IN THE SUPERIOR COURT OF THE STATE OF DELAWARE

STATE OF DELAWARE	:	
v.	:	I.D. No. 1411013133
LAMONTRA R. FOUNTAIN,	:	
Defendant.	:	

MEMORANDUM OPINION

Upon Defendant's Motion to Suppress
Granted

Submitted: August 24, 2016
Decided: August 30, 2016

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STOKES, J.

I. INTRODUCTION

Defendant, Lamontra Fountain ("Defendant"), was arrested on November 21, 2014, and charged with Driving Under the Influence of Alcohol. Defendant moved to preclude the admission of his blood test results based upon the failure of the State of Delaware (the "State") to demonstrate compliance with the instructions provided in the Delaware State Police Blood Alcohol Evidence Collection Kit. At the pretrial hearing, the Court found the State laid the proper foundation for the admission of Defendant's blood test results. However, after trial began and upon hearing testimony from the State's chemist, the Court reversed its decision and suppressed the blood test results based upon the fact that the tube used in Defendant's blood draw was not filled to "maximum volume." The State filed a motion for reargument contending that, however interpreted, maximum volume does not require a full ten milliliters be drawn. The motion was granted in order to clarify the significance and meaning of the direction. After reconsideration, Defendant's Motion to Suppress is **GRANTED.**

II. FACTS AND PROCEDURAL POSTURE

On November 21, 2014, Defendant was stopped while driving by Corporal Christopher Miller ("Cpl. Miller") of the Seaford Police Department. After speaking with Defendant, Cpl. Miller detected a strong alcoholic odor on his breath and an odor of burnt marijuana from inside his vehicle. Based on these observations, Cpl. Miller decided to subject Defendant to a battery of field sobriety tests. From the results of the field tests, Defendant was arrested for Driving Under the Influence and various other violations. Shortly thereafter, Cpl. Miller obtained a search warrant for a sample of Defendant's blood and transported Defendant to Nanticoke Memorial Hospital to execute the warrant.

At the hospital, Cpl. Miller provided Jennifer Ganly ("Ganly"), a phlebotomist, with a Delaware State Police Blood Alcohol Evidence Collection Kit (the "Kit").[1] Although Ganly testified that a legal blood draw requires ten milliliters of blood,[2] the sample she obtained from Defendant was approximately six milliliters. The sample was then sealed and logged into evidence at the Seaford Police Department.

On December 11, 2014, Defendant's blood sample was transferred from the Seaford Police Department to the Delaware State Police Crime Lab ("DSPCL"). The analysis performed on the blood sample revealed that Defendant's blood alcohol content ("BAC") was above the legal limit.[3] Defendant was charged by Information with Driving Under the Influence of Alcohol and associated charges on January 21, 2015.

On April 14, 2015, Defendant moved to preclude the admission of his blood test results asserting breaks in the chain of custody. After a hearing, the Court found the State met the necessary threshold in establishing that the evidence was what it purported to be, and Defendant's Motion was denied. Trial was scheduled for July 15, 2015, but before trial began, an evidentiary hearing was held to determine whether the manner in which Defendant's blood was drawn complied with the instructions provided in the Kit. Ultimately, as discussed above, the decision was reversed because the blood tube used was not filled to maximum volume. Step 2 of the Kit states: "Using normal procedures, withdraw blood from subject (allow tube to fill to maximum volume)." A mistrial was declared as the jury already heard evidence that Defendant's BAC was above the legal limit, and the results could overwhelm the jurors' ability to fairly decide the remaining issues in the case.

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[1] Cpl. Miller also provided Ganly with a Suspect Drug Use Kit. Although Ganly used the tube provided in the Suspect Drug Kit to collect Defendant's blood, the sample was not tested before trial.
[2] *State v. Fountain*, ID No. 1411013133, at A-40 (Del. Super. July 15, 2015) (TRANSCRIPT) [hereinafter "July 2015 Hr'g"].
[3] *See* 21 *Del. C.* § 4177.

Following the granting of the motion, an evidentiary hearing was held to consider the State's position that "a tube less full than 'maximum volume' does not affect the scientific soundness and validity of a blood sample."[4] At the April 19, 2016 hearing, four witnesses testified on behalf of the State. They were: Eric Barton, vice president of Tritech Forensics;[5] Melvin Finke, product development engineer for Medtronic;[6] Dr. Ana Stankovic, clinical pathologist and vice president of Becton Dickinson ("BD");[7] and Julie Willey, Director of the DSPCL. Additionally, the State submitted documentary evidence. Thereafter, the issue was briefed by the parties.

While preparing to render its decision, it became apparent to the Court that some questions were left unanswered. Specifically, what effects, if any, a lower sample volume had on the test's reliability? As a result, the parties were asked to present additional expert testimony addressing that issue. The Court heard testimony from two experts on behalf of the State—Jack Kalin ("Kalin"), Alabama's former Chief Toxicologist, and Alan Wayne Jones ("Jones"), Sweden's former Chief Toxicologist. In rebuttal, Defendant offered testimony from Dr. Stefan Rose ("Rose"), a forensic physician.

III. PARTIES' CONTENTIONS

A. State's Contentions

The State argues "[b]ecause [the DSPCL Director] has validated the reliability of her results with the gas chromatograph regardless of the number of mLs collected in the grey top

[4] State's Mot. for Rearg. at 6.
[5] Tritech Forensics manufactures evidence collection kits for law enforcement. The Kit used to collect Defendant's blood was manufactured by Tritech.
[6] Medtronic, formerly known as Covidien, is a medical device company that manufactures and sells medical devices.
[7] BD is a medical device company that manufactures and sells medical devices. Although Tritech buys blood collection tubes from Medtronic and BD, Tritech's vice president testified that the bulk of the tubes used for their blood collection kits are manufactured by BD. *See State v. Fountain*, ID No. 1411013133, at 21 (Del. Super. Apr. 19, 2016) (TRANSCRIPT) [hereinafter "April Hr'g"].

tube, *Hunter* [*v. State*][8] was not violated."[9] Essentially, the State contends strict compliance with the manufacturer's protocol—as required under *Hunter*—chooses form over function and ignores the scientific principles that support the test's reliability. Further, the language, "allow tube to fill to maximum volume," from Step 2 of the Kit's Instructions, "is satisfied when a sufficient sample is collected to be tested."[10]

B. Defendant's Contentions

Defendant contends that by failing to exhaust the vacuum inside the blood collection tube, the DSPCL did not comply with the manufacturer's protocol, and the test is invalid.[11] Further, the State did not "demonstrate any valid scientific testing, or provide a qualified expert opinion, to support its claim that the blood test should be admitted even though the State Crime Lab did not comply with the manufacturer's use requirements."[12]

IV. APPLICABLE LAW

Concerning the admissibility of scientific test results, Delaware law is clear. As stated by our Supreme Court:

> In *Clawson v. State,* we stated that "the admissibility of intoxilyzer test results center on the State providing an adequate evidentiary foundation for the test result's admission." We held that it was error for the trial court to admit into evidence the results of an Intoxilyzer 5000 test when it was determined that the manufacturer's protocol was not complied with before the test was administered. Following the manufacturer's use requirements ensures the reliability of the scientific test. It is this guarantee of reliability and accuracy that is the foundational cornerstone to the admissibility of the results of a scientific test. Without that guarantee of reliability, there exists too great a risk that a jury will be persuaded by scientific evidence that is unreliable.
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> In *Clawson,* we held that "the admission of a test result that was not in compliance with the manufacturer's requirements jeopardized the fairness of [a]

[8] 55 A.3d 360 (Del. 2012).
[9] State's Op. Br. at 22-23.
[10] *Id.* at 22.
[11] Def.'s Ans. Br. at 12.
[12] *Id.* at 14.

> trial." In Hunter's case, using the expired vacutainer tubes in the blood test kit was in direct contravention of the manufacturer's specification sheet for the vacutainer tubes. In Hunter's case, shaking the tubes vigorously was in direct violation of the manufacturer's instructions for use of the kit.
>
> In accordance with our holding in *Clawson v. State*, those two independent deviations from the manufacturer's required protocol, standing alone, each rendered the BAC test inadmissible due to the lack of a proper foundation. It was an abuse of discretion for the trial judge to deny Hunter's motion to suppress the results of the BAC test. Therefore, Hunter's DUI conviction must be reversed.[13]

Straightforwardly, when performing a scientific test, deviations from protocol threaten the test's validity where the result determines a central issue, *i.e.*, a BAC above the legal limit, and it cannot be based upon unreliable evidence. In that context, there can be no confidence in a jury verdict or the fairness of a trial.

V. DISCUSSION

A. Maximum Volume

From the outset of this litigation, the meaning of the phrase, maximum volume, as stated in the Kit's Instructions, has been the subject of much debate. At the pretrial hearing on Defendant's Motion to Suppress, even though the issue was chain of custody, the Court heard testimony from Ganly about Defendant's blood draw. When asked what maximum volume meant to her, Ganly replied, "When the blood stops flowing into the tube. It has a vacuum in the tube that allows the blood to go into the tube."[14] Shortly after, when asked how full the blood tube needed to be in order to obtain a viable sample, Ganly replied, "At least, up to the label."[15] Ganly later testified that a legal blood draw requires ten milliliters but filling the tube with ten milliliters is not possible because of the rubber stopper. Finally, Ganly explained that although

[13] *Hunter*, 55 A.3d at 365-66 (Del. 2012) (quoting *Clawson v. State*, 867 A.2d 187, 191-93 (Del. 2005)).
[14] July 2015 Hr'g at A-16. Ganly explained that the amount that flows into the tube is the same for every patient. Interestingly, Willey testified that the amount of blood drawn is patient specific. *See infra*, at 12.
[15] *Id.* at A-22.

the tube was designed to draw ten milliliters of blood, the most it could hold was approximately eight milliliters.

The Court initially found the State demonstrated compliance as required under *Hunter* because the blood tube appeared to be filled all the way. However, upon closer examination, the tube only appeared full because the sides were stained with blood. In fact, the tube was filled approximately halfway. Furthermore, during trial, testimony from Whitney Smith ("Smith"), the DSPCL chemist who tested Defendant's blood, revealed further confusion surrounding the phrase maximum volume. Upon questioning Smith about its meaning, she replied, "I don't quite understand the term, maximum volume."[16] As a result, Defendant's BAC results were suppressed.

In its Motion for Reargument, the State argued maximum volume does not mean a full tube of blood is required for testing, and testimony from Willey, Director of the DSPCL, would support that contention. Consequently, while the State's Motion for Reargument was granted, the State was required to proffer testimony from the blood tube manufacturer given the holding in *Hunter*.[17] At Defendant's April 19, 2016 hearing, the State proffered testimony from BD's vice president and clinical pathologist, Dr. Stankovic.[18] Dr. Stankovic explained BD's tubes can hold a maximum of 10.7 milliliters of blood. Also, Dr. Stankovic testified that, concerning BD's tubes, maximum volume means exhausting the vacuum completely "because only then will you get the correct blood to additive ratio. And that is important because we guarantee the

[16] July 2015 Hr'g at B-63.
[17] *See Fountain*, 2015 WL 6437462, at *2.
[18] At Defendant's blood draw, both a Medtronic tube and a BD tube were used. Because both tubes comply with the same FDA requirements, Dr. Stankovic's testimony is applicable to evacuated blood tubes manufactured by Medtronic as well.

performance of the product in these circumstances."[19] In other words, the reliability of the test result is warranted as scientific tests were done to replicate consistent results.

During Dr. Stankovic's direct examination, the State submitted instructions that BD sends in every shipment of blood tubes. The instructions include several passages pertinent to the issue at bar. One such passage, recognizing that limitations of the evacuated blood tube system exist, states: "The quantity of blood drawn varies with altitude, ambient temperature, barometric pressure, tube age, venous pressure, and filling technique, ..."[20] Dr. Stankovic confirmed this notion and explained, "[I]t's reasonable to assume that you might not be able to get nine [m]Ls of blood minimum every single time."[21]

The next witness called to testify on behalf of the State was Willey. As Willey began to testify, it became clear that neither she nor any other current employee of the DSPCL drafted the Kit's Instructions. In fact, Willey testified that the Kit's Instructions have remained unchanged throughout her tenure as Director.[22] Defining maximum volume proved to be an elusive affair. The first time Willey was asked to define maximum volume, she responded, "[T]he maximum volume is the maximum amount of blood that could be drawn into a specific tube that is utilized for a blood draw."[23] A few questions later, Willey testified that maximum volume was not a set amount and was patient specific. In her final attempt to define maximum volume, Willey stated, "Maximum volume to me means the sufficient amount of sample that can be tested so we can generate an accurate result and issue a report from the Delaware State Police Crime Lab."[24]

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[19] April Hr'g at 91.
[20] State's Ex. 9 at 2.
[21] April Hr'g at 99.
[22] The language was developed by an earlier State examiner, however, and not by a manufacturer.
[23] *Id.* at 148.
[24] *Id.* at 173.

Since the meaning of maximum volume was still unclear, additional attempts to define the phrase were made. At the July 11, 2016 hearing, it was established that Kalin, former Alabama Chief Toxicologist, drafted the instructions included inside Alabama's blood alcohol evidence collection kit. Similar to Delaware, Alabama's instructions use the phrase, maximum volume. When asked why he chose this language, Kalin explained:

> Because we were a full-service toxicology laboratory, we didn't know, when a case came in, what we would be doing with a sample. We may just do an ethanol determination and a drug screen that would require, oh, just a fraction of a milliliter to complete. On the other hand, we may have to do full confirmations, quantifications and we might need 10 to 15 milliliters in order to conduct all those tests. So the reason for that, [f]ill to maximum volume, is to, at least, have people give us enough sample in case we needed to do all the testing we might want to do.[25]

Kalin stated the only reason that he included the phrase maximum volume was to ensure he got as much blood as possible. He did so because he recognized that tubes would be submitted with varying volumes of blood. Additionally, he ascribed no weight to Dr. Stankovic's testimony that a minimum of nine milliliters is required "[b]ecause that doesn't matter."[26]

Jones, the State's next expert, was also asked to define maximum volume; he stated, "To try to get as much blood as possible."[27] He also explained that some patients may have fragile or collapsed veins which could affect the amount of blood drawn. When Defendant's expert, Rose, was asked the same question, he explained that:

> [M]aximum volume means the amount of the maximum amount of blood that the tube will allow to be filled when it's collected properly from either an artery or vein, depending on what the tube use is for and if the vacuum is lost then the tube will not be filled to maximum volume or if the vacuum is intact and for whatever

[25] *State v. Fountain*, ID No. 1411013133, at 22-23 (Del. Super. July 11, 2016) (TRANSCRIPT) [hereinafter "July 2016 Hr'g"].
[26] *Id.* at 100.
[27] *State v. Fountain*, ID No. 1411013133, at 32 (Del. Super. Aug. 11, 2016) (TRANSCRIPT) [hereinafter "Jones Hr'g"].

> reason the blood vessel that the needle is inserted into is not capable of delivering enough blood.[28]

After reviewing the entire record, although several different interpretations of maximum volume were proffered, all the interpretations shared a common thread; maximum volume will vary from patient to patient. Given the number of external factors that could potentially affect the amount of blood drawn, *e.g.*, altitude, ambient temperature, barometric pressure etc., maximum volume will vary and will not be a specific amount each time. In light of that, the most logical definition of maximum volume, in the context of the Kit's Instructions, is enough blood to produce reliable results. As will be explained, .5 milliliters of blood or more can yield reliable results. Therefore, maximum volume is satisfied when a phlebotomist, using normal procedures, collects as much blood as reasonably possible in excess of .5 milliliters.

Defining maximum volume this way is also supported by the following caveat in BD's instructions:

> Whenever changing any manufacturer's blood collection tube type, size, handling, processing or storage condition for a particular laboratory assay, the laboratory personnel should review the tube manufacturer's data and their own data to establish/verify the reference range for specific instrument/reagent system. Based on such information, the laboratory can then decide if a change is appropriate.[29]

Dr. Stankovic explained that this caveat was included to account for factors beyond their control which could affect the amount of blood drawn.[30] She further explained that the laboratory is free to use the blood tubes to suit their needs so long as the results are validated. The above-mentioned caveat anticipates end users developing their own instructions and protocol. Because of this, a sample of blood less than nine milliliters would not be a deviation as contemplated under *Hunter*.

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[28] *State v. Fountain*, ID No. 1411013133, at 27 (Del. Super. Aug. 12, 2016) (TRANSCRIPT) [hereinafter "Rose Hr'g"].
[29] State's Ex. 9 at 4.
[30] April Hr'g at 94.

By way of comparison, in *Hunter*, the tube used for the defendant's blood draw was expired.[31] The Court found the results to be inadmissible even though the State proffered expert testimony from a DSPCL chemist establishing that an expired tube would not affect the test's reliability.[32] BD's instructions explicitly state: "Do not use tubes after their expiration date."[33] Unlike the present case, BD's instructions do not include a caveat which allows for the use of an expired tube even if the results are validated.

Assuming *arguendo* that maximum volume means an amount between nine and 10.7 milliliters and that obtaining less would be a deviation from protocol, the State has demonstrated that samples less than nine milliliters are reliable nonetheless. To better understand this, a brief overview of the testing process is necessary.

B. Blood Alcohol Testing

1. Headspace Gas Chromatography

Headspace gas chromatography ("HSGC") is the method used by the DSPCL to analyze BAC. HSGC measures the amount of gaseous alcohol in the headspace above the sample. Because alcohol in blood is volatile, it partitions into the headspace above a blood sample in a unique and consistent manner based on certain temperature and constant pressure. At a given temperature, the amount of alcohol in the headspace is proportional to the concentration of alcohol in the blood sample.[34] The gaseous vapor is then introduced into a machine known as a gas chromatograph. Ultimately, it will permit the calculation of the BAC of the blood sample at the time of collection.[35]

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[31] *Hunter*, 55 A.3d at 364.
[32] *Id.* at 364-66.
[33] State's Ex. 9 at 3.
[34] This phenomenon is known as "Henry's Law."
[35] *See generally*, Harold M. McNair & James M. Miller, BASIC GAS CHROMATOGRAPHY (2d ed. 2009).

Before the technician can run any tests, however, he or she must prepare the blood sample. First, using a pipette,[36] the technician transports .1 milliliter aliquot[37] of blood from the sample tube into a headspace vial. Next, the .1 milliliter sample is diluted ten times with an internal standard (the "Dilution Process"). The Dilution Process is done irrespective of whether the blood tube is full, half full, or barely full.[38] It is this step in HSGC process which forms the basis of the State's contention that a sample size of .5 milliliters is all that is required. Support for this notion originated from a paper[39] published by Jones, one of the State's experts. In order for this scientific evidence to be admissible, however, it must be relevant and reliable.[40]

2. The Dilution Process Under *Daubert*

Delaware Rule of Evidence 702, which governs the admissibility of expert testimony or evidence, provides:

> If scientific, technical or other specialized knowledge will assist the trier of fact to understand the evidence or to determine a fact in issue, a witness qualified as an expert by knowledge, skill, experience, training or education may testify thereto in the form of an opinion or otherwise, if (1) the testimony is based upon sufficient facts or data, (2) the testimony is the product of reliable principles and methods, and (3) the witness has applied the principles and methods reliably to the facts of the case.

D.R.E. 702 is identical to its federal counterpart, and the Delaware Supreme Court has adopted the United States Supreme Court's rulings in *Daubert v. Merrell Dow*[41] and *Kumho Tire Co. v. Carmichael*[42] "as the correct interpretation of Delaware Rule of Evidence 702."[43] "*Daubert* describes Rule 702's 'overarching subject [a]s the scientific validity—and thus the evidentiary

[36] A pipette is a laboratory tool commonly used in chemistry to transport a measured volume of liquid.
[37] An aliquot is a portion of a larger whole.
[38] *See* McNair & Miller, *supra* note 35 at 141 (2d ed. 2009) ("The internal standard method does not require exact or consistent sample volumes . . . .").
[39] A.W. Jones, *Blood Analysis by Headspace Gas Chromatography: Does a Deficient Sample Volume Distort Ethanol Concentration?*, 43 MED. SCI. LAW 241, 245 (2003).
[40] D.R.E. 702.
[41] 509 U.S. (1993).
[42] 526 U.S. (1999).
[43] *M.G. Bancorporation, Inc. v. Le Beau*, 737 A.2d 513 (Del. 1999).

relevance and reliability—of the principles that underlie the submission.' "[44] The trial judge acts as a gatekeeper to determine whether the expert testimony or evidence is both relevant and reliable.[45]

Evidence is relevant if it relates to an "issue in the case"[46] and "assist[s] the trier of fact to understand the evidence or to determine a fact issue."[47] "To determine reliability under *Daubert*, the trial court must consider a non-exhaustive list of factors."[48] Those factors include: (1) whether the expert evidence or testimony "can be (and has been) tested," (2) "whether it has been subject to peer review and publication," (3) "its known or potential error rate," and (4) "whether it has attracted widespread acceptance within a relevant scientific community."[49] While flexible, the focus of a Rule 702 analysis "must be solely on principles and methodology, not on the conclusions that they generate."[50]

Both Kalin and Jones offered testimony regarding the scientific validity of the Dilution Process. Since both opinions echo one another, the Court will focus upon Jones' testimony.

Jones qualifies as an expert under D.R.E. 702.[51] As one of the preeminent experts on breath and blood alcohol testing, Jones is qualified by knowledge, skill, experience, training, and education.[52] He obtained a Ph.D. on the subject of measuring alcohol in breath and blood in 1974. Jones also received a Senior Doctorate of Science as a result of his numerous publications on the subject of forensic alcohol analysis. For thirty years, Jones was a practicing forensic toxicologist and retired as the head of Sweden's toxicology laboratory. Jones is not only a

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[44] *Tumlinson v. Advanced Micro Devices, Inc.*, 81 A.3d 1264 (Del. 2013) (emphasis in original).
[45] *Id.*
[46] *Daubert*, 509 U.S. at 591.
[47] *Id.*
[48] *Tumlinson*, 81 A.3d at 1269.
[49] *Daubert*, 509 U.S. at 580.
[50] *Id.* at 595.
[51] For a copy of Jones' curriculum vitae, see 1 Fitzgerald, Intoxication Test Evidence § 36.7 (2d ed.).
[52] *See* 1 Fitzgerald, Intoxication Test Evidence § 22:14 (2d ed.) (regarding Jones as one of the most prolific writers and researchers in the field of forensic toxicology).

member of numerous professional associations, but also is a frequent presenter on the topic of blood alcohol analysis. Throughout his career, Jones has testified as an expert in cases all over the world.

The evidence and testimony Jones presented is relevant to the facts and would be helpful in resolving this issue. However, before the Court can accept Jones' testimony as scientifically valid, it must determine if it is reliable.

At the August 11, 2016 hearing, Jones testified that his research into whether the volume of the blood sample collected affected the reliability of the results was motivated by a case in England. In that case, the defendant, who was suspected of driving under the influence of alcohol, was acquitted after an expert testified that a deficient volume of blood would artificially increase the BAC detected. Jones disagreed with this conclusion and set out to refute this notion.

To test his theory, Jones filled ten tubes with an identical amount of alcohol. Then, he filled the tubes with varying amounts of his own blood to mimic a situation in which the phlebotomist did not draw a full tube. Jones testified that the results of this experiment demonstrated that an over concentration of sodium fluoride in an under-filled tube did not cause inflated BAC results. In fact, any effects that occurred were in a defendant's favor because the BAC actually decreased.[53] However, a decreased BAC only occurred when a sample size of .5 milliliters or less was collected.

One of the *Daubert* factors is whether the expert's theory can and has been tested. Jones' theory can and has been tested. Not only did he test his theory, but his theory was also tested by other scientists in the field. The study, "Absence of Salting out Effects in Forensic Blood Alcohol Determination at Various Concentrations of Sodium Fluoride Using Semi-Automated

[53] *See*, Jones *supra* note 36 at 246 ("When a deficient volume of blood or urine is sent for determination of ethanol by [Headspace Gas Chromatography], the drunk driver gains a slight advantage compared with a tube filled with blood and no excess [sodium fluoride].").

Headspace Gas Chromatography," confirmed Jones' theory that despite an over concentration of sodium fluoride, reliable results were still obtainable.[54]

Another factor of reliability under *Daubert* is whether the expert's methods were subject to the rigors of peer review and publication. During his testimony, Jones explained that his article was subjected to peer review and published in a medical journal. While relevant, peer review and publication is not a *sine qua non* of admissibility as it does not necessarily correlate with reliability.[55]

In addition, Courts consider the known or potential error rate. Under Jones' theory, the only known error rate is a 2-3% decrease in BAC. However, this only occurs when the volume of the sample collected is .5 milliliters or less. If the DSPCL were to receive a blood tube with .5 milliliters or less, the specimen would be rejected and not subject to testing.

Courts also consider whether the scientific theory has gained widespread acceptance in the relevant scientific community. The article wherein Jones proposed this theory has been cited numerous times by other experts in the field. Further, Jones, Kalin, and Willey testified that this theory had gained general acceptance in the scientific community.

Defendant's expert, Rose, was also qualified under D.R.E. 702. However, the Court was not persuaded by his testimony. First and foremost, Rose recognized the Dilution Process as a valid technique and conceded that he uses the method and will continue doing so.[56] Second, none of his opinions were supported by documentation. Finally, Rose opined that even if a tube was filled between nine and 10.7 milliliters, there was still a potential for unreliable results. In sum, Rose's testimony was speculative, contradictory, and unhelpful.

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[54] B.A. Miller *et al.*, *Absence of Salting out Effects in Forensic Blood Alcohol Determination at Various Concentrations of Sodium Fluoride Using Semi-Automated Headspace Gas Chromatography*, 44 SCI. & JUST. 73, 76 (2004).
[55] *Daubert*, 509 U.S. at 593.
[56] Rose Hr'g at 61.

Essentially, Jones merely reconfirmed the use of the Dilution Process in the sample used in the chromatograph. Kalin's testimony was particularly helpful to explain this situation. This technique is commonly performed in forensic laboratories. When a tube is filled with varying amounts of blood, there is the possibility that the preservatives in the tube, namely sodium fluoride, will be over concentrated. If no precautions are taken, an over concentrated amount has the potential to cause an over inflated presence of ethanol in the headspace tested in the chromatograph.[57] By diluting the sample taken from the collection tube, potential inconsistencies caused by the "salting out" process are eliminated.

Furthermore, if blood collection tubes are filled to nine milliliters or more, the preservatives introduced by the manufacturer are effective to ensure against contamination and to prevent enzyme activity that could result in the presence of more ethanol in the blood than was present at the time of collection. The reference in the literature is the blood-to-additive ratio. The tube tested, which was manufactured by Medtronic, had no instructions as to quantity. The BD manual includes a commercial warranty for its tubes when nine or more milliliters of blood is drawn. As BD's expert acknowledged, the guarantee does not mean that, in situations where less blood is drawn, analytical results were unreliable.

The sample in Defendant's case was clear. There was no clotting or smell that suggests any red flags. The DSPCL followed the Dilution Process and Jones and Kalin found the DSPCL's procedures appropriate.

[57] *See generally* A.W. Jones, *Determination of Liquid/Air Partition Coefficients for Dilute Solutions of Ethanol in Water, Whole Blood, and Plasma*, 7 J. ANALYTICAL TOXICOLOGY 193 (1983).

In passing, the research done in this case indicates that many jurisdictions do not specify any particular amount of blood that needs to be drawn.[58] This reinforces the experience that an exact amount of blood will not always be drawn in the best of conditions, setting aside the challenges that blood draws may present in emergency rooms with defendants presenting in difficult circumstances. The research also reflects that consideration should be given to formalize the directions by a regulatory process often done by agency action.[59]

C. Defendant's BAC Results

Although the State has established that .5 milliliters of blood is all that is required for reliable BAC results, and that Defendant's blood sample was well above that at six milliliters, there is evidence in the record which necessitates suppression. At the July 15, 2015 evidentiary hearing, Ganly testified as to how she performed the blood draw. The following excerpt is from Ganly's testimony on cross-examination:

Ganly:	I put the needle on the tube and then I put the needle into his arm, but I cleaned it first.
Counsel:	Let me step back. So you cleaned the site?
Ganly:	Yes.
Counsel:	With—
Ganly:	Iodine.
Counsel:	And how can you be sure it's iodine?

[58] *See e.g.*, Ohio Admin Code. 3701-52-05 (requiring blood to be drawn into a vacuum container without specifying the volume); Mont. Admin. R. 23.4.220 (requiring samples of "sufficient volume" to provide accurate and repeatable analyses); Miss. Admin. Code 31-5-2:1753.000 (indicating that a low sample volume will not preclude testing).

[59] For a complete list of states that have adopted formal blood alcohol testing regulations, see 50 State Regulatory Surveys: Criminal Laws: Blood Alcohol Testing (2016). Delaware is one of nine states without formal administrative regulations.

Ganly: I'm positive it's iodine because it leaves a yellow tint to the skin and I always clean it with the stuff that the State Police provide us with.

Counsel: So the very next thing is—I wish I had something to use for demonstration, but—you have the needle part—

Ganly: Mm-hmm.

Counsel: —and the tube. You put the tube on to the needle; is that what you said, correct?

Ganly: The needle on to the vacuum container.

Counsel: Yes, I'm sorry. And then you place it into his arm?

Ganly: Yes.[60]

Ganly's testimony is problematic because puncturing the tube before the needle is in the arm will not only degrade the vacuum prematurely but also compromise the tube's sterility. This type of exposure could allow in contaminants that cause fermentation which could artificially inflate BAC results. Ganly later tried to retract her statements. However, Ganly did not use normal procedures.[61] Adherence to these procedures ensures an aseptic collection environment. Thus, the results were unreliable. Accordingly, the Court finds that the State did not establish a sufficient foundation to admit the results of Defendant's BAC analysis.

VI. CONCLUSION

Considering the foregoing, Defendant's Motion to Suppress is **GRANTED.**

IT IS SO ORDERED.

[60] July 2015 Hr'g at A-24-25.

[61] In a Rule 104(a) determination, the proponent must establish the necessary foundational facts by a preponderance of the evidence. A judge can consider credibility of evidence. Here, the foundation would need to show by a preponderance that the needle was first placed in Defendant's arm before the stopper on the collection tube was punctured. *See* Diana Garza & Kathleen Becan-McBride, PHLEBOTOMY HANDBOOK 337 (8th ed. 2010); *see also* 45 Am. Jur. Trials 1 § 64 (1992).