The Validity of Breath Testing — an Overview of the Victorian Experience

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Included in the present legislation in Victoria\textsuperscript{3} are the offences of driving with a blood alcohol concentration (BAC) in excess of 0.05 per cent and driving while under the influence of alcohol. The testing program is carried out by State police and the legislation is primarily enforced by compulsory breath analysis using the Breathalyser. Last year over 16,000 breath analyses were performed under this legislation in Victoria. Since the introduction of breath testing legislation in 1961 over 100,000 analyses have been performed.

In April 1974, statutory provision was made for a blood sample to be taken from all persons over 15 years of age who are brought into hospital for examination or treatment in consequence of an accident involving a motor car. The blood samples collected under these provisions are subjected to a screening test using the Alcolmeter head space technique and the results are used for statistical purposes. Samples from drivers which are found to be positive are accurately analysed by gas chromatography and may be used in the prosecution of drivers.

Provision is made for the admission in evidence of the results of both breath and blood analyses by means of certificates, thereby relieving both police operators and laboratory staff from attendances at court unless specifically required by the defence.

In July 1976, so-called 'random' breath testing of drivers was introduced in Victoria on a trial basis for twelve months. Under this system mobile Breath Testing Stations are established at selected areas for random checking of drivers using Alcotest kits.

It will be noted that the legislation is enforced by means of two separate and distinct media. Thus, blood samples are taken from accident victims under Statutory Rules which stipulate that the sample is to be collected by venipuncture but without specifying the site. In other cases, where compulsory breath analyses are performed pulmonary blood is, in effect, the relevant medium.

While fines or terms of imprisonment have always been prescribed penalties for offences of this nature, the introduction of mandatory licence cancellation upon conviction has led to increased activity in the legal defence of these cases. The legislation relates the minimum period of licence cancellation to the magnitude of the BAC as follows:

- More than 0.05 but less than 0.10 per cent — three months
- 0.10 or more but less than 0.15 per cent — six months
- 0.15 per cent or more — twelve months.

There are also increased penalties for second and subsequent convictions.

It should be pointed out at this stage that the relevant Victorian Act states that the percentage of alcohol indicated to be present by breath analysis shall be evidence of the percentage

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\textsuperscript{b} This paper was in the course of preparation by the late Norman McCallum who was to have presented it at this Conference. Following his unexpected death in November, I undertook to complete and present the paper on his behalf. Although I was familiar with the context of the paper, I have found it difficult not only to include all the material he wished to discuss, but also to maintain the standard set by him.
of alcohol present in the blood of that person at the time his breath is analysed by the instrument'.

The Act also contains a rebuttable presumption to the effect that whatever the BAC that is found within two hours of an alleged offence 'it shall be presumed until the contrary is proved that not less than that percentage of alcohol was present at the time of the alleged offence'.

The problems of enforcement associated with breath analysis differ somewhat in different States depending mainly on the type of legislation in force. In general, the basic principles of breath analysis attract close scrutiny when the legislation is first introduced, but when the technique becomes established, as in Victoria, the basic principles become generally accepted.

In Victorian courts attention has frequently been directed toward the reduction or avoidance of licence cancellation. In order to diminish the period of licence cancellation it is necessary to reduce the value of the BAC accepted by the court to enter one of the lower ranges described earlier. To avoid cancellation completely it is necessary to establish sufficient doubt of the reliability of one or more of the principles on which breath testing is based and so invalidate it as a means of determining the BAC.

Concerning the first and more common procedure of qualifying for a lower concentration range, particularly where the reading is slightly in excess of the upper limit of the range, it is often claimed that allowance should be made for instrumental error thereby effectively reducing a reading of, say, 0.155 per cent to less than 0.150, thus incurring a reduced penalty. In view of the known tendency of the Breathalyser to return a slightly low value of the BAC, and the local custom operators have of reading to the nearest lower 0.005 per cent, the application of instrumental error fails to accomplish its purpose.

To consider the next point, it is necessary to refer to the results of comparisons between the results of blood and breath analyses commenced in 1959 at the University of Melbourne and finally published in 1962.2

The findings of this study were similar to other correlation studies made in Northern America, particularly that the Breathalyser gave generally lower readings of about 0.01 per cent below the corresponding blood test from the median cubital vein. However, some of the breath analyses were in excess of those obtained from blood and these were referred to at the time as 'over-estimations' given by breath analysis. The maximum of these was 0.028 per cent. They were then thought to be instrumental variations and were not recognised as normal physiological variations.

It was realised shortly after the publication of these results that a number of these comparisons were made at a time of rapidly rising BAC when the pulmonary circulation would have a higher alcohol concentration than peripheral venous blood. Subsequent studies have shown that the Breathalyser result does not exceed the blood result when absorption has slowed. The unjustified appeal to courts to subtract 0.028 per cent from the reading is still practised occasionally. Indeed, in several States no prosecution is entertained until the reading is far in excess of the prescribed level. In Western Australia, for example, it is the practice to allow an excess of 10% of the prescribed level before a prosecution is authorised.

It must be stated that the practice of making any allowance for so-called 'over estimations' has no scientific basis. It would appear that many of the problems currently encountered are generated by the failure to appreciate the complex interactions of the various processes which occur in the body after ingestion of alcohol. It is disappointing to note the frequent failure to acknowledge that significant differences occur in the BAC throughout the body, and that the pulmonary BAC is not necessarily identical with that of peripheral venous blood. Similarly, the validity of breath analysis seems to be suspected, rather than consider that it possesses sufficient sensitivity to detect slight fluctuations in arterial BAC which are damped out by the tissues to produce a smoothly changing BAC in venous blood.
Cross examination based on the validity of the blood-breath partition coefficient has been more common in interstate cases than in Victoria. It appears that this is due to the ready access to scientific experts in Victoria.

Since the Victorian Act contains provision for the rebuttal of the presumption that the BAC found by analysis is the same as that which existed at the time of the offence, evidence is often called to demonstrate that a lower BAC existed at the relevant time. Although the onus is on the defence to prove that a lower BAC was present, the degree of proof is on the balance of probability rather than beyond reasonable doubt.

In many cases it can be shown that there is a possibility that, because of the drinking pattern and the times involved, a rise in BAC could occur between the time of the offence and the time of testing. However, it is usually not possible to ascribe any degree of probability other than demonstrate a possibility.

Case law relating to this effect states that it is insufficient to show that the BAC was lower but that the value of the level must be stated or, at the very least, that the BAC was below the relevant concentration in order to escape conviction.4

While general rules may be applied to calculate a BAC at some previous time there can be no guarantee that such a calculation will be valid for a particular person under a particular set of circumstances. The complex interactions of such variables as rate of absorption and distribution of alcohol into the tissues renders the calculation of the precise BAC at a previous time impossible to perform in the individual case. This difficulty was clearly understood by the Law Reform Commission1 which recommended alteration of legislation to establish commission of an offence if the BAC at the time of the test exceeds the prescribed level. In this recommendation it has been recognised that, although such a driver might not exceed the limit at the time of the accident or apprehension by police, he has more alcohol in his body than can be considered consistent with safety if the BAC rises above the limit at any time within two hours.

Cases are frequently encountered where it is claimed that the defendant consumed alcohol after the alleged offence. If the drinking can be corroborated, some benefit may be derived by calling upon an expert to assess the maximum rise in BAC attributed to the supplementary drinking. Again it is not possible to determine the precise change in BAC but, by allowing the maximum rise, the court can often assess whether there is reasonable probability that the supplementary drinking has raised the BAC sufficiently to attain a level which would unjustly incur a more severe penalty.

Requests are frequently received to provide evidence to the effect that the BAC found by breath analysis is not consistent with the defendant's version of his drinking. The inference of such a manoeuvre is that if the defendant's evidence of drinking is accepted by the court, then the breath analysis must be in error. What is overlooked is that, apart from the fact that the defendant's version may be deliberately falsified, a drinker's assessment of the amount consumed is often unreliable (the error tending to increase with increased BAC). Furthermore, the drinking history may be corroborated by companions who are unaware of the magnitude of recent previous drinking sessions of the defendant. In other words, the defendant, although drinking moderately with companions may have commenced that particular episode with a substantial BAC.

In some circumstances the slightest pretext is used to discredit the breath analysis figure. For example, cases have occurred where an informant (with no laboratory experience) has, after failing to notice signs of frank intoxication in the defendant, expressed surprise at the magnitude of the BAC found by breath analysis. This has resulted in doubt being cast on the integrity of the breath analysis which has consequently been rejected in evidence. Experienced Breathalyser operators and laboratory investigators, on the other hand, are well aware of the ability exhibited by experienced drinkers in concealment of signs of deterioration at quite high levels of BAC.

One aspect of the Breathalyser which provokes doubt of its validity is the specificity of the technique for ethanol. While it is well known that the acid dichromate mixture in
the ampoule will react with numerous substances when these are added directly to the mixture, their low volatility, minute quantity or slow reaction rate render them incapable of interference. It has been suggested in court that substances such as antibiotics, morphine and acetone will produce readings which will be erroneously recorded as alcohol. However, it is known that such claims are without foundation.

In spite of the continued search over almost twenty years for substances capable of producing interference with the Breathalyser reading, no such substance has been found.

The technique of operation followed by Victorian operators has been developed by long practical experience and is now specified in laboratory instructions and governed by Statutory Rules. It includes such refinements as the obvious fifteen-minute observation period required to ensure the absence from the mouth of recently ingested alcohol. An additional precaution is the performance of a check reading to ensure that the reaction is complete within ninety seconds thereby eliminating the possible interference of volatile substances such as ether and methanol which have slower reaction rates than ethanol.

At this stage it must be stressed that a major part of the success of the Breathalyser program in Victoria has resulted from the ability and integrity of the police operators, who qualify by undergoing three weeks' training in theory and practice at the laboratory followed by one week under supervision at the Breath Analysis Section. Operators thus gain a degree of competence and professionalism which ensures that standardisations and check procedures are not disregarded. In this way accuracy and integrity are continually maintained.

Over the years, several independent experts have been available throughout Australia to supply evidence on behalf of the defence. Also, staff from the Forensic Science Laboratory have always been readily available for this purpose when reasonable circumstances have warranted their testimony. In latter years the demand for these services has increased to the extent where the purpose and some advantages of breath tests have been offset by the frequent requirement of chemists to attend court.

Most of the difficulties referred to can apply to either breath or blood analysis, but because of the greater frequency of court appearances involving breath these difficulties tend to become regarded as shortcomings of the breath analysis technique. Continued comparison of breath results with peripheral venous blood, so long hallowed as the infallible standard of accuracy of biological tests for alcohol in the body, maintains the illusion that breath analysis is an inferior method of testing for alcohol in the body. This situation was aptly summed up by His Honour Mr Justice Connor in a recent judgment handed down in the Supreme Court of the Australian Capital Territory when he stated ‘The evidence in this case raises the question whether breath testing should continue to hold on to the apron strings of blood testing or whether it has come of age and is ready to lead an independent existence on its own’.

Experience shows that the Breathalyser is sufficiently reliable to lead an independent existence but, like blood analysis, it requires adequate and sound legislation to ensure that it is used to its maximum efficiency.

REFERENCES