

An Introduction to Retrograde Extrapolation

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Introduction

What Is Retrograde Extrapolation?

It's safe to say that in a majority of DUI cases, if a breath or blood sample is taken, it is done anywhere from 15 minutes to three hours after the vehicle stop. In certain jurisdictions, there is a presumption that a sample received within a set time is deemed to be the alcohol concentration at the time of driving. In other jurisdictions, the State may attempt to establish a range of possible alcohol concentrations at the time of driving.

Retrograde extrapolation, or back extrapolation, is an attempt by the State to go “back in time” and try to predict what your client's Breath Alcohol Concentration (BrAC) or Blood Alcohol Concentration (BAC) could have been at the time of driving. Understanding the limits of retrograde extrapolation requires at least a working knowledge of the “basics” of alcohol absorption and elimination.

The Typical Scenario

If you have tried any test cases, you are familiar with this typical scenario: The State asks the State's expert to calculate (1) how many drinks would have been in your client's system at the time of the breath or blood test and (2) what your client's breath or blood alcohol level would have been at the time of driving based on a list of factors the State provides. The State's expert makes a show out of calculating numbers, usually with a calculator, as if it is the first time he or she has been given this information. It is a charade because they have already performed the calculations before the trial. Regardless, he or she finishes the calculations and provides the State with a number of drinks and a range of possible breath/blood alcohol levels.

If you know nothing of the methodology of retrograde extrapolation, you may be inclined to believe that this person has some superior knowledge that allows them to mathematically determine your client's BAC while driving. The truth is that the formula typically used by the State's expert in trial is a truncated version of a mathematical formula that uses certain averages and makes certain assumptions about your client. Exposing these assumptions is one of the simplest ways to challenge testimony on retrograde extrapolation, if that is the strategy you choose.

There are a tremendous number of peer-reviewed scientific articles, studies and books that you can read if your goal is to master this area of science. However, the best investment of your time may be learning the key articles, studies and books authored by those who the State's expert is likely to recognize as authorities. Every effort is made throughout this article to cite alcohol researchers that the State's expert in your case will recognize as authorities.

PRACTICE TIP:

Recognized authorities

In my experience, State's experts will recognize Dr. A.W. Jones, Dr. Kurt Dubowski and the book, *Garriott's Medico-Legal Aspects of Alcohol*, as authorities. If the State's expert has been through training at the Borkenstein Course at the University of Indiana, both Dubowski and Jones have been on the teaching faculty. I like to get this out early so that I can keep referring to them as “your teacher, Dr. Dubowski” or “your teacher, Dr. Jones.”



Absorption and Elimination The Alcohol Curve

An “alcohol curve” is a graph depicting the rate at which alcohol is absorbed into and eliminated from the blood over time. Here is an example of a typical alcohol curve:

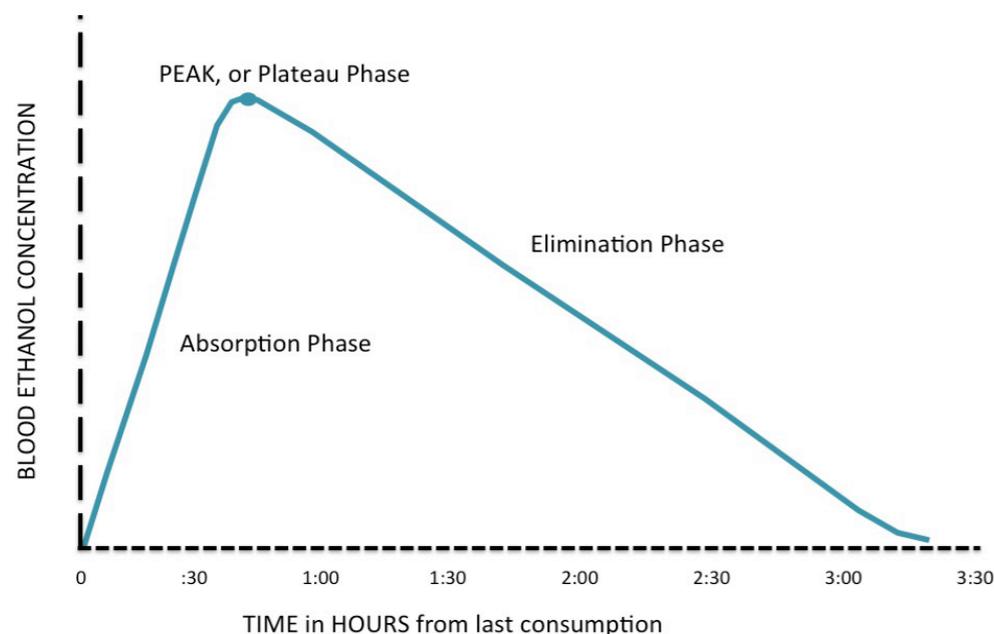


Figure 1 - The graphic used here depicts a drinking spree that was fairly short. The longer the drinking event, the farther out the peak time is stretched (to the right). What is almost always unknown in a DUI case is exactly where your client fell on the curve at the time of driving. The State will likely attempt to convince the judge or jury that your client was in the elimination or falling phase so the reported test score is lower than the actual BrAC at the time of driving. Your job, in most cases, will be to point out that the State’s expert does not know where your client was on the alcohol curve when the client was driving the car.

After drinking, alcohol is absorbed into the blood. The concentration of alcohol in the blood gradually increases until a peak is reached. This is known as the absorption or rising phase of the alcohol curve. After the peak, the concentration of alcohol in the blood begins to decline as it is removed from the blood by the liver. This is called the elimination or falling phase of the alcohol curve. Elimination occurs at a fairly steady rate but is not necessarily linear.

Factors Affecting Absorption

State’s experts typically downplay the large number of factors that can impact the rate of absorption of alcohol. I have heard testimony that all alcohol is absorbed within 20 minutes if there is not a large amount of food in the stomach, food does not play a significant role in absorption, trauma does not affect absorption, and other such nonsense that is completely at odds with the authorities in this area. Having “married” them to the experts, this section will provide you with ammunition to rebut these statements during cross-examination.

Alcohol begins the absorption process immediately after a person begins drinking. A small percentage is absorbed in the stomach but the small intestine is the primary location of absorption. The pyloric sphincter (think of a little trap door at the base of your stomach) allows the stomach contents to pass into the small intestine. Gastric, or stomach, emptying is an important factor in the rate of absorption. The longer the alcohol stays in the stomach, the slower it absorbs and vice versa.

[For a more detailed description of alcohol absorption, see “The Absorption of Alcohol” in Counterpoint, Volume 5; Issue 2 - Article 5. - Editor](#)

Various factors can impact the rate of gastric emptying. According to Dr. A.W. Jones, factors that can slow the rate of absorption by delaying gastric emptying include food in the stomach, certain prescribed medications, alcohol intake later in the day, cigarette smoking, the type of alcohol consumed (beer), trauma, shock or significant blood loss.¹ Factors that can speed up gastric emptying and increase the rate of absorption include drinking early in the day on an empty stomach, the type of alcohol consumed (spirits), carbonated drinks, gastric bypass surgery, low blood sugar and certain prescribed medications.²

¹ *Garriott’s 5th Edition at page 57.*

² *Ibid.*

Gender, weight, age and underlying medical conditions are also factors that may impact absorption. State experts love to throw around the word “average.” *Is your client obese? Underweight? Elderly? Has he or she had recent gastric bypass surgery? Does your client have GERD or Diabetes?* The idea of an “average” absorption rate is ridiculous. According to Dr. Jones, “The absorption stage of the blood alcohol curve is undoubtedly the most variable and unpredictable aspect of ethanol pharmacokinetics and can depend on age, gender and body mass index.”³

NOTE: A high dose of sugar (70g) combined with ethanol intake delays the absorption of the ethanol from the stomach, can lower the peak BAC and reduce the impairment of the alcohol.⁴ Additionally, Dr. Dubowski noted:

The rate of alcohol absorption after oral intake is greatly influenced by the nature and concentration of the alcoholic beverage, food intake and a multitude of other physical, biological, psychological and time factors that combine with the individual’s sex, body weight and body water, and related habitus characteristics as well as offsetting metabolic disposition to determine the ultimate peak blood alcohol concentration and other characteristics of the time course of the blood alcohol concentration.⁵



³ *Garriott’s 5th Edition at page 59.*

⁴ Jones, A.W., *Forensic Science Aspects of Alcohol Metabolism*, For Sci Prog Vol 5, 1991, pg 69.

⁵ Dubowski, K. M., *Absorption, Distribution and Elimination of Alcohol: Highway Safety Aspects*, J. Stud. Alcohol, Supp. No. 10 (July 1985).

According to Dr. A.W. Jones:

The question of retrograde extrapolation of BAC from time of sampling to time of offense is a controversial and highly sensitive subject among forensic scientists. This practice is even more dubious when breath-alcohol measurements are used for making the backtracking calculations.⁶

The Texas Court of Criminal Appeals recognized these factors in *Mata v. State*, 46 S.W.3d 902 (Ct. Crim. App. 2001), the landmark case dealing with the admissibility of retrograde extrapolation evidence in Texas. *Mata* has been cited by many courts nationwide.

As alcohol is consumed, it passes from the stomach and intestines into the blood, a process referred to as absorption. When the alcohol reaches the brain and nervous system, the characteristic signs of intoxication begin to show. The length of time necessary for the alcohol to be absorbed depends on a variety of factors, including the presence and type of food in the stomach, the person’s gender, the person’s weight, the person’s age, the person’s mental state, the drinking pattern, the type of beverage consumed, the amount consumed, and the time period of alcohol consumption. At some point after drinking has ceased, the person’s BAC will reach a peak. After the peak, the BAC will begin to fall as alcohol is eliminated from the person’s body. The body eliminates alcohol through the liver at a slow but consistent rate.

[*Mata* at page 909.]

⁶ Jones, A.W., *Forensic Science Aspects of Alcohol Metabolism*, For Sci Prog Vol 5, 1991, pg 77.

NOTE: There are studies regarding racial differences in alcohol absorption and elimination. One study found a faster rate of elimination in Caucasians than those of Indigenous or Inuit descent.⁷

Dr. A.W. Jones, discussing the enzymes in the liver needed to break down alcohol, noted the “wide, inter-individual and ethnic differences in rates of ethanol metabolism reported in the literature.” An example would be the atypical enzyme prevalent in Japanese and Mongolian populations.⁸ He further notes, “Aspects of the pharmacogenetics of ethanol and variations in rates of metabolism in different ethnic and racial groups has hardly been touched upon in the forensic science literature.”⁹

Rebutting Testimony that Rate of Absorption is Fixed

As you can see, the rate of absorption is not a fixed number. In one study, Dr. Dubowski noted a range of absorption rates from 14 to 138 minutes with a mean of 57 minutes for men and 42 minutes for women.¹⁰ This is significant because Technical Supervisors will typically lead the jury to believe that EVERYONE has fully absorbed all alcohol in 20 minutes and you need to be prepared to rebut this statement.



IMPORTANT:

⁷ Fenna, D., et al. *Ethanol Metabolism in Various Racial Groups*, C.M.A. Journal, Vol. 105, September 1971.

⁸ Jones, AW, *Forensic Science Aspects of Alcohol Metabolism*, For Sci Prog Vol 5, 1991, pg 53-54.

⁹ Ibid, page 73.

¹⁰ Dubowski, K., *Absorption, Distribution and Elimination of Alcohol: Highway Safety Aspects*, J. Stud. Alcohol, Supp. No. 10 (July 1985).

Quoting from the article, Dr. Dubowski’s conclusions in this well-known study are as follows, at page 106:

First, not all blood and breath alcohol curves follow the Widmark pattern, nor is the elimination phase necessarily linear. Second, alcohol absorption is not always complete within 60 to 90 minutes, as often claimed. Third, the peak alcohol concentration cannot be validly predicted or established in an individual instance without frequent and timely measurement of alcohol concentrations. Fourth, it is not possible to establish whether an individual is in the absorption or elimination phase, or to establish the mean overall rate of alcohol elimination from the blood or breath, from the results of two consecutive blood or breath alcohol measurements, however timed. Fifth, significantly large short-term fluctuations occur in some subjects and result in marked positive and negative departures from the alcohol concentration trend line. Six, short-term, marked oscillation of the blood or breath alcohol concentration can occur at various points of the curve, resulting in repeated excursions of the alcohol concentration above or below a given concentration (such as 80 or 100 mg/dl) within a few minutes or for hours. Finally, no forensically valid forward or backward extrapolation of blood or breath alcohol concentrations is ordinarily possible in a given subject and occasion solely on the basis of time and individual analysis results.

Dubowski, K., *Absorption, Distribution and Elimination of Alcohol: Highway Safety Aspects*, J. Stud. Alcohol, Supp. No. 10 (July 1985).

Elimination Rates

Like absorption, the elimination rate can vary from one person to the next. Some State experts will use an average 0.015 elimination rate while others use 0.020. Dr. Jones noted a range of elimination rates from as low as 0.01 to as high as 0.025 per hour.¹¹ Some people have been found to have elimination rates as high as 0.045.

The Retrograde Extrapolation Calculation The Widmark Equation

Dr. Erik Widmark is the grandfather of blood alcohol analysis and the formulator of the Widmark Ratio. This mathematical calculation forms the basis for the retrograde extrapolation calculation that the State's expert will perform in court in front of the jury.

It is important to remember that Widmark's work dealt exclusively with calculating *blood* alcohol concentration - not *breath*. His calculation can be expressed as follows:

Widmark's Equation

$$A = [Ct + (\beta t)] p r$$

Where:

A is the amount of alcohol consumed (raw ethanol in grams)

Ct is the blood alcohol concentration at a specific point in time

β (Beta) is the ethanol elimination rate constant

t is time

p is the body weight in grams

r ("rho") is the ratio of the total body ethanol concentration - Widmark's Ratio

¹¹ Jones, A.W., *Physiological Aspects of Breath Alcohol Measurement*, Journal: "Alcohol, Drugs and Driving," Vol. 6, April-June 1990, pg 7.

Solving for BAC:

$$Ct = \frac{A}{p r} - (\beta t)$$

OR:

$$BAC = \frac{\text{Grams of alcohol consumed}}{\text{Body weight} \times \text{Widmark's Ratio}} - (\text{Widmark's Beta} \times \text{time})$$

Widmark calculated what is referred to as the Widmark Ratio or "rho" factor. The rho factor refers to the relationship of the concentration of ethanol in the body to ethanol in the blood. It is based on the concept that alcohol seeks water and distributes throughout the body based on water content. As such, gender and weight are important factors. The following are the Widmark values assigned for r:

$$\text{Female} = 0.55 (+/- 0.055)$$

$$\text{Male} = 0.68 (+/- 0.085)$$

Various modern studies have attempted to validate Widmark's research and found a fairly significant range for both men and women with regards to the r ratio. Widmark's original research focused on a fairly small group of men (20) and women (10) in 1930's Sweden. It would not be a stretch to imagine that those test subjects (1930's Swedes, all in their early 20's) would differ greatly from modern-day North Americans with our higher body fat percentages. The most significant re-evaluation of Widmark's work was by A. R. W. Forrest¹². In order to get a more precise value, he used body mass index (BMI) to calculate r. BMI is calculated as follows:

$$BMI = \frac{Wt(kg)}{Ht(m)^2}$$

$$\text{Body mass index} = \frac{\text{weight in kilograms}}{\text{height in meters squared}}$$

¹² Forrest, A. R. W., "The Estimation of Widmark's Factor," Journal of the Forensic Science Society, 1986; 249- 252.

For charts reflecting r values calculated using BMI, see “Simplified Estimation of Widmark ‘r’ Values by the Method of Forrest,” Barbour, AD, *Science & Justice* 2001; 41: 53-54. This article is available at <http://home.lightspeed.net/~abarbour/jfss.htm>.

Another important factor in the Widmark equation is referred to as Beta. The Beta factor refers to the *rate of elimination of alcohol from the body*. Widmark settled on an average rate of 0.015% per hour, though, as previously discussed, not every person follows this *average* rate.

Minimum Data Needed for Retrograde Extrapolation

At the very minimum, a person attempting to perform a retrograde extrapolation calculation needs the following information:

- Gender
- Weight
- Food in the stomach or empty stomach
- Time food was eaten
- Time of last drink
- Time of first drink

Arguably, the calculation should also take into account:

- Body mass index
- Type of alcoholic beverage consumed
- Type of food eaten
- Trauma or stress that could have delayed absorption.

BONUS:

Subscribers to Counterpoint can access the **Body Mass Index Calculator** in the members-only online Forensic Encyclopedia at Counterpoint-Journal.com

PRACTICE TIP:

The State may not have the necessary facts

Remember, the information that is fed to the State’s expert is typically provided by your client during questioning by the arresting officer. If you believe the State intends to offer back extrapolation evidence, you need to pay close attention to what your client actually said to the officer.

I have had many trials where the client is very vague about his or her answers, but the State takes part of the answer and tries to use it as a factor for extrapolation purposes. I’ve also had trials where the State did not know my client’s weight and just threw a number out. It is not unusual for the State to attempt to play fast and loose with the factors needed for back extrapolation. This is why a hearing may be necessary to determine if the expert is qualified to render the testimony they are offering.

Using Widmark in Your Own Cases

Let's take some typical situations you may encounter in your own cases and evaluate them for purposes of retrograde extrapolation.

Hypothetical Case #1:

Your client is pulled over for speeding at 1 AM. He provides a breath sample of 0.12 grams at 2 AM. The following information is given to the police officer:

- He had his first drink at 9 PM
- He had his last drink at midnight
- He ate dinner at 7 PM and snacked a little at the party
- He was drinking 12 oz. bottles of Bud Lite.

The officer also knows that: (1) your client is male; and (2) he weighs 180 lbs (from booking information).

Question:

Does the State's expert have enough information to perform a back extrapolation calculation?

Answer:

Yes. The expert knows your client's gender, weight, time of first drink, time of last drink, type and size of drink and has some idea of possible food in the stomach. This is enough information for them to calculate a possible range at the time of driving.

Remember that this does not mean the result is accurate. The calculation still consists of averages.

Hypothetical Case #2:

Your client is pulled over for speeding at 1 AM. His breath test result at 2 AM is 0.12. The following information is given to the police officer:

- He had his first drink "at 7 or 8."
- He drank beer.
- He had his last drink "a little while ago."

The officer also knows that: (1) your client is male; and (2) he weighs 180 lbs (from booking information).

Question:

Does the State's expert have enough information to perform a back extrapolation calculation?

Answer:

No. There is not sufficient information regarding the time of the first and last drink and there is no information regarding food in the stomach. I would object to any attempt to perform back extrapolation on this information and argue that it should be excluded.



Embracing Retrograde Evidence Admissibility

Every state has its own case law regarding the admissibility of retrograde extrapolation testimony. Justice Keasler's analysis in *Mata* includes a summary of the pertinent scientific literature as well as the areas in which scientists disagree. If you have not read the opinion, I encourage you to do so. The Court ruled that retrograde extrapolation evidence can be admissible in certain cases:

We believe that the science of retrograde extrapolation can be reliable in a given case. The expert's ability to apply the science and explain it with clarity to the court is a paramount consideration. In addition, the expert must demonstrate some understanding of the difficulties associated with a retrograde extrapolation. He must demonstrate an awareness of the subtleties of the science and the risks inherent in any extrapolation. Finally, he must be able to clearly and consistently apply the science.

The court evaluating the reliability of a retrograde extrapolation should also consider: (a) the length of time between the offense and the test(s) administered; (b) the number of tests given and the length of time between each test; and (c) whether, and if so, to what extent, any individual characteristics of the defendant were known to the expert in providing his extrapolation. These characteristics and behaviors might include, but are not limited to, the person's weight and gender, the person's typical drinking pattern and tolerance for alcohol, how much the person had to drink on the day or night in question, what the person drank, the duration of the drinking spree, the time of the last drink, and how much and what the person had to eat either before, during, or after the drinking. [*Mata* at page 916.]

Each Case Requires Separate Analysis

From a tactical standpoint, each test case requires an analysis of whether or not retrograde extrapolation evidence will help or harm your client. State's experts will testify to a range of possible alcohol concentrations based on a mathematical calculation. Depending on the particular facts of your case, the range may include an alcohol concentration below the legal limit of 0.08. If this is the case, then the expert should admit during cross-examination that he/she cannot tell the jury that your client's BAC or BrAC was over 0.08 at the time the client was actually driving. In fact, it is *just* as likely that your client was below 0.08 as above it. As a result, you may choose not to contest the State's offer of this testimony as part of your trial strategy. Moreover, you may actually elicit the testimony yourself if the State fails to do so. I have asked State's experts to perform retrograde calculations in low breath test cases where the State's attorney specifically did not ask about it because the prosecutor knew the testimony would include a low-end concentration level below 0.08.

PRACTICE TIP:

Ask about retrograde extrapolation calculation in advance

Depending on what is customary in your area, you may want to contact the State's expert in advance and ask if he or she has been given retrograde facts by the State's attorney and whether he or she has provided the State with a retrograde extrapolation calculation. Often this is done via E-mail. If the expert has done the calculation for the State, I ask them to provide it to me so I'll know in advance what retrograde range will be provided to the jury.

Excluding and Challenging Retrograde Evidence Request an Evidentiary Hearing to Exclude Retrograde Extrapolation

Each state has its procedures regarding objections to the admissibility of scientific evidence. In most instances, you will need to ask for a hearing *BEFORE the State's expert gives an opinion*. Some judges like to hold hearings at the start of a trial in order to make their rulings in advance and to keep the trial flowing. Others will remove the jury when you make your request and hold the hearing in the middle of testimony. Either way, you will need to be prepared to voir dire the State's expert on the factors used to perform the retrograde extrapolation equation and then specify why you do not believe the State's expert has enough data to calculate a retrograde extrapolation range.

A Sample Cross-Examination Challenging the Validity of Retrograde Extrapolation Evidence:

If testimony regarding retrograde extrapolation is admitted and it is not helpful to your defense, your best line of attack is pointing out the “dubious” nature of the practice. Here are some sample questions, assuming you have already had the witness recognize Doctors Dubowski and Jones as authorities. These questions are geared toward the articles previously discussed in this chapter. If the State's expert denies something included in one of the articles, be prepared for it so that you can give them an opportunity to review that particular section and possibly re-think the answer.

*For excerpts of trial transcripts that discuss the issue of retrograde extrapolation, please see Ch. 6 of the **Texas DWI Manual** by Deandra M. Grant and Kimberly Griffin Tucker.*

Some Sample Questions

Q: This calculation you just did for the jury, isn't it true that you had already performed the calculation for the DA prior to trial?

Q: So when she just gave you that hypothetical information and you punched some numbers into your calculator, you both already knew the answer to her question?

Q: What is the exact calculation you are making?

Q: Have you heard of a scientist by the name of Widmark?

Q: Can you tell the jury who Dr. Widmark was?

Q: Are you using Dr. Widmark's formula to compute the numbers in this case?

Q: You would agree that performing a back extrapolation requires you to use several “averages,” correct?

Q: You would agree that you have no way of knowing whether my client actually falls into the category of “average” for any of the factors you are using in your equation?

Q: You would agree that the scientific community frowns on the use of back extrapolation testimony due to the large number of uncertainties involved?

Q: In fact, your teachers, Dr. Dubowski and Dr. Jones, the two most well-known and well-published experts in this field who you recognize as authorities in this area, disagree with the use of back extrapolation?

Q: You are aware that Dr. Jones has referred to the practice as “dubious”?

Q: What elimination rate are you using?

Q: Isn't it true that the scientific literature reports a wide range of elimination rates found in test subjects and that 0.015 (or 0.020 or *whatever the witness used*) is merely a commonly used AVERAGE?

Q: As you sit here today, can you tell this jury what my client's elimination rate was on the night he was arrested?

Q: So if it was not 0.015 (or *whatever rate was used*), then your calculation would be off, wouldn't it?

Q: Another important variable in retrograde extrapolation is the rate of absorption?

Q: You agree that the calculation itself is meaningless if the person is still absorbing alcohol?

Q: In order to perform this calculation, you made the assumption that all of the alcohol in my client's stomach had been fully absorbed and that he was in what is commonly referred to as the elimination phase?

Q: You agree that the scientific literature also reports a wide range of absorption rates?

Q: In fact, your teachers, Dr. Dubowski and Dr. Jones, as well as many others, have experimented and written extensively on all of the many variables that can impact absorption rates, correct?

Q: Do you agree with Dr. Jones that the rate of absorption of alcohol can be impacted by the type of alcohol a person drinks? (i.e., beer vs. whiskey)

Q: Time of day? (For this factor and the ones that follow, see *Garriott's 5th edition at page 57.*)

Q: Trauma?

Q: Cigarette smoking?

Q: Carbonated drinks?

Q: Prescription medications?

Q: Low blood sugar?

Q: Those are lots of variables, aren't they?

Q: Food in the stomach?

Q: Do you know how much food was in my client's stomach that evening?

Q: You're really just making assumptions with regard to whether or not food might have slowed down the alcohol absorption process?

Q: Body fat vs. muscle mass is another variable that needs to be taken into consideration, wouldn't you agree?

Q: Dr. Widmark used young Swedish male subjects in the 1930s for his study, correct?

Q: In fact, researchers after Widmark have recommended using body mass index numbers to more accurately reflect a population that perhaps is not quite the same physically as the 1930s Swedes that Dr. Widmark tested, correct?

Q: After all, people today tend to carry more body fat, don't they?

Q: When taking into account all of the uncertainty involved in attempting to back extrapolate, the calculated range you just gave the jury of what my client's alcohol concentration MIGHT HAVE BEEN when he was driving amounts to nothing more than a guess, right?

(the witness might say it's an educated guess but emphasize that it's still a guess).

Conclusion / Summary

Retrograde extrapolation evidence is often used in DUI prosecutions and it is important for DUI defense attorneys to understand what it is and its limitations. As is the case whenever "scientific" evidence is offered by the State, the prepared defense attorney is the effective attorney. 

Comments? Contact us here: Comments@Counterpoint-Journal.com

For Further Inquiry:

Dubowski, K. M., *Absorption, Distribution and Elimination of Alcohol: Highway Safety Aspects*, J. Stud. Alcohol, Supp. No. 10 (July 1985).

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Jones, A.W., *Forensic Science Aspects of Alcohol Metabolism*, For Sci Prog Vol 5, 1991.

About the Author:

Deandra M. Grant has represented hundreds of Texans charged with criminal offenses such as DWI, violent felonies, and sex crimes. She earned her law degree from Southern Methodist University School of Law, and began her career as a prosecutor focusing on DWI cases. In 1995, she founded her own firm.



Deandra is a national instructor on DWI law, science, and trial skills. She is trained in Standardized Field Sobriety Testing and has successfully completed both the SFST Instructor Course and a Drug Recognition (DRE) course. In addition, Deandra has completed coursework in DWI forensic blood testing and the operation and scientific theory of the Intoxilyzer 5000. In 2011, she received a certificate in forensic gas chromatography from the American Chemical Society.

Deandra is a member of the State Bar of Texas, the DUI Defense Lawyers Association, and the Texas Criminal Defense Lawyers Association (Board 2012-15, DWI Committee Chair 2012-13), and has served on the Board of the Dallas Criminal Defense Lawyers Association since 2007. She is also a member of the American Chemical Society and the American Academy of Forensic Sciences. Deandra is AV rated by Martindale Hubbell, and was named a Texas Super Lawyer in 2011 and 2012.