DRIVING UNDER THE INFLUENCE OF DRUGS IN IRELAND:

RESULTS OF A NATIONWIDE SURVEY 2000-2001

Professor Denis A. Cusack and Ms C. Pauline Leavy

Medical Bureau of Road Safety

Department of Forensic Medicine

University College Dublin

Professor Leslie Daly and Dr Patricia Fitzpatrick

Department of Public Health Medicine

and Epidemiology

University College Dublin

This report could not have been completed without the essential contributions of the following organisations and people.

Analyses for the Presence of a Drug or Drugs:

Medical Bureau of Road Safety

Siobhan Moane PhD.

Kieran Flynn BSc.

Grainne Harrington BSc.

Confirmatory Analyses of Drugs:

The State Laboratory

Bridin Brady PhD.

Siobhan Stokes MSc.

Una Mc Ardle BSc.

All analytical staff of the Toxicology Section

Data Management:

Medical Bureau Of Road Safety

Penny Furney BSc.

Maire Coughlan

Garda Data Collection:

Garda National Traffic Bureau

Inspector Con O'Donohue

Lisa Murray

Project Funding:

Department of the Environment and Local Government

(Responsibility for the area of road safety was transferred to the Department of Transport in June 2002)

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Executive Summary

The number of deaths and serious injuries due to road traffic crashes in Ireland is a cause for serious concern. Although the number of fatalities has fallen significantly in recent years, standing at 339 in 2003 (the lowest number since 1963), tackling the problem of road safety remains a high priority for the Government, the Road Safety Agencies and the population in general. The Government Strategy for Road Safety has identified four major factors as contributory causes in road traffic crashes. These are *Speeding, Non use of safety belts, Careless and dangerous driving and Intoxication*. Alcohol intoxication has been long recognised as a major contributor to road traffic crashes. It remains the major intoxicant in drivers. Increasingly intoxication with drugs other than alcohol has also been recognised. Both the Council of Europe and the European Union have recognised the dangers of driving under the influence of drugs. The drugs fall into both licit and illicit categories.

Driving under the influence of drugs (DUID) has been illegal under statute in Ireland since the 1961 Road Traffic Act. As a result of previous studies carried out by the Medical Bureau of Road Safety (MBRS), Department of Forensic Medicine, University College Dublin (UCD) and of Ireland's co-operation in the Pompidou Group of the Council of Europe, the MBRS applied to the Department of Environment for funding to carry out a study during 2000 and 2001 on blood and urine samples from drivers suspected of intoxicated driving in order to determine current trends in driving under the influence of drugs in Ireland and also to establish an evidence based model to inform future road safety strategies and review of current DUID legislation.

The MBRS was thus commissioned by the Department of Environment and Local Government[1] to carry out the nationwide survey and this work was completed at the Department of Forensic Medicine, UCD in collaboration with the Department of Public Health Medicine and Epidemiology, UCD. Seven drugs or drug classes were chosen for the study: amphetamines, metamphetamines, benzodiazepines, cannabinoids, cocaine, opiates and methadone. 2,000 specimens were selected for drug analysis, 1,000 with results under the limit for alcohol and 1,000 over the limit.

The results of the study are presented in this report and demonstrate that there is a significant driving under the influence of drugs problem in Ireland. There is a strong trend of increasing drug positivity with decreasing level of alcohol. 68% of tested drivers with essentially zero levels of alcohol were positive for one or more drugs. The serious impairing effects of drugs on drivers are evident from the number of drivers apprehended while under the alcohol limit or with no alcohol present at all.

In addition many tested drivers had a combination of high alcohol levels together with drugs in their body. The types of drugs found were similar in both the over and under the alcohol limit specimens. As in most surveys of drug use the cannabinoids formed the most common drug class encountered. Among the 15.7% tested drivers who were positive for some drug, six out of ten gave a positive result for cannabinoids. The finding of polydrug use and driving is also worrying as the impairing effects of this type of behaviour could be very much heightened. There is no significant gender difference in the overall drug positive results although it is noted that over 90% of apprehended drivers were male. Nevertheless, the typical profile of the apprehended and tested DUID driver is young, male, driving in an urban area with low or zero alcohol level with a specimen provided between the hours of 6 am and 9 pm and with a presence of cannabinoids. There is also the profile of the middle aged driver with benzodiazepines present. Benzodiazepines are legally prescribed drugs, which are central nervous system depressants. They can impair driving in a manner similar to alcohol.

1 Responsibility for the area of road safety was transferred to the Department of Transport in June 2002.

This survey highlights the need for education and awareness in relation to driving under the influence of drugs The focus should be on three target groups: the general road user population; the enforcement and oversight group, which includes legislators, Gardai, forensic doctors/scientists and the courts; and finally the medical group, which includes prescribing medical/dental practitioners and pharmacists. The focus to date has centred on illegal drugs and very little attention has been given to prescribed drugs. Specific educational programmes should be set up for the different target groups and a general media campaign should be initiated as soon as possible.

There are immediate implications for the evidential breath alcohol programme; in the event of a nil or low alcohol reading being obtained, the Garda should be aware of the significant likelihood that the driver's impairment could be due to the presence of a drug or drugs other than alcohol. In this case a separate blood or urine specimen should be sought for analysis.

One of the outcomes of this study will be an evidence-based review of the legislation for driving under the influence of drugs. There is recognition worldwide for the need for such legislation. While research is being carried out into the impairing effects of individual drugs, the list of such drugs is extensive. In contrast with alcohol, it is much more complex to establish dose concentration-effect relationships for other drugs. The concentration levels above which driving should be prohibited are still difficult to establish. There is also considerable debate as to the relevant benefits and deficiencies of Zero Tolerance of drugs in driving and the requirement to demonstrate impairment. In the enforcement field, the goal of producing a valid, reliable and convenient roadside testing device for drugs is still paramount and not yet achieved.

Introduction

Driving under the influence of drugs (DUID) has been a statutory offence in Ireland since the Road Traffic Act 1961. The Medical Bureau of Road Safety (MBRS) is the independent forensic body responsible for chemical testing of intoxicants under the Road Traffic Acts.[2] There are graded penalties for driving under the influence of alcohol, depending on concentration. The law does not set prohibited concentrations for other drugs nor does it distinguish between legal and illegal drugs.

Drug level studies in drivers have been carried out in some European countries, following road traffic fatalities or accidents. Other studies have been carried out on impaired drivers. However, prevalence data from different countries are not comparable due to differences in study designs. The statistics gathered are insufficient to give a detailed picture of the DUID situation and this reinforces the need for each country to assess the DUID situation in its own jurisdiction.

Initial surveys were carried out by the MBRS at the Department of Forensic Medicine in University College Dublin (UCD) between 1987 and 1991 to investigate this phenomenon. 1,000 random urine samples were tested for the presence of cannabis, benzodiazepines and opiates and 6.6% were positive for one of these drugs. Subsequently 1,000 urine samples under the legal alcohol limit were screened and 14.4% of the samples contained drugs. Between July 1st 1999 and December 31st 1999 a further study of 338 samples (urine or blood) under the legal limit for alcohol were tested for the presence of drugs. 37% of those samples were positive for drugs. The classes of drugs found were (in descending order) cannabis, benzodiazepines, amphetamines, opiates, methadone and cocaine. No confirmatory analyses were carried out in either of these studies and the results were preliminary findings only. Both studies highlighted the need for an expanded survey.

The government's first strategy for Road Safety to reduce the level of fatalities and serious injuries on Irish roads was introduced in 1998. The strategy identified the need for research into the area of drugs and driving. The Road Safety Action of the European Union, adopted on the 2nd of June 2003, stated that: "Special attention should be accorded to the increasing problem of driving under the influence of drugs". The MBRS was commissioned by the Department of Environment and Local Government to carry out a nationwide survey on the current trends and epidemiology of DUID in Ireland. This work has been carried out by the MBRS at the Department of Forensic Medicine, UCD in collaboration with the Department of Public Health Medicine and Epidemiology, UCD.

2 Section 9 (1) of the Road Traffic Act 1994 states that: "Intoxicant" includes alcohol and drugs and any combination of drugs or of drugs and alcohol.

The MBRS chose seven drugs or drug classes to examine as follows: amphetamines, methamphetamines, benzodiazapines, cannabinoids, cocaine, opiates and methadone. These substances were identified as the most suitable groups to be considered. It is not standard practice to screen for all known drugs, both legal and illegal; toxicology analysis in drivers concentrates on the main drugs and drug classes that are in use and that are known to have impairing effects on driving performance.

Methods

Sample Selection

Under the Road Traffic Acts, the Bureau receives blood and urine specimens from apprehended drivers throughout the whole country. Two thousand specimens were selected for drug analysis, one thousand with results under the limit for alcohol and one thousand over the limit. The Road Traffic Act 1994 set the alcohol limits of 80 mg/100ml in blood and 107mg/100ml in urine.

As expected it took over two years to accumulate the 1,000 consecutive specimens under the limit for alcohol. These were received in the Bureau from the end of 1999 to the end of 2001.The 1,000 specimens over the limit were gathered in two sequential batches, the first at the beginning of 2000 and the second at the end of 2000. These separate batches were considered as representative of all the over the limit specimens over the period of the survey.

The apprehended driver has the choice of providing a blood or urine specimen. There are 1,143 blood specimens (57%) included in the survey, 614 over the limit and 529 under the limit, and 857 urine specimens (43%), 386 over the limit and 471 under the limit.

As part of the Government's Road Safety Strategy 1998-2002, evidential breath alcohol testing commenced in late 1999 with the introduction of instruments in four Garda stations. By the end of 2000 the number had increased to 25 and by the end of 2001 to 40. The number of specimens certified for alcohol concentration for the years 1999-2001 is set out in Table A1 in the Appendix. As the installation of the instruments was nationwide and gradual, the reduction in the number of blood or urine specimens received from these stations was considered not to have any major influence on the study.

Statistical Analysis

The study allows direct calculation of drug taking prevalence separately in those drivers over the limit and in those under the limit. However, to estimate the prevalence of drug taking in all test drivers the fact that most test drivers are over the limit must be taken into account.

According to the 1999 figures for the MBRS, 92% of samples tested for alcohol concentration were over the limit, whereas, in this investigation, over the limit drivers make up only half the study sample. Because over the limit drivers are under-represented and under the limit drivers are over-represented, it is not legitimate to just combine the two groups of one thousand drivers to estimate drug taking prevalences in all tested drivers. It is possible however to combine study results from the two groups of drivers to obtain an overall prevalence figure applicable to all tested drivers. This is referred to as a 'weighted' estimate where the drivers over the limit are given a weight of 92% in the calculations and those under the limit are given a weight of 8% instead of the 50% weights implied by just combining the two groups. The estimate of prevalence in all tested drivers will be much closer to the figure calculated on over the limit drivers than to that in those under the limit.

During the period of the study, there was no provision for collection of specimens from a motorist without evidence of impairment (i.e. no random testing), therefore the blood and urine samples were taken from drivers apprehended by the Gardai and suspected of driving under the influence of an intoxicant. As in all

studies of this nature, there is therefore a limitation on the information obtained, as it does not provide a full picture of use of drugs in the general driving population.

The Garda National Traffic Bureau (GNTB) provided additional data such as age and sex of the driver for the 2000 study specimens as this information is not currently available under the Section 18 doctor's form which accompanies the specimen to the MBRS. Information such as location, date and time of provision of specimen are provided on the doctor's form.

Alcohol Analyses

All specimens were analysed for alcohol on receipt or shortly afterwards by headspace gas chromatography using a standardised protocol. For this study urine alcohol concentrations (UAC) have been converted to equivalent blood alcohol concentrations (BAC) for the purpose of statistical analysis. Table A2 in the Appendix outlines the UAC levels corresponding to the BAC levels used in the study.

Drug Analyses

The specimens were stored at 4°C until analysed for the presence of a drug or drugs using an Elisa system. The micro plate enzyme immuno-assay kits were purchased from Cozart, UK. All specimens found positive were forwarded to the State laboratory for confirmatory analyses. These specimens were frozen on receipt and analysed by either GC-MS or LC-MS. The screening and confirmatory cut off concentrations used to indicate the presence of the drug or drug class are outlined in Table A3 in the Appendix.

Results

Terminology

In this report, the term *"taking drugs"* is based on positive confirmatory results for the particular drugs selected for study.

"Drivers under the limit" refers to the one thousand drivers who were tested but who were under the legal limit for blood or urine alcohol. "Drivers over the limit" refers to the one thousand drivers who were tested and who were over that legal limit.

"ll tested drivers" refers to all tested drivers in the population – both under and over the limit. Estimates of drug taking prevalence in all tested drivers allow for the over-representation of drivers under the limit in the 2,000 drivers actually studied, and using weighted analysis (see above) give figures that apply to all tested drivers in the population.

Drug Taking Prevalence

Three hundred and thirty one of the drivers under the limit tested positive for one or more of the relevant drugs, and the corresponding figures in the over the limit drivers was 142. Thus, the prevalence of drug taking was 33.1% in drivers under the limit and 14.2% in drivers over the limit. Using weighted analysis, this corresponds to 15.7% of all tested drivers (Figure 1). The fact that drug taking prevalence was substantially higher in those under the limit for alcohol suggests that incapacity caused by drug taking may be a reason why these drivers were stopped in the first place.

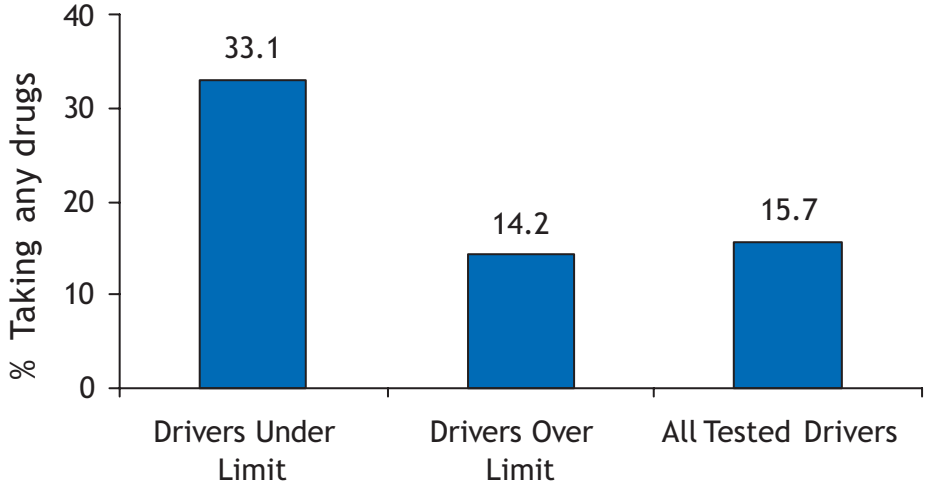


Figure 1: Prevalence of Any Drug Taking

Of the 331 drivers under the limit who were taking drugs, 151 (45.6%) were taking only one drug and the remainder (54.4%) were taking two or more. In the 142 drivers over the limit who were taking drugs, 117 (82.4%) were only taking one drug. Thus drug takers who were under the limit for alcohol were taking more of a cocktail of drugs than were drug takers over the limit. Of course drug takers over the limit were by definition taking alcohol as well. It is clear however that, compared to drivers over the limit, drivers under the limit are more likely to be taking drugs and, if so, are more likely to be taking more than one type.

Table 1 shows the drugs and drug classes detected. For both groups of drivers, cannabinoids were the most common class, with 20.9% of drivers under the limit taking this drug and 8.5% of drivers over the limit. Among all tested drivers 9.5% are estimated to be have been using cannabinoids. The next commonest class of drugs was benzodiazepines.

	Drivers Under the Limit	Drivers Over the Limit	All Tested Drivers
Drug/Drug Class*	Prevalence of Drug Taking (% of 1,000 Under Limit)	Prevalence of Drug Taking (% of 1,000 Over Limit)	(% of All Tested Drivers Taking Drugs)
Any Drug	33.1	14.2	15.7
Cannabinoids	20.9	8.5	9.5
Amphetamines	8.4	1.5	2.1
m-Amphetamines	9.0	2.0	2.6
Opiates	6.9	0.8	1.3
Cocaine	2.5	0.9	1.0
Methadone	6.8	0.6	1.1
Benzodiazepines	9.0	3.4	3.9

*These overlap since many were taking more than one drug or class of drug. (see text) Note that, because there are 1000 drivers in each grouping, the actual number of drivers in each class is obtained by multiplying the prevalence by 10 (e.g. There were 209 drivers under the limit taking cannabinoids).

Table 1 Drugs or Drug Classes Detected

Factors Related to Drug Taking

Alcohol Level

It has already been noted that drivers under the limit were more likely to be taking drugs than drivers over the limit. Figure 2 examines this in more detail and gives drug taking prevalence at different levels of alcohol.

It is clear from the figure that it is not just whether one is over or under the limit for alcohol that relates to the prevalence of drug taking. In addition the lower the alcohol level the higher the prevalence of drug taking. Among drivers who had minimal blood alcohol levels (less than 10 mg/100ml) 67.9% were taking at least one type of drug. The drug taking prevalence reduced steadily as alcohol levels increased but still remained as high as 11.1% for drivers with blood alcohol levels over 200 mg/100ml.

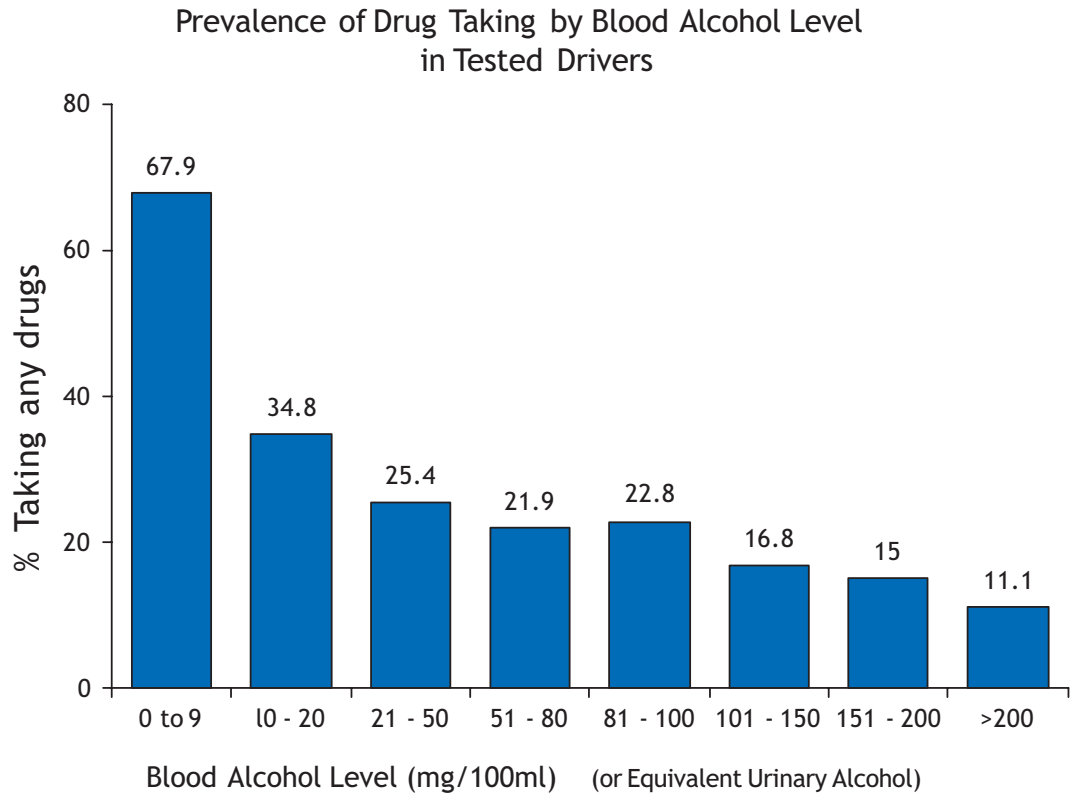


Figure 2 Alcohol Level and Drug Taking

Age and Sex

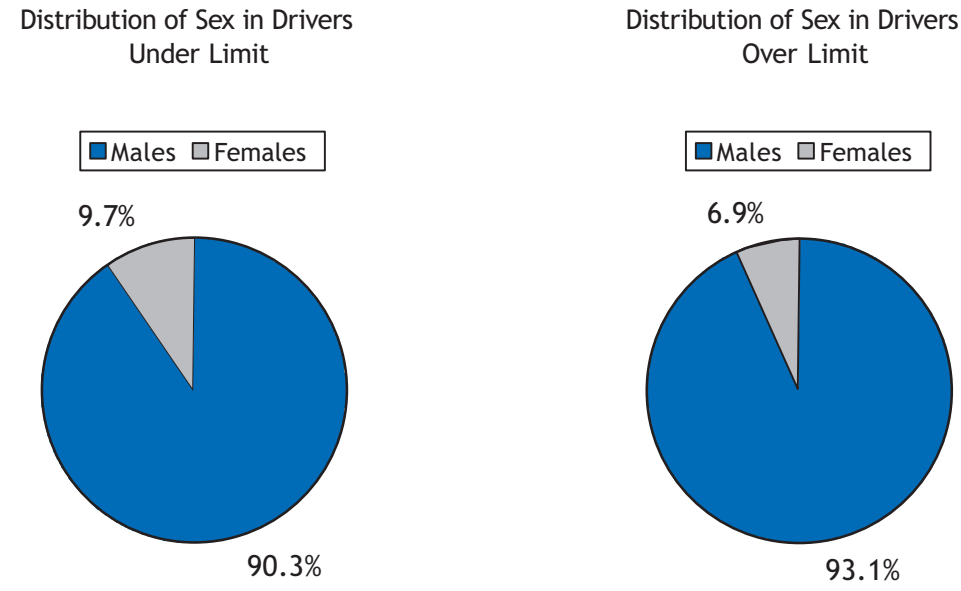
The relationship of sex to drug taking is shown in Figure 3. The pie charts show the male/female breakdown in the two sampled groups of drivers. The vast majority of tested drivers were male with little difference between the groups – 90.3% males in those under the limit and 93.1% in those over the limit. This strong male majority may reflect the type of persons Gardai are more likely to stop.

Among drivers under the limit, the prevalence of drug taking was 33.8% in males and lower at 26.8% in females. In drivers over the limit there was very little sex difference in drug taking – 14.3% in males and 13.0% in females. Consequently there was only a small male excess in drug taking prevalence in all tested drivers (15.8% in males and 14.5% in females).

Figure 4 examines the relationship of age to drug taking. Around 40% of drivers under the limit fell into each of the age groups under 25 and 25 to 44. Just over 20% of drivers under the limit were aged 45 years or over. In drivers over the limit nearly 55% were aged 25 to 44, just over 20% aged under 25. No explanation of these differences is apparent from the data.

The prevalence of drug taking however was strongly related to age. In drivers under the limit, 48.7% of those aged under 25 were taking drugs. In the next two age groups the prevalence dropped to 27.6%, 13.0% and became 7.9% in those aged 55 or above. The same age trend was seen in drivers over the limit though the drug

taking prevalences were lower. The prevalences of drug taking in all tested drivers are estimated to be 24.9% in those under age 25 reducing to 1.9% in those aged 55 or above.



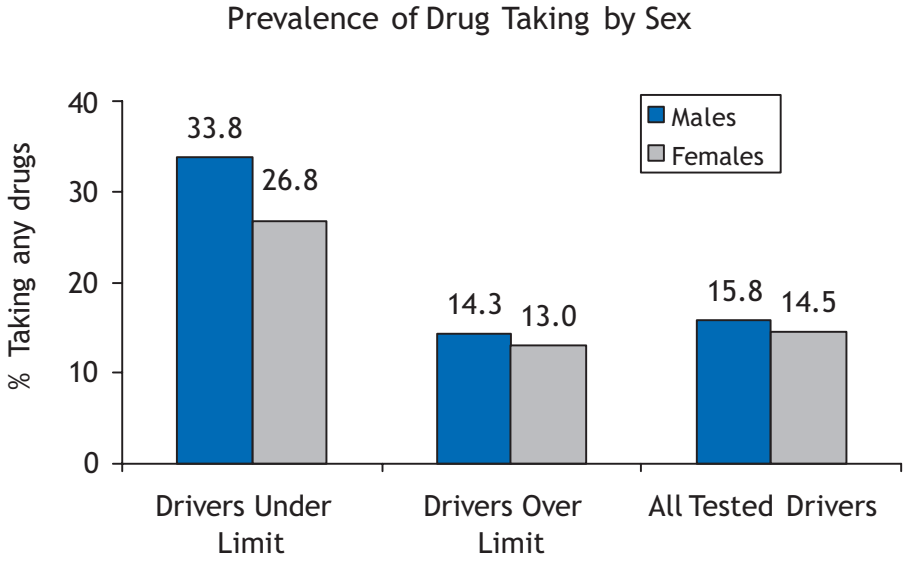
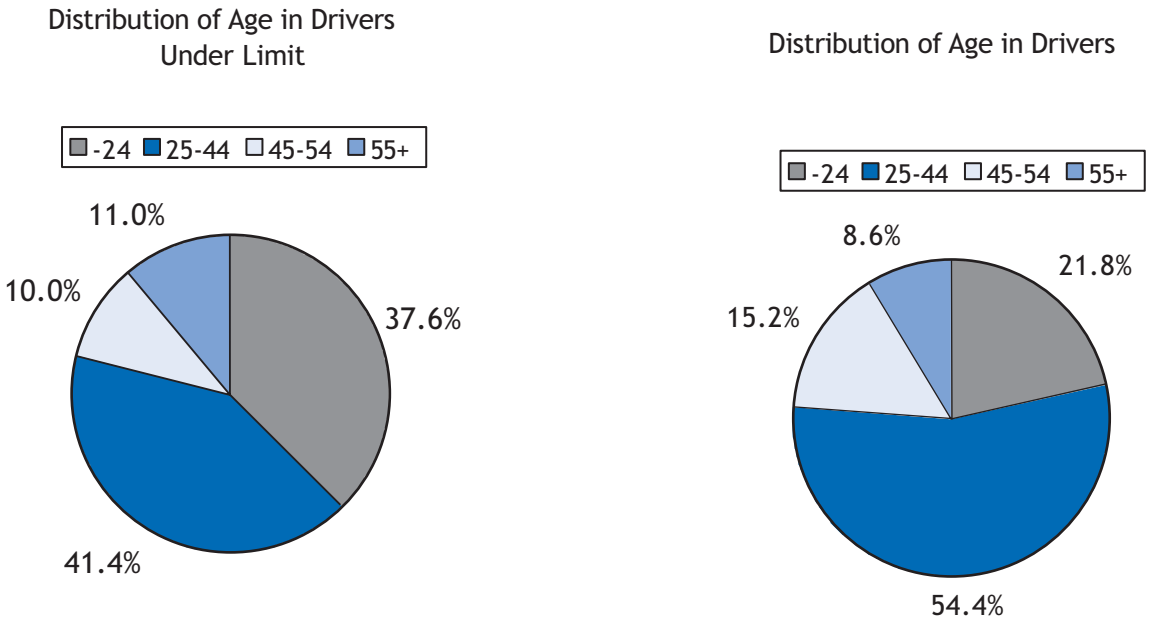


Figure 3 Sex and Drug Taking



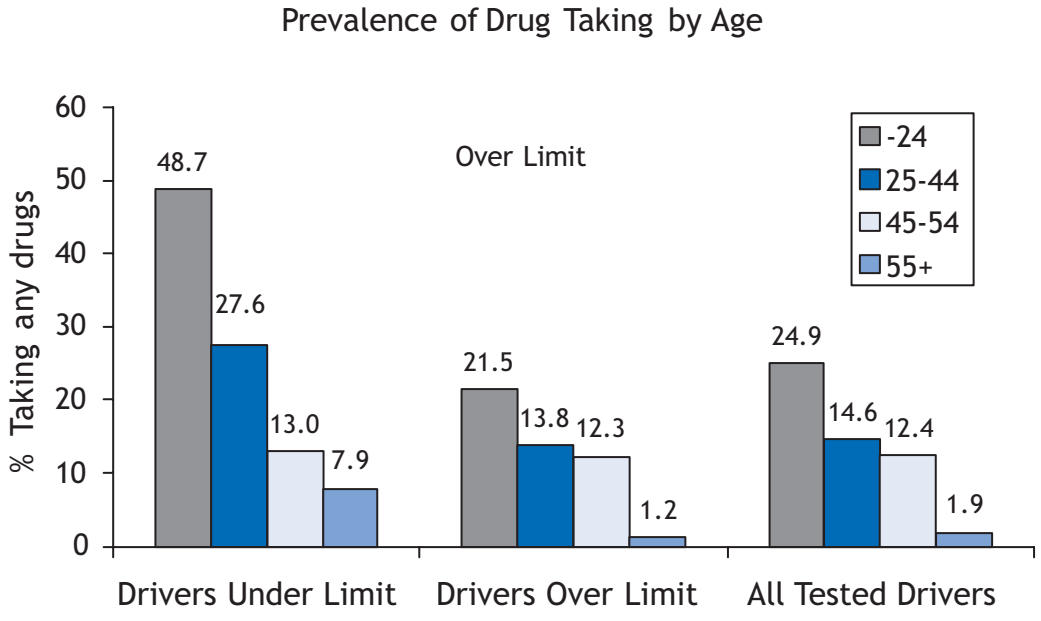


Figure 4 Age and Drug Taking

3 It should be noted that the prevalence of drug taking does not mean that drivers were taking drugs in these periods, but only that a positive test for drug presence was determined in a sample taken at these times.

Time and Place of Specimen Provision

Figure 5 shows the relationship of time of day at which drivers were stopped and provided a specimen with the prevalence of drug taking. The vast majority of specimens were provided in the night hours of 9 pm to 6 am (79.1% of drivers who were under the limit and 84.2% of drivers who were over the limit provided specimens in this period). The proportion of those under the limit who provided specimens in the morning/day – 6 am to 9 pm – was 9.4%; this was twice the proportion providing specimens in this period among those who were over the limit (4.7%). The percentage providing specimens in the evening (4 pm – 9 pm) was essentially the same in the two groups of drivers.

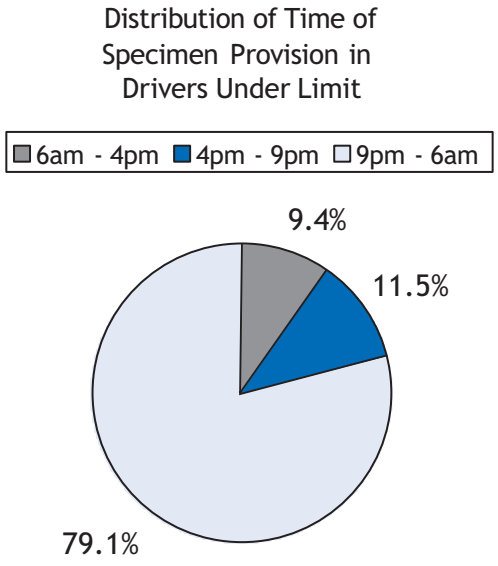
It is interesting however that the highest prevalence of drug taking[3] was among the relatively small group who provided a specimen during the day between 6 am and 9 pm and the lowest prevalence was in those providing a specimen during the night. Overall the prevalence of drug taking was 25.7% in those providing a specimen during the morning/day and 14.8% in those doing so during the night. This higher rate of drug use in those providing a specimen in the morning/day may explain the higher proportion of those providing a specimen who were under the limit in this period.

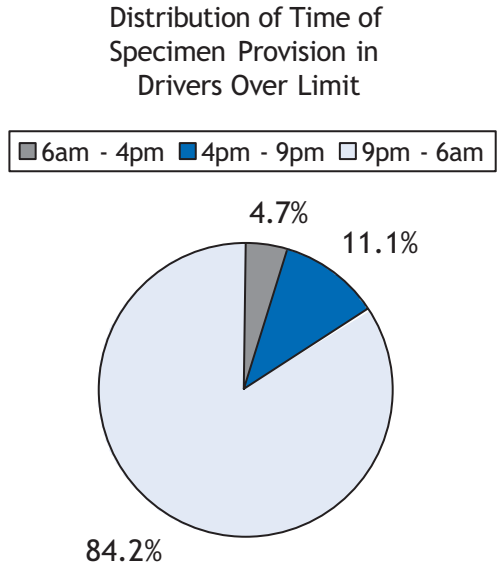
Examination of whether the specimen was provided at the weekend or during the week showed no relationship whatsoever with a positive drug result. A higher level of drug taking at the weekend was not observed among these stopped drivers.

Figure 6 shows a breakdown of the data by whether the Garda station at which the specimen was provided was in an urban or rural area. Urban areas only included the census defined areas within the city boundaries of Cork, Dublin, Galway, Limerick and Waterford. Especially in Dublin these defined areas only include a small part of what would be generally considered as 'urban'. Additionally it should be remembered that the data do not relate to the residence of the driver.

Around a quarter of tested drivers provided a specimen in a defined urban area with no real difference between drivers under or over the limit. However the prevalence of drug taking was much higher in drivers tested in urban areas than in rural areas (drug taking prevalences of 46.3% versus 28.5% among drivers under the limit, and 20.8% versus 12.2% in drivers over the limit). Overall 23.0% of urban tested drivers were taking drugs compared with 13.5% of rural tested drivers.

Table 2 shows the breakdown of drug taking between the five urban areas considered. In all tested drivers the prevalence of drug taking was highest in Cork at 30.4%%, followed by Dublin at 27.0%. Limerick and Waterford had similar drug taking prevalences at over 20% while Galway showed the lowest overall urban prevalence at 7.5%. A high prevalence of 60.0% drug taking was observed in Dublin drivers who were under the limit.





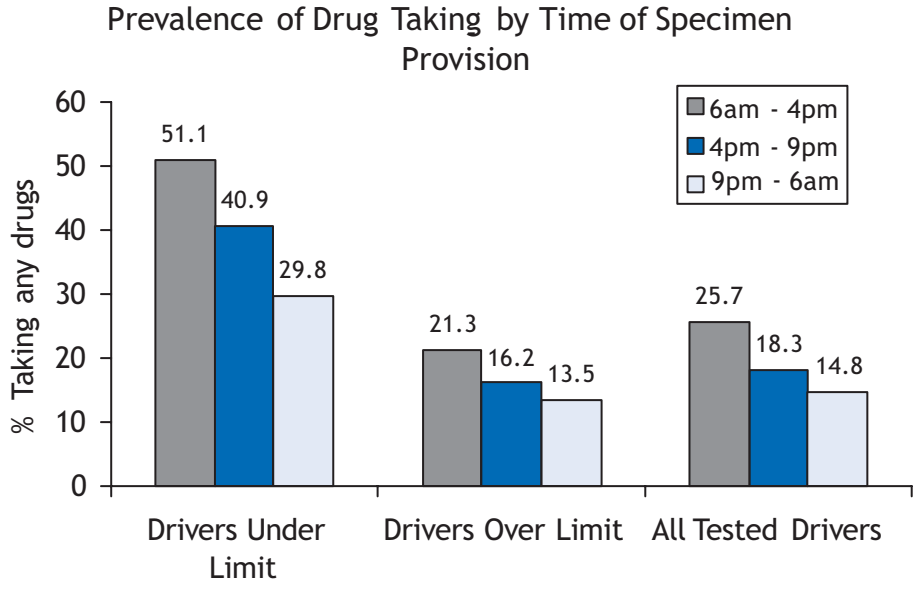
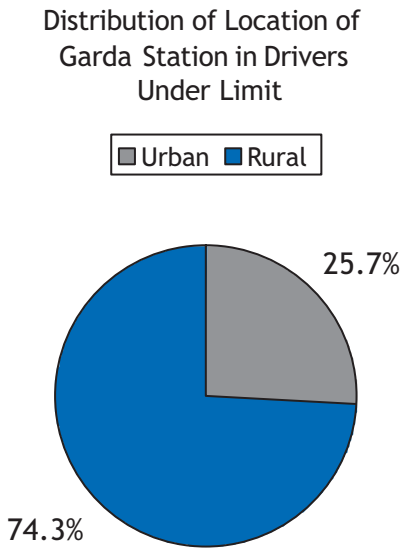
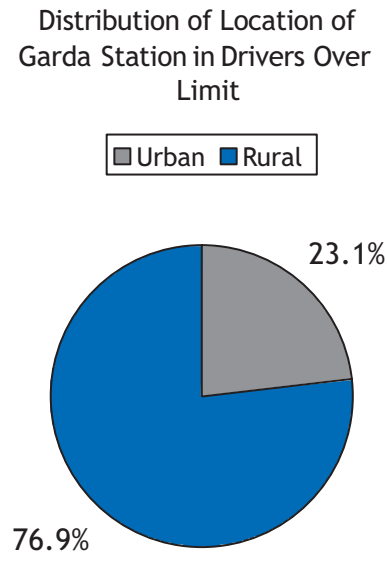


Figure 5 Time of Specimen Provision and Drug Taking





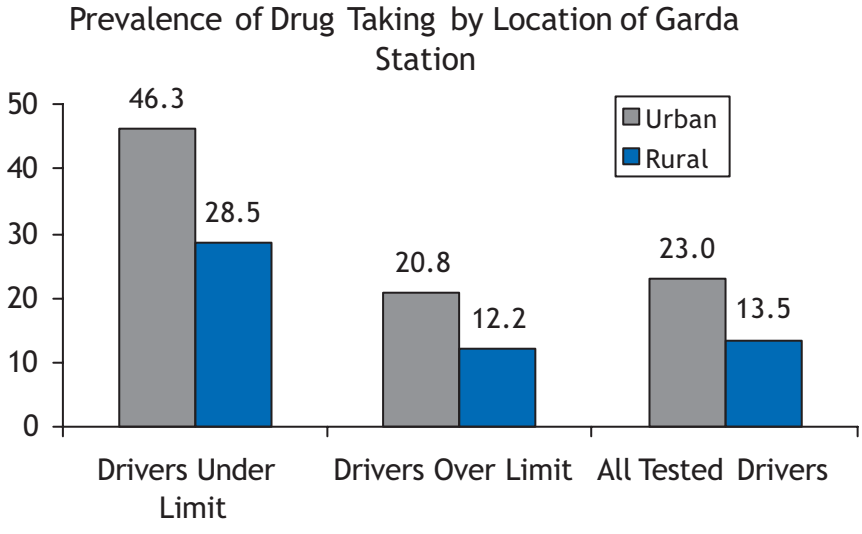


Figure 6 Location of Garda Station and Drug Taking

Drivers Under the Limit			Drivers Over the Limit		All Tested Drivers
Location of Garda Station (City Area/Rural)	Total Number	Prevalence of Drug Taking (% Taking Drugs in each Location)	Total Number	Prevalence of Drug Taking (% Taking Drugs in each Location)	Prevalence of Drug Taking (% Taking Drugs in each Location)
Cork	33	39.4	37	29.7	30.4
Dublin	124	60.5	80	22.5	27.0
Galway	16	31.3	31	6.5	7.5
Limerick	23	26.1	35	22.9	23.0
Waterford	61	32.8	48	18.8	20.2
Rural	743	28.5	769	12.2	13.5
Total	1000	33.1	1000	14.2	15.7

Table 2 Location of Garda Station and Drug Taking

Drug/Drug Class and Age

Figure 7 shows the relationship of age to the prevalence of any drug taking in tested drivers with narrower age bands than in Figure 4. The strong trend of decreasing prevalence with age is again apparent. The prevalence was over 20 times higher in those aged under 25 than in those aged 65+.

Figures 8 and 9 show the age-specific prevalences for the various classes of drugs analysed. Use of each class of cannabinoids, amphetamines and m-amphetamines was highest in those aged below 25 years of age, and subsequently decreased with age. Use of Benzodiazepines rose to a peak in those aged 45 to 54 years and decreased thereafter.

Due mainly to small numbers of cases however, the age-specific patterns for use of the remaining classes of drugs were not fully consistent (Figure 9). Cocaine and methadone use peaked in the 25 to 34 year age group and reduced thereafter. Opiate use increased to a peak in the 45 to 54 year age group and then declined, though usage in those aged 35 to 44 years was also low.

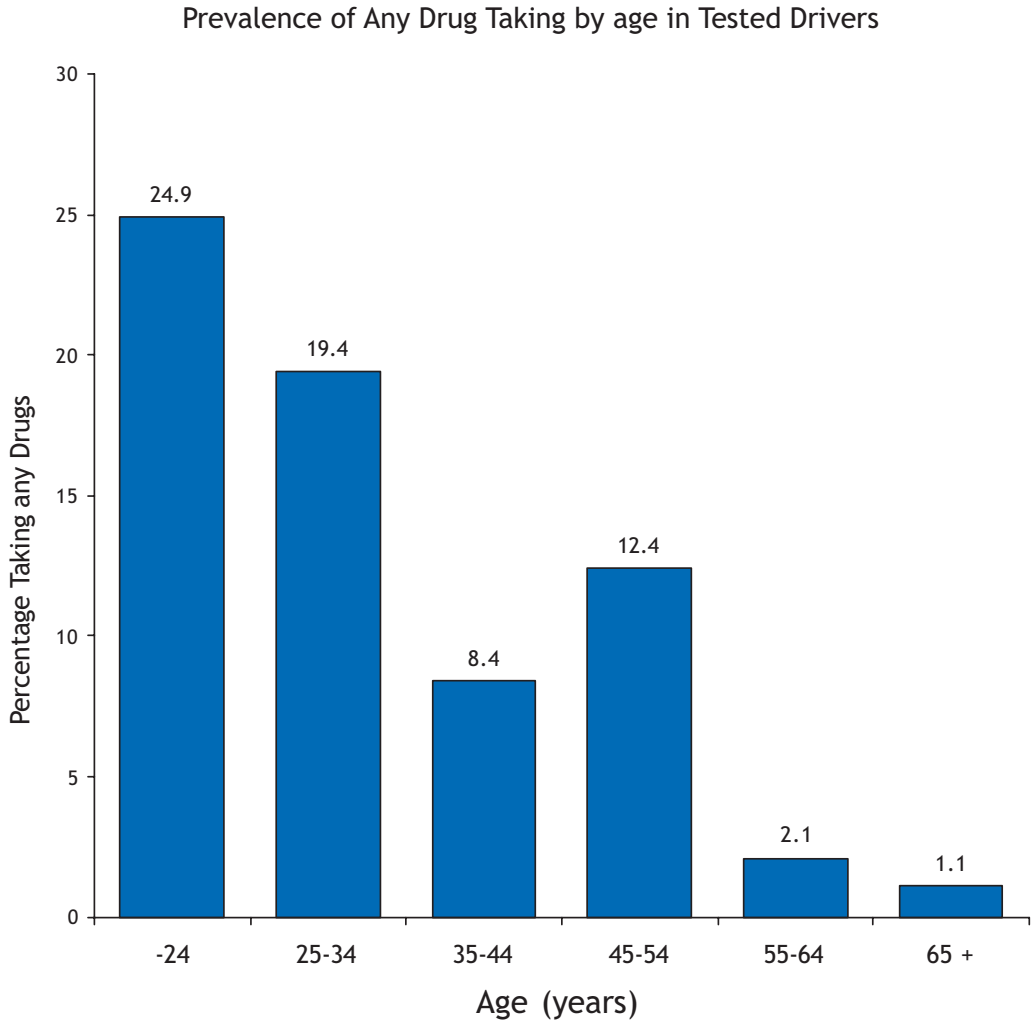


Figure 7 Age and Drug Taking

Prevalence of Drug Taking by Age in Tested Drivers

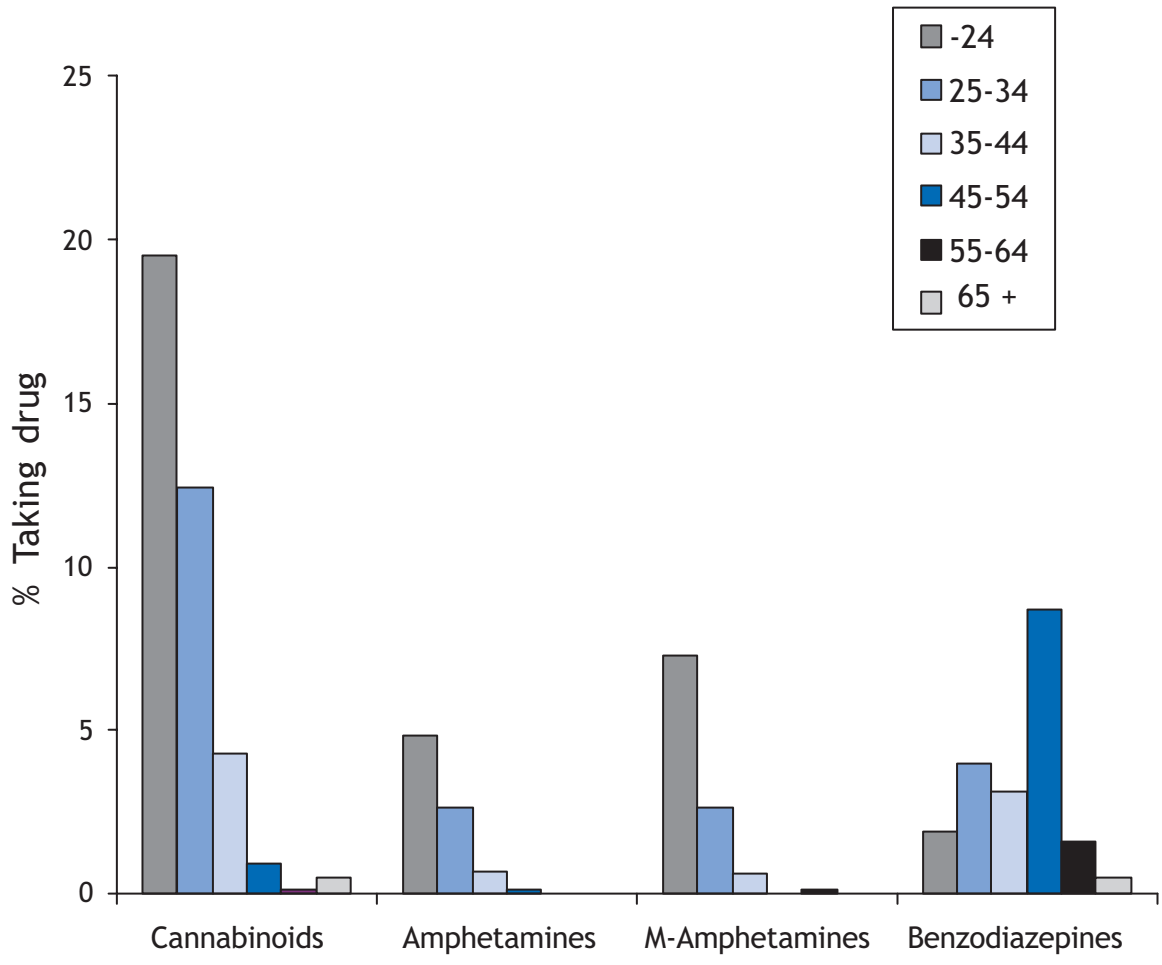


Figure 8 Drug /Drug Class and Age (1)

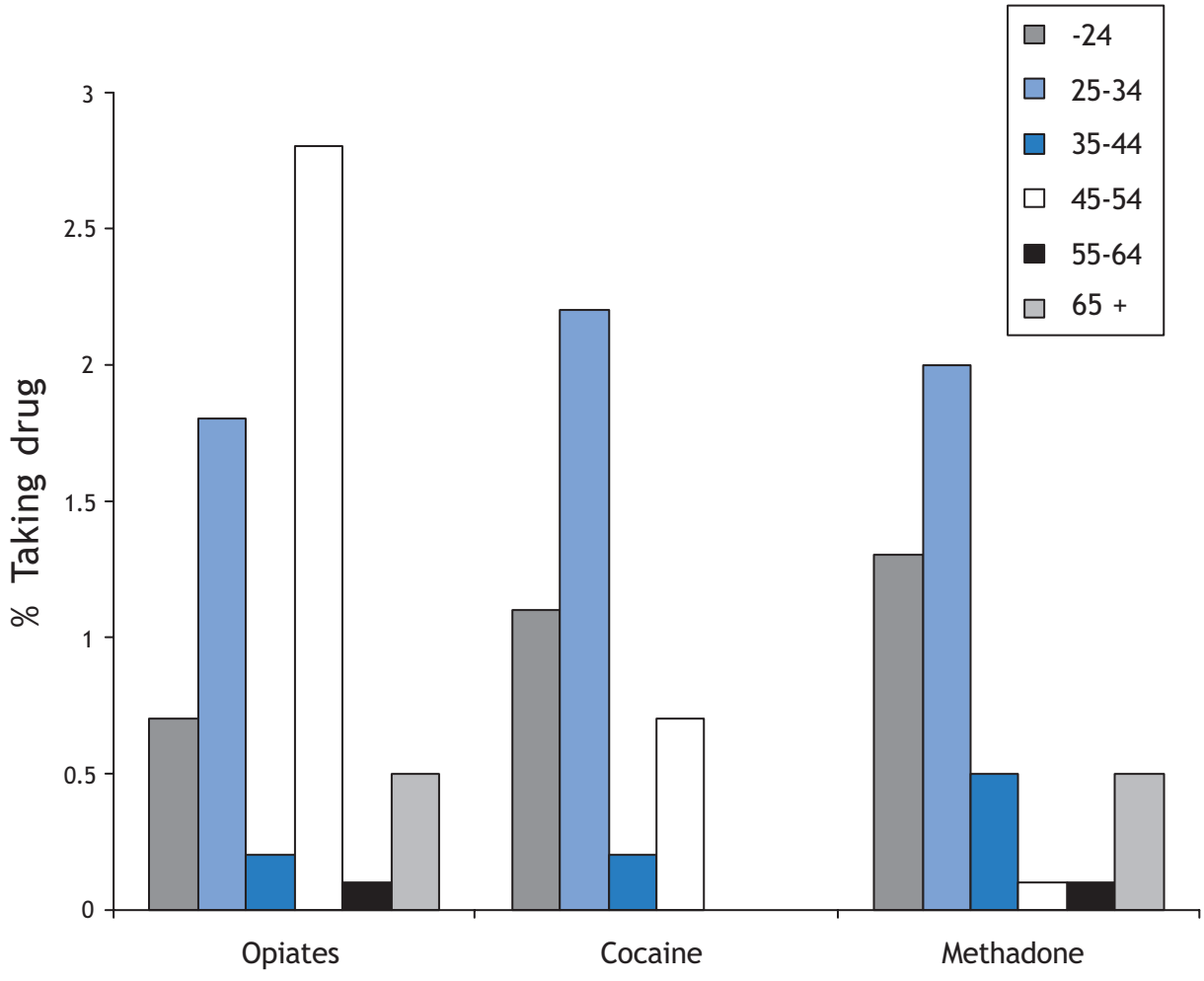


Figure 9 Drug/Drug Class and Age (2)

Conclusions and Recommendations

1. The results of this study demonstrate that there is a significant driving under the influence of drugs problem in Ireland. The serious impairing effects of drugs on drivers is evident from the number of drivers apprehended while under the alcohol limit or with no alcohol present at all. There is a strong trend of increasing drug postitivity with decreasing level of alcohol. 68% of tested drivers with essentially zero levels of alcohol were positive for one or more drugs.

2. In addition many tested drivers had a combination of high alcohol levels together with drugs in their systems. The types of drugs found are similar in both the over and under the alcohol limit specimens. As in recent surveys of drug use,[4,5] cannabinoids formed the most common drug class encountered. Among the 15.7% tested drivers who were positive for some drug, six out of ten gave a positive result for cannabinoids.

3. The finding of polydrug use and driving is also worrying as the impairing effects of this type of behaviour could be very much heightened.

4. Though most (over 90%) of the drivers stopped were male, the preval-ence of drug taking was similar in males and females.

   The typical profile of the driving under the influence of drugs driver apprehended and tested is young, male, driving in an urban area with low or zero alcohol level with a specimen provided between the hours of 6 am and 9 pm with the presence of cannabinoids.

   There is also the profile of the middle aged driver with benzodiazepines present. Benzodiazepines are legally prescribed drugs, which are central nervous system depressants. They can impair driving in the same way alcohol does.

5. This survey highlights the need for education and awareness in relation to driving under the influence of drugs. The focus should be on three target groups: the general road user popula-tion; the enforcement and oversight group, which includes legislators, Gardai, forensic doctors/ scientists and the courts; and finally the medical group, which includes prescribing medical/dental practitioners and pharmacists. The focus to date has centred on illegal drugs and very little attention has been given to prescribed drugs. Specific educational programmes should be set up for the different target groups and a general media campaign should be initi-ated as soon as possible.

4 Kelleher C et al. *The National Health and Lifestyle Surveys*. Health Promotion Unit, Department of Health and Children, April 2003.

5 *Drug Use in Ireland & Northern Ireland*. Bulletin 1, National Advisory Committee on Drugs & Drug and Alcohol Information and Research Unit, Oct 2003.

6. There are immediate implications for the evidential breath alcohol programme; in the event of a nil or low alcohol reading being obtained then the Garda should be aware of the significant likelihood that the driver's impairment could be due to the presence of a drug or drugs other than alcohol. In this case separate blood or urine specimen should be sought for analysis.

7. One of the outcomes of this study will be an evidence-based review of the legislation for driving under the influence of drugs. There is recognition worldwide for the need for such legislation. While research is being carried out into the impairing effects of individual drugs, the list of such drugs is extensive. In contrast with alcohol, it is much more complex to establish dose concentration-effect relationships for other drugs. The concentration levels above which driving should be prohibited is still difficult to establish. There is also considerable debate as to the relevant benefits and deficiencies of Zero Tolerance of drugs in driving and the requirement to demonstrate impairment.

8. In the enforcement field, the goal of producing a valid, reliable and convenient roadside testing device for drugs is still paramount and not yet achieved.

Appendix

Certified Specimens

Year	Blood	Urine	Breath	Total
1999	5174	3242	*	8416
2000	3952	2559	3075	9586
2001	3004	1831	6527	11362

Table A1 The Number of Specimens Certified for Alcohol Concentration under the 1994 Road Traffic Act

*Instruments operational for one month only and Road Traffic Act figures not known as demonstration tests could not be excluded from data collection.

Conversion Factors

Blood Alcohol Concentrations (BAC) mg/100ml	Urine Alcohol Concentrations (UAC) mg/100ml
0 - 80	0 - 107
81 - 100	108 - 135
101 - 150	136 - 200
151 - 200	201 - 267
>200	>267

Table A2 Alcohol Level Equivalents Used in the Study

Screening and Confirmatory Cut-off Levels

DRUG OR DRUG CLASS	ANALYTE	SCREENING CUT-OFF (ng/ml)	CONFIRMATION CUT-OFF (ng/ml) at LOD*
AMPHETAMINE	Amphetamine, MDA	50 (B**) 300 (U)	50 (B & U**)
METHAMPHETAMINE	MDMA	50 (B) 300 (U)	20 (B) 50 (U)
BENZODIAZEPINES	Diazepam, Flunitrazepam, Flurazepam, Nitrazepam, Nordiazepam, Temazepam	100 (B & U)	20 (B & U)
CANNABINOIDS	11 nor-, delta – 9 – Carboxy-Tetrahydrocannabinol	20+ (B & U)	5 (B & U)
COCAINE	Cocaine, Benzolyecgonine, Ecgonine methyl ester	100 (B & U)	50 (B & U)
METHADONE	Methadone, EDDP	25 (B & U)	30 (B & U)
OPIATES	Codeine, Dihydrocodeine, Morphine, 6MAM	100+ (B & U)	50 (B & U)

* LOD is the limit of detection calculated for the method

** (B = blood; U = urine)

\+ After consultation with the State Laboratory, the levels were adjusted upward: Cannabinoids from 10 to 20ng/ml, Opiates from 25 to 100ng/ml and Benzodiazepines from 50 to 100ng/ml.

Table A3 Confirmation Levels Used for the Detection of the Presence of a Drug or Drugs

	Drivers Under the Limit			Drivers Over the Limit		
Sex	Total Number	Positive for Drugs Number	Positive for Drugs Percentage out of 331	Total Number	Positive for Drugs Number	Positive for Drugs Percentage out of 142
Males	903	305	92.1%	931	133	93.7%
Females	97	26	7.9%	69	9	6.3%
Total	1000	331	100.0%	1000	142	100.0%

Table A4 Sex and Drug Taking

	Drivers Under the Limit			Drivers Over the Limit		
Age*	Total Number	Positive for Drugs Number	Positive for Drugs Percentage out of 293	Total Number	Positive for Drugs Number	Positive for Drugs Percentage out of 136
- 24	345	168	57.4%	209	45	33.1%
25 - 44	380	105	35.8%	521	72	53.0%
45 - 54	92	12	4.1%	146	18	13.2%
55 +	101	8	2.7%	82	1	0.7%
Total	918	293	100.0%	958	136	100.0%

* Data missing on age for some persons

Table A5 Age and Drug Taking

	Drivers Under the Limit			Drivers Over the Limit		
Time Specimen Provided	Total Number	Positive for Drugs Number	Positive for Drugs Percentage out of 331	Total Number	Positive for Drugs Number	Positive for Drugs Percentage out of 142
6am - 4pm	94	48	14.5%	47	10	7.0%
4pm - 9pm	115	47	14.2%	111	18	12.7%
9pm - 6am	791	236	71.3%	842	114	80.3%
Total	1000	331	100.0%	1000	142	100.0%

Table A6 Time Specimen Provided and Drug Taking

	Drivers Under the Limit			Drivers Over the Limit		
Location of Garda Station	Total Number	Positive for Drugs Number	Positive for Drugs Percentage out of 331	Total Number	Positive for Drugs Number	Positive for Drugs Percentage out of 142
Urban	257	119	36.0%	231	48	33.8%
Rural	743	212	64.0%	769	94	66.2%
Total	1000	331	100.0%	1000	142	100.0%

Table A7 Location of Garda Station and Drug Taking (1)

	Drivers Under the Limit			Drivers Over the Limit		
Location of Garda Station (City/Area/ Rural)	Total Number	Positive for Drugs Number	Positive for Drugs Percentage out of 331	Total Number	Positive for Drugs Number	Positive for Drugs Percentage out of 142
Cork	33	13	3.9%	37	11	7.8%
Dublin	124	75	22.7%	80	18	12.7%
Galway	16	5	1.5%	31	2	1.4%
Limerick	23	6	1.8%	35	8	5.6%
Waterford	61	20	6.1%	48	9	6.3%
Rural	743	212	64.0%	769	94	66.2%
Total	1000	331	100.0%	1000	142	100.0%

Table A8 **Location of Garda Station and Drug Taking (2)**