P&A Newsletter

PAPE & ASSOCIATES, INC.

Specializing in Toxicology

TOXICOLOGY REPORTER

Criminal Charges

DRUG-RELATED TOPICS

Possession vs. Distribution

Total Net Weight of a Drug

Clandestine Drug Laboratory

Drug-related Death

Probationary Drug Testing

Drug-related Discovery

Retesting for Drugs

Aggressive Behavior

Foreseeability of Risk

DWI-Drugs

ALCOHOL-RELATED TOPICS

Breath Alcohol Testing

Field Sobriety Testing

CROSS-EXAMINATION

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Dr. Brian Pape specializes in toxicology and related sciences. From 1986 to 1997, he held a faculty appointment as Clinical Associate Professor of Pathology, University of Massachusetts School of Medicine.

From 1982 to 1985, he was Senior Associate Consultant for Mayo Clinic (Rochester, MN) and Director of Toxicology at New England Toxicology Services (Woburn, MA).

From 1973 to 1982, Dr. Pape was Director of Toxicology and Associate Professor in the Department of Pathology at the University of Missouri School of Medicine (Columbia, MO), where he was a member of the Emergency Room Committee, Environmental Trace Substances Research Center Advisory Committee, Medical School Committee on Pathogens-Toxins-and-Carcinogens, and the Technical Advisory Committee of the Missouri Association of Crime Laboratory Directors.

Dr. Pape has published papers, abstracts, and professional articles relating to alcohol and drugs, pesticides and toxic chemicals, analytical chemistry, forensic science, and general toxicology. He currently writes the *Toxicology Reporter.*

He has served as a technical and expert consultant to business, labor, and governmental agencies; and he has been qualified as an expert in toxicology and related sciences in State and Federal Courts.

His expertise has been recognized by American Men and Women of Science, Who's Who in Technology Today, Who's Who in Medicine/Healthcare, and the scientific honorary Sigma Xi.

Board-certifications include the American College of Forensic Examiners (BCFE) and the American Board of Forensic Medicine (BCFM).

Dr. Pape has testified in State and Federal Courts on a wide range of issues relating to clinical, analytical, and forensic toxicology. He has also consulted regarding risk assessment, reliability of laboratory testing, and pre-trial evaluation of expert testimony.

While most of Dr. Pape's work involves civil litigation, he does accept some cases that include review, consultation, and testimony in criminal matters.

To request additional copies of this or future newsletters or Dr. Pape's participation in a CLE program, fax him at 800-736-9096. Dr. Pape can also be reached at 800-736-0503.

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The discussions of topics relating to criminal charges are intended to assist attorneys considering technical and scientific issues. The information provided does not necessarily reflect Dr. Pape's opinions.

OTHER P&A NEWSLETTERS

Absorption, Distribution, and Elimination of Alcohol and Drugs … and approaches to the interpretation of premortem and postmortem alcohol and drug test results

Alcohol-Drugs-and-Accident-and-Death

Liquor Liability – Dram Shop

Scientific and Technical Review

Toxic Torts

Drug-related Topics

Possession with intent to distribute or personal use?

Expert testimony by a toxicologist might include the following:

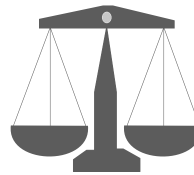
- Calculation of the total amount of drug attributable to the defendant (based on the total net weight and the percentage purity)
- Review of pre-arrest medical, social service, and other records relating to drug use and/or treatment for drug abuse
- Review of the post-arrest records relating to complaints or treatment of drug withdrawal or drug abuse or positive drug tests
- Reasonable estimates of total drug use based on different patterns of drug abuse
- Estimation of the money required to sustain different patterns of drug use and economic or other incentives or motives associated with larger purchases of drugs
- Review of the relationship between potential patterns of drug use, the amounts of drug(s) used, drug packaging, and drug paraphernalia

How would you evaluate the following case based on a defense of personal use?

- Less than 1 gram of cocaine on the person (four bags, each containing 1/4th gram)
- A history of prior drug use
- No drug paraphernalia in the residence
- No guns-beepers-books-wads of cash
- Post-arrest drug counseling-treatment-etc.
- A legitimate means of paying for the habit
- A total weight that is less than the lowest mandatory sentencing guideline

Is there a better case? What are the "extras"?

- A favorable appearance and demeanor
- A consistent medical/psych/social record
- Positive post-arrest drug test results
- Post-arrest drug withdrawal or counseling
- Lower weights of drug and fewer packages
- Character witnesses and family



What is the total net weight of drug?

Discovery: If a case involves a "close call" regarding the actual total net weight of a drug, discovery should include the following:

Written SOPs and test procedures

All test data and records relating to the interpretation of test data including the results of screening tests for the presence of drug in multiple packets and the weights of the physical evidence used for the testing

Quality assurance records including the certification-maintenance-and-verification of the scale(s) used to weigh the drugs

Random Sampling: Random sampling-and-testing of a fraction of the total number of drug packets is sometimes used to provide a basis for a conclusion that all the packets contain the drug and that the total net weight for all packets can be accurately estimated.

One approach to random sampling is to test the number of packets equal to the square root of the total number of packets:

# Packets	*Square Root*
16	*4*
25	*5*
64	*8*

Some crime laboratories use random sampling in a way that is unreliable for one or more of the following reasons:

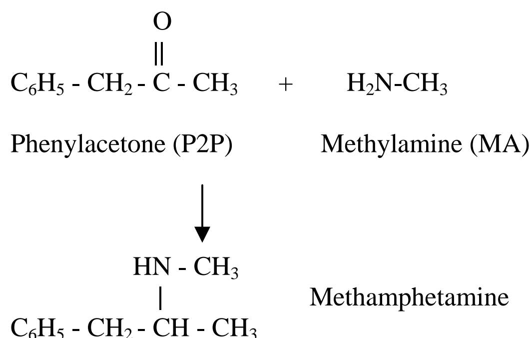
*Given the size of the random sample or the differences in the weights of the sample packets or a comparison of the estimated total net weight with the ***mandatory sentencing guidelines, the random sample is sometimes too small to meet a requirement for testimony based on a reasonable degree of scientific certainty.*

Sometimes the physical appearance of some packets is substantially different from others or there is good reason to believe that some packets contain different weights of drug.

A *boxed* methamphetamine lab?

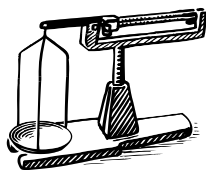
What quantity of methamphetamine was the laboratory capable of producing?

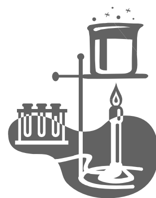
Background: Clandestine drug laboratories have commonly "cooked" methamphetamine using a recipe that requires two restricted or regulated chemicals: phenylacetone (P2P) and methylamine (MA):



If the laboratory has the necessary equipment, a suitable environment, P2P and MA, and other more readily available chemicals, the quantity of methamphetamine that can be produced is determined by the amounts of P2P and MA.

The criminal charge: John Doe was charged with conspiracy to produce methamphetamine. The prosecution emphasized the underlying DEA "sting" operation and the physical evidence.





Case-specific facts: Based on evidence acquired as the result of a reverse DEA sting that included providing suspects with 16 liters of 40% MA, a search warrant was issued for a retail storage shed. The shed contained the following:

- Miscellaneous *boxed* glassware
- Boxes of aluminum foil
- Hydrochloric acid and lye
- Empty bottles of 190-proof ethanol
- One gallon bottle containing $1/10^{th}$ oz. MA

Allegations: The government alleged that the laboratory was capable of producing very large quantities of methamphetamine. *Based on the reaction of P2P and methylamine and assuming 4 gallons of MA, the government's expert testified that the laboratory was capable of producing at least about 10 pounds of methamphetamine. The expert testified that the calculation of the amount of methamphetamine the laboratory was capable of producing was based on a published chemical procedure that was entered into evidence as a trial exhibit. This trial exhibit proved to be a subject of cross-examination and subsequent testimony by the defendant's expert.*

Does the physical evidence represent a *boxed* clandestine drug laboratory capable of producing a lot of methamphetamine or just a bunch of boxes filled with glassware?

Testimony by the government's expert: The expert used the reference and an assumption of a gallon of MA as foundation for testimony that the *boxed* laboratory was capable of producing several pounds of methamphetamine.

Note: The government's expert also testified that P2P and MA were both difficult to obtain and expensive and that it was common practice to store P2P and MA in different locations.

Cross-examination emphasized the expert's reliance on the reference method and the fact that P2P and other chemicals were not found in the storage shed.

Testimony by the defendant's expert: The reference method relied on by the government's expert was read into the record and interpreted:

P2P, MA, ethanol, aluminum grit, and mercuric chloride are added to … and then refluxed for two hours … and then cooled by … the pH is adjusted with … and then extracted … the ether solution is dried over anhydrous sodium sulfate… the ether is evaporated … and the residue is purified by vacuum distillation to obtain methamphetamine free-base. The free-base is then be converted to the hydrochloride or sulfate salt.

The expert then compared the requirements of the reference method with the physical evidence in the storage shed and the shed's environment. This comparison was summarized as a table comparing the requirements of the reference method with the case evidence.

Requirements versus Capabilities

	Present as Physical Evidence	
Requirement	Yes	No
P2P (phenylacetone)		No
MA (methylamine)	Yes (1 gram)	
Ethanol		No
Al grit or foil	Yes	
Mercuric chloride		No
Heat source		No
Glassware, misc.	Yes	
Condensation equip.		No
Distillation equip.		No
Electricity		No
Ether		No
Sodium sulfate		No
Vacuum equip.		No

Case Report of Drug-related Death

Did the deceased's use of heroin he got from John Doe kill him?

The deceased was last seen in the company of John Doe. The M.E. reported the following:

Time of death: 48 hours prior to autopsy

Physical findings: No apparent anatomic or clinical cause of death; moderate pulmonary edema; early stage decomposition. Blood from an unspecified site was collected for alcohol and drug testing.

Toxicology Test Results

Cocaine	250 ng/ml
Benzoylecgonine	900
Morphine	50
Monoacetylmorphine	Present

The medical examiner testified that death was due to opiate and cocaine intoxication and that the consumption of heroin was a substantial contributing factor.

Cross-examination of the M.E. included the following defense positions:

- The lab's records regarding the quantitative tests for drugs in blood were nearly non-existent
- Postmortem decomposition likely caused the redistribution of drugs, leading to higher drug concentrations in blood
- The postmortem concentration of cocaine was reduced due to chemical decomposition to benzoylecgonine
- A proper set of samples including injection sites, nasal swabs, and other physical evidence was not collected
- The test results and trial testimony did not establish how, when, where, how much, by what route, or in what order cocaine and heroin were last used by the deceased
- The only link to heroin (i.e. the reported presence of monoacetylmorphine, MAM) was suspect because of the absence of any laboratory data supporting the detection of MAM
- The autopsy findings were not indicative of one drug class … either drug could have caused death
- The deceased's medical history was not known
- The autopsy was incomplete
- No physical evidence specifically linked the postmortem drug results to John Doe

In this case, the defense attorney was challenged to control the cross-examination of the M.E. and explain to the jury why the actual cause of death is highly speculative.

Cornerstones of cross-examination

Cornerstones of cross-examination include knowledge of case facts and related sciences, **confidence** in the basis for cross-examination, **anticipation** of the expert's response, and **control** of the witness's responses.

Probationary Drug Testing

The reliability of urine drug tests and the interpretation of test results

Immunoassay tests are the frequently used by probationary agencies or offices to test for drugs in urine. These tests are frequently referred to as screening tests. **Confirmation tests** employing a different and more specific method are rarely performed to verify a positive screening test. The most widely accepted confirmation method is gas chromatography-mass spectrometry.

Test reliability is best assessed by a review of factors that include specimen collection and security, test methods, quality assurance, and results review. For example …

A false positive result *refers to a specimen that tested positive when it should have tested as a negative.*

A false negative result *refers to a specimen that tested negative when it should have tested as a positive.*

While a positive screening test is sometimes considered sufficient to establish probable cause for a finding of prohibited drug use, other inferences would usually be considered much more speculative. A true positive urine drug test result means that the person consumed sufficient drug to account for the presence of drug or drug-metabolite in urine. However, in the absence of case-specific assumptions or reliable evidence, a positive test usually does not establish . . .

- when the drug was last taken
- how the drug was last taken
- how much drug was last taken
- the drug concentration in urine
- the drug concentration in blood
- the effect(s) on a person

When immunoassay screening tests are used, a numerical test value reflecting the instrumental response to a test specimen is not a reliable measure of the concentration of the drug or drug metabolite. And, a series of positive urine drug tests does not necessarily establish the continued use of a drug.

Points of comparison: Workplace drug testing programs usually rely on a more rigorous set of procedures, test methods, and documentation. For example, most workplace programs rely on adherence to and documentation of . . .

- specimen collection procedures
- security and chain of possession
- screening tests with pre-defined cut-offs
- confirmation by GC-MS
- medical/drug/results review by an MRO
- split-specimen retesting options
- laboratory quality assurance

FYI, federally mandated urine drug testing guidelines administered by SAMHSA have long-recognized that positive urine morphine and codeine drug test results could be due to the consumption of poppy seed food products.

Example Test-related Discovery

An evaluation of the reliability of a positive or negative drug test result should include a consideration of the test methods, laboratory documentation, and quality assurance. An example approach to discovery is outlined below.

1) All written records, notes, and documentation relating to all biological specimens, pills, powders, residues, and drug paraphernalia obtained in connection with this matter including those specimens that were not submitted for testing.

2) All written materials relating to technical or scientific or methods or outlines of test methods or procedures, administrative-and-laboratory practices and procedures, and actual test procedures as well as notes relating to all specimens submitted for testing and the tests conducted on these specimen(s) including but not limited to tests used to determine specimen suitability, initial screening tests, qualitative and quantitative analyses, and the sensitivity of the tests performed.

The description of these test procedures should include copies of all notes and outlines and technical procedures utilized in the testing of these specimen(s) including descriptions of scientific equipment, the preparation and verification of chemical or test reagents, the step-by-step description or instruction of the testing process, and examples of test data produced or obtained by test analysis as well as criteria for the review of standards, specimen test results, and quality assurance relating to test analysis.

The copy of the actual test records should include all relevant test data including instrument tracings and computer output obtained as a result of testing all of the case-related standards, controls, blank or chemical-free samples, and specimens.

Test-related information should also include the identification of all of the drugs in the analytical or test universe that represents the capabilities of each test conducted including the sensitivity or detection limit expressed as drug or drug-metabolite concentration.

3) Identification of all internal and external quality assurance programs and procedures relating specifically or directly to an assessment of the laboratory's ability to test and report reliable results regarding the presence and concentration of alcohol and drugs including case-specific drugs; and all survey reports and reviews within at least 12 months of the date of testing and the participant code used to identify the survey results submitted by the performing laboratory.

4) Identification of the dates when the laboratory disposed of the specimens. For all specimens remaining in the possession of any laboratory, state the nature and amounts of these specimens and prior storage conditions.

Before requesting discovery materials or the retesting of specimens, you should consult with an experienced forensic toxicologist.

Retesting for Drugs

Confirming positive drug test results

Guidelines include the following:

(A) Choose a laboratory that will retest the specimen using a selective or specific method at a level of sensitivity (detection limit) that is lower than that used by the first laboratory.

(B) Based on (A), submit sufficient sample to achieve the detection limit while retaining the residual specimen for other potential tests.

(C) Insist that the laboratories involved in specimen transfer identify and coordinate their SOPs and that they ensure a chain-of-possession.

(D) If the drug was likely subject to chemical decomposition, consider testing for both the drug and the products of decomposition.

Confirming negative drug test results

See confirming positive test results (above).

Expanding the drug test universe

Drug testing is rarely comprehensive enough to include all reasonable explanations for a person's appearance-behavior-demeanor or state of mind or to identify all cases of a drug-related accident or incident or injury or death. When considering additional testing in order to expand the universe of drugs that would be detected, you should consult with a toxicologist.

When considering expanded drug testing …

What are the reported drug test results?

What features of the case suggest other drug use?

What are the prior drug test results?

What does a person's appearance-behavior-demeanor-or-performance suggest regarding the use of a specific drug or class of drugs?

What does that person's prior medical history or drug use or other history indicate regarding drug use? What do pharmacy records indicate?

What specimens are available? Given this, what are the qualitative and quantitative test options? Given this, how can a process of sequential testing be tailored to address case-specific drug-related questions?

See *confirming positive test results* (above).

Determining drug concentration

See *confirming positive test results* (above).

Pay special attention to the laboratory's approach to standardization, the use of control or check specimens, data review, and other aspects of internal and external quality assurance.

Drug Use and Aggressive Behavior

Common Theory: Alcohol and Drugs

Alcohol-related theories of aggressive behavior are probably applicable to a consideration of the relationship between the use of some drugs and aggressive behavior.

The findings indicate that early aggressive behavior leads to an increase in alcohol use and alcohol-related aggression, but that levels of alcohol use are not significantly related to later aggressive behavior. Thus, the study data suggest that alcohol-related aggression is engaged in by aggressive people who drink. These data lend support to other research indicating that early aggressive and antisocial behavior is predictive of later alcohol-related problems. Other studies suggest that the environmental and situational variables are important.

"Systematic observation of Vancouver barrooms showed that **aggression was highly predictable on the basis of situational variables** and [the results of these studies] identified a drinking environment highly associated with aggression." Aggression and Barroom Environment, K. G. Graham et al., J. Studies on Alcohol, 41(3), 277-92 (1980).

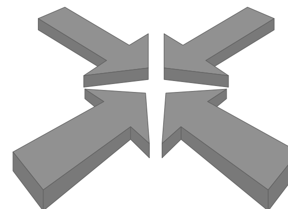
Alcohol and Aggression: What do most people believe?

From Paglia, A and Room, R; J Subst Abuse 10(2): 199-216 (1998): **Over 75 percent of the respondents obtained in a survey of Canadian adults believed that alcohol is associated with aggression** … 92% believed that an intoxicated person is responsible for any behavior and that alcohol is not an acceptable excuse.

Alcohol or Drugs and Behavior: Case Factors

Personal History

BAC / Drugs



Situational and Circumstantial Factors

Inter-personal Relationships

Alcohol-related behavioral theories include the following:

Physiological disinhibition theory: Alcohol increases aggression directly by depressing the brain center that normally inhibits aggressive behavior.

Expectancy theory: Alcohol increases aggressive behavior because people expect it to.

Indirect cause theory: Alcohol increases aggression by causing changes within the person that increase the probability of aggression (e.g. by reducing intellectual functioning).

Based on the uncertainties regarding the application of only one of these theories to a case-specific situation, it is prudent for case-analysis to consider all reasonable theories and relevant factors.

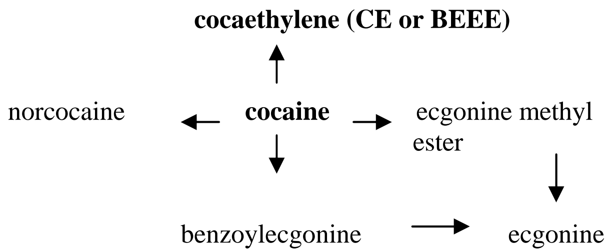
A discussion of cocaine and a benzodiazepine drug such as Valium (diazepam) follows.

Questions?

Call Dr. Pape at (800) 736-0503

Cocaine and Behavior

The fate of cocaine includes a series of enzyme-catalyzed and chemical reactions:



Cocaethylene (CE or BEEE) is the product of a chemical reaction between cocaine and ethanol. The consumption of cocaine and alcohol results in the formation of CE.

Cocaine + Ethanol → Cocaethylene

The individual and/or additive effects of cocaine, CE, and ethanol are associated with adverse behavioral effects including deviant or violent behavior.

Benzodiazepines and Behavior

The reading of the introduction to one reference text would suggest that reports of rage attacks in humans occurred early on and were labeled paradoxical reactions as they tended to occur in isolated instances and usually at high dosages … [but] … reports have continued with the newer benzodiazepines … [and] … studies have suggested that chlordiazepoxide (Librium) and diazepam (Valium) increase hostility. Other studies suggest an additive effect associated with alcohol plus benzodiazepines.

Sale or Distribution of Ecstasy and Foreseeability of Drug-related Injury

- A Case Vignette -

A 19 y.o. female consumed what was believed to be Ecstasy (MDMA) and a relatively small amount of alcohol at a *rave*. She became seriously ill … exhibiting CNS effects and fever. She consumed approximately four quarts of water over a period of about five hours. When her condition did not improve, friends took her to a local hospital.

Her admission blood serum sodium level was well below the normal range; and her urine drug screen was positive for amphetamines. Her conditions were attributed to MDMA.

The individual who sold her the drug was arrested and charged under federal law relating to the sale of illicit drugs carrying with it a foreseeable risk of substantial risk of injury.

Defense counsel retained a toxicologist.

The toxicologist reviewed the following:

The positive test for amphetamines

The positive urine drug test was based on a non-specific screening test for chemicals related to amphetamine including but not limited to amphetamine, methamphetamine, MDMA and analogs of MDMA, and some prescription or non-prescription medications. The presence of MDMA was not confirmed.

Forseeability of substantial risk

Estimates of the absolute and relative risk of substantial injury defined by the following features: (1) ER reference, (2) MICU admission, and (3) death attributed to the drug. These features were compared with selected illicit drugs, prescription medications, and non-prescription medications. The following types of relationships were compared:

Number of users compared to (1-3)

Number of doses sold compared to (1-3)

These comparisons indicated that the foreseeable risk associated with the use of MDMA was less than the risk associated with the use of several prescription medications.

DWI-Drugs

MV operation - field sobriety testing - drug recognition expert interview and report - urine drug testing - use of prescription medications or illicit drugs - and medical history

- FSTs have not been developed or validated for the identification of DWI-drugs
- DRE police usually rely on operator interviews to guide the interpretation of physical findings
- Positive urine drug tests do not establish the time of last use, the amount of drug used, the route of drug administration, or the effects at the time of operation
- Prescription medications that can affect a person's ability to operate a MV are often prescribed after a consideration of risk vs. benefit and without instruction to avoid the operation a MV

A DWI-drugs case vignette

Following a MV stop for "rolling thru the stop sign", the police officer detected a strong odor of marijuana coming from the vehicle. A search of the MV disclosed some "burnt joints" in the ashtray. The operator admitted smoking marijuana with a friend earlier in the day. After performing the HGN test, the operator told the officer to "f___-off". The MV operator was persuaded to provide a urine specimen for drug testing. The urine was positive for marijuana metabolites.

The MV operator was charged with DWI drugs. **Defense counsel consulted with an experienced toxicologist**; and a decision was made to attempt to cross-examine the police officer with leading questions. **The cross-examination of the police officer emphasized the following:**

- The positive urine drug test only established the prior use of marijuana, and that last use could have been hours or days prior to the MV stop.
- The operator's statements did not establish how much marijuana was use, the strength of that marijuana, the way in which the marijuana was shared, and the fate of marijuana. *It was argued that, unlike similar statements that are sometimes made regarding the prior use of alcohol, no reasonable inference could be drawn regarding the effects of marijuana at the time of operation.*
- There are no generally accepted "driving indicators" for drug-related impairment.
- The HGN test was not developed for and has not been validated for the detection of a marijuana-impaired person.
- MV "rolling stops" are very common at the intersection.
- The operator provided an explanation and apology for his use of inappropriate language … and, this was not noted in the police report.

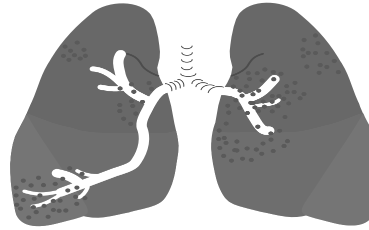
Additionally,

- The operator's treating physician provided a letter and medical records that could have been used by the defendant's toxicologist to establish some aspects of the foundation relating to his anticipated testimony

The toxicologist was not asked to testify … pre-trial consultation and assistance with the controlled cross-examination of the police officer were believed to be sufficient. ***Refer to a discussion regarding some of the principles of cross-examination (see page 10).***

Alcohol-related Topics

Breath Alcohol Testing



The objective of breath alcohol testing is to indirectly estimate BAC. A breath test machine captures a sample of deep lung air; it measures the alcohol concentration in that breath sample; it multiplies the test result by 2100; and it then reports the breath alcohol concentration (BrAC) test result as an equivalent percentage weight-by-volume BAC.

INTOXILYZER - ALCOHOL ANALYZER
MODEL 5000

SUB = JOHN DOE

TEST	% BAC	TIME
AIR BLANK	.000	01:55 EST
CAL. CHECK	.102	01:55 EST
AIR BLANK	.000	01:56 EST
INTERNAL STD	OK	01:56 EST
AIR BLANK	.000	01:56 EST
SUBJECT TEST	.114	01:56 EST
AIR BLANK	.000	01:57 EST
CAL. CHECK	.103	01:57 EST
AIR BLANK	.000	01:57 EST

AIR BLANK refers to a test of room air. It should read .000, indicating no environmental contamination.

CAL CHECK refers to the reading obtained when testing a simulator solution. It can be compared with the acceptable range (e.g. 0.090-0.110).

INTERNAL STD refers to a reading obtained using an internal optical filter. It can be compared with the expected value (e.g. 0.100).

SUBJECT TEST refers to the subject's test result, which is an indirect estimate of the subject's BAC at the time of the breath test.

While most BrAC test results between 0.10% and 0.20% are within about 10 percent of the subject's true BAC at the time of breath testing, combinations of breath test variables can result in a greater than expected difference.

Breath test variables: Because breath test machines are not completely selective and they do not measure an individual's physiological parameters (e.g. an individual's

blood:breath alcohol ratio), breath testing has been criticized for being subject to a variety of errors:

Machine error (1) . . . referring to the accuracy of the breath machine's measurement of the alcohol concentration in the captured breath sample. Some experts consider the permissible level of error for a breath test simulator (e.g. plus or minus 0.005% to 0.010%) as representative of machine error.

Biological error (2) . . . referring to the error associated with the machine's use of a fixed breath-to-blood (i.e. BrAC:BAC) multiplication factor of 1:2100 when indirectly estimating the BAC at the time of the breath test. This is the error due to the use of an arbitrary multiplication factor of 2100 when the breath machine *converts* the measured breath alcohol level as an *equivalent* BAC.

Physiological error (3) . . . referring to the over-estimation of BAC when the subject's alcohol level is rising or at a peak (i.e. when the person is still absorbing some amount of alcohol and the BAC in the blood going to the subject's lungs is higher than the BAC in the rest of the body).

Chemical interference (4) . . . referring to error due to the measurement of other chemicals similar to alcohol.

Unit-of-measure: Percent by weight (w/w) BAC. Connecticut alcohol-related laws are based on percentage by weight BAC. To express a percent weight-by volume (% w/v) BrAC as a percentage by weight (% w/w), you have to divide the breath alcohol level by the specific gravity of whole blood (SpGr = 1.055).

The total potential breath test error (e.g. for 1-4) can be estimated based on case-specific assumptions.

For example, the lower limit for a person's true % w/v BAC at the time of breath testing can be calculated by subtracting appropriate values for each of the potential breath test errors:

BAC = (BrAC - (Test Errors))

BAC = (BrAC - (1) - (2) - (3) – (4))

BAC = % (w/v)

For example: Given a BrAC result of 0.120% and considering only a biological error of five percent, the BrAC test result would over-estimate the true BAC by 0.006%.

BAC = (BrAC - (Test Errors))

= 0.120 – 0.006

= 0.114% w/v

But a total error of 20 percent for (1-4) would indicate a true BAC of 0.10% at the time of breath testing.

Field Sobriety Tests (FSTs)

FSTs are psychophysical tests intended to measure performance. FSTs do not measure BAC; and, even the most reliable tests are subject to error due to confounding factors such as the subject's physical/medical condition, stress, roadside environment, test explanation-instruction-illustration. Other factors include the grading of an individual's performance and the interpretation of results from a battery of FSTs.

One study reported that, when compared to a per se level of intoxication of 0.10%, officers' decisions to arrest the subjects were associated with a rate of 47 percent false positives (i.e. the subjects' measured BACs were less than 0.10% for 47 percent of those arrested). This high rate of false positives was attributed to the following:

BACs slightly less than 0.10%

Failure to heed the apparent lack of evidence of intoxication

Unusual individuals whose manner and/or appearance suggested intoxication

Confounding factors: There are a number of factors that determine the reliability of FSTs. Examples follow.

Physical disability	Medical conditions
Environment	Situational stress
Medications	FST instruction

Cross-examination of an Expert

Throwing things rarely works!

… if you're going to cross-examine the expert … **if you're going to *surgically* cross-examine the expert**, you had better review the case-records, study-up, talk with colleagues, go through some basic mental preparation; and, ... you might want to strategize … then visualize your cross-examination. After all, this is important … right?

… **And you might want to ask an expert to assist in your preparation for cross-examination.**

Examination of an expert

A discussion of case-decisions regarding deposition, voir dire, and cross-examination at trial follows.

Case-decisions regarding deposition, voir dire, and cross-examination at trial

Case-evaluation and case-strategy are two important considerations when an attorney is deciding if-when-how to examine an adversarial expert. When considering these and other case-specific options, counsel will usually benefit from a discussion with an experienced toxicologist.

Deposition of an expert
There are at least three good reasons to consider deposing an expert:

- You know little or nothing about the expert's approach to case-analysis and his/her ability to defend the approach taken, case-assumptions, case-calculations including BAC and TAC, and knowledge of and/or reliance on scientific studies.

- You want to establish the nature, scope, and limits of the expert's case-analysis as presented in a written report and/or you want to "marry" the expert to a flaw in the case-analysis or written report.

- You want to settle the case and hope to indirectly affect the negotiations by diminishing the perceived impact of the expert's testimony.

When should the expert be deposed? As a general rule, as late as possible ... after you have obtained a detailed report or exhausted all related attempts to define the expert's opinions and/or anticipate the expert's testimony as well as the expert's reaction to deposition questions.

Voir dire of an expert
A voir dire is an under-utilized technique. While you might be hesitant to disclose your approach to cross-examination at a pre-trial deposition, you should be much less concerned when conducting a voir dire.

What's in his file?	*What's not there?*
What has he done?	*What has he charged?*
What does he know?	*How does he react?*

Compared to a discovery deposition, a well-devised voir dire can have a much greater impact. The expert is usually not able to effectively rehabilitate his/her lack of case-specific knowledge or approach to case-analysis: *"Isn't it true that when I questioned you about 20 minutes ago, you were not able to …?*

Cross-examination of an expert
The effectiveness of your examination is based in large part on your preparation, your anticipation of the content of expert's testimony, the expert's usual behavior, your confidence, the use of control techniques, and a goal of providing the members of the jury with both information and explanation.

Does your cross-examination reflect a consistent case-strategy that includes ways to present information that will put the expert on the defensive?

Focus on the adversarial expert's …

Qualifications
Knowledge of case-specific facts
Preparation (i.e. what he did and did not do)
Implicit and explicit assumptions
Disregard for case-relevant factors
Gaps in testimony regarding relevant issues
Inaccuracies when describing the case analysis

Do you visualize and then construct a cross-examination that is well organized, understandable, easy to follow, relevant, to the point, interesting-informative-and-illustrative, and persuasive?

Are you able to control the expert?
Are you familiar with the scientific literature, the expert's implicit or unspoken assumptions, and the expert's usual appearance-behavior-demeanor … such that you can confidently and effectively use techniques to control the expert? Are you able to effectively use different types of questions to control both the flow of the examination and the expert's response to the particular question?

Isn't it true that …
Are you able to …
Are you familiar with …
Why didn't you tell the members of the jury …
Have you ever published anything in …
Did you …

Are you able to follow-up?

Isn't that because …
Would you agree with a statement that …
Let's review …

Do you practice and test your trial skills?
Consider your example outlines of case-specific questions and the anticipated answers, your reaction to potential unexpected or adverse answers, techniques you can use to maintain or regain control of the witness and/or focus on your strategic "home-base", follow-up questions and/or illustrations, checklists used to ensure that you have provided the jury with necessary information, and a strong closing.

Have you asked an experienced expert to assume the role of the adversarial expert witness … by outlining the case facts, agreeing to a summary of the expert's anticipated testimony, and then conducting a simulated cross-examination?

Elements Key to an Effective Cross-examination

Preparation - Anticipation - Knowledge - Control

Other P&A Newsletters

Alcohol

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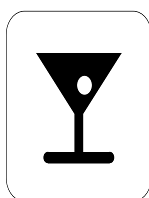
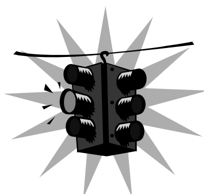
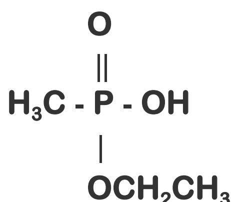
Drugs

Toxic Torts







Pb

As

Hg

TOPICS

ALCOHOL

Absorption – Distribution – Elimination

Alcohol Testing – premortem

Alcohol Testing – postmortem

Effects – Accident

Effects – Aggression

Liquor Liability

Alcohol/Drug-related Terms and Concepts

TOPICS

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Postmortem Drug Testing

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DWI-drugs

TOXIC TORTS

Risk Assessment

Carbon Monoxide

Lead Paint

Cosmetics – Chemicals – Food Additives

VX Nerve Gas and Organophosphates

Drug Toxicity

Airborne Chemical Exposure

Food Products – Adulteration

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