breath Tests Are Specific For Ethanol

Infra-red

A number of studies found substances that can interfere with an infrared testing device that were not picked up by the instrument.

> We conclude that the Intoxilyzer Model 4011 AS may exhibit significant interference when used for subjects previously exposed to lacquer or lacquer thinner fumes.

William Giguiere, David Lewis, Randall C. Baselt, Randall Chang, *Lacquer fumes and the Intoxilyzer*, 12 JOURNAL OF ANALYTICAL TOXICOLOGY 168, 168 (May-June 1988).

> Toluene alone can account for somewhere between 0.048 and 0.058 g/210L of the ostensible ethanol reading without causing the interference mechanism to trigger (Table 2), and this value would be below most legal threshold. However, if the signal resulting from toluene is augmented by the presence of genuine ethanol, the readout could exceed legal limits without activating the interference mechanism.

Jonathan P. Caldwell & Nick D. Kim, *The Response of the Intoxilyzer 5000 to Five Potential Interfering Substances*, 42 (6) JOURNAL OF FORENSIC SCIENCES 1080, 1084 (1997).

> The results of this study clearly indicate that all five substances tested for potential interference with the Intoxilyzer 5000 will interfere to some degree. Even so, the performance of this instrument is significantly better than that of the earlier model Intoxilyzer 4011AS-A. Four of the five compounds (toluene, the two xylenes, and isopropanol) are registered by this version of the Intoxilyzer as interferences by the instrument at given points in their concentration and one (methanol) is not. From the point of view of where this interference mechanism is triggered, the compounds can be ranked in terms of their probability (if present) of causing an undetected false-positive reading for ethanol in this order: methanol > toluene > the xylene > isopropanol.

Id. at 1086.

Giguiere, Lewis, and Baselt examined a 52-year-old male cabinet maker with a 20-year history of work-related exposure to lacquers and paint thinners. At 3:36 p.m he received a test reading of 0.369 percent digital, 0.312 percent printout (w/v) on an Intoxilyzer 5000, with the printout indicating "interferent subtracted." At 3:48 p.m., 0.273 percent digital, 0.245 percent on the printout, also indicating "interferent subtracted." A blood sample drawn at 3:40 p.m. indicated ethanol 0.0 percent, acetone 0.025 percent (w/v), and toluene 11 mg/L.

> Although the highest apparent blood alcohol concentration (0.31 % w/v) given by the Intoxilyzer for this subject is 282 times that of the actual blood toluene concentration, because toluene exhibits a blood:breath ratio that is 116 to 300 times less than that of alcohol, and because it demonstrates significant infrared absorption at the 3.50 Å 0.06 micron wavelength used by the Intoxilyzer 5000, we consider it likely that toluene caused the instrumental interference observed in this case.

Mary Anne Edwards, William Giguiere, David Lewis & Randall C. Baselt, *Intoxilyzer Interference by Solvents*, 10 (3) JOURNAL OF ANALYTICAL TOXICOLOGY 125, 125 (May-June 1986).

> Diethyl ether vapor may substantially interfere with breath alcohol analysis by instruments based on infrared absorption at 9.5 *u*m.

C. M. Bell, S. J. Gutowski, *Diethyl Ether Interference with Infrared Breath Analysis*, 16 JOURNAL OF ANALYTICAL TOXICOLOGY 166, 166 (1992) (Draeger Alcotest 7110).

> . . . IR analysis for breath-alcohol at 9.5 *u*m . . . would not provide a foolproof solution. Common

volatile organic compounds other than ethanol, which occur for example, in solvents, perfumes, and food, also contain carbon-oxygen functionality and exhibit IR absorption bands that overlap this wavelength. Included among these are the following: other alcohols, esters, . . .and ethers . . .

Dominick A. Labianca, *How Specific for Ethanol is Breath-Alcohol Analysis Based on Absorption of IR Radiation at 9.5 um?,* 16 JOURNAL OF ANALYTICAL TOXICOLOGY 404, 405 (Nov.-Dec. 1992).

Fuel Cell

The Alcolmeter device makes use of an electrochemical detector for the determination of ethanol. The alcohol present in a measured volume of breath is oxidized at a platinum electrode surface to generate an electric potential which can be registered. The detector is not specific for ethanol. It gives a response to methanol, *n*-propanol, isopropanol, and acetaldehyde but is insensitive to acetone.

A.W. Jones, *Evaluation of Breath-Alcohol Instruments III. Controlled Field Trial with Alcolmeter Pocket Model*, 28 FORENSIC SCIENCE INTERNATIONAL 147, 148 (1985). This is consistent with a study published on the Intoximeter Web site.

Myth #14: Breath Test — Truncating To Two Digits Favors The Defendant

In many, if not most jurisdictions, two readings are taken and the lowest three-digit reading is truncated, leaving two digits as the reported reading. The government argues this favors the defendant and removes uncertainty in the test reading. Dr. Dubowski argues the third digit is irrelevant because the instrument is not capable of accurately reporting to three digits.

> Figure 8 illustrates the uniform distribution of the third digits of field BrACs in g/210L. Gullberg also reported an essentially uniform distribution of third digits in field forensic breath alcohol testing. In truncating to two digits from three digits, the omitted third digits follow a uniform distribution. Third digits are discrete random variables with an equal probability of being 0, 1_.9. An unknown third digit is as likely to be 9 as 0. Truncating BrAC measurements in g/210L to two decimal places does not introduce bias other than the intended deletion of the third digit.

Kurt M. Dubowski & Natalie A. Essary, *Measurement of Low Breath-Alcohol Concentrations: Laboratory Studies and Field Experience*, 23 JOURNAL OF ANALYTICAL TOXICOLOGY 386, 394 (October 1999), *citing*, R.G. Gullberg, *Distribution of the Third Digit in Breath Alcohol Analysis*, 36 JOURNAL OF FORENSIC SCIENCE 976 (1991).

Dr. Jones takes a different approach, noting that truncating unevenly favors those who have a higher third digit.

> In some jurisdictions rules and regulations for evidential breath-alcohol testing mandate that the lowest of the two independent breath-tests is used for prosecution. Also the third decimal is frequently truncated so that 0.109 g/210 L becomes 0.10 g/210 L. However, these safeguards do not help the person who by chance might have the same BrAC result in the two independent breath-tests or when the third decimal might have been zero.

A.W. Jones, *Medicolegal Alcohol Determinations — Blood — or Breath-Alcohol Concentration?*, 12 FORENSIC SCIENCE REVIEW 23, 42 (Jan. 2000).

Myth #15: The Alcohol Tested Is Alcohol The Defendant Drank

Alcohol Swab Is Okay

A recognized source of physical contamination is the use of alcohol containing swabs to disinfect the area of specimen collection in the living patient. This method of specimen contamination is well documented in the literature (Heise, 1959; Taberner, 1989; Goldfinger and Schaber, 1982) with appropriate admonitions against using alcohol swabs for this purpose.

William H. Anderson, *Collection and Storage of Specimens for Alcohol Analysis,* MEDICAL-LEGAL ASPECTS OF ALCOHOL 237, 239 (James C. Garriott ed., 4th ed. 2003).

Endogenous Alcohol

If for some reason large quantities of ethanol are synthesized in the gastro-intestinal tract and overwhelm the capacity of the alcohol-metabolizing enzymes in the liver, then much higher concentrations of EE should appear in the peripheral venous blood. This is exactly what was described in a group of Japanese subjects who were suffering from various disorders of the gut. Some had previously complained of experiencing feelings of drunkenness even without consumption of alcohol. This condition seemed to appear after the subjects had eaten a carbohydrate-rich meal, such as rice. This study from Japan was difficult to fault because ethanol was identified in the blood, urine, and breath with the aid of a reliable gas chromatographic method for quantitative analysis.

Alan W. Jones & Barry K. Logan, *DUI Defenses*, DRUG ABUSE HANDBOOK 1006, 1016 (Steven B. Karch ed., 1988).

> The term used to describe this abnormal production of EE was 'autobrewery syndrome' and to our knowledge this has only been observed in Japanese subjects. It is widely known that the activity of alcohol metabolizing enzymes, especially aldehyde dehydrogenase, is different in Oriental populations compared with Caucasians, which might render Japanese and other Asians less able to clear ethanol from the portal blood. Other requirements before 'autobrewery syndrome' should be seriously considered as contributing to a person's BAC include genetic predisposition (Oriental origin), a past history of gastrointestinal ailments, documented medical treatment for the problem, low tolerance to alcohol, and reports of fatigue and drunkenness after eating meals.

Id. at 106.

Candida Albicans

In this experiment *Proteus vulgaris* and *a*-streptocci produced relatively little ethanol, and this

production was eliminated or reduced to undetetectable levels by flouride. However, *Candida albicans* produced a much greater amount of ethanol, and this production was not at all inhibited by flouride.

Philip Blume & David J. Lakatua *The Effect of Microbial Contamination of the Blood Sample on the Determination of Ethanol Levels in Serum*, 60 AM. J. CLIN. PATH. 700, 701 (Nov. 1973).

> Glendening and Waugh cite studies indicating the usefulness of fluoride in preserving specimens of blood from which ethanol determinations are to be made. Blackmore and Pleuckhalm and Ballard, reviewing the literature and presenting the result of their own extensive studies, point out the effect of microbial contamination on the production of ethanol in specimens of blood. They both suggest the use of sodium fluoride at a concentration of 1% for the preservation of blood specimens. While this is a worthwhile precaution, it appears that care should be taken to assure the sterility of the specimens nonetheless.

Id.; *but see*, A.W. Jones, L. Hylen, E. Svensson & A. Helander, *Storage of Specimens at +4°C or Addition of Sodium Fluoride (1%) Prevents Formation of Ethanol in Urine Inoculated with Candida Albicans*, 23 JOURNAL OF ANALYTICAL TOXICOLOGY 333 (1999).

Myth #16: Blood Test — Enzyme Tests Are Reliable Enough To Quantify Alcohol

There are important differences between gas chromatographic and enzymatic procedures, which have an impact on this case. Gas chromatography (GC) is the preferred method because of its higher selectivity for ethanol, which allows positive identification by comparison of retention time with known standards. Mass spectral analysis would definitely prove the presence of ethanol. Enzymatic assays are less specific than GC for the analysis of ethanol. For example, both n-propanol and isopropanol are good substrates for ADH. Certain metabolic disturbances such as lactic acidosis create problems when automated enzymatic assays are used, which may lead to false positive test results.

B.K. Logan & A.W. Jones, *Endogenous Ethanol Production in a Child with Short Gut Syndrome*, 36 (3) JOURNAL OF PEDIATRIC GASTROENTEROLOGY 419, 419-20 (March 2003).

> Indeed, the risk of hyperlactacidemia in short-gut syndrome was mentioned by Dahshan and Donovan, who found no measurable d-lactate in their patient. They failed, however, to report l-lactate, pyruvate, acetaldehyde, or other endogenous metabolites, all which measurements are important to the assurance that EE is truly elevated in their patient.

Id. at 420.

> In the forensic laboratory, biochemical methods are not usually used for determining blood alcohol due to their lack of total specificity. Isopropyl alcohol and butyl alcohol interfere in the reaction. For forensic purposes, enzyme methods must be confirmed by an alternate technique. (Garriott, 1983).

Richard F. Shaw, *Methods for Fluid Analysis*, MEDICAL-LEGAL ASPECTS OF ALCOHOL 213, 217 (James C. Garriott ed., 4th ed. 2003).

> The development of enzymatic assays based on the catalysis of ethanol to acetaldehyde and on the correlation of the rate of conversion of coenzyme NAD to NADH with ethanol concentration, as well as the assays' availability in kit form for use on automated instruments, has simplified the task of ethanol determination. These assays, as exemplified by the Syva, Abbott, and Roche enzymatic assays are rapid, sensitive, and cost-effective. However, high serum-lactate and LDH concentrations appear to interfere in some of these assays, resulting in false-positive ethanol values.

Jeffrey S. Nine, Michael Moraca, Mohamed A. Virji & Kalipatnapu N. Rao, *Serum-ethanol Determination: Comparison of Lactate and Lactate Dehydrogenase Interference in Three Enzymatic Assays*, 19(3) JOURNAL ANALYTICAL TOXICOLOGY 192, 194 (May-Jun 1995).

> The authors' conclusion is misleading to law enforcement agencies, attorneys, and even some pathologists because the average individual found driving under the influence or even an intoxicated person with traumatic injury does not match the pathology or the LDH and lactate concentrations described in this article. We would like to caution the forensic community that such a conclusion does not apply to situations in which an injured driver has received lactated Ringer's solution intravenously prior to having his blood taken for a blood alcohol test.

Charles Winek & Wagdy Wahba, *A Response to "Serum-ethanol Determination: Comparison of Lactate and Lactate Dehydrogenase Interference in Three Enzymatic Assays,"* 20 JOURNAL ANALYTICAL TOXICOLOGY 211, 211 (May-Jun 1996).

> Our study showed the effect that abnormally high concentrations of lactate dehydrogenase (LDH) and lactate could have on one specific analytical method, which was then in use for the determination of serum/plasma ethanol concentrations. . . . The conclusions drawn in our paper applied to the cases in the report. The mechanism of interference in the assay was investigated in the laboratory to obtain an understanding of the biochemical basis for the falsely elevated ethanol concentrations at which the effect was observed; we suggested possible approaches to minimize or eliminate the interference. . . .The effect on Ringer's lactate was not investigated.

Jeffrey S. Nine, Michael Moraca, Mohamed A. Virji & Kalipatnapu N. Rao, *The Authors Reply to, A Response to "Serum-ethanol Determination: Comparison of Lactate and Lactate Dehydrogenase Interference in Three Enzymatic Assays,"*

20 JOURNAL OF ANALYTICAL TOXICOLOGY 211, 211 (May-June 1996).

Myth #17: A Urine Test Can Reliably Measure Alcohol

> There is massive documentation that the blood alcohol concentration cannot be established sufficiently reliably for forensic purposes from the alcohol concentration of a pooled bladder urine specimen because of the extensive variability of the blood:urine ratio of alcohol.

Kurt M. Dubowski, *Absorption, Distribution and Elimination of Alcohol: Highway Safety Aspects*, 10 J. STUD. ALCOHOL SUPPL. 98, 102 (1985).

> The overall average urine ethanol to blood ethanol ratio was 1.57:1 with a range of 0.07 to 21.0:1. The actual value of the ratio is unimportant. The wide range however, indicates the high probability of a large error being introduced into the calculation of a blood ethanol value from a urine ethanol concentration when using an average value for the ratio of urine to blood ethanol concentration. . . . Based on the data presented, the unreliability of using a urine ethanol concentration to predict a blood ethanol concentration cannot be questioned.

Charles L. Winek, Kathy L. Murphy, & Tracy A. Winek, *The Unreliability of Using a Urine Ethanol Concentration to Predict a Blood Ethanol Concentration*, 25 FORENSIC SCIENCE INTERNATIONAL 277, 280 (1984).

Myth #18: Extrapolation Backwards Is Accepted In The Scientific Community

> Among the major reasons for the infeasibility of retrograde extrapolation, three stand out:
>
> (1) lack of knowledge, usually, about the timing of the alcohol concentration peak and absorption-post-absorption status;
> (2) ignorance about the mathematical characteristics (e.g. linear, pseudolinear, exponential) and the mean rate of change of the individual's blood or breath elimination curve; and
> (3) unpredictable irregularities of the curve, especially short term fluctuations from the best-fit trend line of the blood or breath alcohol curve.

Kurt M. Dubowski, *Absorption, Distribution and Elimination of Alcohol: Highway Safety Aspects*, 10 J. STUD. ALCOHOL SUPPL. 98, 103 (1985).

> Extrapolation of a later alcohol test result to the time of the alleged offense is always of uncertain validity and therefore forensically unacceptable.

Id. at 106.

Myth #19: The Test Result Is Traceable To NIST

> When simulators are used for control tests . . . at least two variables controlling the control target value need to be checked and properly validated: the ethanol concentration of the aqueous simulator solution and the simulator temperature at which the alcohol equilibration occurs. The former is a laboratory task in which the ethanol standards used should be traceable to National Standards and Technology (NIST) SRM 1828. The latter must necessarily be performed at the test site at the time of the control test; it should be done by thermometry using a device with calibration traceable to a NIST certified thermometer, such as NIST SRM 934.

Kurt M. Dubowski, *Quality Assurance in Breath-Alcohol Analysis*, 18 JOURNAL OF ANALYTICAL TOXICOLOGY 306, 310 (Oct. 1994).

> It is advisable to check all prepared standards versus a certified reference standard available from the National Institute of Standards & Technology (NIST SRM 1828) or College of American Pathologists (CAP Certified Alcohol Standard Solutions). . . Each new set of standards should be verified against the standards in current use as well as the certified reference material.

Barbara J. Basteyns & Graham R. Jones, *Quality Assurance*, MEDICOLEGAL ASPECTS OF ALCOHOL 229, 232 (James C. Garriott, 4th ed. 2003).

> Merely having an instrument or artifact calibrated at NIST is not enough to make the measurement result traceable to reference standards developed and maintained by NIST. To establish traceability to such reference standards there must be an unbroken chain of comparison and each provided measurement must be accompanied by a statement of uncertainty. The measurement system by which values are transferred must be clearly understood and under control. The dates and details of each link in the chain must also be provided.

State v. Jagla, slip. op. at 6-7 (King County District Court, Washington) (June 17, 2003)(emphasis in original), *quoting from, http://ts.nist.gov/ts/htdocs/230/233/calibrations/Policies/policy.htm.*

> We find that in order to be admissible under WAC 448_13_040, _035, and RCW 46.61.502, the thermometer in the breath test must be tested against a thermometer traceable to standards maintained by NIST. To be traceable, the uncertainties must be measured and recorded at each level. Given the posture of the cases before us, we do not reach whether substantial compliance would be sufficient. As the State has not established that the uncertainties had been measured and recorded, it has not met its foundational burden, and therefore the trial courts did not err in excluding the tests.

City of Seattle v. Clark-Munoz, 93 P.2d 141, 146 (Wa. 2004) (*en banc*).

Myth #20: The Test Result Is Based On Science — Not Secrets

> 11.9 Retention of Records
> Records should be retained as long as practical, but for at least 5 years. Records should include a copy of the report, request and custody forms, work sheets, laboratory data, quality control and proficiency testing records.

SOFT/AAFS Laboratory Guidelines (2002).

> Instrument output, laboratory worksheets and reports, internal and external proficiency testing results should be retained for as long as the results of the analysis may be required in court, which could be for many years.

Barbara J. Basteyns & Graham R. Jones, *Quality Assurance*, MEDICAL-LEGAL ASPECTS OF ALCOHOL 229, 233-34 (James C. Garriott, 4th ed. 2003).

There are a number of articles written and guidelines published about the need to follow minimum standards of quality control and assurance in scientific testing in order to provide minimum levels of assurance about the reliability and accuracy of test results. Frederic Whitehurst, a former expert in explosives at the FBI laboratory, and lawyer, who achieved prominence in the late 1990s for his disclosures of incompetence and fraud in that laboratory, has written an article detailing the minimum requirements for quality control and quality assurance in a scientific laboratory. He lists ten requirements for types of records that should be kept by the laboratory, and should be requested by and provided to defense counsel in a criminal case. F. Whitehurst, *Forensic Crime Labs: Scrutinizing Results, Audits & Accreditation*, THE CHAMPION 6 (April & May 2004).

In the field of toxicology, Dr. Dubowski has written an article titled, *Quality Assurance in Breath Alcohol Testing*, 18 J. ANALYTICAL TOX., 306 (1994). The abstract of his article states:

> Evidential breath-alcohol testing requires an adequate quality assurance (QA) program to safeguard the testing process and validate its results. A comprehensive QA program covers (a) test subject preparation and participation; (b) the analysis process; (c) test result reporting and records; (d) proficiency testing, inspections, and evaluations; and (e) facilities and personnel aspects. Particularly important are the following necessary scientific safeguards as components of quality control: (a) a pretest deprivation-observation period of at least 15 minutes; (b) blank tests immediately preceding each breath-collection step; (c) analysis of at least duplicate breath specimens; and (d) a control test accompanying every subject test.

Id. at 306. *See also*, *Cole v. State*, 378 Md. 42, 835 A.2d 600 (2003)(defendant was entitled to discovery of testing laboratory's standard operating procedures, including quality assurance manual, calibration record for gas chromatograph/mass spectrometer (GCMS) used by chemist to test the substance, and discovery of the chemist's own proficiency testing records).

Has anyone from the defense side yet seen and evaluated the algorithms and logarithms used in the breath test computer programs, the software, the computer programs, or the testing done on the equipment? History has shown that defendants can never take for granted what government scientists claim is good science.

Conclusion

As defense lawyers, it is our duty to challenge government science, especially when there are other scientists in the field who criticize the status quo. In the interest of protecting the public from drunk drivers, have legislatures, too, readily blinded themselves to shoddy science? Have courts been able to convict the innocent by failing to properly account for uncertainty in science? It seems certain. Many scientists do recognize these problems.

> While the percentage of overestimates and underestimates of actual BAC can give some indication of the reliability of breath analysis, the most important piece of information for legal purposes is the amount of error or uncertainty expected in an *individual's* BAC result. In a legal situation, the question is whether or not a particular defendant had a BAC in excess of some limit, not what percentage of people in general have actual BAC overestimated or underestimated.

G. Simpson, *Incorrect Overestimates of Blood Alcohol Concentration from Breath Test Results*, 14 (4) JOURNAL OF ANALYTICAL TOXICOLOGY 263, 264 (1990).

> [A] more acceptable way would be to make a subtraction from the mean analytical result with this deduction being derived from statistical considerations of variability as a function of alco-

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Criminal Justice Standards and Goals, Police (1973).

13. State v. Lindsey, 473 N.W.2d 857 (Minn. 1991); State v. Valencia, 93 N.J. 126, 459 A.2d 1149 (1982); *but see* White v. State, 842 So.2d 565 (Miss. 2003).

14. Smith, *Press One For Warrant: Reinventing The Fourth Amendment's Search Warrant Requirement Through Electronic Procedures*, 55 VAND. L. REV. 1591, 1608-1609 (2002).

15. Lane, *Telephonic Search Warrants Under The Oregon Constitution: A Call For The Limitation Of Exigent Circumstances*, 24 WILLAMETTE L. REV. 967, 982 (1988).

16. Benner & Samarkos, *Searching For Narcotics In San Diego: Preliminary Findings From The San Diego Search Warrant Project*, 36 CAL. W. L. REV. 221, 223 (2000).

17. U.S. v. Alvarez, 810 F.2d 879, 882, n.4 (9th Cir. 1987).

18. U.S. v. Santa, 236 F.3d 662, 673-74 (11th Circ. 2000)(footnote omitted).

19. U.S. v. Patino, 830 F.2d 1413, 1416 (7 Cir. 1987)

20. Johnson v. United States, 333 U.S. 10, 13-14, 68 S.Ct. 367 (1948).

21. 384 U.S. 757, 86 S.Ct. 1826 (1966).

About the Author

John Henry Hingson III is a Past-President of NACDL (1993-1994) and the author of HOW TO DEFEND A DRUNK DRIVING CASE (Clark Boardman 1991). Regarded as a foremost expert on the use of state constitutional law in criminal defense, he was able to get a court to suppress a breath test result based on the failure of the police officer to make application for a telephonic search warrant. Co-counsel in *U.S. v. Kyllo*, where the U.S. Supreme Court declared the warrantless use of a thermal imager on a home violated the Fourth Amendment, Hingson is famous for his cross-examination skills.

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> hol concentration .... Note that here a 99.9% confidence limit is appropriate in keeping with a 'beyond a reasonable doubt' standard in criminal cases.

Alan W. Jones, *Medicolegal Alcohol Determinations — Blood — or Breath-Alcohol Concentration?*, 12 Forensic Science Review 23, 42 (Jan. 2000); *see also, Schlup v. Delo*, 513 U.S. 298, 325 (1995).

> Indeed, concern about the injustice that results from the conviction of an innocent person has long been at the core of our criminal justice system. That concern is reflected, for example, in the 'fundamental value determination of our society that it is far worse to convict an innocent man than to let a guilty man go free.' *In re Winship*, 397 U.S. 358, 372, 90 S.Ct. 1068, 1077, 25 L.Ed.2d 368 (1970) (Harlan, J., concurring). See also T. Starkie, Evidence 756 (1824) ('The maxim of the law is ... that it is better that ninety-nine ... offenders should escape, than that one innocent man should be condemned').

These concepts seem to get lost in court where test results are deemed relevant under a preponderance standard and then converted to proof beyond a reasonable doubt by *per se* laws. It is critical that judges and juries be educated as to this slight of hand practiced by the courts. When facing expert testimony expressed in measures of uncertainty defined by standard deviations from a mean or by a probability, we have to question whether the scientific level of uncertainty expressed by the expert and accepted by the court comports with the legal level of certainty that is required to satisfy due process.

It is our duty to educate legislators, judges, juries, prosecutors, police, other defense lawyers, our clients, and the public, so that in the end courts will not convict based on questionable science. ■

About the Author

Leonard R. Stamm has been defending DWI cases since 1984. He is recognized as an authority in the area of drunk driving defense and Motor Vehicle Administration hearings in Maryland. He has been qualified as a practitioner and instructor in standardized field sobriety tests in accordance with standards set forth by the International Association of Chiefs of Police (IACP) and the National Highway Traffic Safety Administration (NHTSA). He is a former President of the Maryland Criminal Defense Attorneys Association.

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VERBATIM

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them. Clearly, much remains to be done.

But it's important to remember that within these interesting times in which we live, each and every one of you makes a difference. You do it because you care. Because you believe as Thomas Jefferson did that "a society that will trade a little liberty for a little order will deserve neither and will lose both."

And you make that difference by fighting for the rights guaranteed in the Bill of Rights.

You make that difference in the quality of representation provided to your clients, and you make that difference ultimately in the lives of your clients.

And you do it day after day — often with little appreciation from the courts or the public.

I always feel like I'm home with family whenever I am with criminal defense attorneys — with people who devote their energy, their intellect and their hearts to the work you do and the clients you represent. As I look around this room, I see the sort of heroes I tell my students about.

I am honored to be your President for this year. Every president is different. It is humbling and very hard to follow Barry Scheck. But each one of us has different strengths that we bring to the job. I pledge to do my best — and with all your help, we will be a force to be reckoned with. ■