National Alcohol Indicators Project

Technical Report No. 2: Trends in Alcohol-Related Road Injury in Australia, 1990-1997

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BACKGROUND

This is the second report of the National Alcohol Indicators Project (NAIP). The aim of NAIP is to monitor and report on trends in alcohol-related and alcohol-caused harm in Australia, at national, state and local levels. The NAIP is a collaborative project between the National Drug Research Institute (Curtin University of Technology) and Turning Point, Alcohol and Drug Centre Inc and is funded by the National Drug Strategy.

This report documents trends in alcohol and non-alcohol-related serious road injuries (SRIs), including fatalities and hospitalisations, between 1990 and 1997 for all Australian states and territories. It also provides estimates of the proportions of all fatally injured drivers and pedestrians that were alcohol-related and provides age and sex profiles for alcohol and non-alcohol involved serious road injuries. Such estimates have not previously been published for all Australian jurisdictions.

Alcohol is a major cause of road injury in Australia. Using aetiologic fraction methodology, it was estimated that in 1997, high-risk drinking caused 418 road deaths and 7,789 hospitalisations (Chikritzhs *et al*., 1999). The average cost of a single road fatality or hospitalisation in Australia has been estimated at about $750,000 and $132,000 respectively[1], resulting in a total of over $1.3 billion for 1997.

METHODS

(i) Serious road injuries (SRIs)

The blood alcohol concentration (BAC) of non-fatally injured drivers and pedestrians is not routinely recorded in Australia. The decision to test is often left to the discretion of the attending officer, favouring the testing of more obviously intoxicated persons and thereby reducing both reliability and generalisability of BAC results among seriously injured persons. As a result, alcohol-related road injuries cannot be directly determined from road injury reports. However, the autopsy process applied to fatally injured persons requires a blood test and coroners' records provide BAC information for about 80% of fatally injured drivers and pedestrians. As well as BAC results, fatality reports also include the time of day and day of

[1] Cost estimates provided by Roadwatch U.W.A.

week of the crash. Information on these BACs was used to identify alcohol and non-alcohol-related times of day and days of the week for subsequent application to all serious road injuries (SRIs) as "surrogate" measures.

Individual surrogates were determined for each state and territory (except Vic and the ACT)[2]. Surrogate measures have been widely used by researchers to examine trends in alcohol-related harm (Holder and Wagenaar, 1994; Wagenaar and Holder, 1991; Blose and Holder, 1987; Wagenaar and Maybee, 1986; Cavallo & Cameron, 1992). In general, they rely on the fact that in most places many night-time crashes include at least one drink driver.

While useful for determining reliable trends over time, surrogate measures are not appropriate for determining the magnitude of alcohol-related harm. As imprecise measures they cannot identify exactly which injuries are and which are not associated with alcohol and there is no doubt that while some alcohol-related injuries will be missed, others which are not alcohol-related will be included. However, for examining trends over time surrogates provide consistent measures which can be reliably applied from year to year.

Across Australia, the most common times for alcohol-related crashes to occur were during the hours of 10pm and 2am on Friday, Saturday and Sunday nights, although longer hours were evident for Saturdays. Day-time hours between 6am and 2pm on most weekdays except Saturdays were commonly associated with large proportions of non-alcohol-related injuries.

(ii) Fatal road injuries

Each Australian jurisdiction reports on the outcomes of blood alcohol tests conducted on fatally injured drivers and pedestrians (Federal Office of Road Safety, 1999). No state has a complete coverage of all cases and the proportion with results reported varies from year to year. Overall, results are available for over 80% of such fatalities. Statistical tests found no relationship between the proportion tested and mean blood alcohol concentrations and hence it was assumed that the available test results were representative of all fatalities and numbers of alcohol-related fatalities were estimated for each state/territory for each year. Numbers of observations were low in the ACT and estimates for that state must be treated with caution.

[2] Specific surrogates for Vic and ACT were unable to be calculated and NSW surrogates were applied.

RESULTS

Between 1990 and 1997, it was estimated that 31% of all driver and pedestrian deaths on Australian roads were alcohol-related (ie, exceeded 0.05mg/ml). The estimated proportions of drivers and pedestrians killed on Australian roads with blood alcohol levels exceeding 0.10mg/ml and 0.15mg/ml were approximately 28% and 23% respectively. The NT indicated the largest estimated proportion of alcohol-related fatalities (71%). A total of 3068 drivers and pedestrians were estimated to have died in alcohol-related road crashes between 1991 and 1997. Notably, this figure does not include passengers who were injured due to driver intoxication and is likely to be an underestimate of all alcohol-related deaths.

Nationally, there was a downward trend in alcohol-related road fatalities and hospitalisations between 1990 and 1996, although most of this decline occurred in the first few years - broadly reflecting concurrent trends in estimated per capita alcohol consumption. Non-alcohol-related SRIs did not indicate the same trend or magnitude of decline as alcohol-related SRIs. Most jurisdictions followed the national trend in alcohol-related SRIs. Only WA had slightly higher levels of alcohol-related road injuries by 1997, though non-alcohol-related injuries had also increased there.

The majority of people who sustained alcohol-related road injuries were male (70%). By comparison, males only contributed to about 56% of non-alcohol-related SRIs. Young people were also over represented among alcohol-related road fatalities and hospitalisations. Nation-wide, over half of all alcohol-related SRIs occurred among people aged between 15 and 24 years (52%) compared to only 26% among non-alcohol-related injuries.

CONCLUSIONS

This report presents data for the first time on trends in alcohol-related serious road injuries in Australia for all jurisdictions. A methodology for estimating these trends is also described along with methods for estimating non-alcohol related road crashes for purposes of comparison. A substantial proportion of all deaths occurring on Australian roads are alcohol-related and although declines were evident in the early 1990's numbers of serious road injuries no longer appear to be reducing. The decline in the early 1990s followed the evident decline in national per capita consumption as well as overall declines in alcohol-caused mortality previously reported (Chikritzhs *et al*., 1999). Males in particular constitute a high-

risk group for alcohol-related road death and hospitalisation. Alcohol-related road death and trauma also remains a leading public health concern in relation to young people. Since declines in alcohol-related deaths on the road have stalled since the early 1990s, new approaches may be needed for the prevention of drinking and driving.

1.0 INTRODUCTION

Alcohol is a major cause of road injury in Australia. It was estimated that in 1997, high-risk drinking caused 418 road deaths and 7,789 hospitalisations (Chikritzhs *et al*., 1999). The average cost of a single road crash fatality or hospitalisation in Australia has been estimated at about $750,000 and $132,000 respectively[3], resulting in an estimated cost of alcohol-caused road injury to the Australian community of over $1.3 billion for 1997.

The National Alcohol Indicators Project (NAIP) is a nationally coordinated, collaborative project between the National Drug Research Institute (Curtin University of Technology) and Turning Point, Alcohol and Drug Centre Inc. The aim of NAIP is to track trends in alcohol consumption and related harm in Australia at national, state and local levels, to disseminate key findings and thereby to potentially increase awareness of the consequences of high-risk alcohol consumption. The project is funded by the National Drug Strategy.

The first report in this series was completed in June 2000 and focused on alcohol-caused morbidity and mortality (Chikritzhs *et al*., 1999). Future reports will focus on adult per capita alcohol consumption, the proportion of all alcohol consumption which is consumed at high-risk levels and alcohol-related violence. By providing information from a range of sources, the likelihood of deriving accurate conclusions about overall levels and trends in alcohol-related harm is greatly improved.

The purpose of this report, the second in the NAIP series, is to document national and state/territory trends in serious alcohol-related road injury between 1990 and 1997. This has been achieved by the use of 'proxy' or surrogate measures, which identified whether any particular crash was more or less likely to have involved alcohol. Surrogate measures have been widely used by past researchers to examine trends in alcohol-related harm (Holder and Wagenaar, 1994; Wagenaar and Holder, 1991; Blose and Holder, 1987; Wagenaar and Maybee, 1986; Cavallo & Cameron, 1992).

Currently in Australia, there is no mandatory requirement that all non-fatally injured drivers and pedestrians (ie, hospitalised) involved in road crashes be tested for alcohol. In fact, the

[3] Road injury cost estimates supplied by Roadwatch UWA

decision to test any particular driver is often left to the judgement of the attending officer, which is likely to favour the testing of more obviously intoxicated drivers. As a result, information on blood alcohol concentration (BAC) for road injures resulting in hospitalisation tends to be both incomplete and unreliable, therefore making it is difficult to directly determine precisely which cases were alcohol-related.

However, the autopsy process involving road fatalities requires blood sampling and therefore provides a more reliable source of information on alcohol involvement. Australia-wide, from 1990 to 1997 about 80% of all fatally injured drivers and pedestrians were BAC tested. According to the Federal Office of Road Safety (FORS), unknown BACs among fatalities largely occur as a result of administrative or technical difficulties and are not related to subjective judgements by coroners (FORS, 1999).

Utilising this information about fatally injured driver and pedestrian BACs, specific days of the week and times of day were able to be identified as either alcohol or non-alcohol-related. By applying these times to all serious road injuries it was possible to identify those cases where alcohol was likely to have been a contributing factor and to produce consistently measured and reliable trends in alcohol-related injuries over time. The comparison of alcohol-related with non-alcohol-related road injuries using these measures allowed an assessment of whether trends were likely to be general effects involving both kinds of injuries alike, or trends unique to alcohol-related injuries. However, while the use of surrogate measures may provide reliable and consistent measures over time, they are not intended for use as absolute measures of the magnitude of alcohol or non-alcohol-related road injury. Inevitably, some injuries which were not at all alcohol-related will occur at high risk alcohol involvement times while other road crashes which were related to prior drinking will be overlooked.

2.0 METHODOLOGY

2.1 DATA SOURCES AND MANIPULATION

Information regarding all serious road injuries was obtained from the Federal Office of Road Safety (FORS) for all states and territories, except Victoria, between 1990 and 1997. Victorian data on serious road injuries was obtained from Vicroads with only aggregate data available. For this study, serious road injuries (SRIs) were defined as those resulting in death or injury requiring admission to hospital. Less serious injuries which did not require medical treatment or which only required attendance at emergency departments were not obtained. Although they occur more frequently, less serious injuries tend to be inconsistently recorded since only a small fraction come to the attention of health services and they are also less likely to be associated with excessive alcohol use.

The Serious Injury Database maintained by FORS has a hierarchical structure with three data levels. Each level contains different information about the incident which may pertain specifically to the characteristics of the crash, vehicle or persons involved. The first level contains details of each individual crash event (ie. road conditions, lighting, time of crash), the second contains information on each of the vehicles involved in the crash (ie. vehicle type, number of vehicle occupants, BAC of the driver) and the third level contains details pertaining to all seriously injured persons (type of road user, pedestrian BAC, sex and age). Although each of the data levels are maintained in separate data-sets they are able to be linked together by identifying codes unique to each record.

Using these unique identifiers, the individual data-sets were linked to compile a single overall database. The following information was then extracted; time of day and date of the crash, level of severity of individual injury (fatality or hospitalisation), state where crash occurred, sex and age of injured person and where recorded, driver/pedestrian blood alcohol concentration (BAC). No names of individuals or vehicle licence numbers were obtained.

Due to changes in recording practices at the collection level, FORS were unable to supply NSW data for hospitalised injuries which occurred during 1997. Similarly, Vicroads data on people hospitalised with road injuries was only available between 1991 and 1996. Fatality records for Victoria were also unavailable for this report for 1990.

In order to determine population rates of serious road injury, estimated residential population (ERP) data was obtained from the Australian Bureau of Statistics (ABS).

Information required to identify metro/non-metro regions was not available for this report however data should become available for future reports.

2.2 INCONSISTENT BAC TESTING AND THE NEED FOR A SURROGATE MEASURE OF ALCOHOL INVOLVEMENT IN SERIOUS ROAD INJURY

Throughout Australia, there is currently no systematic or standardized means of ensuring that all drivers seriously but non-fatally injured due to road crashes are tested for blood or breath alcohol. While some jurisdictions require that all drivers involved in serious crashes and attended by a police officer are given a BAC test (e.g. WA), others only include BAC recordings where the attending officer suspected alcohol involvement. As a result, it is likely that drivers with higher BACs who are more likely to be obviously intoxicated will be tested more often than those who are less clearly intoxicated. For this reason, there is little confidence that BAC data for non-fatally injured drivers can provide a) a reliable indicator of levels of intoxication among injured drivers and b) a reliable indicator of the numbers of crashes where alcohol was a contributing factor.

However, people who are fatally injured in a road crash undergo an autopsy process, which generally includes blood sampling for alcohol. According to FORS any BAC omissions for fatalities are largely due to administrative or technical difficulties and are not related in any way to any perceived level of driver intoxication on behalf of the coroner (FORS, 1999). Therefore, since any exclusions are generally considered to be unbiased, BACs recorded among fatalities are perceived as a reliable indication of overall levels of intoxication. Fatalities contribute to about 9% of all serious road injuries in Australia.

The consistency of BAC testing even among fatalities may also vary from year to year and region to region, although most jurisdictions provide BAC results for the large majority of road fatalities. Table 2.2a shows the proportion of all fatally injured drivers and pedestrians tested for alcohol between 1990 and 1997 by jurisdiction. Overall, NSW, Vic, WA, the NT and Tas all recorded BAC information in over 80% of driver and pedestrian road fatalities.

Qld, SA and the ACT indicated about 70%, 60% and 51% respectively. However, BAC testing varied substantially within jurisdictions, particularly in SA and the ACT.

Table 2.2a: Percentage of BAC tested fatally injured drivers/pedestrians by state/territory, 1990-1997[a]

	NSW	Vic	Qld	SA	WA	Tas	NT	ACT	Total
1990	88.31	-	70.76	80.00	60.96	94.64	100.00	22.73	79.89
1991	88.50	85.42	67.72	87.59	91.37	91.53	86.36	26.67	83.50
1992	87.63	90.77	67.79	30.36	94.92	93.62	87.10	23.53	79.68
1993	89.34	95.56	71.33	8.61	86.23	71.79	92.00	60.00	77.12
1994	87.83	95.03	69.77	69.11	80.26	76.74	76.67	100.00	82.59
1995	86.85	93.86	57.06	91.61	98.58	76.74	83.78	100.00	82.72
1996	90.68	92.97	72.56	19.57	96.70	91.49	76.92	78.57	81.17
1997	89.95	90.53	80.37	96.15	100.00	65.00	68.00	31.25	87.77
Mean	88.58	91.86	69.33	59.55	88.60	85.03	82.94	50.83	81.81

[a] *includes all vehicle operators including pedestrians (includes under 15yrs), motorcycle and bicycle riders.*

Overall, drivers and pedestrians hospitalised with road injuries are BAC tested only about 50% of the time. Moreover, due to the subjective nature of BAC testing among non-fatally injured drivers those cases that are recorded are unlikely to provide a representative sample of all road injury hospitalisations.

As a result of the substantial inconsistency in BAC recording and the variation among jurisdictions, it was not possible to derive an accurate indication of the trend in alcohol involvement in serious crashes over time from BAC results – even for more reliably recorded fatalities. Moreover, any attempt to compare numbers or rates of drivers recording BACs in excess of legal limits among the jurisdictions would be contaminated by recording bias.

Therefore, given the limitations of BAC records as an overall indicator of alcohol involvement in road injury, it was necessary to apply a proxy or 'surrogate' measure of alcohol involvement derived from a standard method. The basic approach was to use the timing of crashes to identify alcohol and non-alcohol-related crashes.

2.3 RELIABILITY OF FATAL BACS

As mention above, it is generally viewed that BAC records for people fatally injured in road crashes, while not always complete, are in fact reliable in that they are not affected by any bias on behalf of the coroner to test individuals likely to have higher or lower BACs.

Whether or not unrecorded BACs among road fatalities were significantly higher or lower than those recorded by coroners cannot be tested directly. However, if it was the case that coroners' subjectively selected which fatalities to BAC test in terms of suspected blood alcohol content, then we might expect there to be a linear relationship between the total proportion of all fatalities tested and the mean of all BACs tested. In order to test this, within each state/territory (except Vic and the ACT[4]), annual mean BACs between 1990 and 1997 were correlated against the proportion of all fatalities tested for blood alcohol.

As shown in Table 2.3a below, preliminary investigations indicated that for all jurisdictions examined, there was no significant relationship apparent between the proportion of all fatalities tested and annual mean BACs.

Table 2.3a: Pearson correlation coefficient between annual proportion of driver/pedestrian fatalities tested for blood alcohol and mean annual BAC

	NSW	Qld	SA	WA	Tas	NT
r^2	0.23	0.56	0.12	0.47	-0.03	-0.40
Sig.	0.57	0.14	0.77	0.23	0.94	0.33
Mean % recorded	89	69	60	89	85	83

2.4 DERIVING A SURROGATE MEASURE OF ALCOHOL-RELATED SERIOUS ROAD INJURY

The problem of inconsistently recorded BACs among seriously injured road victims has been dealt with using several different approaches. Prior researchers have employed surrogate measures such as single vehicle night-time crashes or just night time crashes to provide a consistent measure over time of the overall level of alcohol-related crashes in large populations (Holder and Wagenaar, 1994; Wagenaar and Holder, 1991; Blose and Holder,

1987; Wagenaar and Maybee, 1986; Cavallo & Cameron, 1992). It has been suggested however, that while single vehicle crashes are more likely to involve alcohol, they may not be as reliably reported as more serious crashes or those involving two or more vehicles (Rosman and Knuiman, 1994). Where reliable BAC testing is not available but where the frequency of cases permits, other researchers have used road fatalities as the preferred surrogate measure of alcohol-related road injury. However, by combining information on known BACs, time of day and day of week from state/territory-wide aggregates of road fatalities, it was possible to derive reliable surrogate measures which were specific to each jurisdiction and which could be subsequently applied to all SRIs.

The methodology employed to determine the best surrogate measure of alcohol involved road crash injuries was similar to that originally developed by South (in Haque and Cameron, 1987) for the Road Safety Department of Vic Roads. South grouped crashes by time of day and day of week and examined the proportions of BACs exceeding the legal limit. Those time periods (time of day by weekday) containing greater than 15% of BACs exceeding the legal limit (0.05mg/ml) were determined as alcohol-related while the remainder were categorised as non-alcohol-related. A cut-off of 15% was arbitrarily selected in order to dissect the data into roughly two equal parts.

Building on the method developed by South (in Haque and Cameron, 1987), the current methodology offers three main refinements. Firstly, data were examined on a person basis (ie driver/pedestrian BACs) rather than a crash basis. It has been argued that since driver BACs for all single vehicle crashes are more likely to be known, crash based data overestimates alcohol involvement in single vehicle crashes and underestimates alcohol involvement where multiple vehicles are involved (Cameron, 1980). Secondly, rather than determining alcohol and non-alcohol-related groupings on the basis of a 50% split, the current study utilised a measure of standard deviation to arrive at the greatest dichotomy between alcohol and non-alcohol-related time possible. Thirdly, individual surrogate measures were determined separately for each jurisdiction such that each surrogate measure was able to accommodate jurisdictional differences in drinking patterns. In summary, the main purpose of this method was to define two groups of crash injuries which were as dissimilar in terms of alcohol-

[4] Individual exact BAC results were unavailable for Victoria and means could therefore not be calculated. Due to small numbers of fatalities in the ACT, surrogates derived for NSW were applied to this jurisdiction.

relatedness as possible - given data constraints such as the limited numbers of fatal crashes occurring in smaller jurisdictions.

In order to determine alcohol and non-alcohol-related times, recorded blood alcohol concentrations derived from driver/pedestrian fatalities occurring between 1990 and 1997 were combined for each state/territory (fatalities comprise about 9% of all serious road injuries5). Within each jurisdiction, driver/pedestrian BACs were then aggregated by the day of the week during which the crash occurred and the time of day of the crash. Six time periods were created, each covering four consecutive hours (ie, 6am-10am, 10am-2pm…2am-6am), resulting in a total of 42 possible categories of road fatalities (7 days by 6 time periods). For each category, the proportion of all recorded BACs that exceeded the legal limit (0.05mg/ml) was calculated. From these individual percentages the overall average proportion of BACs exceeding the legal limit (across all 42 categories) and the corresponding standard deviation were calculated. For any one category, where the proportion of BACs exceeding the legal limit was one standard deviation or greater above the mean for all categories, then fatalities occurring during these times were considered to be the best indicator of alcohol-related injuries. Conversely, for a particular hour on any given day, if the proportion of driver fatalities with a BAC exceeding the legal limit was one standard deviation or more below the mean, then fatalities occurring during that hour and on that day of the week were considered to be non-alcohol-related. Alcohol and non-alcohol-related times were also identified for Australia as a whole by combining fatality BACs from all jurisdictions.

Table A1 in Appendix A shows the days of the week and times of day identified as alcohol and non-alcohol-related for each of the states and territories. Australia-wide, the mean percentage of driver fatalities exceeding the legal limit at any time of day was about 31%, with a standard deviation of 23%. Thus, categories where the proportion of known driver/pedestrian fatalities with BACs exceeding 0.05mg/ml was 53% or greater (31+23) were categorised as alcohol-related. Conversely, cells where the proportion of BAC fatalities exceeding 0.05mg/ml was 8% or less (31-23) were categorised as non-alcohol-related.

Using this dichotomy, roughly comparable total numbers of alcohol and non-alcohol-related serious road injuries were produced for most states/territories and were sufficiently numerous to determine reliable trends over time (see Table D1 in Appendix D).

Alcohol and non-alcohol-related times derived from BACs occurring among fatalities (which contain the most reliable BAC information) were then applied to the all serious injuries (all fatalities and all hospitalisations) occurring in each state. The necessary assumption is that alcohol and non-alcohol-related times observed among road fatalities are similar to those occurring among serious hospitalised road injuries.

It should also be noted that since only categorical time data was available it was not possible to apply the specific surrogate methodology to Victorian data. Additionally, due to small numbers of road fatalities it was not possible to derive a reliable surrogate indicator for the ACT. In both cases, the surrogate derived for NSW was applied.

2.5 DERIVING RATES OF ALCOHOL AND NON-ALCOHOL-RELATED SERIOUS ROAD INJURIES

Once alcohol-related and non-alcohol-related serious road injuries had been identified using the various surrogate measures, rates were calculated using total numbers of resident persons (per 10,000) specific to each state/territory and year as the denominator. Estimates of residential populations were obtained from the ABS. National rates of road injury were calculated by applying total Australian residential population to Australia-wide surrogates identifying alcohol and non-alcohol-related times.

As mentioned above, data on road injuries requiring hospitalisation was not available for NSW or Vic during 1997 and therefore rates of all serious road injury could not be calculated for those states. Moreover, since these two states contribute to the largest proportion of all Australian road injuries, representative national rates were also unable to be calculated for 1997. However, national fatality rates for alcohol and non-alcohol-related crashes have been provided.

Due to data being unavailable at the time of compiling this report it was not possible to derive separate rates of road injury for metropolitan and non-metropolitan areas. However, it is

[5] Proportion calculated does not include Victorian data.

hoped that future reports will be able to offer comparisons between metropolitan and non-metro regions.

Finally, it should be noted that while surrogate measures may provide a reliable means of examining trends over time they do not necessarily provide a complete measure of the magnitude of alcohol-related harm. Clearly, some road injuries which do in fact involve alcohol will be missed using this method while others which do not involve alcohol will be included.

2.6 ESTIMATING THE PROPORTION OF ALCOHOL-RELATED ROAD FATALITIES

For each state and territory, the estimated proportion of driver/pedestrian road fatalities that were alcohol-related was determined from BAC information. As discussed above, between 1990 and 1997, complete BAC records for road fatalities were available in over 80% of cases for most jurisdictions and recordings are considered to be both reliable and unbiased (FORS, 1999). All fatality BACs exceeding 0.05mg/ml were defined as alcohol-related. Proportions of fatally injured drivers and pedestrians exceeding 0.10mg/ml and 0.15mg/ml were also calculated.

3.0 RESULTS

3.1 ALCOHOL-RELATED ROAD FATALITIES

Over the eight-year period between 1990 and 1997, 31% of all Australian road fatalities were estimated as alcohol-related. As shown in Table 3.1a, there was considerable variation among the various jurisdictions, with the NT indicating by far the largest proportion of alcohol-related road deaths (71%). Although the ACT indicated only 15% alcohol-related road deaths, the small number of BAC tested fatalities occurring between 1990 and 1997(61) requires that the results be treated with caution. For Tas and the NT there was also considerable variation in the proportion of alcohol-related fatalities between years. Table B1 in Appendix B shows estimated proportions of driver/pedestrian fatalities exceeding 0.10mg/ml and 0.15mg/ml by state/territory (excluding Vic). Australia-wide the estimated proportions of all driver/pedestrian road fatalities associated with BACs exceeding 0.10mg/ml and 0.15mg/ml were approximately 28% and 23% respectively.

Table 3.1a: Estimated percentage and numbers of all driver/pedestrian fatalities which were alcohol-related (BAC >0.05mg/ml) by state/territory, 1990-1997[a]

	NSW	Vic	Qld	SA	WA	Tas	NT	ACT	Australia
Estimated percentage (%) of alcohol-related driver/pedestrian fatalities									
1990	34	na	35	43	37	28	70	-	37
1991	30	31	32	28	34	28	68	-	32
1992	28	31	34	29	37	25	63	-	32
1993	28	20	28	31	29	43	65	-	27
1994	25	30	33	33	32	33	65	-	30
1995	29	26	38	31	32	52	68	-	32
1996	25	27	26	33	32	30	77	-	28
1997	28	24	31	31	32	23	85	-	30
All yrs	29	27	32	33	33	32	71	15	31
Estimated number (n) of alcohol-related driver/pedestrian fatalities									
1990	199	na	98	64	54	16	26	-	468
1991	147	107	90	38	47	16	30	-	478
1992	132	99	102	33	43	12	20	-	447
1993	122	58	83	46	39	17	16	-	373
1994	115	90	102	41	49	14	20	-	425
1995	138	71	128	44	46	22	25	-	464
1996	107	84	72	46	58	14	30	-	405
1997	125	67	85	32	45	5	43	-	399
1991-1997[b]	916	575	664	297	331	96	181	14	3068

[a] *Results not shown where considered unreliable due to small numbers of fatalities.*
[b] *Due to Vic data being unavailable in 1990, total calculated from 1991 to 1997.*

3.2 LEVEL OF INTOXICATION AMONG FATALITIES

As discussed, BACs among driver fatalities are generally considered a reliable indicator of the level of intoxication among individual drivers and of overall levels of intoxication. For all road fatalities where the exact driver BAC was recorded, Table 3.2a shows the corresponding overall mean for all positive BACs (>0.05mg/ml).

Table 3.2a: Mean BACs for fatally injured drivers and pedestrians exceeding 0.05mg/ml by state/territory, 1990-1997[a]

	NSW	Vic[b]	Qld	SA	WA	Tas	NT	ACT
1990	0.189	na	0.192	0.199	0.190	0.179	0.196	-
1991	0.184	na	0.184	0.194	0.187	0.185	0.184	-
1992	0.197	na	0.175	0.146	0.201	0.168	0.204	-
1993	0.186	na	0.184	-	0.189	0.236	0.205	-
1994	0.191	na	0.175	0.181	0.194	0.194	0.217	-
1995	0.190	na	0.177	0.193	0.194	0.189	0.228	-
1996	0.194	na	0.183	0.223	0.193	0.187	0.219	-
1997	0.197	na	0.189	0.194	0.210	-	0.206	-
All yrs	0.191	na	0.182	0.192	0.195	0.189	0.206	-

[a] *Where number of cases fewer than 5, means have not been shown.*
[b] *Unit record BAC data not available for Vic.*

Over all years, the NT indicated the greatest mean BAC (0.206mg/ml) although high levels were also notable for other jurisdictions in some years. South Australia indicated both the highest (0.223) and the lowest (0.146) mean annual BACs of all the states and territories. Between 1993 and 1997, increasing trends in mean BACs were observed for NSW, Qld, SA, and WA.

3.3 TRENDS IN SERIOUS ALCOHOL-RELATED ROAD INJURY IN AUSTRALIA, 1990 – 1997

3.3.1 National trends

As shown in Table 3.3a, between 1990 and 1996 there was an overall decline in the national rate of alcohol-related SRI of over 20%. In comparison, rates of non-alcohol-related SRIs fell by only 5% overall. However, nearly all of the decline in alcohol-related SRIs occurred between 1990 and 1992 – reflecting the sharp fall in per capita consumption during that time. Again, the fall in non-alcohol-related SRIs between 1990 and 1991 was only about 7%, with no decline evident between 1991 and 1992. It should be noted that numbers of SRIs presented in Table 3.3a are shown only to indicate sample size and should not be taken to represent actual or absolute numbers of alcohol or non-alcohol-related road injuries.

Table 3.3a: National trends in per capita alcohol consumption (PCC) of pure alcohol (litres), and numbers and rates (per 10,000) of alcohol and non-alcohol-related serious road injuries, 1990-1996

Year	PCC[a]	Alcohol-related SRI		Non-alcohol-related SRI	
		n	Rate/10,000	n	Rate/10,000
1990	8.4	3465[b]	2.73	4229[b]	3.33
1991	8.0	4317	2.50	5349	3.09
1992	7.7	3811	2.18	5428	3.10
1993	7.6	3935	2.23	5470	3.10
1994	7.7	4147	2.32	5677	3.18
1995	7.6	4317	2.39	5567	3.08
1996	7.6	3982	2.18	5806	3.17

[a] *Sourced from World Drink Trends, 1998.*
[b] *1990 numbers do not include Victorian SRIs (unavailable for this report).*

Figure 3.3a below shows the national trend in per capita alcohol consumption (World Drink Trends, 1998) and rates (per 10,000 persons) of alcohol-related SRIs for males and females between 1990 and 1996. Table C1 in Appendix C also shows annual rates of non-alcohol-related SRIs by sex.

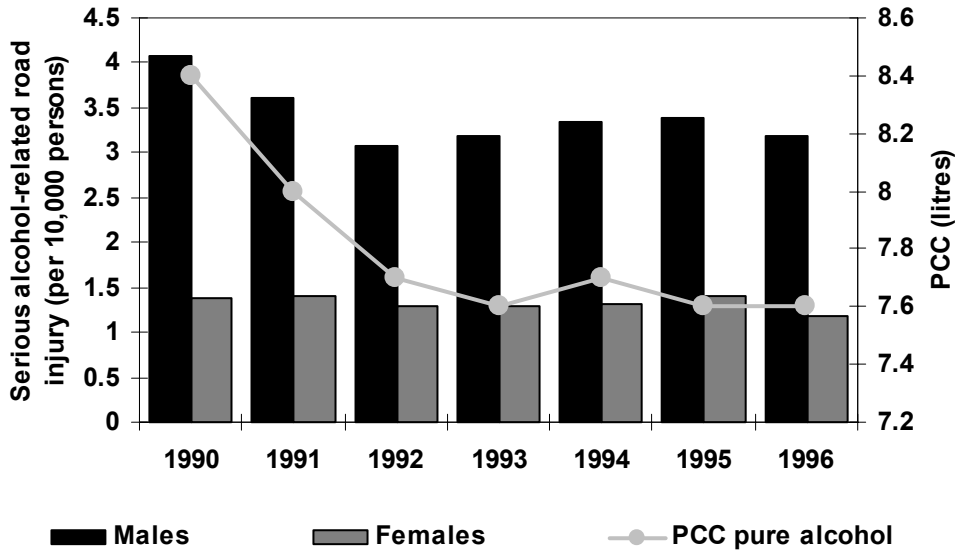

Figure 3.3a: National trends in per capita alcohol consumption (PCC) of pure alcohol (litres) and alcohol-related serious road injury per 10,000 persons, males and females, 1990-1996

Alcohol-related SRI rates were consistently higher for men than for women – about 2.6 times greater on average. In particular, male rates declined by 25% between 1990 and 1992, and

increased slightly by 1996 to show an overall fall of 22%. Between 1990 and 1992, female alcohol-related SRI rates had declined by only 7%, but continued to decline in subsequent years showing an overall fall of 15% by 1996. Non-alcohol-related SRIs declined by about 9% for males and increased by 1.5% for females between 1990 and 1996 (see Table C1 in Appendix C) although there was wide variation between years.

3.3.2 State and Territory trends

The following figures 3.3b through 3.3i show trends in rates (per 10,000 persons) of alcohol and non-alcohol-related SRIs for each of the states and territories.

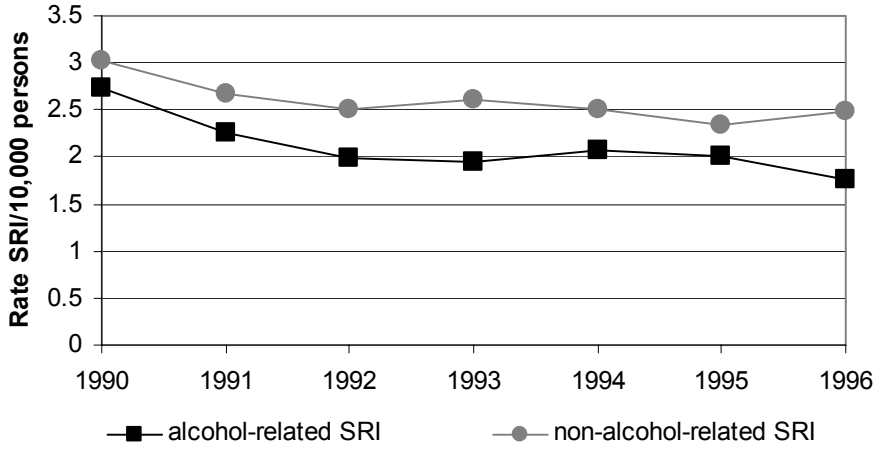

Figure 3.3b: New South Wales trends in alcohol and non-alcohol-related serious road injury (per 10,000), 1990-1996

Note: complete data on hospitalised road injuries was not available for NSW during 1997.

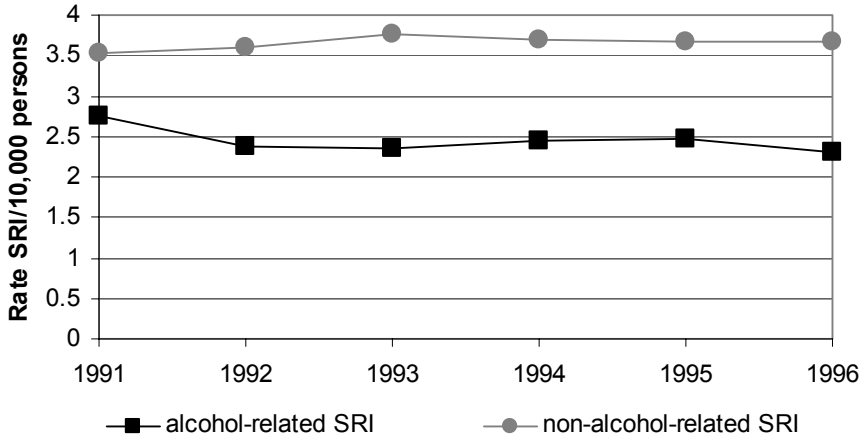

Figure 3.3c: Victorian trends in alcohol and non-alcohol-related serious road injury (per 10,000), 1991-1996

Note: comp *'997.*

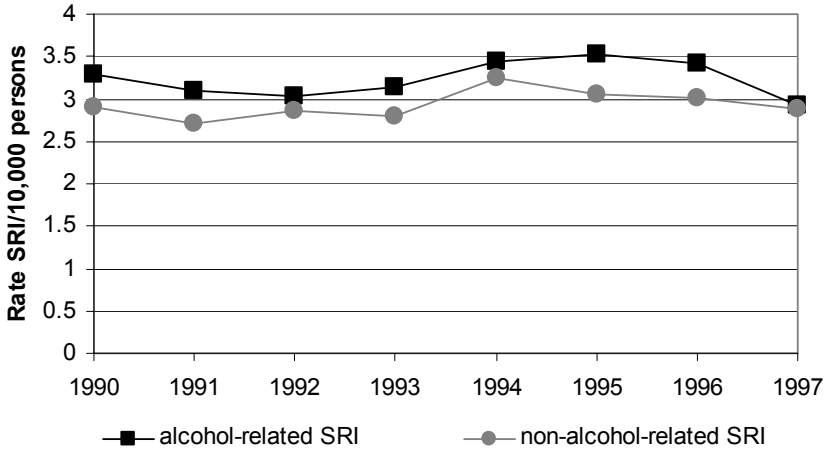

Figure 3.3d: Queensland trends in alcohol and non-alcohol-related serious road injury (per 10,000), 1990-1997

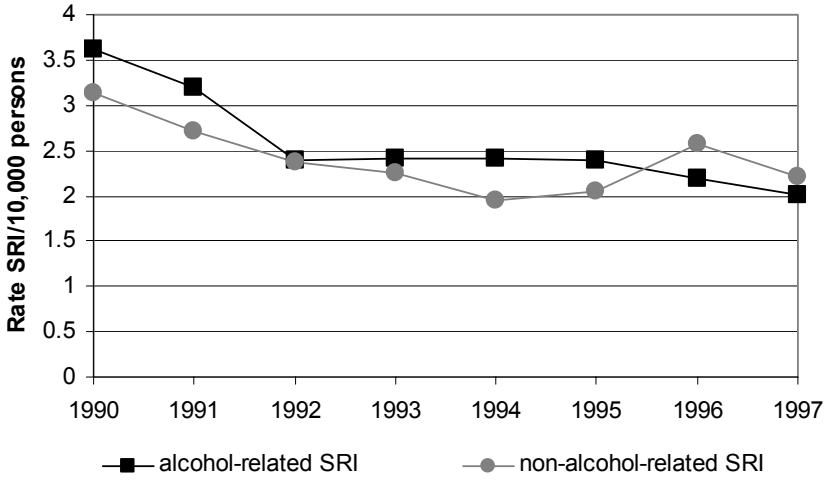

Figure 3.3e: South Australian trends in alcohol and non-alcohol-related serious road injury (per 10,000), 1990-1997

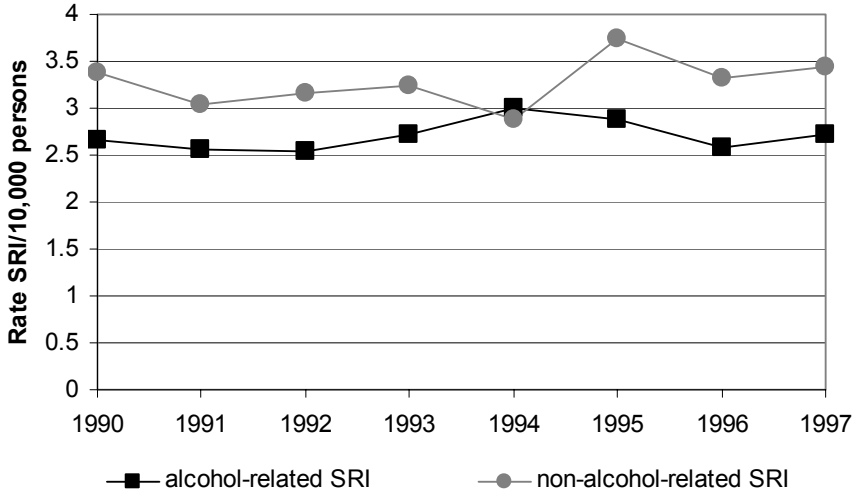

Figure 3.3f: Western Australian trends in alcohol and non-alcohol-related serious road injury (per 10,000), 1990-1997

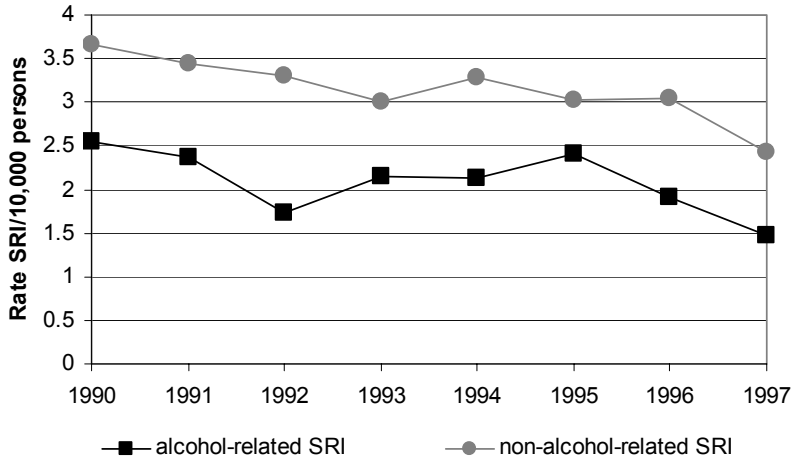

Figure 3.3g: Tasmanian trends in alcohol and non-alcohol-related serious road injury (per 10,000), 1990-1997

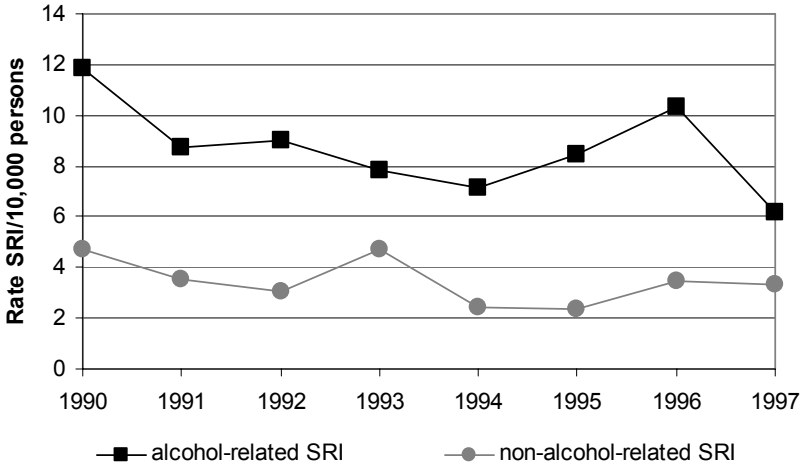

Figure 3.3h: Northern Territory trends in alcohol and non-alcohol-related serious road injury (per 10,000), 1990-1997

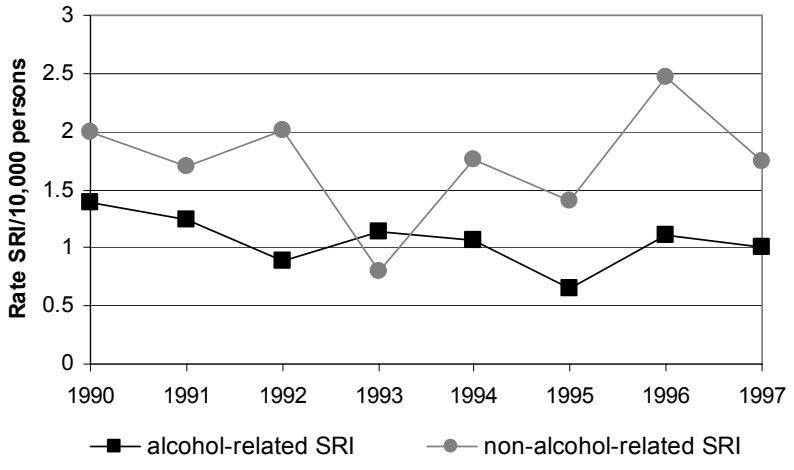

Figure 3.3i: Australian Capital Territory trends in alcohol and non-alcohol-related serious road injury (per 10,000), 1990-1997

Most jurisdictions, with the exception of WA and Qld, showed overall declines in alcohol-related SRI between 1990 and 1997, with a pronounced decrease between 1990 and 1992. In most cases, the decline in alcohol-related injuries was greater than for non-alcohol-related injuries. In WA, Tas and the ACT the overall difference between rates of alcohol and non-alcohol-related injuries did not change across the full period of 1990 to 1997. Within that period, however, between the years of 1993 and 1995, rates of alcohol-related injuries increased to a greater degree than did non-alcohol-related injuries in nearly all jurisdictions.

3.4 AGE AND SEX DISTRIBUTION AMONG ALCOHOL AND NON-ALCOHOL-RELATED SERIOUS ROAD INJURIES

On average, males contributed to about 72% of all alcohol-related SRIs compared to only 56% of non-alcohol-related SRIs occurring between 1990 and 1997. As shown in Table 3.4a, throughout Australia, the proportion of males contributing to alcohol and non-alcohol related road injuries remained relatively constant over the eight-year period. As shown in Table 3.4a the national sex distribution was also reflected amongst the various jurisdictions with the possible exceptions of the NT and the ACT, where females appeared more frequently among alcohol-related SRIs and less frequently among non-alcohol related SRIs.

Table 3.4a: Proportion of alcohol and non-alcohol-related serious road injuries occurring among males, by state/territory, 1990-1997[c]

	NSW[a] (%)	Vic[b] (%)	Qld (%)	SA (%)	WA (%)	Tas (%)	NT (%)	ACT (%)	Australia (%)
					Alcohol-related				
1990	73.38	-	72.10	78.34	76.61	76.27	72.16	79.49	74.60[d]
1991	70.98	69.99	72.43	77.07	73.11	77.48	75.00	55.56	71.90
1992	72.97	71.33	71.04	71.26	71.60	71.60	60.53	61.54	70.24
1993	72.23	67.55	71.56	69.43	69.35	65.35	64.93	73.53	71.03
1994	73.23	69.89	72.05	72.93	71.48	70.30	75.81	68.75	71.59
1995	72.01	68.49	71.57	72.65	70.22	65.79	60.67	75.00	70.60
1996	72.85	68.16	71.95	75.23	77.14	70.33	71.81	61.76	72.68
1997	-	-	71.41	75.00	74.95	74.29	77.59	70.97	-
All yrs	72.54	69.17	71.77	74.32	73.01	71.41	69.63	68.25	71.75
					Non-alcohol-related				
1990	56.52	-	56.94	60.49	56.56	55.62	67.53	50.00	58.19[d]
1991	57.96	54.52	54.06	58.57	53.26	62.73	61.02	67.35	56.57
1992	58.96	54.82	59.84	58.26	54.00	60.00	60.78	71.19	57.06
1993	58.14	54.02	54.88	52.28	49.90	61.97	62.50	62.50	55.63
1994	56.30	54.90	55.50	62.32	54.29	53.55	56.10	53.85	55.12
1995	55.52	54.43	53.92	54.15	56.41	53.85	57.14	54.76	54.68

1996	57.51	54.43	53.97	53.05	53.33	57.64	52.38	59.21	55.22
1997	-	-	54.20	59.69	51.30	53.91	45.16	55.56	-
All yrs	57.28	54.35	55.35	57.39	53.65	57.52	58.32	59.22	55.98

[a] *1997 hospitalisation data unavailable for NSW.*
[b] *1990 and 1997 Victorian SRI data incomplete, means unable to be determined.*
[c] *Where sex known.*
[d] *Does not include Victoria.*

The average age of persons with alcohol-related SRIs was about 27.5yrs compared to 37.6yrs people with non-alcohol-related SRIs (see Table F1 in Appendix F). As shown in Table 3.4b, young people were greatly over-represented among alcohol-related SRIs. Overall, about 52% of SRIs involved people aged between 15 and 24 years, while a further 23% involved 25 to 34 year olds. By comparison, only 26% of non-alcohol-related SRIs occurred among 15 to 24 year olds. Non-alcohol-related SRIs were also common among people aged 55 and over (23%). However the proportion of alcohol-related road injuries occurring among young people varied somewhat between regions. In particular, the youngest age distribution occurred in WA where 82% of all alcohol-related injuries occurred among 15 to 34 year olds. The NT appeared to have the oldest age distribution among alcohol-related injuries with only about 66% occurring among the 15 to 34 year age group.

Table 3.4b: Overall proportion of alcohol and non-alcohol-related serious road injuries by age group, by state/territory, 1990-1997[a]

Age grp	NSW[b] (%)	Vic[c] (%)	Qld (%)	SA (%)	WA (%)	Tas (%)	NT (%)	ACT (%)	Australia (%)
Alcohol-related									
0-14	3.60	-	4.27	3.14	3.02	2.45	5.00	2.85	3.48
15-24	48.76	-	48.52	49.87	59.36	55.17	34.21	57.72	51.56
25-34	23.43	-	23.40	25.08	22.62	23.39	31.58	18.70	23.41
35-44	11.77	-	11.38	11.75	8.58	9.56	16.68	9.76	10.98
45-54	6.38	-	6.26	5.36	3.81	4.39	8.04	6.50	5.55
55+	6.06	-	6.18	4.80	2.61	5.04	4.49	4.47	5.01
Non-alcohol-related									
0-14	8.94	-	7.24	7.69	8.85	11.89	12.61	9.44	8.55
15-24	22.85	-	26.18	23.60	29.16	26.79	23.26	33.66	26.35
25-34	16.94	-	18.66	17.48	18.85	18.52	29.35	19.85	18.64
35-44	13.40	-	13.31	12.07	13.79	11.20	13.26	10.41	13.24
45-54	10.59	-	10.37	7.26	9.76	9.56	9.13	10.17	9.95
55+	27.28	-	24.24	22.93	19.59	22.05	12.39	16.46	23.26

[a] *Where age known.*
[b] *Does not include 1997 data.*
[c] *Victorian age data aggregated by different age categories see Table E1 in Appendix E.*

3.5 TYPES OF ROAD USERS AMONG ALCOHOL AND NON-ALCOHOL-RELATED SERIOUS ROAD INJURIES

As shown in Table 3.5a below, several different types of road users were found among SRIs. Alcohol-related times appeared to capture a greater proportion of injured passengers and fewer motor cycle related injuries than non-alcohol-related times.

Table 3.5a: Proportion of road user types seriously injured in road crashes occurring on Australian Roads, 1990-1997

Road user type	Alcohol-related SRI		Non-alcohol-related SRI	
	n	%	n	%
Driver[a]	10014	42.85	13787	45.37
Passenger	7853	33.60	7657	25.20
Motor cycle rider or pillion	2090	8.94	3729	12.27
Bicycle rider or pillion	323	1.38	1620	5.33
Pedestrian	2965	12.69	3427	11.28
Other	66	0.28	59	0.19
Unknown	58	0.25	111	0.37
Total	23369	100.00	30390	100.00

[a] *cars, trucks, buses*

4.0 SUMMARY AND CONCLUSION

Road injury remains one of the most common causes of alcohol-related death in Australia, contributing to about 13% of all alcohol-caused deaths (Chikritzhs *et al*., 1999). Despite many years of road safety campaigns, random breath testing and heightened public awareness, alcohol was estimated to have killed 418 people in 1997 (Chikritzhs *et al*., 1999) – over half the number killed by all forms of illicit drugs (Higgins *et al*., 2000). It also remains that those most at risk of alcohol-related road injury are male and aged under 25 years.

In economic terms, the cost of alcohol-related road injury to the Australian community is considerable. The average cost of a single road fatality in Australia has been estimated at $750,000, with the cost for a hospitalisation estimated at $132,000. In 1997 an estimated 418 road deaths and 7,789 hospitalisations (Chikritzhs *et al*., 1999) were caused by high risk alcohol consumption, producing a total estimated economic cost of over $1.3 billion to the Australian public.

This report documents trends in rates of alcohol and non-alcohol-related road fatalities and all serious road injuries (SRIs) (includes deaths and hospitalisations) between 1990 and 1997 for most Australian states and territories. It also provides estimates of the proportions of all fatally injured drivers and pedestrians that were alcohol-related for the nation and for each state and territory. Age and sex profiles of all persons seriously injured on Australian roads were provided by jurisdiction.

There is currently no mandatory requirement for all states and territories to test for blood alcohol among all seriously injured (ie, hospitalised) drivers and pedestrians. As a result, road injuries which involve prior alcohol consumption or where the driver exceeded the legal driving limit cannot be directly identified from police records. However, for people fatally injured in a road crash the autopsy process involves the routine sampling of blood. Australia-wide about 80% of all driver and pedestrian road fatalities are BAC tested.

This report identified alcohol and non-alcohol-related SRIs using surrogate methodology. Utilising BAC information derived from road fatalities, specific times of the day and

particular days of the week were identified as those periods most likely to be alcohol or non-alcohol-related for each jurisdiction.

Across Australia, the most common times for alcohol-related crashes to occur were during the hours of 10pm and 2am on Friday, Saturday and Sunday nights, although longer hours were evident for Saturdays. Day-time hours between 6am and 2pm on most weekdays except Saturdays, were commonly associated with large numbers of non-alcohol-related injuries. Interestingly, Ireland and Thommeny (1993) also identified that between the hours of 10pm and 2am, 91% of assaults occurring in public places were alcohol-related.

Averaged over the eight years between 1990 and 1997, it was estimated that 31% of all driver and pedestrian deaths on Australian roads were alcohol-related (ie, exceeded 0.05mg/ml). The estimated proportions of drivers and pedestrians killed on Australian roads with blood alcohol levels exceeding 0.10mg/ml and 0.15mg/ml were approximately 28% and 23% respectively.

Of all jurisdictions, the Northern Territory had by far the largest estimated proportion of alcohol-related fatalities (71%). Western Australia (33%), Queensland (32%), South Australia (33%) and Tasmania (32%) all indicated similar proportions of alcohol-related driver and pedestrian fatalities, while Victoria (27%) and NSW (29%) had slightly lower levels. The Australian Capital Territory indicated the lowest proportion of alcohol-related driver/pedestrian fatalities, although only small numbers of road deaths occurred in this jurisdiction (results may be unreliable).

National rates of alcohol-related SRIs declined by over 20% between 1990 and 1996. However, the vast majority of this decline occurred between 1990 and 1992, and after that time there was a slight but gradual increase evident to 1995. The trend in alcohol-related SRIs broadly reflected concurrent trends in estimated per capita alcohol consumption which fell by over 8% between 1990 to 1992 but which then appeared to plateau at about 7.6 litres per person. By comparison, during the early 1990's, non-alcohol-related SRIs did not indicate the same trend or magnitude of decline (7%) as alcohol-related SRIs. Additionally, between 1990 and 1992, the fall in male alcohol-related SRIs was over three and a half times greater than that seen or females.

Most jurisdictions followed the national trend in alcohol-related SRIs. All states/territories showed declines between 1990 and 1992 and with the exception of Western Australia, overall decreases in alcohol-related injuries were evident by the end of the study periods. Only WA had slightly higher levels of alcohol-related road injuries by 1997, though non-alcohol-related injuries also increased there. In New South Wales, South Australia, Tasmania and the Northern Territory declines in non-alcohol-related SRIs were also evident between 1990 and 1992, however declines in alcohol-related SRIs were consistently larger.

There is strong evidence to support the positive relationship between overall levels of alcohol consumption in a community and levels of alcohol-related harm (Edwards *et al*., 1995,) and the apparent positive association between national levels of serious alcohol-related road injury and national per capita alcohol consumption is not surprising. It is also interesting to note that most states and territories independently showed similar declines in alcohol-related road injury and that declines in all alcohol-caused deaths (including chronic diseases such as alcoholic liver cirrhosis) have also been shown to have occurred between 1990 and 1992 (Chikritzhs *et al*., 1999). Even so, other factors such as major changes to police random breath testing activity which occurred in the larger states may also have been influential in reducing road injury in the early part of the decade (Cavallo & Cameron, 1992; Newstead *et al*., 1998).

The majority of people who sustained alcohol-related road injuries were male (70%). By comparison, males only contributed to about 56% of non-alcohol-related SRIs. The sex distribution among alcohol-related SRIs closely reflected that for most types of alcohol-caused mortality and morbidity including suicide, assault and alcohol dependence - where the overwhelming majority of victims are male (Chikritzhs *et al*., 1999).

Young people were also over represented among alcohol-related road fatalities and hospitalisations. Nation-wide, over half of all alcohol-related SRIs occurred among people aged between 15 and 24 years (52%). For non-alcohol-related SRIs only about 26% occurred among the same age group. Not surprisingly, in 1996, among all other causes of disease and injury, the greatest contributor to the burden of disease among young males (15-24yrs) was in fact road traffic accidents (Moon *et al*., 1999). These results were also congruent with previous findings on alcohol-caused deaths and hospitalisations which indicated that for

males in particular, road deaths predominated in the 15 to 29 year old age group (Chikritzhs *et al*., 1999). Clearly, alcohol and driving remains a serious problem among young people in Australia – particularly males.

In summary, a substantial proportion of all deaths occurring on Australian roads are alcohol-related and although declines were evident in the early 1990's numbers of serious road injuries no longer appear to be reducing. Males in particular constitute a high-risk group for alcohol-related road death and hospitalisation. Alcohol-related road death and trauma also remains a leading public health concern in relation to young people.

5.0 REFERENCES

Blose, J.O. & Holder, H.D. (1987) Liquor-by-the-Drink and Alcohol-Related Traffic Crashes: A Natural Experiment Using Time-Series Analysis. *Journal of Studies on Alcohol,* 48 (1), 52-60

Cameron, M.H. (1980) *Identification of Alcohol Involvement*. ROSTA Internal Report.

Cavallo, A. & Cameron, M. (1992). *Evaluation of a Random Breath Testing Initiative in Victoria 1990 & 1991. Summary Report*. Monash University Accident Research Centre – Report #39.

Chikritzhs, T., Jonas, H., Heale, P., Dietze, P., Stockwell, T., Hanlin, K. & Webb, M. (1999) *Alcohol-caused deaths and hospitalisations in Australia, 1990-1997*. National Alcohol Indicators, Technical Report No.1. National Drug Research Institute, Curtin University of Technology, Perth.

Edwards, G., Anderson, P., Babor, T.F., Casswell, S., Ferrence, R., Giesbrecht, N., Godfrey, C., Holder, H.D., Lemmens, P., Mäkelä, K., Midanik, L.T., Nordström, T., Österberg, E., Romelsjö, A., Room, R., Simpura, J. & Skog, O-J. (1995) *Alcohol Policy and the Public Good*. New York: Oxford University Press.

FORS (1999) *Federal Office of Road Safety Monograph 29*. Canberra.

Haque, O. & Cameron, M. (1987) *Evaluation of the effect of the Victorian Zero BAC Legislation: July 1984 – December 1985*. Internal Paper, Vic Roads

Higgins K, Cooper-Stanbury, M. & Williams, P. (2000) *Statistics on drug use in Australia 1998*. AIHW cat no. PHE 16. Canberra: AIHW (Drug Statistics Series).

Holder, H. & Wagenaar, A. (1994) Mandated server training and reduced alcohol-involved crashes: a time series analysis of the Oregon experience. *Accident, Analysis and prevention,* 26, 1, 89-97.

Ireland, C.S., & Thommeny, J.L. (1993) The crime cocktail: licensed premises, alcohol and street offences. *Drug and Alcohol Review,* 12, 143-150.

Moon, L., Meyer, P. & Grau, J. (1999) *Australia's young people: their health and wellbeing 1999*. AIHW Cat. No. PHE 19 Canberra: AIHW.

Newstead, S., Cameron, M. & Narayan, S. (1998) *Further modelling of some major factors influencing road trauma trends in Victoria: 1990-96*. Monash University Accident Research Centre – Report #129.

Rosman, D.L. & Knuiman, M.W. (1994) A comparison of hospital and police road injury data. *Accident Analysis and Prevention* 26 (2), 215-222.

Wagenaar, A.C. & Holder, H.D. (1991). Effects of alcoholic beverage server liability on traffic crash injuries. *Alcoholism: Clinical & Experimental Research* 15 (6)

Wagenaar, A.C. & Maybee, R.G. (1986) The legal minimum drinking age in Texas: Effects of an increase from 18 to 19. *Journal of Safety Research* 17, 165-178.

World Drink Trends (1998) *International Beverage Consumption and Production Trends*. Henly-on-Thames: NTC Publications Ltd.

APPENDIX A

Table A1: Alcohol and non-alcohol-related times by state/territory

Alcohol-related	Non-alcohol-related
Australia	
Sunday, 10pm – Monday, 6am	Sunday, 2pm – Sunday, 6pm
Wednesday, 10pm – Thursday, 2am	Monday, 6am – Monday, 2pm
Thursday, 10pm – Friday, 2am	Tuesday, 6am –Tuesday, 2pm
Friday, 10pm – Saturday, 2am	Wednesday, 10am – Wednesday, 2pm
Saturday, 6pm – Sunday, 6am	Thursday, 6am – Thursday, 2pm
	Friday, 6am – Friday, 10am
NSW (Vic and ACT)	
Sunday, 10pm – Monday, 6am	Monday, 6am – Monday, 6pm
Monday, 10pm – Tuesday, 2am	Tuesday, 6am – Tuesday, 2pm
Wednesday, 10pm – Thursday, 2am	Wednesday, 10am – Wednesday, 2pm
Friday, 10pm – Saturday, 6am	Thursday, 6am – Thursday, 2pm
Saturday, 6pm – Sunday, 6am	Friday, 6am – Friday, 10am
Qld	
Sunday, 6pm – Monday, 6am	Monday, 6am – Monday, 2pm
Tuesday, 10pm – Wednesday, 2am	Tuesday, 10am – Tuesday, 2pm
Wednesday, 10pm – Thursday, 2am	Wednesday, 6am – Wednesday, 2pm
Thursday, 6pm – Friday, 2am	Thursday, 6am – Thursday, 2pm
Friday, 10pm – Saturday, 6am	Friday, 6am – Friday, 10am
Saturday, 6pm – Sunday, 6am	
SA	
Sunday, 2am – Sunday, 6am	Monday, 10am – Monday, 2pm
Monday, 2am – Monday, 6am	Tuesday, 6am – Tuesday, 2pm
Tuesday, 10pm – Wednesday, 2am	Wednesday, 6am – Wednesday, 2pm
Wednesday, 10pm – Thursday, 2am	Thursday, 10am – Thursday, 2pm
Thursday, 10pm – Friday, 2am	Friday, 6am – Friday, 10am
Friday, 10pm – Saturday, 6am	Saturday, 10am – Saturday, 2pm
Saturday, 6pm – Sunday, 6am	
WA	
Sunday, 10pm – Monday, 6am	Monday, 6am – Monday, 2pm
Monday, 10pm – Monday, 2am	Tuesday, 6am – Tuesday, 10pm
Tuesday, 10pm – Wednesday, 6am	Wednesday, 6am – Wednesday, 2pm
Wednesday, 10pm – Thursday, 2am	Thursday, 10am – Thursday, 2pm
Friday, 10pm – Saturday, 2am	Friday, 10am – Friday, 2am
Saturday, 10pm – Sunday, 6am	Saturday, 10am – Saturday, 2pm
Tas	
Sunday, 10pm – Monday, 6am	Sunday, 10am – Sunday, 6pm
Thursday, 10pm – Friday, 2am	Monday, 6am – Monday, 10am
Friday, 10pm – Saturday, 2am	Tuesday, 6am - 10am, 2pm-6pm
Saturday, 6pm – Sunday, 6am	Wednesday, 6am – Wednesday, 10am
	Thursday, 6am – Thursday, 2pm
	Friday, 10am – Friday, 2pm
	Saturday, 10am – Saturday, 2pm
NT	
Sunday, 2pm – Sunday, 10pm	Monday, 10am – Monday, 2pm
Tuesday, 6pm – Tuesday, 10pm	Wednesday, 10am – Wednesday, 6pm
Thursday, 6pm – Thursday, 10pm	Friday, 2pm – Friday, 6pm
Friday, 6pm – Saturday, 6am	
Saturday, 6pm – Sunday, 6am	

APPENDIX B

Table B1: Estimated proportion of driver/pedestrian fatalities exceeded 0.10mg/ml and 0.15mg/ml by state/territory, 1990-1997

	NSW	Vic	Qld	SA	WA	Tas	NT	ACT	Australia
BACs exceeding 0.10mg/ml									
1990	0.29		0.32	0.39	0.30	0.26	0.59	0.80	0.32
1991	0.26		0.30	0.23	0.30	0.26	0.63	0.00	0.28
1992	0.24		0.31	0.21	0.33	0.20	0.59	0.25	0.28
1993	0.24		0.26	0.31	0.27	0.43	0.65	0.00	0.27
1994	0.22		0.27	0.28	0.28	0.30	0.65	0.00	0.26
1995	0.27		0.33	0.27	0.30	0.45	0.61	0.09	0.30
1996	0.23		0.23	0.30	0.28	0.28	0.77	0.09	0.26
1997	0.26		0.27	0.30	0.30	0.15	0.76	0.20	0.29
All yrs	0.25		0.29	0.29	0.29	0.29	0.66	0.13	0.28
BACs exceeding 0.15mg/ml									
1990	0.23		0.27	0.29	0.27	0.17	0.49	0.40	0.26
1991	0.20		0.23	0.20	0.23	0.19	0.45	0.00	0.22
1992	0.21		0.23	0.15	0.29	0.16	0.56	0.25	0.23
1993	0.18		0.21	0.23	0.18	0.39	0.48	0.00	0.20
1994	0.18		0.21	0.25	0.23	0.24	0.52	0.00	0.21
1995	0.21		0.27	0.20	0.22	0.39	0.52	0.09	0.24
1996	0.18		0.17	0.30	0.25	0.26	0.67	0.09	0.22
1997	0.21		0.19	0.22	0.23	0.08	0.62	0.20	0.22
All yrs	0.20		0.22	0.23	0.24	0.23	0.53	0.10	0.23

APPENDIX C

Table C1: Numbers and rates (per 10,000) of alcohol and non-alcohol-related SRIs for males and females in Australia, 1990-1996

Year	Alcohol-related SRI		Non-alcohol-related SRI	
	n	Rate/10,000	n	Rate/10,000
		Males		
1990	2585[a]	4.08	2461[a]	3.88
1991	3104	3.60	3026	3.51
1992	2677	3.07	3097	3.55
1993	2795	3.18	3043	3.46
1994	2969	3.34	3129	3.52
1995	3048	3.39	3044	3.39
1996	2894	3.18	3206	3.52
		Females		
1990	880[a]	1.39	1768[a]	2.79
1991	1213	1.40	2323	2.68
1992	1134	1.29	2331	2.66
1993	1140	1.29	2427	2.74
1994	1178	1.31	2548	2.84
1995	1269	1.40	2523	2.78
1996	1088	1.18	2600	2.83

[a] *1990 numbers do not include Victorian SRIs (unavailable for this report).*

APPENDIX D

Table D1: Annual numbers of alcohol and non-alcohol-related serious road injuries by state/territory, 1990-1997

	NSW[b]	Vic[c]	Qld	SA	WA	Tas	NT	ACT	Australia[a]
					Alcohol-related				
1990	1589	-	957	518	428	118	194	39	3475
1991	1330	1214	914	462	419	111	144	36	3117
1992	1180	1060	922	348	422	81	152	26	2762
1993	1174	1056	975	351	455	101	134	34	2888
1994	1259	1095	1095	353	512	101	124	32	3053
1995	1229	1118	1150	351	499	114	150	20	3201
1996	1086	1047	1141	323	455	91	188	34	2937
1997	-	-	997	297	489	70	116	31	1936
Total	8847	6590	8151	3003	3679	787	1202	252	23369
					Non-alcohol-related				
1990	1764	-	843	449	546	169	77	56	4259
1991	1582	1565	801	392	497	161	59	49	3805
1992	1496	1605	869	346	524	155	51	59	3853
1993	1572	1683	871	330	543	142	80	24	3808
1994	1524	1659	1036	285	492	155	42	53	4022
1995	1431	1661	994	302	647	143	42	43	3910
1996	1547	1679	1008	378	585	144	63	76	4133
1997	-	-	978	327	619	115	62	54	2600
Total	10916	9852	7400	2809	4453	1184	476	414	30390

[a] *Note: Numbers of Australia-wide SRIs calculated from a nationally derived surrogate does not total to sum of all states/territories.*
[b] *NSW hospitalisation data incomplete for 1997.*
[c] *Vic data incomplete 1990 and 1997.*

APPENDIX E

Table E1: Overall proportion of alcohol and non-alcohol-related serious road injuries by age group, Victoria 1991-1996[a]

Age grp	Alcohol-related	Non-alcohol-related
0-17	10.59	11.71
18-24	44.03	21.19
25-39	30.19	27.62
40+	15.18	39.48
Total	100.00	100.00

[a] *Where age group known.*

APPENDIX F

Table F1: Mean age of persons with alcohol and non-alcohol-related serious road injuries, by state/territory, 1990-1997[c]

	NSW[a]	Vic[b]	Qld	SA	WA	Tas	NT	ACT	Australia
					Alcohol-related				
1990	27.58	-	28.08	26.89	24.72	26.50	28.67	24.10	26.82
1991	28.36	-	28.43	28.54	25.28	26.74	29.74	26.94	27.73
1992	28.79	-	27.51	27.93	25.16	29.48	27.71	31.04	27.82
1993	28.69	-	28.24	27.52	25.33	25.38	29.36	25.41	27.55
1994	28.48	-	27.75	26.27	24.49	26.10	29.86	28.06	27.24
1995	28.42	-	28.73	28.38	25.69	26.98	31.11	29.10	27.48
1996	29.14	-	27.60	29.66	25.77	27.25	30.44	23.97	27.88
1997	-	-	29.17	27.25	25.45	27.40	30.62	26.73	-
All yrs	28.44	-	28.19	27.77	25.24	26.88	29.63	26.60	27.48
					Non-alcohol-related				
1990	38.35	-	36.88	36.78	33.75	33.79	29.45	36.46	35.98
1991	40.27	-	38.69	36.44	35.48	34.80	34.41	34.18	37.74
1992	39.01	-	37.63	38.28	34.67	36.42	30.65	28.92	37.28
1993	39.66	-	38.17	38.82	35.74	36.34	31.10	31.75	37.61
1994	40.36	-	39.00	40.18	36.41	35.20	33.08	30.90	38.09
1995	39.49	-	39.38	37.47	36.32	37.12	30.44	36.58	37.72
1996	40.62	-	39.42	39.04	37.21	41.50	34.13	30.68	38.70
1997	-	-	37.82	40.46	36.41	35.95	34.08	37.09	-
All yrs	39.66	-	38.42	38.37	35.81	36.29	32.06	33.17	37.58

[a] *NSW hospitalisation data incomplete for 1997.*
[b] *Victorian age data aggregated by age categories, mean age unable to be determined*
[c] *Where age known.*