REPORT OF THE MEDICAL BUREAU OF ROAD SAFETY FOR THE YEAR ENDED 31ST DECEMBER 1999

STAFF DETAILS

The Department of Forensic Medicine/Medical Bureau of Road Safety currently has a total of sixteen members of staff. They are as follows:

Director	Professor Denis A. Cusack

Laboratory Staff

Chief Analyst	C.P. Leavy
Principal Analyst	D. Reynolds
Senior Analyst	K.Flynn
Senior Analyst	H. Kearns
Analyst	G. Harrington
Analyst	P. Mullany
Analyst	P. Furney

Technical Staff

Senior Laboratory Technician	K. Lyons
Laboratory Attendant	D. Louthe

Administrative Staff

Administrative Officer	T. Clarke
Senior Executive Assistant	M. Coughlan
Executive Assistant	M. Leonard
Executive Assistant	S. Shelley
Executive Assistant	A. Kelly

MEDICAL BUREAU OF ROAD SAFETY

FOR THE YEAR 1999

ESTABLISHMENT AND FUNCTIONS OF THE BUREAU

The Medical Bureau of Road Safety is a corporate body which was established in November 1968 by the Minister for Local Government under Part V of the Road Traffic Act, 1968. (Minister's title altered to Minister for the Environment in August 1977).

The Bureau's main function is to carry out the analysis, for their intoxicant content, of specimens of blood and urine provided by the Gardai by persons suspected of driving offences and to issue certificate of results of such analyses. Other functions of the Bureau include: -

- the provision of equipment for the taking of such specimens,
- approval of apparatus for indicating the presence and the concentration of alcohol in breath

  and

- research on drinking and drugs in relation to driving, including the methods of determining the amount of alcohol or drugs in a person's body.

The Bureau, which derives its finances from an Annual Grant out of the Vote for the Department of the Environment, comprises five members (including the Director) appointed by the Minister for the Environment. It utilises premises and staff provided under an agreement with University College Dublin, at Earlsfort Terrace.

ANALYSIS OF SPECIMENS

In 1999 a total of 8,476 specimens was received for analysis. Analyses were carried out and certificates issued in 8,416 of these. In 60 cases no certificates were issued either because of some defect in the specimen or in the documentation accompanying it. The total of 8,476 specimens for 1999 is 664 more than in 1998 and continues the upward trend of last year. This represents an increase of 8.5% on 1998 and a 28.6% increase on 1997. (shown in Graph form in Figure 1).

Of the total number of specimens received 83% were provided between the hours of 9.00 p.m. and 6 .00 a.m., 11% between 4.00 p.m. and 9.00 p.m., and the remaining 6% between 6.00 a.m. and 4.00 p.m. This follows the same pattern as 1998 and 1997.

There were 217 specimens provided in hospitals, 63% of these had alcohol concentrations in excess of 150mg/100ml blood or 200mg/100ml urine while 35% were in excess of 200mg/100ml blood or 267mg/l 00ml urine.

ALCOHOL LEVELS IN SPECIMENS

Tables I and II appended to this report give a breakdown of alcohol levels encountered in blood and urine specimens received during 1999. Tables III to V compare these levels with previous years. Figures 2 and 3 correspond to Tables I and II and figures 4 to 6 correspond to Tables III to V respectively.

THE GOVERNMENT'S STRATEGY FOR ROAD SAFETY

& EVIDENTIAL BREATH TESTING

In the document entitled "The Road to Safety" setting out the Government's Strategy for Road Safety 1998-2002, it is stated that "responsibility for Road Safety, in Ireland as elsewhere, is spread over a wide number of agencies at both national and local level. Good multi-agency co-operation is therefore essential for effective road safety and the successful implementation of this strategy." It is further stated that "provision is made in the Road Traffic Act, 1994 for the use of Evidential Breath Testing in the enforcement of drink driving law. The Government will arrange for the Garda authorities and the Medical Bureau of Road Safety to work towards the phased introduction of the system throughout the Country. This will mean that drivers may be required to undergo a breath test in a Garda Station (instead of a blood or urine test) following arrest for drink driving. The breath testing apparatus which will be subject to quality controls operated by the Medical Bureau of Road Safety, will automatically record the driver's alcohol level without the need for further medical or analytical process." In the provisional timetable for key actions involved in the Government Strategy, the preparation and introduction of Evidential Breath Testing with extension Countrywide is scheduled over the five years 1998-2002.

The Bureau, in close consultation and co-operation with the Garda Authorities, introduced Evidential Breath Testing in four Garda Stations in the last quarter of 1999. A joint Garda College/Bureau training scheme for Garda operators was also set up. Details in relation to the introduction of Evidential Breath Testing are included in the following summary paper:

Drugs Driving in Ireland-

A Preliminary Study of the Prevalence of Driving Under the Influence of Drugs on Irish Roads.

S. Moane, C.P. Leavy and D.A. Cusack
Medical Bureau of Road Safety, Department of Forensic Medicine, University College Dublin.

Introduction

Driving under the influence of alcohol on Irish roads is well publicised. In 1999, of the 8476 samples submitted by the Gardaí to the Medical Bureau of Road Safety for alcohol analysis, 92 % were over the legal alcohol limit.

Driving under the influence of drugs has been illegal under statute in Ireland since the 1961 Road Traffic Act. An initial survey was carried out in the Medical Bureau of Road Safety between 1987 and 1991 to investigate driving under the influence of drugs on Irish roads. 1000 urine samples under the legal alcohol limit and 1000 random samples were tested for the presence of cannabis, benzodiazepines and opiates. Screening results (using an EMIT system) showed 14.6 % of samples under the legal alcohol limit and 6.6 % of the random samples to contain drugs.

More recently, the European Monitoring Centre for Drugs and Drug Addiction (EMCDDA) has carried out extensive research into the role that drug use plays in impaired driving and traffic accidents in EU member states. It is also responsible for identifying trends in driving under the influence of drugs across Europe.

To determine current trends in driving under the influence of drugs in Ireland, a survey being carried out in the year 2000 will investigate the presence of amphetamines, benzodiazepines, cannabis, cocaine, opiates and methadone in blood and urine samples taken by the Gardaí under the Road traffic act, 1994. As with the previous study, 1000 of these samples will be randomly selected and 1000 will be under the legal alcohol limit for driving. The results of a preliminary study of 338 samples, showing current trends, will be presented here.

Microplate Enzyme Immunoassay kits are used to screen for the following drugs:

Kit	Analyte
Amphetamine: Methamphetamine:	Amphetamine, Methylenedioxyamphetamine (MDA)
	Methylenedioxymethamphetamine (MDMA)
Benzodiazepines:	Diazepam, Flunitrazepam, Flurazepam, Nitrazepam, Nordiazepam, Temazepam
Cannabis:	11-nor-delta-9-carboxy-
Cocaine:	Cocaine, Benzoylecgonine, Ecgonine Methyl Ester
Opiates:	Codeine, Dihydrocodeine, Morphine, 6-MAM
Methadone:	Methadone, EDDP

Principles of Enzyme Immunoassay (EIA)

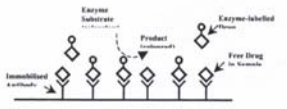


Figure 1: *Principles of*

Materials

Cozart 96 well Blood/Serum EIA kits for Amphetamine, Methamphetamine, Benzodiazepines, Cannabinoids, Cocaine, Opiates and Methadone (Cozart Bioscience Ltd., UK).
High and Low Blood Controls for proficiency testing (Cozart Bioscience Ltd.).
Gilson 25µl Microman® pipette (AGB Scientific Ltd.).
Finnpipette Multistepper (Brownes)
Hamilton Microlab®500 series diluter.
MRW automatic plate washer (Shaw Scientific Ltd.).
Dynex MRX_{II} Plate Reader (Shaw Scientific Ltd.).
Revelation Software.

Procedure

- **Sample preparation** consisted of a 1 in 5 dilution with water. Blanks and controls were also diluted in the same way.
- **Control blood samples** were tested with each kit. 2 levels of control were used - a low control with a concentration at the kit cut-off level and a high control. Controls had been spiked with the calibrator drug for the seven kits.
- A standard curve, blank blood, blank urine and high and low level controls were tested with each batch of samples.
- The procedure provided with each kit was followed, and absorbance was read at 450 nm.
- A 10 % coefficient of variation was allowed for standard solutions and 20 % for controls and samples.

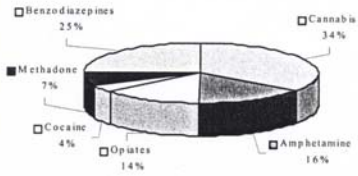


Figure 2: *37 % of samples under the legal alcohol limit tested positive for drugs*

Results and Discussion

All samples submitted to the Medical Bureau of Road Safety between 1st July 1999 and 31st December 1999 which were under the legal limit for alcohol were tested for the presence of drugs. In total, 338 samples were tested, 57 % of which were blood and 43 % urine. As it is the driver's choice which sample to give, a testing system was necessary which allowed for testing of both blood and urine. The traditionally used EMIT system was developed for urine testing and therefore lengthy extraction procedures are necessary for blood analysis. The Cozart Enzyme Immunoassay system is calibrated using serum standards but is readily adaptable for the analysis of urine in addition to blood, as drug concentration levels in urine are much higher than in blood. A simple dilution with water is all the preparation that is necessary.

37 % of the samples tested were positive for drugs, the classification of which is represented in Figure 2 above. Cannabis was found most frequently followed by benzodiazepines. Cocaine was the least common, occuring in only 4 % of samples.

The occurrence of **polydrug use** was frequent. Results shown in Figure 3 indicate that 45 % of samples tested contained 2 or more types of drugs, with 3 % of samples containing 5 types of drugs.

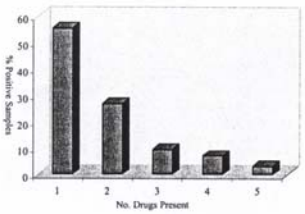


Figure 3: *Prevalence of polydrug use in positive samples*

Drugs and Alcohol

The interaction between alcohol and drugs can greatly enhance the impairment of a driver e.g. a combination of alcohol and cocaine forms Cocaethylene which itself is pharmacologically active. For this reason it is important to identify trends in driving under the influence of a combination of drugs and alcohol.

Analysis of the results to date indicates that in the majority of samples where drugs are detected some level of alcohol is present also. Although all the samples tested for drugs were under the legal alcohol limit, only 22 % of the samples contained no alcohol at all. In the majority of these samples, the incidence of polydrug use was very high. The frequency of the combination of alcohol and drugs are in Table 1.

Analytical Alcohol	Percentage of positive
0 - 10 mg/100ml blood	22 %
11 - 69 mg/100ml blood;	48 %
70 - 86 mg/100ml blood; 100 - 114 mg/100ml urine	30 %

Confirmatory Analysis

The results presented so far are based on screening tests which are used to identify particular classes of drugs present in a sample. Immunoassay screens often read higher concentrations due to the kit crossreacting with a variety of metabolites in a sample. Confirmatory analysis detects specific analytes. Screening results are also affected by the sample matrix, which is reduced in confirmatory analysis through extensive sample clean-up. It also eliminates false positives, in addition to aiding the interpretation of results.

For these reasons, confirmatory analysis is necessary to identify and quantify drugs present in samples. All confirmatory analysis was carried out by the Toxicology Section of the State Laboratory. Confirmation of amphetamines, cannabis, cocaine and opiates was by Gas Chromatography with Mass Spectrometric detection (GC/MS) using a Finnegan Magnum ion-trap instrument run in Electron Ionisation mode.

Benzodiazepine and methadone confirmation was carried out by Dual-Column Gas Chromatography with Nitrogen-Phosphorus Detector.

Confirmatory Analysis - Results to Date

Amphetamines: 20 samples confirmed, 19 contained MDMA. 3 samples contained amphetamine.
Benzodiazepines: 18 samples confirmed. Of these, 8 did not contain any benzodiazepine tested for by the State Laboratory. Further investigations into other possible benzodiazepines are being carried out. Diazepam occurred most frequently, present in 9 of the positive samples.
Cannabinoids: Confirmatory analysis was carried out on 16 samples. The 3 which were found to be negative gave a screening result close to the kit cut-off of 10 ng/ml.
Cocaine: Only 4 samples screened positive for cocaine. The 2 samples which screened near the kit cut-off were confirmed to be negative. Cocaine was confirmed to be present in the remaining 2 samples.
Opiates: GC/MS analysis was carried out on 8 samples. 2 contained 6-monoacetylmorphine, the main heroin metabolite. Codeine only was present in one sample, which is present in over-the-counter painkillers.
Methadone: Confirmed present in all 9 samples analysed for methadone.

Conclusions

The results presented here indicate that there has been a significant increase in driving under the influence of drugs on Irish roads since 1987, when 14.6 % of samples (under the legal alcohol limit) tested were found positive for drugs. This preliminary study has found that the percentage has risen to approximately 37 % .

The extensive survey proposed for 2000 will identify true trends in the types of drugs being taken, their combination with alcohol and the extent of polydrug use.

This work also highlights the importance of confirmatory analysis in the interpretation of drug screening results.

Acknowledgements

The Authors wish to acknowledge Kieran Flynn and Gráinne Harrington for their contribution to this work.

We are also very grateful to the Toxicology Section of the State Laboratory for carrying out the confirmatory analysis by GC/MS and GC/NPD and for their advice on interpretation of results.

References:
1. J. Evans, Proceedings of the TIAFT Meeting, Padova, Italy 1997, 681-685.
2. S.B. Karch, Drug Abuse Handbook, CRC Press, 1998.
3. R. C. Baselt, Disposition of Toxic Drugs and Chemicals in Man, 4th Edition.

THE GOVERNMENTS STRATEGY FOR ROAD SAFETY

& DRIVING UNDER THE INFLUENCE OF DRUGS

In the Governments strategy document it was stated; "The possible influence of drugs on driving behavior is an issue of increasing concern. It is illegal in Ireland to drive while under the influence of drugs to such an extent as to be incapable of having proper control of the vehicle. Identification of the presence of drugs is however more complex than alcohol. A number of research programmes are being carried out internationally in this area, including limited work in Ireland. The Government will monitor and assess these developments with a view to adopting appropriate measures for effective enforcement of road safety requirements in relation to nonalcoholic drugs. Possibilities for improving arrangements for testing blood and urine samples for the presence of drugs will form part of this assessment."

In 1999 the Bureau, in consultation with the State Laboratory, introduced revised arrangements for testing samples for drugs. In accordance with the strategy to advance research in relation to drugs and driving in Ireland, the Bureau carried out a preliminary study of the prevalence of driving under the influence of drugs on Irish roads. All samples submitted to the Bureau between 1st July 1999 and 31st December 1999 which were under the legal limit for alcohol were tested for the presence of drugs. In total 338 samples were tested and the findings are summarised as follows:

INTRODUCTION OF EVIDENTIAL BREATH TESTING IN IRELAND

D. Reynolds, H. Kearns, P. Mullany, C.P. Leavy, D.A. Cusack.
Medical Bureau of Road Safety, Dept. of Forensic Medicine, University College Dublin.

roduction

idential Breath Testing (EBT) is the term used to describe the determination of ol concentration in expired breath. Originally some jurisdictions reported the t of a breath test in terms of blood alcohol concentration, however most EU tries now operate an EBT program with breath alcohol limits defined by tc. The limit in Ireland is prescribed in the 1994 Road Traffic Act at 35 00ml with more severe penalties for levels exceeding 44 and 66 µg/100ml.

r section 6 of the above Act, the Medical Bureau of Road Safety (the au) has a statutory duty to arrange for the approval, supply and testing of ratus for determining the concentration of alcohol in the breath. As part of the rnment Strategy for Road Safety 1998-2002 the Bureau evaluated different s of instruments for this purpose from June 1999 to Sept.1999.Two of these uments were the lion intoxilyzer 6000IRL manufactured by Lion oratories, Cardiff and the INTOXIMETER EC/IR manufactured by cimeters UK Ltd., Devon (Photos 1,2). Both these instruments were already d in the UK by the Home Office at their Forensic Science Laboratories and n use by Police Forces throughout Britain.
specifications against which the instruments were tested in the Bureau are d on those used by the Home Office (1) and the recommendations of the nisation Internationale Metrologie Legale (OIML) (2)

oto 1

Photo 2

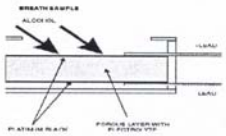
chnology

nd colorimetric methods have been used in the past for breath alcohol esis with varying degrees of success. Recently two technologies have ged for providing a sound fundamental basis for EBT equipment. These are Cell and Infra-Red technology

l Cell

alcohol fuel cell as used in the INTOXIMETER EC/IR consists of a porous layer coated on both sides with platinum black. The porous layer is egnated with an acidic electrolyte solution and platinum electrical connections pplied to the platinum black surfaces. A gas inlet is provided to allow a breath ple alcohol to be introduced. (Figure 1). Oxidation of alcohol takes place on the r surface of the cell producing H^+ions which migrate towards the -ve rode.Thus a current, whose magnitude is proportional to the amount of alcohol umed by the cell, flows when the two electrodes are connected externally.

re 1



a-Red

lion intoxilyzer 6000IRL uses the principle of infra -red absorption. A matic diagram is shown in Figure 2.

re 2.

reater the amount of alcohol in the gas chamber the greater the amount of ir ion is absorbed, hence the detector output is reduced. The relationship en alcohol concentration and absorption is defined by Beers law

ificity is ensured by the use of four narrow band filters in the 3 micron range. ratio between the absorption at the four wavelengths is disturbed, the nce of an interfering substance is flagged.

ality Control

of the key elements in ensuring that EBT instruments produce reliable results external Gas Simulator. This takes the form of a cylinder of compressed ol vapour in air and is supplied to the instrument for checking purposes only. analysed value of the check gas falls outside an allowed tolerance the test will nd will not analyse breath samples. Each cylinder is supplied by BOC and is ied to contain 35µg/100ml +/-0.7µg/100ml. During a normal subject test this analysed twice, at the start and at the end of the test. Following the analysis reath specimen or check gas sample, the system is purged with ambient air hecked to ensure that the room air is free of alcohol. An example of the ment printout is shown in Figure 3.

Figure 3

Uncertainty of Measurement

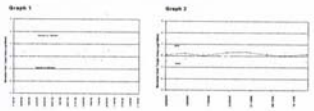
From the above printout it can be seen that the result used for the purposes of the relevant section of the Road Traffic Act,1961 is significantly lower than either breath specimen 1 or 2. In fact 17.5% is subtracted from the lower of the two results and this resultant figure is used for prosecution purposes. Such a subtraction is a forensic scientific prerequisite to allow for analytical variation, the maximum permissible tolerances of the instrument and the presumption of innocence in favour of an accused in Irish jurisprudence.The value of 17.5% was calculated in consultation with the National Metrology Laboratory and the Legal Metrology Service.

Laboratory Evaluation

Two lion intoxilyzer 6000IRL and two INTOXIMETER EC/IR instruments were tested under the following headings:
Accuracy,precision,specificity,clock accuracy and barometer accuracy.

Accuracy

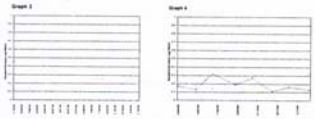
Alcohol vapours were generated at 0,35,44,66 and 200µg/100ml using two Guth C34 simulators heated to 34°C, connected in tandem and charged with ethanol solutions at known concentrations.These solutions were prepared in the Bureau and are traceable to LGC standards.Vapours thus generated were analysed (n=10) by the test instruments on a weekly basis over an extended period.The deviations of the reported results from the target values at the 35 µg/100ml level for both lion intoxilyzer 6000IRL instruments are shown in Graph 1. Similar results for the INTOXIMETER EC/IR are shown in Graph 2. The maximum permissible error allowed by OIML at this level is ± 3µg/100ml.



Precision

The within day standard deviation (n=10) was calculated for each instrument once a week. The results at the 35µg/100ml level are shown in Graphs 3 and 4.

The maximum permissible within day standard deviation allowed by OIML at this level is 1.0 µg/100ml



Specificity

Certified compressed gases containing 35µg/100ml ethanol plus 15 µg/100ml acetone and 35µg/100ml ethanol plus 4µg/100ml methanol were used for this purpose.
All instruments were tested weekly and it was noted that the instruments either flagged "Interfering Substance" or the results were within the allowed OIML tolerance as shown below.

Permitted Tolerances:
Methanol: 4µg/100ml
Acetone: 3µg/100ml

Real Time Clock and Internal Barometer Accuracy

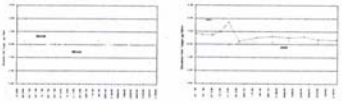
All instruments tested performed within the specification claimed by the manufacturer and allowed by the UK Home Office.

Field Tests

All four approved instruments were installed in selected Garda Stations in Oct./Nov. 1999. To evaluate their performance in the field, Bureau staff tested the instruments on a weekly basis for the first four weeks, followed by monthly tests for the next six months. The format of the tests in the field followed the same pattern as already described in the laboratory. It is intended to eventually increase the testing interval to six months.

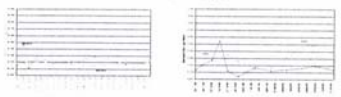
Accuracy

Graph 5 shows the lion intoxilyzer 6000IRL response to an alcohol vapour generated at the 35µg/100ml level using tandem simulators. Field results for the INTOXIMETER EC/IR instruments are shown in Graph 6. On every occasion the instruments performed well within their allowed tolerance of ± 3µg/100ml.



Precision

The absolute standard deviation was determined (n=10) at 35,44,66 and 200 µg/100ml for each instrument periodically. All instruments complied with the O.I.M.L specification in this regard. Graphs 7 (lion intoxilyzer 6000IRL) and 8 (INTOXIMETER EC/IR) show the calculated standard deviation from week to week



Specificity

The response to certified gases containing known amounts of volatiles that could occur in a subjects expired breath was examined for each instrument in the field. In the case of INTOXIMETER EC/IR instruments, there was a tendency to underestimate a result if acetone was present at a concentration of 15 µg/100ml. The presence of methanol caused the instrument to flag "Interfering Substance" and abort the test. Lion intoxilyzer 6000IRL instruments tend to respond to both interfering substances by flagging "Interfering Substance" and aborting the test.

Real Time Clock and Barometer Accuracy

The accuracy of the internal clock was checked against the Eircom "Talking Clock". In all cases the difference between the indicated time and the reference time was within the acceptable tolerance of ± 3 mins. The accuracy of the internal barometer, which is used to adjust the result of the external simulator gas for atmospheric pressure variations, was assessed against a reference barometer. On one occasion the barometer in an INTOXIMETER EC/IR instrument was shown to be reading incorrectly and the instrument was replaced. In all other instances, the variations were within the allowed tolerance of ± 1.0 kPa.

Traceability

All equipment used for this work is properly calibrated and traceable to recognized International Standards.

Operator Training

A joint Garda College / Bureau training scheme is in operation to ensure that the instruments are operated to the proper scientific standard. The training course is of two days duration and operators undergo a written and practical examination before they may operate the instruments for "driving under the influence" cases.

Conclusions

The four instruments tested by the Bureau in the laboratory comply with the Bureau requirements and are suitable for evidential breath alcohol testing. On-going field tests show that these approved instruments continue to operate within their permitted tolerances and are under statistical control.

Additional instruments will be introduced into selected Garda Stations nationwide on a phased basis over the next three years.

References

(1) A Guide to Type Approval Procedures for Evidential Breath Alcohol Testing Instruments, HMSO Publications,Home Office and Forensic Science Service, Oct.1994.

(2) International Recommendation OIML R 126 Edition 1998(E)

11,rue Turgot - 75009 Paris - France.

HIGH LEVEL COMMITTEE

The Bureau continued to be one of the active participating agencies in the workings of the High Level Group on Road Safety during 1999. The Director and Chief Analyst of the Bureau were in attendance at the groups five meetings of the 30th April, 1st June, 6* July, 28th September and 23rd November 1999.

CONFERENCES AND CONTACT WITH OTHER LABORATORIES

During 1999:-

1. The Director attended a seminar "Co-operation Group to Combat Drug Abuse and Illicit Trafficking in drugs (Pompidou Group)" in Strasbourg from 19th to 21st April 1999.

2. Two Analyst's visited the Forensic Science Agency of Northern Ireland on the 4th February 1999 to discuss and view the methods used for drug analysis in the laboratory.

3. Two Analyst's visited the Forensic Science Service Laboratory at Chorley on 2nd March 1999 to discuss and view the methods used for drug analysis.

4. One Analyst attended a conference on drug analysis held by the Academy of Medical Science in Dublin on the 11th March 1999.

5. The Chief Analyst presented a paper entitled "Chemical Testing in Ireland, Drink/Driving the Irish Experience" at the 12th annual meeting of IACT (The International Association for Chemical Testing) in Wilmington, North Carolina which was held from the 18th to the 22nd April 1999.

6. All of the Analyst's and the Senior Technician attended a special physiology course titled "Physiology of Alcohol excretion through the lungs" designed by Professor Paul McLoughlin of University College Dublin, for the introduction of Evidential Breath Alcohol Testing in Ireland. This consisted of six, one hour lectures from June to July 1999.

7. Four Analyst's attended a one day manufacturer's training courses for Intoxilyzer, Intoximeter and Datamaster instruments, held in the Department during the months of June and July 1999.

8. One Analyst attended a British Association in Forensic Medicine Seminar on "Trends in the use of Illicit Drugs and their Fatal Effect" which was held in Dublin on 25'1' June 1999.

9. One Analyst attended the International Association of Forensic Toxicologist's Conference in Cracow from 6th September to the 10th September 1999.

STAFF APPOINTMENTS IN 1999

During 1999 the Bureau appointed an Administrative Officer to fill a position, which had become vacant. An additional administrative member of staff was recruited temporarily from an employment agency. A further new appointment was made at Analyst grade.

BUREAU MEMBERSHIP AND MEETINGS

During 1999 the Medical Bureau of Road Safety held six meetings. These meetings were held on the 10th March, 30th June, 30th September, 4th November, 1st December and 16th December 1999.

PROMPT PAYMENT OF ACCOUNTS ACT, 1997

Under an agreement with University College Dublin, suppliers of the Bureau are paid by the College, and the Bureau reimburses the College on demand for such payments.

The College as a public sector body is required to comply with the requirements of the Act in relation to payments to suppliers for the supply of goods or services.

To assist the College in complying with the provisions of the Act in relation to the Bureau's suppliers, the Bureau works within the internal procedures of the University in relation to the prompt processing of invoices. These procedures are as follows:-

1. All invoices are date stamped when received

2. All invoices for payment should be sent to the Bursar's Office of University College Dublin within 5 working days of being received.

DISPUTES

Where an invoice cannot be passed for payment because of a dispute or an incorrect invoice the Bureau contacts the supplier within 10 working days of receipt of the invoice and identifies the perceived defects which prevent payment being made.

The procedures listed above in relation to processing of invoices and disputes can only provide reasonable and not absolute assurance against material non-compliance with the Act.

INTEREST PAYMENTS

The College pays interest penalties to suppliers of the Bureau, who are not paid by the College, within 45 days of receipt of the invoice, or delivery of the goods. The College does not require the Bureau to reimburse for such penalties.

FIGURE 1

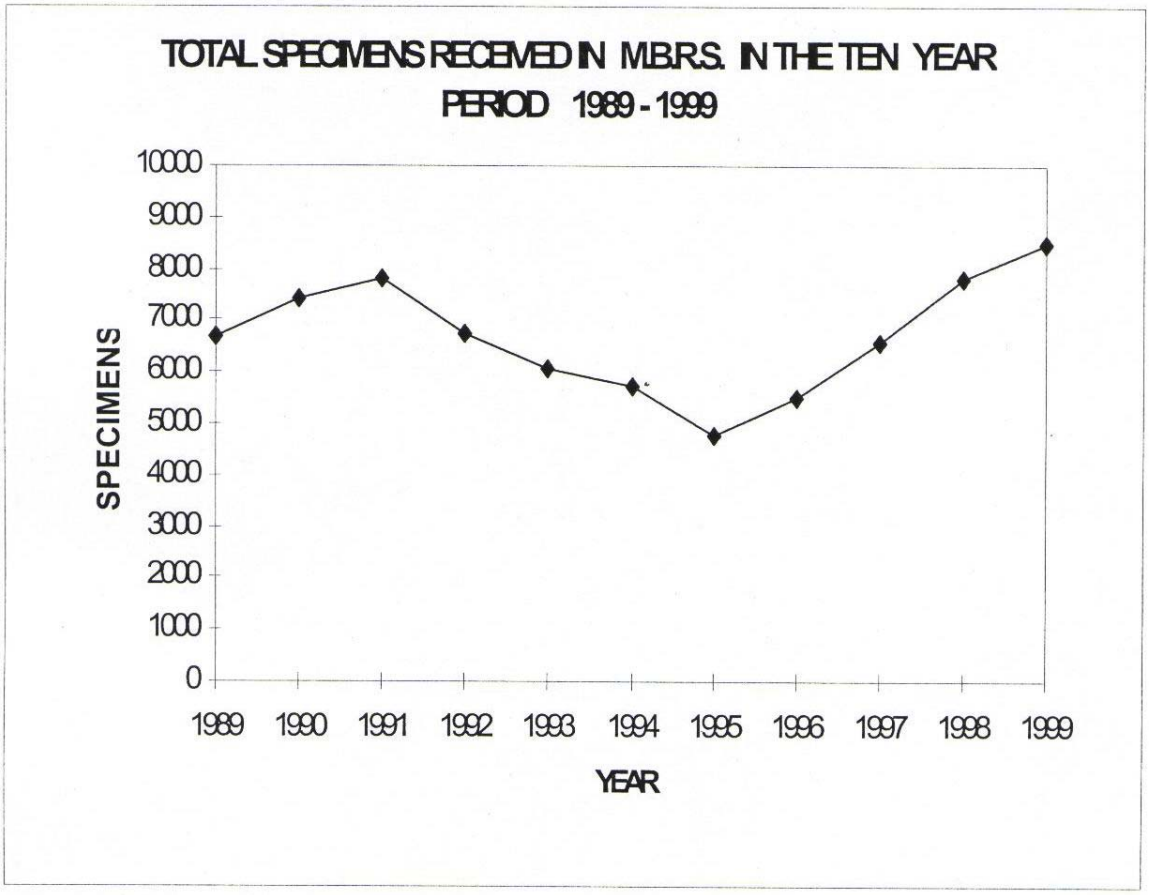

TOTAL SPECIMENS RECEIVED IN M.B.R.S. IN THE TEN YEAR PERIOD 1989 - 1999
SPECIMENS
10000
9000
8000
7000
6000
5000
4000
3000
2000
1000
0
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
YEAR

TABLE I
CERTIFIED ALCOHOL CONTENT OF BLOOD SPECIMENS RECEIVED IN 1999

Mg. Of alcohol per 100ml of blood	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter	TOTAL
0-80	70	74	121	86	351
LEGAL LIMIT					
81-100	49	54	70	67	240
101-150	237	282	257	265	1,041
151-200	332	402	366	376	1,476
201 and over	478	526	572	490	2,066
	1,166	1,338	1,386	1,284	5,174

TABLE II
CERTIFIED ALCOHOL CONTENT OF URINE SPECIMENS RECEIVED IN 1999

Mg. Of alcohol per 100ml of urine	1st Quarter	2nd Quarter	3rd Quarter	4th Quarter	TOTAL
0-107	56	61	66	72	255
LEGAL LIMIT					
108-135	51	53	65	53	222
136-200	154	210	191	178	733
201-267	235	265	303	273	1,076
268 and over	204	271	251	230	956

	700	860	876	806	3,242

TABLE III
BLOOD ALCOHOL LEVEL (COMPARISON WITH PREVIOUS YEARS)

Mg of alcohol per 100ml blood	1999		1998		5 year period 1993 - 1997*	
	No	**%**	**No**	**%**	**No**	**%**
0 - 80	351	6.8	306	6.5	989	5.7
LEGAL LIMIT						
81 - 100	240	4.7	233	4.9	703	4.1
101 - 150	1,041	20.1	924	19.5	3,142	18.1
151 - 200	1,476	28.5	1,374	29.0	5,214	30.1
201 and over	2,066	39.9	1,897	40.1	7,302	42.0

***Legal limit lowered to 80mg/l00ml on 2nd December 1994**

TABLE IV
URINE ALCOHOL LEVEL (COMPARISON WITH PREVIOUS YEARS)

Mg of alcohol per 100ml urine	1999		1998		5 year period 1993 -1997*	
	No	%	No	%	No	%
0-107	255	7.9	269	8.9	855	7.7
LEGAL LIMIT						
108-135	222	6.8	177	5.8	626	5.6
136-200	733	22.6	661	21.8	2,525	22.7
201 -267	1,076	33.2	983	32.5	3,637	32.7
268 and over	956	29.5	938	31.0	3,492	31.3

***Legal limit lowered to 107mg/100ml on 2nd December 1994**

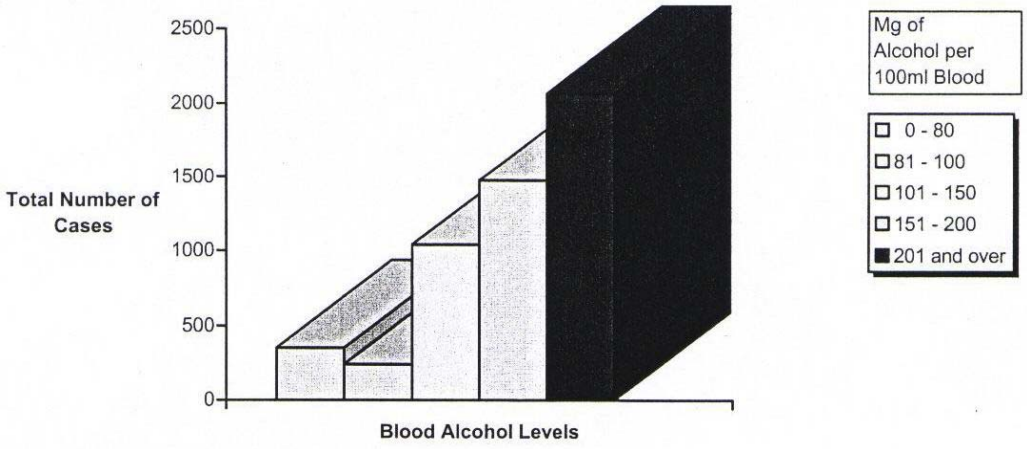
TABLE V
ALCOHOL LEVEL ALL SPECIMENS
COMPARISON WITH PREVIOUS YEARS

Alcohol Content mg/100ml		1999		1998		5 year period 1993 - 1997*	
BLOOD	**URINE**	**No**	**%**	**No**	**%**	**No**	**%**
0 – 80	0 - 107	606	7.2	575	7.4	1,844	6.4
LEGAL LIMIT							
81 – 100	108 – 135	462	5.5	410	5.3	1,329	4.7
101 – 150	136 – 200	1,774	21.1	1,585	20.4	5,667	19.9
151 – 200	201 – 267	2,552	30.3	2,357	30.4	8,851	31.1
201 and upwards	268 and	3,022	35.9	2,835	36.5	10,794	37.9

***Legal limit lowered to 80mg/100ml blood and 107mg/100ml urine on 2nd December 1994**

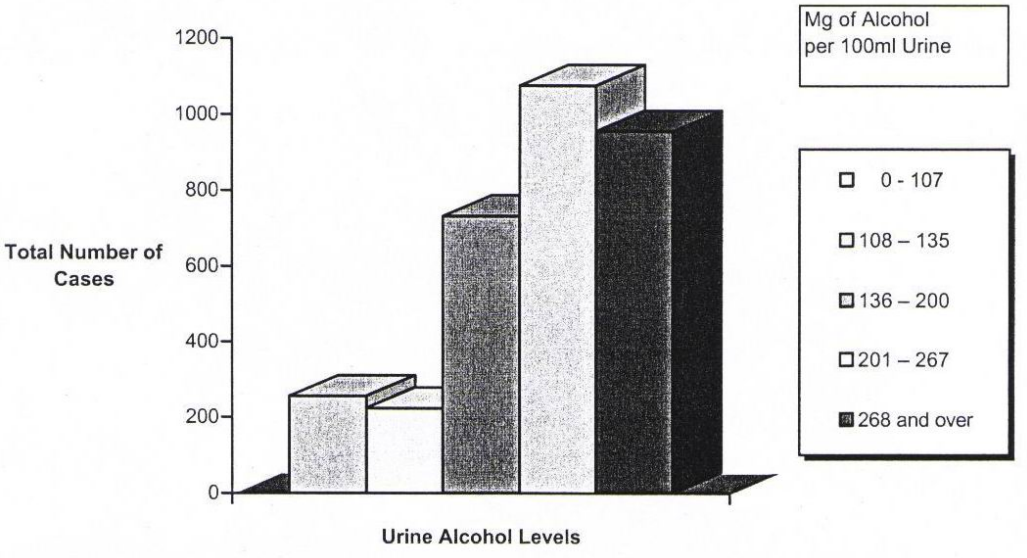
CERTIFIED ALCOHOL CONTENT OF BLOOD SPECIMENS RECEIVED IN 1999

FIGURE 2



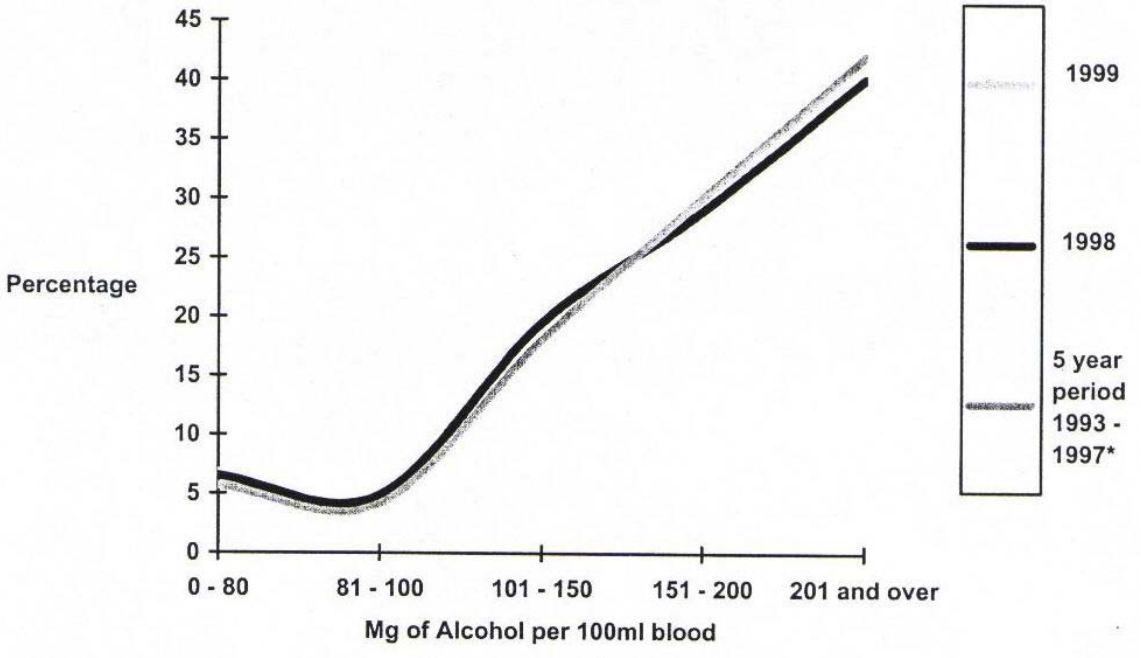
CERTIFIED ALCOHOL CONTENT OF URINE SPECIMENS RECEIVED IN 1999

FIGURE 3



BLOOD ALCOHOL LEVEL COMPARISON WITH PREVIOUS YEARS

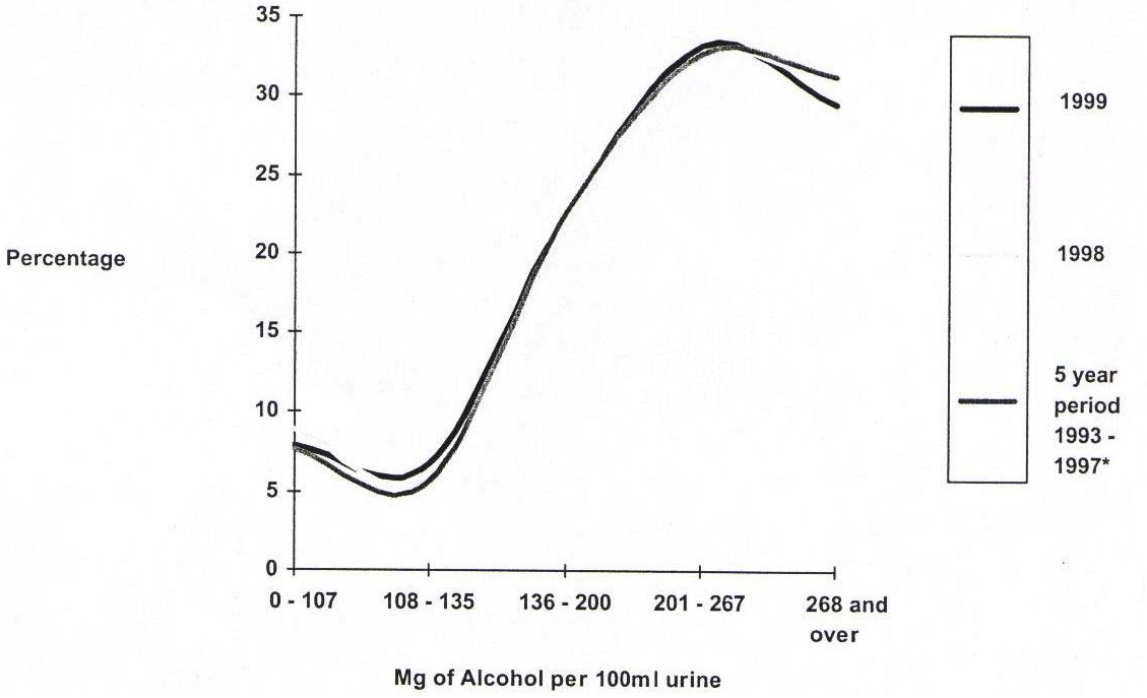
FIGURE 4



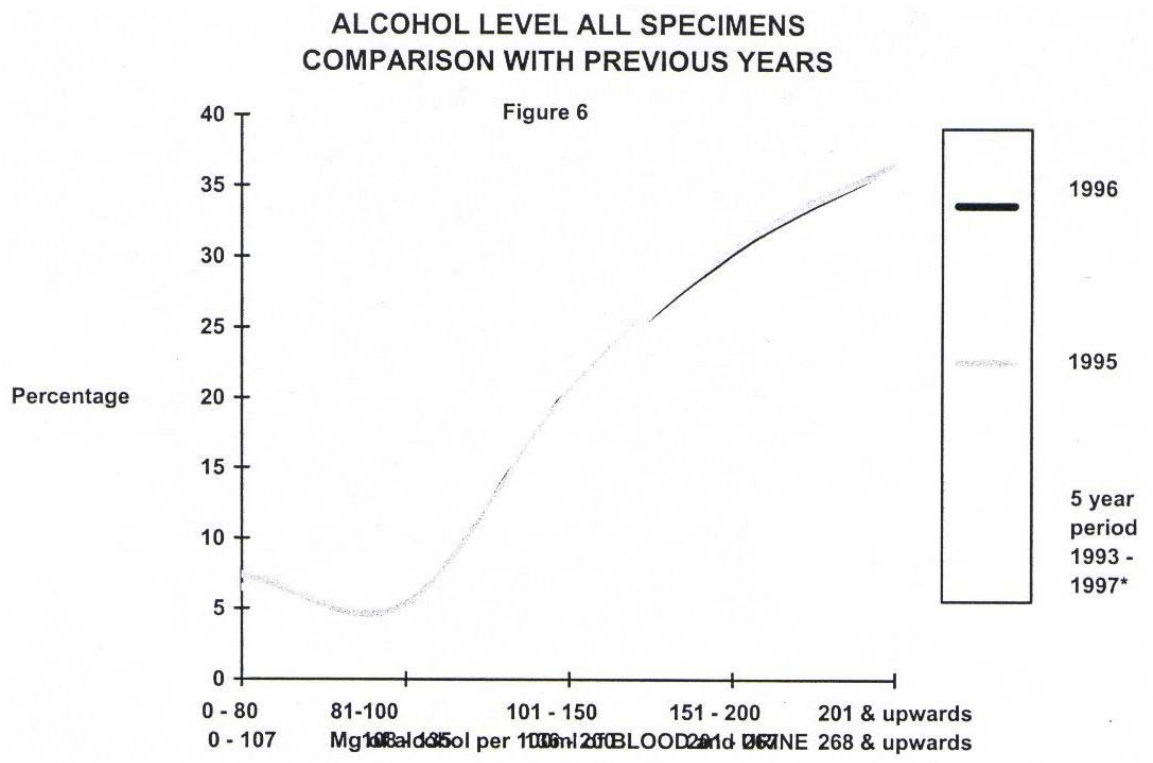
*Legal limit lowered to 800mg/100ml on 2nd December 1994

URINE ALCOHOL LEVEL COMPARISON WITH PREVIOUS YEARS

FIGURE 5



* Legal limit lowered to 800mg/100ml on 2nd December 1994



* Legal limit lowered to 80mg/100ml blood and 107mg/100ml urine on 2nd December 1994