A. General and neuropsychological

ODOR OF ALCOHOL

1. The odor of an alcoholic beverage is noted as an indicia of intoxication in your client. This indicia is unreliable because “…even under optimum laboratory conditions, breath odor detection is unreliable…” according to the study Police Officers’ Detection Of Breath Odors From Alcohol Ingestion by Herbert Moskowitz, Marcelline Burns, and Susan Ferguson that appeared in Accident Analysis Prevention 31 (1999) 175-180.

The odor of an alcohol beverage is primarily due to congeners. Congeners include fusel oils which are alcohols. There are more than 45 different alcohols that can be congeners. They are mostly aliphatic alcohols. They are not ethyl alcohol but they would be detected on GC/MCS.

Additionally, other volatile organic compounds other than ethanol exhibit Infrared (IR) absorption bands that overlap a 9.5 µm wave length. Wave length on infrared (IR) spectroscopy. Dominic A. Labianca, How Specific for Ethanol is Breath-alcohol Analysis Based on Absorption of I.R. Radiation at 9.5 Micrometers?, and Journal of Analytical Toxicology, vol. 16, November/December 1992, pgs. 404-405.

Furthermore, the odor of alcohol on the breath is only qualitative, not quantitative. The presence of such an odor does not equate to intoxication. Additionally, it may indicate the presence of gastroesophageal reflux.

OVER THE AGE OF 40

2. The National Highway Traffic Safety Administration, based upon studies done in 1977 and 1983, determined that standardized field sobriety tests were unreliable in those over age 60. This is reflected in the National Highway Traffic Safety Administration manual from 1991. In 2006 it was changed to age 65, however, this was not based upon any additional data.

A recent British study indicates that the breakpoint for reliability on field sobriety tests is the age of 40, (Philip R. Dixon, Tony Clark, Brian Tiplady, Evaluation of a Road Side Impairment Test Device Using Alcohol, Accident Analysis and Prevention, 41 (2009) 412-418). This is more consistent from a medical perspective. Therefore, field sobriety tests cannot be relied upon in people greater than 40 years of age.
OVERWEIGHT

3. Psychophysical testing is unreliable in those overweight or obese.

FEVER OR ELEVATED BODY TEMPERATURE

4. Fever or elevated body temperature produces an appearance that can be similar to the indicia of intoxication and weakness that negatively impacts upon performance.

An elevation of temperature is known to elevate the results on evidentiary breath testing. (Glyn R. Fox, PhD and John S. Hayward, PhD, Effect of Hyperthermia on Breath Alcohol Analysis, Journal of Forensic Sciences, JFSCA, Vol. 34, No. 4, July 1989, pp. 836-841.) Warm air holds more water vapor than cold air. The water vapor humidifies the air sharing its alcohol content as it does so. This comports with the origin of the alcohol in the breath specimen as described by Michael P. Hlastala, PhD., in the peer reviewed journal article entitled Pardigm Shift for the Alcohol Breath Testing, which appeared in the Forensic Science, in March 2010, Volume, 55 No. 2. Therefore, increased temperature produces increased alcohol in the breath specimen changing the ratio between the amount of alcohol in the blood and the amount of alcohol in the breath specimen such that the breath specimen has a higher alcohol content and which is not representative of the blood alcohol level. {Observations/Psychophysicals and breath test}.

PRESCRIPTION MEDICATIONS

5. Prescription medications affect appearance and invalidate observations used as indicia of intoxication. When taken in therapeutic amounts as prescribed, they are not impairing. Only the treating physician is qualified to determine therapeutic dose of a medication for his patient.

{Observations/Psychophysicals}.

BREATH SPRAY

6. The use of breath sprays indicates pathologic process affecting the respiratory tract. Additionally, some sprays contain alcohol. {Breath test}
SLEEP DEPRIVATION

7. Sleep deprivation leading to tiredness and fatigue effect appearance as well as performance on psychophysical tests. The tests have not been validated in people who are tired so no correlation can be drawn with alcohol intoxication or impairment.

Sleep deprivation and the resultant impairment of cognitive performance and balance is discussed in the peer reviewed paper “Postural control after a night without sleep” by Marco Sabbri et al, which appeared in the peer reviewed Journal Neuropsychologia in 2006 (Neuropsychologia 44(206) 25-20-2525).

“Postural control is determined by an interplay of visual, proprioceptive and vestibular inputs which are dynamically weighed to determine body position and maintain equilibrium.” According to the paper by Sabbri, it is believed that lack of sleep results in deactivation of certain brain areas concerned with mediating attention and supervision.

Deactivation of these areas would be responsible for the loss of balance or postural control. {Observations/Psychophysicals}

DEPRESSION

8. Depression produces signs and symptoms which are indistinguishable from those induced by a chemical which causes depression. Of course, the classic and most used depressing chemical is alcohol.

Therefore, one who suffers from depression may appear depressed from this chemical intoxicant when it is really the physiologic disorder that is producing this appearance. {Observations/Psychophysicals}

PANIC ATTACK

9. Anxiety or a panic attack causes inattention to instructions. This affects psychophysical tests. [It also adds to the confusion caused by the reading of “Paragraph 36” in close temporal proximity to the Miranda Warnings creating more confusion.] {Observations/Psychophysicals and Refusal}
EPILEPSY

10. Epilepsy, or a seizure disorder, completely precludes a psychophysical evaluation for intoxication because all of the signs and symptoms used as indicial of intoxication are most likely due to the seizure and the postictal state. Additionally, a person in a postictal state is not fully cognizant so they cannot make a knowing and voluntary decision regarding consent or refusal to give consent. {Observations/Psychophysicals and Refusal}

CRYING

11. The act of crying impacts upon the observations. It causes increased blood flow to the face producing increased redness to the face and eyes. Increased blood flow to the respiratory tract brings more alcohol to the area and the production of nasal secretions and tears containing alcohol. These secretions and tears can contaminate the breath specimen. There is an erroneous elevation of the results of evidentiary breath testing due to the presence of the contamination with additional alcohol. (Garriott’s Medicolegal Aspects of Alcohol, 5th Edition, Edited by James C. Garriott, 2008, p. 123.)

While the subject is crying, there is also a tendency for the operator to hold the breath tube for a longer period of time after the subject has inhaled. This allows for more time for additional alcohol to pass from the respiratory tract and the secretions into the breath specimen before it is measured and extrapolated to arrive at the blood alcohol level (Garriott’s Medicolegal Aspects of Alcohol, 5th Edition, Edited by James C. Garriott, 2008, p. 406.) {Observations and Breath test}

BLOOD LOSS

12. The loss of blood with respect to the results of evidentiary blood testing are impacted upon many ways, these include:

1. Trauma decreases gastric emptying which prolongs the pre-absorption state.

2. Blood loss whether internal or external, into a sequester area, of the body or otherwise will reduce the total blood volume. Therefore any alcohol still present in the stomach, a pre-absorptive state would be absorbed into a smaller volume of blood leading to a higher BAC on laboratory analysis.
3. Blood loss will be replaced by interstitial fluids. These interstitial fluids have a higher water content than blood, and therefore would contain a higher concentration of alcohol than whole blood, so laboratory results would reveal an erroneously elevated BAL.

4. Trauma would activate the coagulation scheme to limit blood loss. Activation of the coagulation scheme depletes the blood of clotting factors and related proteins. This decrease in clotting factors and related proteins results in a higher water concentration in the remaining blood. This higher water concentration leads to an erroneously elevated whole blood alcohol level result on a laboratory analysis.

TIREDNESS AND FATIGUE

13. Your client was very tired at the time of the field sobriety tests. An inadequate amount of sleep produces tiredness and fatigued that can affect an individual’s performance on psychophysical testing. Furthermore, field sobriety tests have not been validated in people who are tired and fatigued.

Sleep deprivation/fatigue and the resultant impairment of cognitive performance and balance is discussed in the peer reviewed paper Postural Control After A Night Without Sleep by Marco Sabbri et al, which appeared in the peer reviewed Journal Neuropsychologia in 2006 (Neuropsychologia 44(206) 25-20-2525). “Postural control is determined by an interplay of visual, proprioceptive and vestibular inputs which are dynamically weighed to determine body position and maintain equilibrium.” According to the paper by Sabbri, it is believed that lack of sleep results in deactivation of certain brain areas concerned with mediating attention and supervision. Deactivation of these areas would be responsible for the loss of balance or postural control.

B. Head/Eyes/Ears

AIRBAG DEPLOYMENT - OBSERVATIONS

14. Deployment of an airbag is a “stunning” experience. Obviously this would have an adverse impact upon an individual’s appearance. The observations of such an individual cannot be relied upon as indicia of intoxication. {Observations}
15. Deployment of air bags frequently cause injury to the face and mouth. There is frequently blood in the mouth. One must consider the effect of this on any subsequent evidentiary breath testing in that blood in the oral cavity, as well as, swelling and inflammation, and the concomitant rise in temperature provides a source of contamination of the breath specimen.

The increased blood flow that results in the swelling includes additional alcohol being brought into the area. The increased temperature will increase the amount of alcohol that is imparted to the breath specimen as it passes over the area. These two factors will lead to an erroneous elevation on evidentiary breath testing.

A violation of evidentiary breath testing procedure would occur because the blood, in such a case, would be a foreign substance in the mouth and the procedure requires that no foreign substances be present in the oral cavity at the time of the provision of a breath specimen for evidentiary breath testing.

Consequently, the breath specimen cannot be relied upon as an indication of your client’s true blood alcohol level because of the following.
   a. The presence of a foreign substance in the mouth and the procedural violation that results.
   b. The foreign substance in the mouth, specifically blood, contains alcohol which will contaminate the specimen.
   c. The swelling consequently brings additional blood to the oral cavity which can be imparted to the specimen.
   d. The increased temperature resulting from the inflammatory response. {Observations and Breath test}

AIRBAG DEPLOYMENT AND REFUSAL

16. Deployment of an airbag is a “stunning” experience that will leave an individual dazed and confused. The confusion would negatively impact upon an individual’s comprehension. It would exacerbate the confusion associated with Miranda Warnings in close temporal proximity to the reading of “Paragraph 36. Such confusion eliminates the requisite knowledge necessary to make an informed decision and eliminates the possibility of providing a voluntary and knowing consent or refusal because one would be unable to understand their rights and obligations due to the decreased cognitive abilities resulting from the trauma of the deployment of the airbag.

Your client did not intentionally refuse to provide a specimen. {Refusal}

HORIZONTAL GAZE NYSTAGMUS

17. The Horizontal Gaze Nystagmus (HGN) test may include noting the angle of onset of the nystagmus as an indication of degree of intoxication. This test has not had adequate validation. The threshold of angle of onset with respect
to the degree of intoxication is in dispute by researchers and the studies have unacceptably high error rates.

The methodology used for this test does not include electronystagmography and has also not been adequately studied. The test is not generally acceptable for these reasons as well as the poor sensitivity and specificity associated with the test. In regards to this poor sensitivity and specificity, it is well recognized that there are a significant number of other causes of nystagmus.

Many factors can cause nystagmus. These factors vary from atmospheric conditions to changes in biorhythms. Normal medical conditions as well as pathological medical conditions and medications can cause nystagmus.

Climate changes such as changes atmospheric pressure including barometric pressure as well as temperature and other weather changes can result in nystagmus. For example, irrigation of the ears with water of varying temperatures is utilized as a diagnostic test by a neurologist.

Biorhythms such as the circadian rhythm can be associated with nystagmus. Pathological conditions including infections, both bacterial such as streptococcus, or viral, such as measles, influenza, the common cold. Other infections, such as syphilis, can also cause nystagmus. This is primarily due to their effect on the labyrinth associated in the inner ear.

Vitamin deficiency such as Thiamine or vitamin B1 causes what is known as Wernicke’s encephalopathy or Wernicke-Korsakoff syndrome which can include nystagmus.

Neurologic disorders such as multiple sclerosis and epilepsy as well as psychogenetic factors are associated with nystagmus.

Endocrine conditions like thyroid disease and diabetes mellitus can present with nystagmus.

Cardiovascular diseases such as arteriosclerotic cardiovascular disease (ASCVD) and associated hypertension, arrhythmias and cerebral vascular accidents (CVA) or strokes.

Other pathological conditions including sunstroke, motion sickness, eye strain, Glaucoma, and exposure to relatively innocuous substances, such as caffeine, nicotine and aspirin. Of course, various eye conditions including strabismus and amblyopia severely and negatively impact upon this test.

All of these conditions and many others can result in HGN which is indistinguishable from that caused by the consumption of alcohol.

Therefore, the appreciation of nystagmus in an individual is not a very specific test. There are a lot of false positives when searching for alcohol
intoxication with this test. The test for nystagmus is too non-specific, producing a very high error rate when used for the purpose of determining alcohol intoxication, let alone the degree of alcohol intoxication.

It is impossible to develop a methodology to reliably ascertain nystagmus short of electronystagmography and even with that, it is not possible to determine the etiology without more information. With the additional information the error rate still makes the test much too unreliable to provide a specific diagnosis of alcohol intoxication. It is readily apparent why HGN is not generally an accepted test, it is not conclusive, it is not specific, it is insensitive and the methodology that is commonly used has not been systematically validated.

In addition, without recorded electronystagmography, the test itself and its interpretation can be “fudged,” that is, it is subject to fraud. {Observations/Psychophysical tests}

**HEAD INJURY**

18. A head injury or concussion of the head can result in neurologic changes that totally invalidate any psychophysical testing. Therefore, psychophysical testing in such an individual is of no use in determining state of intoxication. (A head injury with resultant brain damage negates the ability of an individual to provide a knowing and voluntary consent or waiver.) {Psychophysical tests and Refusal}

**DECREASED HEARING**

19. Decreased hearing can result from many causes. It is most commonly secondary to inflammation in the upper respiratory tract affecting the Eustachian tube and can be associated with balance problems interfering with psychophysical testing in these circumstances. It can also effect psychophysical testing by causing confusion in responding to oral instructions. It would exacerbate the confusion associated with Miranda warnings in close temporal proximity to the reading of “Paragraph 36”. Such confusion eliminates the requisite knowledge to form an informed decision. {Psychophysicsals and Refusal}
**SINUSITIS**

20. Sinusitis, or inflammation of the sinuses, results in an appearance easily mistaken for alcohol intoxication (and can cause contamination of a breath specimen)

**C- MOUTH**

**ORAL CAVITY**

21. Cold sores or Herpes simplex is a viral invasion of the mucous membranes of the oral cavity manifested by an inflammatory condition that can interfere with speech. (The lesions can also produce contamination of the breath specimen. {Observation/Psychophysicals and Breath}

22. The presence of jewelry in the mouth is a violation of the requirement that the oral cavity be empty in order to properly perform evidentiary breath testing.

Foreign objects can contain alcohol, sequester alcohol, or contain small amounts particulate matter that contains alcohol and be dislodged with the forced expiration required of evidentiary breath testing. The alcohol or particulate matter containing alcohol when dislodged contaminates the breath specimen such that the results are falsely elevated. Mouth jewelry must be removed prior to evidentiary breath testing. {Breath test}

23. Periodontal disease or Gingivitis is an inflammatory condition of the gums and produces contamination of the breath specimen. {Breath test}

**POOR DENTITION**

24. Poor dentition Poor dentition can produce locations for sequestration of small particles of food which may become saturated with alcohol. During forced expiration the alcohol or the particles themselves may become dislodged contaminating the breath specimen. Additionally, poor dentition can produce inflammation with its concomitant increase in temperature and blood flow to the mouth. This increase in blood flow would bring with it an increased flow of alcohol to this area; a further additional possible source of contamination to the breath.

This contamination of the breath specimen would lead to an erroneous elevation on evidentiary breath testing. It is important to note that it would take only a minute amount of alcohol to cause an elevation on evidentiary breath testing. This is due to the fact that the machine multiplies the amount of alcohol that it receives 2100 times due to the 2100 to 1 breath to blood ratio. {Breath test}
RECENT DENTAL WORK

25. Recent dental work constitutes trauma to the oral cavity and is accompanied by an inflammatory response. This will change speech and contaminate a breath specimen. {observations/psychophysicals and breath test}

DENTAL APPARATUS

26. Dental apparatus, i.e. dentures, braces, bridges, etc. serve as locations for sequestration of small particles of food which become saturated with alcohol. During forced expiration, the alcohol or the particles themselves can become dislodged, contaminating the breath specimen.

The manufacturer of evidentiary breath testing equipment recommends that dental apparatus be removed prior to evidentiary breath testing. Hansueli Ryser, Vice President of Drager Safety Diagnostics, Inc., indicates, in an e-mail dated July 26, 2009 that dental apparatus should be removed prior to the beginning of the observation period.

Contamination of the breath specimen produces to an erroneous elevation on evidentiary breath testing. It is important to note that it would take only a minútet amount of alcohol to cause an elevation on evidentiary breath testing. This is due to the fact that the machine multiplies the amount of alcohol that it receives 2100 times due to the 1 to 2100 blood to breath ratio. {Breath test}

D. RESPIRATORY SYSTEM OR AIR PASSAGES AND LUNGS

27. Sinusitis effects evidentiary breath testing such that results are erroneously elevated and do not represent the true blood alcohol level. This occurs due to at least two factors, (1) the temperature elevation associated with an inflammatory response and (2) the production of alcohol laden secretions that contaminate the breath specimen.

Sinusitis and the resultant inflammation leads to an elevation of local and core body temperature. An elevation of temperature is known to elevate the results on evidentiary breath testing. (Glyn R. Fox, PhD and John S. Hayward, PhD, Effect of Hyperthermia on Breath Alcohol Analysis, Journal of Forensic Sciences, JFSCA, Vol. 34, No. 4, July 1989, pp. 836-841.)

Sinusitis, or inflammation of the sinuses, results in the production of secretions. The significance of this is that these secretions are derived from blood and, as such, contain blood products as well as alcohol from the water
content of blood at a concentration significantly greater than that of expired air. These secretions in the upper airways would contaminate the breath specimen prior to its presentation for analysis resulting in an erroneously elevated reading due to the presence of extraneous material. This is a form of pre-analytic error. {Breath test}

COLD OR URI

28. Upper Respiratory Tract Infection (URI)/Cold/Flu Upper respiratory infections (URI) effect evidentiary breath testing such that results are erroneously elevated and do not represent the true blood alcohol level. This occurs due to at least two factors, (1) the temperature elevation associated with an inflammatory response and (2) the production of alcohol laden secretions that contaminate the breath specimen.

URI’s and the resultant inflammation lead to an elevation of local and core body temperature. An elevation of temperature is known to elevate the results on evidentiary breath testing. (Glyn R. Fox, PhD and John S. Hayward, PhD, *Effect of Hyperthermia on Breath Alcohol Analysis*, Journal of Forensic Sciences, JFSCA, Vol. 34, No. 4, July 1989, pp. 836-841.)

URI’s also result in the production of inflammatory secretions in the upper airways. Such secretions are derived from blood and contain blood products. As such, they would also contain an alcohol content significantly greater than that of expired air. The presence of these secretions in the upper airways would result in contamination of the breath specimen. This contamination is a form of pre-analytic error. {Breath test}

BRONCHITIS

29. Bronchitis effects evidentiary breath testing such that results are erroneously elevated and do not represent the true blood alcohol level. This occurs due to at least two factors, (1) the temperature elevation associated with an inflammatory response and (2) the production of alcohol laden secretions that contaminate the breath specimen.

Bronchitis and the resultant inflammation leads to an elevation of local and core body temperature. An elevation of temperature is known to elevate the results on evidentiary breath testing. (Glyn R. Fox, PhD and John S. Hayward, PhD, *Effect of Hyperthermia on Breath Alcohol Analysis*, Journal of Forensic Sciences, JFSCA, Vol. 34, No. 4, July 1989, pp. 836-841.)

Bronchitis is an inflammatory disease of the air passages. It is characterized by inflammation of the air passages, the hallmark of which is increased blood flow to those air passages. This would, of course, provide increased alcohol flow to these air passages.
This would serve as a source of contamination of the breath specimen as it passes through the passages from the alveoli below to the evidentiary breath testing instrument above. This contamination would lead to false elevation of the results of evidentiary breath testing because the instrument received a specimen of alveolar air contaminated with additional alcohol.

The bronchospasm will significantly impair the individual’s ability to produce a breath specimen.

The forced expiration as well as the extended exhalation required to provide a breath specimen could result in an error message “minimum volume not achieved.” Furthermore, the forced expiration would frequently cause paroxysms of coughing.

The bronchospasm can be initiated by two mechanisms, the first mechanism could involve the neurologic innervation of the esophagus as well as the bronchial passages since the neurologic innervation of these two are intimately associated anatomically.

Additionally, and more likely, aspiration of material from the gastrointestinal tract into the respiratory tract would initiate bronchial spasm. This occurs due to gastroesophageal reflux. {Breath test}

**ASTHMA**

30. Asthma (Restrictive Airway Disease) Asthma is a condition which includes bronchial spasm and inflammation. Both of these can contribute to an effect on evidentiary breath testing.

The bronchial spasm will significantly impair the individual’s ability to produce a breath specimen. The forced expiration as well as the extended exhalation required to provide a breath specimen could result in an error message “minimum volume not achieved”. Furthermore, the forced expiration would frequently cause paroxysms of coughing.

The bronchial spasm can be initiated by two mechanisms, the first mechanism could involve the neurologic innervation of the esophagus as well as the bronchial passages since the neurologic innervation of these two are intimately associated anatomically. Additionally, and more likely, aspiration of material from the gastrointestinal tract into the respiratory tract would initiate bronchial spasm. This occurs due to reflux.

The inflammatory condition associated with asthma increases the blood flow to the lungs, thereby bringing more alcohol to the air passages, which could impart a greater amount of alcohol to the breath specimen. Inflammatory material would also contain increased amounts of alcohol which would be imparted to the breath specimen as it passes through the airways, thereby
causing more contamination of the breath specimen. This has been described by Hlastala, PhD., entitled Paradigm Shift for the Alcohol Breath Testing which appeared in the peer reviewed journal, Forensic Science, in March 2010, Volume, 55 No. 2.

Additionally, asthma is frequently associated with gastroesophageal reflux disease. 

**INHALER**

31. Inhaler use is significant because they indicate the presence of a bronchospastic condition that impairs the ability to provide a breath specimen and contamination of the breath specimen by an inflammatory process. It also significantly raises the possibility of gastroesophageal reflux. 

**EMPHYSEMA OR COPD**

32. Emphysema or Chronic Obstructive Pulmonary Disease (COPD) impairs the ability to provide a breath specimen and raises the significant possibility of contamination of the breath specimen by an inflammatory process. 

**ALLERGIES**

33. Allergies account for some of the observations regarding appearance noted in discovery. In addition, allergies result in the production of secretions. These secretions are derived from blood and contain blood products. These secretions would have an alcohol level significantly higher than that of expired air.

Any contamination of the breath specimen by these secretions as the breath specimen passes over them, would result in an erroneous elevation of the BAL and the breathalyzer results, a form of pre-analytic error.

This has been presented by Michael Hlastala, PhD., entitled Paradigm Shift for the Alcohol Breath Testing which appeared in the peer review journal, Forensic Science, in March 2010, Volume, 55 No. 2.

**PNEUMONIA**

34. Pneumonia is an acute inflammatory condition that will produce increased blood flow, increase temperature in the airways, and secretions in the airways that would impart additional alcohol to a breath specimen as it passes over the airways contaminating the breath specimen with additional alcohol not representative of the blood alcohol level as it exchanges in the alveoli. Of course the use of an inhaler containing alcohol would be to further contamination of the breath specimen.
This respiratory illness, and the medication used to treat it, make the taking of an evidentiary breath sample useless as an indicator of blood alcohol level in this case. {Breath test}

E. GASTRINTESTINAL

35. Esophagitis is an inflammatory condition of the esophagus. It is indicative of gastroesophageal reflux disease. It is also frequently associated with bronchospasm. {Breath test}

GERD

36. GASTROESOPHAGEAL REFLUX DISEASE (GERD)

Gastroesophageal reflux disease (GERD) is similar to belching/burping. It produces essentially an inaudible belch. This condition makes the 20 minute observation deprivation period impossible to perform and leads to contamination of the breath specimen just as a belch (or burp) would lead to contamination of the breath specimen with extraneous alcohol.

GERD concerns the incompetence of the sphincter or valve between the esophagus and the stomach. Therefore, stomach contents, whether they be solid, liquid or gas would tend to rise from the stomach back up into the esophagus, pharynx and even the mouth. When the stomach contains alcohol, gases expressed from the patient's mouth would include alcohol from the stomach. This contamination is a form of pre-analytic error.

GERD affects about 30 percent of the population. This can exist with or without signs and/or symptoms.

A. GERD has been mentioned in the medical literature as leading to erroneous results on evidentiary breath testing.


B. GERD has been studied by David Wells of the Draeger Corporation, the manufacturers of the Breathalyzer. The first reliable machine used in evidentiary breath testing, invented by Dr. Borkenstein in the early 1950s. Their study, Breath-Alcohol Analysis of a Subject with Gastric...
Regurgitation, D. Wells, J. Farrar, Office of Forensic Medicine and Draeger, Australia, Melbourne, Victoria, Australia, which has been published by the National Highway Traffic Safety Administration of the Department of Transportation of the United States Government, clearly shows that gastroesophageal reflux disease can produce erroneous results which may be up to four or five times greater than the true blood alcohol levels.

C. GERD has been studied by A. W. Jones, Ph.D., D.Sc of the Department of Forensic Toxicology University Hospital, Linkoping, Sweden, has stated that, "...In the absorption phase, breath alcohol values always tended to be systemically higher than venous blood alcohol levels." Gastrooesophageal Gastric-Reflux Disease (GERD) and how this Influences the Results of Breath-Alcohol Analysis.

D. Hansueli Ryser, of Draeger Safety Diagnostics, Inc. and the instructor of the mandated Alcotest course, has written regarding regurgitation of stomach contents and the vapors stemming from regurgitation “are of extremely high alcohol concentration. Unfortunately, even a 15 minute waiting period cannot prevent this situation. This phenomena leads to the erroneous high alcohol measurements and must be addressed when testing for legal purposes”.


Evidentiary breath testing is unreliable in people with GERD such individuals require a blood test for reliable determination of blood alcohol content.

**HIATAL HERNIA**

37. A Hiatal Hernia is an anatomic defect which produces gastroesophageal reflux. {Breath test}

**BARIATRIC SURGERY**

38. Bariatric Surgery is associated with gastroesophageal reflux. {Breath test}
F. MUSCULOSKELETAL SYSTEM

FR ACTURE STRAINS AND SPRAINS

39. Orthopedic conditions, i.e. fracture, strains and sprains and orthopedic surgeries, involving the back, hips, knees, ankles, feet, and toes adversely impact upon one’s ability to stand, walk and perform psychophysical tests involving the use of the lower extremities. {Observations /Psychophysical tests}
G. **PODIATRIC CONDITIONS (FEET AND ANKLES)**

**HEEL SPURS**

40. Heel spurs adversely impacts upon one’s ability to stand, walk and perform psychophysical tests involving the use of the lower extremities. {Observations /Psychophysical tests}

**ORTHOTICS**

41. The use of orthotics indicates a podiatric condition with an adverse impact upon one’s ability to stand, walk and perform psychophysical tests involving the use of the lower extremities. {Observations /Psychophysical tests}

**IMPROPER FOOTWEAR**

42. Improper footwear adversely impacts upon one’s ability to stand, walk and perform psychophysical tests involving the use of the lower extremities. {Observations /Psychophysical tests}

**BUNIONS**

43. Bunions adversely impact upon one’s ability to stand, walk and perform psychophysical tests involving the use of the lower extremities. Observations /Psychophysical tests}

**SPRAINED ANKLES**

44. Sprained ankles adversely impacts upon one’s ability to stand, walk and perform psychophysical tests involving the use of the lower extremities. {Observations /Psychophysical tests}

H. **ENDOCRINE CONDITIONS (GLANDS)**

**THYROID DISEASE**

45. Thyroid disease produces an imbalance in thyroid hormone that require frequent monitoring and adjustments. In the meantime the effects of the abnormal levels will adversely impact upon an performance on psychophysical tests. {Observations /Psychophysical tests}
46. Diabetes Mellitus effects the evaluation for DWI in a variety of ways: It is very difficult to evaluate a diabetic for DWI because many of the indicia of intoxication are common to diabetes mellitus, and complications that arise from diabetes.

a. Normal metabolism and blood sugar levels are affected by the disease. Normal metabolism and blood sugar levels are also affected by oral and parenteral hypoglycemic agents. This can affect demeanor, it can result in behavior that ranges from excitability and seizure to frank coma. The mental changes impact upon the ability to provide a truly knowledgeable and voluntary consent.

b. Diabetes may result in the metabolism of fat which produces ketones. Ketones also can impart an odor to the breath, which may be mistaken for alcohol. In addition, Ketones can cause drowsiness.

c. Low blood sugar or hypoglycemia, in Type I Diabetes can produce diabetic ketoacidosis. The ketones in diabetic acidoses are a form of acetone. “Acetone may be converted to isopropanol in physiological conditions...” (Detection of Isopropanol In Acetonemic Patients Not Exposed to Isopropanol by David N. Bily, MD of the Division of Laboratory Medicine. Department of Pathology, University of California Medical Center, Sand Diego, California, according to the Article published in Clinical Toxicology, 28(4).459-466, (1990). The journal Clinical Toxicology is a peer reviewed journal. Additional publications in peer reviewed journals support these findings. For example. “… The detection of isopropyl alcohol may not represent an acute ingestion but, rather, a byproduct of acetone metabolism in certain disease states…” which appeared in Detection of Isopropyl Alcohol In A Patient With Diabetic Ketoacidosis by Alan E. Jones and Richard L. Summers, MD in the Journal of Emergency Medicine. Vol.19, No. 2 pps. 165-168, 2000, support these findings. The Journal of Emergency Medicine is also a peer review journal.

d. Ketone bodies include acetone, acetoacetate and Beta-hydroxybutyrate “...Under certain circumstances acetone is reduced in the body to isopropanol by hepatic alcohol dehydrogenase (ADH) “A.W. Jones and S. Rossner False-positive breath – alcohol test after a ketogenic diet, International Journal of Obesity (2007) 31, 559-561. Isopropanol is an alcohol that can be detected by evidentiary breath testing equipment.
e. Complications of diabetes include gastroparesis. This is a disorder of stomach motility such that there is a delay in gastric emptying. This would result in a prolonged presence of alcohol in the stomach which would affect absorption as well as reflux.

f. Complications of diabetes include neurologic damage that can adversely impact upon an individual’s performance on psychophysical tests.

g. The high sugar content and microvascular disease commonly leads to infections. These infections are more frequent and of longer duration. Infections typically affect the lower extremities. These infections can impair one’s use of their lower extremities which significantly affects field sobriety tests.

The usual indicia of intoxication are totally unreliable in people with this condition. Consent or refusal are also of dubious reliability. {Observations /Psychophysical tests and Breath test}