... intoxication has decreased, penalties for DWI have increased in severity.\textsuperscript{14} Twenty states currently impose sentences of mandatory jail, community service, or commitment to an alcohol treatment center on the first offense.\textsuperscript{15} Further, *\textsuperscript{250} in five states, a convicted drunk driver may have to forfeit his or her vehicle.\textsuperscript{16} Public humiliation and publication of the names of those whose licenses have been suspended for drunk driving are punishments imposed on drunk drivers in Nevada\textsuperscript{17} and South Carolina,\textsuperscript{18} respectively.\textsuperscript{19} In fourteen states,\textsuperscript{20} multiple convictions for driving while intoxicated *\textsuperscript{251} are considered felonies, even if no person or property is injured.\textsuperscript{21}

The major tools used to enforce the legislation aimed at reducing the occurrence of DWI's are various breath alcohol testing devices. These devices have been controversial due to a number of flaws\textsuperscript{22} since their *\textsuperscript{252} initial development in the 1930s and 1940s.\textsuperscript{23} Since 1987, two new attacks on the legality of these devices have resulted in conflicting rulings in courts across America. The first challenge is that breath testing devices cannot give reliable results because these devices use a standard ratio to convert breath alcohol contents into blood alcohol contents that does not take into account the great variances in blood to breath conversion ratios among the general population.\textsuperscript{24} Another challenge concerns a report by the Pennsylvania Auditor General that the company responsible for manufacturing chemical components used in some models of breath testing machines failed to follow proper scientific procedures in its manufacturing process to the extent that its products can no longer be trusted as accurate.

*\textsuperscript{253} This Comment will discuss the nature of these challenges. It will then present various solutions formulated by courts to deal with these challenges. This Comment will also propose a model solution to these challenges that will balance society's interest in enforcing the drunk driving laws with the individual defendant's interest in receiving a fair trial.

II. THE CHALLENGES TO THE BREATH TESTING DEVICES

A. Basic Operating Principles Behind Breath Testing Devices

There are two basic types of breath alcohol devices: the “wet” type, and the “dry” type. The wet type determines blood alcohol content by measuring the results of a chemical reaction between a solution contained in an ampoule and the alcohol found in the suspect's breath.\textsuperscript{25} The most common wet devices are the Breathalyzer Model 900, the Breathalyzer Model 900A, the
Breathalyzer Model 1000 and the Breathalyzer Model 2000. The wet devices are not widely used in many jurisdictions, although they are still popular in the state of New York.

Dry devices, the second major type of breath alcohol device, use infrared radiation in analyzing a breath sample to determine a suspect's blood alcohol content. The principle dry devices are the Intoxilyzer Model 4011AS and the Intoximeter 3000. Most jurisdictions, including California, use the dry devices.

The wet device has three main components. These components are (1) an air sample collection device; (2) two identical glass ampoules (test and control) containing a chemical solution of fifty percent sulfuric acid, 0.025 percent silver nitrate, 0.025 percent potassium dichromate, and distilled water; and (3) a photometric system consisting of a light bulb, two photo cells, two blue filters and a null meter, that is sometimes referred to as a galvanometer. The two ampoules are situated on either side of the light bulb. At the start of the test an equal amount of light shines through both ampoules. The suspect blows a sample of his breath into the air intake, which is connected to the test ampoule. The machine absorbs 56.5 ml of this breath, which is reduced to 52.5 ml.

The alcohol in the breath sample reacts with the potassium dichromate to form chromic sulfate, potassium sulfate, acetic acid, and water. The reaction causes the test ampoule to change from yellow to green. As a result of the color change, more light now shines through the test ampoule than through the control ampoule. The operator then turns the null meter to reestablish the equilibrium that was present before the test. The suspect's blood alcohol content is then determined by measuring the distance the light was moved by first using the Beer-Lambert Law and the inverse square law, and then by multiplying that result by 40. A larger amount of alcohol in the breath results in a more intense chemical reaction and a greater color change that necessitates moving the light a longer distance, thereby causing a higher blood alcohol content reading.

The dry devices, unlike the wet devices, do not use chemicals. Dry devices instead use infrared spectroscopy, a process which identifies a chemical compound by identifying the infrared radiation wave lengths that the chemical absorbs. A dry device has four main parts: an air sample collection device, two gas chambers, a quartziodide light bulb and a detector cell. The gas chambers function similarly to the ampoules in the wet device. One chamber collects a sample of the suspect's breath, while the other chamber contains a sample of ordinary air as a control sample.

Once the air samples have been collected, the quartziodide light beams infrared radiation into both samples. The alcohol in the suspect's breath sample absorbs infrared radiation with a wavelength of 3.39 microns. The absorption of infrared radiation causes less energy to reach the detector cell in the sample chamber than in the control chamber. This difference in the energy detected is then converted into a percent of blood alcohol content using the Beer-Lambert Law. The greater the alcohol content of the breath, the greater the difference in energy levels detected by the two detectors. Consequently, a higher blood alcohol content will be recorded.

Both wet and dry devices are able to determine a blood alcohol level from the amount of alcohol present in a suspect's breath by using the principle known as Henry's Law. Henry's Law states that "at constant temperature, the concentration of a gas dissolved in a liquid is proportional to the concentration of that same gas in air directly above that liquid." Breath
testing devices apply Henry's Law to a sample of air from the suspect's alveoli, the small air sacs in the lungs where oxygen is transferred to the blood and where blood can pass alcohol into the suspect's breath.  

B. Partition Ratio Challenge

In order to use Henry's Law, all breath testing devices must use some ratio to convert the breath alcohol concentration into a blood alcohol concentration. This ratio is known as a partition ratio. Since 1952, that ratio has been fixed at 1 to 2,100, so that the amount of alcohol present in 2100 milliliters of air from the lungs equals the concentration present in one cubic centimeter of blood. This fixed standard has come under attack by a group of very influential forensic toxicologists over the last few years, as their research has shown that this fixed ratio may be too unreliable to justify its years of universal acceptance.

The universality of the 1:2,100 ratio is readily apparent. All breath testing devices currently on the National Highway Traffic Safety Administration's list of devices conforming to its model specification for breath testing equipment use this ratio. These model specifications are used as guidelines by states receiving federal money to purchase breath testing devices. The 1:2,100 ratio is also recognized by the Committee on Alcohol and Other Drugs of the National Safety Council as an accurate way to determine blood alcohol content.

In addition, the Uniform Vehicle Code now incorporates the 1:2,100 ratio into its per se definition of intoxication by defining alcohol concentration as either grams of alcohol per 100 milliliters of blood or grams of alcohol per 210 liters of breath. Fourteen states have adopted this definition of intoxication.

The 1:2,100 ratio, although widely accepted, was never regarded as a universal constant for all people. The true average partition ratio was long thought to be about 1:2,280. The fact that the 1:2,100 was slightly lower allowed most suspects to record alcohol readings slightly lower than a blood test (which uses no partition ratios and gives the most accurate alcohol content reading) would have shown. This generosity has been termed a judicial “benefit of the doubt” by one court.

A judicial benefit of the doubt, however, can turn into a conviction based on misleading evidence when an individual defendant has a partition ratio under 1:2,100. A person with a low partition ratio produces a blood alcohol reading which overstates his or her blood alcohol content. For instance, if a person has a breath alcohol reading of 0.14 and a partition ratio of 1:1,100, that person's true blood alcohol content would be 0.075. If a person with a partition ratio of 1:1,500 registers 0.13, that person's true blood alcohol content would be 0.092. A 0.13 reading from a person with a partition ratio of 1:1,700 is produced by a true blood alcohol content of 0.099, and that same reading from a person with a 1:1,700 ratio would be produced by a true blood alcohol content of 0.105.

During the last fifteen years, several leading experts in the field of forensic toxicology have conducted research that they believe severely contradicts the usefulness of the 1:2,100 standard. The research of Dr. Norman Scholes, for instance, has shown that the partition ratio varies...
A third factor affecting an individual's partition ratio is that person's lung capacity. It is apparent that those with smaller lungs will have higher readings than those with larger lungs. Henry's Law measures the ratio of a gas dissolved in a liquid to the ratio of that gas in the air immediately above the liquid. The area where blood containing alcohol comes into contact with air is the alveoli of the lungs. In order to produce a sufficient breath sample, a person with smaller lungs will be forced to exhale more of his or her lung capacity into the breath machine than will a person with average lung capacity, assuming that the people are the same size except for lung capacity. The more air exhaled from the alveoli, the higher the blood alcohol reading, as alveolar air contains more alcohol than non-alveolar air. Therefore, the smaller lunged individual will have a higher blood alcohol content reading, because the breath testing device will receive a sample containing more alcohol-rich alveolar air than that from a similarly sized leather-lunged counterpart.

A defendant who wears dentures will also have an overstated blood alcohol reading. In order for the breath testing device to properly apply Henry's Law, the breath sample produced by the defendant must be free of any sources of alcohol other than that transferred from the blood at the alveoli. It has become a common practice to wait at least fifteen minutes before taking the breath sample, during which time the defendant is continuously observed and forbidden from placing anything in his or her mouth, in order to insure that the blood is the only source of alcohol in the breath sample. Dentures, however, retain alcohol in the mouth, which is then transmitted into the testing machine when the suspect blows into it.

This research has led these experts to believe that approximately 14% of the population, or one person in seven, is subject to an inflated blood alcohol content reading because their partition ratios are lower than the 1:2,100 standard. These experts have sought reductions in breath test readings based on these findings. Dr. Dubowski has been particularly vocal on this subject, advocating a universal reduction in all breath test readings by 0.055%.

As a further result of this new research, there is no longer the near unanimous agreement among the scientific community that a breath testing machine using a fixed 1:2,100 partition ratio is acceptable. This is particularly troubling in states which follow the Frye v. United States standard for admitting scientific evidence, which states that the device or process must be accepted by a majority of the scientific community as reliable.

C. Equal Protection Challenge

The same research that has disputed the usefulness of the 1:2,100 partition ratio has also shown that the lower ratios are related to gender and race. These findings have led defendants to challenge breath testing on equal protection grounds, claiming that the lower partition ratios for minority racial groups and women create suspect classifications that require strict scrutiny in order to survive. Only the Supreme Court of Washington, in State v. Brayman, has actually addressed this issue.

The Brayman court was presented with evidence that blacks have both smaller lung capacity and lower partition ratios. Additionally, the court reviewed evidence that women, because of smaller lung capacity and higher average body temperatures have blood breath ratios eight to fifteen percent lower than the average male. The respondents argued that these disparities created suspect classifications based on race and gender, and that the court should apply a strict scrutiny test. Such a test would require the state to show that there was a compelling interest in allowing intoxication to be proven by a
showing that the defendant had more than 0.10 grams of alcohol in 210 liters of breath and that there were no other ways for it to achieve that interest, except through the use of breath testing.

The court, however, applied a rational basis test, requiring only minimum scrutiny. The court used the rational basis test because “the classification . . . distinguishes only between those persons who have the prohibited breath alcohol level and those who do not.” The court then found that breath alcohol was rationally related to impairment and upheld the statutory use of a 1:2,100 partition ratio to determine what constitutes per se DWI. In further support of its decision, the court also found that there was insufficient evidence to show that any particular race or class was adversely affected by any classification:

Moreover, the record does not establish that a particular race or class of persons is affected by the classification. The State maintains that to the extent the trial court's conclusion suggests a discriminatory impact on those groups, no findings of fact support it. We agree. While the record indicates that the average black person has a 13 percent smaller lung capacity than the average white person, the record contains no evidence suggesting that breath alcohol readings inaccurately measure impairment among blacks, nor that the average statistic affects particular black individuals.

The court likewise found the statute constitutional under the Washington equal rights amendment, as the respondents failed to carry their burden of proving a disparate impact on women.

An additional factor which the court did not consider in upholding the use of a 1:2,100 partition ratio from an equal protection challenge was the lack of intent to discriminate on the part of the legislature in passing the statute. The United States Supreme Court has held that intent to discriminate is a necessary element which must be shown by the party challenging the state’s action in an equal protection challenge.

D. Ampoule Chemical Challenge

The second major challenge to breath test results affects only the “wet” breath testing devices. The challenge centers around the ampoules and simulator solution manufactured by Systems Innovations, Incorporated (“SII”) of West Hallstead, Pennsylvania, during the period September 1986 through November 1987. SII is one of the main manufacturers of the ampoules and simulator solutions used in the Smith & Wesson Breathalyzer model devices. This challenge has been most acute in New York, which not only relies heavily on the Breathalyzer and on chemicals produced by SII, but also has a strict standard for admitting Breathalyzer results that have been affected by the SII scandal.

In order to admit Breathalyzer results in New York, the prosecution must follow a four step procedure. The first step requires the production of evidence that the operator of the device is qualified. The prosecution must then show that the machine was properly calibrated, and that “the chemicals used in the test were of the proper kind, and mixed in the proper order.” The final item of proof is evidence that the test was “administered in accordance with the rules and regulations of the State Police Department.”

The SII scandal has made the third element of proof much more difficult to establish. Prior to the scandal, a Certificate of Analysis from the New York State Police Crime Laboratory satisfied the third element of proof. The certificate stated that a sample ampoule from the same lot used in the defendant’s test had been analyzed by the New York State Police Crime Laboratory.
and had been found to have the proper chemical solution.\textsuperscript{130} The SII scandal has made those certificates inadmissible for a large number of ampoules that have been in use in New York since 1986.\textsuperscript{131}

SII is a small company operating out of a two room suite behind a Radio Shack in Hallstead, Pennsylvania.\textsuperscript{132} SII produces ampoules and chemicals used in Breathalyzers as well as simulator solution chemicals.\textsuperscript{133} It also repairs Breathalyzers and trains Breathalyzer operators.\textsuperscript{134} *265 The company currently sells equipment to police agencies in New York, Michigan, Oklahoma, Pennsylvania, South Carolina, and Virginia.\textsuperscript{135}

The problems at SII came to light in early 1987. At that time, a dispute concerning...

*** Start Section

... as his complaint led the Auditor General to conduct an intensive investigation into SII's activities\textsuperscript{137} that culminated in a report issued in December 1987.\textsuperscript{138} The report held the lab procedures at SII didn't meet “nationally scientifically acceptable quality control standards.”\textsuperscript{139}

The Auditor General's holding was based on several specific findings. SII had no written procedures or safety manuals for employees to follow when handling the sulfuric acid and other dangerous chemicals used in the ampoule solution.\textsuperscript{140} SII was found to have not used analytic grade chemicals.\textsuperscript{141} The independent lab that certified the simulator solution used unacceptable scientific procedures.\textsuperscript{142} These findings made questionable the chemical composition of SII ampoules.

In order for the testing to be accurate, the ampoules must contain the proper amounts of the chemicals needed to run the reaction. If the concentration of potassium dichromate is too low, the breath test will read too high.\textsuperscript{143} Conversely, if there is too much potassium dichromate, the result will be too low.\textsuperscript{144}

*266 SII's shortcomings have led many defense lawyers to challenge the Certificates of Analysis for ampoules manufactured during Campbell's employment: lots 0916, 0917, and 0217.\textsuperscript{145} In order for the Certificate of Analysis to have any meaning, the sample ampoule must be identical to all of the other ampoules in the same lot. Complete uniformity among the ampoules is important because the ampoules used in the Breathalyzer must be identical, as the wet test compares a test ampoule to a control ampoule.\textsuperscript{146} SII's business and manufacturing procedures make this requirement highly unlikely.

In order for a sample to be identical to all of the other ampoules in the lot, the entire lot must be placed in the same container at some point in the manufacturing process prior to each ampoule being bottled. SII claimed that this step occurred when it poured five gallon jugs of ampoule solution into one 55 gallon drum.\textsuperscript{147} SII further claimed that these *267 jugs were then refilled and stored with the uniform solution\textsuperscript{148} until that lot could be tested and bottled.\textsuperscript{149} SII then supposedly manufactured a second batch while the first was being stored, so that it was always one batch ahead of its orders.\textsuperscript{150}

There is considerable evidence to the contrary. SII only owned one drum and that drum was used to store water from which employees drank and used to make Kool-Aid.\textsuperscript{151} It is unlikely that anyone would drink water from a drum which had ever stored a sulfuric acid solution like the ampoule solution.\textsuperscript{152} In addition, not only was lot 0916 far too large to have been placed inside of a single 55 gallon drum,\textsuperscript{153} but the entire two room manufacturing plant was too small to store jugs of solution from one batch while a second batch was being mixed.\textsuperscript{154}
These discoveries have led three courts to conclude that SII...

*** Start Section

..., SII failed to follow its own numbering system for its lots.\(^{161}\) Ampoules which SII advertised as being indelibly marked were renumbered.\(^{162}\) SII used a poorly designed process to seal its ampoules, so that tiny glass particles could settle in the solution and refract the light from the beam.\(^{163}\) The Auditor General reported that the Oklahoma Department of Public Safety had found that 75% of the ampoules supplied to it by SII were unacceptable,\(^{164}\) as were 80% of the ampoules supplied to the South Carolina Law Enforcement Division.\(^{165}\)

\[*269*\] The result of these findings has been that the Certificates of Analysis for ampoules from lots 0916, 0917, and 0217 have been ruled inadmissible by two trial courts.\(^{166}\) Only one court, however, has held that the results of tests conducted with ampoules from any of these lots are inadmissible.\(^{167}\) Two trial courts have allowed the prosecution to rehabilitate these ampoules through alternate means of proving the integrity of the ampoule chemicals.\(^{168}\) This has been possible because the New York Court of Appeals has not made the Certificate of Analysis the only way to prove the integrity of the ampoules.\(^{169}\)

New York trial courts have allowed the prosecution to use the simulator solution tests as an alternative method of proof.\(^{170}\) The simulator tests have been allowed as a substitute because “it is inconceivable that the test ampoule solution and the simulator solution could both be inaccurate to the same degree.”\(^{171}\)

The only good news for SII has been that two of its shortcomings had only a negligible impact on the quality of its products. SII was found to have used 190 proof grain alcohol, purchased at a local Pennsylvania state liquor store, in its simulator solution instead of U.S.P. 100% alcohol for simulator solutions, as scientific standards dictated.\(^{172}\) The company was also found to have substituted filtered tap water for distilled water in all of its products.\(^{173}\) These findings have been the least damaging because experts have shown that 190 proof alcohol\(^{174}\) and \(*270*\) filtered water\(^{175}\) are acceptable substitutes.

The Auditor General's report has been criticized.\(^{176}\) The...

*** Start Section

... people whose words were most damning.\(^{180}\)

Further criticism of the Auditor General's report has come from Dr. Kurt Dubowski,\(^{181}\) who claims that the main reason behind the Oklahoma Department of Public Safety's cancellation of its contract with SII was due to the adverse publicity that stemmed from the Auditor General's report.\(^{182}\) The alleged problems with the ampoules, as cited by South Carolina's Auditor General, seem to have been refuted by both the director of the chemistry laboratory at the South Carolina Law Enforcement Division,\(^{183}\) and the chief chemist of the South Carolina Criminal \(*271*\) Justice Academy.\(^{184}\) In addition, Robert Horn, the Director of the New York State Police Crime Lab, has stated in sworn affidavits used in several cases that random field tests of questioned SII ampoules have shown that they meet New York's specifications.\(^{185}\)
As a result of all of these revelations, the state of the admissibility of Breathalyzer results in New York is very questionable. The courts that have decided this issue, like the state courts deciding the partition ratio issue, have chosen several different methods for solving it. These methods have been grouped along with the partition ratio methods and will be discussed in the next section.

III. CURRENT APPROACHES TO THE BREATH TEST CHALLENGES

Only a handful of courts have decided cases involving the recent challenges to the breath testing devices. While a number of these courts are in California, the California Supreme Court has not yet ruled on any of the recent breath test challenges. Therefore, each court is free to choose its own rule in spite of inferior California court opinions that may have rules to the contrary.  

Three distinct approaches for admitting breath test evidence have been developed by the courts facing the recent breath test challenges. These methods are the discount method, the affirmative defense method and the weight of the evidence method. Each of these methods will be discussed and evaluated in relation to its strengths and weaknesses. In addition, this section will examine other potential approaches which have not been used by the courts to solve the problems caused by these new challenges to breath testing evidence.

*272 A. Discount Approach

The discount method tries to give a defendant the full judicial “benefit of the doubt” he or she enjoyed in the days when 1:2,100 was more widely accepted, by reducing the defendant's breath test reading to a level it would have been had a lower partition ratio been used. The discount method was first adopted by the Nebraska Supreme Court in State v. Burling.

The ampoule challenge has spawned a similar approach to the discount method, which is to make inadmissible any test results produced with ampoules from the lots tainted by the SII scandal. This is the approach taken by the court in People v. Serrano.

In Burling, defendant Lyle Burling was arrested by the Nebraska State Patrol after having been observed crossing the center line of a highway, accelerating for no reason, and failing to stop at a stop sign. He was given various field sobriety tests, failing them all. Finally, he was given a breath test and registered 0.164. Defendant was tried and convicted for driving while intoxicated under Nebraska's per se DWI statute, which makes it unlawful to drive while one has more than 0.10 grams of alcohol in one's blood.

*273 At trial, defendant presented uncontradicted testimony from Dr. Norman Scholes that partition ratios vary from 1:1,100 to 1:3,400. The Nebraska Supreme Court reversed Burling's conviction under the per se statute. The court reduced his breath test reading by 52.38%, the amount necessary to produce the result the breath test would have produced had the breath testing device used a 1:1,100 ratio, because it was possible that his partition ratio was 1:1,100. The court followed the rule that when a test is subject to a margin of error, the defendant must be given the benefit of the doubt, and that meant reducing his ratio to 1:1,100. Burling's conviction was nevertheless upheld under the non per se prong of the statute, based on the other evidence of his intoxication.

New Jersey briefly followed the discount method. In State v. McGinley, the court adopted a mandatory 0.055% reduction for all breath test results. However, McGinley was subsequently overruled by the Appellate Division in State v. Downie. However, the Appellate Division did not reject the discount method because it found it flawed. Rather, the Court rejected the test
because it felt bound by New Jersey Supreme Court precedent in Romano v. Kimmelman. In Romano, the court held that a Breathalyzer's reliability had to be judicially noticed. The Appellate Division in Downie held that the Romano decision was binding on all inferior New Jersey courts, in spite of evidence to the contrary.

The New Jersey Supreme Court not only has recently affirmed the Appellate Division's decision in Downie, but has reinforced breath testing devices as “reliable and indispensable tools for law-enforcement purposes,” whose accuracy is worthy of continued judicial notice. The court rejected the discount method based on several factors. First, the court noted that Dr. Dubowski had revised his original research conclusion that the 1:2,100 partition ratio overstated blood alcohol levels in 14% of the population. Dubowski now concludes that the 1:2,100 partition ratio overestimates blood alcohol levels in 2.3% of the population. Second, the court noted that there was only one measure of blood alcohol that was potentially more accurate than a breath testing device, a sample of defendant's arterial blood. However, the court noted that this test was practically unobtainable; thus, the breath testing device was the best available measure of blood alcohol content. The court also noted that certain factors that vary an individual's partition ratio may also lower his or her breath test reading, and that breath testing devices have been engineered to underestimate blood alcohol content.

The discount method is not the proper method to balance the interests of the state in enforcing the drunk driving laws with those of the individual defendant in receiving a fair trial because the discount method is more arbitrary than the 1:2,100 ratio. The individual partition ratios of each defendant will still not be taken into consideration in determining what the proper partition ratio should be in any particular case. The basis for the challenge to the 1:2,100 partition ratio has been that partition ratios not only vary from person to person, but also within every person from time to time. Replacing the 1:2,100 standard ratio with a lower ratio based on what experts have shown to be the lowest possible ratio for humans merely exchanges one ratio based on over 50 years of careful research with another ratio that will probably understate the true blood alcohol content for the vast majority of the population.

The discount method is also unacceptable under the Frye v. United States standard for admitting scientific evidence. That standard requires that any scientific device or process must have the general acceptance of the experts in the field from which it belongs before it can be admitted into evidence. The discount method fails this test because the experts who disagree with the 1:2,100 ratio do not agree on what discount level should replace it. For example, one group of experts led by Dr. Dubowski has found that the lowest partition ratio is approximately 1:1,100, while other researchers have stated that the lowest partition ratio is approximately 1:1,550.

The discount method is a dangerous concept which on its face appears to protect innocent drivers from being convicted under tough per se DWI statutes by the use of erroneous evidence produced by antiquated machines. In actuality, the discount method turns courts into judicial versions of K-Mart, dispensing red and blue light discount specials to defendants who are guilty of driving while intoxicated, and who most likely have partition ratios high enough to render the effects of any over-estimate of blood alcohol content minimal.

The dangers of this approach were recognized by the Nebraska Supreme Court in State v. Hvistendahl. Almost before the ink had dried on the Burling decision the court began to withdraw from its discounting position. In Hvistendahl, the court upheld a per se DWI conviction based on conflicting expert testimony from which a jury could have discounted defendant's breath test.
reading to 0.1055. 225 Finally, in State v. Babcock, 226 the court announced that it would not follow any automatic discounting formula and would allow discounting of results only where appropriate based on credible evidence. 227

*277 The discount method's ampoule challenge equivalent, a per se bar to the use of tests conducted using ampoules from SII lot numbers 0916, 0917, and 0217, is likewise flawed and should be abandoned. The New York Court of Appeals requires that the prosecution establish that the chemicals used in the ampoule were of the proper kind and mixed in the proper proportions, 228 as a prerequisite for the admission of any test results from that ampoule. Traditionally, the prosecution has met this burden by introducing into evidence the Certificate of Analysis for the lot number of the ampoule in question. 229 Several New York trial courts have, however, ruled that these Certificates are inadmissible because the SII scandal has cast considerable doubt upon whether the samples upon which a lot's Certificate is based contain a chemical solution identical to all other ampoules with that lot number. 230

The Certificate of Analysis is not the exclusive means for establishing the reliability of the ampoule chemicals. It is merely the most expedient method available. One viable alternative is to use the result from the simulator solution test. This test is performed using the same ampoule after the defendant completes his or her test. The Breathalyzer operator recalibrates the machine and places a container holding a solution of 0.10% alcohol over the mouthpiece and then blows into the machine through a mouthpiece on the simulator solution container. 231 If the simulator test produces a result within plus or minus 0.01% of 0.10%, then the ampoule should be found to have contained the proper chemical solution. 232

Thus far, two New York courts have reached this conclusion and allowed test results to be admitted if the simulator test produced a result within plus or minus 0.01% of 0.10%, by reasoning that “it is inconceivable that the test ampoule solution and the simulator solution could be inaccurate to the same degree.” 233 Because this approach allows reliable and relevant evidence to be admitted consistent with New York precedent, it should be preferred over the outright ban on test results obtained from ampoules whose Certificates of Analysis have been ruled inadmissible due to the SII scandal.

**B. Weight Of The Evidence Approach**

Under the weight of the evidence approach, all evidence relevant to the issue of the defendant's guilt is admissible. The trier of fact is left to decide what weight to give to each piece of evidence in determining the defendant's guilt. This evidence includes the breath test result, the expert testimony both challenging and supporting the accuracy of breath testing devices, and any other relevant evidence, such as the arresting officer's observations of the defendant.

This approach has been the most popular to date. It has been followed by courts in seven states, 234 including the Appellate Division of the Los Angeles County Superior Court, 235 the California Court of Appeal, Fourth District, 236 as well as the supreme courts of South Dakota, 237 and Vermont. 238 The adoption of the weight of the evidence approach by the two California courts is significant because, prior to the fall of 1989, those courts had followed another approach, the affirmative defense approach, 239 for admitting evidence challenging the 1:2,100 partition ratio. In addition, the weight of the evidence approach has been used by the Nebraska Supreme...

*** Start Section

... of the evidence approach has several benefits. The first benefit is that all evidence relevant to the defendant's guilt is admissible. *279 The second benefit is that it allows a state legislature to set a level of blood alcohol concentration as a per se level of intoxication and to approve methods for analyzing a defendant's blood in a DWI prosecution “which shall be
considered valid’ if properly performed,” without the prosecution having to ‘‘reinvent the wheel’ by demonstrating the soundness of the procedures for calculating the BAC of the accused.”

Unfortunately, the weight of the evidence approach is not perfect. Its first major drawback is that it could conceivably result in lengthy trials if a defendant is able to find enough experts to challenge breath testing devices because all relevant expert testimony is admissible. This problem could be remedied by barring duplicative evidence.

The second major shortcoming, however, is of greater consequence. The problem is that if the weight of the evidence approach requires a defendant to rely on expert testimony to challenge the validity of breath testing devices, only defendants with sufficient financial resources to hire qualified experts will be able to challenge the reliability of breath testing devices. However, even though the weight of the evidence approach has shortcomings, it is still the superior method, as compared with the other methods to be discussed in the following subsections.

C. Affirmative Defense Approach

The affirmative defense approach requires the defendant to produce evidence that his or her partition ratio was lower than 1:2,100 in order to challenge the presumption that the 1:2,100 ratio is accurate. This approach is the one that has been developed, and until very recently, followed by California appellate courts.

This approach was initially developed by the Appellate Department of the Los Angeles County Superior Court in People v. Pritchard. In Pritchard, the defendant had been tried and convicted of per se DWI based on two breath test results of 0.11% and 0.12%, respectively. The prosecution presented an expert who testified that the Intoxilyzer breath tests given to defendant had an error of plus or minus 0.005%, and that the 1:2,100 partition ratio used by the machine had a potential error of plus or minus ten percent.

Defendant then attempted to take advantage of what had appeared to be a fatal prosecution faux pas, by claiming that “if this 10 percent error margin is applied to the 0.11 percent machine reading, the result would be less than 0.10 percent . . . therefore . . . there was insufficient evidence presented to establish that he was driving with a blood-alcohol level of 0.10 percent or more.” The court, however, rejected this reasoning because the validity of the 1:2,100 partition ratio was a presumption set up by the legislature to facilitate DWI prosecutions based on the fact that “a blood-breath ratio of 2,100 to 1 was mandated by title 17 of the California Administrative Code.” In order to refute this presumption, specific evidence that the individual defendant's partition ratio was less than 1:2,100 had to be presented.

The Pritchard court placed the burden of proving the defendant's partition ratio was under 1:2,100 on the defendant. The court reasoned that while the 0.005% error was readily ascertainable, the defendant's personal partition ratio was a fact “peculiarly within the defendant's knowledge.” Furthermore, the defendant's contention that his particular partition ratio deviated from the norm was a fact ascertainable only by the defendant. These characteristics made the defendant's partition ratio a fact subject to the rule of convenience. By placing the burden of proof on the defendant, the court thereby created an affirmative defense to per se DWI.
The affirmative defense approach, like the discount method, on its face presents a rational way to solve the admissability problems caused by the recent challenges to breath testing devices. Its greatest strength is that it allows the jury to use both the breath testing evidence and evidence challenging the reliability of breath testing devices.

Unfortunately, like the discount method, the affirmative defense approach is fatally flawed. The approach is too favorable to the prosecution because it is impossible to prove precisely what any person's partition ratio was at some time in the past. A defendant could, however, establish a partition ratio range for himself or herself to show that it would always be impossible for him or her to have partition ratio of 1:2,100 or greater. However, the tests that would establish what an individual's partition ratio range are prohibitively expensive. In addition, California appellate courts have also taken notice of the fact that partition ratios vary from person to person, and within individuals from time to time. It has been for these reasons that California appellate courts, including the court that decided Pritchard, have rejected the affirmative defense approach.

D. Reverse Frye Approach

The “reverse Frye” approach is a variation of the affirmative defense approach. This approach takes its name from Frye v. United States, and was developed by the New York City Criminal Court in People v. Nieves. Nieves involved both a challenge to the validity of the 1:2,100 partition ratio and a challenge to the ampoule chemicals based on the Pennsylvania Auditor General's Report. The key distinction between this approach and the affirmative defense approach is that the reverse Frye approach, unlike the affirmative defense approach, suppresses breath test results.

First, the reverse Frye approach allows the prosecution to use the preexisting general acceptance of breath testing devices to satisfy its burden of proving that such devices have met “the Frye test of general acceptance in the scientific community.” This is similar to the Pritchard approach of allowing the statutory requirement that all breath testing devices use a 1:2,100 ratio to set up a rebuttable presumption that that ratio applies to the defendant.

The next step in the reverse Frye approach requires the defendant to come forward with evidence that breath testing devices are no longer generally accepted within the scientific community. This new found lack of acceptance must be based on the fact that the scientific community sees breath testing devices as unreliable because of one of the recent challenges to the accuracy of such devices. The defense must prove this lack of acceptance in the scientific community by “clear and convincing evidence.” The defendant's burden of proof arises “because he alleges that a generally accepted breathalyzer device, as used in his particular case, produced a scientifically unreliable result.”

The reverse Frye method carries all of the flaws and none of the virtues of the previously discussed tests. The jury will not get to hear the breath test result evidence if the reverse Frye motion is successful, because the breath test result evidence will be suppressed. If the motion is unsuccessful, the jury will not be able to hear the evidence challenging the breath test device's reliability. In addition, the standard which the defendant must meet for suppressing the breath test results is vague, because what constitutes “general acceptance by the scientific community” is not defined.

E. Abandonment of Breath Testing Devices

A drastic solution to the breath testing device challenges is to replace these machines with blood testing to determine the alcohol content of a defendant's blood. This approach was adopted in Pennsylvania in the wake of the SII scandal.
a defendant's blood completely eliminates the partition ratio problem because no formula is needed to convert the test result into a percentage of blood alcohol content. 275

Blood testing has drawbacks compared to breath testing, the most important of which is that it too contains inherent inaccuracies. Only arterial blood can be used if a blood test is to be more accurate than a breath test, because arterial blood carries alcohol to the brain, where it impairs a defendant's driving abilities. 276 Arterial blood is almost impossible to extract without unduly harming the defendant. 277 Blood tests therefore use either capillary or venous blood. Capillary blood is less accurate than arterial blood because it is “small in amount and the alcohol it contains easily evaporates when it is exposed to the air.” 278 Venous blood carries less alcohol than arterial blood, hence test results from venus blood underestimate a defendant's blood alcohol content. 279 Yet, in spite of this underestimation, venous blood tests still produce blood alcohol figures that are 9-10% above those produced by breath tests conducted simultaneously upon the same individuals. 280

In addition to its inherent inaccuracies, blood testing is more expensive than breath testing. Blood testing in most jurisdictions requires the blood to be drawn by a licensed physician, nurse, laboratory technician, or certified paramedic. 281 This drawback no longer applies in California *284 because unlicensed laboratory personnel are also allowed to draw blood for the purpose of analyzing its blood alcohol content. 282

Because blood tests, unlike breath tests, must be sent to a laboratory for analysis, they do not produce immediate results. 283 This drawback makes it necessary for the prosecution to establish that all collection, chain of custody, and laboratory procedures were properly followed. 284 As a result of these problems, a suspect who opts for a blood test in California is subject to an automatic suspension of his or her California driver's license by the arresting officer, whereas a suspect who opts for a breath test is only subject to an automatic suspension if he or she fails the test. 285

A final drawback to blood testing is that some groups of individuals are exempt from such testing. These groups include hemophiliacs 286 and individuals with heart conditions who are on anti-coagulant medications. 287

F. Abandonment of Per Se DWI Statutes

The final approach to coping with the breath testing device challenges is to eliminate the use of statutes that define DWI as occurring per se whenever a defendant is found to have had been in control of a vehicle while his blood alcohol level was at or over a set figure. Twenty-five years ago it was not uncommon to find a state that did not use a set figure to determine either when a DWI had been committed or as prima facie evidence of intoxication. 288 California exclusively used a similar statute prior to 1969. 289 Today, all of the 53 jurisdictions surveyed use a set *285 figure for at least one of the above purposes. 290

On the other hand, eliminating the per se/prima facie level of intoxication from the DWI statute would overcome the problems caused by the breath testing challenges because such evidence would be of reduced weight. The prosecution would now only have to show that the defendant had lost the ability to safely operate a vehicle due to his or her alcohol consumption. A breath test result would need be only a part of the prosecution's burden of proof, 291 and it could be easily augmented by testimony of the arresting officer as to his or her observation of defendant's lack of driving ability prior to arrest, 292 as well as defendant's inability to pass simple sobriety tests. 293
Eliminating the per se/prima facie level of intoxication will only ameliorate the problems caused by the breath test challenges, and in some cases may actually exacerbate them. The per se/prima facie statutes give a trier of fact some guidance as to what constitutes intoxication. Without that guidance, the trier of fact may place undue emphasis on a low and perhaps flawed breath test and convict a defendant who would not have been found intoxicated under the per se/prima facie statutes.

IV. MODEL APPROACH FOR SURMOUNTING BREATH TEST CHALLENGES

The previous section examined the potential methods for solving the recent challenges to breath testing evidence. Only one of those solutions, the weight of the evidence approach, shows any real promise for adequately balancing the interests of the prosecution and defense. This section will show how that approach can be improved by using some of the ideas already present in the California Vehicle Code.

Under the model solution, the defendant, upon being arrested, would be given a breath test. The defendant would then be advised that breath testing devices use the standard 1:2,100 partition ratio and that an individual's ratio is subject to variations, such that an individual's ratio may be under 1:2,100 at the time of the test, and that if his or her partition ratio is under 1:2,100, then his or her blood alcohol content will be somewhat overstated by the breath testing machine. The defendant would then be offered a choice for a second confirmatory test of either a second breath test or a blood or urine test. 294

The model solution is easily adaptable to existing California law. The partition ratio warning is similar to the warning advising the defendant that because no breath sample is retained if he or she chooses a breath test, the state will conduct a blood or urine test free of charge that will be retained should defendant request such a test. 295 Because a failure to give the latter warning by an arresting officer does not render any evidence of the defendant's blood alcohol content inadmissable, 296 a failure to give the partition ratio warning should likewise result in any evidence of the defendant's blood alcohol content remaining admissable. A defendant is already allowed a chance to submit to an additional blood or urine test from which a sample will be retained under California law. 297

Vehicle Code section 23157(2)(A), however, would have to be amended, as it provides that a defendant must be advised that he or she must be given a choice of either a blood, breath, or alcohol test for the first test and be advised the right to choose that test. This change is necessary because if a defendant were to be given the partition ratio information prior to choosing any tests, conceivably a large number of defendants may choose the less accurate and more costly blood tests over breath tests. As a result, DWI enforcement would become more expensive and more intrusive upon the defendant's rights. 298

At trial, the arresting officer would be able to testify that defendant was advised of the partition ratio problem, and that he or she consented to a breath test, anyway. If the defendant submitted to an additional test, then the results of that test could be entered into evidence, and if they differ from the breath test result by over 0.01%, then the breath test results would become inadmissible.

V. CONCLUSION

On first examination, the partition ratio and ampoule challenges appear to be the last gasp for the breath testing devices. However, these challenges, like those that have arisen before them, can be handled in such a way that new life can be breathed into these machines, so that their use can continue until better devices are developed.
Footnotes

1 Congress has limited the availability of liquor to young drivers by requiring states to set a minimum 21 year old drinking age. If a state fails to comply, 10% of that state's federal highway funds will be withheld. 23 U.S.C.A. § 158(a)(2) (Supp. 1990).


...
47, § 11-902(C) (West 1990) (10 day minimum jail sentence); OR. REV. STAT. § 813.020(2) (Supp. 1990) (unspecified amount of community service plus alcohol or drug information program or rehabilitation program); R.I. GEN. LAWS § 31-27-2(6)(d)(1) (1989) (10 hours community service minimum); S.C. CODE ANN. § 56-5-2940(1) (Law. Co-op. 1989) (48 hrs. of either jail time or community service minimum); TENN. CODE ANN. § 55-10-403(a)(1) (1990) (48 hours minimum jail sentence); TEX. REV. CIV. STAT. ANN. art. 67011-1(7)(c)(1) (Vernon 1990) (72 hours minimum jail sentence); and W.VA. CODE § 17C-5-2(c)(3) (1990) (24 hours minimum jail sentence).

California has a 96 hour minimum jail sentence requirement. See CAL. VEH. CODE § 23160(a) (West. 1985). A defendant must serve at least 48 hours of this sentence in jail during one continuous period. CAL. VEH. CODE § 23160(a) (West Supp. 1991). The court may defer this sentence to a time that does not interfere with the defendant's work schedule. CAL. VEH. CODE § 23160(b) (West Supp. 1991).

16 See ALASKA STAT. ANN. § 28.35.036(a) (1989) (vehicle may be seized if defendant has been previously convicted of DWI or refusal to submit to a chemical test); ARIZ. REV. STAT. ANN. § 28.692.06(a) (1990) (vehicle may be seized if defendant has been previously convicted of DWI and had been driving with suspended license); ME. REV. STAT. ANN. tit. 29, § 1312-G (Supp. 1989) (vehicle may be seized if defendant has been previously convicted of DWI and had been driving with suspended license); N.D. CENT. CODE. § 39-08-01.3 (Supp. 1989) (vehicle may be seized and sold by court order if defendant has been convicted of DWI on at least three earlier occasions within the last five years).

New York allows for the forfeiture of the defendant's car when the defendant has been convicted of DWI as a felony under N.Y. VEH. & TRAF. LAW § 1193(1)(c) (McKinney Supp. 1990) (DWI classified as felony on second conviction within ten years), based on N.Y. CIV. PRAC. L. & R. 1311 (McKinney 1989), which allows the court to order forfeiture of the proceeds or instrumentality of a crime when the defendant is convicted of a felony, and N.Y. CIV. PRAC. L. & R. 1310 (McKinney 1989), which defines instrumentality of a crime as any property whose use directly and materially contributes to the commission of a crime.

California requires that the defendant's vehicle be impounded for at least one day, unless it is community property, is operable under a class three or four license, and is the only vehicle available to the defendant's immediate family. See CAL. VEH. CODE §§ 23195(a)&(b) (West 1985).

17 A court has the option of sentencing a first time convicted drunk driver “to perform 48 hours of work in distinctive garb which identifies him as having violated the provisions of NRS 484.379.” NEV. REV. STAT. ANN. § 484.3792(2) (Michie Supp. 1989). The 48 hours may be reduced to 24 hours if the defendant applies to the court to undergo a drug and alcohol rehabilitation program of at least one year in duration. See NEV. REV. STAT. ANN. § 484.3794(2)(c)(1) (Michie Supp. 1989).


An ignition interlock device is a mechanism that attaches to a car's ignition system. The operator must exhale a breath sample into the device before starting the car. The interlock renders the car inoperable if it detects more than 0.02% blood alcohol content in the operator's breath. See MICH. STAT. ANN. § 257.625(b)(2) (Callaghan Supp. 1989). Ignition interlock statutes include provisions that make it unlawful for a person required to use an interlock device to have another person blow into the device to start the car, see, e.g., CAL. VEH. CODE § 23248(a) (West Supp. 1989), or to tamper with the device in any manner, see, e.g., CAL. VEH. CODE § 23248(c) (West Supp. 1989). The typical interlock statute also subjects the defendant to inspection of the device at the discretion of the sentencing court or probation officer. See, e.g., CAL. VEH. CODE § 23241(e) (West Supp. 1989).

20 See ARIZ. REV. STAT. ANN. § 28-692.01F (Supp. 1989) (DWI classified as felony on third conviction within 60 months); ARK. STAT. ANN. § 5-65-111(3) (1988) (DWI classified as felony on fourth conviction within three years); ILL. ANN. STAT. ch. 95 1/2, para. 11-501(d)(1) (Smith-Hurd 1989) (DWI classified as felony on third conviction); IND. CODE ANN. § 9-11-2-3 (Burns Supp. 1989) (DWI classified as felony on second conviction within five years); IOWA CODE ANN. § 321J.2.2(c) (West 1990) (DWI...
classified as felony on third conviction); KY. REV. STAT. ANN. § 189A.010(2)(c) (Michie/Bobbs-Merrill 1990) (DWI classified as felony on third conviction); L.A. REV. STAT. ANN. § 14:98(E) (West 1988) (DWI classified as felony on third conviction within three years); NEV. REV. STAT. ANN. § 484.3792(1)(c) (Michie Supp. 1989) (DWI classified as felony on third conviction within seven years); N.Y. VEH. & TRAF. LAW § 1192(5) (McKinney 1987) (DWI classified as felony on second conviction within ten years); OKLA. STAT. ANN. tit. 47, § 11-902(C) (West Supp. 1990) (DWI classified as felony on second conviction within ten years); S.C. CODE ANN. §§56-5-2940(4) (Law. Co-op Supp. 1989) (DWI considered felony on fourth conviction); S.D. CODIFIED LAWS ANN. § 32-23-4.6 (Supp. 1989) (DWI considered felony on fourth conviction); and W. VA. CODE § 17C-5-2(i) (1986) (DWI considered felony on third conviction).

The maximum sentence for driving while intoxicated is currently ten to thirty years of hard labor in Louisiana. See LA. REV. STAT. ANN. § 14:98(E) (West 1988). South Carolina has the highest maximum mandatory fine at $3,500. “By a fine of not less than three thousand, five hundred dollars . . . for the third offense.” See S.C. CODE ANN. § 56-5-2940(3) (Law. Co-op. Supp. 1989).

California's penalties, however, are remarkably lax when compared to those found in the rest of the nation. The maximum penalties allowed in California are a jail sentence of 180 days to 1 year, in either county jail or state prison, a fine of $390 to $1,000, and revocation of his or her driver's license, if the defendant has been convicted of driving while intoxicated at least three previous times in the last seven years. See CAL. VEH. CODE § 23175 (West 1985 & Supp. 1989). In addition, the defendant's car must be impounded for at least one day, but no more than 90 days, unless the car is community property, is operable under either a class 3 or class 4 license, and is the only vehicle available to him or her immediate family. See CAL. VEH. CODE §§ 23195(a)&(b) (West 1985).

California courts can reduce the maximum penalties by sentencing a defendant with three prior DWI convictions to probation on the conditions that the defendant serve at least 30 days in the county jail and participate in an approved alcohol treatment program for the following 30 months; see CAL. VEH. CODE § 23176(b) (West 1989); or 180 days in the county jail plus participate in a treatment program for up to 1 year; see CAL. VEH. CODE §§ 23176(a)&(c) (West Supp. 1989).

See S. BRENT & S. STILLER, infra note 23, at 101-06. See also P. GERSTENZANG, infra note 23, at 236-37. The most serious challenge to the reliability breath testing equipment involved a report by Smith and Wesson that the Breathalyzer Models 900, 900A, 1000, and 2000 were sensitive to interference from police radios. Id. at 241-42. The radio interference was believed to cause the breath testing machine to give a false reading. Id. at 242. Breath testing devices were challenged in a number of jurisdictions as a result of these findings. Although evidence was introduced showing that a Breathalyzer model 900A could inflate a breath test reading by 100% if exposed to radio interference, see People v. Hochheimer, 119 Misc. 2d 344, 349, 463 N.Y.S.2d 704, 708 (1983), these challenges were unsuccessful because such tests had been conducted under conditions that did not resemble field conditions. Id. In addition, some courts admitted breath test results because there was no evidence that the defendant's test had been conducted under conditions in which radio interference would have caused such inaccuracies. See People v. Garneau, 120 A.D.2d 112, 507 N.Y.S.2d 931 (1986). See also Romano v. Kimmelman, 96 N.J. 66, 474 A.2d 1 (1984). These challenges arose during the period 1982-85. P. GERSTENZANG,infra note 23, at 242-44. Since that time, police departments have taken precautions to guard against radio frequency interference. Id. at 244.

The first breath testing device to be sold commercially was the Drunkometer, which was first sold to the public in 1938. See Watts, supra note 4, at 58 n.74. In 1941, the Intoximeter and Alcometer were first marketed. Id. at 61 n.82. The Alcometer was the first automated breath testing device, id. at 61, while the Intoximeter had the distinction of being both the first portable breath testing device, id. at 62-63, and the first device to use the 1:2,100 partition ratio. Id. at 56 n.71. For a discussion of how these devices worked, see infra note 25. See also, supra note 61. The Smith & Wesson Model 900 Breathalyzer, which was first marketed in 1954, is the oldest breath testing device still in use today. P. GERSTENZANG, HANDLING THE DWI CASE IN NEW YORK 180 (1987); S. BRENT & S. STILLER, HANDLING DRUNK DRIVING CASES 139 (1985).

The current challenge to the 1:2,100 standard partition ratio has actually been festering for decades. Professor Leon Greenberg believed that the partition ratio varied considerably among individuals based on two pioneering partition ratio studies that he made in 1934 and 1941, respectively. See Watts, supra note 4, at 56-57 n.72. Greenberg abandoned this belief when he acknowledged the results of a 1952 National Safety Council report that adopted the 1:2,100 ratio as a standard average for all people as accurate. Id. However, there were some who believed that he was pressured, by those anxious to have a single universal ratio, into discrediting the results of his early studies as experimental error. Id. (citations omitted). The first judicial challenge to the 1:2,100 partition
ratio occurred in Cooley v. Municipality of Anchorage, 649 P.2d 251 (Alaska Ct. App. 1980). That court rejected the challenge by concluding that “the breathalyzer is fundamentally accurate in the vast majority of cases.” Id. at 254. The New Jersey Supreme Court refused to label the current partition ratio a new scientific development because “[s]cientists have performed many studies, stemming from as far back as 1930, to determine the various factors that might affect the range of the partition-ratio variability.” State v. Downie, 117 N.J. 450, 457, 569 A.2d 242, 245 (1990).

The first modern breath testing device, the Smith & Wesson Model 900 Breathalyzer, was a wet device. See supra note 22. Prior to its introduction in 1954, cruder breath testing devices such as the Drunkometer and the Intoximeter were in use by police forces around the country. See, e.g., City of Appleton v. Sauer, 271 Wis. 614, 74 N.W.2d 167 (1956). These devices measured blood alcohol content based on a color change that occurred in a chemical solution when a sample of the defendant's breath was introduced into it. The defendant's blood alcohol content was determined by the rapidity of the color change. Sauer, 271 Wis. at 616, 74 N.W.2d at 168. The Intoximeter test was in use in California as early as 1952. See People v. Hernandez, 121 Cal. App. 2d 55, 262 P.2d 367, 368 (1953). The Intoximeter test required the defendant to blow up a rubber balloon. Id. at 57, 262 P.2d at 368. Defendant's breath was then chemically analyzed when the air inside the balloon was allowed to escape. Id. The Drunkometer and Intoximeter both fell out of favor because they were based on the theory that there was a constant relationship between the amount of carbon dioxide and alveolar air in the sample. That theory has been proven erroneous. See S. BRENT & S. STILLER, supra note 23, at 95-96 & n.5.
these ranges, then, the inverse square law of light and the Beer-Lambert Law will be in inverse geometrical relationship, and an essentially linear (or directly proportional) ratio results.
Id. at 139 n.1 (citations omitted).

The Breathalyzer, like all breath testing machines uses the 1:2,100 standard partition ratio. It is therefore also subject to the same challenge as "dry machines." See P. GERSTENZANG, supra note 23, at 181.

Id.

Id. at 235.

Id. Infrared spectroscopy uses the radiation absorption properties "to establish absorption 'fingerprints' for any given chemical compound." Id.

Id. at 236.

Id.

Id.

Id.

Id.

Id. Alcohol also absorbs radiation with wavelengths of 7.25, 9.18, 9.50, and 11.5 microns, respectively. Id.

See supra note 41 for a description of the Beer-Lambert Law.

P. GERSTENZANG, supra note 23, at 235-36.

See S. BRENT & S. STILLER, supra note 23, at 95. Henry's Law is named for its discoverer, the English chemist William Henry (1774-1836). Id.


In 1952, a subcommittee of the National Safety Council reported that the partition ratio was approximately 1:2,100. The subcommittee had been appointed in 1949 specifically to resolve conflicts among the scientific community as to what was the true partition ratio. The scientific community put its imprimatur of approval on the subcommittee's work when the three most prominent researchers in the field endorsed the 1:2,100 ratio as the proper standard. These researchers were Glenn C. Forrester, who developed the Intoximeter in 1941, R.N. Harger, who developed the Drunkometer in 1938, and Leon A Greenberg, who developed the Alcometer in 1941. See Watts, supra note 4, at 56 n.71, 58 n.74, 61 n.82.

P. GERSTENZANG, supra note 23, at 126. This ratio works at a standard temperature of 34°C, which is estimated as the mean temperature at which breath leaves the human body. See S. BRENT & S. STILLER, supra note 23, at 96.
NHTSA model specifications for breath testing equipment defines BAC as “Blood alcohol concentration, expressed in percent weight by volume (% w/v) based upon grams of alcohol per 100 cubic centimeters of blood or per 210 liters of breath in accordance with the Traffic Laws Annotated.” See 49 Fed. Reg. 48857 (1984).


See ALASKA STAT. § 28.35.030(a)(2) (1988); COLO. REV. STAT. § 42-4-1202(2)(c) (1989); IDAHO CODE § 18-8004(4) (1990); KAN. STAT. ANN. § 8-1013 (Supp. 1989); MONT. CODE ANN. § 61-8-407 (1987); NEB. REV. STAT. § 39-669.07(2) (1988); N.C. GEN STAT. § 20-4-01.02(b) (1989); OHIO REV. CODE ANN. § 4511.19(3) (Page Supp. 1990); S.D. CODIFIED LAWS. § 32-23-7 (1989); TEX. REV. CIV. STAT. ANN. art. 6701-1(a)(1)(B) (Vernon Supp. 1990); UTAH CODE ANN. § 41-6-44(2) (1988); WASH. REV. CODE ANN. § 46.61.504 (Supp. 1990); WIS. STAT. ANN. § 885.235(1) (West Supp. 1989); and WYO. STAT. § 31-5-233(1)(a) (1989). All of these states, except for Utah, use 0.10 grams in 210 liters of breath in their respective definitions of intoxication, as 0.10 grams coincides with the per se level of 0.10% blood alcohol content. See supra note 5. Utah uses 0.08 grams in 210 liters of breath in its definition of intoxication, as that level coincides with Utah’s per se level of 0.08% blood alcohol content. See supra note 7. The Coast Guard uses “grams of alcohol per 210 liters of breath” in its definition of alcohol concentration. See 33 C.F.R. § 95.010 (1989). The Federal Railroad Administration also incorporates the 1:2,100 partition ratio into its definition of alcohol concentration. See 49 C.F.R. § 219.15(b) (1989).

California currently does not use the 1:2,100 ratio in its statutory definition of DWI. California’s definition is based on a percentage of alcohol in 100 milliliters of blood, which as of January 1, 1990, is 0.08% alcohol in 100 milliliters of blood. See CAL. VEH. CODE § 23152(b) (West Supp. 1990). California is scheduled to incorporate the 1:2,100 ratio into its statutory definition of DWI on January 1, 1992. See CAL. VEH. CODE § 23152(b) (West Supp. 1990) (effective Jan. 1, 1992).

The National Safety Council subcommittee that adopted the 1:2,100 participation termed that figure as an approximation of what the partition ratio most likely was. See Watts, supra note 4, at 56 n.71.

Id. All of these levels of intoxication would be above the 0.08% level in force in California as of January 1, 1990. See supra notes 9 & 68. However, in a state like New Jersey, where the presumptive level is still 0.10%, see supra note 5, only the last example would produce a level of intoxication above the presumptive level.

These experts are Dr. Kurt Dubowski, of the University of Oklahoma, who headed the National Safety Council’s Committee on Alcohol and Drugs in 1970-71, was president of the American Academy of Forensic Sciences in 1978-79, and who is regarded as the most knowledgeable scientist in this field today, see McGinley, 229 N.J. Super. at 201, 550 A.2d at 1309; Professor Stanley J. Broskey, “a forensic chemist toxicologist with the New Jersey State Police for 3 years,” id. at 200, 550 A.2d at 1310, who is also familiar with breath testing practices in 40 states id.; Dr. Norman Scholes an associate professor of Pharmacology and research scientist who's expert testimony led the Nebraska Supreme Court to discount Burling's breath test result 52.38% in People v. Burling, 224 Neb. 725, 728-29, 400 N.W.2d 872, 875-76 (1987). A portion of Dr. Scholes' testimony in that case is reprinted in P. GERSTENZANG, supra note 23, at 126-27 (Supp. 1989).


81 Other factors related to body temperature will also affect the partition ratio. These factors include the condensation of water vapor present in the defendant's breath when he or she breathes into the machine. If the temperature of the machine is less than the 34°C, see supra note 62, then some of that water vapor will condense, resulting in the loss of the alcohol that condensed with the water vapor. See S. BRENT & S. STILLER, supra note 23, at 105. Also, if the defendant exercises prior to being tested, his or her breath test result will be lower than if he remained inactive prior to the test. Id.

82 State v. Brayman, 110 Wash. 2d 183, 203, 751 P.2d 294, 304 (1988). Other research has shown that there is a 7% change in the partition ratio for every 1°C change in body temperature. See S. BRENT & S. STILLER, supra note 23, at 103.

83 State v. McGinley, 229 N.J. Super. 191, 203, 550 A.2d 1305, 1311 (1988). A driver with a fever of 102.2°F if pulled over and tested and who registers 0.11% on a breath test, would have a result that is 0.0154% high, assuming a 7% error for every 1°C increase in body temperature. See S. BRENT & S. STILLER, supra note 23, at 103. If this ailing defendant had been on medication when he was tested, that medication may also have affected his or her partition ratio. See McDonald, 206 Cal. App. 3d at 880, 254 Cal. Rptr. at 386.

84 McGinley, 229 N.J. Super. at 202, 550 A.2d at 1310; see also S. BRENT & S. STILLER, supra note 23, at 103-04.

85 S. BRENT & S. STILLER, supra note 23, at 103-04. “The hematocrit is composed mainly of red and white blood cells and platelets.” Id. at 104.

86 Id. at 103.

87 Id.

88 Id. at 104.

89 Id. However, according to Professor Broskey, “[H]emoglobin content varies in individuals from 42% to 54%, and, toward the upper end of that variation, can cause a breathalyzer reading error of 7 to 10 percent.” See People v. McGinley, 229 N.J. Super. 191, 204, 550 A.2d 1305, 1311 (1988).


91 S. BRENT & S. STILLER, supra note 23, at 95.

92 Id.

93 Brayman, 110 Wash. 2d at 203, 751 P.2d at 304.

94 Id. The effects of lung capacity variations may have been overstated by the forensic toxicologists who have recently attacked the reliance on a fixed 1:2,100 partition ratio by breath testing devices. Although a small lunged person will exhale more alveolar air than a leather-lunged counterpart of similar stature,

“[i]n actuality, little of the air an individual exhales into an evidential breath tester (EBT) is truly alveolar. Rather, the best most of us can do is exhale the air from the deepest portion of the lungs above the alveoli. This does not make a critical difference. To the extent it makes a difference at all, it benefits the person being tested.”

See S. BRENT & S. STILLER, supra note 23, at 96 (citations omitted).

95 Brayman, 110 Wash. 2d at 203, 751 P.2d at 304.

96 Id. at 202, 751 P.2d at 303.

97 S. BRENT & S. STILLER, supra note 23, at 100.
Id. at 101. The fifteen minute period is based on studies that show "that in the normal individual, alcohol in the defendant's mouth will dissipate within 15 minutes of the last drink." Id. (citations omitted).

Id. Broken fillings and other unusual characteristics of the defendant's mouth that form pockets where alcohol can collect have the same effect. Id. See also Brayman, 110 Wash. 2d at 203, 751 P.2d at 302.


Mc Ginley, 229 N.J. Super. at 200, 550 A.2d at 1310. Dr. Dubowski's 0.055% reduction is based on a 0.03% reduction for inherent errors in the machine itself and .025% for errors occurring in translating the breath reading to a blood reading.


293 F. 1013 (D.C. Cir. 1923).

Id. at 1014. The rule was stated by the court as follows:

Somewhere in this twilight zone the evidential force of the principle must be recognized, and while courts will go a long way in admitting expert testimony deduced from a well-recognized scientific principle or discovery, the thing from which the deduction is made must be sufficiently established to have gained general acceptance in the particular field in which it belongs.

Id.

State v. Brayman, 110 Wash. 2d 183, 751 P.2d 294 (1988). Brayman involved a challenge to WASH. REV. CODE ANN. § 46.61.502 (Supp. 1989), which defines intoxication as "0.10 grams or more of alcohol per two hundred ten liters of breath, as shown by analysis of his breath, blood, or other bodily substance . . . ." Id. at 186, 751 P.2d at 296. See supra note 67 for other states with similarly worded statutes.

Id. at 302-03. See also State v. Downie, 229 N.J. Super. 207, 211, 550 A.2d 1313, 1315 (1988).


The Downie court failed to address this issue because not enough facts were presented to it on the trial court record. Downie, 229 N.J. Super. at 212, 550 A.2d at 1315.

Brayman, 110 Wash. 2d at 198-202, 751 P.2d at 302-03. See supra notes 90-95 and accompanying text for a discussion of how a smaller lung capacity can affect breath test results. But see supra note 94, for a discussion of evidence showing that lung capacity may be overrated as a factor leading to lower partition ratios.

Id. at 198, 751 P.2d at 302.

Id. at 202-03, 751 P.2d at 304.

Id. at 203-03, 751 P.2d at 304. Women also have lower average hematocrit levels than men. The hematocrit ranges from 34% to 47% for the average healthy female, and from 42% to 52% for the average healthy male. See S. BRENT & S. STILLER, supra note 23, at 104. This difference may actually benefit women, since Dr. Dubowski's research has shown that hematocrit variations “toward the upper end of that variation, can cause a breathalyzer reading error of 7 to 10 percent.” See State v. McGinley, 229 N.J. Super. 191, 204, 550 A.2d 1305, 1311 (1988) (emphasis added). Therefore, variations toward the lower end of the spectrum may cause errors in the defendant's favor. See also State v. Downie, 117 N.J. 450, 463, 569 A.2d 242, 248 (1990).

Brayman, 110 Wash. 2d at 202, 751 P.2d at 304.

In Washington, under the state constitution's equal rights amendment, a statute is unconstitutional when it has a disparate impact on a gender. Id. at 200, 751 P.2d at 303. Under the California constitution, classifications based on sex are also given a strict scrutiny
analysis, “because classifications based upon sex should also be treated as suspect.” Sail'er Inn, Inc. v. Kirby, 5 Cal.3d 1, 17, 485 P.2d 529, 539, 95 Cal. Rptr. 329, 339 (1971).

See WASH. REV. CODE ANN. § 46.61.504 (Supp. 1989). See also supra note 67 for those states with similarly worded statutes.

Brayman, 110 Wash. 2d at 198, 751 P.2d at 303.

Id. at 198, 751 P.2d 302.

Id. at 200, 751 P.2d 303. California has used the same rational relationship test to uphold the use of evidence that defendant had a blood alcohol content of 0.10% or more while he or she had been operating a vehicle, to establish a rebuttable presumption that defendant had committed DWI. “The presumption . . . is not based on speculation but is founded on the long-recognized and scientifically established relationship between blood alcohol level and degree of intoxication.” See People v. Lachman, 23 Cal. App. 3d 1094, 1098, 100 Cal. Rptr. 710, 712 (1972) (citations omitted).

Id.

Id. at 204, 751 P.2d at 305.


See supra notes 29-43 and accompanying text for a discussion of how wet testing devices work and how they differ from “dry” devices. California no longer uses any of the wet types of machines. The use of wet devices is not prohibited by CAL. ADMIN. CODE tit. 17, § 1221.2(a)(1) (1986), which sets the standards for breath testing devices. That section requires that any breath testing “instrument and any related accessories shall be capable of conforming to the ‘Model Specifications for Evidential Breath Testing Devices’ of the National Highway Traffic Safety Administration of the United States Department of Transportation.” Wet devices conform to those specifications and are on the NHTSA's conforming products list for breath testing devices. See 49 Fed. Reg. 48855-01 (1984).

This period is the time during which Lee Campbell was employed by SII. See People v. Serrano, 142 Misc.2d 1087, 1093, 539 N.Y.S.2d 845, 849 (N.Y. Crim. Ct. 1989). Campbell was a part-time worker who filled and sealed ampoules. People's Response, Appendix H at 2, 9, People v. Bevins, Special Term, June 14, 1989, Calendar No. 15 (Ulster Co. Ct. July 25, 1989). It was during Campbell's term of employment at SII that lots 0916,0917, and 0217 were manufactured. Bevins, at 3.

See supra note 25 and accompanying text. These devices are the Smith and Wesson Breathalyzer Model 900, the Breathalyzer Model 900A, the Breathalyzer Model 1000 and the Breathalyzer Model 2000.


Id. at 41, 319 N.Y.S.2d at 177.

Id.

Id.

See P. GERSTENZANG, supra note 23, at 194. The certificates are admissible under N.Y. CIV. PRAC. L. & R. 4518(c) (McKinney 1987). Id.

Id.


A simulator solution is a mixture of a precise amount of ethyl alcohol and distilled water that is used to test a breath testing machine immediately after the defendant's test result. See P. GERSTENZANG, supra note 23, at 184. The simulator solution is placed over the air intake valve on the breath testing machine. Id. at 185. The operator then blows through the solution and into the machine. Id. The air from the operator's breath picks up alcohol contained in the solution. Id. The breath testing device then records a reading within plus or minus 0.01% of the alcohol concentration in the solution. Id.


Id. at 4.


Id. at 1090-91, 539 N.Y.S.2d at 847.


In 1969, a similar challenge was brought in California, People v. Van Halen, 3 Cal. App. 3d 233, 83 Cal. Rptr. 140 (1969). Defendant produced expert testimony challenging the Breathalyzer ampoules on the grounds that:

(1). . .the glass used in test ampoules is not optically perfect, and that defects or imperfections therein would affect the passage of light in such a way as to give a reading inaccurately adverse to the test subject; (2) that it is possible that the quantity of solution in the ampoule might be less than the assumed 3 cubic centimeters, (and that any reduction in quantity would also produce an adversely inaccurate reading; and (3) that it is possible that the solution might be qualitatively inaccurate, again with an adversely inaccurate result.

Id. at 236, 83 Cal. Rptr. at 141. Unfortunately, this case is not of much use in the present challenge, on account of the fact that defendant challenged the admissibility of Breathalyzer on the ground that the ampoule had not been preserved by the police. Id. The court denied the trial court's grant of a writ of prohibition against admitting the test result in spite of the destruction of the ampoule. Id. at 239, 83 Cal. Rptr. at 144. This issue was ultimately decided by the United States Supreme Court in California v. Trombetta, 467 U.S. 479 (1984), wherein the Court allowed breath test results to be admitted into evidence even when the ampoule has been destroyed.

Suppression Hearing Record at 44, People v. Ventratico, Indictment No. 3452 (Cayuga Co. Ct., May 10, 1988). Because the wet tests compare a test and control ampoule, it is critical that both ampoules be identical. If the ampoules are not identical, there will be errors of unknown proportion:

THE WITNESS: Absolutely. The point is they [the ampoules] have to be identical because the machine compares the two.

THE COURT: If they are not identical when you start out there is no way you're going to get a valid reading no matter high or low, correct?

THE WITNESS: That's right. There are ways and the operator does achieve a new balance but you're starting out with a compromised system to begin with, yes. The whole thing is based on those two ampoules being identical, both in their color and reactivity to alcohol.

Id. (testimony of Dr. Oliver Brown).


Serrano, 142 Misc. 2d at 1096, 539 N.Y.S.2d at 851.

Id.

Id.


Q. Can you tell us, sir, whether you were ever employed—Strike that. Whether Systems Innovations was ever known also as Law Enforcement Products, Inc.?

A. Yes, sir.

Q. They were?

A. Yes, sir.

Q. Did Systems Innovations have a separate location for the manufacture and production of ampoule or breath test kits for Law Enforcement Products aside from the Radio Shack store at Hallstead, PA?

A. Not that I'm aware of.

Q. Were you ever aware of any other location for anything from Law Enforcement Products?

A. No, sir.

Q. And you were the person that was actually in charge of the manufacture of the ampoules at the Radio Shack store in Hallstead Plaza?

A. Correct. . . .

Q. To your knowledge, did you ever supervise or direct the manufacture of ampoules at the Radio Shack location in Hallstead, PA for the name of — or that was used in the name of the company known as Law Enforcement Products, Inc.? . . .

A. Could, have, yes. As I had stated, they were used interchangeably.

Id.

Id. at Appendix H, 40-42.

Id. at Appendix H, 34-35. Under the SII numbering system, the first two numbers of an ampoule lot corresponded to the month the lot was manufactured, the third digit corresponded to the batch from which that lot was drawn, and the fourth digit corresponded to the year of manufacture. Under this system, lot number 0916 would be the first batch of September 1986. Id. at Appendix H, at 34. According to Michael Dugan, 0916 was actually made in July 1986. Id. at Appendix H, at 35. SII also failed to keep records of which batches were produced for each lot number in addition to not following its lot numbering system. Id. at Appendix I, at 26; Suppression Hearing Record at 35, People v. Ventatido, Indictment No. 3452 (Cayuga Co. Ct. May 10, 1988). As a result of these errors, SII's lot numbers are considered meaningless because there is no way to tell that ampoules with the same lot numbers came from the same batches. Suppression Hearing Record at 35, People v. Ventafido, Indictment No. 3452 (Cayuga Co. Ct. May 10, 1988).


Serrano, 142 Misc. 2d at 1098, 539 N.Y.S.2d at 852.


People v. Freeland, 68 N.Y.2d 699, 497 N.E.2d 673, 506 N.Y.S.2d 306 (1986). “We note that, on the state of this record, we have no occasion to determine what nature, quantity, and quality of proof is required to establish these foundational requirements, because
there was no such proof in this case.” Id.; see also supra notes 119-122, and accompanying text for a discussion of those requirements. Freeland did not make admissibility of the test results depend on admissibility of the Certificates of Analysis.

- See supra note 133 for a description of a simulator solution test.

- Bevins, at 4 (citations omitted). See also Singh, 142 Misc. 2d at 1020, 542 N.Y.S.2d at 1022.

- Serrano, 142 Misc. 2d at 1091, 539 N.Y.S.2d at 848.

- Id. 539 N.Y.S.2d at 848; see generally P. GERSTENZANG, supra note 23, at 138-39. The use of tap water results in the ampoule solution oxidizing substances other than ethyl alcohol. This results in an unknown degree of inaccuracy. Among the substances found in tap water which could cause oxidation other than ethyl alcohol would be such organic matter as Polychlorinated hydrocarbons, pesticide residue, fertilizer residue, and heavy metals found in plumbing. Id.

- People's Response to Motion to Suppress, Appendix C, at para. 21a, People v. Bevins, Special Term, June 14, 1989, Calendar No. 15 (Ulster Co. Ct. July 25, 1989). One of the experts challenging the importance of using 200 proof alcohol in the simulator solution is Robert Horn, the Director of the New York State Police Crime Lab. Mr. Horn stated: The Report criticizes SII for using 190 proof alcohol, and not 200 proof alcohol, in manufacturing its simulator solution. This difference should not affect the quality of final product. Once exposed to air, 200 proof alcohol will rapidly absorb water from the air so that its proof is reduced. The difference in proof is not important in making the product. Id.


- Id. at 5. “There is no evidence that SII hid anything from the state, gave false statements or reinforced false impression or prevented the Commonwealth from acquiring information.” Id.

- See supra note 76. Dr. Dubowski is one of the forensic toxicologists who has conducted research disputing the reliability of the 1:2,100 partition ratio. Dr. Dubowski was also involved in the radio frequency challenge. See supra note 22. He felt that such interference had only minimal effects upon the accuracy of a breath test result. See also People v. Hochheimer, 119 Misc. 2d 344, 349, 463 N.Y.S.2d 704, 708 (1985).


- Id. at para. 3-4.

- Id. at para. 4.

In Foley v. Interactive Data Corp., 47 Cal. 3d 654, 765 P.2d 373, 254 Cal. Rptr. 211 (1988), the California Supreme Court overturned a line of Court of Appeals cases which had held that an employee who is wrongfully terminated had a tort cause of action against his or her employer for breach of implied covenant of good faith and fair dealing. The California Supreme Court held that its decision did not violate stare decisis on the ground that the issue had not yet been decided or settled. The court said:

There has, however, clearly and indisputably, been no holding by this court that such a cause of action exists. If we were to follow the dissent's urging that we should therefore leave this area of law untouched, we would be abdicating our role. Trial courts are of course bound by the decisions of the Court of Appeal. But decisions of the lower appellate court are in no way binding upon this court which is free at any time to overrule lower court interpretations of questions of law and reach a different conclusion.

Id. at 689 n.28, 765 P.2d at 393-94 n.28, 254 Cal. Rptr. at 231-32 n.28.


224 Neb. 725, 400 N.W.2d 872 (1987).

142 Misc. 2d 1087, 1099, 539 N.Y.S.2d 845, 852 (1989).

Burling, at 726-27, 400 N.W.2d at 874.

Id. at 727, 400 N.W.2d at 874-75. The court discussed in detail Burling's inabilities to pass simple field sobriety tests:

[D]efendant had the odor of alcohol on his breath, had slurred speech, and had trouble retrieving his license from his billfold. When instructed to go to the patrol car, defendant staggered and swayed, lost his footing ‘once or twice,’ and had difficulty walking on the shoulder of the road. . . . He made three attempts to recite the alphabet, but could not proceed past the letter k. . . . [D]efendant also failed a ‘horizontal gaze test’. . . . When instructed to walk heel to toe, defendant staggered and had to step to the side to balance himself. When instructed to hold his arms out, close his eyes, and touch his finger to the tip of his nose, defendant would either touch the bridge of his nose or miss his nose completely. He also swayed while attempting to perform this test. When instructed to balance on one leg and raise the opposite foot off the ground, defendant lifted his foot, then dropped it immediately. Defendant was asked to stand erect with his head titled back and his eyes closed. During this maneuver defendant swayed, staggered, and almost fell.

Id.

Id. at 727, 400 N.W.2d at 875.

NEB. REV. STAT. § 39-669.07(2) (1988). See supra note 5 for a list of other states with similar statutes. California has a similar per se DWI statute, See CAL. VEH. CODE § 23152 (West 1985). Section 23152(b) states: “[i]t is unlawful for any person who has 0.10 percent or more, by weight, of alcohol in his or her blood to drive a vehicle.” Id. Since January 1, 1990, the California statute has differed from the Nebraska statute at issue in Burling in that the California statute now defines per se DWI as occurring whenever a defendant has 0.08% or more alcohol, by weight, in his or her blood. See CAL. VEH. CODE § 23152(b) (West Supp. 1990).

The Downie court summarized Dubowski's new partition ratio position as follows:

In 14% of the cases, it did not underestimate the blood-alcohol level. Of that 14%, in 2.3% of cases the breathalyzer states exactly the blood-alcohol content. In 9.4% of the cases, the breathalyzer overestimates the blood-alcohol level at the third decimal level, where it has no impact on the subject's breathalyzer reading. In only 2.3% of cases does the breathalyzer materially overestimate the blood-alcohol level potentially to the detriment of the accused. Even the 2.3% figure is subject to question inasmuch as it involves separate pairs from the same subject. It is not established that 2.3% of the people would have a higher breathalyzer reading than the actual percentage of alcohol in their blood.

Id. at 462, 569 A.2d at 248. Dr. Dubowski's 2.3% estimate is still significantly higher than the population percentage which is estimated by his colleagues as having partition ratios less than 1:2,100. See infra note 215.

Id. at 458, 569 A.2d at 246. See infra notes 276-287 and related text for a discussion of the drawbacks of blood tests.
213 Downie, 117 N.J. at 458, 569 A.2d at 246.

214 “Even defense witnesses admitted that some of these factors would actually lower breathalyzer readings.” Id. at 463, 569 A.2d at 248. The Downie court noted such factors as an individual’s body temperature, the individual’s hematocrit level, gender, and medications taken by the individual at the time of the breath test as being among those affecting the partition ratio. Id. See supra notes 76-101 & 105-119 and related text for a discussion of how these and other factors affect an individual’s partition ratio.

215 The court based this conclusion on the fact that the 1:2,100 ratio is significantly lower than the approximately 1:2,300 ratio that the scientific community generally accepts as the average human partition ratio. The court found that “the National Safety Council adopted the 2100:1 ratio instead of the more accurate 2300:1 ratio because they wanted to err on the low side and have almost no errors on the high side.” Downie, 117 N.J. at 461, 569 A.2d at 247.

216 See supra note 81.

217 “Well, there are a few studies which have shown a range [in the partition ratio] of eleven hundred [to one] to three thousand [to one], but of course these studies have been shown to be grossly erroneous based on the other studies that have been produced over fifty years.” State v. Gates, 777 P.2d 717, 719 (Haw. Ct. App. 1989) (quoting from trial transcript). The first major partition ratio studies were conducted during the 1920s and early 1930s, although some primitive studies of this topic were published as early as 1854 and 1887. See Watts, supra note 4, at 56 n.70. The most important research used in establishing the 1:2,100 standard was conducted by R.N. Harger during the 1940s and was first published in 1950. Id. at 56 n.71.

218 Other research has also shown that very few individuals are significantly below the 1:2,100 ratio: One recent study indicates that . . 68% of the population will have a ratio greater than 2038.5:1; 95% of the population will have a ratio greater than 1797:1; 99.7% of the population will have a ratio greater than 1555.5:1; and 0% to a maximum 0.3% of the population will have a ratio which falls between 1100:1 to 1555.5:1. People v. Amores, 143 Misc. 2d 527, 529, 541 N.Y.S.2d 695, 696 (1989) (footnotes omitted) (citing Simpson, Accuracy and Precision of Breath Alcohol Measurement for a Random Subject in the Post-Absorptive State, 33 CLINICAL CHEMICAL 2, 261-68 (1987)). The Amores court used the Simpson study to conclude that no more than three people in 1000 who register a 0.16% breath test reading would have a blood alcohol concentration below 0.10%. Id. at 530, 541 N.Y.S.2d at 697. Other estimates place the percentage of the population with partition ratios of under 1:2,100 at only six percent. Gates, 777 P.2d at 719 (quoting from trial transcript). Even the researchers challenging the reliability of the 1:2.100 ratio have admitted that the extremely low ratios they claimed to have discovered are extremely rare. For instance, 99.9% of the population has a ratio over 1:1,550. State v. McGinley, 229 N.J. Super. 204, 550 A.2d 1305, 1311 (1988), overruled on other grounds, State v. Downie, 229 N.J. Super. 207, 550 A.2d 1313 (1988).

219 293 F. 1013 (D.C. Cir. 1923).

220 The Frye standard is followed in California for admitting scientific evidence. “We have expressly adopted the foregoing Frye test and California courts, when faced with a novel method of proof, have required a preliminary showing of general acceptance of the new technique in the relevant scientific community.” People v. Kelly, 17 Cal. 3d 24, 30, 549 P.2d 1240, 1244, 130 Cal. Rptr. 144, 148 (1976).

221 Frye, 293 F. at 1014.

222 S. BRENT & S. STILLER, supra note 23, at 97 (citations omitted). Dr. Stanley Broskey also agrees with Dr. Dubowski’s 1:1,100 figure. See McGinley, 229 N.J. Super. at 191, 550 A.2d at 1309-10, as does Dr. Norman Scholes. See P. GERSTENZANG, supra note 23, at 126 (Supp. 1989).

223 People v. McDonald, 206 Cal. App. 3d 877, 880, 254 Cal. Rptr. 384, 386 (1988). Other experts have stated that the human partition ratio range is from 1:1,375 to 1:3,000. See State v. Robitaille, 561 A.2d 412, 414 (Vt. 1989).


225 Id. at 319, 405 N.W.2d at 276.

227  Id. at 653, 419 N.W.2d at 530.

        “[T]his court did not intend to, nor did it, rule that as a matter of law a reading of the test results from an Intoxilyzer Model 4011AS should automatically be adjusted. . . . [T]his court merely ruled upon evidentiary facts peculiar to each of those cases. Whether an adjustment is required is dependent upon the credible evidence in each case.”


229  See supra note 23.


231  P. GERSTENZANG, supra note 23, at 184.

232  Id.

233  Bevins, at 4 (citing People v. Meikrantz, 77 Misc. 2d 892, 901 (1974)). See also People v. Singh, 542 N.Y.S.2d 1018, 1021-22 (1989). These courts have been willing to accept simulator solution tests in lieu of the discredited Certificates of Analysis even though SII is also a leading manufacturer of simulator solution, as the accuracy and reliability of simulator solution has not been called into question to the degree that the SII ampoules have been discredited. See supra notes 168-171 and related text.


236  Lepine, 215 Cal. App. 3d at 91, 263 Cal. Rptr. at 543.

237  McCarty, 434 N.W.2d at 69.

238  Robitaille, 561 A.2d at 414.

239  See infra notes 243-264, and accompanying text for a discussion of the affirmative defense approach.

240  See supra notes 187-233 and accompanying text for a discussion of the discount method. The discount method involves the reduction of a breath test result by a judicially determined percentage in order to compensate for any overstatement of the defendant's blood alcohol content caused by his or her partition ratio falling under the 1:2,100 standard. In State v. Babcock, 227 Neb. 649, 419 N.W.2d 527 (1988), the Nebraska Supreme Court modified this approach with the weight of the evidence approach by holding that “[w]hether an adjustment is required is dependent upon the credible evidence in each case.” Id. at 653, 419 N.W.2d at 530.


242  Id. at 414.


Defendant was tried under CAL. VEH. CODE § 23152(b) (West 1985), which defined per se DWI to have occurred when a defendant operated a vehicle with a blood alcohol content of 0.10% or more. CAL. VEH. CODE § 23152(b) has been amended so that under current law per se DWI occurs when a defendant's blood alcohol content is 0.08% or more. See CAL. VEH. CODE § 23152(b) (West 1990). See also Pritchard, 162 Cal. App. 3d Supp. at 15, 209 Cal. Rptr. at 315.


Id.

Id.

Id.

Id. at 16, 209 Cal. Rptr. at 316.

“General evidence of such a possibility of error in the partition ratio will not suffice to rebut this presumption. Id. at 17, 209 Cal. Rptr. at 316.

Id.

Id. at 16, 209 Cal. Rptr. at 316.

Id.

Id. at 16, 209 Cal. Rptr. at 316.

Id. at 17, 209 Cal. Rptr. at 316.

People v. Herst, 197 Cal. App. 3d Supp. 1, 4, 243 Cal. Rptr. 83, 84 (1987). In Herst, the court upheld the following jury instruction that made proof of a partition ratio of less than 1:2,100 an affirmative defense:

The jury was instructed:

. . . All forensic alcohol laboratories licensed by the California Department of Health Services . . . are required by law to use a blood-breath ratio of 2100 to 1.

The jury may infer that this defendant has a 2100 to 1 partition ratio unless she presents evidence as to her personal partition ratio which establishes that the 2100 to 1 ratio does not apply to her. General evidence of such a possibility of error will not suffice to rebut this presumption. The People are not required to prove this Defendant's particular partition ratio.

The jury should not consider any conclusions made by any witness regarding the Defendant's blood alcohol concentration based upon breath alcohol results which use a partition ratio other than 2100 to 1.

Id. at 4 n.1, 243 Cal. Rptr. at 84 n.1.

People v. McDonald, 254 Cal. App. 3d 877, 883, 254 Cal. Rptr. 384, 388 (1988). “Indeed, [defendant's expert] Greenberg disputed the notion that a defendant could measure his or her partition ratio because it would be only speculative that the ratio had been the same at the time of the prosecution's breath test.” Id. See also People v. Brown, 143 Misc. 2d 270, 272, 540 N.Y.S.2d 650, 652 (N.Y. Crim. Ct. 1989).


“[A] single test to determine an individual's partition ratio would cost $600, and a series of tests to determine a partition ratio range would cost approximately $6,000.” Id. at 94, 263 Cal. Rptr. at 545.

Id. at 100, 263 Cal. Rptr. at 549.
People v. Thompson, 215 Cal. App. 3d Supp. 7, 10, 265 Cal. Rptr. 105, 108 (1989). “We are persuaded by all of the above that the time has come to abandon the rule of ‘convenience’ adopted in Pritchard.” Id.


293 F. 1013 (D.C. Cir. 1923). See supra notes 103-104 & 219-221.


Id. at 735-36, 541 N.Y.S.2d at 1009-11.

Id. at 736-39, 541 N.Y.S.2d at 1011-14. The reverse Frye approach developed out of a challenge to the ampoules based on the Auditor General’s Report, id. as the court rejected the motion to suppress the breath test results based on the partition ratio challenge. Id.

Id. at 738, 541 N.Y.S.2d at 1013.

See supra notes 254-258 and accompanying text.

Nieves, 143 Misc. 2d at 738, 541 N.Y.S.2d at 1013.

Id.

Id.


See Watts, supra note 4, at 49.


Id.

Id. at 459, 569 A.2d at 246.

Id. at 458, 569 A.2d at 246.

Id. at 455, 569 A.2d at 244.

The applicable California statute that was in effect prior to January 1, 1990, was typical of most other states’ statutes. See CAL. VEH. CODE § 23158(a) (West Supp. 1989) which states:

Only a licensed physician and surgeon, registered nurse, licensed vocational nurse, duly licensed clinical laboratory technologist or clinical laboratory bioanalyst, or certified paramedic acting at the request of a peace officer may withdraw blood for the purpose of determining the alcoholic content therein.

Id.

CAL. VEH. CODE § 23158(a) (West Supp. 1990) states: “[U]nlicensed laboratory personnel regulated pursuant to Sections 1242, 1242.5, and 1246 of the Business and Professions Code . . . may withdraw blood for the purpose of determining the alcoholic content therein.” Id.

DOT Alcohol Abuse Prevention Program for the Transportation Industry, Advance Notice of Proposed Rulemaking, 54 Fed. Reg. 46326, 46341 (proposed Nov. 2, 1989). Urine tests are also subject to these delay related problems. For additional problems with urine tests, see infra note 294.

CAL. VEH. CODE § 23157(5)(e)-(f) (West Supp. 1990). The arresting officer must issue a temporary permit valid for 45 days after the suspension. Id. at § 23157(5)(f).


In 1965, 36 states had adopted the 0.15% blood alcohol level as the presumptive level of intoxication and three states had adopted 0.10% blood alcohol as a presumptive level. Therefore, 11 states had no presumptive level of intoxication. See Watts, supra note 4, at 91.

California did not adopt a set figure of blood alcohol concentration as a prima facie level of intoxication until 1969. See CAL. VEH. CODE § 23126 (Deering 1980). California still uses a non per se DWI definition as a supplement to the per se definition. “It is unlawful for any person who is under the influence of an alcoholic beverage or any drug, or under the combined influence of an alcoholic beverage and any drug, to drive a vehicle . . . .” See CAL. VEH. CODE § 23152(a) (West 1985 & Supp. 1990). This definition is similar to those used by other jurisdictions to supplement their per se or prima facie DWI definitions. See, e.g., supra notes 194-200 and accompanying text for a discussion of the Nebraska non per se DWI definition and how the Nebraska Supreme Court has used it to augment that state's per se DWI statute.

Urine testing is a less desirable method for determining blood alcohol content than are either breath or alcohol testing. The least expensive urine test, the EMIT test, which is commonly used for drug testing in the workplace, is often unable to distinguish between melanin, the hormone responsible for dark skin color, and THC, the active ingredient in marijuana. Black employees have used this testing flaw as a basis for challenging terminations based on positive EMIT drug tests as violative of Title VII of the Civil Rights Act of 1964, 42 U.S.C. § 2000e (1982). See Comment, Employee Drug Testing—Balancing the Interests in the Workplace: A Reasonable Suspicion Standard, 74 VA. L. REV. 969, 975 & n.44, 988 & n.120 (1988); see also Chaney v. Southern Ry. Co., 847 F.2d 718, 721 (11th Cir. 1988). In addition, a urine test is expensive. Test prices range from $4.50 to $22 for the EMIT test, depending upon the number of drugs for which one is testing, up to $75 for the highly accurate and racially unbiased GC/MS test. See Comment, supra at 988 n.120.

Ironically, a defendant who chooses to take a blood test based on the partition ratio warning would likely exacerbate his blood alcohol reading by 9-10% over what would have been produced by a breath test. See State v. Downie, 117 N.J. 450, 455, 569 A.2d 872, 874-75 (1990). Thus, a defendant should be advised of this possibility prior to any blood testing.