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A RELATIVE COMPARISON OF THE EXTENT OF DRINK-DRIVING BY FEMALES AND MALES IN VICTORIA

by

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April 1995

Report No. 79

MONASH UNIVERSITY ACCIDENT RESEARCH CENTRE
REPORT DOCUMENTATION PAGE

Report No.	Report Date	ISBN	Pages
79	APRIL 1995	0 7326 0079 0	52

Title and Subtitle

A Relative Comparison of the Extent of Drink-Driving by Females and Males in Victoria

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Abstract

This study resulted from random breath tests on Melbourne freeways which indicated that female drink-drivers may be a larger problem than previously thought. It aimed to make a relative comparison of the extent of drink-driving by females and males in Victoria, using data available to the researchers at the time.

Several sets of data on random breath testing were obtained from the Victoria Police. It was confirmed that on Melbourne freeways, during the hours of midnight to 6 am Saturday mornings, there was a relatively high proportion of female drivers with illegal Blood Alcohol Concentration (BAC) for the years 1991 and 1992 compared with male drivers. This difference became less pronounced in subsequent years and on other major roads and at other times of the week the proportion of female drink-drivers with illegal BAC was lower than the male proportions.

Information from Breathalyser operator reports allowed an examination of the characteristics of those drivers apprehended for drink-driving through random breath tests and routine Police checks. For female drink-drivers in Melbourne, those aged 30 to 39 years contributed a high percentage of the females apprehended (38%). Forty-nine percent of these drivers had a relatively low BAC reading of less than 0.100g/100ml and those with managerial or administrative occupations were over-represented. In contrast, a high percentage of the female drink-drivers apprehended in the rest of Victoria had an excessive BAC reading over 0.150g/100ml. Unemployed females were over-represented among those apprehended in the rest of Victoria.

Trends in the proportion of drivers killed in Victoria with illegal BAC were analysed for the ten year period 1984-1993. Female drivers showed a sharp decrease in this proportion during 1992 yet males did not show the same significant change. It was concluded that the record drop in the proportion of drivers killed with illegal BAC in 1992 was largely due to the substantial reduction in female drink-drivers killed.

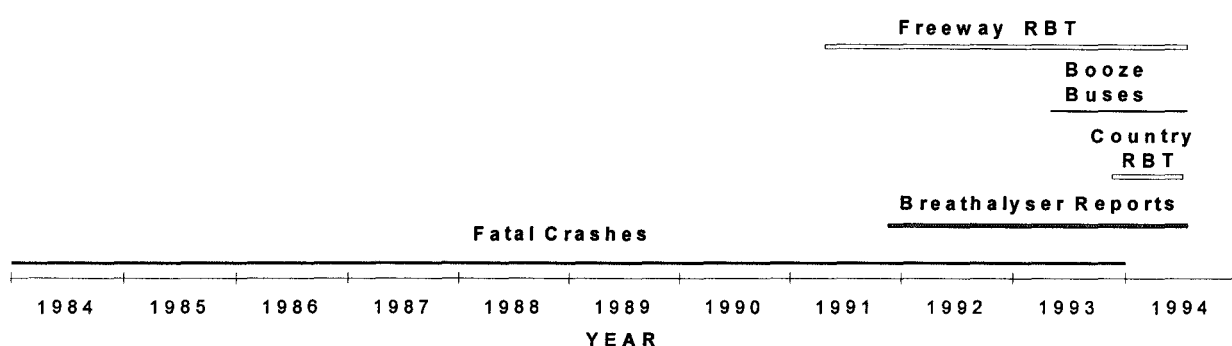
Key Words :

Females, Alcohol Consumption, Blood Alcohol Content, Drink-Driving.

EXECUTIVE SUMMARY

Results from certain random breath tests were recently the cause of a concern that female drink-drivers in Victoria may be a larger problem than previously thought. This study made a relative comparison of the extent of drink-driving by females and males in Victoria by examining available data on drink-driving on the road and analysing trends in drink-driving in crashes over recent years. Figure 1 shows the time period covered by each data source.

Figure 1 : Time Period Spanned by each Data Source



Data from the random breath testing results on Melbourne freeways confirmed that, among females, the proportion of drivers with illegal Blood Alcohol Concentration (BAC) was higher than among males for the years 1991 and 1992, during the hours of midnight to 6 am Saturday mornings. This difference then became less pronounced, and other random breath testing statistics from 1993/94 show that on other major roads and at other times of the week the proportion of female drink-drivers with illegal BAC on the road was lower than the male proportions.

It should be noted that random breath testing operations are most frequently carried out on major roads and highways, and during times when drink-driving is most common, and that the levels of drink-driving measured in this study cannot be generalised to all roads and times. However, the relative comparisons of the proportions of drivers found to have illegal BACs should be valid. There is no evidence that drivers are tested non-randomly related to their gender. This includes the tests carried out in recent years in country Victoria since the major program of sending Melbourne-based booze buses to country districts commenced.

Trends in the proportion of drivers killed in Victoria with illegal BAC were analysed for the ten year period 1984-1993. Female drivers showed a sharp decrease in this proportion during 1992 yet males did not show the same significant change. Hence it was concluded that the record drop in the proportion of drivers killed with an illegal BAC in 1992 was due to the substantial reduction in female drink-drivers who were killed.

It is possible that the high proportions of females apprehended for drink-driving on the road during the early 1990's contributed to the reduction in female drivers killed with illegal BAC levels. It was noted that the reduction in fatal crashes involving drink-drivers was greatest for the same time of week as the highest percentage of females were being apprehended for drink-driving.

Another part of the study examined the characteristics of drink-drivers apprehended through random breath tests and routine Police checks during 1993/94, so that particular areas of concern may be adequately addressed in the future. Information obtained from Breathalyser operator reports enabled a comparison of female and male apprehended drink-drivers in terms of age, BAC level, time of apprehension and occupation. For female drink-drivers in Melbourne, those aged 30 to 39 years contributed a high percentage of the females apprehended (38%). Forty-nine percent of these drivers had a relatively low BAC reading of less than 0.100g/100ml and those with managerial or administrative occupations were over-represented. In contrast, a high percentage of the female drink-drivers apprehended in the rest of Victoria had an excessive BAC reading over 0.150g/100ml. Unemployed females were over-represented among those apprehended in the rest of Victoria.

ACKNOWLEDGMENTS

The authors wish to thank:

Inspector Mike Moloney and Senior Sergeant Ian Cairns from the Traffic Alcohol Section of the Victoria Police for their permission for the use of random breath testing data.

Ms. Margaret Smythe from the Research Section at the Federal Office of Road Safety for permission to use data that had been originally collected for use in a report prepared for FORS.

Lyn Bowland, Monash University Accident Research Centre, for the data collection from both the Breathalyser operator reports and random breath testing forms.

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1. INTRODUCTION

An analysis of drivers exceeding the Prescribed Concentration of Alcohol (PCA)* during Random Breath Testing (RBT) operations on freeways during 1991 and 1992 has shown that among females the proportion testing positive was considerably higher than among males. While the number of females with positive readings was relatively small compared with male drivers, there was concern that among females the drink-driving problem is larger than previously thought.

These findings prompted this study of the extent of drink-driving by females, which involves analysing trends in female drink-driving both on the road and in crashes over recent years to identify possible areas of concern. By examining females and males separately, comparisons can be made and any speculations, such as the problem lying mainly with professional females drinking after work, could be tested.

Firstly, **drink-driving on the road** in Victoria is examined, made possible from the availability of Random Breath Testing data from the Traffic Alcohol Section of Victoria Police. Figures from the Freeway operations, all Booze Bus operations, and the increased Country RBT program during 1993/94 are presented. The extent of drink-driving, for each sex, has been measured as both the proportion of tested drivers with illegal Blood Alcohol Concentration (BAC) and the comparative number of drivers with illegal BAC. These analyses have capitalised on the availability of previously extracted RBT operations data which has categorised the drivers by their sex.

An additional source of information originates from Breathalyser operator reports of drink-drivers apprehended at Random Breath Testing stations and through random routine Police checks. A sufficient number of cases for each sex was available, enabling a comparison of apprehended drink-drivers in terms of age, BAC level, time of the day, day of the week and occupation. This data was originally collected for the Federal Office of Road Safety, whose permission to use the data was sought and obtained.

The second section includes an analysis of **drink-driving crashes** in Victoria over the period 1984 to 1993. Police-reported crash data was obtained from the State Traffic Accident Record (STAR) database. BAC information obtained by the coroners and hospital blood tests had been merged with other data available on drivers involved in crashes, but unfortunately the BAC data has a high proportion of unknowns. However, the data extracted allows both the numbers and proportions of drink-drivers involved in crashes to be estimated. Issues covered over the ten year period include driver age, BAC level, time of the day, day of the week and the type of road, and again a comparison of each sex is made.

* Prescribed Concentration of Alcohol (PCA) : 0.05g/100ml for fully licensed drivers and 0.00g/100ml for probationary drivers.

2. DRINK-DRIVING ON THE ROAD

All sources of data used to obtain information on drink-drivers on the road originated from Random Breath Testing (RBT) stations in Victoria. Available in the first three sets of data was the number of drivers tested at various RBT locations and the number of drivers exceeding BAC limit. In this report, drivers exceeding the Prescribed Concentration of Alcohol (XPCA) are referred to as having an **illegal** BAC reading. It is understood that Police reports using the terminology 'Positive/Pos' BAC or XPCA have the same meaning.

These sources are most likely to over-represent the number of drink-drivers on the road because the RBT operations are most frequently held during high alcohol hours, those times of the week when drink-drivers are most likely to be on the road, and on major roads. All RBT sites are encouraged to be sited primarily on main roads and highways so as to be exposed to the maximum number of drivers.

In some sections of the report, the absolute number of drivers with illegal BAC is presented followed by the percentage of tested drivers with illegal BAC. This keeps in perspective the small number of females with illegal BAC while examining in more detail the probability of each tested driver having an illegal BAC, for each sex. These percentages, when compared for females and males, represent a relative comparison of the extent of drink-driving done by drivers of the two sexes on the road. However, it cannot necessarily be generalised to all driving at all times because of the limited coverage of RBT operations.

The probability of being apprehended with an illegal BAC is expressed as both a 'strike-rate' ratio and a percentage. In 1993, for example, 37 249 drivers were randomly breath tested on Freeways and 263 drivers exceeded the legal BAC limit. Therefore one in every 141 tested drivers had illegal BAC (the strike rate) or 0.7% of tested drivers had illegal BAC.

The fourth data set provided further detail on illegal drink-drivers from a report completed by the Breathalyser operator. The percentage distributions of the drink-driver's age, BAC level, occupation and time of apprehension are presented for each sex.

2.1 MELBOURNE FREEWAY RBT OPERATIONS

The Victorian Police Random Breath Testing Section was formed in November 1989, to carry out Random Breath Testing on a larger scale. This section was formed to utilise the specially designed Victoria Police "Booze Buses" to carry out testing. During the first twelve months of the Random Breath Testing campaign, it became apparent that drivers affected by alcohol were using metropolitan freeways in the belief that by doing so they could avoid Random Breath Testing sites. This belief was correct because no testing had been conducted on freeways due to the perceived danger of such an operation. As a result, freeway operations were conducted using Booze Buses to target drivers affected by alcohol leaving the Melbourne city area late at night.

Each operation took place at the peak times and days for drink-driving, usually on a Friday evening between 12 midnight and 6 am. (Moloney, 1993). The first operation was conducted on Friday, 2 August 1991, and has since been conducted on a regular basis. On that Friday, one in every 43 drivers, (2.3%), travelling in the lanes leaving the Melbourne city area who was screened for alcohol, was found to have illegal BAC.

Figure 2.1 displays the number of tested drivers with illegal BAC for each calendar year 1991 to 1993, and for the 1993/1994 financial year (only this data was available for this report). The number of tested drivers who exceeded the Prescribed Concentration of Alcohol (PCA) on Melbourne freeways has been increasing over the last three years. In 1991 there was only 17 females and 44 males with illegal BAC. After that time the number of both females and males increased at similar rates until 1993/1994 which resulted in 66 females and 197 males with illegal BAC. On average, there was 2.8 times more tested males with illegal BAC than tested females.

Figure 2.1 : Freeway Random Breath Testing - Number of Tested Drivers with ILLEGAL BAC by SEX, 1991-1994

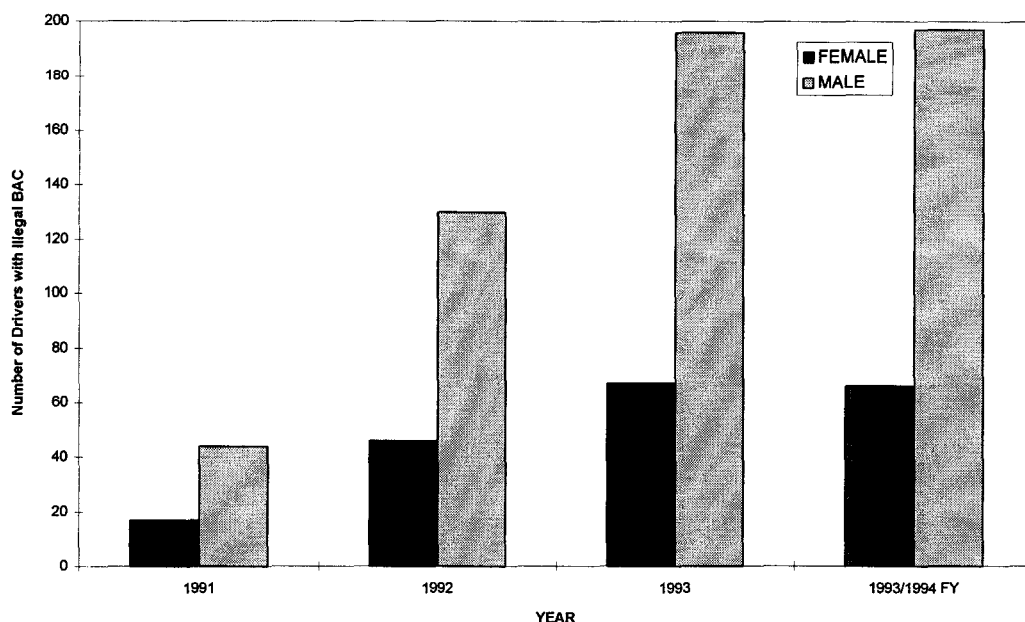


Figure 2.2 depicts the proportion of tested female and tested male drivers exceeding the PCA on Melbourne freeways. Since 1991, females have had a higher 'strike rate' than males. A statistically significant difference exists between the female and male proportions in both 1991 and 1992, as shown by the non-overlapping 95% confidence limits, (Walpole and Myers, 1989). In particular, during 1992 one in every 83 (1.2%) females tested had an illegal BAC reading compared to one in every 106 (0.9%) males. The difference in strike rates between females and males has become less pronounced and non-significant over time. During 1993/1994 the percentages with illegal BAC readings were 0.7% and 0.6% for females and males respectively.

Figure 2.2 : Freeway Random Breath Testing - Percentage of Tested Drivers with ILLEGAL BAC by SEX, 1991 - 1994

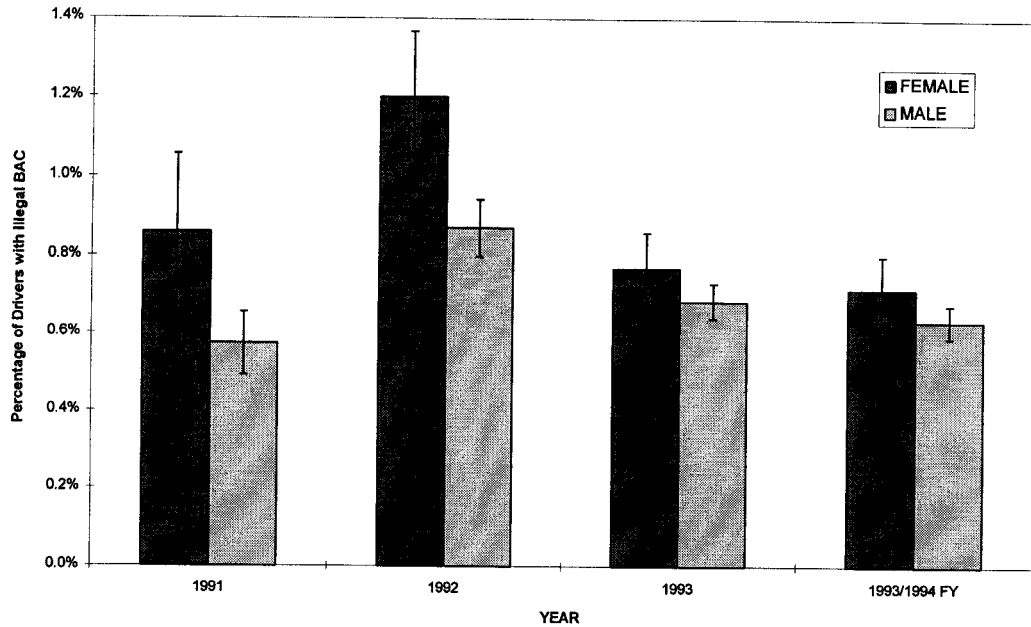
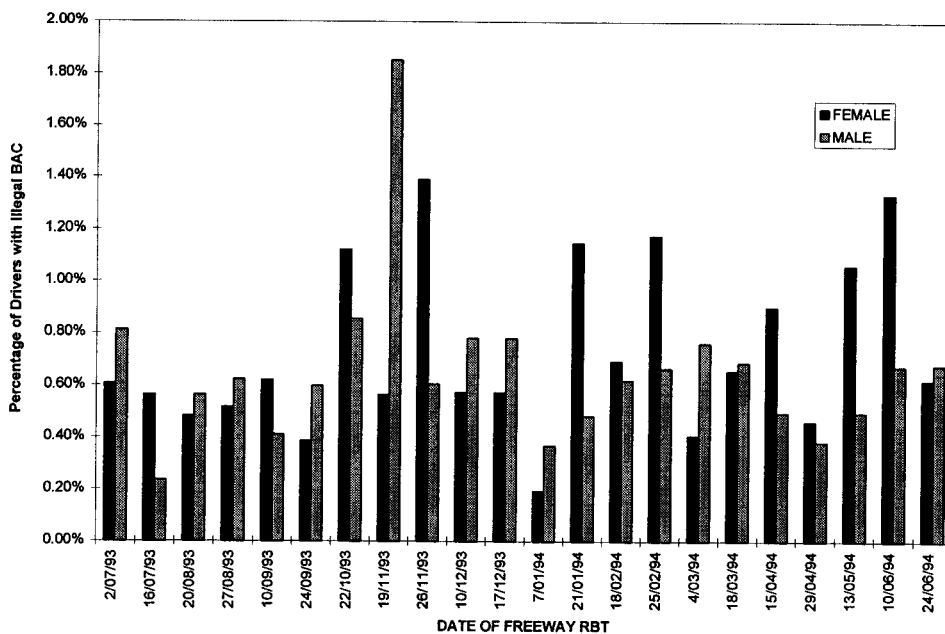


Figure 2.3 displays the results from Freeway RBT sessions held in 1993/1994. No monthly trend in the female strike-rates relative to the males is apparent.

Figure 2.3 : Freeway Random Breath Testing - Percentage of Tested Drivers with Illegal BAC by Sex, 1993/1994



2.2 BOOZE BUS RBT OPERATIONS

In recognition of the fact that the RBT operations on freeways cover a relatively small part of the Melbourne road system, recent results from all other Booze Bus operations which were situated on main roads and highways were also considered.

All Booze Bus operations within the Metropolitan area are controlled by the Traffic Alcohol Section (TAS) of the Victorian Police. Within Country Victoria, both District Buses and TAS Buses sent from the Metropolitan area are used. In this section a comparison is made between Melbourne and Country Victoria for all Booze Bus operations in 1993/1994. Results from the TAS buses in Melbourne are compared with both TAS and District Buses in Country Victoria.

Figure 2.4 represents the number of drivers with illegal BAC apprehended during Booze Bus operations. It reveals a relatively low number of females apprehended in both Melbourne and Country Victoria. Results from Booze Bus activities in Melbourne show 5.2 times more males than females with illegal BAC and for Country Victoria there was 6.2 times more males than females. These relativities are considerably higher than the Melbourne freeway operations for the same time period (see section 2.1).

Figure 2.4 : Booze Bus Random Breath Testing - Number of Tested Drivers with ILLEGAL BAC by SEX, 1993/1994

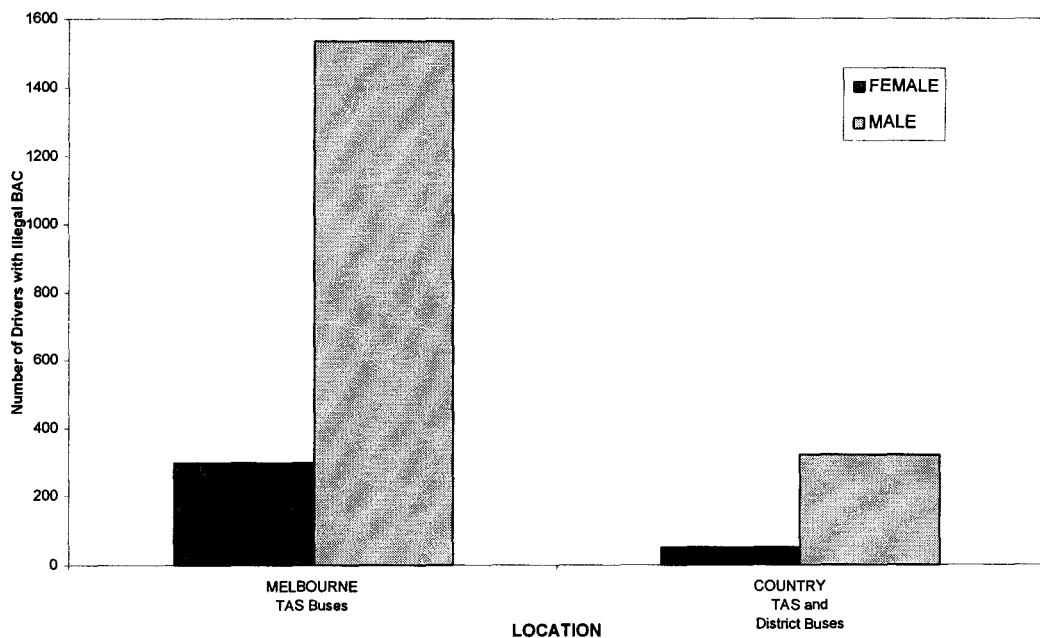
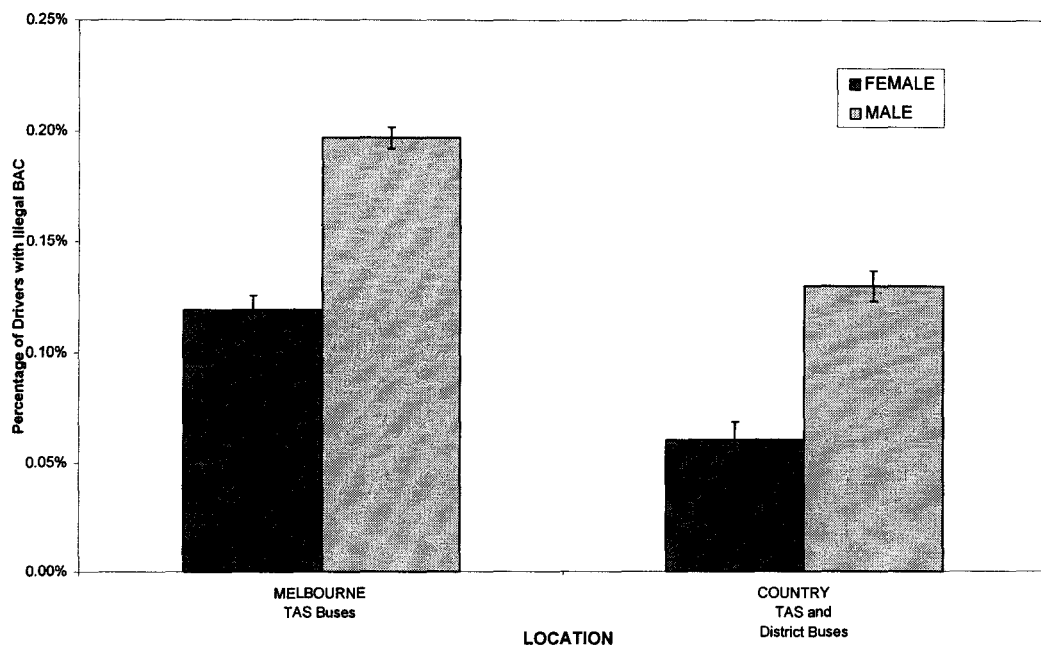


Figure 2.5 shows the proportion of female and male tested drivers exceeding the PCA for Booze Bus operations. Tested female drivers in Melbourne had a greater percentage of drink-drivers than tested females in the country, one in every 840 drivers (0.12%) compared to one in every 1638 drivers (0.06%). By contrast, tested male drivers, one in every 507 drivers (0.20%) in Melbourne had illegal BAC and one in every 769 drivers (0.13%) in the country were drink-drivers.

Figure 2.5 : Booze Bus Random Breath Testing - Percentage of Tested Drivers with ILLEGAL BAC by SEX, 1993/1994



It is interesting to compare the results from Melbourne Booze Bus operations depicted in Figure 2.5 and Melbourne Freeway Booze Bus operations in Figure 2.2. During the same time period, (1993/94), the more global coverage of Melbourne Booze Bus operations, situated on main roads, highways and freeways, showed females having a lower strike rate than males. It appears that female and male drink-driving habits on main roads and highways throughout the week differ from those of drink-drivers on freeways on late Friday nights.

2.3 RBT OPERATIONS IN COUNTRY VICTORIA

The number of random breath tests conducted in country Victoria during November 1993 - June 1994 were collected as part of a Transport Accident Commission (TAC) contract project to evaluate the country RBT and publicity program launched on 22 November 1993. The aim of the program was to increase the number of random breath tests in country Victoria with additional Melbourne-based Booze Buses being sent to country Police districts each weekend. These operations were considered likely to reduce the extent of any "non-random" selection of drivers that may have previously occurred in rural Victoria due to testing operations being mainly manned by local Police officers.

For this project 'country Victoria' refers to Police Districts K to Q, where District K includes Geelong and surrounding areas. In addition to the number of tests, the numbers exceeding the Prescribed Concentration of Alcohol were collected. The number of tests and the number exceeding PCA are categorised by driver sex, start/finish times of RBT session, date, day of week and the Local Government Area (LGA) of the site location.

The extent of drink-driving by females relative to males in country Victoria will be measured by the proportion of tested drivers exceeding the PCA for each sex, as well as by the absolute numbers exceeding the PCA. Comparisons of female and male drink-driving in country towns and on the open road and between days of the week and times of day will be undertaken.

Tests conducted in Local Government Areas that are defined as cities or towns were placed in the 'Country Towns' category, whilst the remaining country tests were considered to have occurred on the 'Open Road'. The midpoint of the duration of each session was used to determine the time of day each test was conducted. The 'time of day' intervals used were:

- 6:00 am to 3:59 pm, DAYTIME
- 4:00 pm to 7:59 pm, EVENING
- 8:00 pm to 10:59 pm, NIGHT
- 11.00 pm to 5:59 am, LATE NIGHT/EARLY MORNING.

2.3.1 Overall Results

Between November 1, 1993 and June 30, 1994 a total of 440,385 random breath tests were conducted in country Victoria. The gender of the tested drivers was known for all but approximately 6% of the RBTs. Of all drivers tested, 108,853 (25%) were female and 305,653 (69%) were male. The number of tested female drivers exceeding the PCA was 61 and the corresponding male drink-driver frequency was 434 (Figure 2.6).

The proportion of tested drivers exceeding the PCA is depicted in Figure 2.7 for both sexes. Due to the fact that negative test results were usually recorded in the cases of drivers of unknown sex, these proportions are likely to be slight over-estimates of the true proportions of females and males who were drink-drivers.

Figure 2.6 : Number of Random Breath Tested Drivers Exceeding the PCA by SEX in Country Victoria

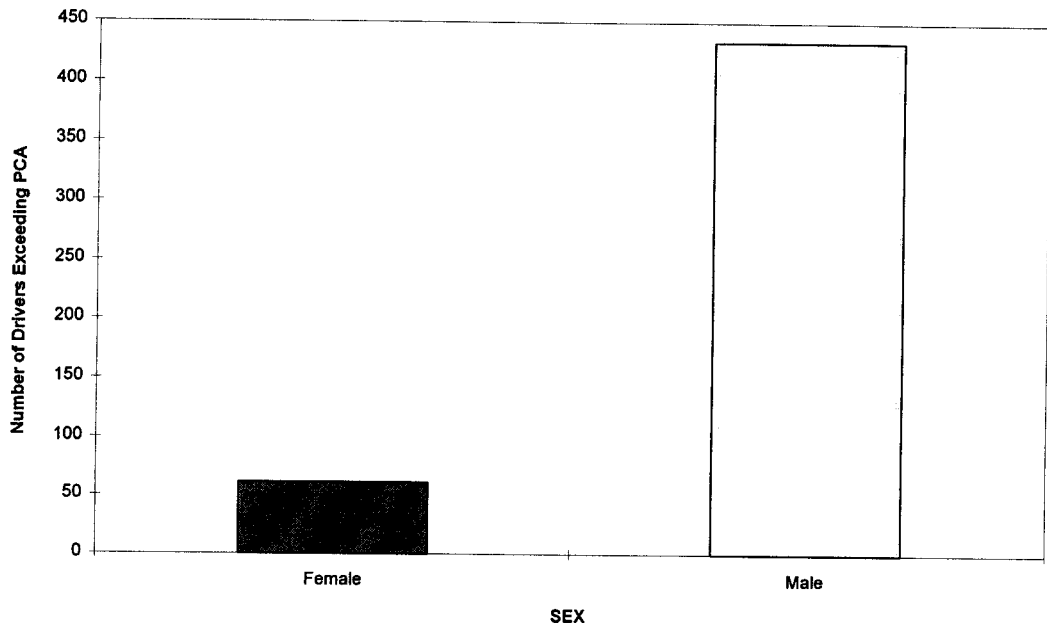
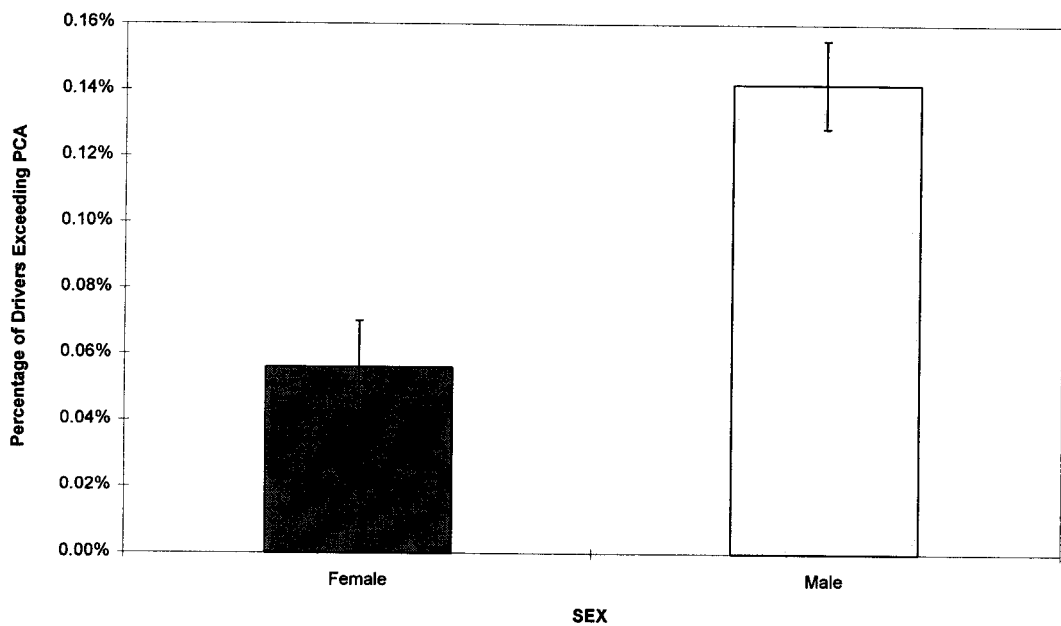


Figure 2.7 : Proportion of Random Breath Tested Drivers Exceeding the PCA by SEX in Country Victoria

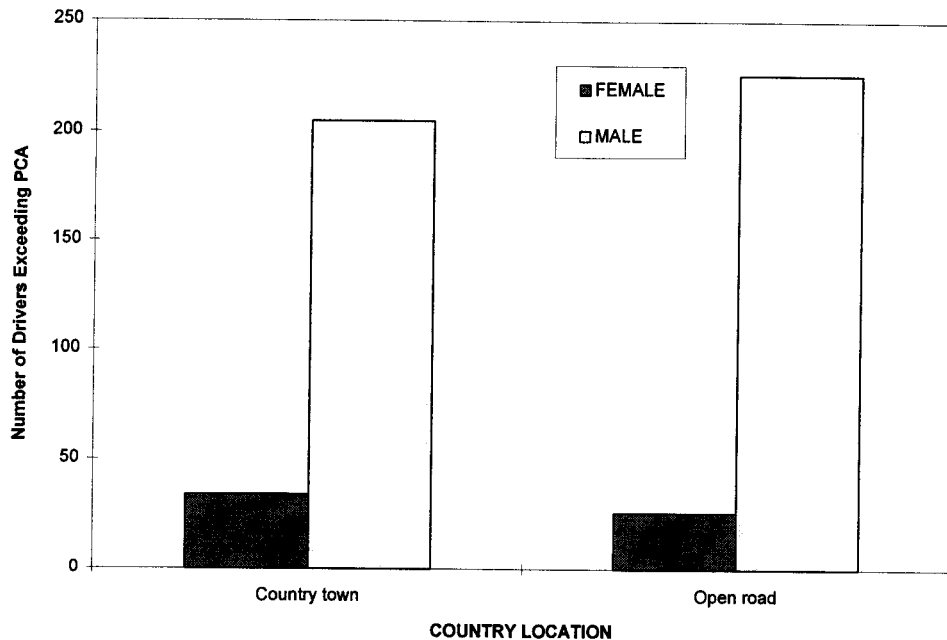


In country Victoria one in every 1 786 of female drivers tested, (0.056%), exceeded the PCA. The corresponding male strike ratio of one in every 704 drivers, (0.142%), was more than two and half times that of the female strike rate. As shown by the non-overlap of the 95% confidence limits depicted in Figure 4, this difference is statistically significant. Males were more likely to be caught drink-driving than females in country Victoria during 1993/1994.

2.3.2 Results by Country Location

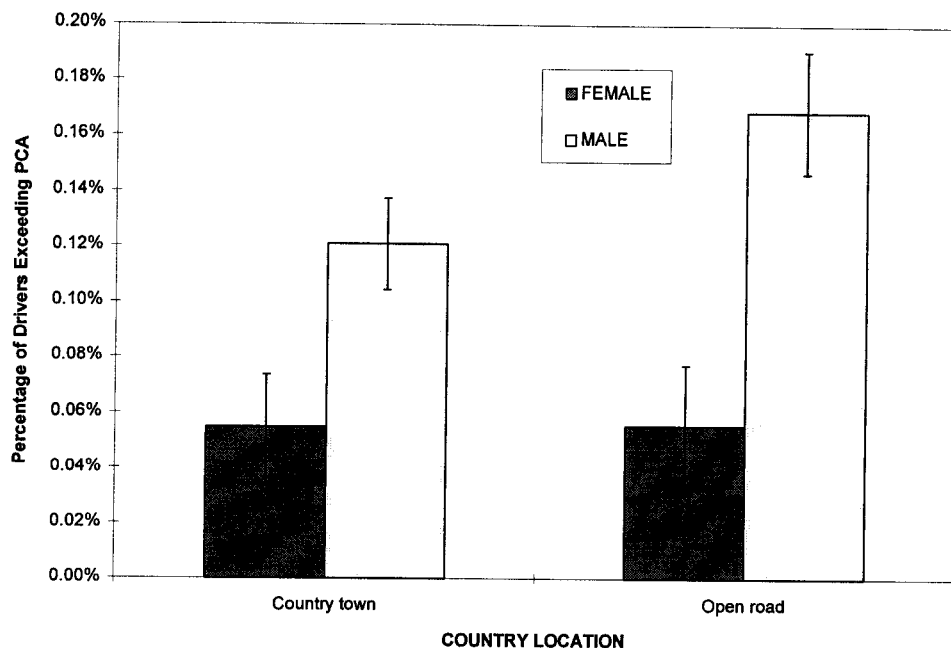
Figure 2.8 displays the frequency of male and female drivers who exceeded the PCA for both country towns and open roads. More females were found to drink-drive in country towns (34 drivers) than on the open road (26 drivers). This pattern was reversed for male drink-drivers, 226 on the open road and 205 in country towns.

Figure 2.8 : Number of Random Breath Tested Drivers Exceeding the PCA by SEX and LOCATION in Country Victoria



Similar proportions of random breath tested female drivers exceeding the PCA occurred in country towns and on the open road - approximately 0.06% for both locations (Figure 2.9). However for males, a greater proportion of tested drivers exceeding the PCA existed on open roads than in towns. One in every 593 males random breath tested on open roads in country Victoria exceeded the legal limit, whilst only one in every 826 males tested in towns did so. This difference was statistically significant.

Figure 2.9 : Proportion of Random Breath Tested Drivers Exceeding the PCA by SEX and LOCATION in Country Victoria



2.3.3 Results by Day of Week

The number of tested drivers exceeding the PCA increased progressively from Monday to Saturday for both males and females (Figure 2.10), with Sunday exhibiting similar frequencies of drink-drivers as Friday for both sexes.

Figure 2.10 : Number of Random Breath Tested Drivers Exceeding the PCA by SEX and DAY OF WEEK in Country Victoria

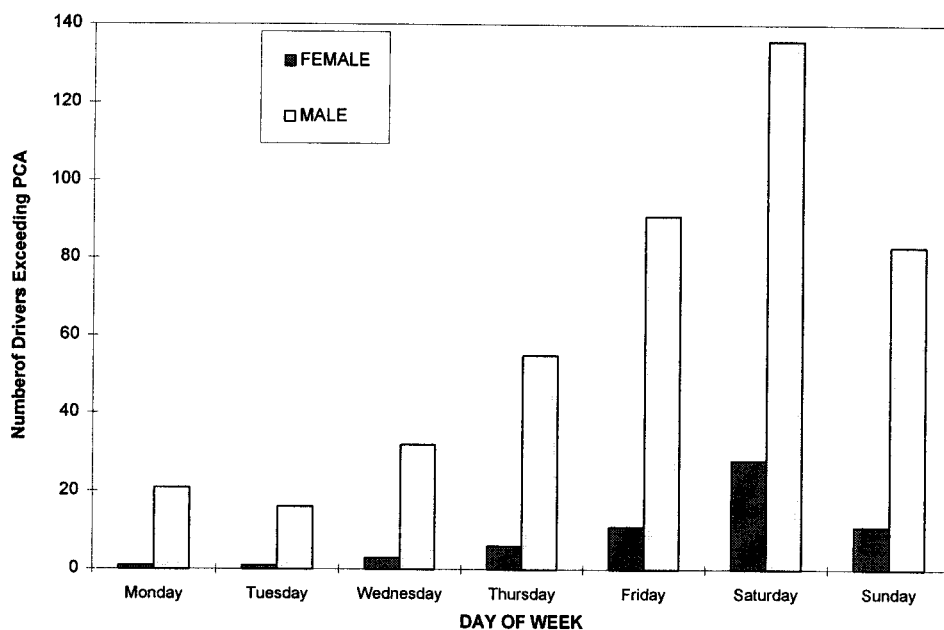
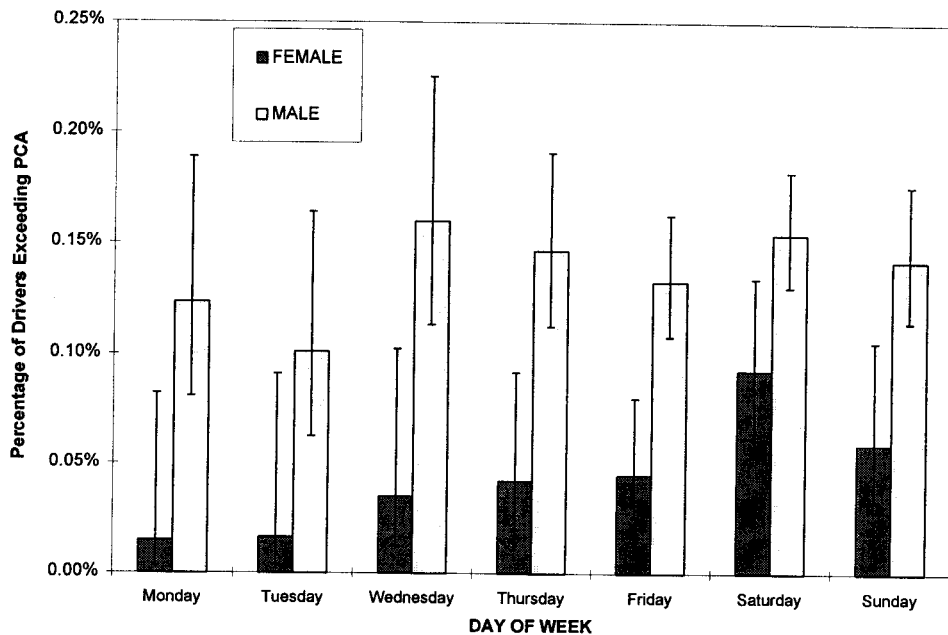


Figure 2.11 : Proportion of Random Breath Tested Drivers Exceeding the PCA by SEX and DAY OF WEEK in Country Victoria



The proportions of random breath tested female and male drivers exceeding the Prescribed Concentration of Alcohol for each day of the week are shown in Figure 2.11. Small sub-samples sizes of female drink-drivers, especially for RBTs conducted on weekdays, caused difficulties when the confidence limits were estimated using the Walpole and Myers (1989) method. On this occasion, the F-distribution was used as an approximation to create the error bars in Figure 2.11 (Pollard, 1977).

The proportion of females tested that exceeded the PCA steadily increased from Monday to Saturday, with the greatest proportions of drink-drivers occurring on Saturday (0.093%) and Sunday (0.059%), and the lowest on Monday (0.015%) and Tuesday (0.016%). The weekly trends in these proportions are similar to the absolute numbers of female drink-drivers depicted in Figure 2.10. (It should be noted that the proportions for Monday and Tuesday are likely to be unreliable due to only one female being found to exceed the PCA on each of these days in country Victoria during November 1993-June 1994).

The same increasing pattern did not exist for male drink-drivers. The male proportions were similar during Wednesday to Saturday, with Wednesday (0.160%) and Saturday (0.154%) exhibiting the greatest proportions. Statistically significant differences existed between males and female drink-drivers on Wednesday, Thursday, Friday and Sunday.

2.3.4 Results by Time of Test

The number of tested female and male drink-drivers exceeding the PCA is shown in Figure 2.12 according to the midpoint of the time interval when the Random Breath Test session occurred. Similar patterns exist for females and males, with the largest numbers of drink-drivers detected at night during sessions with midpoints between 8:00 pm and 10:59 pm for both sexes.

Figure 2.12 : Number of Random Breath Tested Drivers Exceeding the PCA by SEX and TIME OF TEST in Country Victoria

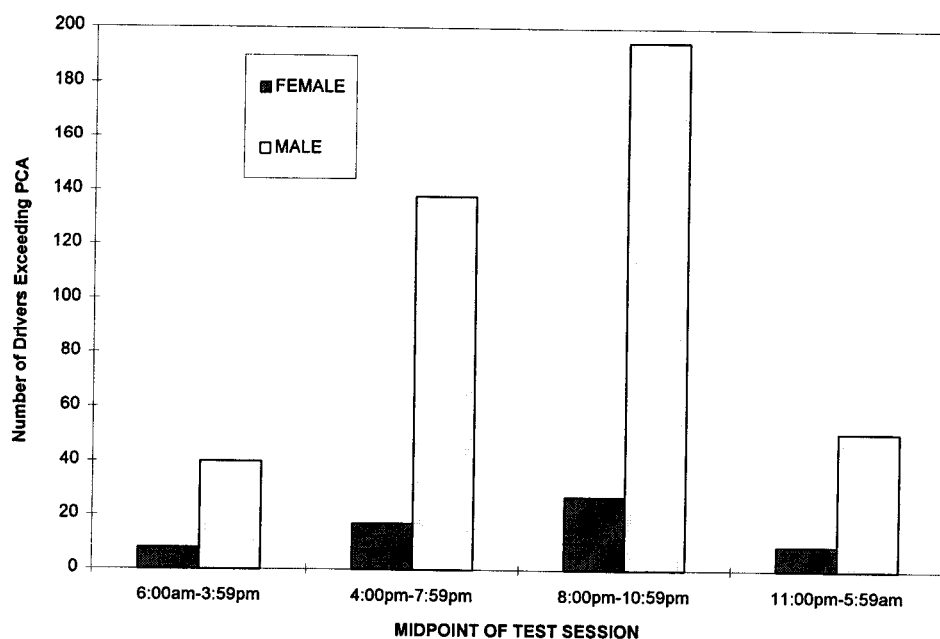
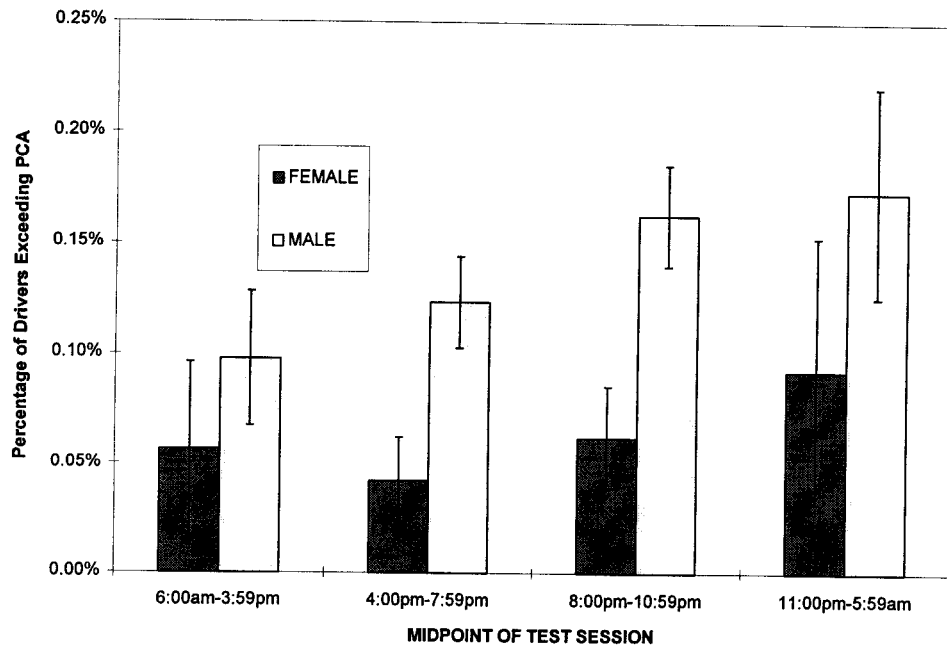


Figure 2.13 depicts the *proportion* of male and female drink-drivers by the time of the test session. The proportion of tested female drivers exceeding the PCA is greatest for RBT sessions with midpoints between 11:00 pm and 5:59 am (0.093%). This proportion, however, does not differ significantly from the proportion of females exceeding the PCA at other times of the day. The least proportion of tested females caught drink-driving in country Victoria occurred in the early evening between 4:00 pm and 7:59 pm.

Similar patterns to females occurred amongst male drink-drivers in country Victoria with regard to the time of the test session. Males, as a proportion of drivers tested for drink-driving, were more likely to be exceeding the PCA during test sessions with midpoints between 11:00 pm and 5:59 am (0.173%) than at other times of the day. However the proportion was lowest for sessions during daylight hours, between 6:00 am and 3:59 pm. Significant differences existed between the proportions of female and male tested drink-drivers for RBT sessions occurring in the afternoon/evening between 4:00 pm and 7:59 pm, and at night between 8:00 pm and 10:59 pm.

Figure 2.13 : Proportion of Random Breath Tested Drivers Exceeding the PCA by SEX and TIME OF TEST in Country Victoria



Although the number of drivers exceeding the PCA was greatest for tests sessions with midpoints between 8:00 pm and 10:59 pm for both sexes (Figure 2.12), the proportion of drink-drivers *amongst those tested* was largest for sessions with midpoints in the late night/early morning hours between 11:00 pm and 5:59 am (Figure 2.13).

2.4 BREATHALYSER REPORTS FROM DRINK-DRIVING APPREHENSIONS

The two sources of data used to obtain information on drivers apprehended for drink-driving both came from a report completed by Breathalyser operators following detection either at an RBT station or through random routine Police checks, (Diamantopoulou, Cameron and Mullan, 1994). Those drivers with a high preliminary breath test reading are required to take a Breathalyser test with a certified operator, who also records information from the driver including their age, sex, occupation and, of course, the evidentiary BAC reading.

2.4.1 Data Sources

Drink-drivers apprehended at RBT stations

Because of the unpredictable locations of RBT stations and the high volume of tests conducted in recent years in Victoria, drink-drivers apprehended at these stations could be considered to represent a *random* sample of drink-drivers on the road, at the places and times during which RBT is operated. Those drivers with a high preliminary breath test reading are required to take a Breathalyzer test with a certified operator, who also records information from the driver on a Summary Offence form. The form includes the driver's age, sex, occupation and the evidentiary BAC reading

Drink-drivers apprehended through routine checks

Not all the drink-driver apprehensions occurred at random breath testing stations. Both the Melbourne and Rest of Victoria samples included a number of drink-driving offences that were the result of a routine police check. A routine police check has a police officer(s) apprehending a driver whilst on routine duty either randomly or for a specific reason. Only routine police checks that appeared to be random were included in the data collected. Those apprehensions that occurred because of suspicious driver behaviour, driver speeding, unroadworthy vehicle or crash-involvement were *not* included.

2.4.2 Data Analysed

The completed summary offence forms are held by the Victoria Police and those most recently acquired by the Accident Records Branch, at the time of collection (September 1994), were used. This data set consisted of 67% drink-drivers apprehended in 1993, 25% from 1994 and 6% from 1992. Less than two percent of the offence forms were from years prior to 1992. A total of 1015 drivers were apprehended in Melbourne and 531 were apprehended in the 'Rest of Victoria'. The Melbourne and Rest of Victoria** samples were examined separately because country drinking habits are likely to differ from those in city locations. Females and males for the Melbourne and Rest of Victoria samples were categorised by age, BAC group, day of the week, time of the day and occupation.

** 'Melbourne' refers to locations situated in the Police Districts A to J.
'Rest of Victoria' refers to locations situated in Police Districts K to Q.

The age groups used were:

- 24 years and below
- 25 to 29 years
- 30 to 39 years
- 40 to 49 years
- 50 years and above,

and the BAC readings were grouped as follows:

- positive to 0.099g/100ml
- 0.100g/100ml to 0.149g/100ml
- 0.150g/100ml and above.

A small proportion of illegal drink-drivers had BAC readings of 0.05g/100ml and below (3% of the Melbourne sample; 4% of the Rest of Victoria sample). These drink-drivers were predominantly probationary licence holders, whose legal BAC limit is zero in Victoria.

Time of the day refers to the time when the driver was apprehended for drink-driving:

- 6 am to 3:59 pm - DAYTIME
- 4 pm to 7:59 pm - EVENING
- 8 pm to 11:59 pm - NIGHT
- midnight to 5:59 am - EARLY MORNING.

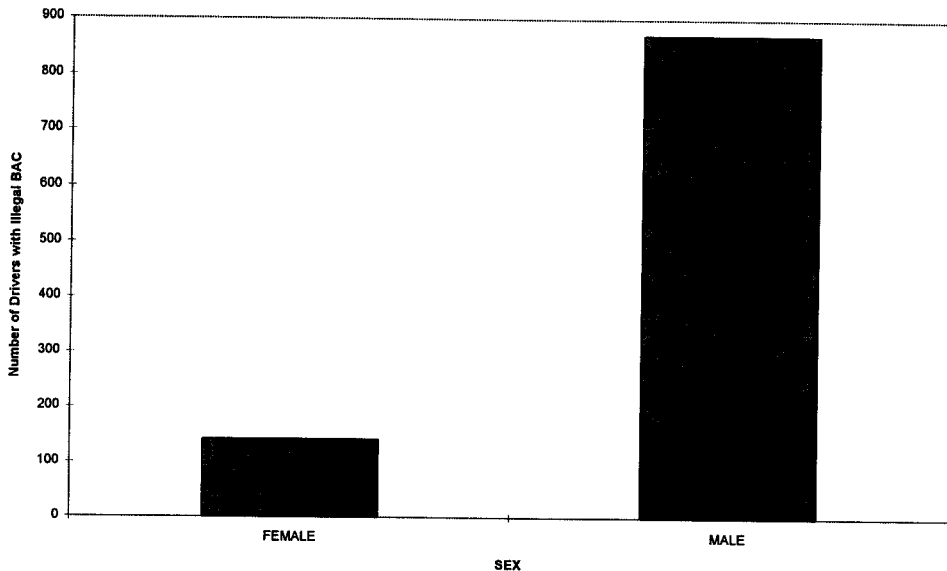
The drivers occupation was categorised by the Australian Standard of Occupation Classification (ABS, cat no. 1223.0). Further categories were added for those who were not classified as employed. These are as given:

- | | | |
|-------------------------------|------------------------------|---------------------|
| • Managers and Administration | • Tradesperson | • Student |
| • Professionals | • Plant Machine Operators | • Retired/Pensioner |
| • Para-Professionals | • Labourers and Related Work | • Unemployed |
| • Clerks | • Self-Employed | • Unknown |
| • Personal Service and Sales | • Home Duties | |

2.4.3 Melbourne Drink-Driver Apprehensions

The random sample of 1015 drink-drivers who were apprehended in Melbourne consisted of 871 (86%) males and 142 (14%) females. The sex of two drivers was not recorded.

Figure 2.14 : Number of Drivers with ILLEGAL BAC in Melbourne by SEX

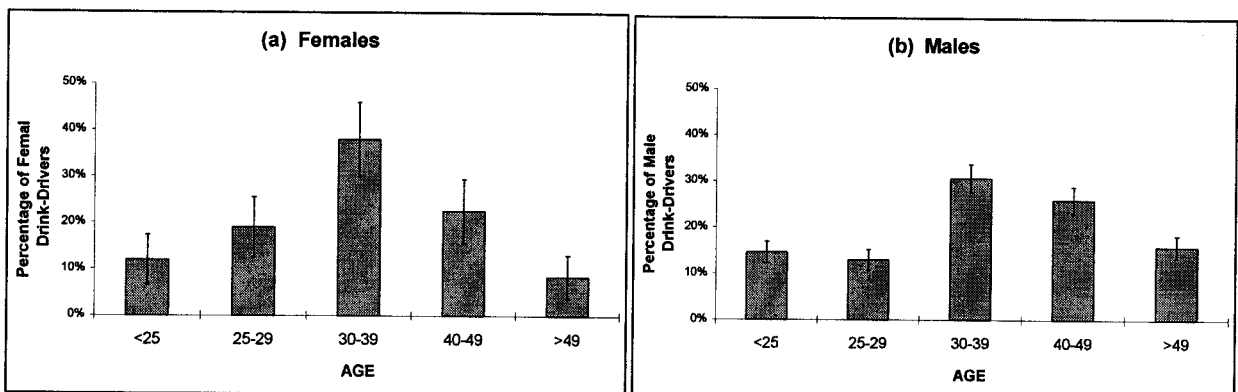


The major focus of this project was the driver characteristics within each sex and where they differ. The two samples of Melbourne female and male drink-drivers were examined separately.

Driver Age

Figure 2.15 depicts the distribution of drink-driving apprehensions for each sex by driver age. Of those females apprehended, a noticeable problem is in the age group 30 to 39 years (38% of the total females), which was significantly higher than any other age group. For male drivers apprehended, the highest percentage is also in the age group of 30-39 years (31%). Another major difference between females and males lies in the younger age groups. Drivers between the ages of 25 and 29 years contribute 19% of female drink-drivers but only 13% of male drink-drivers. Combining these it can be seen that 57% of female drink-drivers are in the 25-39 year age group while the corresponding percentage for male drink-drivers is only 44%.

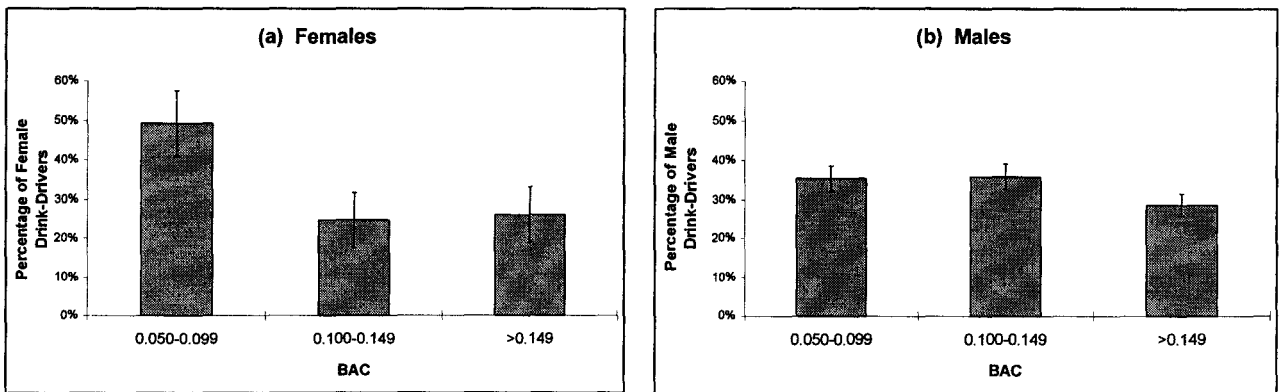
Figure 2.15 : Percentage of Drink-Drivers in Melbourne by SEX and AGE



Driver BAC

Drink-drivers with positive BAC readings below 0.1g/100ml were very common in female drink-drivers, contributing 49% of the total females apprehended (figure 2.16). Male drink-drivers were more evenly distributed over all three categories with only 35% in the lowest BAC group.

Figure 2.16 : Percentage of Drink-Drivers in Melbourne by SEX and BAC

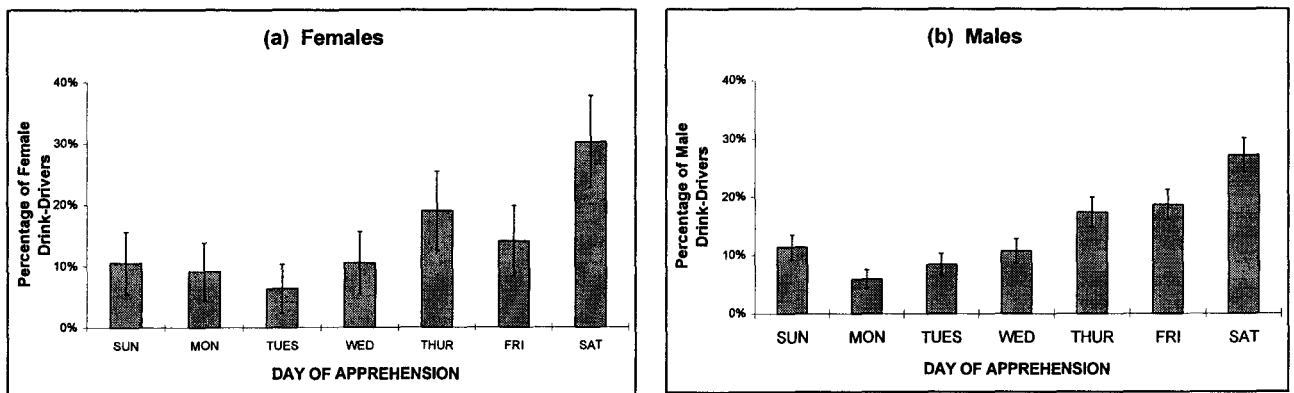


Day Of Week

When examining the day of week and time of apprehension it is not possible to see variations in the true *level* of drink-driving over that particular day/time because it is known that random breath testing is generally conducted on weekends and in high alcohol hours, leading to a bias on those particular days and times. However, a relative comparisons of females and males is still possible because of the essentially random selection and testing by gender.

The proportion of females drink-driving on Saturday was higher than other days (30%), and significantly higher for males at 27% (figure 2.17). More female drink-drivers had been apprehended on Thursday, 19% than on Friday, 14%. Opposite findings occurred for male drink-drivers who had an increasing trend from Monday to Saturday.

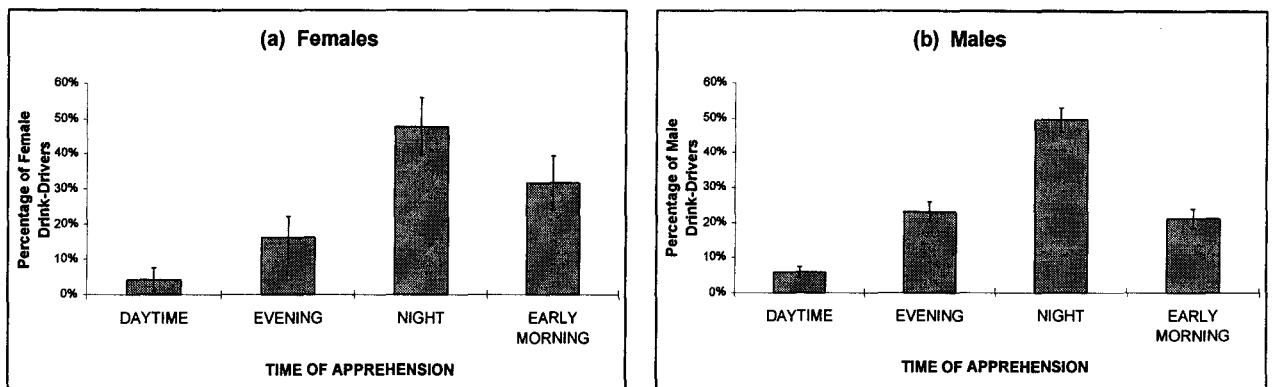
Figure 2.17 : Percentage of Drink-Drivers in Melbourne by SEX and DAY OF WEEK



Time Of Day

From Figure 2.18, it appears that female and male drink-drivers have similar patterns regarding the time of the day they were apprehended. Female and male drink-drivers were most likely to have been apprehended during the hours classified as 'night'. The percentage of females apprehended during the 'daytime' was very low (4%). In the 'early morning' hours (midnight to 5:59 pm), 32% of female drink-drivers were apprehended compared to 21% male drink-drivers.

Figure 2.18 : Percentage of Drink-Drivers in Melbourne by SEX and TIME OF DAY

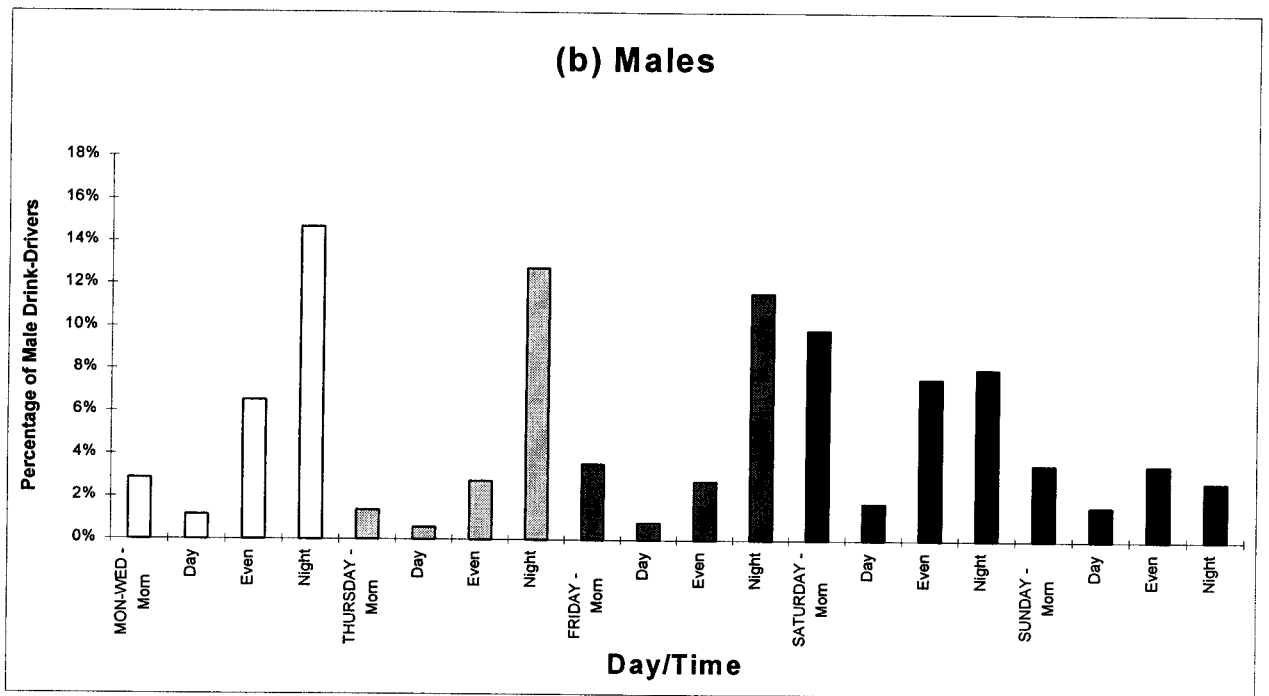
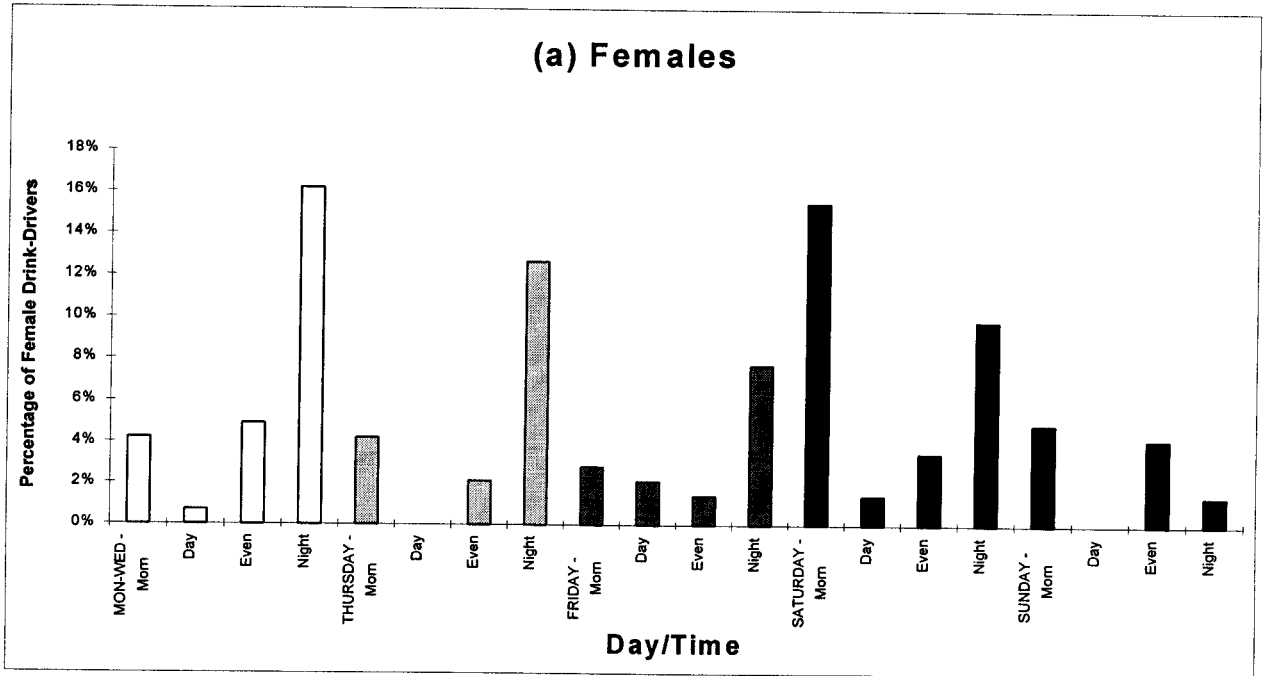


It was noted that the time of day distributions may be different for some days of the week, reflecting different patterns of late-night drinking on Fridays and weekends. For this reason the interaction of 'day of the week' and 'time of the day' is examined also (Figure 2.19).

Female and male drink-drivers had similar characteristics in regards to the time and day of the week they were apprehended. Figure 2.19 shows that on Monday, Tuesday, Wednesday and Thursday only a small percentage of drink-drivers were apprehended through 'early morning' hours (midnight to 6 am). Likewise, the percentage of drink-drivers apprehended on a Friday was low for 'day' hours, although female drink-drivers did have a higher percentage of apprehensions during Friday 'day' hours than during the 'evening' hours of 4 pm to 8 pm.

Weekday 'night' hours, 8 pm to midnight, had the highest percentages of drink-drivers for both females and males. Of those drink-drivers apprehended on weekends there was some variation between sexes. In particular, 15% of females were apprehended on Friday nights (defined as Friday 'night' and Saturday 'early morning') after midnight compared to 10% of male drink-drivers. In contrast, the pattern on Saturday night appeared to give similar results for both sexes.

Figure 2.19 : Percentage of Drink-Drivers in Melbourne by DAY OF WEEK and TIME OF DAY

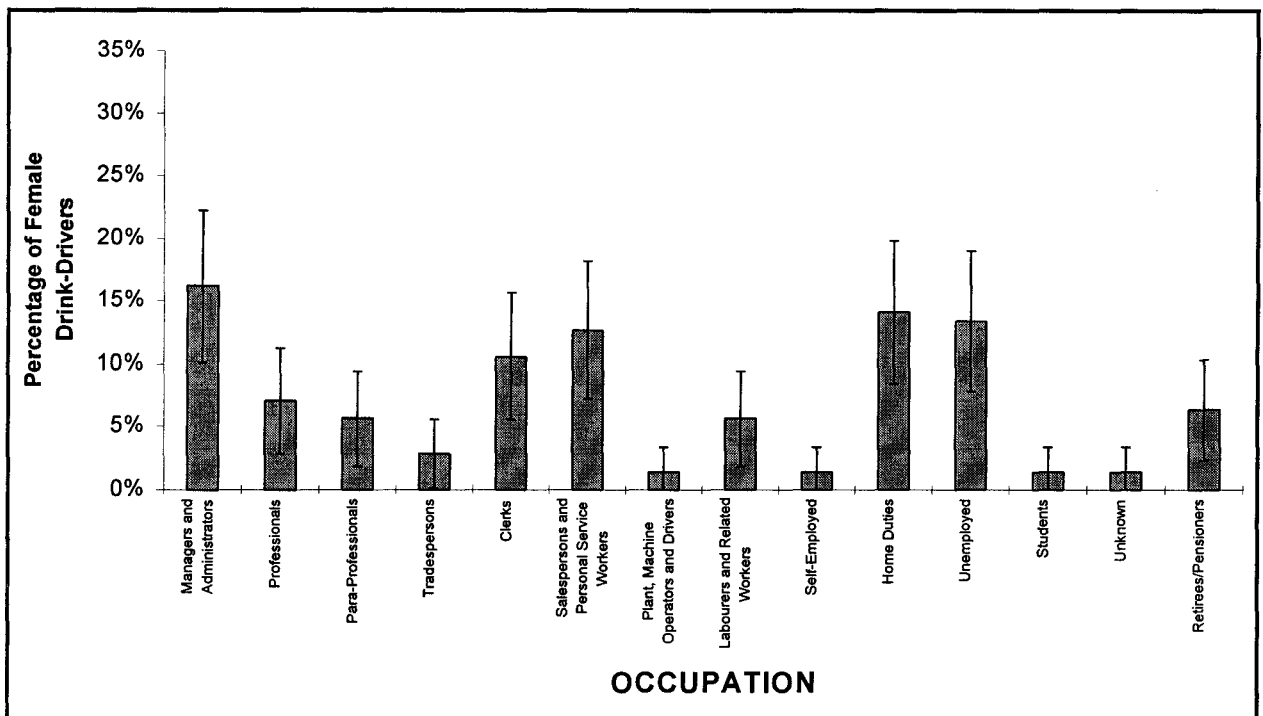


Driver Occupation

As part of the survey completed by the Breathalyser operator, the driver's occupation was recorded if possible. Of the 1015 drink-drivers in the Melbourne sample all females had an occupation recorded and all but one male had a recording. When broken down into the 14 occupation categories, sample sizes became rather small, however a comparison of drink-drivers with the Victorian workforce (ABS, cat no. 6202.2, 1994) was possible for ten of these categories. This information was available for both the Melbourne Statistical Division and the balance of Victoria. Results of the initial segregation are presented, followed by results after adjustment for the number of females and males in each occupation.

In Melbourne, female drink-drivers were most likely to fall into one of the following three categories: Managers or Administrators (16.2%), Unemployed (14.4%) or Home Duties (14.1%) (Figure 2.20). There was also a high percentage in the Clerks and Personal Service/Sales categories.

Figure 2.20 : Percentage of Female Drink-Drivers in Melbourne by OCCUPATION



A comparison of female drink-drivers with the female workforce in Victoria, as of August 1994, was only possible for ten of the categories in Figure 2.20. The number of female and male drink-drivers responsible for Home Duties was only available for all of Victoria, though the distribution of the total number of female and males 'not employed in the labour force' (ABS, cat no. 6203.2) were separated by Melbourne and the rest of Victoria. The number of females and males in Home Duties was then estimated in relation to this break down, hence it is expected that the number of females in Home Duties are underestimated.

Figure 2.21 depicts the number of female drink-drivers per 10,000 female workers in each occupation. Adjusting for this exposure, the distribution of the clerks and personal service and sales occupations was similar to the Victorian workforce. However it is apparent that managers and administrators were over-represented, warranting further analysis.

Figure 2.21 : Number of Female Drink-Drivers in Melbourne per 10,000 Females in each OCCUPATION

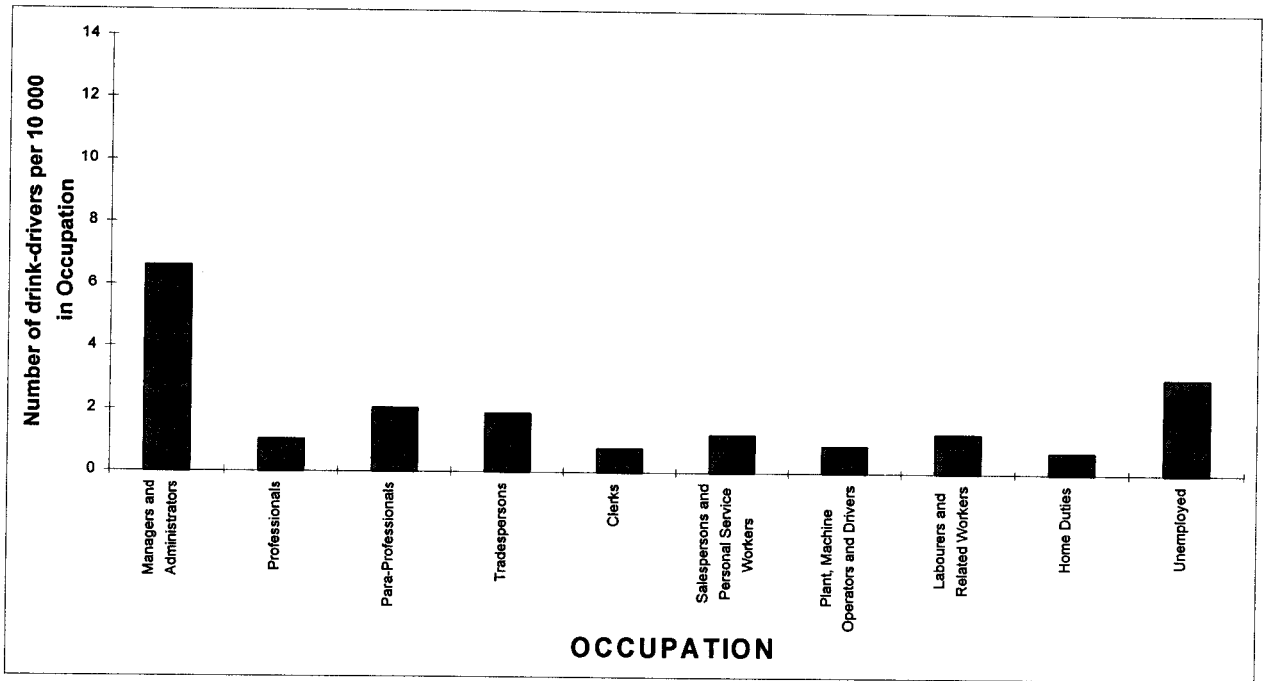


Figure 2.22 displays further detail to this sample of drink-driving females by showing on which day of the week certain occupation groups were apprehended. Due to low numbers in some samples, several occupations have been collapsed into one.

Figure 2.22 : Percentage of Female Drink-Drivers in Melbourne by OCCUPATION and DAY OF WEEK.

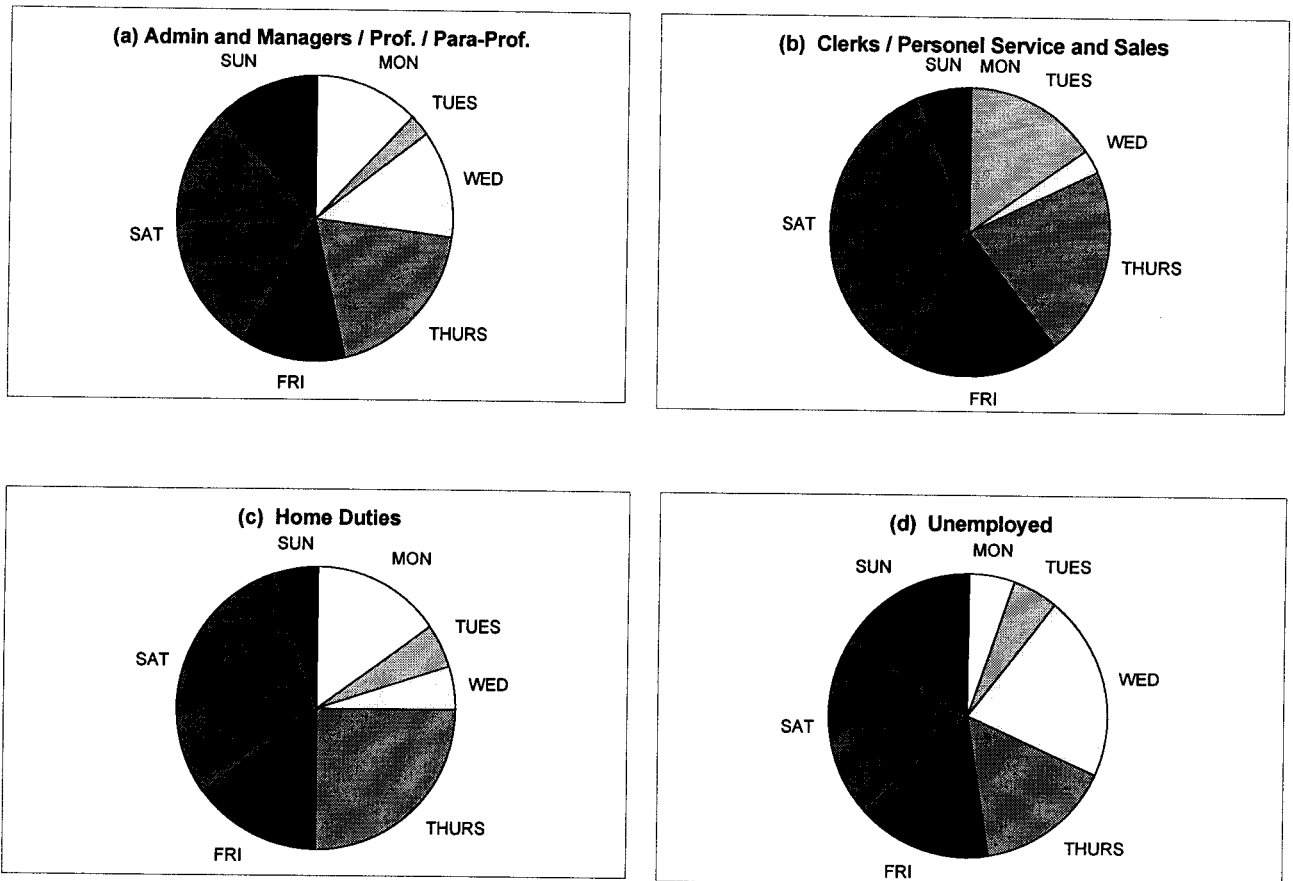


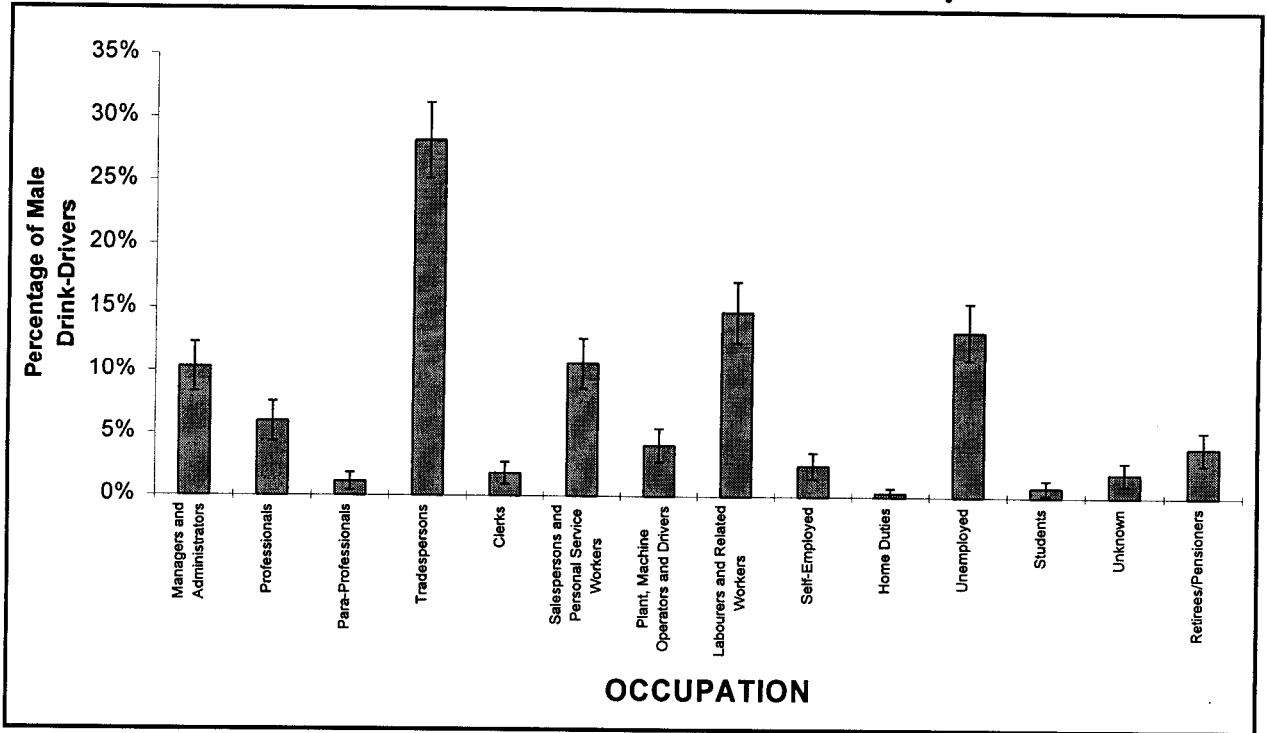
Figure 2.22 (a) shows that drink-driving females who were in managerial or professionally orientated occupations were apprehended in similar proportions on Monday (12%), Wednesday (12%) and Thursday (19%) and the highest on Saturday (29%). Female drink-drivers employed in clerical, personal service or sales occupations had a high percentage of apprehensions on Saturday (36%) and females with the responsibility of home duties were most likely to have been apprehended on a Thursday (25%) or Saturday (30%).

As noted previously, there was a relatively high proportion of female drink-drivers apprehended early Saturday morning between midnight and 6 am. It appeared to be one area in which the time of apprehensions for females differed substantially from males, and in past years a higher proportion of females than males tested positive during RBT operations on Melbourne freeways at this time.

Of the 22 females apprehended for drink-driving on early Saturday morning, 36% were in the 30 to 39 year age group. This was followed by 27% in the 25 to 29 age group and only 13% were under the age of 25. These drink-drivers were most likely to be Professional, 17%, followed closely by Managers and Administrators, (13%), Clerks, (13%), Sales and Personal Service workers (13%). The female drink-drivers apprehended during this time were more than twice as likely to be employed in a Professional occupation than female drink-drivers generally.

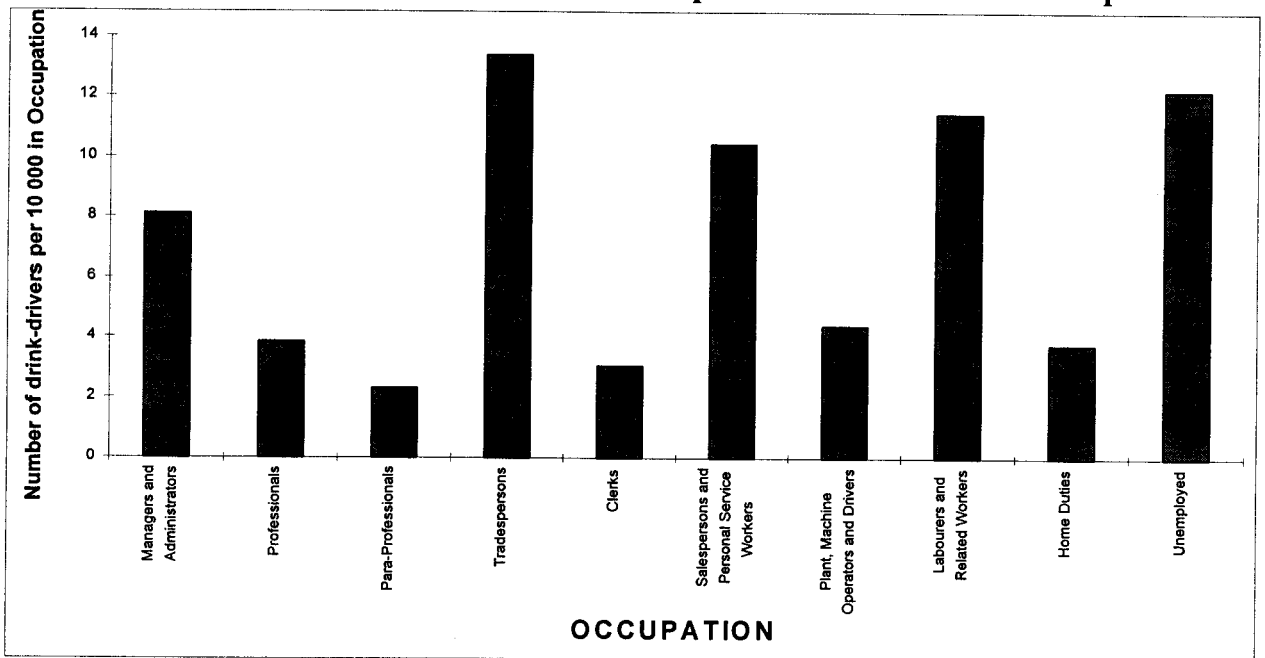
Figure 2.23 depicts the breakdown of Melbourne male drink-drivers into occupations. This is one area in which drink-driving females and males have some distinct differences. The raw figures show that 28% of apprehended males fall into the Tradesperson category.

Figure 2.23 : Percentage of Male Drink-Drivers in Melbourne by OCCUPATION



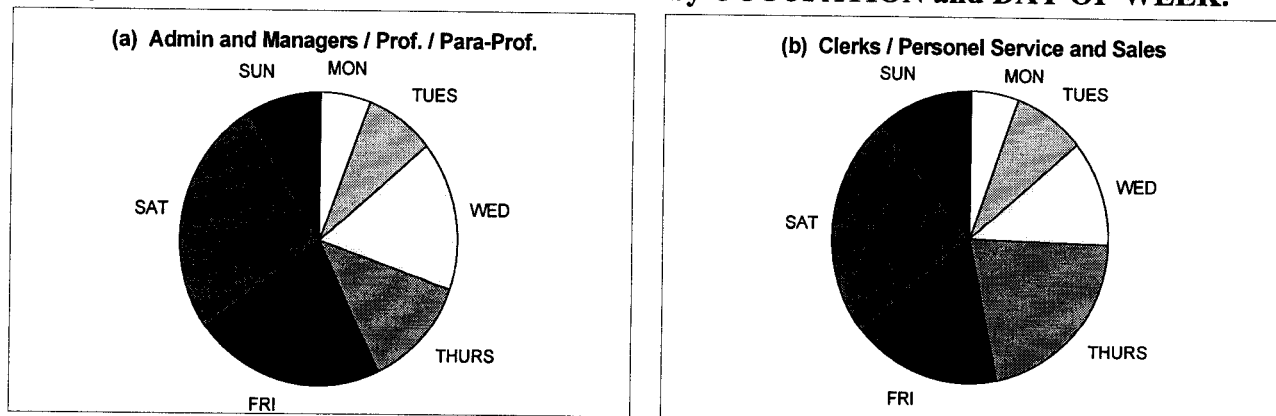
A comparison with the Victorian male workforce is presented (figure 2.24) which portrays a similar picture to figure 2.23. The Tradesperson category is over-represented with 12 drink-drivers apprehended for every 10 000 Tradesperson.

Figure 2.24 : Number of Male Drink-Drivers per 10 000 Males in each Occupation



It is not possible to reliably compare occupations containing low numbers of either females or males (tradesperson or home duties). However, the sample does allow a comparison between Managers and Administration/Professional/Para-Professional occupations, and Clerks/Personal Service and Sales occupations of both sexes, by day of the week.

Figure 2.25 : Melbourne Male Drink-Drivers by OCCUPATION and DAY OF WEEK.



When comparison is made with figure 2.22, the drink-driving patterns by day of the week are similar for female and male drivers of the same occupation. Slight differences occurred during weekdays, with drink-driving apprehension of males more evenly distributed from Monday to Friday.

2.4.4 Drink-Drivers Apprehended in the Rest of Victoria

The number of female and male drink-drivers in the Rest of Victoria are presented in Figure 2.26. The sample size of 531 is smaller than those apprehended in Melbourne over the same time period (mainly in 1992 and 1993), and consists of 42 (8%) females and 489 (92%) males.

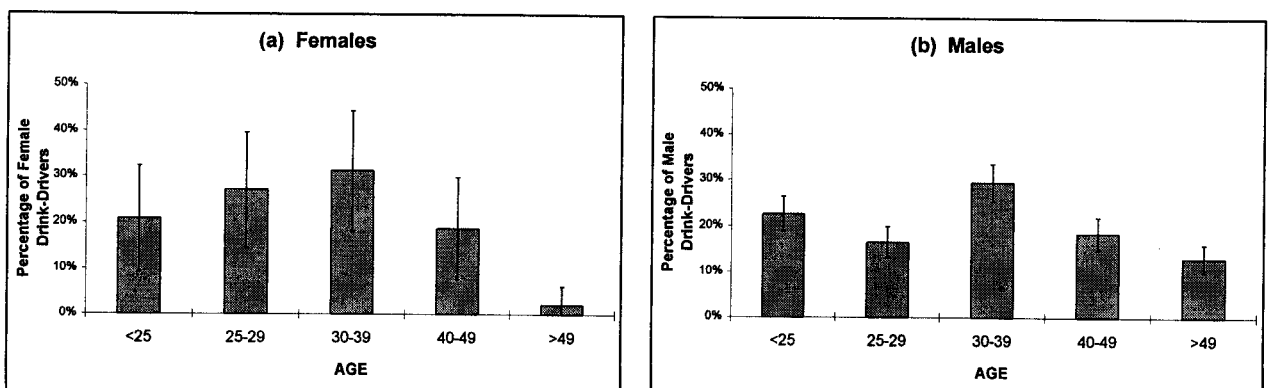
Figure 2.26 : Number of Drivers with Illegal BAC in the Rest of Victoria by SEX



Driver Age

Figure 2.27 depicts the distributions of female drink-drivers in the rest of Victoria by driver age. Thirty-three percent of the female drink-drivers were aged between 30 and 39, although the differences between the first three age groups are not significant, illustrated by the overlapping 95% confidence limits. There were significantly less female drink-drivers aged over 49 years. For male drink-drivers there was a relatively low percentage in the 25-29 year old age group, (17%), in comparison with female drink-drivers in the same age bracket (27%). The percentage of male drink-drivers aged 50 and over (13%) was considerably higher than the percentage of female drink-drivers (2%) in the same age bracket.

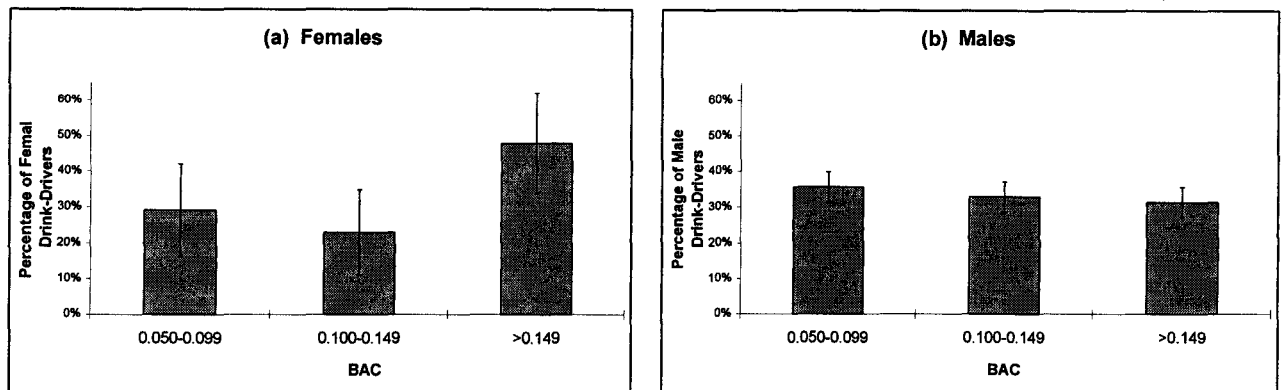
Figure 2.27 : Percentage of Drink-Driver Offences in the Rest of Victoria by SEX and AGE



Driver BAC

Figure 2.28 illustrates the percentage of female and male drink-drivers within each BAC range for the Rest of Victoria. Forty-eight percent of the female drink-drivers apprehended in the Rest of Victoria had an excessive BAC reading of over 0.149g/100ml. This is different from the corresponding 26% of female drink-drivers with excessive BAC levels found in Melbourne. Amongst the male drink-drivers in the Rest of Victoria there was little difference in the proportions in each BAC range, which is similar to the corresponding proportions found for Melbourne.

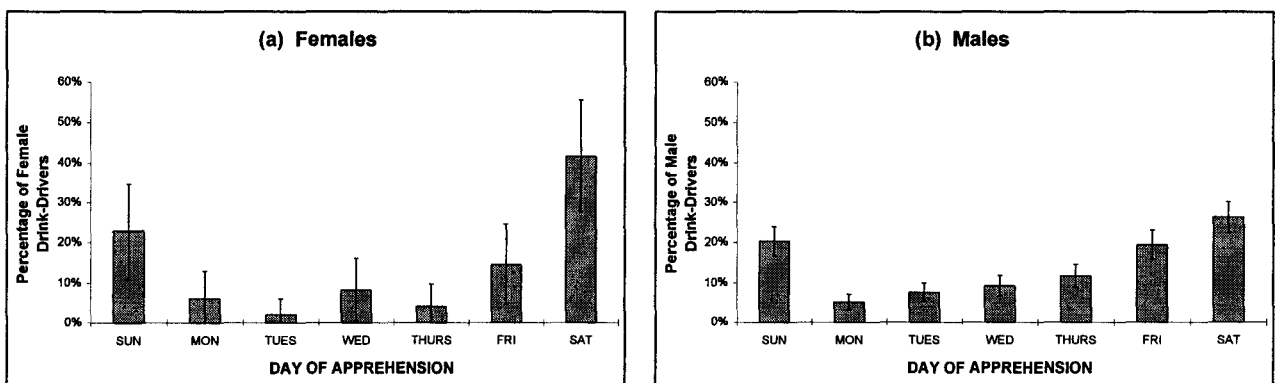
Figure 2.28 : Percentage of Drink-Driver Offences in the Rest of Victoria by SEX and BAC



Day Of Week

Drink-drivers in the Rest of Victoria were most likely to have been apprehended on Saturday (Figure 2.29). Less than twenty-one percent of female drink-drivers were apprehended from Monday to Thursday and a high percentage (65%) were apprehended on Saturday and Sunday. The percentage of male drink-drivers steadily increased from Monday to Saturday, with the greatest proportions of drink-driving apprehensions occurring on Saturday (26%) and Sunday (20%). The 95% confidence limits shows a statistically significant difference between male drink-driving apprehensions on Friday, Saturday and Sunday, and the rest of the week.

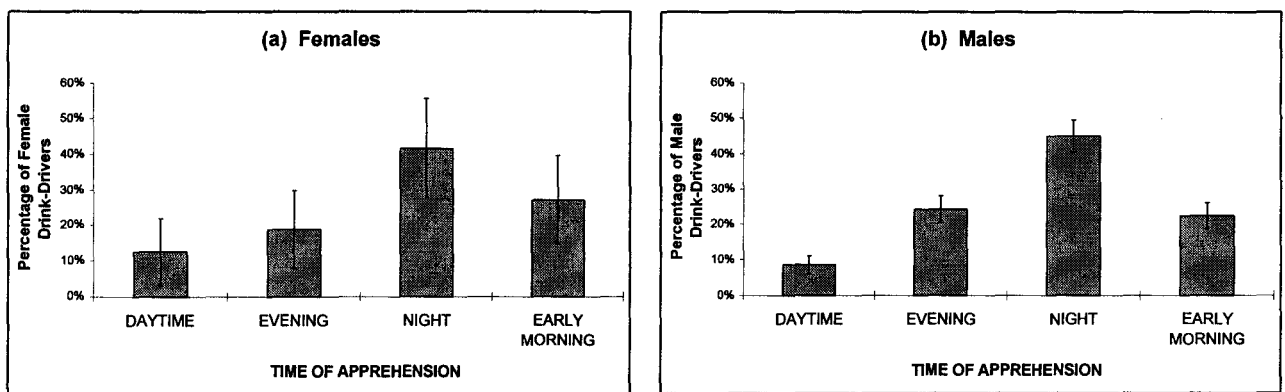
Figure 2.29 : Percentage of Drink-Driving Offences in the Rest of Victoria by SEX and DAY OF WEEK



Time Of Day

Figure 2.30 depicts the percentage distribution of female and male drink-drivers apprehended in the Rest of Victoria. The percentage of female drink-drivers apprehended is greatest between 8 pm and midnight (42%). The least number of females caught drink-driving occurred in the daytime hours (6 am to 4 pm). Similar patterns to females occurred amongst male drink-drivers apprehended in the Rest of Victoria with regard to time of apprehension. The highest percentage of male offenders occurred in the night hours and the lowest in the daytime hours. Both of these results were significantly different from all other hours of male drink-driving apprehension.

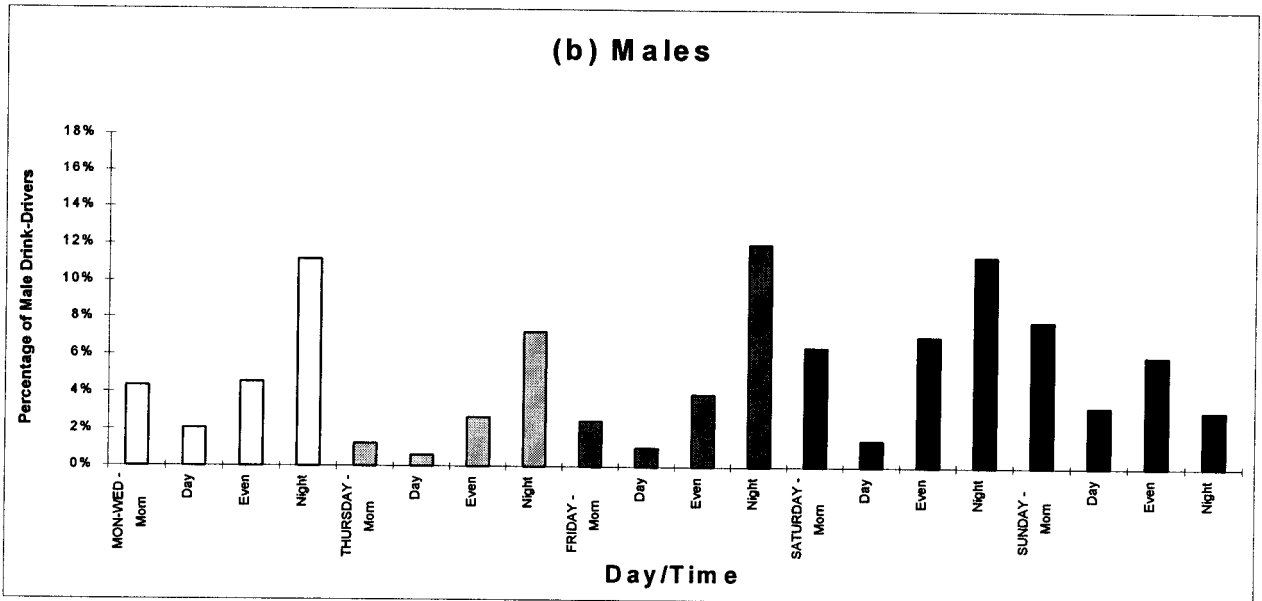
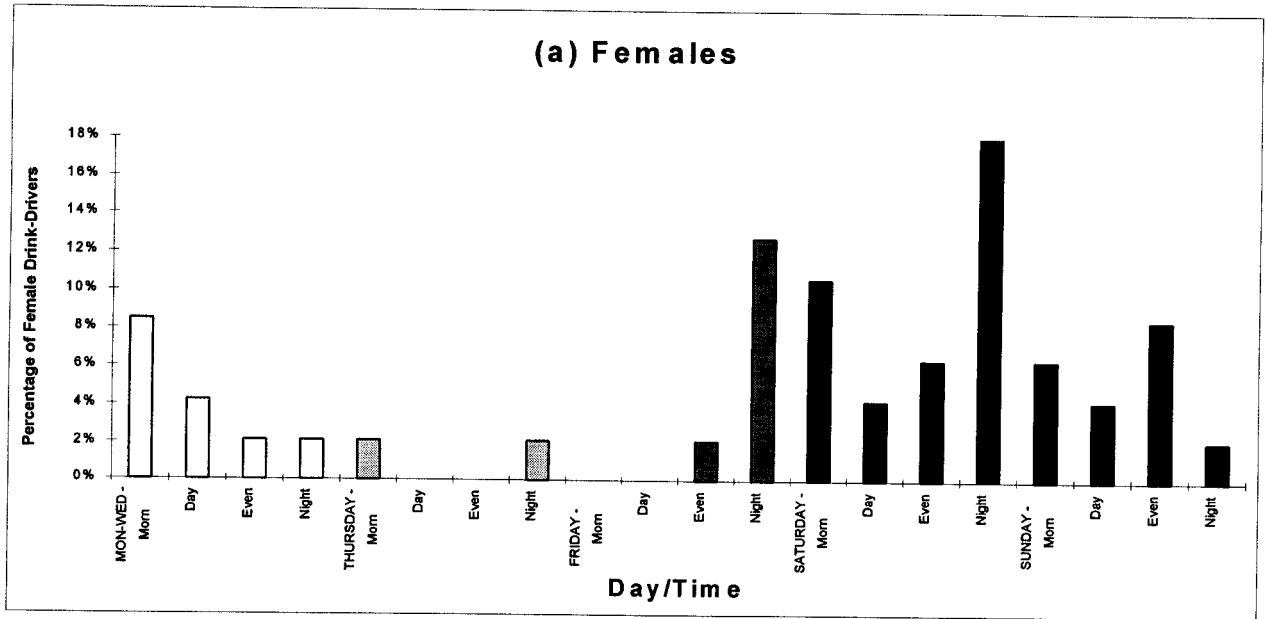
Figure 2.30 : Percentage of Drink-Drivers in the Rest of Victoria by SEX and TIME OF APPREHENSION



It was noted that the time of day distributions may be different for some days of the week, reflecting different patterns of late-night drinking on Fridays and weekends. For this reason the interaction of 'day of week' with 'time of day' is examined (Figure 2.31).

The most noticeable difference between female and male drink-drivers in regard to time and day of week of apprehension is Thursday and Friday. There were very few females apprehended on Thursday and Friday, yet 31% of the male offenders were apprehended on these days of the week. The highest percentage of apprehensions, (18%), for female drink-drivers in the rest of Victoria occurred on early Saturday nights, between 8 pm and midnight. Friday and Saturday nights produced the high percentages for male drink-drivers apprehended in the rest of Victoria.

Figure 2.31 : Drink-Drivers in the Rest of Victoria by DAY OF WEEK and TIME OF DAY

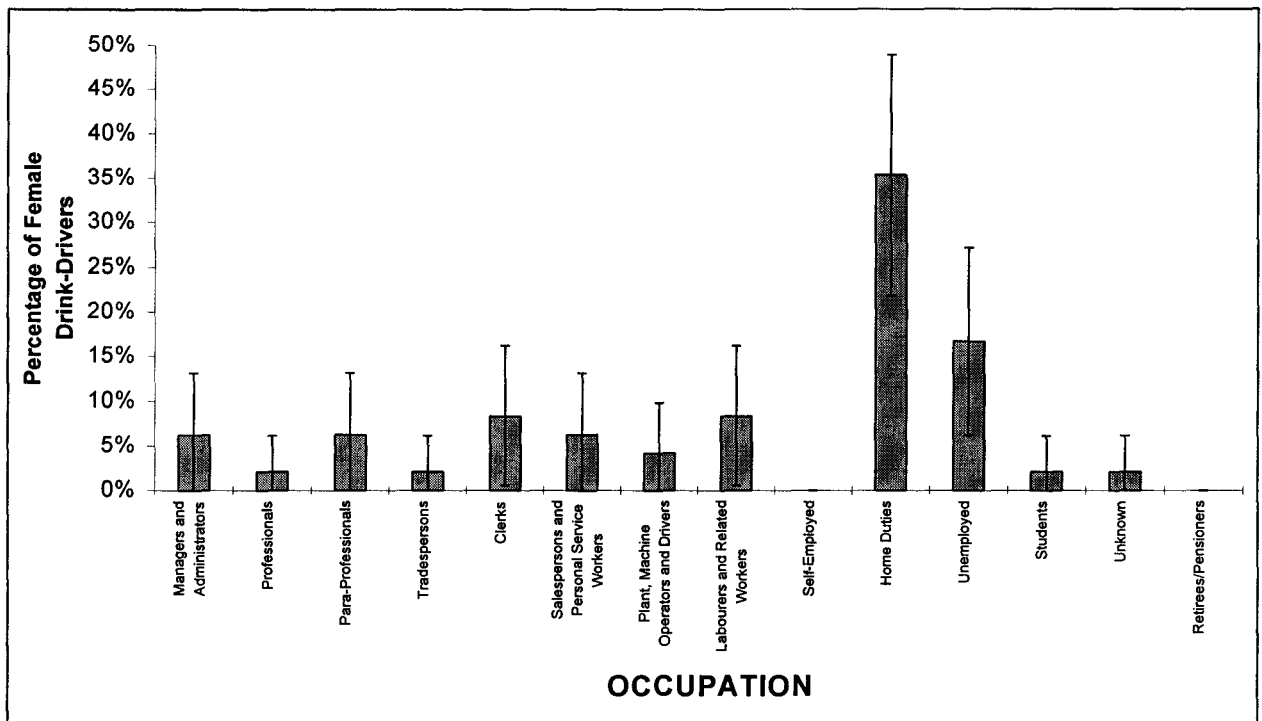


Driver Occupation

This section follows a similar format to Section 2.4.1, namely, the driver occupation for drink-drivers presented as a percentage of all occupations, followed by adjusted figures for ten occupational categories which compare drink-driver occupations with the numbers in the rest of Victoria (outside the Melbourne Statistical Division) workforce.

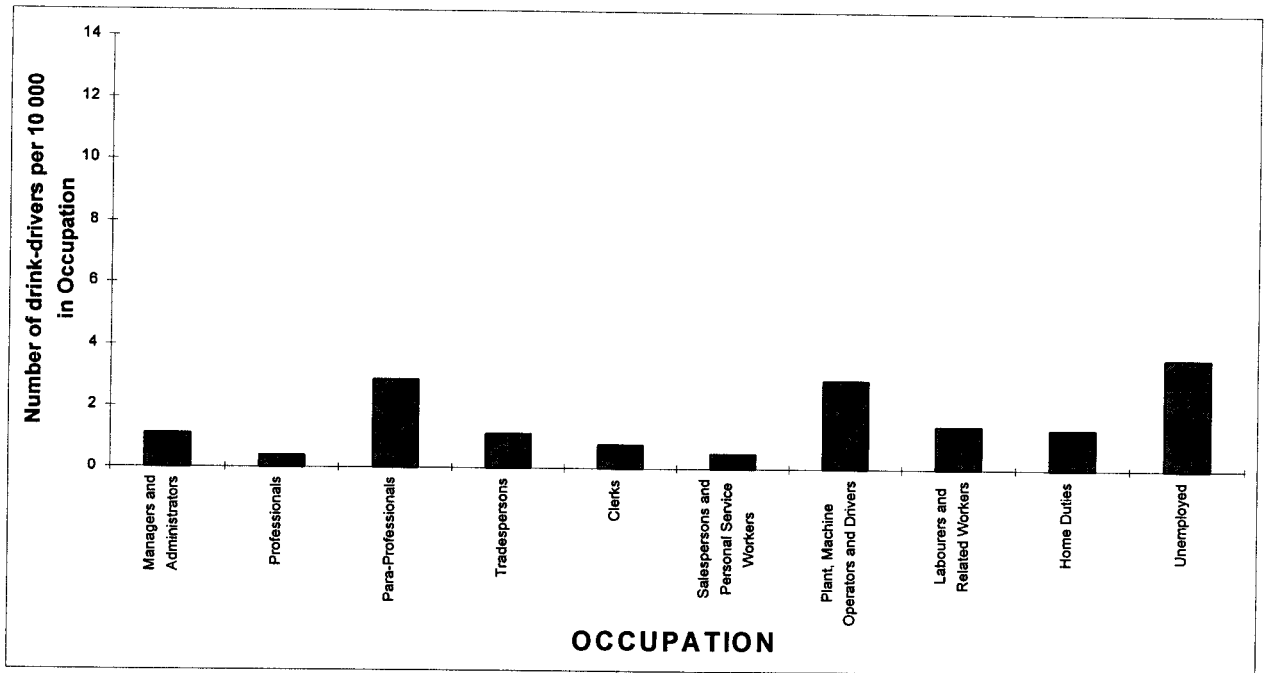
Figure 2.32 illustrates the distribution of occupations of those females apprehended for drink-driving in the Rest of Victoria. Of all the females apprehended, 36% gave their occupation as Home Duties. This was significantly higher than all other occupations except for those female drink-drivers unemployed.

Figure 2.32 : Percentage of Female Drink-Drivers in the Rest of Victoria by OCCUPATION



A comparison of female drink-drivers in the rest of Victoria with the female workforce in the same area showed that in fact females practising Home Duties were not over-represented among drink-drivers (figure 2.33). Female drink-drivers working as para-professionals and plant or machine operators/drivers had the highest number of drink-drivers per 10 000 females in the respective occupations. The unemployed female drink-drivers in the rest of Victoria were still higher with 4 in every 10 000 females unemployed apprehended for drink-driving.

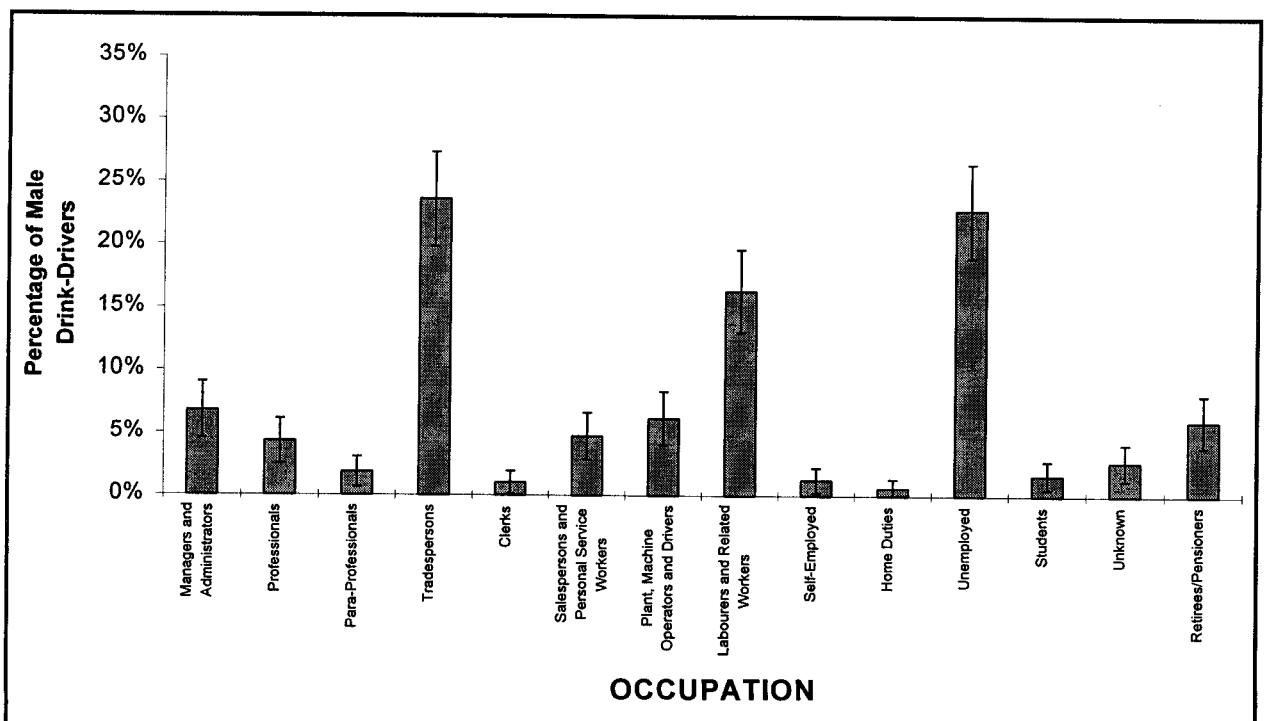
Figure 2.33 : Number of Female Drink-Drivers in Melbourne per 10 000 Females in each OCCUPATION



A further breakdown of each occupation into the day of week the drink-drivers were apprehended was not possible for those drivers in the rest of Victoria due to relatively small sample sizes.

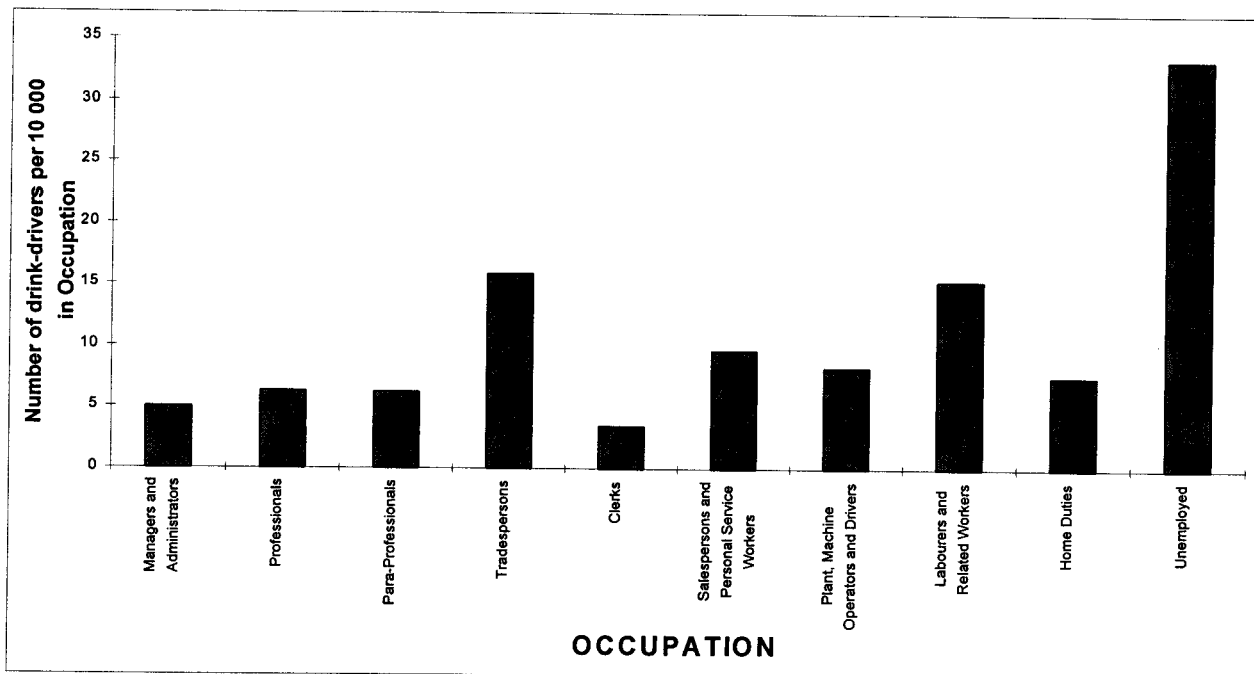
The distribution of the occupation of males apprehended for drink-driving in the rest of Victoria is presented in Figure 2.34. The raw figures show the highest percentages are for the occupations; Tradesperson (24%), Unemployed (23%) and Labourers and Related Workers (16%).

Figure 2.34 : Percentage of Male Drink-Drivers in the Rest of Victoria by OCCUPATION



A comparison with the rest of Victoria's male workforce is presented in Figure 2.35. Unemployed male drink-drivers then appeared to be substantially over-represented with 35 drink-drivers for every 10 000 males unemployed in the rest of Victoria. All the other occupations also had higher rates than female drink-drivers apprehended in the same location. Male drivers apprehended for drink-driving with the occupations of Tradesperson, or Labourers and Related Workers, were also over-represented.

Figure 2.35 : Number of Male Drink-Drivers in the Rest of Victoria per 10000 Males in each OCCUPATION



2.4.5 Female Drink-Driving Behaviour : Melbourne vs The Rest of Victoria

In summary, the differences between female drink-driving behaviour in Melbourne and the rest of Victoria are more pronounced than the differences between male drink-drivers in both locations.

Female drink-drivers apprehended in the rest of Victoria had a higher percentage aged under 30 than female drink-drivers in Melbourne whose problem lay predominantly with the 30-39 year old age group.

The Blood Alcohol Concentration level of females in the two groups differed considerably. Forty-eight percent of females apprehended in Melbourne had a BAC reading of less than 0.100g/100ml. The opposite occurred for female drink-drivers in the rest of Victoria, where they were most likely to have been apprehended with an excessive BAC reading of over 0.150g/100ml (48%). Male drink-drivers in Melbourne and the rest of Victoria had similar patterns of BAC level.

Given that in the past two years RBT operations have been similar in both locations, another noticeable difference between female drink-drivers in Melbourne and the rest of Victoria was the day of apprehension. A high percentage of those apprehended in Melbourne were caught on a Thursday (19%) and Saturday (30%). Drink-driving during the week was very low for females in the rest of Victoria with sixty-five percent apprehended on the weekend (Saturday and Sunday). Male drink-drivers in both locations had similar patterns of an increasing trend from Monday to Saturday.

For female drink-drivers apprehended in Melbourne, the highest percentage in each occupation were in Managers and Administrators, Home Duties and Unemployed. After adjusting for the number of females within each occupation, it was apparent that Managers and Administrators were over-represented. The occupation distribution for apprehended female drink-drivers in the rest of Victoria was similar to the rest of Victorian female workforce.

3. DRINK-DRIVING IN CRASHES

The crash frequency trends for all Police-reported casualty crashes including fatal crashes in the ten year period 1984-1993 were examined. Trends in the severity of the injury sustained by the drivers, both female and male, were also studied.

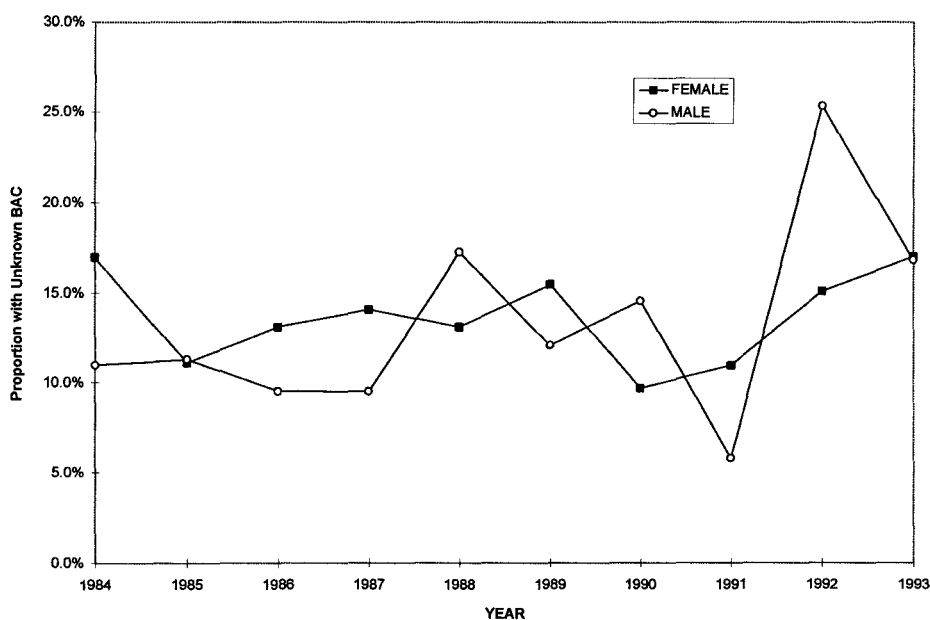
Only drivers of passenger cars who were killed or seriously injured in Police-reported crashes were used, since a substantial proportion of the minor injured casualties had unknown BAC readings. Further, the practice of taking blood samples in hospitals to determine alcohol content changed in 1989 (South, 1994). A campaign by medical staff in hospital Emergency Departments in October 1989 disrupted the taking of samples, making comparisons with BAC readings from earlier years difficult. After 1991 hospitals agreed to adopt a Code of Practice to take blood samples from those drivers that were suspected to have been drinking. However the degree to which this Code of Practice has been adhered to by hospitals is unknown. The above changes make it difficult to compare these figures over the time series presented.

Changes made to the taking of blood samples would mainly have affected seriously injured drivers after 1989, but less so those killed. For this reason fatal and seriously injured drivers have been analysed separately.

3.1 DRINK-DRIVING IN FATAL CRASHES

Figure 3.1 depicts the proportion of killed drivers, female and male, with unknown BAC readings. The proportion of female drink-drivers with unknown BAC generally decreased from 1984 to 1990 then increased, whereas the corresponding proportion for male drink-drivers has alternately increased and decreased during 1984-1993. There is no apparent trend or change after 1989 and no indication of a sex related bias.

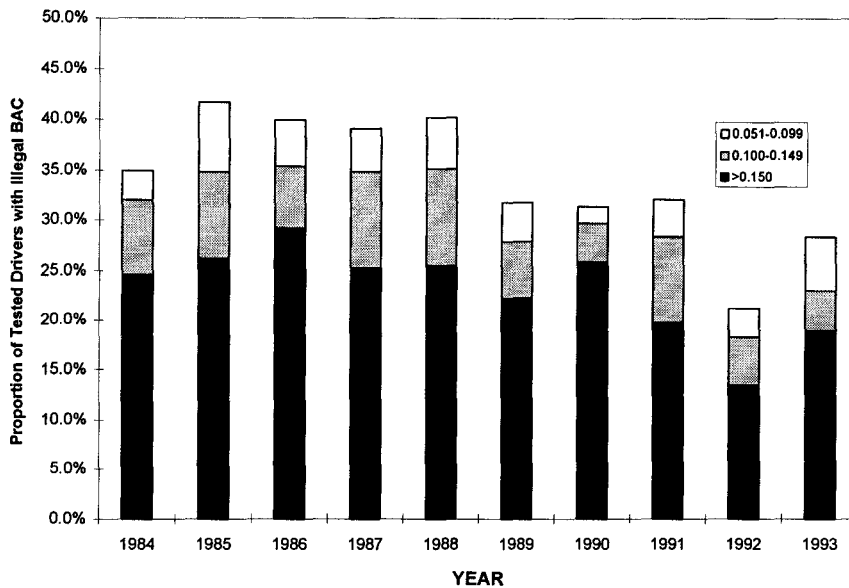
Figure 3.1 : Percentage of UNKNOWN BAC for Killed Drivers, 1984-1993



The proportion of drivers killed with illegal BAC readings in Victoria during 1984-1993 is given in figure 3.2. For drivers in Victoria, the highest proportion of fatalities occurred where the illegal

BAC level was excessive (0.151g/100ml or above). After 1988 the proportion of all drivers killed with illegal BAC readings steadily declined, with 1992 being an unusually low year.

Figure 3.2 : Victorian Drivers KILLED with ILLEGAL BAC as a Proportion of those with KNOWN BAC, 1984-1993



The proportions of female and male drivers killed with illegal BAC readings in Victoria during 1984-93, are given in figures 3.3 and 3.4 respectively.

The percentage of female drivers killed with illegal BAC was considerably lower than the corresponding percentage of males killed during the ten years. The female percentages fluctuated in the years 1984-91 before a considerable decrease in 1992. During this record low year, only 4% of female drivers killed with a known BAC had an illegal BAC reading. The proportion of drivers killed increased with the increasing BAC level of the driver. This order of magnitude remained the same over the 10 year period with the greatest proportion of killed drivers being those with BAC readings of 0.15g/100ml or above.

The percentage of Victorian male drivers killed with illegal BAC reached a peak in 1985, 48%. (Figure 3.4). After 1988 the proportion decreased steadily until 1993. 1990 saw an increase in excessive BAC readings, with 80% of drivers with illegal BAC having a reading of 0.151g/100ml or above. These trends are very similar to the trends of all drivers (Figure 3.2) with the exception of 1992. There was no major decrease in the corresponding percentage of male driver fatalities during this year. There was also a high percentage of unknown BAC results for males in 1992 (Figure 3.1).

The number of unknowns for all drivers in the last two years was higher than other published figures due to the preliminary nature of the 1992 and 1993 crash data files used for this report. Presuming that the female and male BAC results not present were distributed in an unbiased manner, it can be concluded that the record drop in the proportion of drivers killed with an illegal BAC in 1992 was due to the substantial reduction in female drink-drivers who were killed.

Figure 3.3 : Victorian FEMALE Drivers Killed with ILLEGAL BAC as a Proportion of those with KNOWN BAC, 1984-1993

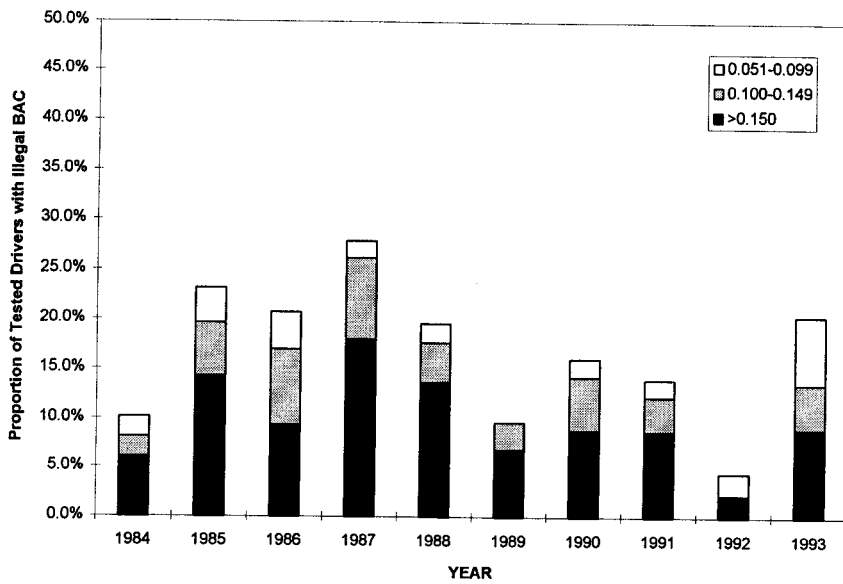
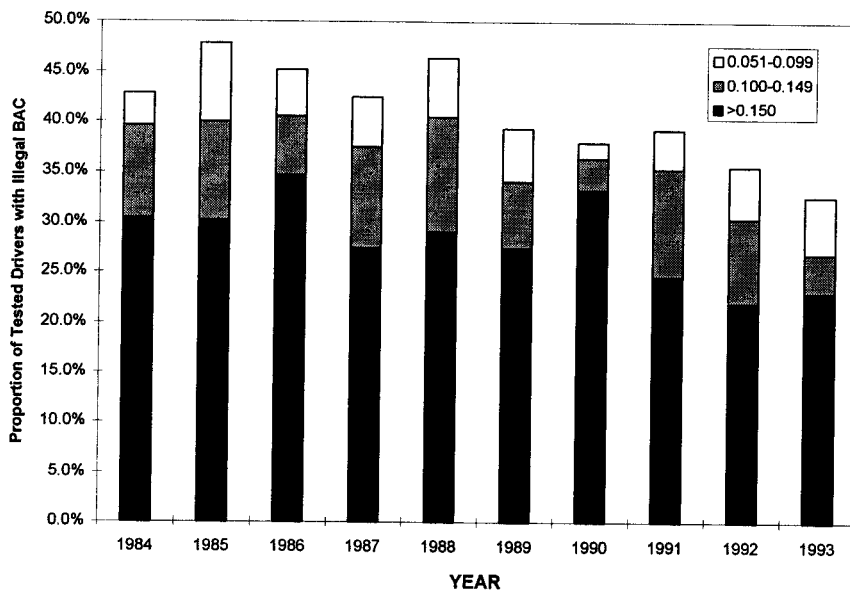


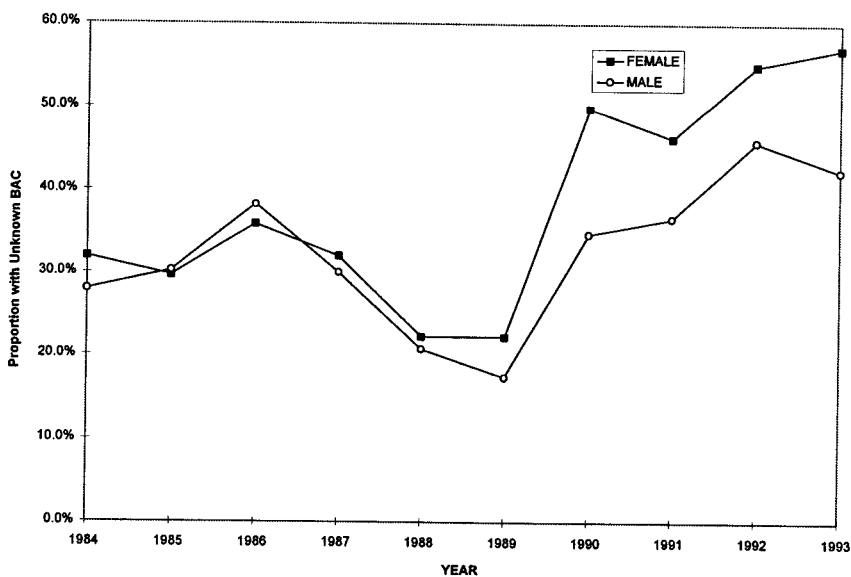
Figure 3.4 : Victorian MALE Drivers Killed with ILLEGAL BAC as a Proportion of those with KNOWN BAC, 1984-1993



3.2 DRINK-DRIVING IN SERIOUS INJURY CRASHES

Figure 3.5 depicts the proportions of seriously injured female and male drivers in Victoria with unknown BAC readings. Seriously injured female and male drivers show similar trends in their unknown BAC level proportions. The unknown BAC rates decreased during 1984-88, and then after a sharp increase in 1990 showed an upward trend.

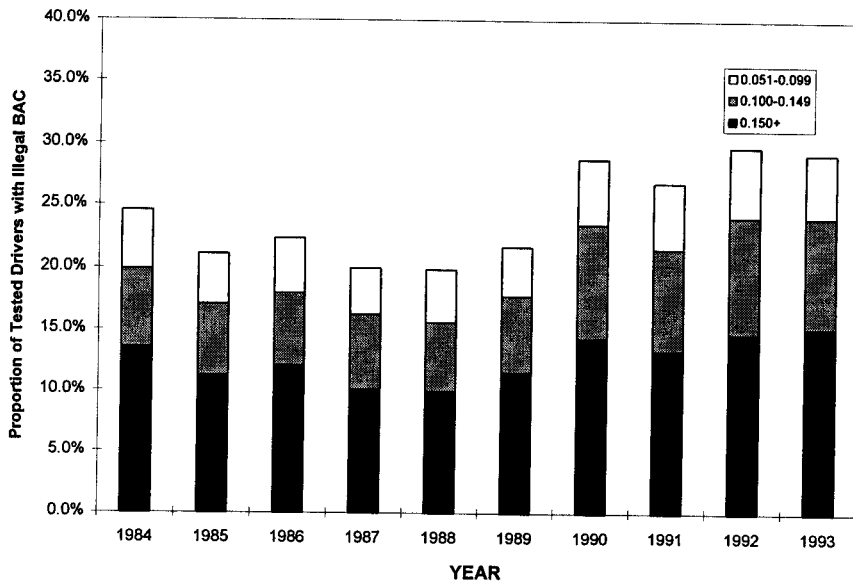
Figure 3.5 : Percentage of UNKNOWN BAC for Seriously Injured Drivers, 1984-1993



The unknown BAC rates for seriously injured drivers throughout the ten year period exhibit different trends to the corresponding fatal unknown BAC rates reflected in figure 3.1. The sharp increase in unknown BAC rates for seriously injured drivers after 1989 corresponds to the change in taking of blood samples. There is an apparent sex-related bias in the rate of missing BAC data for the years 1990-93, therefore an analysis of trends over the ten year period would be difficult for seriously injured drivers.

The proportion of Victorian drivers seriously injured with illegal BAC also showed an increase after 1989 (Figure 3.6). It should be noted that this may be due to the inconsistency of the data set, as well as to a bias that would have resulted in blood samples being more frequently taken from intoxicated drivers rather than from sober drivers.

Figure 3.6 : Victorian Drivers Seriously Injured with ILLEGAL BAC as a Proportion of those with KNOWN BAC, 1984-1993



Figures 3.7 and 3.8 depict the proportion of seriously injured female and male drivers in Victoria with illegal BAC readings, of those drivers with known readings.

Over the ten year period, the proportion of seriously injured female drivers with illegal BAC was notably lower than seriously injured male drivers with illegal BAC. The breakdown of BAC levels for drink-drivers of each sex also showed similar trends. Both sexes showed an increase in the proportion seriously injured with illegal BAC after 1989. However, neither of these trends is reliable (especially a comparison of the post-1989 and the pre-1990 periods) for seriously injured drivers due to the changes in the practice of taking blood samples in hospital and the likely biases these changes may have introduced.

Figure 3.7 : FEMALE Drivers Seriously Injured with ILLEGAL BAC as a Proportion of those with KNOWN BAC, 1984-1993

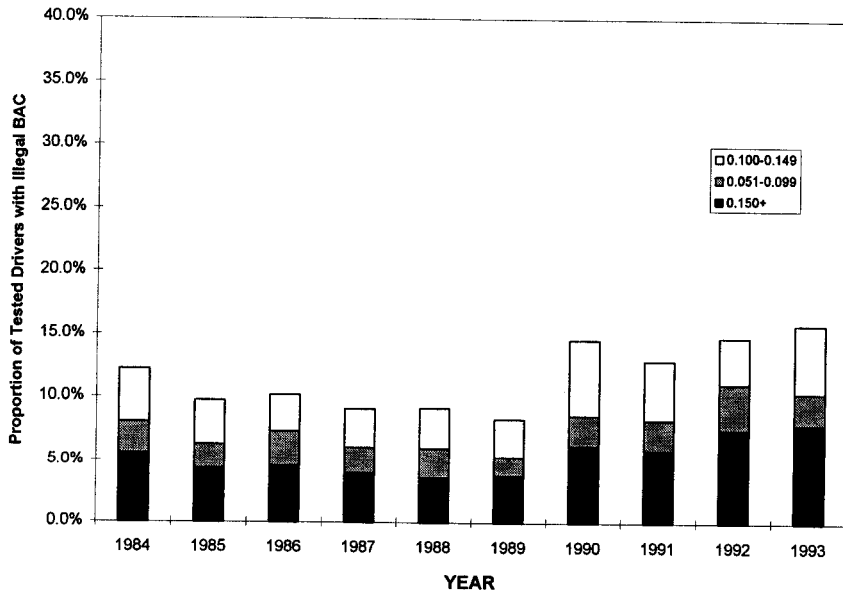
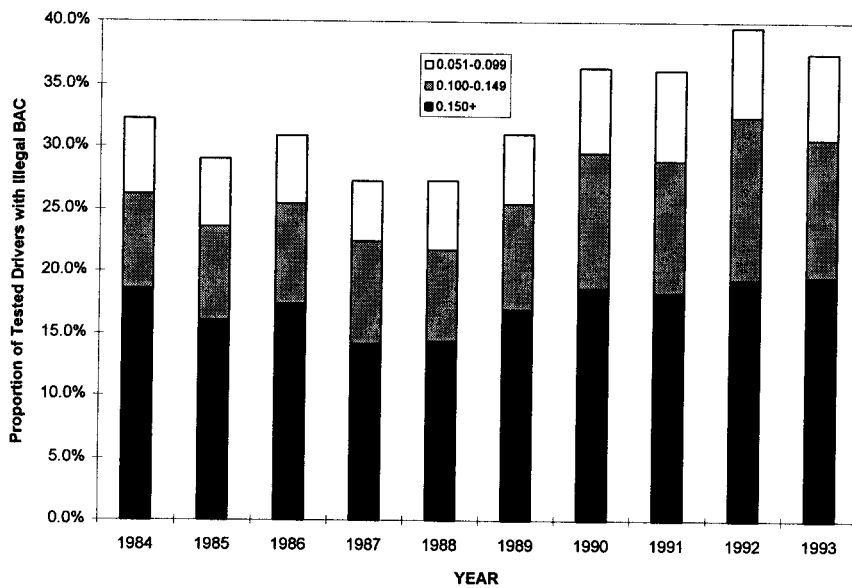


Figure 3.8 : MALE Drivers Seriously Injured with ILLEGAL BAC as a Proportion of those with KNOWN BAC, 1984-1993



Due to the questionable nature of the BAC information for seriously injured drivers from the years 1989 onwards, the remainder of this section will concentrate only on passenger car drivers who were killed. Graphs portraying the results from seriously injured drivers are presented in Appendix A for those readers wishing to examine this data after noting the caveats given above.

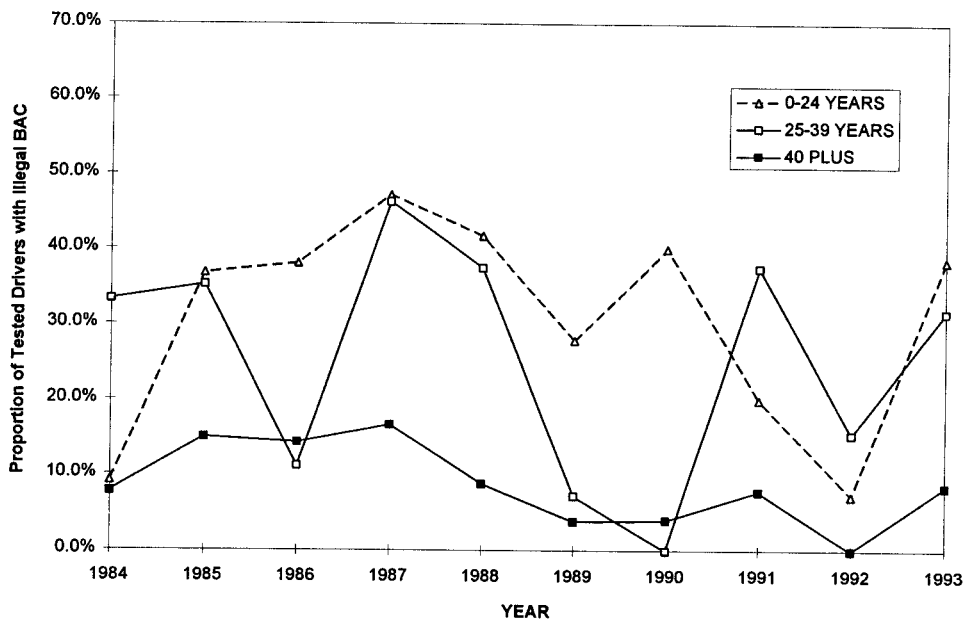
3.3 TRENDS IN FATAL DRINK-DRIVING CHARACTERISTICS

During the ten year period 1984-93 there was a total of 2054 drivers killed and tested for blood alcohol content in Victoria. Thirty-five percent or 723 of these drivers had an illegal BAC reading. The number of killed female drivers tested was 544. Sixteen percent or 91 of these had an illegal BAC reading (the corresponding figure for killed male drivers tested is 1510 of which 632 or 42% had an illegal BAC reading). Trends for killed drivers in Victoria for 1984-93 were analysed by the age of the driver, day and time of the accident, and location, separately for each sex. The limited amount of data, especially for females with illegal BAC, resulted in some categories being aggregated more than was desirable.

3.3.1 Driver AGE

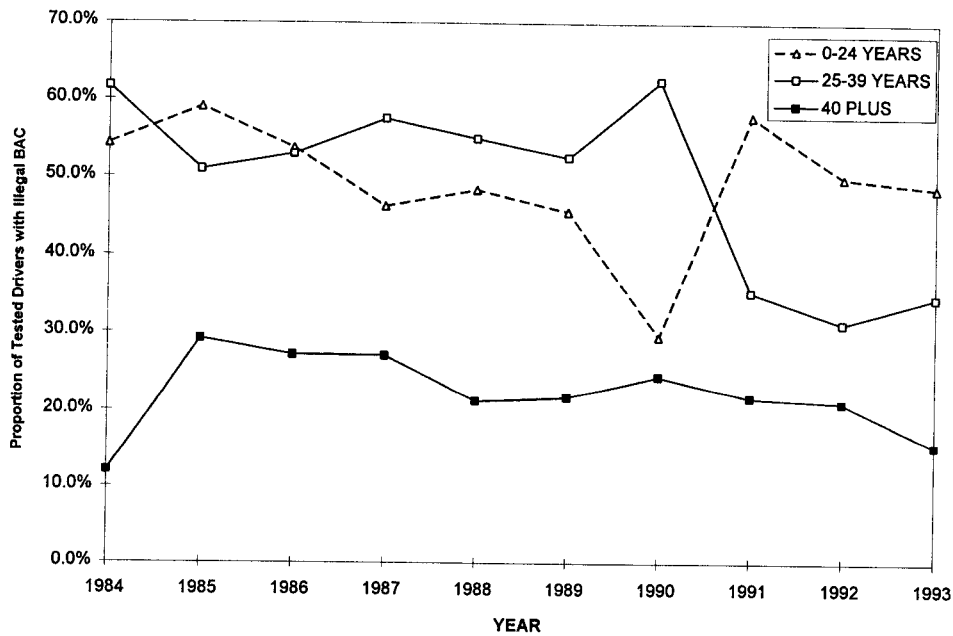
Figure 3.9 represents the trends in female drivers killed with illegal BAC as a proportion of those with known BAC in Victoria during 1984-93 for differing age groups. During 1992, there were relatively low proportions of drivers with illegal BACs in all age groups. This was followed by a sharp increase in 1993.

Figure 3.9 : FEMALE Drivers Killed in Crashes with ILLEGAL BAC as a Proportion of those with KNOWN BAC by AGE, 1984-1993



The proportion of male drivers killed with illegal BAC aged between 25 and 39 years decreased notably after 1990 (Figure 3.10). Trends differed for those male drivers younger than 25 years when in 1991, 60% of these male drivers killed and tested for blood alcohol content had an illegal BAC reading. For male drivers aged 40 years and over, the proportion of those killed with illegal BAC has remained essentially constant (in contrast with the marginal decline for females aged 40 years and over).

Figure 3.10 : MALE Drivers Killed in Crashes with ILLEGAL BAC as a Proportion of those with KNOWN BAC by AGE, 1984-1993



3.3.2 Day of Week

The trends presented in figure 3.11 and 3.12 indicate the proportion of female and male drivers killed in Victoria with illegal BAC for each day of the week. ‘Weekend’ refers to Friday, Saturday and Sunday, and is presented in comparison with proportions for Monday to Thursday. There is an obvious difference between the relatively low proportions of female drivers killed with illegal BAC and the higher male proportions.

Of those females killed and tested for drink-driving, the proportions with illegal BAC on the weekend shows a decrease since 1987. The proportions during 1990-1993 are similar to the ‘weekday’ proportions.

From figure 3.12 it is obvious that the proportions of male drivers killed with illegal BAC is considerably higher on weekends than weekdays. This latter proportion was the smallest in 1992 when 8% of male drivers killed during Monday to Thursday had an illegal BAC reading.

Figure 3.11 : FEMALE Drivers Killed with ILLEGAL BAC as a Proportion of those with KNOWN BAC by DAY OF WEEK, 1984-1993

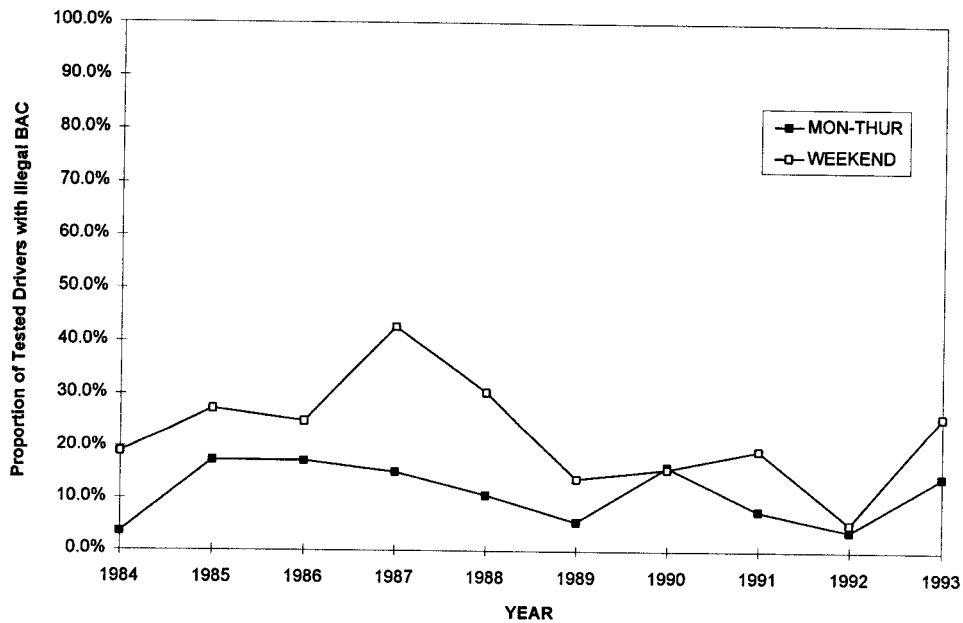
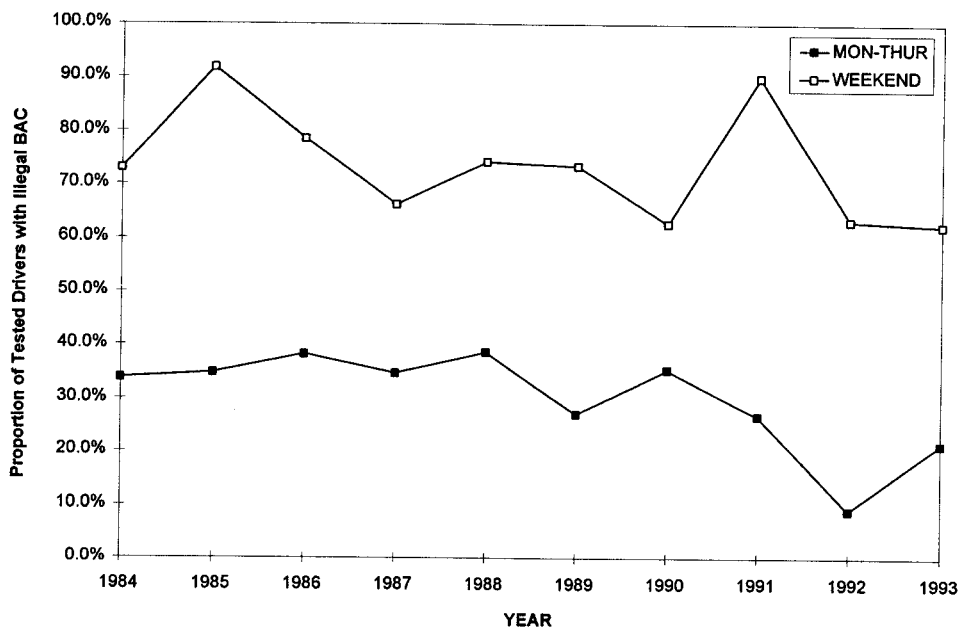


Figure 3.12 : MALE Drivers Killed with ILLEGAL BAC as a Proportion of those Drivers with KNOWN BAC by DAY OF WEEK, 1984-1993



3.3.3 Time of Day

Figure 3.13 and 3.14 depicts the trends in the time of the day female and male drivers killed in accidents had an illegal BAC reading. The time intervals were grouped as defined in section 2.4.

For those females killed in the early morning, the proportion with illegal BAC has decreased over 1990-93. There was a constant and low proportion of fatal crashes involving alcohol in the daytime during 1984-93. There is a clearer distinction between the different accident times for killed male drivers with illegal BAC. There were more early morning fatal crashes involving alcohol than at other times. After 1989 there were general declines in the proportions of killed male drivers with illegal BACs during the night, and more recently during the evening and daytime.

Figure 3.13 : FEMALE Drivers Killed with ILLEGAL BAC as a Proportion of those Drivers with KNOWN BAC by TIME OF DAY, 1984-1993

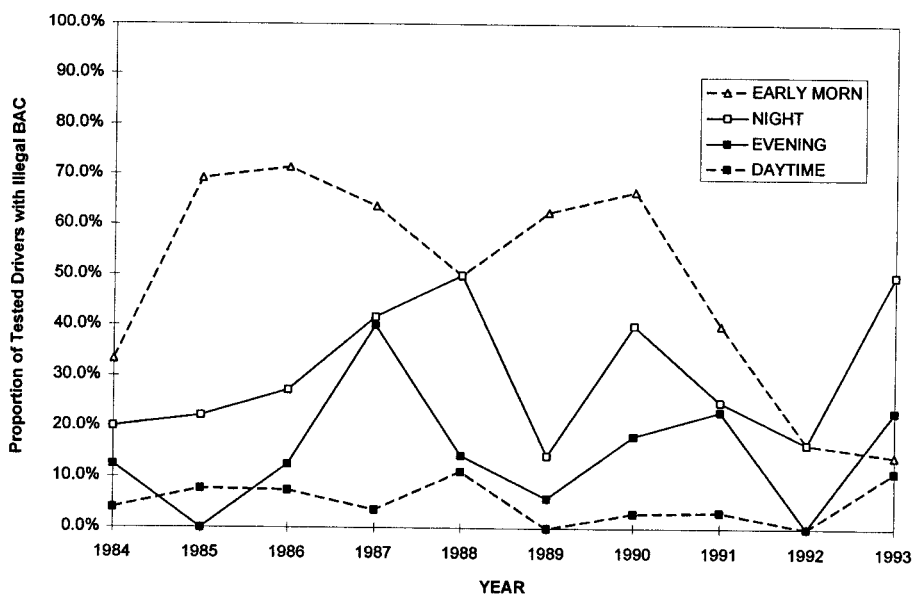
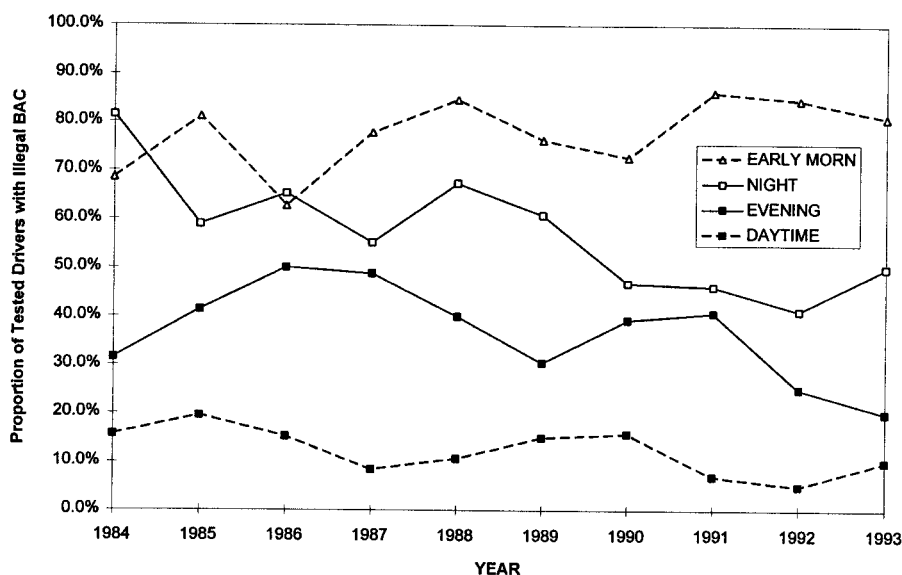


Figure 3.14 : MALE Drivers Killed with ILLEGAL BAC as a Proportion of those drivers with KNOWN BAC by TIME OF DAY, 1984-1993



3.3.4 Road Type

Roads within Victoria are classified in a hierarchical system identified by criteria such as traffic volume and economic significance. Vic Roads has defined the road network available in the accident data used in this report. Due to low numbers in fatal crashes, an analysis by road types such as Freeways, Highways and Local Roads is not possible. In figures 3.15 and 3.16, categories have been grouped together to form 'major roads', (all arterial roads with speed limit greater than 80 km/h) and 'non-major' roads, (the remainder).

After 1987 there was a drop in the proportion of female drivers killed with illegal BAC on roads with lower speed limits and since then the highest proportion has been on the major roads. The proportions are greater for male drivers killed with illegal BAC than females. In contrast to female drivers, the proportions are somewhat similar for the two types of road on which the accident occurred. After 1988 there was a slight decline in the proportions of male drivers killed with illegal BAC for both major and non-major roads.

Figure 3.15 : FEMALE Drivers Killed with ILLEGAL BAC as a Proportion of those Drivers with KNOWN BAC by ROAD TYPE, 1984-1993

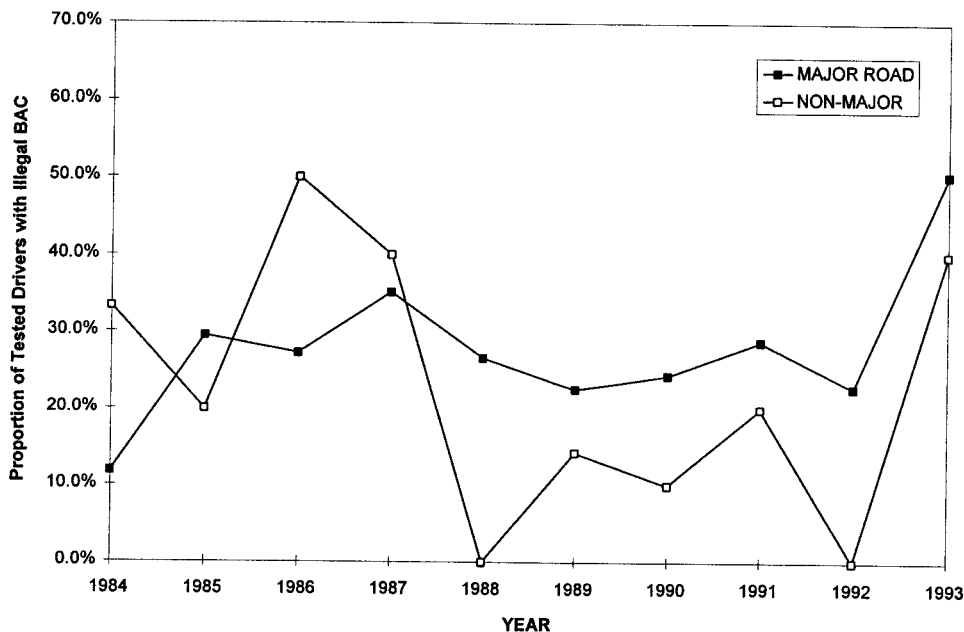
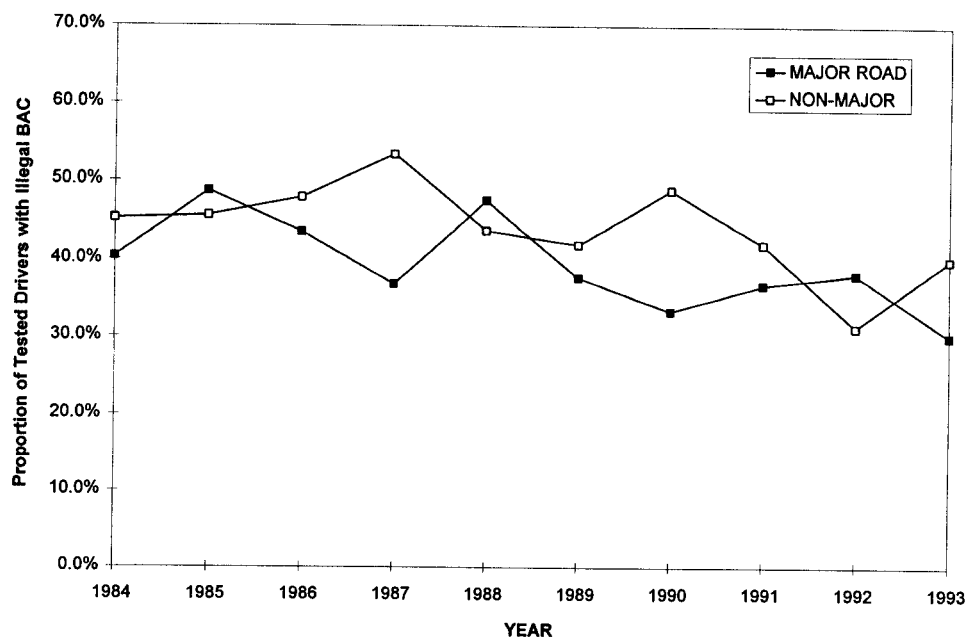


Figure 3.16 : MALE Drivers Killed with ILLEGAL BAC as a Proportion of those Drivers with KNOWN BAC by ROAD TYPE, 1984-1993



3.3.5 Geographical Location

The proportion of tested female drink-drivers killed with illegal BAC in Melbourne was generally larger than that in the rest of Victoria during the ten year period (Figure 3.17). For both locations there was a decline in 1991 and 1992.

Figure 3.18 indicates that except in 1991, the proportion of killed males with illegal BAC was similar in Melbourne and the Rest of Victoria. Both proportions are higher than for females killed.

Figure 3.17 : FEMALE Drivers Killed with ILLEGAL BAC as a Proportion of those Drivers with KNOWN BAC by LOCATION, 1984-1993

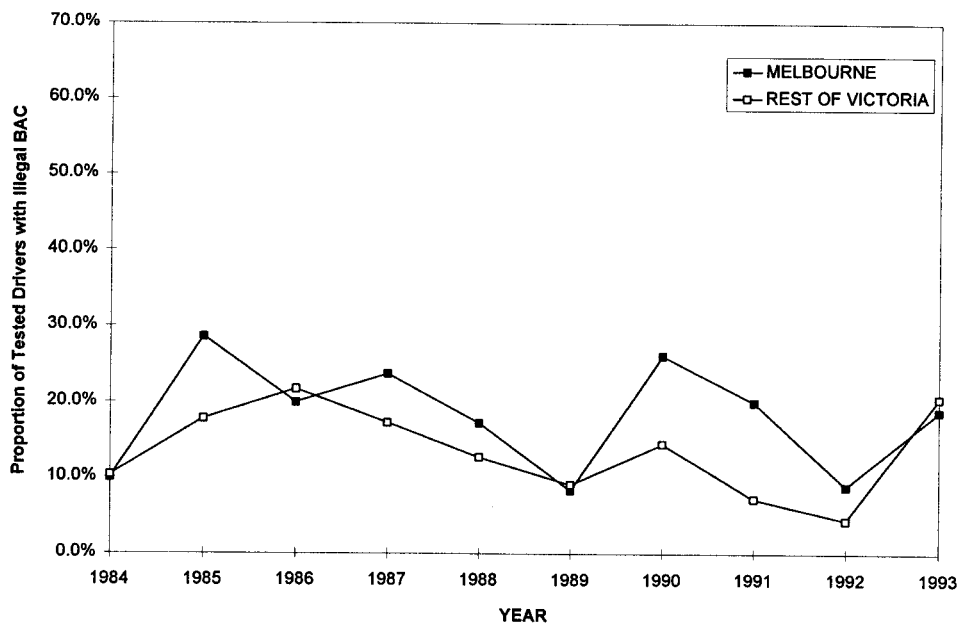
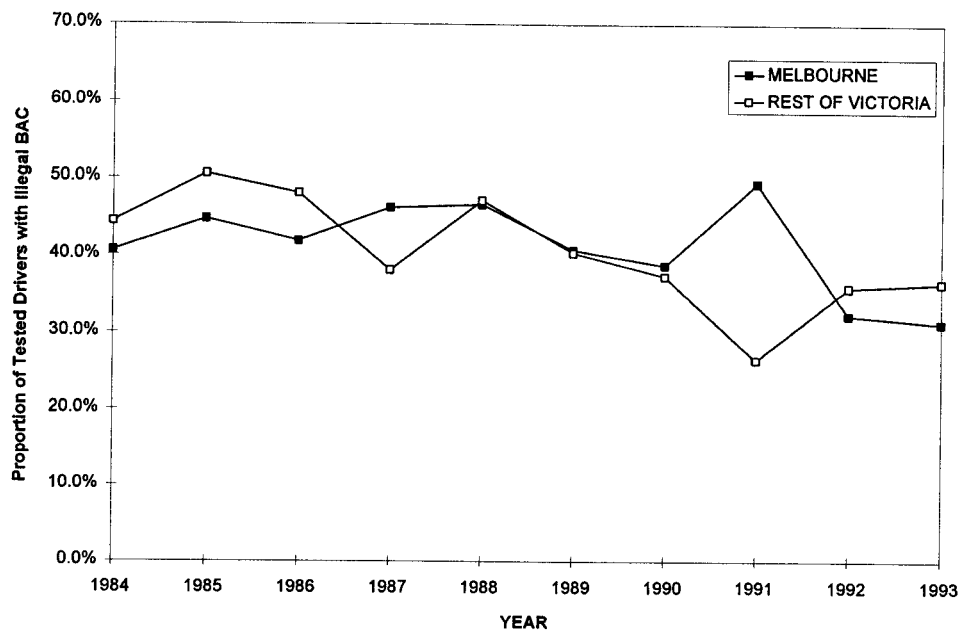


Figure 3.18 : MALE Drivers with ILLEGAL BAC as a Proportion of those Drivers with KNOWN BAC by LOCATION, 1984-1993



3.3.6 Comparisons of Female Vs. Male Trends in Fatal Crashes, 1984-1993

It was noticeable across all categories that the proportion of tested male drivers killed with illegal BAC was consistently higher than that for females.

During 1992 there were relatively low proportions of female drivers killed with illegal BACs in all age groups. In recent years, the proportion of female drivers killed with illegal BAC was the highest in the 25 to 39 year age group, whereas between 1991 and 1993 the highest proportion of male drivers killed with illegal BAC occurred in the younger age group, aged under 25 years.

The proportion of female drivers killed with illegal BAC in crashes on weekends decreased substantially after 1987 and continued to remain low until 1993. The difference between the proportion killed with illegal BAC on weekends and weekdays became marginal after 1988. These proportions were still relatively low in comparison with male drink-drivers. Male drivers on weekends represent the biggest problem. In 1991 over 90% of male drivers killed on weekends had an illegal BAC reading.

Generally, for females and males killed with illegal BAC, the lowest proportion of fatal crashes with illegal BAC occurred during daytime hours for 1984-93, and the greatest proportion in the early morning hours. However, due to the small sample of female drink-drivers, there is a clearer distinction between the different accident times for killed male drivers with illegal BAC. The proportion of female drivers killed with illegal BAC during early morning hours decreased considerably after 1990.

Between 1988 and 1993 there was a higher percentage of female drivers killed with illegal BAC on major roads than on non-major roads. There appears to be no distinction between the type of road, major or non-major, for the percentage of male drivers killed with illegal BAC.

The proportion of female drivers killed with illegal BAC in Melbourne was generally larger than that in the rest of Victoria during the ten year period. For both of these locations there was a decline in these proportions during 1990-1992.

4. DISCUSSION

It has been shown that the proportion of drivers exceeding the Prescribed Concentration of Alcohol (PCA) during Random Breath Testing (RBT) operations on Melbourne freeways during 1991 and 1992 was considerably higher for females than males. Using available data, an examination of the characteristics of female drink-drivers apprehended on the road during 1993/94 and those involved in crashes over the ten-year period 1984-1993 was made possible.

While tested female drivers had a significantly higher proportion exceeding the PCA than males on Melbourne freeways during 1991 and 1992, this difference was not statistically significant during 1993/94. Results from Booze Bus RBT operations in Melbourne during 1993/94 showed that globally, the opposite occurred, ie. males had a higher proportion than females. It could therefore be assumed that female and male drink-driving habits on main roads and highways throughout the week differ from those of drink-drivers on Melbourne freeways during early Saturday morning hours.

Fatal crash results during 1984-93 showed that the proportion of female drivers killed with illegal BAC fluctuated in the years 1985-88 before a considerable decrease in 1992. The trends in male drivers killed with illegal BAC were very similar to the trends presented for all Victorian drivers, with the exception of 1992 (Table 4.1). There was no major decrease in the proportion of male drivers killed with illegal BAC during this year, hence it can be concluded that the record drop in the proportion of drivers killed with an illegal BAC was due to the substantial reduction in female drink-drivers who were killed.

Further detail on drink-drivers apprehended during the 1993/94 was made available through a study of the recent offenders described on Breathalyser operator reports (Table 4.2). Within Melbourne, female drink-drivers had a high percentage in the 30-39 year group. Furthermore they were most likely to have had a BAC reading below 0.100g/100ml and to be apprehended on Thursday or Saturday. A notable difference between females and males driving with illegal BAC occurred on Saturday mornings, between midnight to 6 am, when 15% of all female drink-drivers were apprehended compared with 10% of male drink-drivers. (This is also the time of week when random breath testing is conducted on Melbourne freeways). A substantial proportion of females drink-driving at this time were aged 30 to 39 and were most likely to have professional occupations.

Although initial concerns were not with female drink-drivers in the rest of Victoria, it was felt that their involvement should also be studied. The proportions of random breath tested female drivers exceeding the PCA in country towns was similar to that on the open road, but considerably lower than the proportions for Melbourne. In contrast, male drink-drivers showed a higher rate on the open road. Breathalyser operator reports showed more younger female drink-drivers were apprehended in the rest of Victoria than in Melbourne and majority of the female drink-drivers had excessive BAC reading (48%). The number of drivers apprehended was greatest for both sexes during the night hours, 8 pm to midnight, although allowing for those tested, proportions with illegal BAC were the highest during the early morning hours. After adjusting for the number of females within each occupation, females who were most likely to drink-drive in the rest of Victoria were likely to be unemployed.

A more accurate method would have been to survey representative samples of on-road drink-drivers who had exceeded the Prescribed Concentration of Alcohol over the period of the study. The amount and type of alcohol consumed by the driver, as well as their age, sex and occupation would have been recorded. This survey method would have allowed a fully random sample of drink-drivers to be selected if constructed validly. Because of time and economic constraints a survey of this nature was not feasible for this study.

Trends in the characteristics of drink-driving such as driver age, time and place of apprehension were examined for those drivers killed. A low proportion of female drivers killed with illegal BAC were aged over 40 years. High proportions existed in the younger age group, although 1990-92 saw a sharp decrease in this age group. The proportion of female drivers killed with illegal BAC was high on weekends but reduced considerably after 1987 and became similar to weekday proportions. The proportion of drivers killed with illegal BAC during the early morning hours was high for the years 1984-89, although this has decreased substantially since 1990 for females. However the proportion with illegal BAC during evening and night hours increased in 1993.

It is possible that the high proportions of females apprehended for drink-driving on the road during the early 1990's contributed to the reduction in female drivers killed with illegal BAC levels. It was noted that the reduction in fatal crashes involving drink-drivers was greatest for the same time of week as the highest percentage of females being apprehended for drink-driving (refer to Table 4.2). The percentage of those females apprehended for drink-driving during early morning hours on weekends was particularly high and the notable reduction in fatal female crashes involving drink-driving for the years 1990-93 was during the early morning hours on weekends. The year 1992 was the best example of this possible relationship, as there was a record high of females caught for drink-driving and a record low of females killed with illegal BAC.

To include seriously injured drivers in the crash data analysis would greatly improve the validation of this report, however the number of drivers with an unknown BAC increased considerably after 1989 because of a change in the requirements governing the taking of blood samples in hospitals. Investigation into the bias in the unknown BAC recordings on the accident data base, and methods for taking this into account, would be worthwhile.

Table 4.1 : Trends in Strike-Rate Ratios for Victorian Females

Test Type	Data Source	Strike Rate Ratio	
		Melbourne	Rest Of Victoria
On The Road	Freeway RBT	Melbourne peaked in 1992	n/a
	Booze Bus Data	females strike rate considerably lower than males in 93/94	female strike rate lower than in Melb. and less than males
	Country RBT Program	n/a	- similar strike rates on the open and town roads, - highest strike rates on weekends - highest strike rates in the early mornings
In Crashes	Fatality Accident Data	reached peak in 1987 record low in 1992	

© STRIKE RATE RATIO - $\frac{\text{Number of Females with Illegal BAC}}{\text{Number of Females Tested}}$

Table 4.2 : Characteristics of Female Drink-Drivers Apprehended in Victoria

Law Type	Data Sources	Predominant Categories	
		Melbourne	Rest Of Victoria
On the Road	Country RBT Program - Tested Drivers		
	- Location	n/a	Similar number of drink-driving females in country towns and open roads
	- Day of Week	n/a	low numbers from Monday to Friday, peak reached on Saturday
	- Time of Day	n/a	largest number apprehended during night hours
	Breathalyser Surveys - Apprehended Drivers		
	- BAC	high percentage ^ψ with low BAC (<0.100g/100ml)	high percentage with excessive BAC (>0.150g/100ml)
	- Age	30-39 years significantly higher	high percentage less than 40 years
	- Day of Week	Highest percentages on Thursday and Saturday	Highest percentages Saturday and Sunday
	- Time of Day	Night and early morning hours have the highest number of apprehensions	Night hours had the highest number of apprehensions
	- Day of Week/Time of Day	Saturday, early morning, was noticeably different from male drink-drivers	Saturday nights gave a high percentage
- Occupation	Managers and Administrators were over-represented	Drink-Drivers occupation distribution similar to workforce dist.	
In Crashes	Fatality Accident Data - Killed Drivers with Known BAC		
- BAC	Largest proportion * with excessive BAC over all years		
- Age	Low proportion aged over 40 and decrease in all ages from 1991 to 1992		
- Day of Week	Decrease in the proportion on weekends from 1987 to 1992, 1992 had similar proportions for weekend and weekdays		
- Time of Day	Low proportions during day hours and substantial decrease in early morning hours from 1990 to 1993		
- Road Type	High proportion on major roads and decrease of those on non-major roads.		

ψ PERCENTAGES - Number of females with Illegal BAC within each category
Total Number of Females with Illegal BAC

*** PROPORTION** - Number of female drivers killed with Illegal BAC within each category
Number of Females with Known BAC within each category

5. CONCLUSION

This study made a relative comparison of the extent of drink-driving by females and males in Victoria by examining available data on drink-driving on the road and analysing trends in drink-driving in crashes over recent years.

The study showed that among females, the proportion apprehended with illegal BAC (the strike-rate) on Melbourne freeways was 1.5 and 1.3 times higher than the proportion among males for the years 1991 and 1992, respectively. The difference in the strike rates between females and males became less pronounced by 1993/94 and it was found that drink-driving habits on Melbourne's main roads and highways throughout the week differed from those of drink-drivers on the freeways late Friday nights/early Saturday mornings. In the rest of Victoria for 1993/94, the proportion of drivers exceeding the legal limit for both sexes was lower than drivers in Melbourne and the female strike-rate was less than males.

It should be noted that random breath testing operations are most frequently carried out on major roads and highways, and during times when drink-driving is most common, and that the levels of drink-driving measured in this study cannot be generalised to all roads and times. However, the relative comparisons of the proportions of drivers found to have illegal BACs should be valid. There is no evidence that drivers are tested non-randomly related to their gender. This includes the tests carried out in recent years in country Victoria since the major program of sending Melbourne-based booze buses to country districts commenced.

The proportions of drivers killed in crashes with illegal BAC were estimated for the ten year period 1984-93. The proportion of female drivers killed with illegal BAC was consistently lower than the male proportion. Female drivers showed a sharp decrease in this proportion during 1992 yet male drivers did not show the same significant change. Hence it was concluded that the record drop in the proportion of drivers killed with illegal BAC in 1992 was due to the substantial reduction in female drink-drivers who were killed.

Several other data sources were available to allow a study of the characteristics of drink-drivers in the recent years, particularly 1993/94.

Details of apprehended drink-drivers in 1993/94, obtained from Breathalyser operator reports identified certain areas of concern. For female drivers in Melbourne, those aged 30 to 39 years contribute a high percentage of the females apprehended (38%). Forty-nine percent of those drink-drivers apprehended had a relatively low BAC reading of less than 0.100g/100ml and were most likely to have been apprehended on a Thursday or Saturday. There was a difference in the occupations of drink-driving females and males, and for most occupations, males were more likely to have been apprehended. Females with occupations of managers or administrators were over-represented among those apprehended for drink-driving. In contrast to the Melbourne female drink-drivers, a high percentage of females apprehended for drink-driving in the rest of Victoria had an excessive BAC reading over 0.150g/100ml (48%). Unemployed females in the rest of Victoria were over-represented among drink-drivers.

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Trends in Drink-Driving Serious Injury Crashes, 1984-1993

NB:- Graphs to be treated with caution due to the likely biases these changes that may have been caused by the changes in the practice of taking blood samples in hospitals over the years 1990-1993.

Figure 1 : FEMALE Drivers Seriously Injured with ILLEGAL BAC as a Proportion of those with KNOWN BAC by AGE, 1984-1993

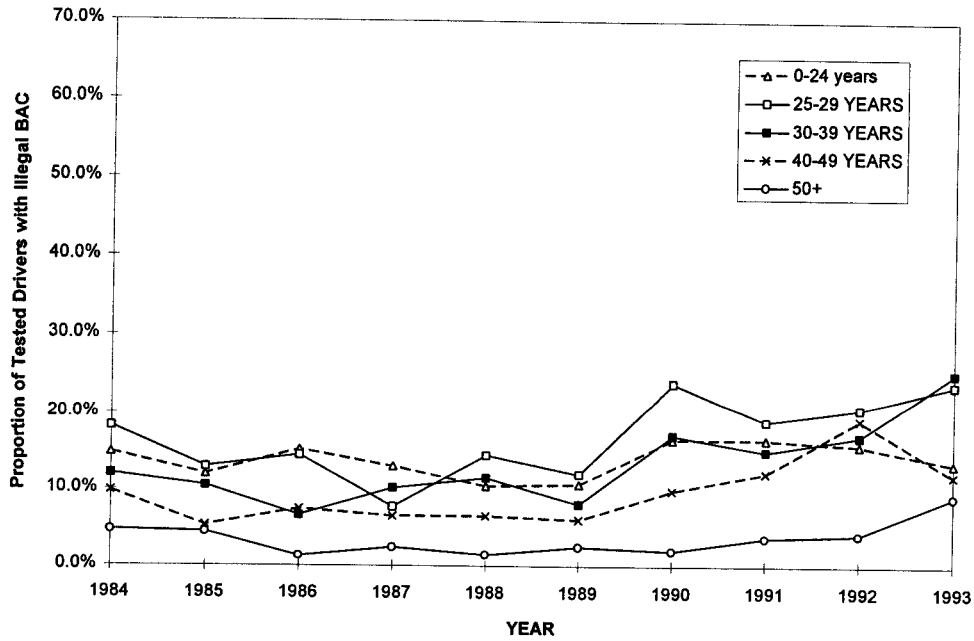


Figure 2 : MALE Drivers Seriously Injured with ILLEGAL BAC as a Proportion of those with KNOWN BAC by AGE, 1984-1993

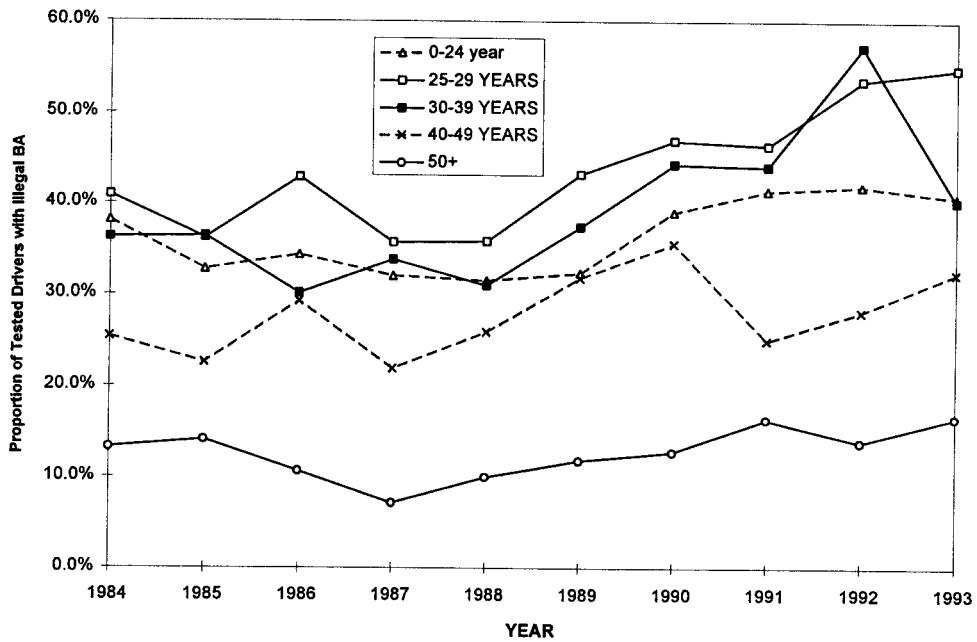


Figure 3 : FEMALE Drivers Seriously Injured with ILLEGAL BAC as a Proportion of those with KNOWN BAC by DAY OF WEEK, 1984-1993

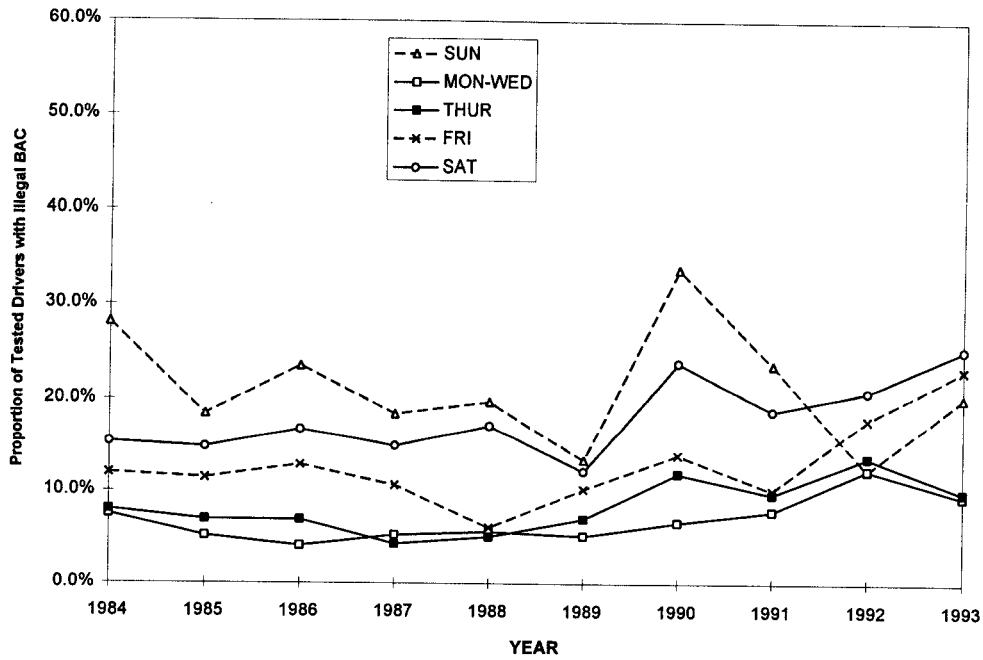


Figure 4 : MALE Drivers Seriously Injured with ILLEGAL BAC as a Proportion of those with KNOWN BAC by TIME OF DAY, 1984-1993

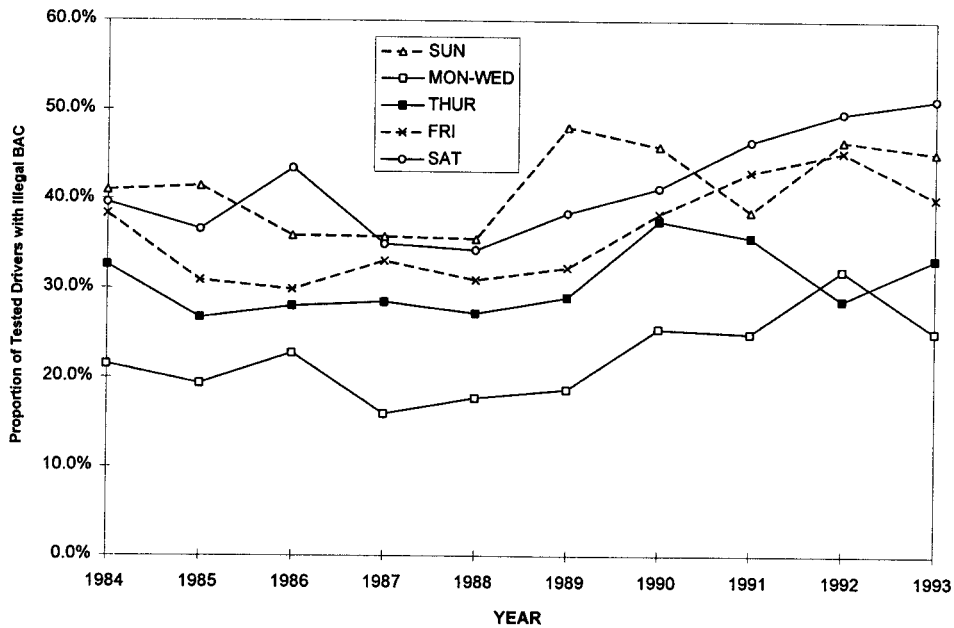


Figure 5 : FEMALE Drivers Seriously Injured with ILLEGAL BAC as a Proportion of those with KNOWN BAC by TIME OF DAY, 1984-1993

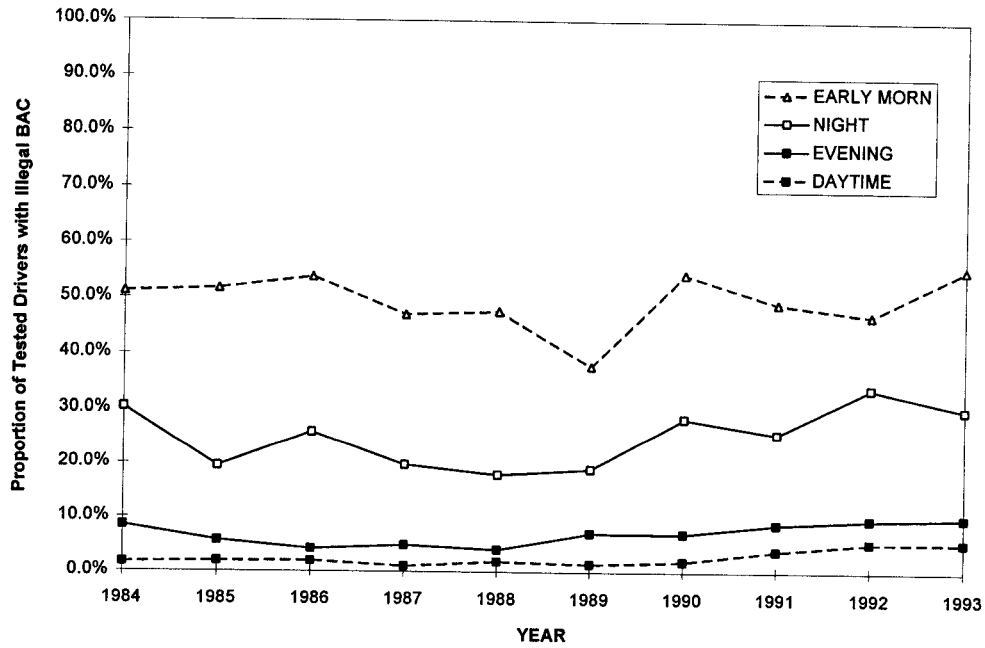


Figure 6 : MALE Drivers Seriously Injured with ILLEGAL BAC as a Proportion of those with KNOWN BAC by TIME OF DAY, 1984-1993

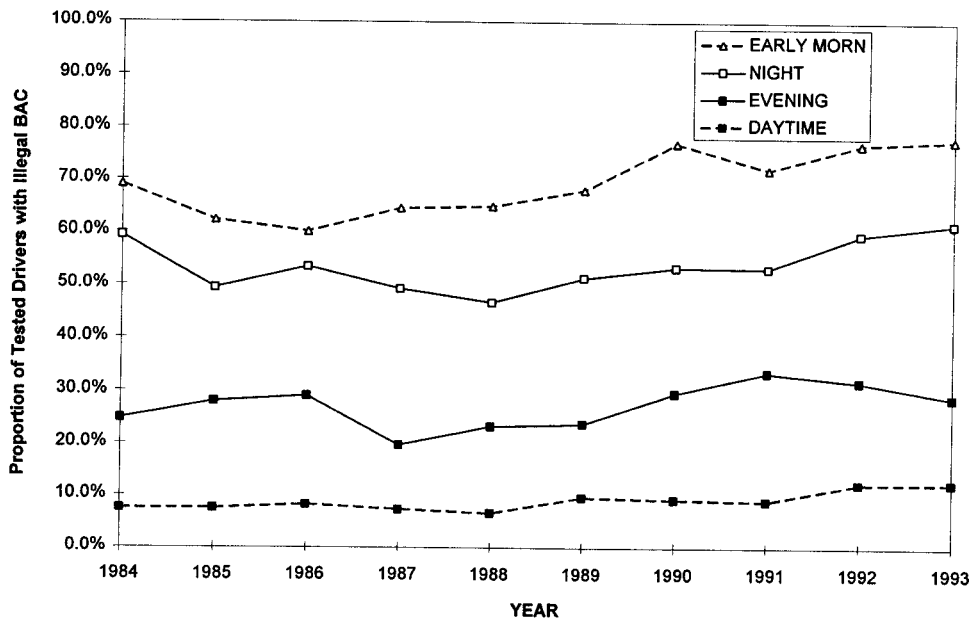


Figure 7 : FEMALE Drivers Seriously Injured with ILLEGAL BAC as a Proportion of those with KNOWN BAC by LOCATION, 1984-1993

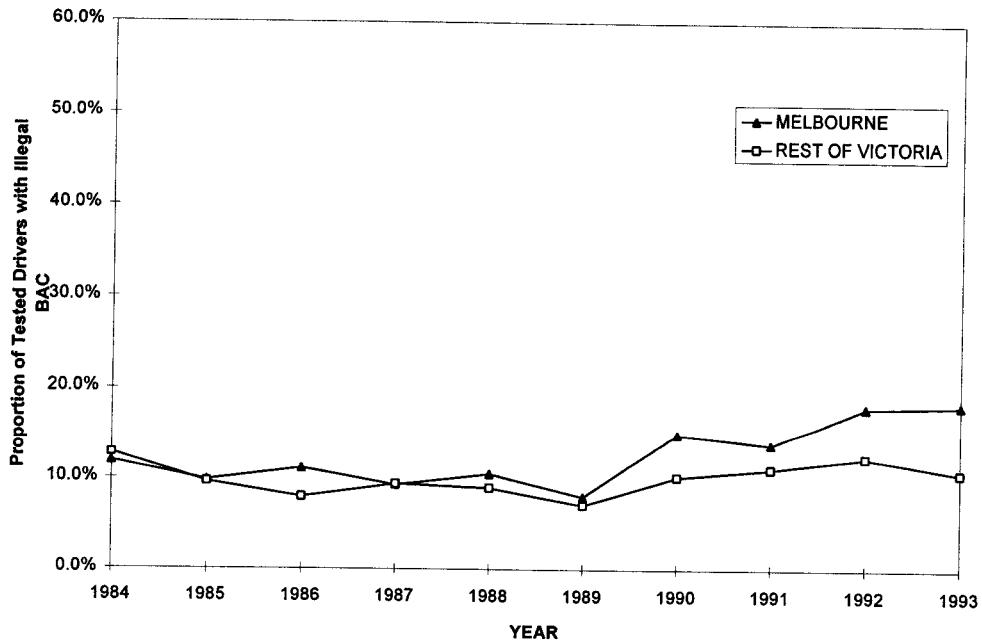


Figure 8 : MALE Drivers Seriously Injured with ILLEGAL BAC as a Proportion of those with KNOWN BAC by LOCATION, 1984-1993

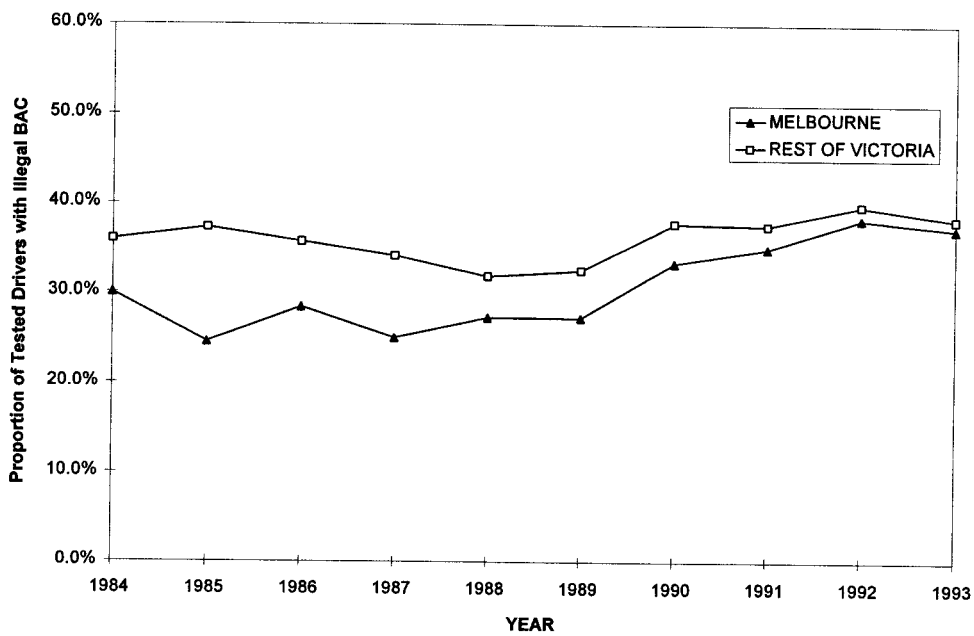


Figure 9 : FEMALE Drivers Seriously Injured with ILLEGAL BAC as a Proportion of those with KNOWN BAC by ROAD TYPE, 1984-1993

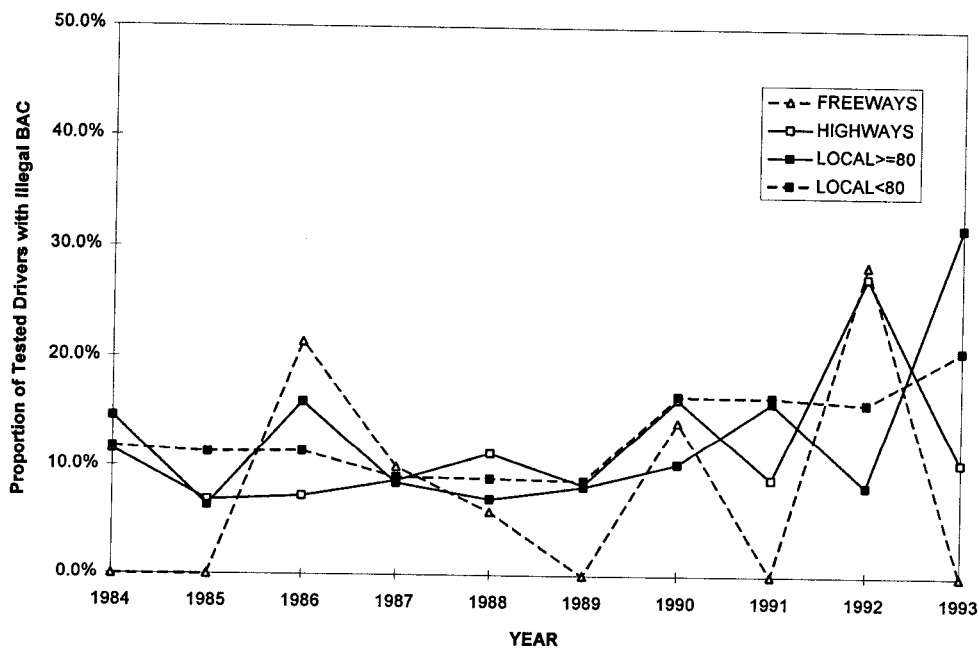


Figure 10 : MALE Drink-Drivers Seriously Injured with Illegal BAC as a Proportion of those with KNOWN BAC by ROAD TYPE, 1984-1993

