Evidential Breath Analysis in New South Wales: An Exercise in Pragmatism


* Clinical Forensic Medicine Unit, Level 4, Sydney Police Centre, 151 Goulburn St, Surry Hills, NSW, 2010, Australia

** Department of Pharmacology, University of Sydney, Australia

ABSTRACT

Evidential breath analysis has been practiced since 1968. At that time legislation was enacted making it an offence for a person to be in control of a motor vehicle if the blood alcohol concentration exceeded a certain level. Since that time evidential breath analysis has been the main method of law enforcement in matters relating to alcohol and driving. Results have always been expressed as a value of a mass of alcohol in a specific volume of blood.

In applying evidential breath analysis as a method of law enforcement the New South Wales Police have always taken the approach that the breath analysis result should never be of a nature that it would unjustly lead to the conviction of a motorist.

It has been found that the Courts in New South Wales have accepted the approach that breath analysis results, expressed as blood alcohol concentrations, always under read the true blood alcohol concentration. This is due to certain factors used when applying evidential breath analysis as the main method of law enforcement in matters relating to alcohol and driving.

EVIDENTIAL BREATH ANALYSIS

When a person is charged with breaking laws relating to alcohol, drugs and driving, both the legislation and the procedures relating to it are tested by the way in which the prosecution passes through the Courts. Because New South Wales has adopted the British system of accusatorial justice, all persons are innocent in the eyes of the law unless proven guilty “beyond a reasonable doubt”. Traffic matters which involve alcohol and drugs are no different in this respect.

There is now no question that alcohol consumption is associated with driving impairment and increased crash risk. Fifteen years ago (Johnston, 1980), it was found that one in every three adults killed in Australian road crashes had a blood alcohol concentration of 0.05 g/100 ml or higher. The exact processes by which alcohol causes psychomotor impairment have not been clearly delineated, although they are usually dose-dependent. There is enormous inter-individual variability, however, which has been variously explained in terms of age, gender, body weight, metabolic capacity, experience with alcohol and many other factors (Starmer, 1989).
Performance in tests of driving related skills can be shown to be impaired at blood alcohol concentrations as low as 0.02 g/100 ml, especially in tasks requiring division of attention (Moskowitz & Robinson, 1988). Closed-course driving performance deficits have been found at blood alcohol concentrations of 0.05 g/100 ml (Lovibond & Bird, 1971), and were most evident in less-skilled subjects. The deterioration of driving performance at low blood alcohol concentrations was accompanied by a perceived improvement of driving ability (Flanagan et al., 1983), making the situation potentially more dangerous.

Although there is a cohesive body of evidence to support the proposition that both psychomotor performance and driving ability can be impaired at low blood alcohol concentrations (Moskowitz & Robinson, 1988; Starmer, 1989), the scientific basis for legally-prescribed (per se) blood alcohol concentration limits for drivers is almost entirely epidemiological and derives from several large case-controlled studies (e.g. Borkenstein et al., 1974; Borkenstein, 1985). It is now reasonably clear that the risk of crash-involvement is increased at blood alcohol concentrations above 0.05 g/100 ml and that the blood alcohol concentration of the driver is epidemiologically related to crash-risk. It is much less certain whether any measurable increase in crash-risk occurs below 0.05 g/100 ml. The law enforcement and health agencies noted this relationship and an obvious progression was to propose that it be an offence to be in charge of a motor vehicle at some predetermined blood alcohol level or above, rather than to attempt to prove impairment in every case.

Australian law enforcement agencies noted the introduction of evidential breath analysis in the United States during the 1950s and, from a forensic point of view, it appeared to be a practical and scientifically sound method of enforcing the laws on alcohol and driving. Research in Australia confirmed that breath analysis was a quick and efficient method of measuring the blood alcohol concentration of a subject. It was found that breath analysis instruments which are capable of taking a sample of deep lung air, give readings which closely approximate to the alcohol concentration of pulmonary blood (McCallum et al., 1962; McCallum et al., 1979; Perl et al., 1984; Burns et al., 1990). These studies also consistently found that most commercially-available evidential breath analysis instruments exhibited excellent reliability and repeatability, if properly serviced and operated.

In December 1968, legislation was introduced into New South Wales (Motor Traffic Act, 1968) which made it an offence to be in control of a motor vehicle if there was present in the blood an alcohol concentration at or above a specific level. The method used to measure the blood alcohol concentrations of drivers and riders was breath analysis and the result was expressed as an alcohol concentration in grams/100 ml of blood. Originally, evidential breath analyses were carried out on the Breathalyzer® 900 instrument but, since 1990, these instruments have been replaced by the Dräger Alcotest 7110.

The procedure followed by Police is to first administer a road-side breath test. If a positive road-side result is returned, the motorist is taken into custody for the purpose of undertaking an evidential breath analysis. The demand for an evidential breath analysis is also made if the motorist refuses to undergo a road-side test. A specialist breath analyser operator is contacted and the evidential test is carried out. As long as the breath analysis is conducted within two hours of the original incident, the reading at the time of the evidential test is deemed to be that at the time of the incident.
The subject can contest the breath analysis result in a number of ways. A blood sample can be requested from a doctor of choice as long as it is carried out in the presence of Police. The venous blood sample is divided between two specially-prepared vials (which contain sodium fluoride as an enzyme inhibitor and potassium oxalate as an anticoagulant) which are then sealed. One aliquot is given to Police, and is analysed in the State Laboratory, and the other is given to the subject, for private analysis. Another method of challenging the charge is to call an expert witness who is capable of establishing that, on the balance of probability, the blood alcohol concentration of the subject was likely to have been below the prescribed limit at the time of the incident.

The cornerstone of the breath analysis legislation has always been an absolute reliance on ability of the breath analysis instrument (Breathalyzer® 900 [1968 - 1990] and the Dräger Alcotest 7110 [1990 on] in performing the evidential breath test correctly. For such confidence to be justified, two matters have to be taken into account; the maintenance of the instrument and the operational procedure. Evidential instruments must always be properly serviced and maintained. Servicing facilities for the Breathalyzer® 900 and the Dräger Alcotest 7110 are available within the Police Department itself and are of a high standard. In New South Wales Police service, the Dräger Alcotest 7110 instrument is programmed to display the result to the nearest 0.005 g/100 ml below the reading which is actually recorded and it also subtracts 0.005 g /100 ml from the reading to allow for a confidence factor of ± 0.005 g/100 ml for this instrument in Australia. In the operational procedure for breath analysis instruments, only Police officers certified by the Commissioner are allowed to operate the instrument. To become a breath analysis operator a Police officer must complete a comprehensive training and pass an examination in the appropriate areas of law, anatomy, physiology, pharmacology and chemistry. The trainee operator also carries out experiments testing subjects for the absorption and elimination of alcohol.

In Court, the service and maintenance history of the Dräger Alcotest 7110 may be challenged, as may the manner in which the particular instrument was operated on a given occasion. The operator could also be called to give evidence about the conduct of the test in question. Expert Police witnesses will then be called to give evidence on the maintenance of the instrument and/or that the proper operational procedure had been followed at the time in question.

Such a system has been found to eliminate many of the potential problems which could cause embarrassment at Court. There are some analyses which are aborted under the system because of a failure in procedure or a breakdown of the instrument. This is accepted. The training of the operator in the biological sciences allows for a fair judgement of a subject’s ability to give a proper sample thus giving some credibility to the presentation of certain types of medical evidence at Court.

There has been much discussion of how the result of breath analyses should be expressed. Some insist that it should be expressed as micrograms of alcohol in a volume of air while others have allowed for a conversion factor to be used so that the result will be expressed as grams or milligrams of alcohol in a volume of blood. Blood:breath ratios for alcohol have been found to vary. Local studies (Moynham et al., 1987) have indicated that it would be rare to find that a blood:breath ratio would fall below 2100:1.

Occasionally, there is some issue in the New South Wales Courts about the Dräger Alcotest 7110 being programmed to use a conversion factor of 2100:1 and/or giving the result as
grams of alcohol in 100 millilitres of blood. On these occasions, the Court has to be convinced that, in practice, it would not be possible for the instrument to over-read the true blood alcohol concentration. When allowances are made for the fact that an average mean blood: breath ratio for very large populations has been found to be about 2300:1 (Dubowski, 1977) and for the confidence factor and the rounding down of the result, the possibility of an over-read of the instrument would be vanishingly rare.

The Dräger Alcotest 7110 breath-analysis instrument is used by the New South Wales Police to enforce the law against drinking and driving. It is regarded as a reliable and accurate scientific instrument in that it carries out its function in a manner which is forensically sound. Used within the framework of the law in New South Wales, it can provide excellent evidence for a drink-driving offence. The way in which the instrument is calibrated and operated should obviate the possibility of an overestimation of the true blood alcohol concentration and therefore it would be very difficult for a driver to be falsely convicted of an offence. What has occurred in New South Wales is the development of a local system for evidential breath analysis which works effectively. It is recognised that there will inevitably be some subjects whose blood alcohol concentration would have been at or marginally above the prescribed limit who will not be convicted under this system. This is consistent with the spirit of the system of law in Australia and is also supportive of the reliability of a breath-analysis system in that it should never falsely find that a persons was over the prescribed limit and had, in consequence, committed a drink-driving offence.

The Organisation Internationale De Metrologie Legale (1992) Third Preliminary Draft relating to evidential breath analysers was examined in New South Wales and the other Australian states. All of the mainland Australian states found that the OIML Draft Standard was unsuitable, for a variety of reasons, to be applied to their methods of evidential breath analysis and were unanimous in their rejection. The National Standards Commission (of Australia) stated, when replying to the OIML Draft Standard:

“We wish to abstain from voting on the global acceptance of the third predraft as our Australian experts do not support the document in its present form; the recommendation is not compatible with the types of instruments in use or the practices currently in force in Australia.”

This is not a criticism of the OIML Draft Standard for evidential breath analysers and it may well be appropriate in other parts of the world, where the laws and their application are different from those in Australia.

The system used for evidential breath analysis in New South Wales has evolved from a system which was found to be practicable in the early 1960s. It is applied in a manner which will give credibility to the evidential instrument(s), the way in which it is used and the underlying legislation. It has been found to be effective not only as a method of law enforcement but also as a deterrent to potential offenders.

REFERENCES

Borkenstein, R. F., Crowther, R., Shumate, R. P., Zeil, W. B. and Zylman, R. (1964). The role of the drinking driver in traffic accidents., Indiana University, Department of Police Administration, 1.


Motor Traffic (Road Safety) Amendment Act (1982), No. 123.


Organisation Internationale De Metrologie Legale (1992), Third preliminary draft of an international recommendation relating to evidential breath analysers, 1.
