DEPARTMENT OF TRANSPORT

OFFICE OF ROAD SAFETY

DOCUMENT RETRIEVAL INFORMATION

Report No.	Date	Pages	ISBN	ISSN 0810 770X
CR 28	July, 1983	1 - 98	0 642 50999 4	

Performing Organisation (Name and Address)

VICTORIA POLICE HEADQUARTERS,
380 WILLIAM STREET,
MELBOURNE, VICTORIA, AUSTRALIA, 3000.

Sponsor (Name and Address)

OFFICE OF ROAD SAFETY, DEPARTMENT OF TRANSPORT,
P.O. BOX 594,
CIVIC SQUARE, A.C.T., AUSTRALIA, 2608.

Available from (Name and Address)	Price/Availability/Format
OFFICE OF ROAD SAFETY, DEPARTMENT OF TRANSPORT, P.O. BOX 594, CIVIC SQUARE, A.C.T., AUSTRALIA, 2608.	FREE

Abstract: **This report describes the use of alcohol and medication reported by weekend, night-time drivers surveyed at random by Police in Victoria, Australia and Northern Ireland, United Kingdom.**

In Melbourne 5.3% of these drivers had used alcohol, 8.4% had used medication and 12.7% had used alcohol and medication or both. **These figures were 2.1%,** 2.6% and 3.7% respectively for drivers in rural Victoria. **In Belfast, they were 1.5%,** 5.5% and 6.6% respectively.

Differences between Melbourne and Belfast in the frequency of alcohol and medication use by drivers were generally consistent with differences in published data relating to use of alcohol and medication in the two communities.

Prescription drug use was reported up to six times more frequently than use of over-the-counter preparations. The community and existing drug control agencies therefore need to co-operate with Road Safety organisations in developing new countermeasures against driving under the influence of alcohol and other drugs.

KEYWORDS: ROADSIDE SURVEYS, ALCOHOL, DRUGS, AUSTRALIA, UNITED KINGDOM

NOTES:

(1) ORS research reports are disseminated in the interests of information exchange.

(2) The views expressed are those of the author(s) and do not necessarily represent those of the Commonwealth Government.

(3) The office of Road Safety publishes two series of research reports
   (a) **reports generated as a result of research done within the ORS are published** in the OR series;

DRIVING WITH DRUGS IN VICTORIA AND NORTHERN IRELAND

JANE HENDTLASS

A report prepared for the
Chief Commissioner, Victoria Police,
and the
Chief Constable, Royal Ulster Constabulary,
and funded by the
Office of Road Safety,
Department of Transport,
Commonwealth of Australia.

July, 1983

ACKNOWLEDGEMENTS

This project has proceeded with the support of the Chief Commissioner of the Victoria Police, Mr. S.I. Miller, and the Chief Constable of the Royal Ulster Constabulary, Sir John Hermon, together with the heads of their two Traffic Departments, at various times, J.Crutchley, J.D Darley, T.E.T. Forbes, W.M. Johnston, R.J. Martin, and R. Robinson.

The information which has been gathered will contribute particularly to the making of management and policy decisions but it could not have been undertaken without the participation of operational policemen in the Traffic Departments of the Victoria Police and the Royal Ulster Constabulary. I am most grateful to all those involved for their willing co-operation.

Associate Professor Graham Starmer has been a most helpful consultant to the project and Pat Gazzana and Loree Rochester also made important contributions.

Finally I must thank Carol Boughton, Research Director, Office of Road Safety, Australian Department of Transport. Her help, both professional and personal, has been invaluable.

Police Headquarters,
380 William Street,
Melbourne,
AUSTRALIA. 3000.

DEFINITIONS

Definitions of terms in this report which could lead to confusion include :-

Drinking Driver :	Driver with a blood alcohol reading over 0.00g/100ml.
Non-Drinking Driver :	Driver with a blood alcohol reading of 0.00g/100mls OR Driver who was not considered to have used alcohol by policemen who interviewed him.
Drug :	Substance which is taken to change the state of the user. This includes alcohol and over-the-counter medicines as well as substances controlled under various sections of the Misuse of Drugs Act 1971 in the United Kingdom or the Poisons Act 1962 in Victoria.
Adult :	Aged over 17 years unless otherwise stated.
Weekend, Night-Time Driver :	Driver surveyed between 9.30 p.m. and midnight on Friday or Saturday night.

ABBREVIATIONS

Abbreviations used in this report are as follows :-

A.B.S.	Australian Bureau of Statistics
A.C.T.	Australian Capital Territory
A.R.R.B.	Australian Road Research Board
B.A.C.	Blood Alcohol Concentration
D.H.S.S.	Department of Health and Social Services, Northern Ireland
Fig.	Figure
g	grams
km	kilometres
l	litres
M.M.B.W.	Melbourne and Metropolitan Board of Works
ml	millilitres
NK	Not Known
N	Sample size
N.S.W.	New South Wales
NI	Northern Ireland
No.	Number
%	Per cent
Ro.S.P.A.	Royal Society for Prevention of Accidents
Ro.S.T.A.	Road Safety and Traffic Authority, Victoria
S.A.	South Australia
UDR	Ulster Defence Regiment
U.K.	United Kingdom
U.S.A.	United States of America
W.H.O.	World Health Organisation
Yrs.	Years

CONTENTS

LIST OF TABLES

Page

TABLES (cont.)

Page

TABLES (cont.)

Page

TABLES (cont.)

Page

TABLES (cont.)

Page

TABLES (cont.)

1. INTRODUCTION

Most of the countries which rely heavily on road transport have recognised that alcohol is an important contributory factor in many traffic crashes. Since early in the 20th century nearly all industrialised nations have passed legislation which makes it illegal to drive a motor vehicle while under the influence of alcohol and these laws were preceded in the United Kingdom as early as 1843 by special provisions prohibiting drunken driving by hackney drivers (Brown, 1983). The significance of the relationship between alcohol use and both accident risk and level of injury has now been well documented (e.g. Borkenstein et al, 1964; Hendtlass, et al, 1981a). Many different road safety initiatives have been directed against drinking drivers.

Use of drugs and medicaments began to increase in all sections of Western society at about the same time that the relationship between alcohol and traffic accidents was recognised. The history of escalation of drug discoveries, manufacturing and use has been reviewed by the Senate Standing Committee on Social Welfare (1981) and it seems that a dramatic increase in the number of useful medicines available began with the discovery of sulphanamides in 1935. It was sustained by the commercial production of other antibacterial agents such as penicillin and streptomycin. The effect of availability of these drugs on society's use of medication has been given momentum by the increased number of medical practitioners and pharmacists in the community and by government subsidies for many prescription drugs.

Comparison with other forms of therapy has led to the conclusion that:

> "Drugs are far cheaper in terms of money as well as time and effort" (Senate Standing Committee on Social Welfare, 1981).

In the United Kingdom and Australia, control of therapeutic substances has mostly been maintained through the medical profession and pharmacists since the first Dangerous Drugs Act came into force in Britain in 1920 (Bean, 1974). A system of prescriptions and permits has now evolved to govern their use. In the United Kingdom, this is covered by the Misuse of Drugs Act 1971 Great Britain. Section 38, Sub-sections 1, 2, and 4, extends the jurisdiction of this law to Northern Ireland. In Victoria, the Poisons Act 1962 carries the relevant legislation.

Other medicines such as aspirin, paracetamol and some antihistamines have become available over-the-counter from food outlets and, in Australia, only 5% of these substances are sold by pharmacists (Stolz, 1978). Most medication is therefore freely available to the consumer at very little personal cost.

The range of illegal drugs, which before 1900 really only included opium and, in the United Kingdom, cocaine, has also become very diverse and more freely available this century (e.g. Home Office, 1980; Australian Federal Police, 1981; 1982;). Many of the most frequently used illegal substances such as marijuana, opium and cocaine play an important role in cultures other than our own. In contrast, sophisticated pharmacological research combined with simple technological requirements have now produced the blue-prints for backyard manufacture of other drugs such as amphetamines and lysergic acid diethylamide.

Decisions about which drugs to prohibit completely and which to place under medical control seem to have been taken mainly by international conferences such as the The Hague Convention in 1912 and, more recently, the Single Convention of Narcotic Drugs in 1961 and the Convention on Psychotropic Drugs in 1971 (Bean, 1974; Australian Department of Health, 1981). Special emphasis has been given to the substances' apparent potential for abuse and their usefulness to medicine. However, there does not appear to be any agreed definition of this implied danger and political and community pressures have led to some gross inconsistencies. For example, it has been known for a long time that nicotine and alcohol are just as poisonous as heroin; that is, these drugs can have similarly dangerous addictive and physical effects on chronic users (e.g. Furlong, 1922). Yet control over the availability of cigarettes and alcohol remains slight while heroin use is prohibited under international agreement.

Western culture is still learning how to integrate use of all these different substances into its social mores and customs.

The level of knowledge about the relationship between drug use and involvement in road crashes is very similar in 1983 to that which existed for alcohol in the 1950's. Many medicines and illicit drugs are known to affect driving-related skills (e.g. Clayton et al, 1977; Palva & Linnoila, 1978; Bird et al, 1980; de Gier et al, 1981) but the frequency with which they contribute to road crashes remains largely conjecture. There are figures ranging up to 29% for the incidence of drugs in driver fatalities and it has been estimated that drugs other than alcohol contribute to at least 10% of fatal collisions both in Australia and overseas (Milner, 1974; Cimbura et al, 1980).

In 1981, Victoria Police and the Royal Ulster Constabulary agreed to undertake the surveys of alcohol and drug use among drivers in Melbourne and Belfast which form the basis of this report. Financial assistance for the Australian component of the study was provided by the Office of Road Safety of the Australian Department of Transport.

The project developed out of discussion among delegates to the 8th International Conference on Alcohol, Drugs and Traffic Safety in Stockholm about the problems associated with comparing road safety information from countries which have different cultures and attitudes to alcohol, drugs and road safety. The surveys make use of the legislation which enables police to stop drivers at random to administer a breath-test, introduced as a road safety measure in Northern Ireland in 1968 and in Victoria in 1976. Several other States of Australia have recently passed similar laws but other parts of the United Kingdom have declined to include these provisions in their new drink-driving legislation which took effect in May, 1983.

1.1 ROADSIDE AND OTHER SURVEYS OF ALCOHOL USE IN DRIVERS

About 13% of drivers breath tested for alcohol by police at Preliminary Breath Test Stations in Victoria in 1977 had been drinking although only 2% had a blood alcohol reading over 0.05g/100mls (Hendtlass et al, 1981b). In the same year 2.4% of drivers stopped at Accident Prevention Units in Northern Ireland had been drinking and 1.9% were found to have a blood alcohol reading over 0.08g/100mls which is the legal limit in that country (Morgan, 1981).

Other recent surveys of the incidence of drinking among drivers have been carried out in Australia (Canberra, Sydney and Adelaide), Northern Sweden, the United States of America, South Africa and the Netherlands (Wolfe, 1975; Duncan, 1976; Moberg, 1980; Voas & Hausen, 1980; Pieterse, 1980; McLean & Holubowycz, 1981; Paciullo, 1983). The results of these surveys, summarised in Table 1, indicate that the incidence of alcohol use among drivers in Australia is similar to that in many other countries but in Northern Ireland drink driving is a less frequent occurrence. The Swedish data appears to be open to interpretation because the survey was undertaken as part of an enforcement operation and the law requires subsequent evidentiary blood analysis of drinking drivers.

1.2 ROADSIDE AND OTHER SURVEYS OF OTHER DRUG USE BY DRIVERS

Roadside surveys of drug use by drivers are much more limited than those surveying alcohol use. The only known survey based on analysis of blood samples for drugs was undertaken in Finland by Honkanen and his associates (1980). They found that 13% of drivers selected from among petrol station customers had used drugs. There was good agreement between the analyses and self-reported use of medication in this group but serious under-reporting occurred in a parallel survey of accident-involved drivers. Other surveys cited by Bean (1974) suggest that about 14% of drivers in Great Britain and 13% of those in California admit use of therapeutic drugs while a household survey of male motorists in Great Britain who had not been convicted for traffic offences in the last 10 years showed 11.1% were using medication (Clayton *et al*, 1980).

There is more information available about use of medication by drinking drivers and those suspected of drink driving. MacPherson and his collaborants (1982) have found that 32.5% of drivers breath tested on evidentiary instruments in New South Wales between 1974 and 1978 had used medicines, of which about 40% affect the central nervous system, and analyses of blood taken from drivers suspected of driving under the influence of drugs in Queensland (1977-1978) showed about 69% contained drugs most of which were psychoactive (Wilson, 1981). In Northern Ireland, 37.1% of drivers suspected of driving under the influence of alcohol or drugs had taken sedative, tranquilliser or hypnotic medication (Robinson, 1972).

Table 1. The Incidence of Drink-Driving Behaviour among Drivers Surveyed in Different Countries.

Country	Year	Proportion of Drivers who had been Drinking (%)	Special Conditions
Australia, Canberra, A.C.T.	1976	7	Roadside survey
Victoria	1977	13	Preliminary Breath Test Stations
Sydney, N.S.W.	1983	0.4	Random Breath Test Stations Over 0.05g/100mls.
Rural N.S.W.		1.1	
Adelaide, S.A.	1979	8.4	Controls for Accident Study
Northern Ireland	1975-1979	2.4 - 3.8	Accident Prevention Units
Northern Sweden	1978-1979	0.1	Roadside Surveys
California, U.S.A.	1979	5.3 - 8.8	Night-time/Weekend Over 0.05g/mls
South Africa	1975-1978	13.1	Over 0.08g/100mls

Lundberg and his co-workers (1979) analysed blood samples from drivers suspected of taking drugs in California and found 91% had used medication and a study of 10,436 drinking drivers in Santa Clara County showed 24.5% had used medication (Finkle, 1969). In Sweden, 23% of drinking drivers surveyed admitted that they had taken medicines (Solarz, 1981).

Dutch data suggests that, in 1979, 21% of drinking drivers combined their alcohol use with use of medication (Van Ooijen, 1981). This figure had increased from 9% in 15 years. Alha and his co-workers (1977) found that 5% of a random sample of 100 suspected drinking drivers in Finland had used drugs. In Great Britain, 16% of convicted drinking drivers admitted to taking medication (Clayton et al, 1980)and the Germans have found that 2.2% of suspected drinking drivers have taken diazepam (Gelbke et al, 1978).

It seems that, within the limited information available, about 13% of drivers from several countries admit use of medication but this figure may be higher for drivers who have also been drinking.

The types of drug which have been used in combination with alcohol are remarkably consistent in information which comes from different countries (Table 2). Drugs which affect the central nervous system, particularly benzodiazepines and other sedatives and tranquillizers, account for 30% to 60% of all drug use reported for drinking drivers in several different countries, including Australia and Northern Ireland.

This means that, by calculation, 7% to 18% of all drinking drivers may be also driving under the influence of psychoactive drugs, many of which are known to affect the performance of driving-related skills. Some also interact with alcohol in various ways, most of which increase the degree of impairment observed when under the influence of alcohol alone (e.g. Clayton et al, 1977; Franks et al, 1978; Palva & Linnoila, 1978; Bird et al, 1980; de Gier et al, 1981).

Concern about the lack of information about the role of drugs in road crashes and those collisions in which alcohol is involved has instigated a series of directly comparable investigations into the relationship between alcohol and other drug use by drivers and by those involved in fatal collisions. These are being undertaken in Melbourne, Sydney and Northern Ireland by the Victoria Police, Sydney University, and the Royal Ulster Constabulary, respectively.

This report describes the people who drive in metropolitan and rural Victoria, Australia, and in Belfast, Northern Ireland, on Friday and Saturday nights between 9.30pm and midnight. Particular attention is paid to drivers' reported use of alcohol and medication and an attempt is made to interpret the characteristics of drivers who use these drugs in terms of demographic differences in the communities and the driving populations from which they derive.

Table 2. Types of Psychoactive Drugs Used by Drinking Drivers from Different Countries.

Year	Country	Type of Drug	Proportion of Drug Positive Drinking Drivers (%)
1966-68	Santa Clara County, U.S.A. (Finkle, 1969)	Central Nervous System	38.6
1973-75	California, U.S.A. (Lundberg et al, 1979)	Diazepam Barbiturates	13.6 58.1
1973-76	Northern Ireland, U.K. (Robinson, 1972)	Sedatives, Tranquillisers & Hypnotics	39.7
1974	Finland (Alha et al, 1979)	Benzodiazepines	40.0
1974-75	Germany (Gelbke et al, 1978)	Diazepam	2.2
1975-80	Queensland, Australia (Wilson, 1981)	Benzodiazepines	41.4
1979	The Netherlands (Van Ooijen, 1981)	Sedatives, Tranquillisers	50.4
1980	New South Wales, Australia (MacPherson et al, 1982)	Central Nervous System	30.2

2. STUDY METHOD

The project described in this report involved surveys of drivers stopped in Victoria, Australia, under Section 81A of the Victoria Motor Car Act (1969) and in Northern Ireland under the Road Traffic (NI) Order 1981 - Article 146. These laws enable police to select drivers at random for the purposes of enforcing the drink-driving legislation in each country.

The surveys were administered by personnel from the Traffic Departments of the Victoria Police and the Royal Ulster Constabulary.

2.1 STUDY POPULATION

The Study Population comprised three groups of drivers who were on the road on Friday and Saturday nights between 9.30 p.m. and midnight:-

Group 1. Drivers who encountered a Preliminary Breath Testing Station in metropolitan Melbourne, Victoria, which had been set up at sites selected to conform with the criteria established for the survey (N=3503). Surveys of these drivers were undertaken in August and November, 1981, and February, May and November, 1982.

Group 2. Drivers who encountered an Accident Prevention Unit in or around Belfast, Northern Ireland, which had been set up at sites selected to conform with the criteria established for the survey (N=1987). Surveys of these drivers were undertaken in November, 1981, and in February, May, August and November, 1982.

Group 3. Drivers who encountered a Preliminary Breath Testing Station in rural Victoria which had been set up as part of normal Traffic Department operations (N=301) between July and December, 1981. The sites at which these drivers were selected did not conform with the criteria set down for the other two groups of drivers and the information which was collected was more limited. These rural drivers serve as a comparison for those who were surveyed in metropolitan Melbourne.

There was no significant difference in the proportion of drivers in Groups 1 and 2 who were surveyed in different months of the project (Table 3).

Table 3. Months of Surveys

Month	City	
	Melbourne (N=3502) %	Belfast (N=1978) %
August	14.4	17.8
November	43.1	39.2
February	18.3	19.7
	24.1	23.3
	100.0	100.0

Chi Square Test
Not Significant

2.2 SURVEY SITES

The same sites were used to select drivers in sub-populations 1 and 2 in each different month of the study. These sites were selected to conform with the following criteria :

a) Distance from the Main Post Office in Melbourne or Belfast - Sites were selected to be either :
   i) between 5 and 15 kilometres from the Main Post Office, or
   ii) between 15 and 30 kilometres from the Main Post Office.

b) Residential or Non-Residential Area -
   iii) Residential, or
   iv) Non-Residential/Not Built Up

c) Direction of Traffic Flow from Melbourne or Belfast -
   v) towards the City, or
   vi) away from the City.

The site criteria were allocated to each Friday and Saturday night of the month according to the following schedule :

Day	Criterion a	Criterion b	Criterion c	Site No.
1st Friday	i	iii	vi	1
1st Saturday	ii	iv	v	2
2nd Friday	i	iii	vi	3
2nd Saturday	ii	iv	v	4
3rd Friday	i	iv	v	5
3rd Saturday	ii	iii	vi	6
4th Friday	i	iv	v	7
4th Saturday	ii	iii	vi	8

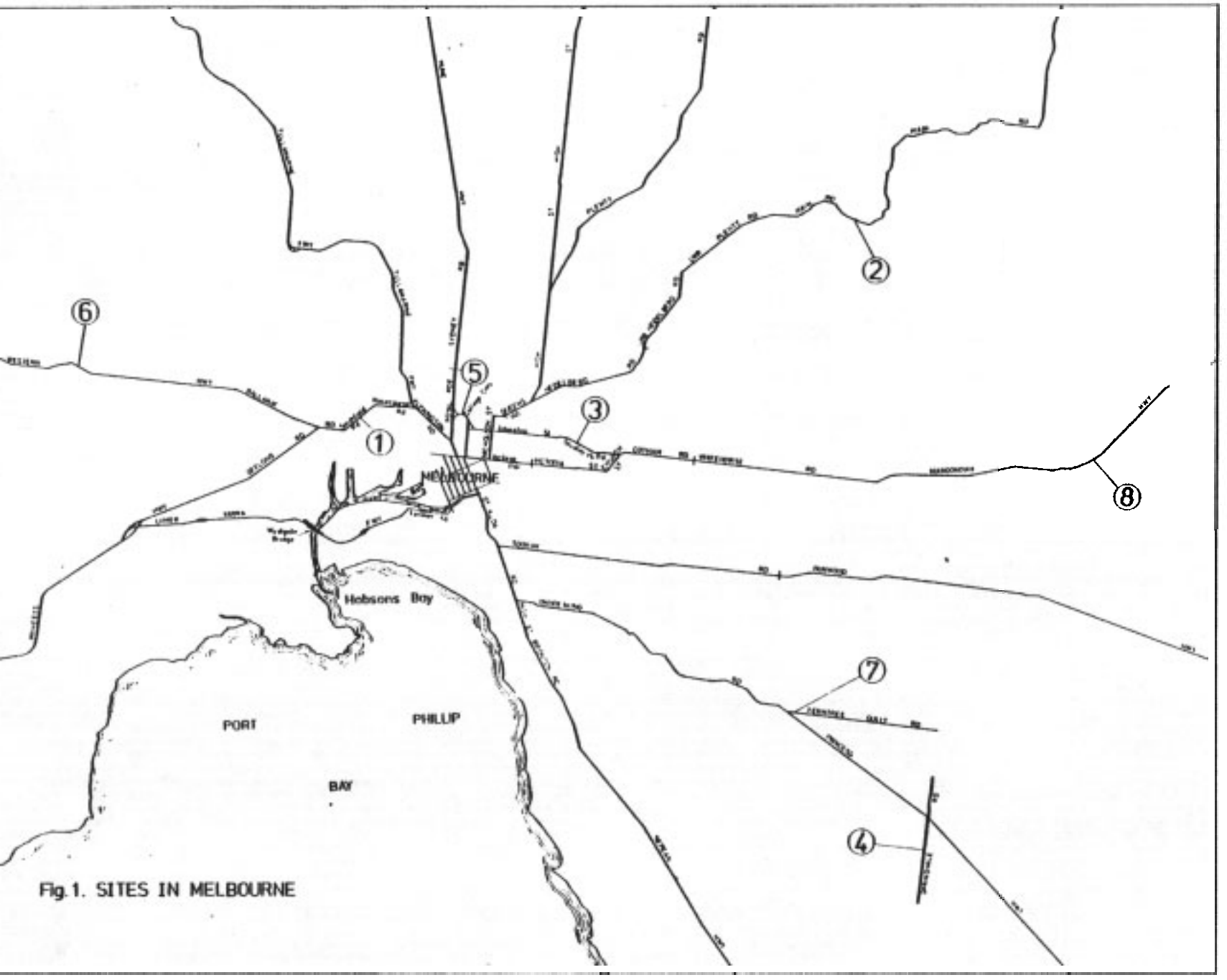


Fig.1. SITES IN MELBOURNE

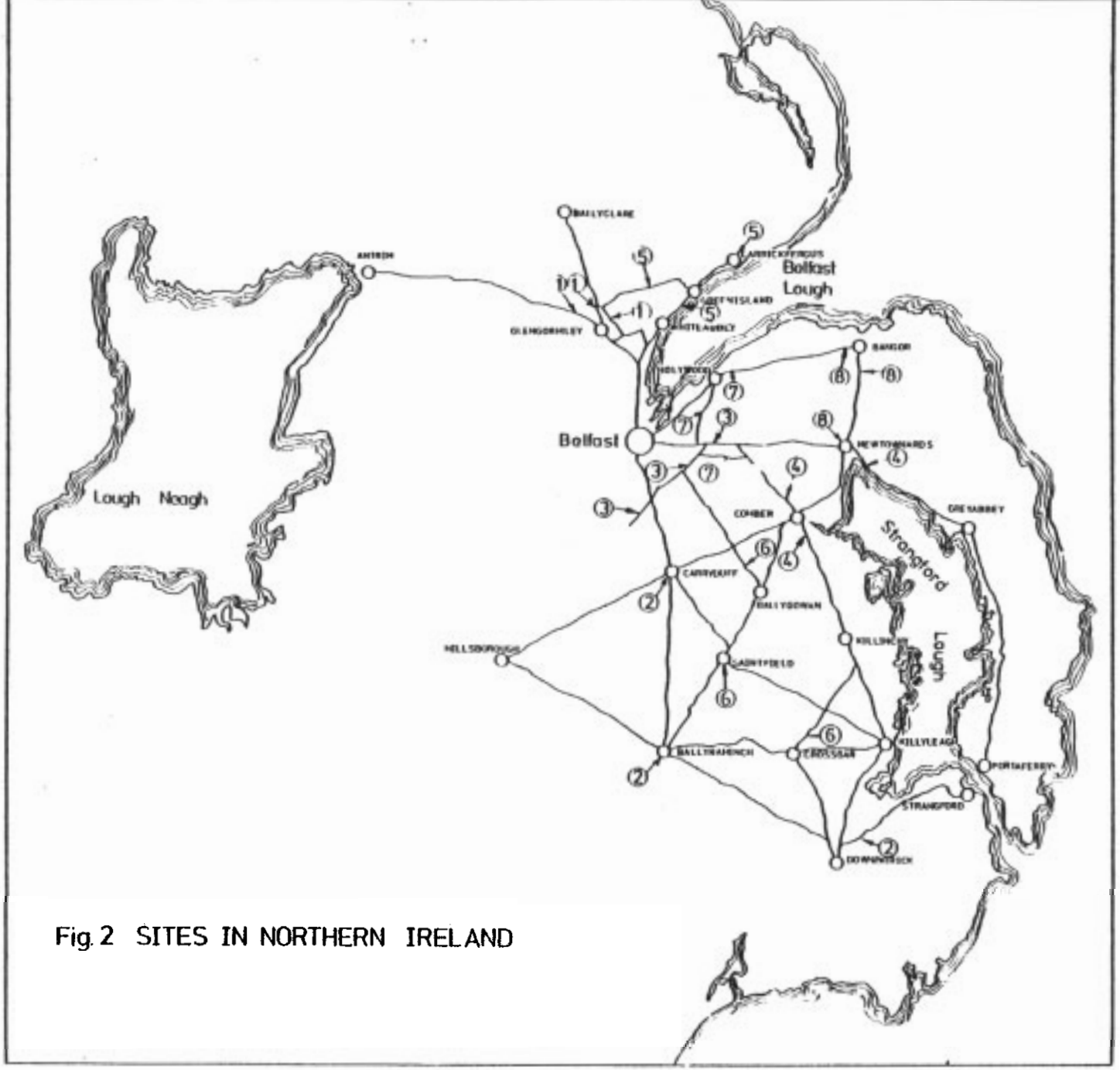


Fig. 2 SITES IN NORTHERN IRELAND

UNITED KINGDOM
AND EIRE

The position of each site used to survey Study Population Groups 1 and 2 has been indicated on Figures 1 and 2. In Melbourne the same site was used for each entire evening but in Belfast it was necessary to move the operation every thirty minutes because of security considerations. This was accommodated by using the time periods 9.30 p.m. to 10.00 p.m., 10.30 p.m. to 11.00 p.m. and 11.30 p.m. to midnight for conducting the surveys in both Belfast and in Melbourne.

There was no significant difference between Melbourne and Belfast in the relative frequencies with which drivers were surveyed on the eight different survey nights of each month.

2.3 DATA COLLECTION

Information was collected from or about drivers in the Study Population by the police personnel who were operating the testing stations. These data include information about the driver and about the site :

1) Driver Information:
   - sex
   - age
   - occupation
   - use of alcohol
   - use of medication
   - whether it was prescribed, and what type.

Victoria Police use Draeger Alcotest tubes to determine the presence of alcohol while the Royal Ulster Constabulary rely on extended conversation and indirect questioning before requesting a driver to provide "a sample of breath sufficient for a breath test". In both Victoria and Northern Ireland, refusal to provide a sample of breath constitutes an offence. The unreliability of Draeger Alcotest tubes as evidence of drinking is documented in the literature (Golderg and Bonnischen, 1970) so that, in both countries, the detected frequency of alcohol use among drivers must be considered an underestimate of the true situation.

Information about type of vehicle was also collected from drivers in Survey Groups 1 and 2.

2) Site Information
- time
- distance from Melbourne or Belfast
- weather

2.4 DATA ANALYSIS

The information collected has been analysed using the Statistical Package for Social Sciences (Nie et al. 1975). Difference between categorical variables have been tested for statistical significance using the chi-square test. These differences are identified as :

Significant	at the	5% Level
Very Significant	at the	1% Level
Highly Significant	at the	0.1% Level

This means , in general, that differences which have been designated as significant are conservative opinions and that some differences which may be related to the populations under consideration have been reported as random.

All missing data had been excluded from statistical analyses and this accounts for minor inconsistences between sample sizes in some tables.

3. DRIVERS SURVEYED IN VICTORIA

This chapter begins with a description of the demographic characteristics of the Victorian population, with particular reference to their known use of alcohol and medication. The drivers who were surveyed for this project in metropolitan Melbourne and rural Victoria during weekend, night-time hours are then described with special attention again being given to these drivers' use of alcohol or medication.

Victoria is the southernmost State on the Australian mainland. It has a population of 3.95 million people, 71% of whom live in the Melbourne Statistical Division (A.B.S., 1981). About 75% of Victorians are aged 18 years or over.

The age distribution of adults is different for those who live in metropolitan Melbourne and those who live in rural Victoria. About 24% of the rural dwellers compared with 19% of their metropolitan counterparts are aged 60 years and over but this difference is counterbalanced by a 5% higher proportion of people aged 20 to 29 years in the city compared with the country.

Differences in the distribution of occupational categories among rural and city dwelling Victorians reflect the urban nature of metropolitan Melbourne where people are more likely to have white collar jobs particularly in clerical categories while more of those who live in the country are farmers.

The people of Victoria may be tested to obtain their probationary driver's licence when they reach their 18th birthday. This is followed by a three year probationary period before a full licence is granted.

The road safety statistics for Victoria in 1982 show 3.0 road fatalities per 10,000 vehicles or 17.7 fatalities per 100,000 population. This fatality rate is lower than for the rest of Australia (Victoria Police, 1983). Over 46% of drivers killed in Victoria had been drinking (Hendtlass et al,1981b).

Legislation which enabled evidentiary breath-testing for alcohol was enacted in Victoria in 1974 when the legal limit was set at 0.05g alcohol/100mls blood. The laws which allowed Police to stop drivers at random at Preliminary Breath Test Stations followed in 1976.

3.1 ALCOHOL AND DRUG USE IN AUSTRALIA

The frequency of alcohol use in Australia is high compared with many other countries (Brown et al, 1982). In 1980-1981 Australians consumed 10.19 litres alcohol per head compared with, for example, per capita consumptions of 5.44 litres in Sweden, 7.31 litres in the United Kingdom, 8.55 litres in the United States but 14.94 litres in France. About 61% of adult Victorians use alcohol at least once a week and 2.2% are considered very heavy or problem drinkers because they consume an average of over 80 grams of alcohol per day (Rankin & Wilkinson, 1971; A.B.S., 1978).

Indicators of the alcoholism rate in Australia suggest an incidence of at least 2.8% (Stolz, 1978) with 11.1 deaths from liver cirrhosis per 100,000 population in Victoria in 1981. About two thirds of these deaths can be attributed to alcohol abuse (A.B.S., 1982b).

At the other end of the scale only 7.5% of adult Australians consider themselves total abstainers (Mugford, 1981). More women than men never drink alcohol.

Australian drinkers prefer beer to other types of alcoholic beverage with a per capita consumption of 134.1 litres in 1980-81 (A.B.S., 1982b). This figure is 4th in rank order of the 20 top beer drinking nations of the world, following East and West Germany and Czechoslovakia (Walker, 1983). However, wine sales in Australia are increasing significantly in an environment where wine carries no excise duty, reaching 18.3 litres per head in 1980-81 (Hendtlass, et al, 1981b; A.B.S., 1982b).

When Australian men are considered, those aged 25 to 44 years who live in State capital cities have a higher incidence of alcohol use in the two weeks prior to interview than men in other age-groups or those who live in less urban areas. This same group of 25 to 44 year old city dwellers was also more likely to have consumed over 80g of alcohol per day in the fortnight before they were surveyed (A.B.S., 1978).

Alcohol use is more prevalent among men in adminstrative, clerical and managerial occupations and miners than among men in other occupations while women who hold professional occupations are more likely to drink more often than other women (A.B.S., 1978).

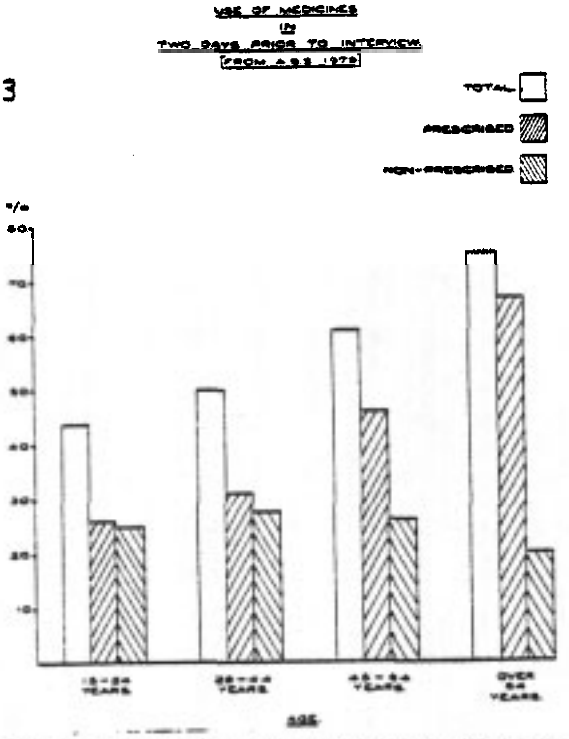
Australians are also heavy users of medication compared with the rest of the world (Stolz, 1978).

Women in Victoria are more likely to use medication than men (A.B.S., 1979) and more women than men use other health care facilities.

In Australia, 8.9 prescriptions were dispensed per adult in 1981 and about 20% of these preparations affect the central nervous system (Webb, 1982). A survey of Australians' use of health care resources had shown that 54.6% of adults take some form of medication in any two day period and 6.8% say that they have taken sleeping medicines in that time. One third of Victorians say that they have consulted a doctor in the previous two weeks (A.B.S., 1979).

The proportions of both men and women who take medication increase with age. Australian surveys have shown that three quarters of people aged 65 years and over have taken medication in any two day period, compared with about one half of those aged 25 to 44 years (A.B.S., 1979). Most of this difference in use of medicines by different age-groups can be attributed to differences in prescribed drug use (Fig. 3).

Fig. 3



3.2 DRIVERS SURVEYED IN METROPOLITAN MELBOURNE

Drivers surveyed in Melbourne were different in gender, age and occupation from the general population aged over 17 years.

Sex - Women comprised 22.9% of the surveyed drivers compared with 51.8% of the adult population of metropolitan Melbourne (A.B.S., 1981).

Age - People aged under 30 years occurred nearly twice as frequently among the drivers surveyed as in the population who live in the city (Table 4).

About 8% of both men and women surveyed in metropolitan Melbourne were 18 or 19 years old but there were significantly fewer women drivers than men drivers aged over 39 years.

Table 4. Age of Drivers Surveyed compared with General Population of Metropolitan Melbourne.

Age	Driving Population Surveyed (N=3503) %	Adult Population of Melbourne Statistical Division (A.B.S., 1981) (N=1,923,235) %
Under 20 years	8.3	5.0
20 to 29 years	43.6	24.1
30 to 39 years	22.8	21.5
40 to 49 years	13.4	15.5
49 years & over	11.8	33.9
	100.0	100.0

Occupation - Half as many of the surveyed drivers were not working compared with the general population (Table 5). This figure includes 68% of female drivers compared with 43% of women in the community (M.M.B.W., 1981) while, in contrast, 19% of men in both the survey group and in the general population had no work.

Other differences between surveyed drivers and the general population include a higher proportion of professional people and those in transport occupations in the survey group.

Table 5 Occupations of Drivers Surveyed compared with the Population of Metropolitan Melbourne

Occupation	Drivers Surveyed in Metropolitan Melbourne (N=3406) %	Population Aged Over 15 Years* (A.B.S., 1981) (N=2062016) %
Professional	20.7	9.5
Administrative, Managerial	5.5	3.5
Clerical & Sales	15.7	19.5
Farmers, Miners, etc.	1.5	1.1
Transport & Communication	7.0	3.1
Tradesmen & Labourers	28.1	21.7
Service	5.7	10.1
Unemployed	1.9	2.7
Not Working	13.8	28.6
	100.00	100.0

* People aged under 18 years comprise 4.3% of the workforce.

Summary - The characteristics of drivers surveyed in metropolitan Melbourne on Friday and Saturday nights between 9.30 p.m. and midnight can be summarised as:

- 23% were women
- there were twice as many drivers aged between 18 and 29 years as are in the general population
- people in professional and transport or communication occupations were over-represented compared with the general population and there was a smaller proportion of people not in the workforce.

3.3 DRIVERS SURVEYED IN RURAL VICTORIA.

Drivers surveyed in rural Victoria were different in sex, age and occupation from Victorians aged over 17 years who live outside the Melbourne Statistical Division.

Sex - The rural drivers surveyed included 21.9% women, compared with 50.4% of the rural population aged 17 years (A.B.S., 1981).

Age - People aged under 20 years made up three times the proportion of rural drivers compared with the general adult population and those in their twenties were also over-represented among the driving population (Table 6). Drivers aged over 49 years were less frequent than in the community.

Table 6 Age of Drivers Surveyed Compared with the Adult Population of Rural Victoria.

Age	Driving Population Surveyed (N=298) %	General Population of Rural Victoria (A.B.S.,1981) (N=375452) %
Under 20 years	15.8	4.8
20 to 29 years	38.6	22.4
30 to 39 years	21.8	20.1
40 to 49 years	14.1	14.4
49 years & over	9.7	38.3
	100.0	100.0

Occupation - There were significantly more people in professional, transport or communication, trades and labouring occupations among drivers surveyed in rural Victoria compared with the Victorian population who live outside the metropolitan area. In contrast, those not in the workforce were severely under-represented in the driver group (Table 7).

Table 7 Occupation of Drivers Surveyed compared with the Population of Rural Victoria.

Occupation	Rural Victoria (N=294) %	Population of Rural Victoria aged over 14 years* (A.B.S.,1981) (N=804844) %
Professional	15.3	6.6
Adminstration, Managerial	4.4	2.0
Clerical, Sales	12.6	10.8
Farmers, Miners, etc.	6.1	10.2
Transport & Communication	6.8	2.6
Tradesmen & Labourers	33.7	15.3
Service	4.8	9.2
Unemployed	2.7	3.7
Not Working	13.6	39.9
	100.0	100.0

* People aged under 18 years comprise 5.3% of the workforce

Summary - The characteristics of drivers surveyed in rural Victoria on weekends between 9.30 p.m. and midnight can be summarised as :

- 22% were women.
- People aged 18 or 19 years comprised 16% of the survey population compared with 5% of the general population.
- People in professional, transport,or communication trades and labouring occupations were over-represented compared with the general population and there was a smaller proportion of people not in the workforce.

3.4 USE OF ALCOHOL

Two and one half times as many drivers surveyed in metropolitan Melbourne had been drinking compared with those surveyed in rural Victoria (Table 8).

This figure included 6.3% of the men and 1.9% of the women in the Melbourne group. None of the women in the rural group and 2.6% of the men had been drinking.

Table 8 Use of Alcohol by Drivers surveyed in Metropolitan Melbourne and Rural Victoria.

Alcohol Use	Metropolitan Melbourne (N=3470) %	Rural Victoria (N=299) %
Alcohol Use	5.3	2.1
No Alcohol Use	94.7	97.9
	100.0	100.0

Chi Square Test
Highly Significant

Drivers surveyed within 15 kilometres of the centre of Melbourne were not significantly different from those surveyed between 15 kilometres and 30 kilometres from the city centre in the frequency of alcohol use.

There was no significant relationship between the incidence of alcohol use and age in the metropolitan drivers group or in the rural drivers group (Table 9). In the city, drinking tended to be more prevalent among those aged between 30 and 49 years old and it was least likely among 18 and 19 year olds, and those aged over 49 years.

Table 9 Comparison of the Relative Frequency of Alcohol Use Among Different Age Groups of Drivers Surveyed in Metropolitan Melbourne and Rural Victoria.

	Alcohol Use			
Age	Metropolitan Melbourne*		Rural Victoria**	
Under 20 years	(N=286)	2.8%	(N=47)	6.4%
20 to 29 years	(N=1511)	5.3%	(N=115)	1.7%
30 to 39 years	(N=788)	6.1%	(N=65)	.
40 to 49 years	(N=464)	3.6%	(N=42)	.
Over 49 years	(N=411)	3.6%	(N=29)	3.4%

* Chi Square Test (Age by Alcohol Use)
Not Significant

** Chi Square Test (Age by Alcohol Use)
Not Significant

Table 10. Relationship between Blood Alcohol Level and Occupation among Drivers surveyed in Metropolitan Melbourne.

Blood Alcohol Level (g/100ml)	Professional (N=637) %	Administrative, Managerial (N=426) %	Clerical, Sales (N=222) %	Farmers, Miners, etc (N=49) %	Transport, Communication (N=216) %	Tradesmen, Labourers (N=869) %	Service (N=172) %	Unemployed (N=63) %	Not Working (N=433) %
No Alcohol	95.4	90.5	93.5	95.9	94.4	93.6	93.6	93.7	97.7
0.05 or Under	2.4	5.9	3.5	2.0	1.4	3.1	5.2	6.3	1.6
0.051 to 0 100	1.9)	1.8)	0.5)	2.0)	1.9)	1.7)	.)	.)	0.7)
0.101 to 0.150	0.2)2.3	1.8)3.6	0.4)0.9	0.0)2.0	1.9)4.3	1.2)3.4	1.2)1.2	.)0.0	.)0.7
Over 0.150	0.2)	.)	.)	0.0)	0.5)	0.5)	0.0)	.)	.)
	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Chi Square Test
Significant

When the use of alcohol by different occupational categories in the drivers surveyed in metropolitan Melbourne is considered (Table 10), those in professional occupations, farmers and those not working were least likely to have been drinking while those in administrative and managerial occupations had the highest incidence of alcohol use. However, among this group of drinking administrators and managers, 62% had blood alcohol readings under the legal limit compared with only half of the drinkers in professional occupations and one quarter of those working in transport and communication.

The incidence of drinking driving among drivers surveyed in Melbourne tended to be higher in August than in any other month of the survey though the difference did not reach statistical significance (Table 11).

Table 11 Relationships between Alcohol Use and Month among Drivers Surveyed in Metropolitan Melbourne.

	Month			
Alcohol Use	August (N=505) %	November (N=1511) %	February (N=641) %	May (N=802) %
No	92.3	95.0	95.6	94.9
Yes	7.7	5.0	4.6	5.1
	100.0	100.0	100.0	100.0

Chi Square Test
Not Significant

Rural drivers were surveyed only between July and December and the reported difference in the relative frequency of their drinking compared with their Melbourne counterparts may therefore understate the true difference in the alcohol use of drivers in metropolitan and rural Victoria.

Summary- The characteristics of alcohol use among drivers surveyed in metropolitan Melbourne and rural Victoria can be summarised as follows :

- Twice as many drivers in the metropolitan area compared with rural Victoria have been drinking.
- Alcohol use is significantly higher among men than women in both groups of drivers.
- The incidence of drinking was not significantly related to age among the city drivers or in the rural group.
- Professional people, farmers and those not working were less likely to have been drinking than most other groups.
- Alcohol use tended to be higher in August than in November, February or May.

3.5 USE OF MEDICATION

Drivers were asked three questions about their use of medication :-

Have you taken any tablets or medicine today?

Was it prescribed?

What was it and what was it for?

These data allow measurement of the reported incidence of use of medication as well as the types of medicines used.

Incidence of Use of Medication - About 8% of drivers surveyed in metropolitan Melbourne and 3% of drivers surveyed in rural Victoria admitted use of medication (Table 12). In both groups more people said that they had used prescribed drugs than said that their medication was not prescribed.

Table 12 Use of Medication by Drivers Surveyed in Metropolitan Melbourne and Rural Victoria.

Drug Use	Metropolitan Melbourne (N=3455) %	Rural Victoria (N=276) %
No Medication	91.6	97.4
Non-Prescribed Drugs	2.2	0.4
Prescribed Drugs	6.2	2.2
	100.0	100.0

Chi Square Test
Significant

Gender made no significant difference to the frequency with which use of medication was admitted by Melbourne drivers. However, the frequency of drug use did increase with age from about five percent of metropolitan drivers who were under 20 years to 17.1% of those aged over 49 years (Table 13) Most of this increase in use of medication was associated with increased use of prescription drugs. Rural drivers in all age groups were consistently less likely to have used medication on the day that they were surveyed than their urban counterparts.

Table 13 Comparison of the Relative Frequency of Medication Use Among Different Age Groups of Drivers in Metropolitan Melbourne and Rural Victoria.

Age	Use of Medication: Metropolitan* Melbourne (N=3456)		Use of Medication: Rural** Victoria (N=268)	
Under 20 years	(N=285)	4.4%	(N=44)	.
20 to 29 years	(N=1513)	5.9%	(N=103)	.
30 to 39 years	(N=460)	9.3%	(N=38)	5.3%
Over 49 years	(N=409)	17.1%	(N=26)	7.7%

* Chi Square Test (Age by Use of Medication) Highly Significant

** Chi Square Test (Age by Use of Medication) Highly Significant

Occupation was not significantly related to the driver's use of medication among the Melbourne drivers and the small numbers of people in the rural group who said that they had used drugs precluded this analysis of their data.

Overall, 10.7% of all drivers surveyed in metropolitan Melbourne and 3.7% of drivers surveyed in rural Victoria had used alcohol or medication or both. Use of medication was nearly twice as high among drinkers than among non-drinkers in the Melbourne group (Table 14). Rural figures were too small to allow this analysis of the data.

The difference between drinkers and non-drinkers in their use of medication resulted from a higher incidence of use of both non-prescribed and prescribed drugs and it was significant for men in the survey but not for the women.

Table 14 Use of Medication by Drinkers and Non-Drinkers among Drivers Surveyed in Metropolitan Melbourne.

Drug Use	Alcohol Use: Drinkers (N=173) %	Alcohol Use: Non-Drinkers (N=3253) %
No Medication	86.1	91.8
Non-Prescribed Drugs	5.2	2.2
Prescribed Drugs	8.7	6.0
	100.0	100.0

Chi Square Test
Significant

Drug use among metropolitan drivers was related to the month in which the survey was undertaken (Table 15) with more drivers using medication in August than in any of the other three months. This relationship held for men when they were considered separately but it was not significant for women drivers surveyed. As well it held for drivers aged in their thirties but not for other age categories.

The figures for use of medication in November, 1981, and November, 1982, have been combined in this analysis but there was a significant difference in the incidence of drug use reported in November of the two separate years. In November, 1981, 11.8% of drivers admitted using medication compared with 4.9% of drivers surveyed in November, 1982.

Table 15. **Use of Medication by Drivers surveyed in Metropolitan Melbourne in Different Months.**

Use of Medication	Month			
	February (N=641) %	May (N=829) %	August (N=505) %	November (N=1480) %
Nil	92.7	91.9	88.1	91.9
Yes	7.3	8.1	11.9	8.1
	100.00	100.0	100.0	100.0

Chi Square Test
Significant

Type of Medication Used - There was a significant difference in the types of medication used by male and female drivers in metropolitan Melbourne (Table 16). More men used drugs which affect the musculoskeletal and cardiovascular systems while more women used anti-infective drugs. There was no significant difference in the proportions of male and female drivers who admitted use of tranquillisers or analgesic drugs.

There was also a significant difference in the types of drugs used by different age groups of drivers (Table 17). More drivers aged under 40 years who reported taking medication used drugs which affect the respiratory system and analgesics while more drivers aged over 40 years used musculoskeletal and cardiovascular preparations.

Over 52% of drivers who used medication in combination with alcohol, used drugs which affect the central nervous system, predominantly analgesics. A further 28% used respiratory drugs many of which also interact with alcohol. That is, at least 4% of all drivers surveyed in Melbourne were using alcohol in combination with drugs which can exacerbate its effects on driving related skills.

Further, the types of medication used in different months of the survey tended to be different though the small numbers of users in some drug categories meant this difference was not statistically significant (Table 18). Use of respiratory drugs was less frequent in August while the frequency of musculoskeletal drug use reported at that time was high. On the other hand, use of anti-infectives was lower in November. The high incidence of respiratory drug use in November was associated with a particularly high incidence of antihistamine use: 11.4% of drug users and 10.5% of drugs used in November, 1981. In Australia, November and December are known to be associated with high pollen counts and consequently a high incidence of grass pollen allergies (Knox & Touhy, 1981; Weston et al, in preparation)

Summary - The characteristics of use of medication by city and rural drivers surveyed in Victoria can be summarised as follows :-

- 13 % of drivers surveyed in metropolitan Melbourne and 3.7% of drivers in rural Victoria had used alcohol or medication or both.
- The frequency with which drivers used drugs was higher in the city than in rural Victoria.
- There was no relationship between sex and the incidence of use of medication but the frequency of drug use increased with age.
- Drinkers were nearly twice as likely to use medication as non-drinkers.
  Use of medication was highest in August.
- The most frequently used drugs were analgesics, and drugs affecting the cardiovascular and respiratory systems.
- Men who used medication were more likely to use drugs which affect the musculoskeletal and cardiovascular systems while women were more likely to use anti-infective preparations.
- Drivers aged under 40 years who used medication were more likely to have used analgesics or drugs which affect the repiratory system while drivers aged over 40 were more likely to have used musculoskeletal or cardiovascular preparations.
- Over 80% of the medication used by drinking drivers is from drug categories that include drugs which are known to interact with alcohol.

Table 16 Relationship between Sex and Type of Medication Reported by Drivers Surveyed in Metropolitan Melbourne.

Drug Classification	Sex: Men (N=223) %	Sex: Women (N=72) %
Alimentary Tract and Metabolism	9.4	11.3
Blood and Blood Forming Organs	1.8	-
Cardiovascular System	20.8	7.0
Dermitological Preparations	0.4	4.2
Genitourinary System and Sex Hormones	0.9	1.4
Hormones other than Sex Hormones	1.3	4.2
Anti-Infectives	8.1	18.3
Musculoskeletal System	5.8	-
Anaesthetics (Local)	0.9	-
Analgesics	22.5	25.4
Antiepileptics	2.7	2.8
Psycholeptics: Tranquillisers, Hypnotics and Sedatives	8.5	8.5
Psychoanaleptics: Antidepressants, etc.	1.3	-
Parisitology	0.4	-
Respiratory System	15.7	16.9
Other	-	-
	100.0	100.0

Chi Square Test
Significant

* 12% of these Melbourne drivers admitted use of more than one preparation.

Table 17 Relationship between Age and Type of Medication Reported by Drivers Surveyed in Metropolitan Melbourne.

Drug Classification	Age: Under 20 years (N=18) %	20 to 29 years (N=90) %	30 to 39 years (N=80) %	40 to 49 years (N=41) %	Over 49 years (N=75) %
Alimentary Tract & Metabolism	-	12.2	11.4	2.4	10.7
Blood & Blood Forming Organs	-	-	-	2.4	4.0
Cardiovascular System	-	3.3	7.6	26.8	40.0
Dermitological Preparations	9.1	-	2.5	2.4	-
Genitourinary System & Sex Hormones	-	-	-	4.9	1.3
Hormones other than Sex Hormones	-	3.3	-	4.9	1.3
Anti-Infectives	9.1	17.9	7,9	9.8	4.0
Musculoskeletal System	9.1	1.1	2.5	7.3	8.0
Anaesthetics (Local)	-	1.1	1.3	-	-
Analgesics	54.5	24.5	34.2	17.1	10.7
Antiepileptics	-	4.4	2.5	2.4	1.3
Psycholeptics: Tranquillisers, Hypnotics & Sedatives	-	6.7	8.8	9.8	10.7
Psychoanaleptics: Antidepressants, etc.	-	4.4	-	-	-
Parisitology	-	1.1	-	-	-
Respiratory System	18.2	20.0	21.5	9.8	8.0
Other	-	-	-	-	-
	100.0	100.0	100.0	100.0	100.0

Chi Square Test
Highly Significant

Table 18 Type of Medication Reported in Different Months by Drivers Surveyed in Metropolitan Melbourne.

Drug Classification	Month August (N=61) %	November (N=115) %	February (N=47) %	May (N=69) %
Alimentary Tract & Metabolism	9.8	7.9	12.8	11.6
Blood & Blood Forming Organs	3.3	0.9	-	1.5
Cardiovascular System	16.4	16.6	17.0	18.8
Dermitological Preparations	1.6	1.8	-	1.5
Genitourinary System & Sex Hormones	-	2.4	-	-
Hormones other than Sex Hormones	4.9	0.9	2.1	1.5
Anti-Infectives	13.1	8.9	14.9	10.1
Musculoskeletal System	9.8	3.3	4.3	1.5
Anaesthetics (Local)	-	1.8	-	-
Analgesics	24.6	24.5	19.1	26.0
Antiepileptics	3.3	2.4	4.2	-
Psycholeptics: Tranquillisers, Hypnotics & Sedatives	8.3	7.9	6.4	10.1
Psychoanaleptics: Antidepressants, etc.	-	2.4	-	-
Parisitology	-	-	2.1	-
Antihistamines	1.6	9.1*	-	3.8
Other Respiratory System	3.3	9.2	17.1	12.1
Other	-	-	-	-
	100.0	100.0	100.0	100.0

Chi Square Test
Not Significant

* 1981 Antihistamines 10.5%
1982 Antihistamines 7.7%

4. DRIVERS SURVEYED IN NORTHERN IRELAND

In this chapter the scene will be set by describing the demographic characteristics of the people of Northern Ireland including information which has been published about their use of alcohol and medication. Information about the Eastern Health and Social Services Area of the province will be used wherever possible because that area covers the region around Belfast which was used for the survey.

This introduction will be followed by a description of the drivers who were surveyed for the current project in and around Belfast on Friday and Saturday nights between 9.30p.m. and midnight. Particular attention will be given to their reported use of alcohol and medication.

Northern Ireland is made up of the six northernmost counties of Ireland and is part of the United Kingdom. Although most of its political control is now vested in Westminster and the law in Northern Ireland follows closely that which governs the rest of the country, the province's legislation is separate and distinct from that in Scotland, England and Wales. This means that, even in the area of road safety, there are special provisions within the law governing Northern Ireland which are quite different from those which exist in the rest of the United Kingdom. Use of evidentiary breath testing for alcohol came into force in Northern Ireland in 1968 with the passing of the Road Traffic Act (NI) 1968 together with provisions which enable police to set up Accident Prevention Units to stop drivers at random for the purposes of enforcing the alcohol legislation.

The legal blood alcohol limit in Northern Ireland is 0.08g/100ml which is in line with the rest of the British Isles and has been continued in the drink-driving legislation in Great Britain which was promulgated on May 6th, 1983. These new laws do not have effect in Northern Ireland. Generally speaking, drivers become eligible to drive motor cars and other light vehicles on their 17th birthday.

Although the Province is well known internationally for its high level of sectarian violence and this type of crime has tended to take priority in police activities (e.g. McCullough, 1982), the Chief Constable of the Royal Ulster Constabulary has noted in his Annual Report (Royal Ulster Constabulary, 1982a):

> "Road traffic accidents continue to be the cause of more than twice the number of deaths attributable to terrorist violence".

The fatality rate on roads in Northern Ireland is 14.5 per 100,000 population or 5.1 per 10,000 registered motor vehicles (Ro.S.P.A., 1983). These figures are significantly higher than those in other parts of the United Kingdom but less than those in the Republic of Ireland. Alcohol and speed are the most important known causes of road deaths in the province. Alcohol contributed to 22% of road deaths in 1981 and 28.9% of fatal accidents where a driver was responsible in the first eight months of 1982 (Black, 1982; Royal Ulster Constabulary, 1982b).

The population of the Northern Ireland is 1.54 million of whom about 25% are aged under 16 years (Ulster Year Book, 1983) and the Eastern Health and Social Services area accounts for 44.5% of the population aged over 17 years (Blaney & MacKenzie, 1978). One quarter of this adult group are aged under 30 years and a further 16.5% is aged between 30 and 49 years. This age distribution is fairly consstant across the whole Province.

4.1 ALCOHOL AND DRUG USE IN NORTHERN IRELAND

In Northern Ireland, 37.4% of people aged over 17 years say that they totally abstain from alcohol use. This figure is about five times higher than that for the rest of the United Kingdom. Twenty one percent of women and 62% of men consumed alcohol in the week prior to survey. About 1% of people in Northern Ireland can be diagnosed as alcoholics based on evidence from psychological testing for pre-occupation and self reported drinking habits (Blaney & Mackenzie, 1978; Harbison & Haire, 1982). The Eastern Sector of the Province has a 10% lower incidence of total abstinence than other parts of the province. It also has a higher frequency of diagnosed alcoholism.

Twice as many women as men in Northern Ireland say that they have never consumed alcohol and these include over 60% of all women over 55 years old. On the other hand, 95% of diagnosed alcoholics are men with the highest incidence in the 60 to 65 year age bracket.

The drinking patterns of Northern Ireland must be seen to be derived historically from a synthesis of those which exist in the Republic of Ireland and those of the United Kingdom. In the Republic of Ireland the adult per capita consumption of alcohol was 10.4 litres in 1981 while in the United Kingdom it was 9.3 litres. A recent survey of alcohol use has shown that men in Northern Ireland drink 18% less than their counterparts in the rest of the United Kingdom (Harbison & Haire, 1982). All of these figures are low compared with those of most other European countries and the United States (Brown et al, 1982).

About 65% of alcohol is consumed as beer (Blaney & MacKenzie, 1978) and Ireland and England rank 9th and 10th respectively in per capita consumption among the 20 top beer drinking nations of the world (Walker, 1983). Alcohol consumption in Northern Ireland increased every year between 1969 and 1976 and

the relative importance of spirits, in terms of duty paid, appears to have been increasing during that time. Spirits are more likely to be consumed in Northern Ireland than in England, Scotland and Wales (Harbison & Haire, 1982).

As well, deaths from cirrhosis of the liver and chronic liver disease in 1970 were particularly low in Northern Ireland (2.6 per 100,000 population) compared with other countries (W.H.O., 1973). The incidence of cirrhosis in Great Britain and in the Republic of Ireland is also low and in Northern Ireland, England and Wales has remained so while it has been increasing in other countries (Brown et al, 1982; Harbison & Haire, 1982). In 1981, the rate of deaths from cirrhosis and chronic liver disease in Northern Ireland was still only 4.4 per 100,000 population (D.H.S.S., 1983). This places in question the general belief that the Irish are heavy drinkers and have a high prevalence of alcoholism. Perhaps they lean more toward the drinking patterns of their nearest neighbours than their reputation suggests.

In 1981, 13,062,000 prescriptions were dispensed in Northern Ireland. That is a frequency of about 12.5 prescriptions per head in the population aged over 18 years, and 20% of these prescriptions were for drugs which affect the central nervous system (Northern Ireland Central Services Agency, 1982). This figure is higher than that for the rest of the United Kingdom. In Great Britain, about half of the adult population take some form of medication on any single day. One third of these drugs are medically prescribed and nearly 60% of prescriptions are dispensed for a continuous period of less than one month (Parish, 1971). The frequency of use of medication increases with age.

About 18% of the population of Northern Ireland require a medical consultation in any two-week period and 6% say that they take sleeping tablets every night (Blaney & Mackenzie, 1978). All the figures about use of medical facilities are higher for women than they are for men in Northern Ireland but the part of the Province in which the respondents lives seems to be largely unrelated to their use of health care services.

4.2 GENERAL CHARACTERISTICS OF DRIVERS SURVEYED IN BELFAST

Drivers who were surveyed for this project were significantly different from the general population of Northern Ireland in gender, age and occupation.

Sex - Women comprise 53.3% of the population aged over 18 years who live in the Eastern Health and Social Services Area (Blaney & Mackenzie, 1978). However, only 17.2% of drivers surveyed were women.

Age - The drivers who were surveyed were more likely to be aged under 39 years while people aged over 49 years were much less frequent among the driving group compared with the age distribution of adults in Northern Ireland (Table 19).

Nine percent of both male and female drivers were less than 20 years old but, at the other end of the scale, 20.2% of the men and 11.4% of the women were aged over 40 years. As well, 41.3% of women were in their twenties compared with only 32.7% of the men.

Table 19. Age of Drivers Surveyed in Belfast compared with Adult Population of Northern Ireland.

Age	Survey Population (N=1949)	Population of Eastern D.H.S.S. Area (1971 Census) (N=471,884)
Under 20 years	9.0	4.8
20 to 29 years	34.2	21.2
30 to 39 years	21.0	16.0
40 to 49 years	17.0	17.1
Over 49 years	18.8	40.9
	100.0	100.0

Occupation - The occupations of drivers surveyed in Belfast reflect the more urban nature of the area in which the survey was conducted with a relatively high proportion of people in professional and trades or labouring occupations compared with distribution of occupations in the general population of Northern Ireland (Table 20).

The over-representation of people in the clerical and sales occupations among those surveyed is even greater than it appears because some managers and adminstrators in insurance, banking, finance and business will have been classified as clerical or sales personnel in the general population data (Ulster Year Book, 1983).

The unemployed and those not in the workforce were significently less frequent in the driving group than among the general population of Northern Ireland.

Table 20. Occupation of Drivers Surveyed in Belfast compared with the General Population of Northern Ireland aged over 17 years.

Occupation	Survey Population (N=1959) %	Population of Northern Ireland Aged over 17years (from Ulster Year Book, 1983.) (N=1,162,700) %
Professional	15.4	9.6
Administrative,Managerial	8.5	4.6
Clerical, Sales (Insurance, Banking, Finance and Business Services.)	14.5	1.8
Farmers, etc.	5.2	4.8
Transport & Communications	6.1	1.8
Tradesmen & Labourers	28.4	18.8
Service (Includes fulltime police and UDR but excludes British Army Units)	6.4	6.1
Unemployed	2.5	8.9
Not Working	13.1	43.6
	100.0	100.0

There was no significant difference between the frequency of alcohol use observed among drivers surveyed within 15km of Belfast, that is in essentially urban areas, and the frequency of alcohol use in more rural areas of the Province.

Summary - To summarise the characteristics of weekend, nighttime drivers in Belfast in November, 1981 and February, May, August and November, 1982:

- 17.5% were women.
- 18.8% of surveyed drivers were aged over 49 years compared with 40.9% the general population.
- People in white collar occupations were over-represented among drivers surveyed while those not working were less frequent than in the general population.

4.3 USE OF ALCOHOL

Among drivers surveyed in Belfast, 1.5% had consumed alcohol. This figure included 1.7% of the men in the survey and only one woman.

There was no significant relationship between the age or occupation of the driver or the month of survey and the likelihood he had been drinking. However, drinking tended to be most prevalent among drivers aged under 29 years and it was less likely among those who were older than 29 years (Table 21).

Table 21. Use of Alcohol by Different Age Groups of Drivers surveyed in Belfast.

Alcohol Use	Age: Under 20 Years (N = 175) %	20to29 Years (N=667) %	30to39 Years (N=409) %	40to49 Years (N=331) %	Over 49 Years (N=367) %
No	97.7	97.6	99.0	99.4	99.2
Yes	2.3	2.4	1.0	0.6	0.8
	100.0	100.0	100.0	100.0	100.0

Chi Square Test
Not Significant

4.4 USE OF MEDICATION

Of all drivers surveyed in Belfast, 5.5% said that they had taken medication. Nearly 4% said that they had used prescription drugs and 1.6% said that they had taken over-the-counter preparations but there was no significant difference between men and women in their use of these drugs.

There was a significant relationship between the age of the driver and his use of medication. Overall, the frequency of medication use was constant over all age groups up to 49 years but there was a big increase among the older drivers. The people aged 50 years and over admitted more than twice the incidence of prescription drug use reported by any other age group (Table 22).

Table 22. Use of Medication by Different Age Groups of Drivers Surveyed in Belfast.

Use of Medication	Age: Under 20 Years (N=174) %	20to29 Years (N=662) %	30to39 Years (N=405) %	40to49 Years (N=331) %	Over 49 Years (N=367) %
No Medication	96.0	94.9	95.7	95.4	90.9
Non-Prescribed Drugs	1.1	1.9	1.8	1.5	1.1
Prescribed Drugs	2.9	3.2	2.5	3.1	8.0
	100.0	100.0	100.0	100.0	100.0

Chi Square Test
Very Significant

The occupations of Belfast drivers were not significantly related to their use of medication. Further, 10.7% of drinkers and 5.4% of non-drinkers reported use of drugs but the small numbers of drinkers involved mean that these differences are not statistically significant. Overall, 6.8% of all drivers surveyed were taking alcohol or medication or both; this figure includes 6.9% of all men and 5.7% of all women surveyed in Belfast.

The frequency of reported use of medication by drivers was related to the month in which they were surveyed (Table 23). The highest incidence of drug use occurred in February and the lowest was in May.

Table 23 Relationship between Use of Medication and Month for Drivers surveyed in Belfast.

Use of Medication	Month February (N=361) %	May (N=454) %	August (N=352) %	November (N=764) %
Nil	92.0	96.9	94.3	94.5
Yes	8.0	3.1	5.6	5.5
	100.0	100.0	100.0	100.0

Chi Square Test
Significant

The types of medication used by male and female drivers taking drugs were not significantly different from each other but men tended to use more drugs which affect the musculoskeletal system and analgesics while more women used tranquilisers and drugs which affect the respiratory system and alimentary tract (Table 24).

There was a significant relationship between the age of the driver and the type of medication use reported (Table 25). Older drivers were more likely to use cardiovascular drugs, while younger people used more analgesic preparations and anti-infective agents.

Table 24. Relationship between Sex and Type of Medication Reported by Drivers surveyed in Belfast.

Drug Classification	Sex: Male (N=82)	Sex: Female (N=18)
Alimentary Tract & Metabolism	14.8	22.2
Blood & Blood Forming Organs	-	-
Cardiovascular System	25.9	16.7
Dermitological Preparations	1.2	-
Genitourinary System & Sex Hormones	-	-
Hormones other than Sex Hormones	-	-
Anti-Infectives	9.9	5.6
Musculoskeletal System	3.7	-
Anaesthetics (Local)	-	-
Analgesics	30.9	27.8
Antiepileptics	-	-
Psycholeptics: Tranquilisers, Hypnotics & Sedatives	1.2	11.1
Psychoanaleptics: Antidepressants, etc.	1.2	-
Parisitology	-	-
Respiratory System	9.9	16.7
Other	1.2	-
	100.0	100.0

Chi Square Test
Not Significant

Table 25. Relationship Between Age & Type of Medication Reported by Drivers surveyed in Belfast.

Drug Classification	Age 18 to 39 Years (N=52)	Age Over 39 Years (N=46)
Alimentary Tract & Metabolism	13.5	17.4
Blood & Blood Forming Organs	-	-
Cardiovascular System	7.7	41.3
Dermitological Preparations	1.9	-
Genitourinary System & Sex Hormones	-	-
Hormones other than Sex Hormones	-	-
Anti-Infectives	15.4	2.2
Musculoskeletal System	1.9	4.3
Anaesthetics (Local)	-	-
Analgesics	42.3	19.6
Antiepileptics	-	-
Psycholeptics: Tranquilisers, Hypnotics & Sedatives	1.9	4.3
Psychoanaleptics: Antidepressants, etc.	1.9	-
Parisitology	-	-
Respiratory System	11.6	10.9
Other	1.9	-
	100.0	100.0

Chi Square Test
Very Significant

The month in which the survey was conducted was not significantly related to the type of medication which was used but there was a tendency for more drugs affecting the respiratory system and analgesics to be used in February than in other months.

Summary - To summarise this information about use of medication by drivers surveyed in Belfast:

- About 5% reported use of medication.
- 6.7% used alcohol or medication or both.
- 9.2% of drivers aged over 49 years used medication compared with 4.1% of those aged under twenty.
- Older people tended to use more cardiovascular drugs while younger people were more likely to use analgesics or anti-infective agents.
- Drugs were used more often in February than in May, August or November.

5. COMPARISON OF THE USE OF ALCOHOL AND MEDICATION BY DRIVERS SURVEYED IN MELBOURNE AND BELFAST

The surveys which are described in this report were designed to allow direct comparison of weekend, night-time drivers in metropolitan Melbourne, Australia, and Belfast, Northern Ireland. The relative geographical position of the two cities is close to antipodean and this means that differences between the use of alcohol and medication by the two survey populations can be interpreted with reference to seasonal influence as well as in terms of the personal characteristics of the drivers such as sex, age and occupation.

This chapter will compare the use of alcohol and medication among drivers surveyed in Melbourne and Belfast and discuss possible reasons for differences between the two driving populations.

5.1 ALCOHOL USE

Alcohol use was reported in 5.3% of drivers surveyed in metropolitan Melbourne and 1.5% of drivers surveyed in Belfast. Although there was a tendency for a greater proportion of the drinking drivers surveyed in Belfast than in Melbourne to have a blood alcohol reading over 0.10g/100mls, overall differences in the distribution of blood alcohol readings between the two survey groups were not statistically significant (Table 26). This means that the big difference between the frequencies of drink-driving among drivers surveyed in the two cities cannot be attributed to the different procedures used to test for alcohol.

Table 26. Distribution of Blood Alcohol Readings of Drinking Drivers Surveyed in Melbourne and Belfast.

Blood Alcohol Reading (g/100ml)	City	
	Melbourne (N=184) %	Belfast (N=29) %
0.001 to 0.050	59.7	48.3
0.051 to 0.100	24.4	20.7
0.101 to 0.150	12.5	20.7
Over 0.150	3.4	10.3
	100.0	100.0

Chi Square Test
Not Significant.

It can be shown that differences in the distributions of sex, age and occupation in the two driving populations do not account for the difference in alcohol use either.

Sex - In both Melbourne and Belfast women drivers were significantly less likely to have been drinking than men drivers.

There was also a highly significant difference in the use of alcohol by men surveyed in the two cities with the incidence of alcohol use among male Melbourne drivers six times that found among male drivers surveyed in Belfast (Table 27).

Table 27. Use of Alcohol by Male Drivers Surveyed in Melbourne and Belfast.

Blood Alcohol Reading (g/100ml)	City	
	Melbourne (N=2665) %	Belfast (N=1636) %
Nil	93.7	98.3
0.001 to 0.051	3.7	0.8
0.051 to 0.101	1.6	0.4
0.101 to 0.150	0.9	0.4
Over 0.150	0.2	0.2
	100.0	100.0

Chi Square Test
Highly Significant

About 23% of drivers surveyed in Melbourne were women compared with 17% of those surveyed in Belfast. This means that, if gender is considered a factor which could contribute to the difference in alcohol use observed between Melbourne and Belfast drivers surveyed, the lower incidence of drink-driving among women drivers and the higher frequency of women among Melbourne drivers would have tended to lower the expected relative incidence of drink-driving among Melbourne drivers. This was more than compensated for by the high frequency of drink-driving behaviour observed in male Melbourne drivers. The difference in the incidence of alcohol use by drivers surveyed in Melbourne and Belfast therefore results from a much higher frequency of drink-driving behaviour among the Melbourne men compared with women in both cities and with Belfast men.

Age - In both Melbourne and Belfast, people aged under 29 years were more frequent among drivers surveyed than they are in the general population. Similarly, in both surveys, drivers aged over 49 years were significantly under represented.

The population of the Belfast area has a greater proportion of people aged over 39 years than the Melbourne population and this is reflected in the age distribution of drivers surveyed. There was a higher frequency of people aged 20 to 29 years among Melbourne drivers while in Belfast drivers aged over 39 years were more prevalent (Table 28). However, this factor did not contribute significantly to the difference in alcohol consumption in the two survey populations.

There was no significant relationship between the age of drivers surveyed and the frequency of their drinking in either Melbourne or in Belfast although, in Melbourne, alcohol use tended to be more prevalent among drivers in the 30 to 49 years age categories while in Belfast it tended to be more prevalent among drivers aged 17 to 29 years.

Table 28. Age of Drivers Surveyed in Melbourne and Belfast.

Age	City	
	Melbourne (N=3503) %	Belfast (N=1949) %
Under 20 years	8.3	9.0
20 to 29 years	43.7	34.2
30 to 39 years	22.8	21.0
40 to 49 years	13.4	17.0
Over 49 years	11.8	18.8
	100.0	100.0

Chi Square Test
Highly Significant

Occupation - There was a significant relationship between blood alcohol level and occupation among drivers surveyed in Melbourne with people in administrative and managerial occupations having a higher incidence of alcohol use than any other group. Those in professional occupations, farmers, miners and fishermen, and those not working were least likely to have been drinking. This relationship did not exist among the drivers surveyed in Belfast.

In both groups of drivers surveyed, people in professional occupations were over-represented compared with the general populations of Melbourne and Northern Ireland while the unemployed and those not in the workforce were less frequent.

However, overall, drivers surveyed in Melbourne were more likely to hold professional occupations than Belfast drivers while Belfast drivers were more likely to be in the category which includes farmers and fishermen. There was no significant difference in the proportion of drivers from each country who held administrative or managerial positions, were unemployed or were not working. Farmers, fishermen and miners accounted for only about 5% of the population surveyed in Northern Ireland.

Therefore, differences in the distribution of occupation categories among the drivers surveyed in the two countries cannot account for the differences in the incidence in alcohol use. Again, generally, differences in the incidence of alcohol use among drivers tend to run counter to that which could be expected from the occupation distribution of people from Melbourne and Northern Ireland.

Season of Year - Among Melbourne drivers surveyed, the incidence of alcohol use was significantly higher in August than in any other month. In contrast, there was no significant relationship between the incidence of drink-driving and the month in which Belfast drivers were surveyed but alcohol use was higher in February than in any other month.

The months of August in the Southern Hemisphere and February in the Northern Hemisphere occur in winter and these figures may therefore suggest that drink-driving in Melbourne and Belfast tends to be more prevalent among winter drivers than among drivers in the other three seasons (Table 29).

The inclusion of November, 1981, and November, 1982, in the survey period, has led to Spring drivers being over-represented in the Melbourne information while Autumn drivers were more frequent in the Belfast figures. However, the effect of this seasonal difference in the data from the two cities does not account for the overall difference in alcohol use among drivers surveyed in Victoria and Northern Ireland.

Table 29. Alcohol Use by Drivers Surveyed in Different Seasons.

Season	City	
	Melbourne (N=3459)	Belfast (N=1968)
Winter	7.7%	1.6%
Spring	5.0%**	0.4%
Summer	4.4%	1.1%
Autumn	5.1%	0.8%*

November, 1981	*0.5%	**4.5%
November, 1982	1.1%	5.5%

Discussion -

The difference in the incidence of alcohol use among Melbourne and Belfast drivers cannot be accounted for merely by the differences in known operational and demographic characteristics of the two groups of people surveyed.

Differences in the drinking characteristics of the communities from which each group of drivers derives may provide an explanation. The incidence of indicators associated with drinking in general, such as per capita consumption, and with heavy drinking in particular, for example cirrhosis deaths, is much higher in Australia than it is in Northern Ireland (Table 30).. In contrast, the frequency of total abstinence from alcohol is five times higher in Northern Ireland than it is in Australia. Of themselves, these differences can account for much of the difference in the drink-driving behaviours of Melbourne and Belfast drivers surveyed in this project and this is in accord with Borkenstein's theory (1976) that :

> "Alcohol involvement in highway deaths reflects the cultural use of alcohol rather than the effectiveness of counter-measures such as law enforcement."

Some account has to be given to the association of particular characteristics with alcohol use and with drivers. For example, total abstainers are more likely to be women and to be older than their drinking counterparts. On the other hand, young people and men have a higher incidence of regular alcohol use. When drivers are considered, men and younger people form a greater proportion of drivers than they do in the general population, while women, older people and those not in the workforce are under-represented. These factors occur in both Northern Ireland and Australia.

This means that, in both countries, the characteristics which are over-represented among the driving population are also over-represented in the drinking population.

Table 30. Known Characteristics of Alcohol Use in Australia and Northern Ireland.

Indicator of Alcohol Use	Place		Ratio - Australia: Northern Ireland
	Australia	Northern Ireland	
Per Capita Consumption (per annum)	10.2 (Brown et al,1982)	7.3 (United Kingdom) (Brown et al,1982)	1.4
Total Abstainers	7.5% (Mugford, 1981)	37.4% (Harbison & Haire,1982)	0.2
Drink at least once a week	61.0% (Mugford, 1981)	43.0% (Harbison & Haire,1982)	1.4
Alcoholics	2.8% (Stolz,1978)	1.0% (Blaney & Mackenzie,1978)	2.8
Liver Cirrhosis & Chronic Liver Disease (Deaths per 100,000)	11.1 (Victoria) (A.B.S.,1982b)	4.4 (D.H.S.S.,1983)	2.5
Alcohol Involvement in Road Deaths	46% (Victoria) (Hendtlass et al.1981b)	22% (Royal Ulster Constabulary, 1982b)	2.1

To summarise then, Melbourne drivers surveyed have five times the incidence of drink-driving behaviour observed among Belfast drivers. This difference cannot be accounted for by differences in the alcohol use which were associated with differences in the age, sex or occupation of drivers or the

month of the survey. It seems that differences in the alcohol use by the drivers surveyed in the two cities reflect, in general, differences in the alcohol use of men in the two populations but factors associated with extreme behaviour such as the high frequency of abstinence in Northern Ireland and of very heavy drinking in Australia tend to cushion the differences observed in the driving populations.

5.2 USE OF MEDICATION

The Melbourne drivers who were surveyed in this project were 55% more likely to have used medication than those surveyed in Northern Ireland (Table 31). The degree of difference was similar for the frequency of both prescribed and non-prescribed drug use.

Table 31. Use of Medication by Drivers Surveyed in Melbourne and Belfast.

Drug Use	City: Melbourne (N=3466) %	City: Belfast (N=1949) %
No Medication	91.5	94.5
Non-Prescribed Drugs	2.3	1.5
Prescribed Drugs	6.2	4.0
	100.0	100.0

Chi Square Test
Highly Significant

There was no significant difference in the types of medication reported by drivers who used drugs in Melbourne and Belfast (Table 32) although more of the Belfast group tended to have used cardiovascular drugs and those which affect the alimentary system, while more Melbourne drivers used respiratory preparations and tranquilisers, hypnotics or sedatives.

Overall, drugs which affect the central nervous system account for about 35% of all drug use reported by drivers in both Belfast and Melbourne.

It can be shown that differences in the incidence of use of medication could not be attributed to differences in the distribution of sex, age or occupation among the two driver populations. However, the difference between Belfast and Melbourne drivers in their use of alcohol may be a contributory factor.

Sex - There was no significant difference in the incidence of use of medication reported by male and female drivers surveyed in metropolitan Melbourne or in Belfast. However, there was a significant difference between the frequencies of use of medication by male drivers surveyed in Melbourne and Belfast. This significance did not extend to the difference in the frequency of drug use by female drivers from the two countries.

In Melbourne, men who used medication used more drugs affecting the cardiovascular system while women were more likely to have used anti-infective agents, hormones and genitourinary preparations. In Belfast, differences in the types of drug use reported by men and women were not statistically significant but men tended to use more cardiovascular drugs while women were more likely to use tranquilisers, hypnotics and sedatives or drugs affecting the respiratory system.

Table 32. Comparison of Types of Medication Used by Drivers in Melbourne and Belfast.

Drug Classification	City Belfast* (N=100) %	Melbourne ** (N=295) %
Alimentary Tract & Metabolism	16.1	9.9
Blood & Blood Forming System	-	1.4
Cardiovascular System	24.2	17.3
Dermatological Drugs	1.0	1.4
Genitourinary System & Sex Hormones	-	0.9
Hormones other than Sex Hormones	-	2.0
Anti-Infectives	9.1	10.6
Musculoskeletal System	3.0	4.4
Anaesthetics***	-	0.7
Analgesics***	30.3	23.2
Antiepileptics***	-	2.8
Psycholeptics: Tranquilisers, Hypnotics & Sedatives***	3.0	8.5
Psychoanaleptics: Antidepressants, etc.***	1.1	0.9
Respiratory	11.1	16.0
Other	1.1	-
	100.0	100.0

*1% Belfast Drivers admitted use of more than one preparation.
**12% of Melbourne drivers admitted use of more than one preparation.
*** Affect Central Nervous System.

Chi Square Test
Not Significant.

This means that, while the over-representation of men among drivers surveyed in Belfast cannot account for the reduced incidence of drug use observed in Northern Ireland compared with Melbourne, it can account for the higher frequency of use of drugs which affect the cardiovascular system among Belfast drivers.

Age - Reported use of medication increased with age among drivers surveyed in both Melbourne and Belfast. Nearly all this increase could be attributed to a greater use of prescription drugs by older drivers in both countries.

However, there was no significant difference in use of medication when drivers aged under 30 years in Belfast and Melbourne are compared. This means that the over-representation of young drivers among the Melbourne survey group does not contribute to differences between the two countries in drivers' use of medication (Table 33).

On the other hand, Melbourne drivers in each age category over 30 years were about twice as likely to have used medication as their Belfast counterparts. This difference more than compensates for the over-representation of older drivers in the Belfast group and means that the higher incidence of use of medication in Melbourne can be attributed to a higher incidence of use among drivers aged over 30 years.

Table 33. Proportion who Use Medication among Different Age Groups of Drivers Surveyed in Melbourne and Belfast.

Age	City	
	Melbourne (N=3456)	Belfast (N=1904)
Under 20 years	4.4%	4.0%
20 to 29 years	5.9%	5.1%
30 to 39 years	10.0%	4.3%
40 to 49 years	9.3%	4.6%
Over 49 years	17.1%	9.1%

In both Melbourne and Belfast, age was significantly related to the type of medication used by drivers. In both cases, use of cardiovascular and musculoskeletal drugs was higher among drivers aged over 39 years while young drivers were more likely to have used analgesics and anti-infectives. This means that the tendency for Belfast drivers to report more use of cardiovascular preparations can be partly attributed to the greater proportion of older drivers among those surveyed there.

Occupation - Occupation was not significantly related to use of medication in either Melbourne of Belfast.

However, the difference in the frequency of drug use by the two groups of drivers only held for drivers in trades and labouring jobs when each occupation category was observed separately.

Alcohol Use - Drinking drivers in both Melbourne and Belfast were about twice as likely to have used medication as non-drinking drivers (Table 34).

Table 34. Proportion of Drinkers and Non-Drinkers who Used Medication among Drivers Surveyed in Melbourne and Belfast.

Alcohol Use	City: Melbourne (N=3326)	City: Belfast (N=1904)
Non-Drinkers	13.9%	10.7%
Drinkers	8.2%	5.4%

The smaller proportion of Belfast drivers who had been drinking may have contributed to the difference in the overall use of medication observed among Belfast and Melbourne drivers.

Season of Year -

The incidence of drug use was highest in August among drivers surveyed in Melbourne and in February among drivers surveyed in Belfast. Both these months are associated with winter in their respective hemispheres (Table 35).

Table 35. Use of Medication by Drivers Surveyed in Different Seasons.

Season	City: Melbourne (N=3455)	City: Belfast (N=1933)
Winter	11.9%	8.0%
Spring	8.1%**	3.1%
Summer	7.3%	5.6%
Autumn	8.1%	5.5%*

November, 1981 • 4.3% **11.8%
November, 1982 6.8% 4.9%

There was a significant difference among the Melbourne drivers in the spring figures for different years of the survey. In 1981, the higher incidence of drug use could be partly attributed to antihistamines which are used for treatment of hayfever and if these 1981 figures are considered an anomaly, the spring figures show the lowest incidence of drug use in both Melbourne and Belfast.

Summary - Melbourne drivers appear to be about 1.5 times more likely than Belfast drivers to say that they have used medication. This difference is about the same for both prescription and over the counter drug use and reflects differences between the two cities in the frequency of use of medication by drivers aged over 30 years and the high incidence of drug use among drinking drivers who are 3.5 times more frequent in the Melbourne group.
Overall, 10.7% of Melbourne drivers and 6.8% of Belfast drivers surveyed have used alcohol or medicines or both.

The incidence of alcohol and medication use is higher in winter than in any other season in both Melbourne and Belfast and, in contrast, if 1981 spring figures for Melbourne are excluded, use of medicines is low in springtime. However, there does not seem to be a consistent variation in the types of drugs used in each season.

6. CONCLUSIONS AND RECOMMENDATIONS

This project has shown that drivers surveyed in metropolitan Melbourne, Victoria, have used alcohol and medication more often than their counterparts in rural areas of the State or in Belfast, Northern Ireland (Table 36).

Table 36. Frequency of Alcohol and Medication Use by Drivers

Drug Use	Place of Survey: Metropolitan Melbourne (N=3470)	Rural Victoria (N=267)	Belfast (N=1904)
Alcohol	5.3%	2.1%	1.5%
Medication	8.4%	2.6%	5.5%
Alcohol and/ or Medication	10.7%	3.7%	6.7%

The weekend, night-time driving population has been shown to be consistently much more likely to be men, to be aged under 40 years and to work in white collar occupations than the number of people with these characteristics in the adult communities of Victoria and Northern Ireland would lead us to expect. Men and young people are known to have a high accident potential relative to other drivers (Carlson, 1972; Henderson, 1975).

6.1 ALCOHOL USE

In Australia and Northern Ireland, men aged under 44 years are more likely to drink more alcohol more often than any other identifiable group in the community (A.B.S., 1978; Blaney & Mackenzie,1978). Male drivers surveyed in this project were also consistently more likely to have been drinking than female drivers but age was not significantly related to drink-driving behaviour.

Traditionally it has been considered too difficult to relate incidence of alcohol use in the community to the drinking behaviour of drivers (e.g. South, 1982). This has probably occurred because drinking problems have carried a social stigma which has led to subjugation of their influence on other community issues. As well, deterioration of driving skills and increased accident risk occur at blood alcohol levels below those which are normally associated with intoxication (e.g. Borkenstein et al, 1964; McLean and Holubowycz, 1981) and it has therefore been important, in a policy sense, to dissociate drink-driving from general inebriance. It is probably relevant in the context of road safety, to continue to discriminate between objective measures of heavy or frequent drinking and the implication of drunkenness or alcoholism which accompanies a blood alcohol reading over 0.15g/100ml or consumption of over 80g alcohol per day (Rankin & Wilkinson, 1971).

This project has shown that 2.7% of male drivers surveyed in Melbourne and 1.0% of drivers surveyed in Northern Ireland had a blood alcohol concentration of over 0.05g/100mls. People with this reading are likely to be frequent or heavy drinkers, that is they are likely to regularly consume more than 28 to 40g of alcohol per day. These levels are considered the upper limits for safe alcohol consumption in literature published in Northern Ireland and Australia respectively (Rankin & Wilkinson, 1971; Harbison & Haire, 1982).

Social drinkers rarely drink beyond a blood alcohol concentration of 0.05g/100mls or 0.08g/100mls (Hurst, 1973). Borkenstein & his associates (1964) found that 63% of American drivers with a blood alcohol level exceeding 0.05g/100mls were heavy drinkers. Therefore, while it cannot be assumed that only heavy drinkers achieve high blood alcohol readings (Sharma & Moskowitz, Undated), it is unlikely that an infrequent drinker would encounter a breath-testing station on the rare occasion when his reading did exceed 0.05g/100mls.

Heavy drinkers are known to be more likely to be involved in road accidents than other drinkers (Hurst, 1973) and many are also multiple drug users (Carroll et al, 1977;Healy, 1977; Travers & Hendtlass, 1978). Further, in this survey there was a significant difference between drink-drivers surveyed in Melbourne with a blood alcohol reading under 0.05g/100mls and those with a higher reading in the frequency with which they used prescribed medication. As well, previous work in Northern Ireland (Robinson, 1979) has shown 13% of blood samples taken from drivers with a blood alcohol concentration between 0.01g/100mls and 0.08g/100mls contained psychoactive drugs compared with 55% of blood samples from drivers with readings above 0.08g/100mls.

Therefore, in the context of this project, male heavy drinkers are a particularly important group of drivers.

In the community, 17.4% of men in Victoria drink over 40g alcohol per day (A.B.S., 1978) while in Northern Ireland 6.0% of men in the Eastern Health and Social Services Area drink over 29g alcohol per day (Harbison & Haire, 1982). Further, the average daily consumption of alcohol by men in Australia is 21.1g (A.B.S., 1978) compared with 9.1g in Northern Ireland (Harbison & Haire, 1982). The per capita death rate from liver cirrhosis and chronic liver disease among men is 2.8 times higher in Victoria than it is in Northern Ireland (A.B.S., 1982b; D.H.S.S., 1983) (Table 37).

There is therefore a constant relationship between these published indicators of heavy drinking behaviour by men in Victoria and men in Northern Ireland. It is similar to the relative frequency with which men from each country drive with a blood alcohol reading over 0.05g/100ml.

Table 37 Indicators of Frequent or Heavy Drinking among Male Drivers and Men in the General Population.

Indicator	Place		Ratio - Victoria: Northern Ireland
	Victoria	Northern Ireland	
B.A.C.over 0.05g/100ml (this survey)	2.7% (Melbourne)	1.0% (Belfast)	2.7
Frequency of Heavy Drinking	17.4% (over 40g/day) (A.B.S., 1978)	6.0% (over 29g*/day) (Eastern D.H.S.S Area) (Harbison & Haire, 1982)	2.9
Average Daily Consumption (g*)	21.1 (Australia) (A.B.S., 1978)	9.1 (Harbison & Haire, 1982)	2.3
Deaths from Liver Cirrhosis and Chronic Liver Disease (per 100,000)	22.2** (A.B.S., 1982b)	8.0 (D.H.S.S., 1983)	2.8

* Calculated from A.B.S., 1978, and Harbison & Haire, 1982, figures for fortified wine where 1 unit is equivalent to 4g alcohol.

** 62% of these deaths known to be due to alcohol (A.B.S., 1982b).

The constant relationship between cirrhosis death rates and the proportion of drivers with a particular blood alcohol reading in the two groups of drivers surveyed in this project was not found by Smart (1976) in his analysis of published data relating to several countries in North America and Europe. He was surprised by this lack of correlation. However, it seems possible that his result may be explained by the different sampling methods used in gathering the data about drink-drivers used in his analysis; or from his not seperating out men for specific attention when it is known that they are heavily over-represented among both the drinking and the driving populations; or from his using the frequency of driving with a blood alcohol level over 0.1g/100ml to compare with the frequency of deaths from liver cirrhosis. It is of course, also possible that Australia and Northern Ireland are more alike in these matters than the countries which Smart used in his analyses.

The data presented here are consistent with the hypothesis that there is a direct relationship between the incidence of heavy drinking among men in the community and the frequency with which male, weekend, night-time drivers exceed a blood alcohol level of 0.05g/100mls. All the indices used also suggest that heavy drinking among Victorian men is about 2.7 times higher than it is among men in Northern Ireland.

The special problem of preventing heavy drinkers from driving seems to be largely intransigent to conventional legal deterrents such as heavy fines and long minimum periods of licence disqualification (Steenhuis, 1979; Homel, 1980; Hendtlass et al, 1981b). In the United Kingdom, driving with a blood alcohol reading slightly over the legal limit is considered by the community to be only 9th in rank order of severity of thirty-one traffic offences while a reading over 0.15g/100mls is considered 29th in the order (Brown & Copeman, 1975). Further, the likelihood that any single drink-driving trip will be detected has been calculated to be around 1 in 750 in Victoria (Hendtlass et al, 1981b). This means that two elements required for effective deterrence from drink-driving with a blood alcohol level under 0.15g/100ml, social unacceptability of the behaviour and sufficiently high perceived risk of detection, are not met by legal sanctions (Zimring & Hawkins, 1973).

The results of this survey suggest that new efforts directed at reducing the frequency of drink-driving behavior may be better concentrated on the drinking behavior of the community instead of using legal threat to persuade the heavy drinker to restrict his driving behaviour. For example, barmen and barmaids have been identified as a group in the community which has relevant access to drinkers and the skills to intervene in reducing heavy alcohol consumption and drink driving behaviour (Waring & Sperr, 1982). The precedent for their use in this sort of programme has been set by the California Alcoholic Beverage Control Department but their potential influence is still largely untapped in Australia and Northern Ireland (Rice, 1981).

It is therefore recommended that dialogue be opened between road safety and other groups in the community with the aim of developing counter measures appropriate to reducing the frequency of alcohol use by men in each country.

The documented association between heavy drinking behaviour and detection with a blood alcohol reading over 0.05g/100mls (Borkenstein et al, 1964; Hurst, 1973) suggests that it may be more sensible to deal behaviourally with the drinking pattern of drink-drivers identified with blood alcohol. readings under 0.15g/100mls seperately from those with higher blood alcohol readings and seperately from their driving behavior.

Until now most intervention schemes designed specifically for convicted drink drivers have selected clients who had a blood alcohol reading over 0.15g/100ml or were multiple offenders. These people are usually high risk offenders who present with diagnosable alcohol problems (e.g. Waller, 1967; Buikhuisen, 1969) and it is inconsistent to offer them treatment as part of the sentencing or relicensing process (McGrath et al, 1977; Bush, 1982; Department of the Attorney General and of Justice, 1982). Court cases can take place up to nine months after detection and the minimum period for licence disqualification in these cases is two years. Inevitably, evaluation of programmmes administered so long after the original offence in terms of their effect on recidivism has led to equivocal results (Hagen et al, 1979; Homel, 1980; South, 1980).

Alternative procedures could include, for example, requiring immediate court appearances for drink driving offenders (Department of Transport, 1979; Brennan & Duffy, 1981). This procedure would establish a suitable background for immediate crisis intervention strategies relevant to each individual's level of alcohol consumption to be introduced.

It is therefore recommended that particular attention be paid to developing innovative, evaluated procedures for dealing with the possible frequent heavy drinking behaviour of drivers detected with a blood alcohol reading over the legal limit.

6.2

Over 8% of Melbourne drivers and 5% of Belfast driver surveyed said that they had used medication. This figure is an underestimate of the true figure because of the self-reported nature of the data and because the question asked about "use of tablets or medicines today" will have selected against use of sleeping preparations on the previous evening. Use of other illicit drugs such as marijuana will not have been admitted. Nevertheless, more of the drivers surveyed in this project said they had used medication than had used alcohol.

The degree of difference between Melbourne and Belfast drivers in the frequency with which they said they had used medication was not as great as the difference in the use of alcohol by the two groups and this is generally consistent with the information which is available to describe the use of drugs and other health care facilities in each community (Table 38).

Use of medication by drivers in both Victoria and in Northern Ireland increased with age in the same way that it does in the general population (Blaney & Mackenzie, 1978; A.B.S., 1979) and the high proportion of people aged over 49 years among drivers surveyed in Belfast may account for some of the inconsistency between similar prescribing rates in each country but more frequent use of medication among Melbourne drivers. People aged over 49 years who had taken medication account for 1.5% of all Belfast drivers but only 0.3% of all Melbourne drivers surveyed.

Another factor which could influence the degree with which the frequency of prescribed drug use among drivers is related to published information about use of medication is the relative urbanisation of Melbourne and Belfast. Prescribing frequency is related to population density and to the number of patients attended by general practitioners (Parish, 1971) and this means that the per capita use of prescription drugs in the city of Melbourne would be relatively underestimated in National data (Webb, 1982).

In Northern Ireland, on the other hand, published figures about use of medication in the Province could be expected to more closely reflect the situation in the survey area (Northern Ireland Central Services Agency, 1982).

Table 38. Indicators of Adult use of Medication and Other Health Care Facilities in Australia and Northern Ireland.

Indicator	Place		Ratio - Australia: Northern Ireland
	Australia	Northern Ireland	
Use of Medication by Drivers (These surveys)	8.4% (Melbourne)	5.5% (Belfast)	1.5
Annual Prescription Rate (per capita)	8.9 (Webb, 1982)	11.7 (Over 14yrs) (N.I. Central Serices Agency)	0.8
Used Medication in last 2 days	54.6% (A.B.S.,1979)	NK	
Used Sleeping Medicines	6.8% (Over 14yrs) (In last 2 days) (A.B.S.,)1979)	6.3% (Eastern D.H.S.S. Area) (Daily) (Blaney & Mackenzie, 1978)	1.1
Seen General Practitioner in last 2 weeks	29.7% (Victoria) (A.B.S.,1979)	17.8% (Blaney & Mackenzie, 1978)	1.7
Attended Hospital Casualty Department	9.5% (Last 2weeks) (A.B.S.,1979)	5.0% (Eastern D.H.S.S. Area) (Last6months) (Blaney & Mackenzie, 1978)	1.9
Average Annual Number of Consultations with General Practitioner (per capita) (by calculation)	10.8	4.6	2.3

There was no significant difference between male and female drivers in the frequency with which they used medication even though women in the respective general populations use these drugs more often than men (Parish, 1971; Blaney & Mackenzie, 1978; A.B.S., 1979). This could be explained by the disproportionally small number of women drivers aged over 30 years in each driver group because these older women are the group who contribute most to the difference between male and female members of the community in their use of medication.

Two thirds of the drugs used by drivers were prescribed which is a higher proportion than was found in population surveys in Australia and Great Britain (Parish, 1971; A.B.S., 1979). The distribution of types of prescribed drug use reported by drivers is not significantly different from that reported in the prescribed drug indices of both Australia and Northern Ireland (Northern Ireland Central Services Agency, 1982; Webb, 1982).

In both Melbourne and Belfast there was a seasonal variation in use of medication by drivers which followed that which would be expected in the community with the highest levels occurring in winter in both hemispheres.

All these factors suggest that drivers' use of medication generally follows the use of medicines in the adult population but that prescribed drug use is more frequent than use of over-the-counter medicines.

In Melbourne and Belfast, 4.4% and 3.0% respectively of drivers had taken medication in the categories that include many drugs which are known to affect the driving-related skills; that is, they have used drugs which affect the central nervous or the respiratory systems (e.g. Clayton et al, 1978; de Gier et al, 1981; Fink & Irwin, 1982; Palva et al, 1982).

These figures are higher than the proportion of drivers who were found to have a blood alcohol reading over 0.05g/100mls, a level which has been associated with increased likelihood of crash involvement and reduced psychoactive performance (Table 39).

Table 39. Comparison of the Incidence of Use of Drugs which may Impair Driving among Drivers surveyed in Melbourne and Belfast.

Drug Use	Place	
	Melbourne	Belfast
Drugs which may Impair Driving*	4.4%	3.0%
Blood Alcohol Level Over 0.05g/100mls	2.1%	0.8%

* Central Nervous System, Respiratory

It is known that drugs which affect the central nervous or respiratory systems as well as those affecting the cardiovascular and musculoskeletal systems increase the likelihood of accident involvement of drinking drivers (Macpherson et al, 1982) and they can also increase the effects of alcohol on psychomotor performance (e.g. Palva & Linnoila, 1978; Palva et al, 1982; Scott et al, 1982; Seppala et al, 1982). Use of medication could therefore be between two and four times as important as alcohol in contributing to accident involvement even if only those drugs known to affect driving-related skills have a similar effect on predisposition to crashes.

It is therefore recommended that research into the precise relationship between use of the most frequently used medicines and accident risk be given high priority.

It is important not to generalise the effects which drugs have on driving performance, even within chemically, pharmacologically or physiologically similar groups of substances. For example, not all antihistamines affect psychomotor skills equally (Clarke & Nicholson, 1978); not all antidepressants affect psychomotor skills equally (Clayton et al, 1977; Scott et al, 1982) and not all benzodiazepines affect psychomotor skills equally (Seppala et al, 1982).

Any legal sanctions which are brought against medicated drivers must therefore include measures of impairment such as those used in California (Hendtlass & Starmer, 1983) or those being developed in England (Bragg & Tay Wilson, 1980).

Further, legal drug controls do not significantly reduce the non-medical use of drugs in the community (Lonie, 1979) and their use in the road safety context is not likely to be effective unless they are seen as part of a package which also involves those who control the medical use of drugs. The high proportion of prescribed drugs in the medication use reported by drivers underlines the important role which the medical profession and pharmacists could play in this area.

It is therefore recommended that countermeasures directed against use of drugs already known to affect driving related skills or to potentiate the affects of alcohol on driving be undertaken. These initiatives should be directed through the drug regulatory organisations which already exist and should therefore involve the medical professions and pharmacists, as well as law enforcement agencies.

However, it has been stated:

"Any serious evaluation of general practitioners prescribing and their use of therapeutic knowledge quickly leads to the conclusion that the channels of information are overloaded" (Parish, 1971).

This means that dissemination of information about drugs and driving needs to be handled realistically.

Australia and Northern Ireland would do well to note the initiative of the Scandanavians in this area.

A definitive system of warnings has been introduced in Norway in which a committee first considers the drug's potential 'danger to traffic', that is the number of road users liable to be prescribed each preparation which is available. A list of potentially dangerous drugs has been compiled and a warning label must be affixed to all listed drug containers. The prescriber still retains the right to order a label for unlisted drugs but he may not waive the requirement to label listed drugs. An explanatory leaflet is also issued to the patient when the prescription is dispensed.

The text of this leaflet puts the responsibility firmly on the patient:

"Everyone knows that alcohol impairs your ability to drive a motor vehicle in a reasonable manner and that there are heavy penalties (prison) for driving when intoxicated.

But are you aware that drugs may also impair your ability and that it is an offence to drive if your ability to do so is reduced by drugs?"

The information in the leaflet also:

- Gives broad categories of drugs liable to be dangerous,
- Asks patients to be aware of their own symptoms and warns them not to venture onto the road if they have reason to expect impairing symptoms,
- Makes the point that not everyone reacts in the same way to drugs. The important feature is how you react yourself.

Lists can be dangerous generalisations but, providing patients are not told unbelievable things like "all drugs impair driving" or "all drugs interact with alcohol", education like this is an area where prescribers, health authorities and motoring organisations can greatly contribute to road safety. This would enable more complicated research to continue less pressured by demands to do something now.

SUMMARY AND RECOMMENDATIONS

The use of alcohol and medication reported by weekend, night-time drivers stopped randomly by police in Victoria and Northern Ireland has been surveyed.

In metropolitan Melbourne, 5.3% of drivers surveyed had used alcohol, 8.4% had used medication and 10.7% had used alcohol or medication or both. Figures for drivers surveyed in rural Victoria were 2.1%, 2.6% and 3.7%, respectively. In Belfast, 1.5% of drivers had been drinking, 5.5% had used medication, and 6.7% had used one or both of these types of drugs.

Differences between Melbourne and Belfast in the incidence of drink-driving are similar to differences between known indices of alcohol use in the two communities especially when the demographic characteristics of drivers are taken into account.

In both countries the drivers surveyed were more likely to be male, to be aged under 29 years and to be in white collar occupations than the general populations. Drinkers in the community are also more likely to be male, to be aged 25 to 50 years and to be in white collar occupations.

The relative frequencies with which male drivers in Melbourne and Belfast were found to have a blood alcohol reading over 0.05g/100 mls was directly related to the difference in the frequencies of heavy drinking and death from liver cirrhosis in the two communities. The incidence of heavy drinking among male drivers and men in the community appears to be consistently 2.7 times higher in Melbourne than it is in Belfast. In the road safety context, it may be more appropriate to address the drinking behaviour of the men in the community than to concentrate only on their drink-driving behaviour.

It is therefore recommended that dialogue be opened between road safety and other groups in the community with the aim of developing counter-measures appropriate to reducing the frequency of alcohol use by the men in each country.

Intervention schemes for convicted drink drivers have been, until now, made available more often to those with blood alcohol readings over 0.15g/100ml or those who are multiple offenders. These people are usually problem drinkers or alcoholics and it may be relevant to deal with the possible heavy drinking behaviour of those people convicted with lower blood alcohol readings separately from those who exceed a blood alcohol level of 0.15g/100ml.

It is therefore recommended that particular attention be paid to developing innovative, evaluated procedures for dealing with the drinking behaviour of drivers detected with a blood alcohol reading over the legal limit.

Drivers' use of medication generally seemed to follow use of medicines in the general populations and, in Melbourne and Belfast, 4.4% and 3.0% respectively of drivers had taken medicines which can affect driving related skills. This frequency was between two and four times higher than the number of drivers who exceeded blood alcohol reading of 0.05g/100mls, the level which has been associated with increased likelihood of crash involvement and reduced psychoactive performance.

Use of medication was reported significantly more frequently among drinking drivers than non-drinking drivers in both Melbourne and Belfast and, among drinking drivers, this use of drugs was more frequent in the group with a blood alcohol level over 0.05g/100ml. In Melbourne, over 80% of those drugs used by drinking drivers are known to increase the likelihood with which they will be involved in an accident.

It is therefore recommended that research into the precise relationship between use of the most frequently used medicines and risk of crash-involvement be given high priority.

Use of prescription drugs by drivers was reported up to six times more frequently than use of over-the-counter preparations. This means that it is unlikely that legal sanctions against medicated drivers will be effective unless they are part of a package which involves those who control the medical use of drugs.

It is therefore recommended that counter-measures directed against use of drugs already known to affect driving-related skills or to potentiate the affects of alcohol on driving be undertaken. These initiatives should be directed through the drug regulatory organisations which already exist and should therefore involve the medical profession and pharmacists as well as law enforcement agencies.

REFERENCES

ALHA, A.R., KARLSON, M., LINNOILA, M. & LUKKARI, I., 1977
Prevalence of Drugs Among Drivers Arrested for Drinking and Driving in Finland.
Z. Rechtsmedizin 79: 225-234

AUSTRALIAN BUREAU OF STATISTICS, 1978
Alcohol & Tobacco Consumption Patterns. February, 1977
Catalogue No. 4312.0 Canberra.

AUSTRALIAN BUREAU OF STATISTICS, 1979
Australian Health Survey
Catalogue No. 4311.0 Canberra.

AUSTRALIAN BUREAU OF STATISTICS, 1981
Census of Population & Housing,
Small Area Summary. Victoria.

AUSTRALIAN BUREAU OF STATISTICS, 1982a
Apparent Consumption of Foodstuffs & Nutrients, Australia, 1980-81
Catalogue No. 4306.0 Canberra

AUSTRALIAN BUREAU OF STATISTICS, 1982b
Mortality Tabulations 1981.

AUSTRALIAN DEPARTMENT OF HEALTH, 1981
Operation of the Drug Treaties, Australia, 1978-80

AUSTRALIAN FEDERAL POLICE, 1981
Drug Abuse in Australia 1980.

AUSTRALIAN FEDERAL POLICE, 1982
Drug Abuse in Australia 1981.

BEAN, P., 1974
The Social Control of Drugs.
Law in Society Series.
Campbell, C.M., Carson, W.G., & Wiles, P.N.P.
pub. Robertson. London.

BIRD, K.D., BOLEYN, T., CHESHER, G.B., JACKSON, D.M., STARMER, G.A. & TEO, R.K.S., 1980.
Intercannabinoid & Cannabinoid-Ethanol Interactions and their Effects on Human Performance
Psychopharmacol. 71: 181 - 188

BLACK, D., 1982
Ulster - The Road Safety Story
Care on the Road October, p14

BLANEY, R. & MACKENZIE, G., 1978
A Northern Ireland Community Health Study.
Report to the Department of Health & Social Services, Northern Ireland.

BORKENSTEIN, R.F., 1976
Efficacy of Law Enforcement Procedures concerning Alcohol, Drugs and Driving.
Mod. Probl. Pharmacopsych. 11: 1-10

BORKENSTEIN, R.F., CROWTHER, R.F., SHUMATE, R.D., ZIEL, W.B. & ZYLMAN, R., 1964
The Role of the Drinking Driver in Traffic Accidents.
Indiana University, Department of Police Administration.

BRAGG, B.W.E. & TAY-WILSON W., 1980
Evaluation of a Performance Test to Detect Impaired Drivers.
Acc. Anal. Prev. 12: 55-65

BRENNAN, M.W. & DUFFY, T.G., 1981
The Bebefits of Early Disposition of Drinking-Driver Cases in Alcohol, Drugs & Traffic Safety.
ed. Goldberg, L., Vol111 pp.1389-1897

BROWN, M.M., DEWAR, M.F., & WALLACE, P., 1982
International Survey - Alcoholic Beverage Taxation & Control Policies, 5th edition.
Brewers Association of Canada

BROWN, I.D. & COPEMAN, A.K., 1975
Drivers' Attitudes to the Seriousness of Road Traffic Offences Considered in Relation to the Design of Sanctions.
Acc. Anal. Prev. 7: 15-26.

BUIKHUISEN, W., 1969
Criminological & Psychological Aspects of Drunken Drivers
Ministry of Justice, The Hague, Netherlands.

BUSH, R., 1982
Intervention Programmes for Convicted Drink Drivers.
An Evaluation and Some Suggestions for Future Directions
N.S.W. Drug & Alcohol Authority.
Briefing Paper 2.

CARLSON, W.L., 1972
Alcohol Usage of the Night-time Driver.
J. Saf. Res. 4: 12-25

CARROLL, J.F.X., MALOY, T.E., & KENRICK, F.M., 1977
Drug Abuse by Alcoholics and Problem Drinkers:
A Literature Review & Evaluation.
Amer.J.Drug Alcohol Abuse 4: 317-341

CHILDS, J.M., 1978
Caffeine Consumption & Target Skanning Performance.
Human Factors 20: 91-96

CIMBURA, G., WARREN, R.A., BENNETT, R.C., LUCAS, D.M.
& SIMPSON, H.M., 1980
Drugs Detected in Fatally Injured Drivers & Pedestrians in the
Province of Ontario.
Traffic Injury Research Foundation, Ontario, Canada.

CLARKE, C.H. & NICHOLSON, A.N., 1978
Performance Studies with Antihistamines
Br. J. Clin Pharmacol. 6: 31-35

CLAYTON, A.B., 1976
The Effects of Psychotropic Drugs upon Driving-Related Skills.
Human Factors 18: 241-252

CLAYTON, A.B., HARVEY, P.G., & BETTS, T.A., 1977
The Effects of Two Antidepressants, Impramine and Viloxazine,
upon Driving Performance.
Proc. Int. Symp. on Alcohol, Drugs & Traffic Safety, Melbourne.

CLAYTON, A.B., McCARTHY, P.E., & BREEN, J.M., 1980
The male drinking driver: Characteristics of the Offender & his Offence.
Transport & Road Research Laboratory, Supplementary Report 600.

DE GIER, J.J., t'HART, B.J., NELEMANS, F.A. & BERGMAN, H., 1981
Psychomotor Performance & Real Driving Performance of Outpatients receiving Diazepam.
Psychopharmacol. 73: 340-344

DEPARTMENT OF HEALTH AND SOCIAL SERVICES, 1983
Unpublished Information.

DEPARTMENT OF TRANSPORT, 1979
Consultative Document on Drinking & Driving.
London (H.M.S.O.).

DEPARTMENT OF THE ATTORNEY GENERAL & OF JUSTICE, 1982
The Sydney Drink-Driver Rehabilitation Programme: An Evaluation of the Pilot Scheme 1976
N.S.W. Bureau of Crime Statistics & Research, Research Report 10.

DREW, L.R.H., 1983
Death & Drug Use in Australia, 1969 to 1980
Technical Information Bulletin 69: 1-29

DUNCAN, J.A., 1976
Drinking/Driving by Canberra Motorists.
Canberra, Australian Government Printing Service.

FINK, M. & IRWIN, P., 1982
Central Nervous System Effects of Aspirin
Clin. Pharmacol. Ther. 32: 362-365

FINKLE, B.S., 1969
Drugs in Drinking Drivers: Study of 2,500 Cases
J. Saf. Res. 1: 179-183

FINKLE, B.R., BIASOTTI, A. & BRADFORD, L.U., 1968
The Occurrence of Some Drugs & Toxic Agents Encountered in Drinking-Driver Investigations
J. For. Sci. 13: 236-2

FRANKS, H.M., HENSLEY, V.R., HENSLEY, W.J., STARMER, G.A. & TEO, R.K., 1978
The Interaction between Alcohol & Antihistamines/Dexchlorpheniramine
Med. J. Aust. 1: 449-452

FURLONG, W.V., 1922
Brit. Med. J. 1: 862

GELBKE, H.P., SCHLICHT, H.J. & SCHMIDT, G., 1978
Occurrence of Diazepam in Blood Samples of Drivers Under the Influence of Alcohol
Z. Rechtsmedizin 80: 319-328

GOLDBERG, L. & BONNISCHEN, R., 1970
Trafica Yaterhetsbrotl, Statens Offentiliga Utreninger, SOV 61,1970.

HAGEN, R.E., WILLIAMS, R.L. & McCONNELL, E.J., 1979
Traffic Safety Impact of Alcohol Abuse Treatment as an Alternative to Mandatory Licensing Controls.
Acc. Anal. Prev. 11: 275-291

HARBISON, J.J.M., & HAIRE, T., 1982
Drinking Practices in Northern Ireland
A Survey Carried out on behalf of the Department of Health and Social Services (NI).

HARRIS, J. & BUSH, R., 1981
Drinking Driver Progress N.S.W. Drug and Alcohol Authority Briefing Paper 1.

HEALY, P., 1977
Use of Psychotropic Drugs in Australia.
Informed Opinion, 14: 1-23. Health Commission, N.S.W.

HENDERSON, M., 1975
Traffic Accidents & Social Deviance
in Edwards, A.E. and Wilsom, P.R. eds
Social Deviance in Australia, Melbourne, Cheshire

HENDTLASS, J., BOCK, I.M. & RYAN, M.P., 1981a
Drivers involved in Metropolitan Casualty Crashes.
in Man, Drugs & Society-Current Perspectives,
Proc. 1st Pan Pacific Conference on Alcohol & Drugs, Canberra. pp 124-136.

HENDTLASS, J., BOCK, I.M. & RYAN, M.P., 1981b.
Drink-Driving Counter-measures. Study of the Victorian System.
Australian Department of Transport Report CR 23

HENDTLASS, J. & STARMER, G., 1983
Drugs & Driving: Current Perspectives
Office of Road Safety, Department of Transport & Construction
Report No. WD69

HINDMARCH, I. & GUDGEON, P., 1980
The Effects of Clobazepam & Lorazepam on Aspects of
Psychomotor Performance and Car Handling Ability.
Brit. J. Clin. Pharmacol, 10: 145-150

HOME OFFICE, 1980
Statistics of the Misuse of Drugs in the United Kingdom, 1979
Home Office Statistical Bulletin, Issue 11/80

HOMEL, R., 1980
Penalties and the Drink-Driver.
A Study of One Thousand Offenders
Research Report 7,
N.S.W. Bureau of Crime Statistics and Research.

HOMEL, R., 1983
The Impact of Random Breath Testing in New South Wales,
December, 1982 to February, 1983.
Med. J. Aust. 1: 616-619

HONKANEN, R., ERTAMA, L., LINNOILA, M., et al, 1980
Role of Drugs in Traffic Accidents.
Brit. Med. J. 281: 1309-1312

HURST, P.M., 1973
The Epidemiological Aspects of Alcohol in Driver Crashes &
Citations.
J.Saf. Res. 5: 130-148

JOHNSTON, I.R., 1982
Deterring the Drinking Driver - Australia's Experience.
Australian Road Research Board
Internal Report AIR 361-2

KNOX, R.B., & TUOHY, M., 1981
Pollen, Plants and People - A Review of Pollen Aerobiology in Southern Australia.
Proc. Weeds Conf. 6th August 2: 125-142

LAW REFORM COMMISSION, 1976
Alcohol, Drugs & Driving.
Australian Government Publishing Service, Canberra.

LONIE, J., 1979
A Social History of Drug Control in Australia
Royal Commission into the Non-Medical Use of Drugs,
South Australia.

LUNDBERG, G.D., WHITE, J.M., & HOLLMEN, K.I., 1979
Drugs (other than alcohol and in addition to alcohol) & Driving Behavior.
J. For. Sci. 24: 207-215

MacPHERSON, R.D., HOMEL, R., PERL, J., & STARMER, G., 1982
Self Reported Drug Usage & Crash-Incidence in Breathalised Drivers.
Submitted to Accident Anal. Prev.

McCULLOUGH, H.M., 1982
The Royal Ulster Constabulary
Police Studies 4: 3-12

McGRATH, T., O'BRIEN, T., LIFTIK, J., 1977
Coercive Treatment for Alcoholic 'Driving Under the Influence of Liquor' Offenders
Brit. J. Addict. 72: 223-229

McLEAN, A.J., & HOLUBOWYCZ, O.T., 1981
Alcohol & Risk of Accident Involvement
Alcohol, Drugs & Traffic Safety Vol. 1 ed.
Goldberg L. pp 113-123

MELBOURNE & METROPOLITAN BOARD OF WORKS, 1981
Comparative Local Statistics,
Melbourne Statistical Division.

MILNER, G., 1974
Drink, Drugs & The Driver,
Proc. Summer School of Studies on Alcohol & Drugs,
Melbourne pp 138-155

MISSEN, A.W., CLEARY, W., ENG, L., & McMILLAN, S., 1978
Diazepam, Alcohol and Drivers,
N.Z. Med. J. 87: 275-277

MOBERG, J., 1980
Roadside Surveys in Northern Sweden,
Roadside Surveys Conference, Umeo, Sweden, 1980

MORGAN, W.H.D., 1981
A Review of Breath Testing in Northern Ireland 1968-1979
Alcohol Drugs & Traffic Safety ed. Goldberg, L., Vol.1.pp
195-202

MOSER, J., 1974
Problems & Programmes Related to Alcohol & Drig Dependence in
33 Countries.
World Health Organisation, Geneva

MUGFORD, S., 1981
Patterns of Drug Use in Canberra, Australia in 1971 & 1978
Man, Drugs & Society: Current Perspectives
Proc. 1st Pan-Pacific Conference on Drugs & Alcohol. Canberra,
1980 p 56-64.

NIE, N.H., HILL, C.H., JENKINS, J.G., STEINBRENNER, P.C. & BENT,
D.H., 1975
Statistical Package for Social Sciences.
pub. McGraw Hill, N.Y.

NORTHERN IRELAND 1971 CENSUS.
(cited by Blaney & Mackenzie)

NORTHERN IRELAND CENTRAL SERVICES AGENCY, 1982
Prescriptions Dispensed
Unpublished Report.

PALVA, E.S.& LINNOILA, 1978
Active Metabolites of Chlordiazepoxide & Diazepam, Alone or in
Combination with Alcohol, on Psychomotor Skills Related to
Driving.
Eur. J. Clin. Pharmacol. 13: 134-350

PALVA, E.S., LINNOILA, M., ROUTLEDGE, P., & SEPPALA, T., 1982
Actions & Interactions of Diazepam & Alcohol on Psychomotor Skills in Young & Middle-Aged Subjects.
Acta Pharmacol. Toxicol. (Kbh.) 50: 363-369

PARISH, P.A., 1971
The Prescribing of Psychotropic Drugs in General Practice.
J. Royal College General Practitioners 21 (Suppl.4)

PIETERSE, S.H., 1980
Roadside Surveys in South Africa, 1975 to 1978
Roadside Surveys Conference, Umeo, Sweden.

PISHKIN, V., LOVALLO, W.P., FISHKIN, S.M., & SHIRLEY, J.I., 1980
Residual Effects of Temazepam & Other Hypnotic Compounds on Cognitive Function.
J.Clin. Psychiat. 41: 358-363

RANKIN, J.G., & WILKINSON, P., 1971
In The Health of a Metropolis
ed. Krupinski, J. & Stoller, A.,
Pub. Heinemann Education, Sydney.

RICE, B., 1981
Training for the Bar
Traffic Safety Newsletter, November: 7
National Highway & Transport Safety Association

ROAD SAFETY & TRAFFIC AUTHORITY, 1982
Road Accident Facts.
Government Printer Melbourne.

ROAD SAFETY & TRAFFIC AUTHORITY, 1983
Unpublished data.

ROBINSON, T.A., 1979
The Incidence of Drugs in Impaired Driving Specimens in Northern Ireland.
J. For. Sci. Soc. 19: 237-244

Ro.S.P.A., 1983
1981 Road Accident Statistics.

ROYAL ULSTER CONSTABULARY, 1982a
Chief Constable's Report, 1981

ROYAL ULSTER CONSTABULARY, 1982b
Road Traffic Accident Report 1981.

ROYAL ULSTER CONSTABULARY, 1983
Unpublished Information

SCOTT, D.B., FAGAN D. & TRIPLADY, B., 1982
Effects of Amitryptyline & Zimeldine in Combination with Ethanol
Psychopharmocology (Berlin) 76: 209-211

SENATE STANDING COMMITTEE ON SOCIAL WELFARE, 1981
Another Side of the Drug Debate ... a medicated society/ The Parliament of the Commonwealth of Australia, Parliamentary Paper No. 98/1981.

SEPPALA, T., ARANTO, K., MATTILA, M.J. & SHROTRIYA, R.C., 1982
Effects of Alcohol on Buspirone & Lorazepam Actions.
Clin. Pharmacol. Ther. 32: 201-207

SHARMA, S., & MOSKOWITZ, H., UNDATED.
Alcohol Consumption of Social Drinkers in an Experimental Situation.
Unpublished Report

SMART, R.G., 1976
Per Capita Alcohol Consumption, Liver Cirrhosis Death Rates and Drinking & Driving.
J. Saf. Res. 8: 112-115

SOLARZ, A., 1981
Conclusions from a Study Concerning Driving Under the Influence of Medicine.
Alcohol Drugs & Traffic Safety. ed. Goldberg, L. Vol.1. pp 353-366

SOUTH, D.R., 1980
Treatment Programmes for Drinking-Drivers in Australia - Potential & Limitations.
Community Health Studies 4: 294-298

SOUTH, D.R., 1982
Priorities in the Development & Implementation of Drink-Driving Countermeasures
ARRB Proceedings 11: 44-53

STEENHUIS, D., 1979
General Deterrence & Drunken Driving
in Proc. 7th Int. Conference on Alcohol, Drugs and Traffic Safety.
ed. Johnston, I.R., Canberra.

STOLZ, P., 1978
Australia in 1978
32nd Int. Congress on Alcoholism & Drug Dependence, Warsaw.

SWOV, 1977
Drinking by Motorists.
Institute for Road Safety Research, The Netherland.

TRAVERS, D., & HENDTLASS, J., 1978
Survey of Alcoholism Treatment Services.
Proc. Autumn School of Studies on Alcohol & Drugs, Melbourne.

ULSTER YEAR BOOK, 1983
The Official Handbook of Northern Ireland

VAN OOIJEN, D., 1981
Driving While Intoxicated & the Combined Use of Alcohol & Drugs.
Drugs, Alcohol & Traffic Safety Vo.1.
ed. Goldberg, L. pp 342-381.

VICTORIA POLICE, 1982
Annual Report 1981

VICTORIA POLICE, 1983
Traffic Department Annual Report for the year 1982.

VOAS, R., & HAUSE, J., 1980
Roadside Surveys in U.S.A. Use of Roadside Surveys to Evaluate an Enforcement Programme.
Roadside Surveys Conference, Umeo, Sweden.

WALKER, F., 1983
Battle of the Brews
The National Times July 1st to 7th : 24

WALLER, J.A., 1967
Identification of Problem Drinking among Drunken Drivers
J.A.M.A. 1967 : 114-120.

WARING, M.L. & SPERR, I., 1982
Bartenders: an untapped resource for the prevention of alcohol abuse?
Int. J. Addict. 17: 859-868

WEBB, R.C., 1982
Pharmacological Classification of National Health Pharmaceutical Benefits.
Commonwealth Health Department, Internal Publication.

WESTON, R., TUOHY, M., & KNOX, R.B., in preparation
Relationships between Bronchial Asthma and the Seasonal Incidence of Grass Pollen and The Fungal Spores Alternaria and Cladosporium.

WILSON, D.G., 1981
Psychoactive Drugs & Driving Impairment
Drugs, Alcohol & Traffic Safety Vol. 1.
ed. Goldberg, L. pp 328-341

WOLFE, A.C., 1975
Characteristics of late-night, week-end drivers:
Results of the U.S. national roadside breath-testing survey and local surveys
Proc. 6th Int. Conference on Alcohol, Drugs & Traffic Safety.
Toronto.

WORLD HEALTH ORGANISATION, 1973.
World Health Statistics Annual.

ZACUNE, J. & HENSMAN, C., 1971
Drugs, Alcohol & Tobacco in Britain.
London, Heinemann.

ZIMRING, F.E. & HAWKINS, G.J., 1973
Deterrence; the legal threat of crime control.
pub. University of Chicago Press, Chicago.