

ANNUAL REPORT 2016

MEDICAL BUREAU OF ROAD SAFETY



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Director's Introduction

I am again pleased to write this introduction to the Medical Bureau of Road Safety's Annual Report for 2016 and to highlight some of the developments for the year. This report sets out a summary of the activities and performance of the Bureau and its ongoing essential role in the Government's Road Safety Strategy 2013 – 2020.

In 2016 the total number of specimens received and analysed for alcohol in blood, urine and breath and for drugs in blood and urine totalled 9,140. The mean alcohol concentrations were 125mg/100ml of blood, 144mg/100ml of urine and 48µg/100ml of breath. After alcohol the two most prevalent intoxicants confirmed on testing continue to be cannabis and benzodiazepine classes. The predominant demographic pattern of driver specimens submitted in the year continued to be from the younger male driver. Six blood specimens from incapacitated drivers were forwarded by Gardaí to the Bureau for analysis.

The Bureau continued the approval, supply and testing of instruments and devices for garda use and also supplied 5,800 blood and urine specimen kits for the Gardaí throughout the country.

ISO 17025 accreditation was maintained in 2016 for the following tests: Blood and Urine Alcohol Analysis; Preliminary Drug Screening; Cannabis and Benzodiazepine confirmation in Blood and Urine; Preliminary and Evidential Breath Testing. Under flexible scope drugs in oral fluid testing was added to the scope after full assessment by INAB.

The Bureau continued to provide operator and supervisor courses for the 86 EvidenzerIRL instruments in garda stations and there was a 50% increase in these courses compared with 2015. 204 Operators and 103 Supervisors were trained.

The procurement process for the replacement of the existing roadside preliminary alcohol screening devices was reviewed in 2016 at the request of An Garda Síochána and a new procurement process was commenced in 2016 and will continue into 2017 with a target completion date for early 2018.

There was significant preparation for the implementation of roadside and garda station based preliminary drug testing. This included making garda stations ready for the installation of the chosen Draeger DrugTest 5000 device, and devising a training course for An Garda Síochána trainers in the use of the device and developing in-house methods for analyser performance testing and Stk testing (consumable part of the system). There was also in-depth preparation for the introduction of specified *per se* levels for certain drugs to be introduced in legislation in 2017. The implementation of these programmes will follow in early 2017 following the passing of the Road Traffic Act 2016.

The Bureau continues its committed work together with Government Departments and public authorities and also with the road using public, in fulfilling its responsibilities under the road traffic legislation and to continue its role as a lead or support agency in the Government's Road Safety Strategy.

**Professor Denis A. Cusack,
Director.**

Mission

The Mission of the Medical Bureau of Road Safety is to provide a high quality national forensic service in alcohol and drug (intoxicant) detection in support of the effective operation of the road traffic legislation.

Functions of the Medical Bureau of Road Safety

The responsibility for chemical testing of intoxicants in driving in Ireland rests with the Medical Bureau of Road Safety, which is a corporate body established in November 1968 by the Minister for Local Government under Part V of the Road Traffic Act, 1968. The Minister's title was altered to Minister for the Environment & Local Government on 22nd July 1997. In June 2002 the Medical Bureau of Road Safety came under the aegis of the Minister for Transport under the Transfer of Departmental Administration and Ministerial Functions Order 2002. Since 2011 the Medical Bureau of Road Safety is under the Department of Transport, Tourism and Sport.

The functions of the Bureau are laid down in the Road Traffic Acts 1968 – 2016 and their regulations and they include:

- The receipt of and analysis for intoxicants in blood and urine specimens forwarded to the Bureau
- The issue of certificates of analysis
- The provision of equipment for the taking or provision of specimens of blood and urine
- Approval, supply and testing of equipment or apparatus for indicating the presence of alcohol in the breath
- Approval, supply and testing of equipment or apparatus for determining the concentration of alcohol in the breath
- Approval, supply and testing of equipment or apparatus for determining the presence of drugs in oral fluid
- 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 and the epidemiology of driving under the influence of intoxicants

When the Bureau was established in 1968 it commenced operating roadside alcohol testing, blood and urine alcohol analysis, the issue of Certificates of Analysis and provision of equipment for the taking of specimens. Since then there have been several legislative changes such as the introduction of evidential breath alcohol testing, and driving under

the influence of drugs (DUID), specimens provided in hospitals, specimens taken from drivers involved in collisions and mandatory alcohol testing. The Bureau has had to expand and develop all aspects of its work while focussing on its legal responsibilities as set out in the Road Traffic Acts (RTA) and in accordance with the Government's Road Safety Strategy. Currently the Bureau has several programmes and services in operation and these are: Blood and Urine Alcohol Analysis; Breath Alcohol Analysis; Blood and Urine Drug Analysis; Oral Fluid Testing; Research – Driving under the influence of Intoxicants; Professional Expert Witness; Corporate/Financial and Quality Assurance.

The Director is responsible for the day to day running of the Bureau. The Chief Analyst, Ms. H. Kearns is responsible for the day to day running of the laboratories and their programmes and the Senior Administrator, Ms. T. Clarke is responsible for the Corporate/Financial programme and for overall administration within the Bureau. Each programme has a programme manager at Principal Analyst level. The Bureau has an appointed Quality Manager (see chart 13 Organisational Chart).

The Bureau depends on a highly trained and skilled staff who are up to date on current scientific and technical best practice. This enables the Bureau to carry out its functions and keep up to date with technological developments. It has kept abreast of innovation in instrumentation in the field of alcohol and drug detection both in the laboratory and for use by An Garda Síochána at the roadside and in garda stations.

Since the establishment of the Bureau it has built up a reputation of the highest forensic integrity. It has been established for almost five decades and has been able to impart its knowledge and experience to its staff, clients and other relevant parties by means of education, training and advice.

The Bureau provides a service to the Department of Transport, Tourism and Sport, the Courts, An Garda Síochána, both defense and prosecution lawyers and the public.

Significant Achievements & Developments during 2016

Health and Safety

The Bureau was audited by the Health and Safety Authority in March 2016. The staff were commended for their commitment to safety and the audit led to a full review of safety in the Bureau which included several improvements in that area.

Quality Assurance

ISO 17025 accreditation was maintained in 2016 for the following tests:

- Blood and Urine Alcohol Analysis
- Evidential Breath Testing
- Preliminary Breath Testing
- Laboratory Preliminary Drug Screening
- Cannabis confirmation in Blood and Urine
- Benzodiazepine confirmation in Blood and Urine

Under flexible scope, Drugs in Oral Fluid testing was added to the scope after full assessment by INAB.

An application for extension to scope was submitted to include Preliminary Drug Testing devices for use at the roadside and in garda stations and stk testing (consumable part of drug testing system) for assessment in 2017.

Road Safety Strategy 2013 - 2020

Progress was made in areas of responsibility within the Government's Road Safety Strategy, particularly in preparation for Roadside Drug Testing implementation. The Director, the Chief Analyst and the Principal Analyst (Head of Toxicology programme) took part in the Road Safety Authority mid-term strategy review.

Preliminary Breath Alcohol Testing

The Bureau continued to support in excess of 1,000 Draeger 6510 devices provided to An Garda Síochána throughout 2016.

Evidential Breath Alcohol Testing

The Bureau continued to support the Evidential Breath Testing instruments in 86 Garda Stations nationwide and provide training courses for Operators and Supervisors.

Preliminary Drug Testing

In December the Road Traffic Act 2016 was enacted. The Bureau was active in the legislative group charged with formulating the Bill.

The Implementation group continued communications throughout the year. 2016 saw a great amount of activity in the Preliminary Drug Testing programme. This ensured the

laboratory and garda stations were ready for the implementation date which was moved several times through 2016 and eventually moved into 2017.

The Bureau established an oral fluid testing laboratory and developed and validated GC-MS-MS and LC-MS-MS methods for the analysis of THC (Cannabis), Cocaine, Opiates and Benzodiazepines in oral fluid as part of the preparations for the evaluation of the Preliminary Drug Testing system to be used at the roadside and in garda stations.

Laboratory Preliminary Drug Screening

The Bureau continued to develop a new preliminary drug screening method using LC-MS-MS for the analysis of drugs to replace the currently used immunoassay system.

Confirmatory Drug Testing

The Bureau made significant progress on development of confirmatory drug testing in blood using LC-MS-MS and existing confirmatory tests were amended to be ready for the implementation of the *per-se* levels introduced in the Road Traffic Act 2016.

Knowledge Sharing and Development

Bureau staff and the Director presented at and attended many conferences, meetings and working groups related to the work of the Bureau. The Bureau hosted groups from other national and international agencies with the aim of sharing expertise. Two Scientific staff continued to study for an M.Sc. in Toxicology at University College Dublin and carried out their projects on drug testing in the Bureau. The Bureau hosted a secondary school transition year student for a week.

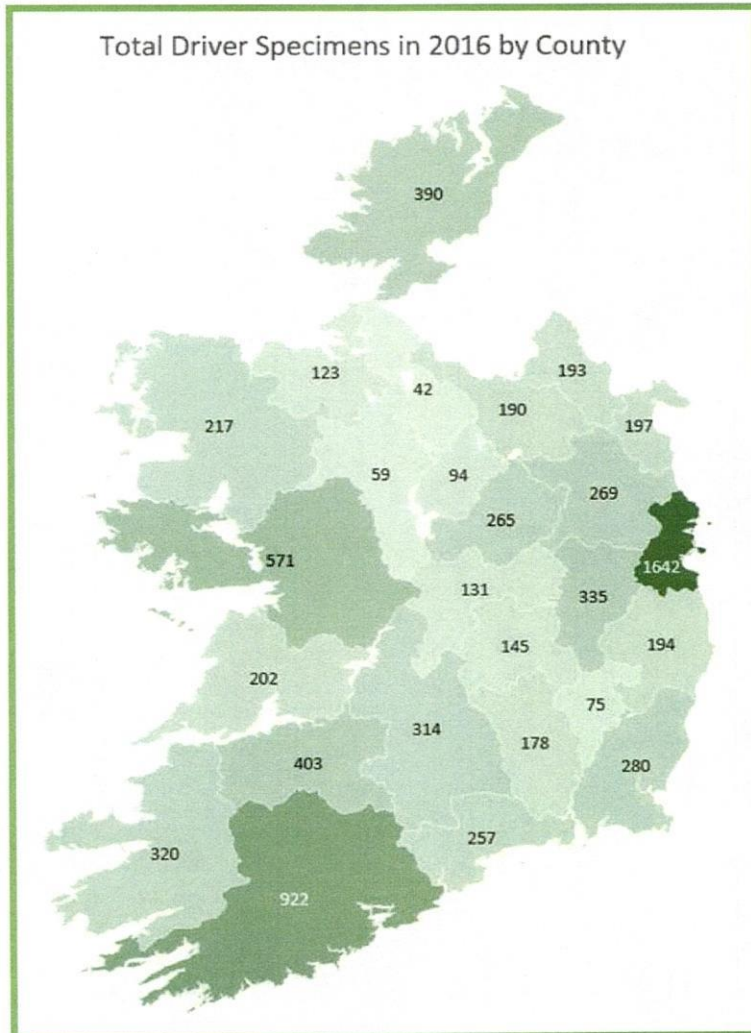
Specimens Received for Analysis

In 2016 a total of 8,007 blood, urine and breath specimens were analysed for alcohol concentration. There was no significant change in the number of specimens tested for drugs or alcohol from 2015 to 2016 (see Table 1). Driver specimens by county are illustrated in Map 1.

Table 1
Total Number of Specimens Received within Programmes

Programme	2016	2015
Alcohol Blood & Urine	3,019	3,077
Toxicology Blood & Urine	1,133	1,140
Evidential Breath Testing	4,988	4,909

Map 1



Blood and Urine Alcohol Programme

This section was headed by the Principal Analyst, Ms. Susan Mc Donald. The main functions of this programme are:

- The receipt and analysis of specimens of blood and urine forwarded to the Bureau
- The determination of the concentration of alcohol in blood and urine specimens
- The issue of Certificates of Analysis
- The provision of equipment (kits) for the taking of such specimens
- The testing of spurious specimens
- Provision of expert assistance to the Courts and the Department of Transport Tourism and Sport (DTTAS)
- Collection and analysis of data in relation to alcohol tests



Provision of Blood and Urine kits

The number of specimen kits prepared in 2016 was 5,800 and 5,700 kits were issued (See Tables 2 and 3). This was an increase on the previous year in anticipation of the change in the Road Traffic Legislation and the possible increase in the requirement for blood provision in drug driving cases.

Table 2
Kits Prepared in Medical Bureau of Road Safety

	2016	2015
	No.	No.
Blood Kits	3,100	2,100
Urine Kits	2,700	2,900
Jugs	2,800	2,800

Table 3
Kits Issued to An Garda Siochana

	2016	2015
	No.	No.
Blood Kits	3,200	1,800
Urine Kits	2,500	2,000
Jugs	2,600	2,300

The Bureau retained a contingency supply of at least 500 of each kit type throughout the year.

Blood and Urine Alcohol Analysis

Blood and Urine specimens are analysed using Headspace Gas Chromatography with Flame Ionisation Detection (HSGC-FID). Each specimen is analysed at least twice by two different scientists using two different HSGC-FID systems. The results of analyses must concur before issue of a Certificate of Analysis.

A total of 3,019 blood and urine specimens were received for alcohol analysis during 2016. One specimen was received for drug testing only, as the driver had been tested for alcohol using an Evidential Breath Testing instrument. In 85 (2.8%) cases certificates were not issued either because of some defect with the specimen or in the documentation accompanying the specimen. This level of non-issue is a slight increase on 2015. The number of blood and urine specimens received in 2016 is very close to the previous year with a slight decrease of less than 2% on the number received during 2015.

Number of Specimens Provided in Hospitals

In 2016 there were 479 specimens provided in hospitals, this represents 15.8% of total blood and urine specimens. Of these 262 had returned an alcohol level of 0mg/100ml.

Unconscious Drivers

6 specimens were forwarded after being taken from unconscious drivers.

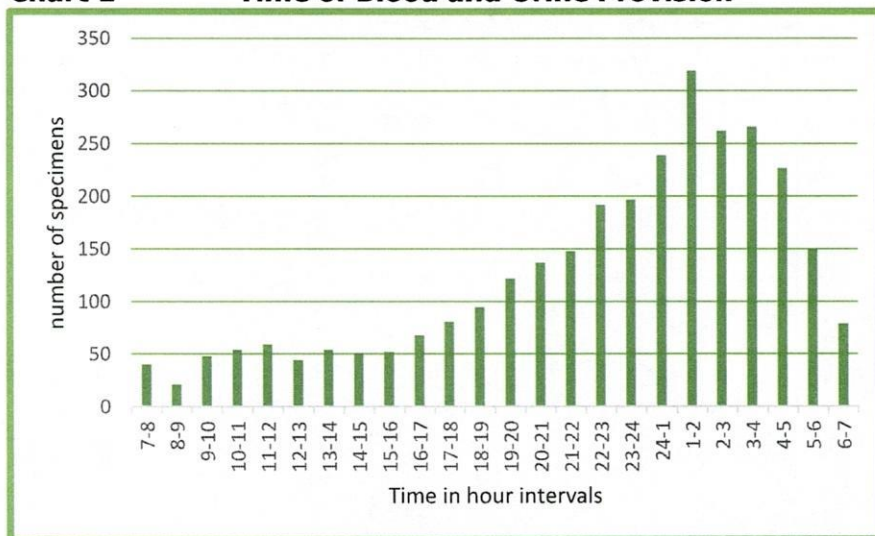
Mean Alcohol Level in Blood and Urine

The mean alcohol level in blood was 125mg/100ml and in urine was 144mg/100ml for 2016, however excluding specimens which had no trace of alcohol the blood mean result was 169mg/100ml and the urine mean was 200mg/100ml.

Analysis of Time

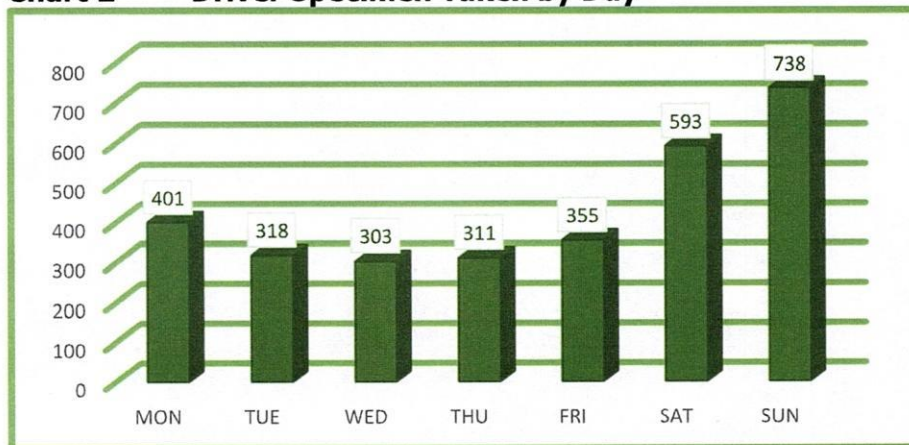
Specimens of blood and urine are much more likely to be provided in the evening to early hours of the morning as can be seen from Chart 1.

Chart 1 Time of Blood and Urine Provision



From Chart 2 it is evident that more specimens are provided on Saturday, Sunday and Monday than any other weekday.

Chart 2 Driver Specimen Taken by Day



Gender of Drivers Providing Blood and Urine Specimens

A similar pattern was seen in the male/female ratio in 2016 as in previous years, with 80% of drivers providing specimens being male.

Table 4
Gender Profile of Specimens Received – Blood and Urine

Gender	2016		2015	
	No.	(%)	No.	(%)
Male	2432	80%	2,497	81%
Female	562	19%	561	18%
Not Stated	26	1%	19	1%

The total number of blood and urine specimens received in the Bureau in 2016 was 3020, of these 3019 were processed through alcohol analysis and on to drug testing where appropriate as described on pg 20 below. 1 specimen was processed directly to drug testing as the driver had provided breath specimens and an evidential breath alcohol result had been issued in that case.

Table 5
Age Profile of Specimens Analysed for Alcohol – Blood and Urine

Age Profile	2016		2015	
	No.	(%)	No.	(%)
≤ 24	658	21.8%	675	22.0%
25 – 34	856	28.4%	825	26.8%
35 – 44	652	21.6%	654	21.2%
45 – 54	418	13.8%	449	14.6%
≥ 55	422	14.0%	457	14.9%
Not Stated	13	0.4%	17	0.6%

From Table 5 it is notable that the age profile of driver specimens in the 25–34 year old group contribute to the greatest percentage of arrested drivers. Almost 50% of driver specimens were under 34 years of age, with 72% under 44 years of age. Charts 3,4,5 and 6 represent age and gender distribution of drivers providing blood and urine specimens

Chart 3

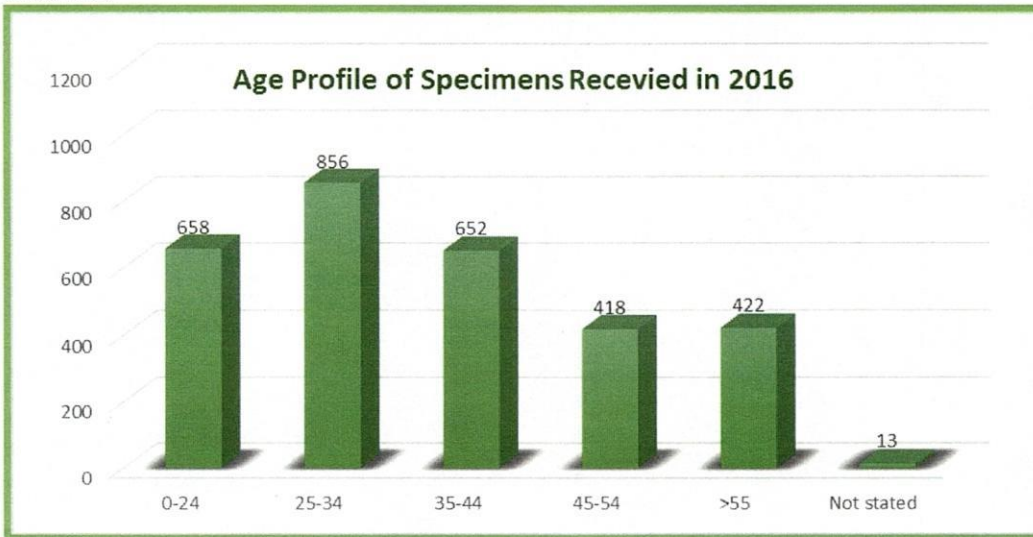
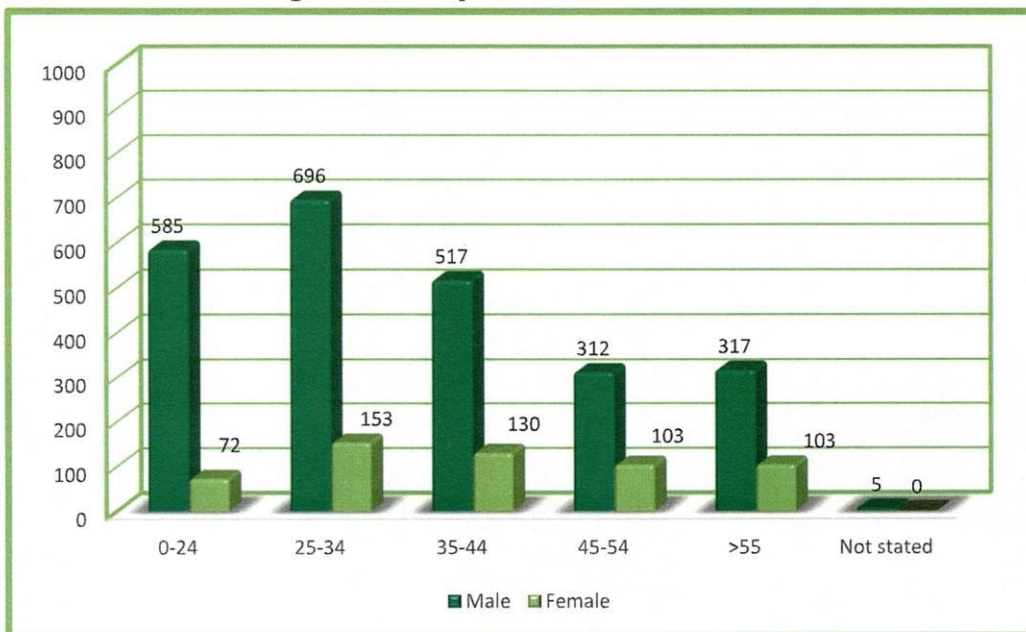
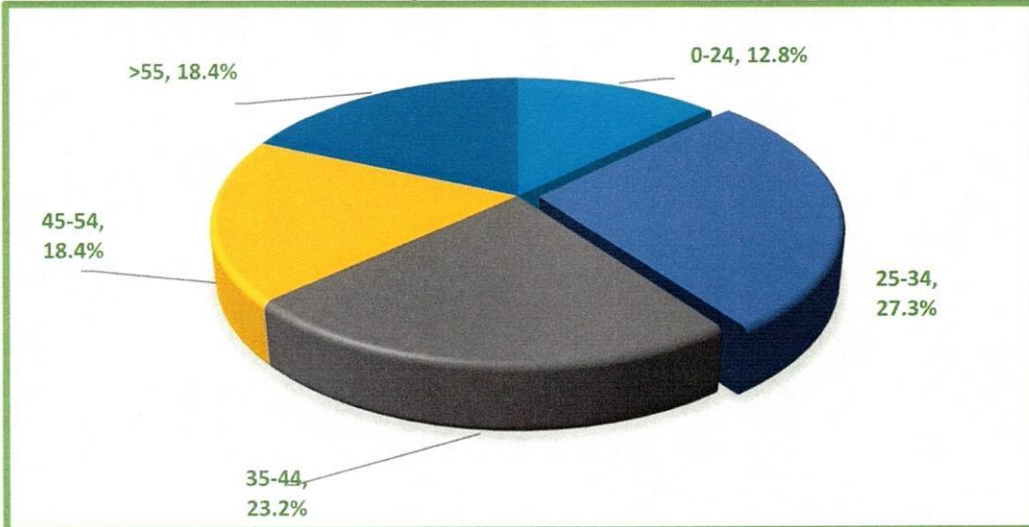


Chart 4 **Age Profile by Gender**



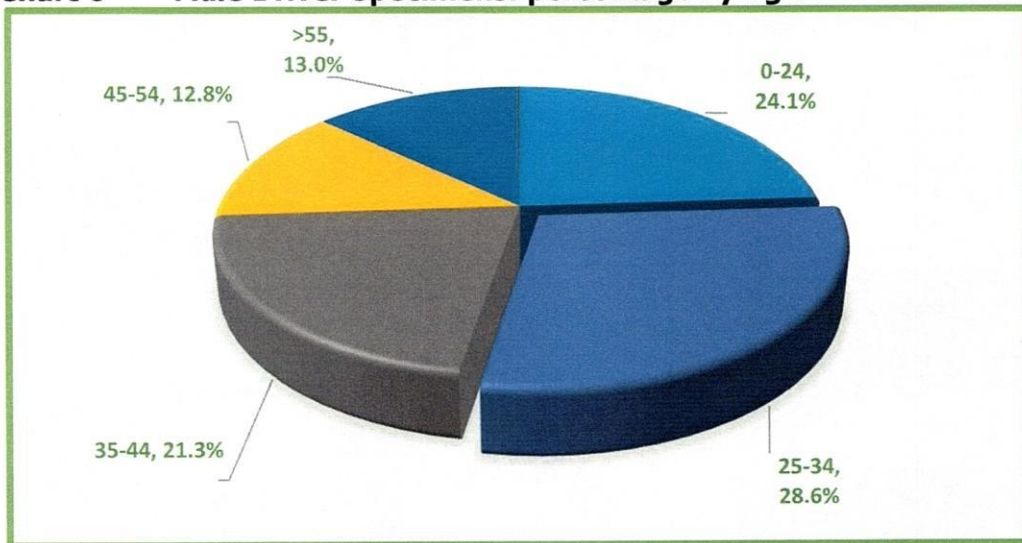
Once divided by gender there is a significant difference in the trend in younger drivers ≤ 24 years, for female drivers this age group represented the lowest of number of specimens provided. NOTE: Of the 13 specimens received with age not stated, 8 of these also had gender not stated. This accounts for apparent differences in numbers in the charts above.

Chart 5 Female Driver Specimens: Percentage by Age



40% of female drivers were under 34 years of age, this is in comparison to 53% of male driver specimens.

Chart 6 Male Driver Specimens: percentage by Age



Over Twice the Limit of 50mg/100ml (Blood) or 67mg/100ml (Urine)

During 2016 there were 1,586 specimens certified which were twice or more over 50mg/100ml (Blood) or 67mg/100ml (Urine). This figure represents 52.5% of the total number of specimens certified.

Drivers with alcohol concentrations within the administrative penalty zone of 50-80mg/100ml blood or equivalent.

In 2016 there were 102 (6%) drivers with blood alcohol concentration, 98 (7.5%) with urine alcohol concentration and 796 (16%) with a breath alcohol level within the administrative penalty level. (Tables 6, 7 and 8). Overall this amounts to 996 (12.5%) drivers with a certified alcohol result being within the administrative penalty zone. No account has been taken for specified drivers in this data analysis as this information is not available to the Bureau.

Table 6
Certified Blood Alcohol Level – Comparison with previous year

mg Alcohol/100ml Blood	2016		2015	
	No.	(%)	No.	(%)
0 – 20	470	27.5%	471	26.9%
21 – 50	73	4.3%	66	3.8%
51 – 80	102	6%	104	5.9%
0 – 80	645	37.7%	641	36.6%
81 – 100	68	4%	81	4.6%
101 – 150	259	15.1%	285	16.3%
151 – 200	319	18.6%	370	20.9%
201 & Over	365	21.3%	379	21.6%

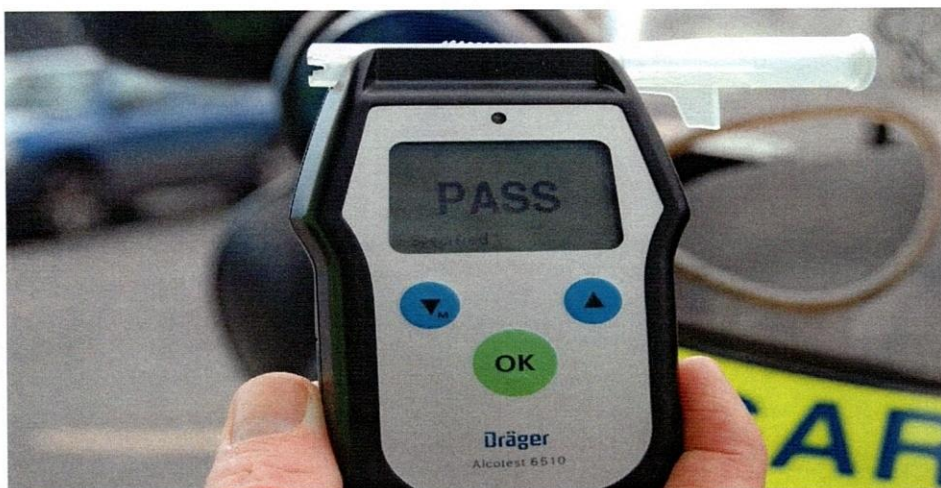
Table 7
Certified Urine Alcohol Level – Comparison with previous year

mg Alcohol/100ml Urine	2016		2015	
	No.	(%)	No.	(%)
0 – 27	388	29.7%	319	25.6%
28 – 67	78	6%	60	4.8%
68 – 107	98	7.5%	106	8.5%
0 – 107	564	50.1%	485	39.0%
108 – 135	74	5.7%	76	6.1%
136 – 200	203	15.5%	235	18.9%
201 – 267	245	18.8%	248	19.9%
268 & Over	191	14.6%	200	16.1%

Breath Alcohol Programme

This programme was headed by Principal Analyst, Mr. D. Reynolds until November 2016 when he retired from his position. The main functions associated with this programme are:

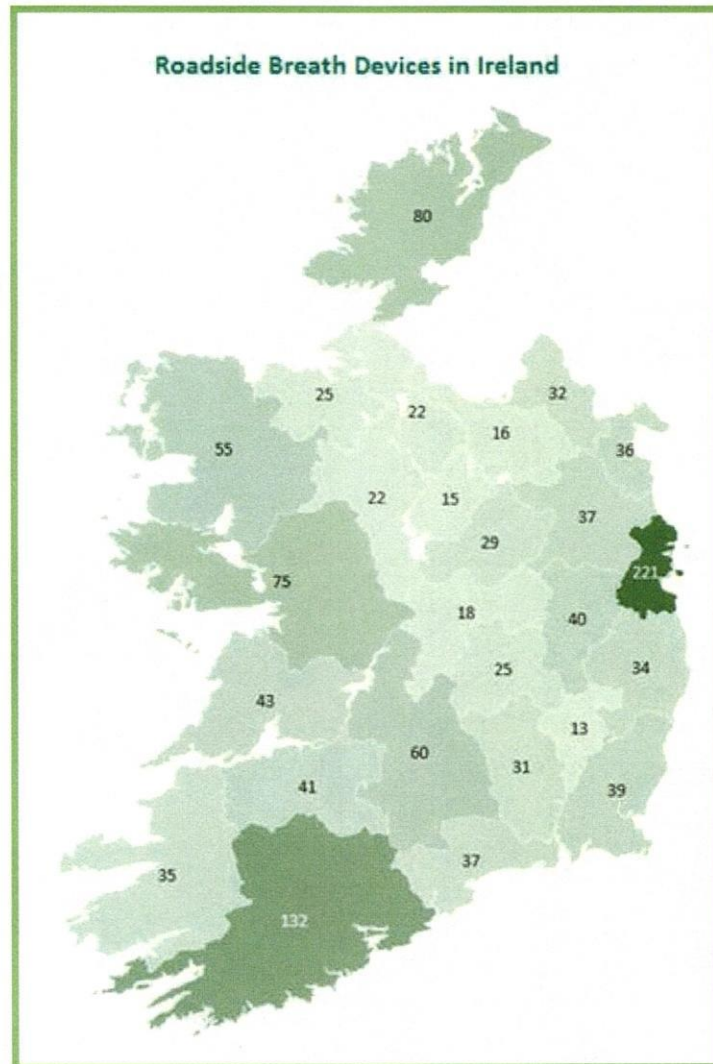
- The approval, supply and testing of apparatus for indicating the presence of alcohol in the breath (roadside preliminary breath testing devices)
- The approval, supply and testing of apparatus for determining the concentration of alcohol in the breath (evidential breath testing instruments)
- Provision of expert assistance to the Courts and DTTAS
- Provision of training courses for EvidenzerIRL Operators and Supervisors
- Collection and analysis of data in relation to evidential breath alcohol tests



Roadside Breath Alcohol Testing

The Bureau continued to support the Draeger 6510 electronic devices issued to An Garda Síochána in approximately 373 garda stations throughout the country. The distribution of devices is outlined in Map 2 below.

Map 2



Evidential Breath Alcohol Testing

The Bureau continued to support the 86 EvidenzerIRL instruments in garda stations.

Training

The Bureau continued to provide Operator and Supervisor training courses in conjunction with An Garda Síochána. This is a one and a half day training course which was devised to train Garda Operators and Supervisors in the use of the EvidenzerIRL instrument. Eleven Operator/Supervisor Training Courses training 204 Operators and 103 Supervisors were held in 2016, this is an increase of 50% on courses provided in 2015.

Testing & Visits to Garda Stations

Bureau Scientists visited and tested each instrument that had been previously installed in garda stations on at least two occasions throughout the year. Onsite visits totalled 202 in 2016. These visits covered testing and maintenance and are an essential element in assuring the quality of breath alcohol test results for evidential purposes.

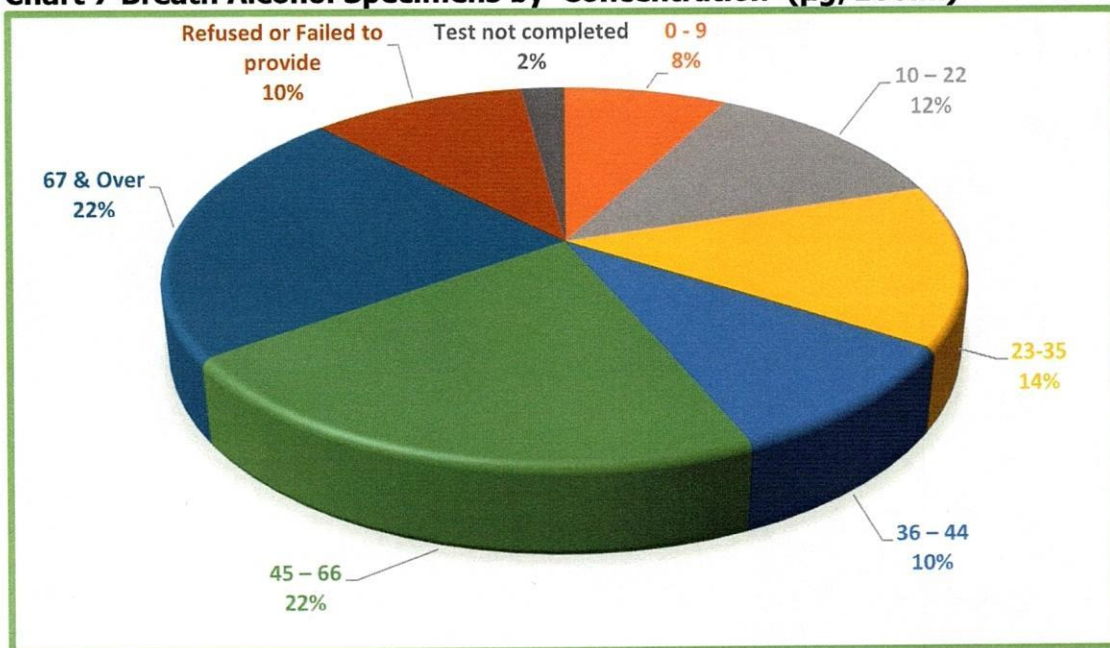
Breath Alcohol Analysis

In 2016 a total of 5,694 drivers were brought to garda stations with the intention of them providing breath specimens for alcohol analysis. In 119 (2%) cases, the EvidenzerIRL flagged a reason why a section 13 Certificate could not be produced, for example safeguards such as Mouth Alcohol or Breath Difference. Of the remaining 5,575, 560 drivers either failed (426) or refused (161) to provide breath specimens. A total of 4,988 section 13 Certificates were issued. Table 8 and Chart 7 detail frequency with alcohol concentration.

Table 8
2016 Certified Breath Alcohol Levels – Comparison with 2015

µg. of Alcohol per 100ml of Breath	2016		2015	
	No	(%)	No	(%)
0 - 9	451	9%	400	9%
10 – 22	703	14%	532	12%
23-35	796	16%	617	14%
36 – 44	534	11%	431	10%
45 – 66	1230	25%	1,111	25%
67 & Over	1274	25%	1,258	30%

Chart 7 Breath Alcohol Specimens by Concentration (µg/100ml)



Mean Alcohol Level in Breath

Excluding breath specimens which returned a zero alcohol result the mean alcohol level in breath was 48µg/100ml in 2016.

Analysis of Time

Of the total number of valid breath specimens (4,988) 68% were provided between the hours of 9.00 p.m. and 6.00 a.m., 17% between 6.00 a.m. and 4.00 p.m. and the remaining 15% between 4.00 p.m. and 9.00 p.m.

Over Twice the Limit of 22 µg /100ml (Breath)

51% of breath specimens provided were over twice this limit.

Gender in Evidential Breath Testing Specimens

The number of male drivers required to provide breath specimens far exceeds the number of female drivers, the male to female ratio being 8:1 (See Table 9)

Table 9
Gender Profile of Certified Specimens - Breath Alcohol Analysis

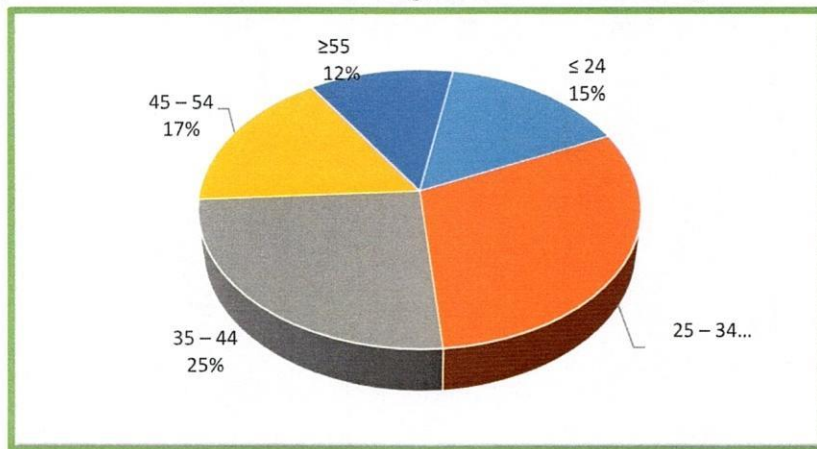
Gender	2016		2015	
Male	4,403	88.3%	3,840	88%
Female	585	11.7%	509	12%

Table 10
Age Profile of Certified Specimens - Breath Alcohol Analysis

Age Profile	2016		2015	
	No.	%	No.	%
≤ 24	765	15%	780	18%
25 – 34	1517	31%	1,364	32%
35 – 44	1267	25%	1,014	23%
45 – 54	839	17%	698	16%
≥55	598	12%	493	11%
Not stated	2		0	

Following the pattern found in blood and urine specimens the greatest frequency is seen in the 25-34 group (32%).

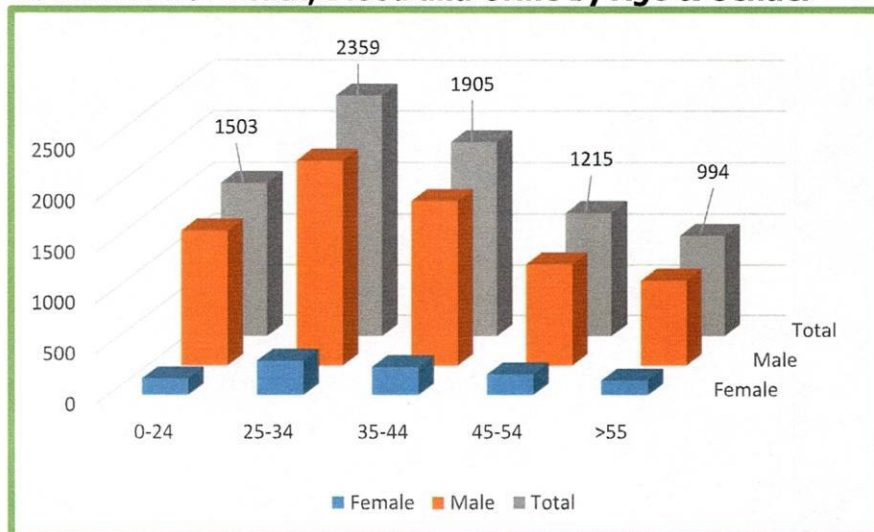
Chart 8 Age Profile of Drivers Providing Certified Breath Specimens



Male/ Female Ratio

The male to female ratio differs depending on whether a breath or blood/urine is provided. With breath specimens there was approximately 88% male and 12% female. With blood/urine there was approximately 80% male and 20% female, combining all specimen types gives approximately 85% male provision compared to 15% female. In 26 cases gender was not stated, in 13 cases age was not stated and of these cases 8 had neither gender nor age stated.

Chart 9 Total Drivers Breath, Blood and Urine by Age & Gender



Research

The Bureau commenced a clinical research project in conjunction with clinical partners to look at lung function and drivers' capability to provide evidential breath testing specimens. This project is expected to conclude in 2017.

Toxicology Programme

This programme is headed by Principal Analyst, Dr. Richard Maguire. The main functions of this programme in 2016 were:

- The analysis of blood and urine specimens for the presence of drugs. The issue of certificates of analysis for the presence of a drug or drugs.
- Provision of expert assistance to the Courts and DTTAS.
- Collection and analysis of data in relation to toxicology tests.
- Preliminary Drug Testing Device procurement, validation and implementation planning.
- Development of new methods of drug testing.
- Research on drugs that cause impairment in drivers.



Preliminary Analysis

The Bureau analyses all blood and urine specimens, found under a defined limit for alcohol (80mg/100ml in blood and 107mg/100ml in urine), for the presence of seven different classes of drugs. The Gardaí can also request drug analyses on specimens with alcohol levels above this limit and also for specimens where an EBT statement for breath alcohol content has already been issued. The number of 2016 specimens analysed for the presence of a drug or drugs was 1,133.

1,108 specimens fell under the defined limit category, 25 specimens were above this limit and were subsequently tested following requests made by An Garda Síochána. There was 1 specimen that had been tested for alcohol using EBT submitted directly for drug testing in 2016. Of the 1,133 specimens tested 813 (72%) were found to be positive for at least one drug class on preliminary drug testing, while 320 (28%) were negative for drugs.

The current lab based preliminary drug test is an immunoassay test which can detect the presence of a drug in a biological fluid through the use of specific antibodies. Work was on-going throughout 2016 on a new preliminary drug testing method which will replace the immunoassay test and will broaden the type and number of impairing drugs for which the MBRS can test. The new screening method which uses Liquid Chromatography and Tandem Mass Spectrometry is planned for introduction in 2017.

Confirmatory Analysis

Throughout 2016 the Bureau carried out confirmatory testing for the presence of Cannabinoids and Benzodiazepines in blood and urine specimens at the Bureau's premises in UCD.

The Bureau used Gas Chromatography–Mass Spectrometry (GCMS), Gas Chromatography and Tandem Mass Spectrometry (GC-MS-MS) or Liquid Chromatography with Tandem Mass Spectrometry (LC-MS-MS) in its confirmatory analysis of drugs.

These techniques allow the unequivocal determination of drugs in biological fluids. The Bureau conducts the majority of the confirmatory analysis at its UCD premises and it arranged that a portion of the testing be carried out by the LGC in the UK. The following table outlines the number and type of confirmatory tests conducted at the Bureau premises in UCD and the number and type of tests conducted by the LGC in the UK. Several specimens had multiple drug class testing conducted.

Table 11
Summary of Confirmatory Testing Conducted

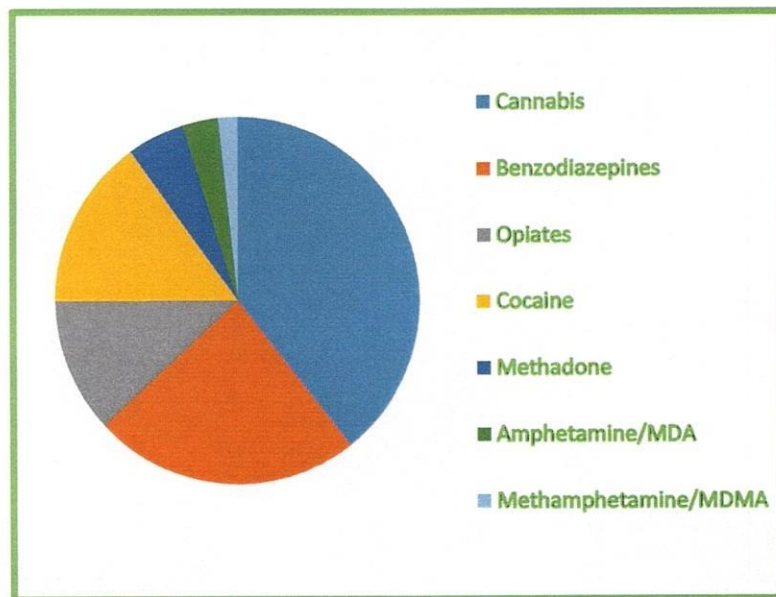
Drug Class	No. of tests	Conducted
Cannabis	546	MBRS
Benzodiazepines	194	MBRS
Opiates	46	LGC
Cocaine	57	LGC
Methadone	7	LGC
Amphetamine	16	LGC
Methamphetamine	13	LGC

813 specimens were found to be positive for at least one class of drug when analysed using the screening method. Many drugs were found to be positive for more than one drug class, where this occurred a priority testing scheme was employed for confirmatory testing. This resulted in some specimens being tested for more than one drug class. Table 11 summarises the confirmatory drug testing conducted by class. In 2016 the Bureau continued development of Liquid Chromatography with Tandem Mass Spectrometry confirmatory tests to eliminate the need to outsource testing, this will bring all confirmatory testing in-house.

Drug Analysis Results

A summary of positive drug screening results is shown in Chart 10. As can be seen cannabis is the most prevalent followed by benzodiazepines.

Chart 10: Prevalence of Drug Classes based on preliminary Drug Testing



The age profile and gender breakdown of drivers who tested positive for drugs on preliminary drug screening has been estimated and is shown in Table 12 and 13.

Table 12
Driver Age and Drug Class of Preliminary Drug Screen Positive Specimens

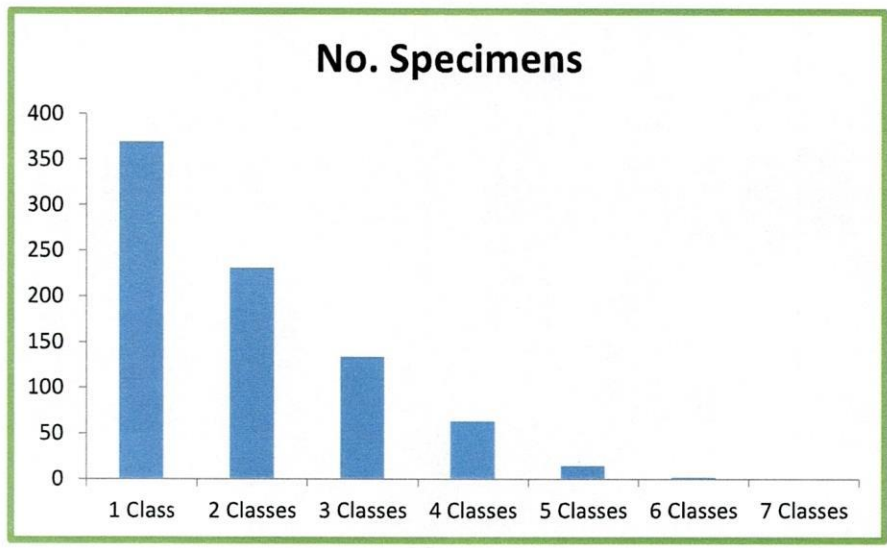
	Ampheta mine	Benzo	Cannabis	Cocaine	Methadone	Methamphetamine	Opiate
≤24	16	115	268	81	4	10	26
25-34	25	134	225	92	37	13	72
35-44	7	81	85	55	33	4	62
45-54	0	19	21	7	5	0	19
≥55	1	22	19	1	1	0	7
Not Stated		3	2	1			

Table 13
Gender profile of specimens positive on preliminary drug screening

Gender	2016		2015	
	No.	(%)	No.	(%)
Male	721	88.7	607	86.6%
Female	92	11.3	94	13.4%

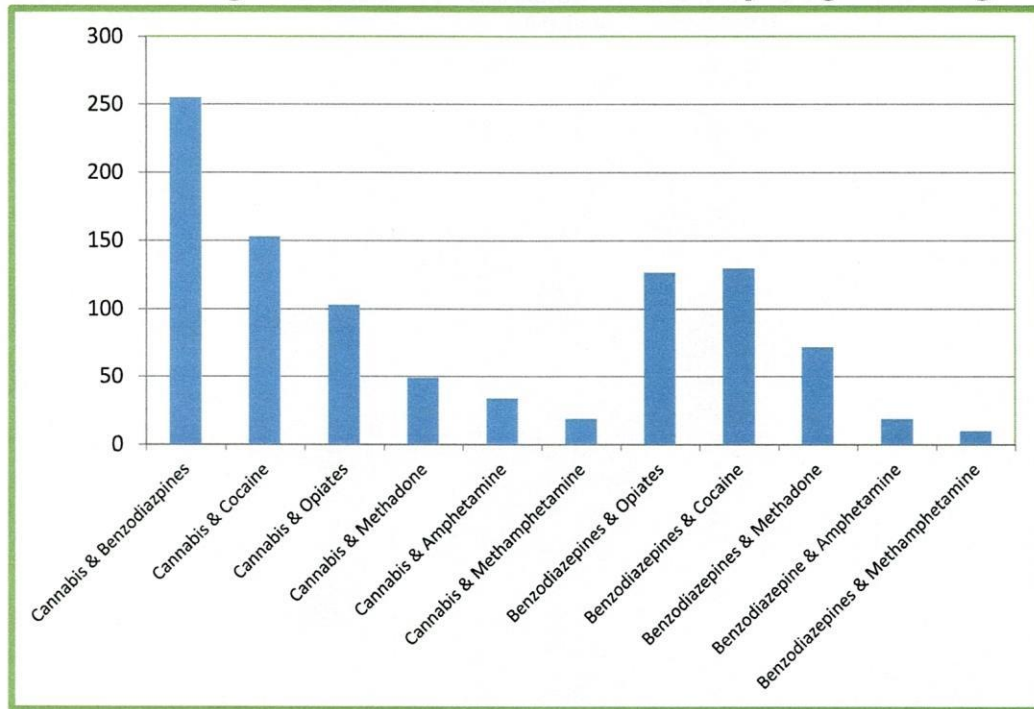
In Preliminary Drug Screening, detection of multiple impairing drugs in the same specimen was observed. In all, 31% of specimens submitted for Preliminary Drug Screening which were positive had 2 or more drug classes present. A number of specimens were positive for 5 classes of drugs. Chart 11 highlights the extent of this.

Chart 11: Prevalence of Multiple Drugs use based on Preliminary Drug Testing



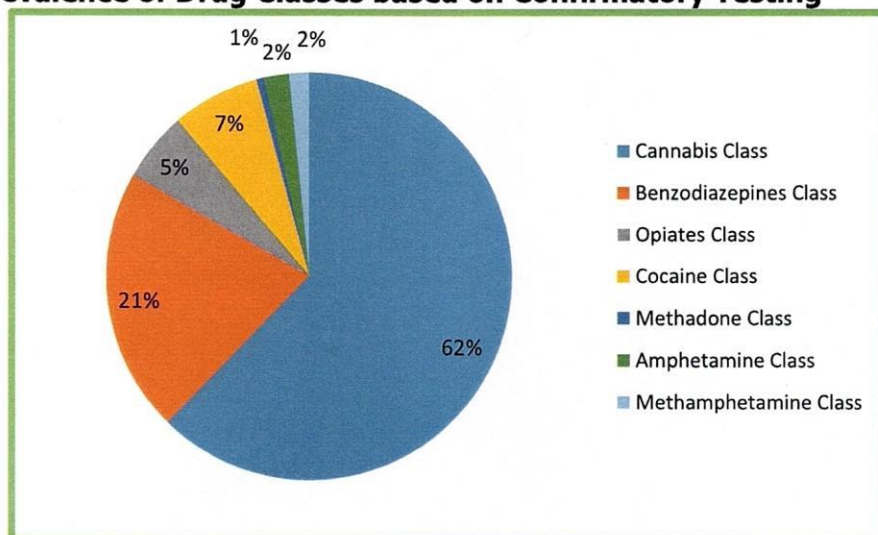
The most commonly encountered combinations are charted below (Chart 12).

Chart 12
Prevalence of Drug Combination Based on Preliminary Drug Screening



In the case of each specimen, 1 drug class was selected for confirmation and chart 12 shows the distribution of the drug classes for confirmatory analysis.

Chart 13
Prevalence of Drug Classes based on Confirmatory Testing



Roadside Chemical Drug Testing

In 2016 the Roadside Chemical Drug Testing Implementation group, which was formed in 2013, continued to meet. The group is made up of representatives from An Garda Síochána, DTTAS and Bureau Scientists, with the Chief Analyst acting as Chair of the group. This group had previously devised the specifications for a tender for a suitable preliminary drug testing system using oral fluid to be used at the roadside and/or in garda stations. This tender was published in 2014.

The evaluation of the tender was completed in 2015. The Draeger DrugTest 5000 system which has the capacity to test for Cannabis, Benzodiazepines, Cocaine and Opiates was the successful bidder and a framework agreement was put in place in 2015. The request to DTTAS for an extension of a contract for an additional scientist for this project was sanctioned in 2016 to run to December 2017. Work continued through 2016 to ensure that full and proper procedures were in place for the implementation of preliminary drug testing by An Garda Síochána. This included design and installation of a shelf to hold the PDT device in each of 86 intoxicant testing garda stations, devising a training course for operators of the device in conjunction with the Garda Training Unit at Templemore as well as developing the laboratory testing methods.

GC-MS-MS and LC-MS-MS analysis of drugs in oral fluid continued in 2016 to support the on-going quality control of the drug test system material purchased over the lifetime of the contract.

Development of Quantitative Methods

The Road Traffic Bill 2016 introduced *per se* levels in whole blood for particular drugs for the first time in Ireland when it was enacted in December 2016. The development and amendment of test methods to accommodate these legislative changes was initiated in 2015 and validation and procedures were developed in 2016 to ensure the laboratory was ready for a 2017 commencement date.

Research

Due to the changing nature of drug misuse there is an on-going need to monitor the drugs being used/misused by drivers. The Bureau is actively developing new methods which are aimed at increasing the type and number of impairing drugs that can be detected and also improving existing methods in order to ensure that methods keep pace with advances in drug detection. Through 2016 staff continued to develop methods on existing technology and resources were also applied to method development on the High Resolution LC-MS-MS instrument which was purchased to further improve the Bureau's capability of detecting drugs in drivers.

Professional Witness

The area of road traffic safety enforcement and in particular driving under the influence of intoxicants (both alcohol and drugs) is the most litigated area in the criminal law sphere in Ireland. The Bureau is involved in advising on and through its scientists giving expert witness in cases before the Courts.

In 2016 the level of court attendances by Bureau witnesses was lower than previous years with only three attendances by Bureau staff.

Quality Assurance

The Medical Bureau of Road Safety maintained its ISO 17025 Accreditation in 2016 for the areas of: Blood and Urine alcohol analysis; Drug analysis; Evidential Breath Testing; and Preliminary Breath Testing.

The Bureau operates a Flexible Scope; this facilitates the addition of new drug tests to the Bureau's Scope of Accreditation as they are developed in-house. A master list of additionally accredited tests (MLAAT) is maintained as part of the flexible scope procedure. Several Drugs in Oral Fluid test methods were added to the list in 2015 for review by INAB in early 2016. These methods were subsequently incorporated into the Bureau's Scope of Accreditation following the INAB visit in March 2016. Full details of the Scope of Accreditation are available at [https://www.inab.ie/Directory of Accredited Bodies](https://www.inab.ie/Directory_of_Accredited_Bodies).

An application for extension to scope to include the Preliminary Drug Testing device testing was submitted to INAB in October 2016 for assessment in early 2017.

Proficiency Testing

The laboratory participates in a number of Proficiency Testing schemes. Table 14 details the schemes for 2016.

Table 14
Proficiency Testing Programmes

Programme	Provider	Scheme	No. Specimens	Analytes
Toxicology	CAP	Drugs of Abuse in Whole Blood and Urine	8 specimens per annum	Amphetamines & Stimulants Cannabinoids Cocaine & Metabolites Minor Tranquilisers Non - Opiate Narcotics Opiates
	Labquality	Drugs of Abuse in Urine	6 specimens per annum	Amphetamines & Stimulants Cannabinoids Cocaine & Metabolites Minor Tranquilisers Non - Opiate Narcotics Opiates
	LGC Standards	Drugs of Abuse in Urine	12 specimens per annum	Amphetamines & Stimulants Cannabinoids Cocaine & Metabolites Minor Tranquilisers Non - Opiate Narcotics Opiates, Creatinine
	LGC Standards	Toxicology	8 specimens per annum	Amphetamines & Stimulants Cannabinoids Cocaine & Metabolites Minor Tranquilisers Non - Opiate Narcotics Opiates
	LGC Standards	Drugs in Oral Fluid	12 specimens per annum	Amphetamines & Stimulants Cannabinoids Cocaine & Metabolites Minor Tranquilisers Non - Opiate Narcotics Opiates
	LGC Standards	Tox- Benzodiazepines	8 Specimens per annum	Diazepam, Nordiazepam, Temazepam, Oxazepam, Nitrazepam
	LGC Standards	Tox – Z-Drugs	8 specimens per annum	Zopiclone, Zaleplon, Zolpidem
Alcohol in Blood and Urine	Labquality	Blood	8 specimens per annum	Alcohol
	Labquality	Urine Quantitative	4 specimens per annum	pH, Creatinine & Urea
	LGC Standards	Tox – Bld & Tox Urn	24 specimens per annum	Alcohol
Evidential Breath Testing	CTS, Inc.	568 Breath Alcohol Simulator Solution Analysis	2 solutions per annum	Alcohol

Financial Information

The Medical Bureau of Road Safety derives its finances from an Annual Grant out of the Vote for the Department of Transport, Tourism and Sport. The total grant allocation for the Bureau for 2016 was €4,227,000.

Corporate Governance

The Board of the Medical Bureau of Road Safety operates in accordance with the Code of Practice for the Governance of State Bodies. The Board is accountable to the Department of Transport, Tourism and Sport and the Department of Finance. The Board meets regularly and is responsible for the proper management of the Bureau. It makes major strategic decisions and reviews the Bureau's risk management strategy and control processes on an annual basis.

Board Members

The Board of the Medical Bureau of Road Safety comprises of five members (including the Director) and is appointed by the Minister for Transport, Tourism and Sport.

Table 15 Board Members 2016

Name	Position	Attendance Record
Professor Cecily Kelleher	Chairman	4 of 4
Professor Denis Cusack	Board Member and Director	4 of 4
Ms. Nicola Hayes	Board Member	3 of 4
Mr. Paul Burns	Board Member	4 of 4
Dr. Declan Bedford	Board Member	4 of 4

Bureau Membership and Meetings

During 2016 the Medical Bureau of Road Safety held four meetings. These meetings were held on 7th April, 16th June, 29th September and 8th December 2016.

Schedule of Fees and Aggregate Expenses Paid to Directors During 2016

During 2016 the following fees were paid:

Table 16
Board Fees Paid

Board Member	TYPE OF FEE	PAID
Mr. Paul Burns	Fee for Non-Executive members of Boards of State Bodies	€5,985
Dr. Declan Bedford	Fee for Non-Executive members of Boards of State Bodies	€5,985

Compliance

The Board is pleased to report that during the year ended 31st December 2016 the Medical Bureau of Road Safety complied with the relevant provisions of the Code of Practice for the Governance of State Bodies. An internal audit was performed.

Ethics in Public Office Acts

The members of the Board who held office at the 31st December 2016 had no interests for the purposes of the Ethics in Public Office Acts 1995 and 2001.

Audit Committee

The Audit Committee reviews any aspect which relates to the financial matters of the Medical Bureau of Road Safety. The committee operates under formal terms of reference. The meetings are normally attended by the members of the Committee and it reports to the Board on a bi-annual basis.

External Financial Audit

The Comptroller and Auditor General performed the annual audit of the 2015 Financial Statements during 2016. No significant issues were raised during the course of the audit.

Internal Audit

The internal audit function is a key element in informing the Board on the effectiveness of the system of internal financial control. The internal auditor operates in accordance with the Code of Practice for the Governance of State Bodies. An Internal Audit report was prepared in relation to 2016.

Procurement

Competitive tendering is the normal policy utilised by the Medical Bureau of Road Safety in the procurement process. It affirms that it complied with procurement procedures and relevant EU Directives as set out in the Code of Practice for the Governance of State Bodies during 2016.

Strategic Planning

The Bureau compiled its Annual Strategic Plan for 2017 and also its Five Year Strategic Plan 2017 -2021 and both strategies were forwarded to the Minister. The Plans set out the Bureau's key objectives over the coming year and years in conjunction with its key actions to achieve these objectives. Both strategies can be viewed on the Bureau's website.

Prompt Payment of Account

The Board acknowledges their responsibility for ensuring compliance in relation to the Prompt Payment of Accounts Act. Under an agreement with University College Dublin, suppliers are paid in the first instance by the College which is then reimbursed by the Bureau. It is the policy of the Medical Bureau of Road Safety to ensure that all invoices are paid promptly. University College Dublin, 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 and therefore has very strict procedures in operation.

In the case of a small number of suppliers, when the Bureau receives an invoice it will issue a payment by cheque directly to the supplier. The controls in relation to processing of invoices, credit notes and dealing with supplier disputes can only provide reasonable and not absolute assurance against material non-compliance with the Act.

STATEMENT ON INTERNAL FINANCIAL CONTROL

Responsibility of Internal Control

On behalf of the Members of the Medical Bureau of Road Safety, I acknowledge our responsibility for ensuring that an effective system of internal financial control is maintained and operated.

The system can only provide reasonable and not absolute assurance that assets are safeguarded, transactions authorised and properly recorded, and that material errors or other irregularities are either prevented or would be detected in a timely period.

Key Control Procedures

The Bureau has set out the following key procedures designed to provide effective internal financial control within the Bureau. The Bureau has agreed that the Director and staff are responsible for operational matters. The Director reports to the Bureau at its meetings of which four were held in 2016.

The Bureau has set out its financial procedures and delegation practices to ensure a transparent control environment appropriate to a small semi-state agency. The Bureau has an Audit Committee to support quality assurance of financial procedures. The Committee held four meetings during 2016 and reported to the Bureau.

The system of internal financial control is based on a framework of regular management information, administrative procedures including segregation of duties, and a system of delegation and accountability. In particular it includes:

- Comprehensive budgeting system with an annual budget which is reviewed and agreed by the Bureau.
- Regular reviews by the Bureau of periodic and annual financial reports which indicate financial performance against forecasts.
- Setting targets to measure operational financial and other performance.
- Formal project management disciplines.

The Bureau has an internal audit function, which operates in accordance with the Code of Practice for the Governance of State Bodies. The Bureau's monitoring and review of the effectiveness of the system of internal financial control is informed by the work of the internal auditor, the audit committee and the executive of the Bureau which has responsibility for the development and maintenance of the financial controls framework, and comments made by the Comptroller and Auditor General in his report, as applicable.

Annual Review of Controls

The Bureau carried out a review of the effectiveness of its system of internal financial control in respect of 2016 in accordance with the requirements.

Dr Declan Bedford
Chairman

Courses and Conferences attended by Staff in 2016

1	A Senior Analyst attended an MS Access Course on 13 th January 2016 in UCD.
2	A Senior Analyst attended an MS Excel Expert Course in UCD on 28 th January 2016.
3	The Director attended the RCPI Working Group on Traffic Medicine on 1 st February 2016 and 10 th October 2016 at RCPI, Dublin.
4	An Analyst attended an MS Excel Expert course in UCD on 11 th February 2016
5	8 Senior Analysts and a Technical Officer attended a Supervisory Management Development course at the MBRS on the 11 th and 18 th of February.
6	The Chief Analyst, a Principal Analyst and a Senior Analyst visited the Draeger facility in Lubeck, Germany on 22 nd , 23 rd and 24 th of February 2016.
7	A Principal Analyst and a Senior Analyst attended the OIML R126 meeting in Berlin, Germany on 22 nd February 2016.
8	The Director attended Sub-Group: Drug & Alcohol Misuse, RCPI Working Group on Traffic Medicine on 3 rd March 2016 at RCPI, Dublin.
9	The Director attended a meeting of the Medical Advisory Panel on Alcohol, Drugs & Driving, UK Department of Transport on 9 th March 2016 and 12 th October 2016 at Department of Transport, London, England.
10	An Analyst and a Senior Analyst attended the Draeger Drug and Alcohol conference on the 9 th and 10 th of March 2016 in Manchester, England.
11	Two Senior Analysts attended the LTG UKIAFT joint meeting on the 11 th March 2016 in London, England.
12	An Analyst attended an MS Access course in UCD on 15 th March 2016.
13	Two Analysts and an Executive Assistant attended a 2 hour Manual Handling course in UCD on 22 nd March 2016.
14	A Technical Officer attended a Gas Safety Awareness Workshop at BOC, Dublin on 24 th March 2016.
15	A Senior Analyst and three Analysts attended the Perkin Elmer Innovation Tour at the Clarion Hotel, Dublin on 7 th April 2016.
16	Two administrative staff and one scientist attended a course on VDU Assessor Training in the MBRS on 13 th and 19 th April 2016.
17	A Principal Analyst, Senior Analyst and two Analysts attended Train MIC Metrology in Chemistry on 20 th April 2016 at the State Laboratory, Co. Kildare.
18	22 members of staff attended a selection of General, Biological and Chemical Risk Assessment Seminars on the 22 nd April 2016 at the MBRS.

19	The Director attended the Faculty of Forensic & Legal Medicine conference on 5 th - 7 th May 2016 in London, England.
20	The Chief Analyst, a Principal Analyst, Senior Analyst and two Analysts attended the Irish Mass Spectrometry Society conference in Dublin on 18 th May 2016.
21	Two Senior Administrative staff attended the Freedom of Information Act-Exemptions conference on 19 th May 2016.
22	The Director, Chief Analyst and the Principal Analyst (Tox) attended the TISPOL conference on 25 th May 2016 in Malahide, Co. Dublin.
23	The Chief Analyst, three Principal Analysts, six Senior Analysts and seven Analysts attended Alcohol and Drugs Training on the 2 nd - 3 rd June and 14 th - 15 th September 2016 at the MBRS.
24	An Analyst and a Senior Analyst attended a Phenomenex Gas Chromatography training course on 14 th June 2016 in Dublin.
25	The Director and the Principal Analyst (Tox) attended the four day International Academy of Legal Medicine conference in Venice, Italy on 21 st – 24 th June 2016.
26	A Senior Analyst attended training courses on Statistics with SPSS, on 21 st and 23 rd June 2016 at UCD, Dublin.
27	A Senior Technical Officer attended a two hour training course on Perkin Elmer in MBRS on 1 st August 2016.
28	A Technical Officer attended a one day Technical Officers Development Conference in UCD on 6 th August 2016.
29	The Director attended the international conference of the World Association of Medical Law from 9 th -11 th August 2016 in Los Angeles, USA.
30	Two Senior Analysts and two Analysts attended the UKIAFT conference in Manchester, England on the 18 th and 19 th August 2016.
31	A Senior Technical Officer attended a three hour eProcurement training course at UCD on 24 th August 2016.
32	Four Senior Analysts, four Analysts, a Technical Officer and Senior Technical Officer attended Perkin Elmer Training sessions on 25 th and 26 th August 2016 at the MBRS.
33	A Senior Analyst attended the five day TIAFT conference in Brisbane, Australia from 28 th August - 01 st September 2016.
34	A Senior Technical Officer attended a Draeger Alcotest 6510 Repair and Maintenance course on 31 st August 2016 in Blythe, England.
35	The Director attended a two day national meeting of the Coroners Society of Ireland on 9 th and 10 th September 2016 in Cork.
36	An Analyst attended a five day Borkenstein DUID course from 19 th - 23 rd September 2016 in Philadelphia, USA.

37	A Senior Technical Officer attended a three hour course on MS Excel Core in UCD on 22 nd September 2016.
38	A Principal Analyst attended a conference on Expert Evidence: the New Regime on 12 th October 2016 at Croke Park, Dublin.
39	An IT Officer, an Analyst and two Senior Executive Assistants attended a two day SharePoint 2016 Course on 12 th and 13 th October 2016 in Dublin.
40	A Principal Analyst attended a 6 day SOFT conference from 16 th - 21 st October 2016 in Dallas, USA.
41	A Principal Analyst, Senior Analyst and three Analysts attended a Eurachem Ireland Workshop at the State Laboratory, Co. Kildare on 27 th October 2016. The Principal Analyst presented.
42	The Chief Analyst attended the ICADTS four day conference in Gramado, Brazil in October 2016.
43	A Principal Analyst, Technical Officer, three Senior Analysts and seven Analysts attended a one and a half hour seminar on How to Deal with a Chemical Spill at the MBRS on 3 rd November 2016.
44	A Senior Technical Officer, an Analyst and an Operations Support Specialist attended a Gas Safety Awareness Workshop at BOC, Dublin, on 1 st December 2016.
45	Two Senior Administrative staff attended general Data Protection Regulation for State and Semi-state Bodies on 6 th December 2016.
46	Two Senior Analyst completed a taught Masters in Forensics and Regulatory Affairs in UCD and completed projects in The Bureau.
47	Throughout 2016, a number of staff attended a variety of other short courses offered by UCD People Learning and Development covering topics such as Staff Development and Health and Wellbeing.

Energy Consumption

Under the Government's commitment to improve public energy efficiency by 33% in 2020 the Medical Bureau of Road Safety has registered for and is reporting through the SEAI online system. The Bureau's main energy usage is gas and electricity which is necessary for operating a forensic laboratory and ancillary facilities, e.g. heating and lighting, laboratory equipment, air handling, computers and servers.

The Bureau utilises initiatives to improve energy efficiency. A Building Management System (BMS) is used to monitor and control heating, air handling units, water boiler (direct hot water supply) and extractor fans. Each of the four floors of the Bureau's premises is managed individually and automatic controls are scheduled accordingly. Energy efficient light bulbs, movement sensors and timer switches have been fitted throughout the building to further reduced energy consumption.

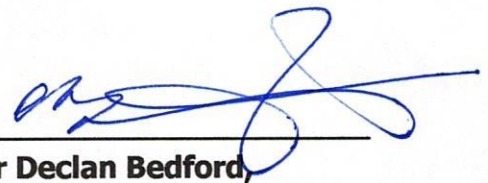
An energy audit was carried out in the Bureau's facility in 2016 with an aim of identifying any further energy reducing actions to be implemented.

Legal Disclaimer

The descriptions and statistics contained within this report are of a condensed and general informative nature only. They should not, by themselves, be relied upon in determining legal rights or other decisions under the Road Traffic Acts. Readers and users are advised to verify with their legal advisors any information on which they may wish to rely.



**Professor Denis A. Cusack,
Director.**



**Dr Declan Bedford,
Chairman.**