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Risks of alcohol-attributable hospitalisation and death in Australia over time: Evidence of divergence by region, age and sex.

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RESEARCH

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Abstract

Background

Past reports on trends of alcohol consumption and related harm have generally been descriptive in nature and have not provided evidence of whether changes over time are significant.

Aims

We investigated whether: (i) the risk of alcohol-attributable hospitalisation and death between 1994 and 2005 for three different age groups changed significantly across all Australian jurisdictions; and (ii) the relative rates of hospitalisation for males and females changed over time.

Method

Estimates of alcohol-attributable hospitalisations and deaths were calculated using the aetiologic fraction method. Hospitalisations and deaths were grouped by age: 15-29 years, 30-44 years and 45+ years. Risk estimates and risk differences were analysed using Poisson regression.

Results

Risk of alcohol-attributable hospital separations increased nationally and across most jurisdictions throughout the study period. Male and female rates converged over time. Alcohol-attributable deaths decreased nationally across the three age groups and across several jurisdictions beginning in the mid-1990s.

Conclusion

Nationally, alcohol-attributable deaths declined while hospitalisations rose. However, states with higher population density tended to drive national rates, with considerable variation by jurisdiction. The conditions which dominated hospitalisations (e.g. alcohol dependence, falls) differed substantially from those underlying alcohol-attributable deaths (e.g. alcoholic liver cirrhosis, road crashes). Jurisdictional variation in death and hospitalisations rates as well as changes over time may be partly due to differences in: regulation of alcohol supply; patterns and levels of alcohol consumption; the nature and effectiveness of law enforcement; demographic characteristics of general and sub-populations; and medical health services and screening for chronic conditions.

Key Words

Alcohol, aetiologic fraction, mortality, morbidity, risk, epidemiology

What this study adds:

1. Although trends in alcohol-attributable mortality and morbidity have been previously described, the studies have not analysed trends and did not provide information on changes in risks of alcohol-attributable hospitalisations and deaths by age and sex.
2. Our analyses suggest an increase in risks of alcohol-attributable hospitalisations, with variations across states and territories, as well as by age and sex. Our analyses also indicate decreasing overall risks of alcohol-attributable deaths countrywide.
3. Further investigation of causal factors for the decline in deaths with increased rates of hospitalisations is necessary, and more recent data and analyses are needed.

Background

Alcohol consumption is costly to the Australian population, in terms of economic and social impact.[1] Every year, alcohol consumption is responsible for more than 250 deaths and over 11,000 hospitalisations among young people aged 15-24 years.[2] Each week, approximately one death and 65

hospitalisations among the under-aged (14-17 years) are attributed to alcohol.[3] A substantial proportion of alcohol-attributable mortality and morbidity occurs among older Australians. Indigenous people experience particularly high risk of harm related to alcohol consumption.[4-7]

National Drug Strategy Household Surveys (NDSH surveys)[8-12] have suggested that an increasing proportion of Australian women report drinking at least weekly, although the most recent survey report[13] suggests a decrease in weekly consumption. Past monitoring efforts have indicated that population rates differ by region, and that levels of alcohol-attributable morbidity have generally increased over time, while death rates in general have decreased.[14,15] These regional differences may in part be due to differences in legislative regulations (Licensing Acts), the nature of enforcement of these laws, patterns of consumption within each jurisdiction (Australian State/Territory), and the demographic characteristics of general and sub-populations. Moreover, it is important to note that the most common conditions which underlie alcohol-attributable mortality differ considerably from those which underlie the majority of morbidity cases.[15] For instance, alcoholic liver cirrhosis is a major cause of alcohol-attributable death (about 25%) but comprises less than 5% of all alcohol-attributable hospitalisations, in which alcohol dependence and falls are dominant causes.

To date, trends in alcohol-attributable mortality and morbidity have been limited to descriptive comparisons.[2,7,14,15] Our aim was therefore to determine whether, over a 12-year period: (i) the annual jurisdiction-specific risks of hospitalisation and death for three different age groups differed significantly from the reference year (1993/94 for hospitalisations and 1994 for deaths); and (ii) there was evidence of convergence in male and female alcohol-attributable hospitalisations.

Method

Data sources

Hospital separation (hospitalisation) data was sourced from the Australian Institute of Health and Welfare's (AIHW) National Hospital Morbidity Database (NHMD). The NHMD data provided information on each hospital separation recorded in public and private hospitals within a specific financial year. Data for sex, age, usual residence, and primary diagnoses as well as additional external causes of injury were provided as well, coded according to the protocol International Classification of Diseases-9 (ICD-9) or International Classification of Diseases-10 (ICD-10). Mortality data was sourced from the Australian Bureau of Statistics' (ABS) Unit Record File (URF) system. The URF is a collection of de-identified data provided by each jurisdiction and represents a collation of information from each of the country's birth, death and marriage registries. It contains data items such as the sex, age, area of usual residence and primary cause of death (coded to ICD-10) for all cases within a specified calendar year.

Population alcohol aetiologic fractions (PAAFs)

In order to estimate the proportion of deaths and hospitalisations attributable to the risky and high-risk consumption of alcohol, the population alcohol aetiologic fraction (PAAF) method was used. For this analysis, risky and high-risk consumption in the short- and long-term were based on the 2001 National Health and Medical Research Council (NHMRC) guidelines where: (i) Risky short-term drinking was defined as 7 to 10 standard drinks (10g pure alcohol) for males and 5 to 6 for females on a single occasion; (ii) High-risk short-term drinking defined as 11 or more standard drinks for males and 7 or more for females on a single occasion; (iii) Risky long-term drinking defined as 29 to 42 drinks per week for males and 15 to 28 drinks per week for females; and (iv) High risk long-term drinking defined as 43 or more drinks per week for males and 29 or more per week for females.[16] New Australian drinking guidelines published in 2009[17] failed to distinguish between risky and high-risk levels of consumption, and only provide a single drinking level for lifetime (no more than two standard drinks per day) and single occasion drinking (no more than four standard drinks per occasion), under which the risk of harm is reduced. These more simplistic guidelines do not support the application of an aetiologic fraction method which analyses the marked differences in relative harm for risky versus high-risk drinking across a range of diseases. In cases where alcohol was the known sole cause of a condition (e.g. alcoholic liver cirrhosis, alcohol dependence), a PAAF of 1 (one) was applied. Where only partial causality was established, PAAFs were calculated as a function of the strength of the relationship between drinking level and condition (i.e. relative risk, with abstainers as the unexposed population), and the prevalence of risky/high risk drinking (at various levels) in the population differentiated by jurisdiction, sex and age group. Such fractions would be of a value ranging between -1 and 1. A detailed description of the PAAF methodology applied here can be found in Chikritzhs et al.[18]

Comparison of rates

Relative risks and confidence intervals were used to assess whether rates of alcohol-attributable hospitalisations and deaths were statistically different from 1993/94 rates in the case of hospitalisations and 1994 rates for deaths, controlling for sex. PAAFs were applied to both the NHMD

(hospitalisations) and URF (deaths) datasets for each of the years 1993/94 for hospitalisations (1994 for deaths) to 2004/05 for hospitalisations (2005 for deaths). Three age groups were created for independent analysis; 15-29 years, 30-44 years and 45+ years.

Estimates of the number of alcohol-attributable hospitalisations per adult (15+ years) due to risky/high risk drinking were calculated for each jurisdiction and age group.

The risk of hospitalisation attributable to alcohol for years subsequent to 1993/94 was calculated as follows:

(risk for age group y in year x)

_____

(risk for age group y in year 1993/94)

An analysis based on differences in risk of hospitalisation for males and females was performed in order to test for possible changes in risk by sex. The following formula was applied:

(risk for males in year x/risk for females in year x)

_____

(risk for males in year 1993/94/risk for females in year 1993/94)

Finally, the risk of death attributable to alcohol for years subsequent to 1994 was calculated as follows:

(risk for age group y in year x)

_____

(risk for age group y in year 1994)

Poisson regression was used to obtain annual estimates of incidence rate ratios (IRR) and all analyses were performed with STATA® 11.

Results

Hospitalisations

15-29 year age group

Compared to 1993/94, the nation-wide IRR for alcohol-attributable hospitalisation in Australia for the 15-29 year age group was significantly greater across all subsequent years, with the exception of 1994/95 and 1996/97 (Figure 1). This pattern was evident for New South Wales, Victoria, the ACT and Tasmania. Contrary to the national trend, Western Australia and Queensland tended towards either stable or declining annual IRRs subsequent to 1993/94. (See Table 1 for IRRs and confidence intervals.)

30-44 year age group

Nationally, risk of hospitalisation due to an alcohol-attributable injury or illness increased consistently across Australia over the 12-year period, with only 1994/95 showing no significant change from the reference year (1993/94) (Figure 2). For the 30-44yr age group, the IRR for alcohol-attributable hospitalisation in 2004/05 was about 38% (IRR 1.38, 95% CI: 1.35-1.41) higher than in 1993/94. This increasing trend was apparent for most of the jurisdictions, except for Queensland which tended to remain stable over time. In the last three years of the observation period, Tasmania experienced a large increase in IRR (highest in the nation), reaching about 2.5 times the reference year rate. (See Table 1.)

45+ year age group

This age group showed the clearest increase in risk of alcohol-attributable hospitalisation nationally compared to 1993/94 levels, particularly from 1996/97 onwards (Figure 3). The relative risk of hospitalisation in 2004/05 was 1.46 (95% CI: 1.44-1.49) times that for 1993/94. All jurisdictions showed a statistically significant increase in risk at some point over the ten years. In 2004/05, relative to 1993/94 levels, West Australians in the 45+ year age group had the lowest IRR while the nation's highest risk of alcohol-attributable hospitalisation was indicated for Victorians. (See Supplementary Table 1.)

Risk of alcohol-attributable hospitalisation by gender

We also conducted analyses comparing risk of alcohol-attributable hospitalisation for males and females across the three age groups. Overall, within all age groups, the gap between male and female hospitalisation risk diminished significantly after 1993/94. Exceptions to this overall trend among jurisdictions occurred most frequently within the 45+yr age group.

Deaths

15-29 year age group

Compared to 1994, the IRR for alcohol-attributable death among 15-29 year olds was significantly lower in New South Wales in the last three years (IRR 0.71, 95% CI: 0.54-0.93; IRR 0.55, 95% CI: 0.41-0.74; IRR 0.50, 95% CI: 0.37-0.68, respectively) and a similar pattern was found for Queensland (IRR 0.61, 95% CI: 0.44-0.83; IRR 0.56, 95% CI: 0.40-0.77; IRR 0.56, 95% CI: 0.41-0.77, respectively). Other jurisdictions did not show clear statistical differences in risk over the years from 1994; however, the overall national trend indicated that from 2000 alcohol-attributable deaths were significantly lower for this age group. (See Figure 4 and Table 2).

30-44 years age group

Australia-wide, there were less noticeable changes in IRR for deaths in the 30-44yr group, with significantly lower risks occurring after 2002 only. This pattern was mirrored in New South Wales from 2003 to 2005 (IRR 0.74, 95% CI: 0.60-0.92; IRR 0.65, 95% CI: 0.52-0.81; IRR 0.73, 95% CI: 0.58-0.90, respectively) and in Queensland from 2004 to 2005 (IRR 0.66, 95% CI: 0.50-0.87; IRR 0.65, 95% CI: 0.50-0.86, respectively). Other jurisdictions did not appear to show significant changes in the level of alcohol-attributable deaths for this age group. (See Figure 5 and Table 2.)

45+ years age group

Nationally, the risk of alcohol-attributable death decreased significantly and consistently after 1996 for the group aged 45+yrs. This was indicated across most jurisdictions with the exception of the Northern Territory and Australian Capital Territory (ACT) which both showed no significant differences and Tasmania where only 2004 rates were significantly lower (IRR 0.64, 95% CI: 0.46-0.89). (See Figure 6 and Table 2.)

Discussion

Across Australia, alcohol-attributable morbidity and mortality appear to be trending in opposite directions. The extent of this change varies by age and sex. At the outset, it is important to acknowledge that the types of conditions which dominate alcohol-attributable hospitalisation records in this country (e.g. alcohol dependence, alcohol abuse, assaults and falls) are different to those which underpin deaths (e.g. alcohol liver cirrhosis, road traffic injuries and haemorrhagic stroke).[15]

Overall, from 1994 to 2005, Australians aged 15 years and older were less likely to die as a result of an alcohol-attributable illness or injury. This is likely due in part to continuously improving medical health services and screening for chronic conditions such as liver cirrhosis[19] and a widespread decline in road crash fatalities as a result of legislative changes regarding 0.05 blood alcohol maximum driving limit, random breath testing campaigns, as well as improved enforcement technology and road safety.[20,21] Declines were particularly notable among the national 45 years and older age group and for several jurisdictions from the mid-1990s. Overall, the 30-44 year old group showed little or no changes in risk, while the youngest age groups showed decreases in risk from the turn of the century only. National changes appeared to be largely driven by trends in New South Wales and Queensland, two of the larger states. In the less populated jurisdictions, significant trends were more difficult to establish as annual alcohol-attributable deaths were relatively small (i.e. in statistical terms) and the confidence intervals large.

Contrary to mortality trends, the overall trend in alcohol-attributable hospitalisation increased. Depending on the age group, in 2004/05 the national risk of hospitalisation was between 1.1 and 1.5 times greater than in 1993/94. Increases were indicated nationally and across the states and territories and interestingly, and the steepest trends were apparent among those aged 45 years and older. The only notable exception was Queensland where rates for those aged less than 45 years, either declined or remained stable. Particularly rapid increases in the risk of hospitalisation due to alcohol occurred in New South Wales, Victoria, the ACT and Tasmania, especially in the older age groups. Towards the end of the study period, Victoria indicated risks for hospitalisation reaching twice that of the 1993/94 reference year, particularly for the older age group. Tasmania also indicated sharp rises in risk, especially among the older age groups, with 2002/03 and 2003/04 risks some 2 to 2.5 times greater than 1993/94 levels.

The reasons underpinning changes in alcohol-attributable hospitalisations over time and differences between jurisdictions cannot be confirmed by the trend analyses presented here; longitudinal intervention analysis would be required. It is reasonable to suspect, however, that these changes may in part reflect changes in the availability of alcohol. Between the years 2003 and 2005, Tasmania had the highest increase in outlet density (per 1,000 population count) in Australia, at 23%, followed closely by Victoria (20%) and Queensland (18%).[22] In Western Australia, where hospitalisation risks remained relatively stable over time, there was little change in the per capita numbers of outlets (0.6%).

Local research[23,24] indicates positive associations between outlet density and rates of violence, property damage or similar negative outcomes. In particular, using a longitudinal approach, Livingston[25] showed how rapid and substantial increases in numbers of outlets in Victoria between 1996 and 2005 were strongly associated with simultaneous increases in violence. Other longitudinal studies conducted outside of Australia have found similar associations between outlet density and alcohol-related harms.[26]

It is also apparent that male and female risks of alcohol-attributable hospitalisation have been converging. Convergence in the gender mortality risk has been indicated previously for several jurisdictions (but not by age, as there are too few cases) with underpinning declines in male death rates, but relatively small or no change for females.[15] These findings concur with changes in male and female self-reported alcohol consumption from surveys of secondary

school students in Australia[27,28] and the NDSH surveys.[8-12]

Limitations

The trend analyses presented here do not reveal causal relationships between the observed series and candidate causes. Potential causes underpinning observed changes over time and differences between jurisdictions require confirmatory longitudinal intervention analysis. Although it was possible to compare male and females risks by age group for hospitalisations, relatively small numbers of cases precluded a similar comparison for deaths.

Conclusion

The magnitude and distribution of alcohol-attributable harm in Australia has changed over time and has varied by jurisdiction, age and gender. Alcohol-attributable deaths have declined while hospitalisations have increased. The causal factors behind declines in deaths and those driving increases in hospitalisations may be independent, as these two measures of alcohol-attributable harm are, to a large extent, driven by different forms of illness and injury. More recent data is needed to confirm whether these trends have continued, and confirmatory intervention analyses are required to investigate underlying causes.

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ETHICS COMMITTEE APPROVAL

Curtin University Human Research Ethics Committee (HR 146/2009) - National Alcohol Indicators Project.

Figure 1: IRR and confidence (95%) intervals for alcohol-attributable hospitalisations among Australian aged 15-29 years, relative to 1993/94

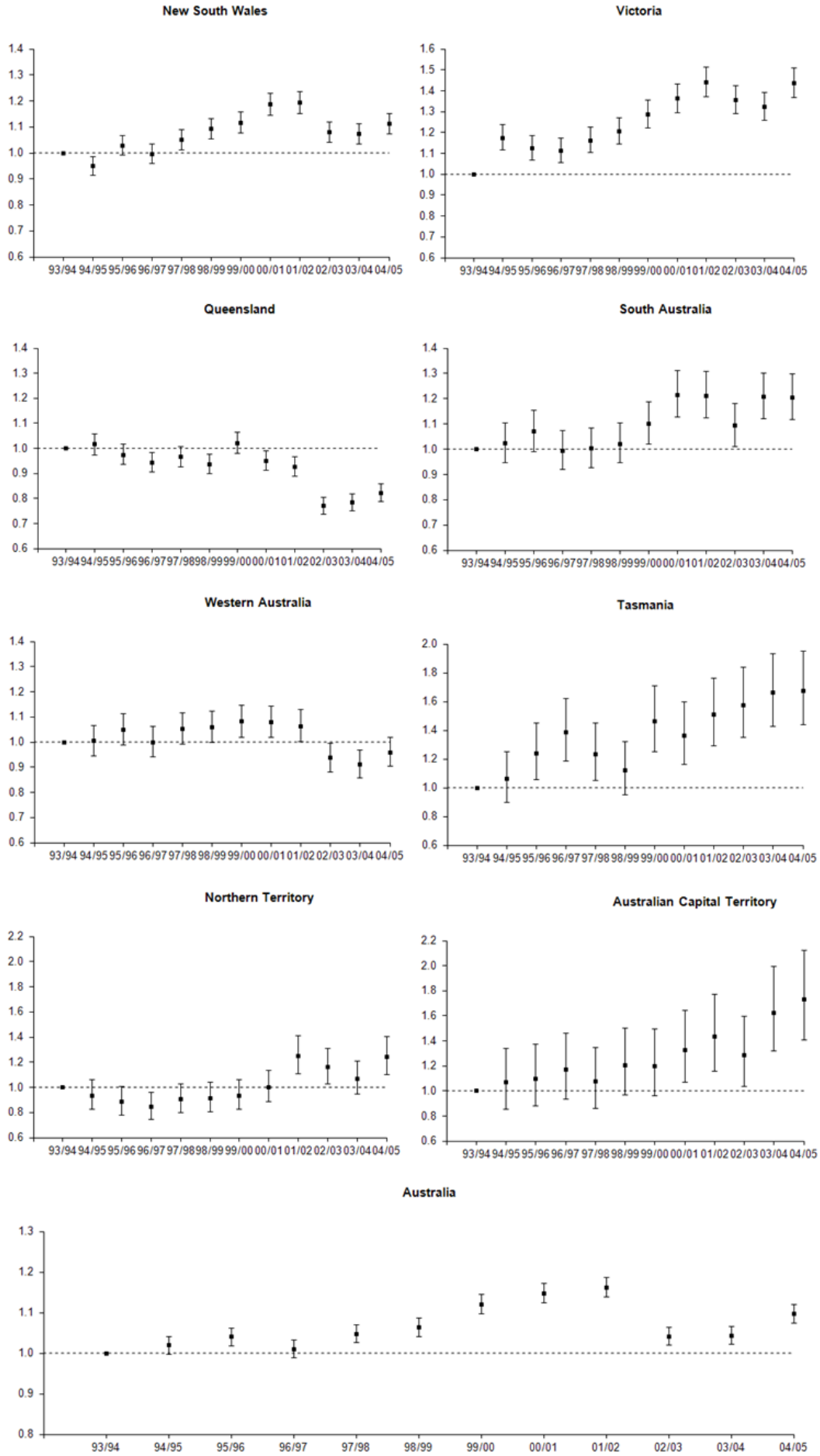

Figure 2: IRR and confidence (95%) intervals for alcohol-attributable hospitalisation among Australians aged 30-44 years, relative to 1993/94

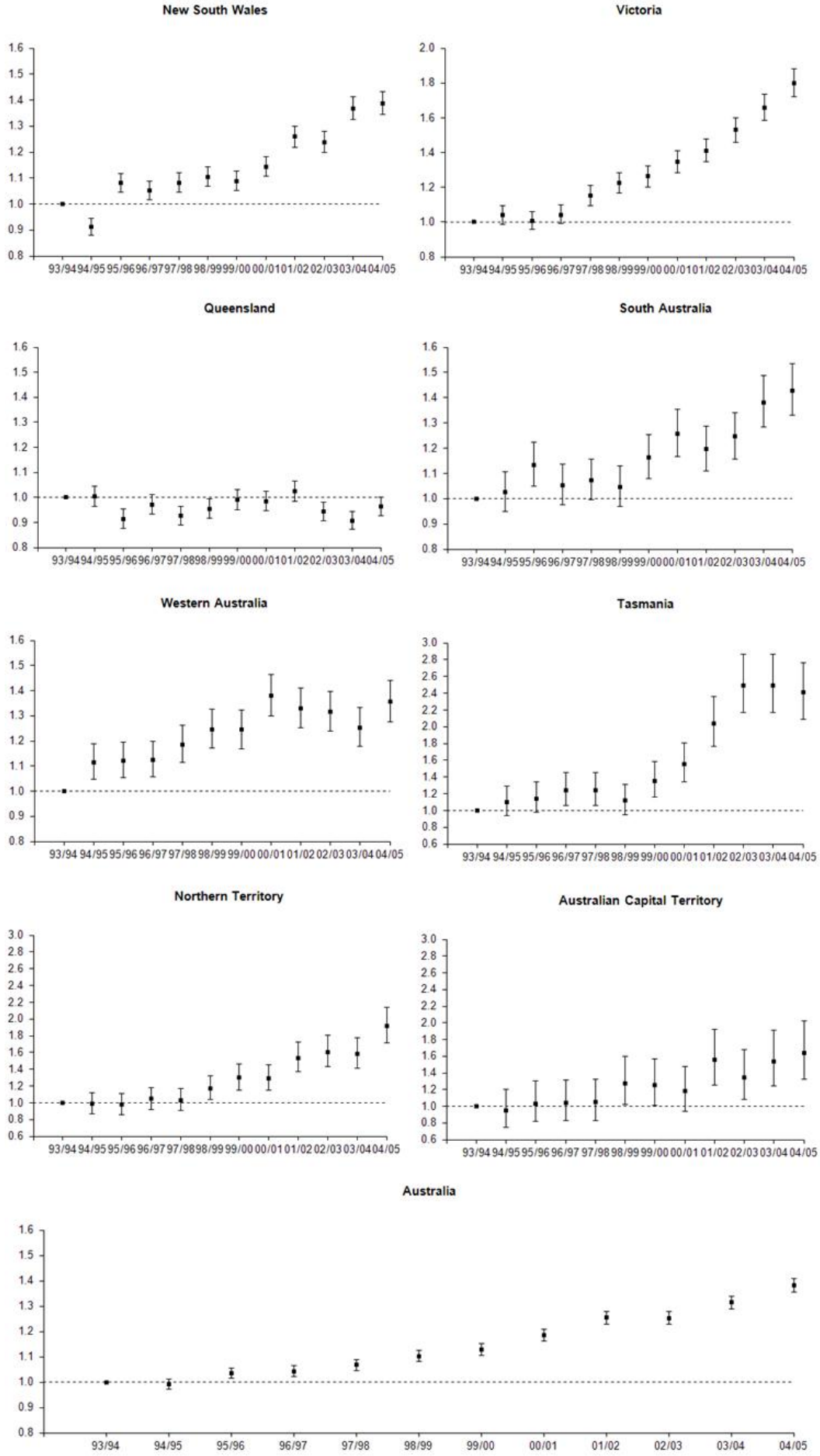

Figure 3: IRR and confidence (95%) intervals for alcohol-attributable hospitalisation aged 45 years and older, relative to 1993/94

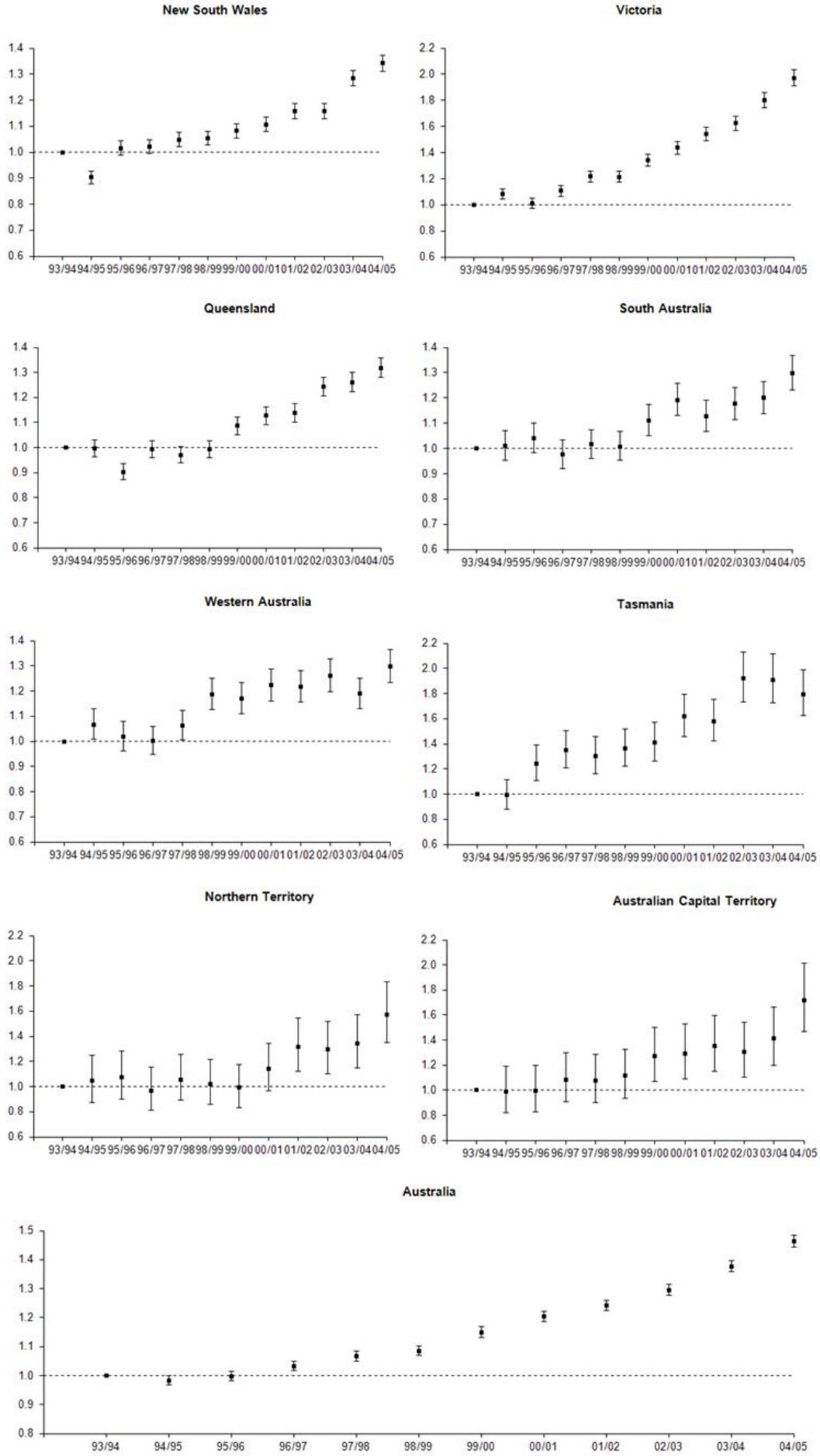

Figure 4: IRR and confidence (95%) intervals for alcohol-attributable deaths among Australians aged 15-29 years old, relative to 1994

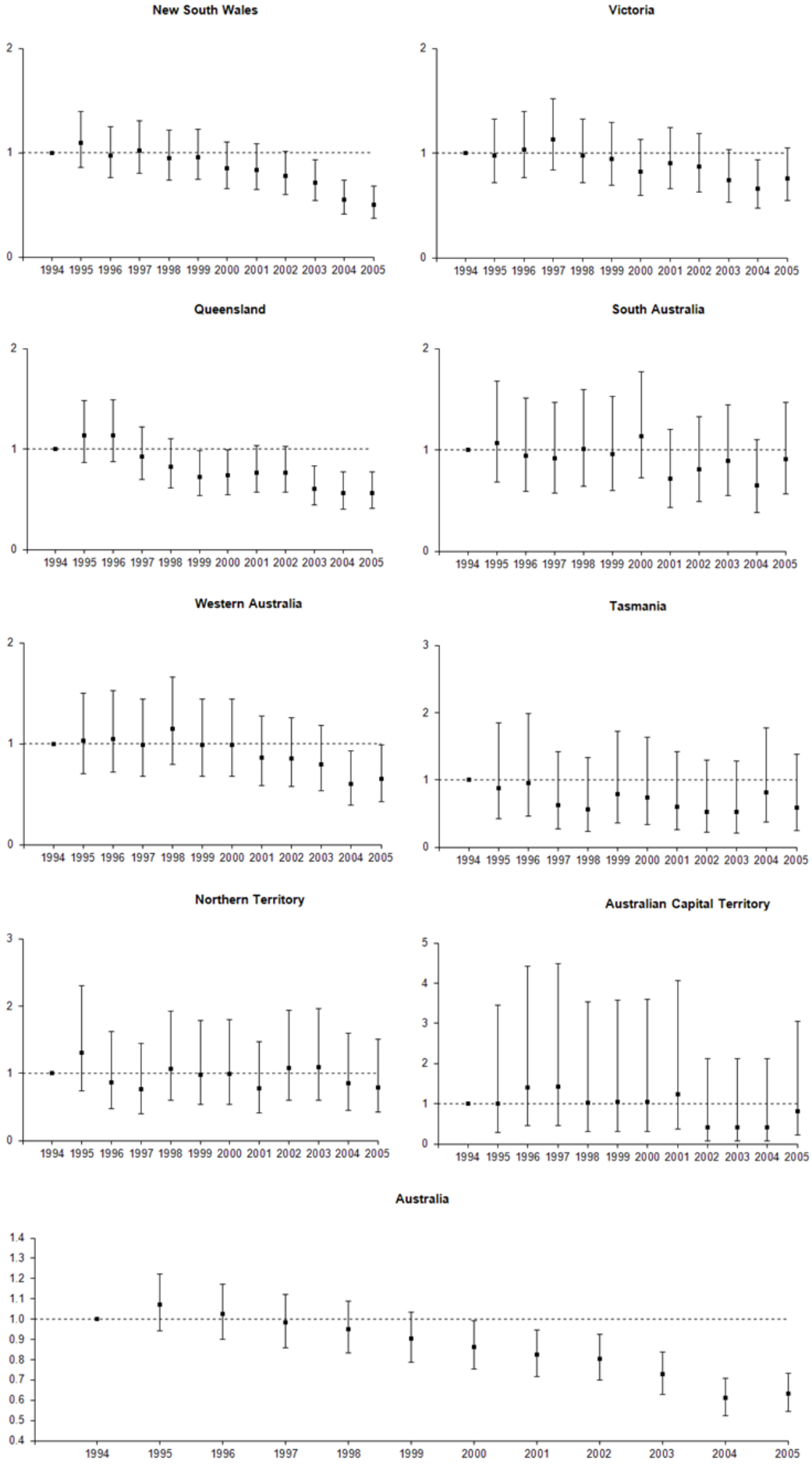

Figure 5: IRR and confidence (95%) intervals for alcohol-attributable deaths among Australians aged 30-44 years, relative to 1994

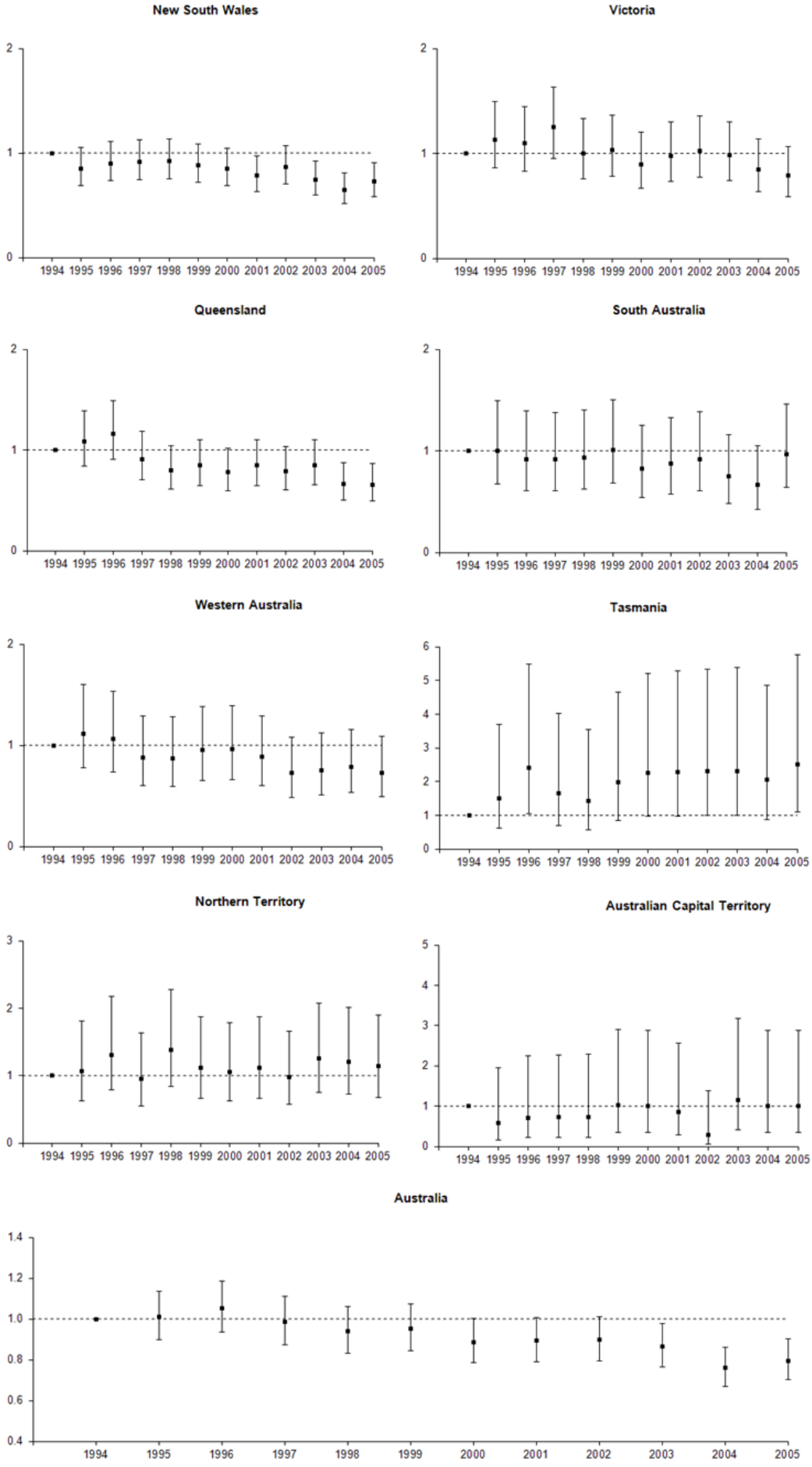

Figure 6: IRR and confidence (95%) intervals for alcohol-attributable deaths among Australians aged 45 years and older, relative to 1994

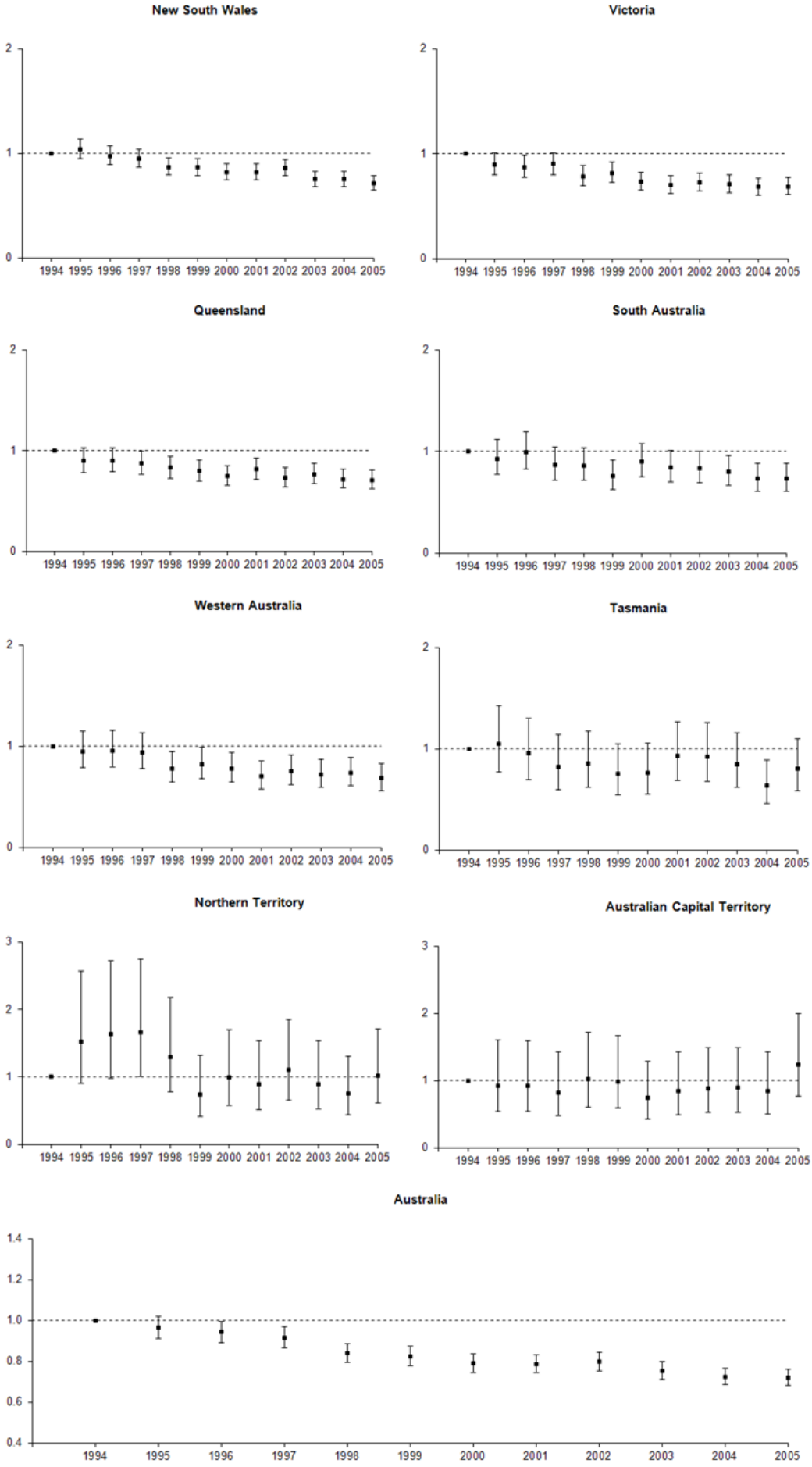

Table 1: IRR and confidence intervals of alcohol-attributable hospitalisations for all age groups, relative to 1993/94

		IRR (95%CL)								
		NSW	Vic.	Qld	SA	WA	Tas.	NT	ACT	Aus.
Age	Year									
15-29 years	94/95	0.95 (0.91-0.99)	1.17 (1.11-1.24)	1.02 (0.97-1.06)	1.02 (0.95-1.10)	1.00 (0.95-1.07)	1.06 (0.90-1.25)	0.93 (0.82-1.06)	1.07 (0.85-1.34)	1.02 (1.00-1.04)
	95/96	1.03 (0.99-1.07)	1.12 (1.07-1.18)	0.97 (0.93-1.02)	1.07 (0.99-1.16)	1.05 (0.99-1.11)	1.24 (1.05-1.45)	0.89 (0.78-1.01)	1.10 (0.88-1.37)	1.04 (1.02-1.06)
	96/97	1.00 (0.96-1.03)	1.11 (1.06-1.17)	0.94 (0.90-0.98)	0.99 (0.92-1.07)	1.00 (0.94-1.06)	1.39 (1.19-1.62)	0.85 (0.74-0.96)	1.17 (0.94-1.46)	1.01 (0.99-1.03)
	97/98	1.05 (1.01-1.09)	1.16 (1.10-1.22)	0.96 (0.93-1.01)	1.00 (0.93-1.08)	1.05 (0.99-1.12)	1.23 (1.05-1.45)	0.90 (0.80-1.03)	1.07 (0.86-1.35)	1.05 (1.03-1.07)
	98/99	1.09 (1.05-1.13)	1.20 (1.14-1.27)	0.94 (0.90-0.98)	1.02 (0.95-1.10)	1.06 (1.00-1.12)	1.12 (0.95-1.32)	0.91 (0.81-1.04)	1.21 (0.97-1.50)	1.06 (1.04-1.09)
	99/00	1.12 (1.08-1.16)	1.29 (1.22-1.35)	1.02 (0.98-1.06)	1.10 (1.02-1.19)	1.08 (1.02-1.15)	1.46 (1.25-1.71)	0.93 (0.82-1.06)	1.20 (0.96-1.49)	1.12 (1.10-1.14)
	00/01	1.19 (1.15-1.23)	1.36 (1.30-1.43)	0.95 (0.91-0.99)	1.22 (1.13-1.31)	1.08 (1.02-1.14)	1.36 (1.16-1.60)	1.00 (0.88-1.13)	1.32 (1.07-1.64)	1.15 (1.12-1.17)
	01/02	1.19 (1.15-1.24)	1.44 (1.37-1.51)	0.93 (0.89-0.97)	1.21 (1.12-1.31)	1.06 (1.00-1.13)	1.51 (1.29-1.76)	1.25 (1.11-1.41)	1.43 (1.16-1.77)	1.16 (1.14-1.19)
	02/03	1.08 (1.04-1.12)	1.36 (1.29-1.43)	0.77 (0.74-0.81)	1.09 (1.01-1.18)	0.94 (0.88-0.99)	1.57 (1.35-1.84)	1.16 (1.03-1.31)	1.28 (1.03-1.60)	1.04 (1.02-1.06)
	03/04	1.07 (1.04-1.11)	1.32 (1.26-1.39)	0.78 (0.75-0.82)	1.21 (1.12-1.30)	0.91 (0.86-0.97)	1.66 (1.43-1.93)	1.07 (0.94-1.21)	1.62 (1.32-1.99)	1.04 (1.02-1.07)
	04/05	1.11 (1.07-1.15)	1.44 (1.37-1.51)	0.82 (0.79-0.86)	1.20 (1.12-1.30)	0.96 (0.90-1.02)	1.67 (1.44-1.95)	1.24 (1.10-1.40)	1.73 (1.41-2.12)	1.10 (1.07-1.12)

		IRR (95%CL)								
		NSW	Vic.	Qld	SA	WA	Tas.	NT	ACT	Aus.
Age	Year									
30-44 years	94/95	0.91 (0.88-0.95)	1.04 (0.99-0.05)	1.0 (0.96-1.05)	1.02 (0.95-1.11)	1.12 (1.05-1.19)	1.10 (0.94-1.29)	0.98 (0.87-1.12)	0.95 (0.75-1.2)	0.99 (0.97-1.01)
	95/96	1.08 (1.04-1.12)	1.01 (0.96-0.05)	0.91 (0.88-0.95)	1.13 (1.05-1.22)	1.12 (1.05-1.2)	1.14 (0.98-1.34)	0.97 (0.86-1.11)	1.03 (0.82-1.3)	1.04 (1.01-1.06)
	96/97	1.05 (1.02-1.09)	1.04 (0.99-0.05)	0.97 (0.93-1.01)	1.05 (0.98-1.13)	1.12 (1.06-1.2)	1.24 (1.06-1.45)	1.04 (0.92-1.18)	1.04 (0.83-1.32)	1.04 (1.02-1.06)
	97/98	1.08 (1.05-1.12)	1.15 (1.1-0.06)	0.93 (0.89-0.96)	1.07 (0.99-1.16)	1.18 (1.11-1.26)	1.24 (1.06-1.45)	1.03 (0.91-1.17)	1.05 (0.83-1.32)	1.07 (1.05-1.09)
	98/99	1.10 (1.07-1.14)	1.22 (1.16-0.06)	0.95 (0.92-0.99)	1.05 (0.97-1.13)	1.25 (1.17-1.32)	1.12 (0.95-1.31)	1.17 (1.04-1.32)	1.28 (1.02-1.6)	1.10 (1.08-1.12)
	99/00	1.09 (1.05-1.13)	1.26 (1.2-0.06)	0.99 (0.95-1.03)	1.16 (1.08-1.25)	1.24 (1.17-1.32)	1.35 (1.16-1.58)	1.3 (1.15-1.47)	1.26 (1.01-1.57)	1.13 (1.11-1.15)
	00/01	1.14 (1.11-1.18)	1.35 (1.28-0.06)	0.99 (0.95-1.03)	1.26 (1.17-1.35)	1.38 (1.30-1.47)	1.55 (1.34-1.81)	1.29 (1.15-1.46)	1.18 (0.94-1.48)	1.19 (1.16-1.21)
	01/02	1.26 (1.22-1.3)	1.41 (1.34-0.06)	1.02 (0.99-1.07)	1.20 (1.11-1.29)	1.33 (1.25-1.41)	2.04 (1.77-2.35)	1.53 (1.37-1.72)	1.56 (1.26-1.92)	1.25 (1.23-1.28)
	02/03	1.24 (1.2-1.28)	1.53 (1.46-0.07)	0.94 (0.91-0.98)	1.25 (1.16-1.34)	1.32 (1.24-1.4)	2.49 (2.17-2.86)	1.61 (1.43-1.8)	1.34 (1.08-1.67)	1.25 (1.23-1.28)
	03/04	1.37 (1.33-1.41)	1.66 (1.59-0.07)	0.91 (0.87-0.94)	1.38 (1.29-1.49)	1.25 (1.18-1.33)	2.49 (2.17-2.87)	1.58 (1.41-1.78)	1.54 (1.24-1.91)	1.31 (1.29-1.34)
	04/05	1.39 (1.34-1.43)	1.80 (1.72-0.08)	0.96 (0.93-1.0)	1.43 (1.33-1.54)	1.36 (1.28-1.44)	2.41 (2.09-2.77)	1.91 (1.71-2.14)	1.63 (1.32-2.02)	1.38 (1.36-1.41)

		IRR (95%CL)								
		NSW	Vic.	Qld	SA	WA	Tas.	NT	ACT	Aus.
Age	Year									
45+ years	94/95	0.90 (0.88-0.93)	1.08 (1.04-1.12)	1.00 (0.96-1.03)	1.01 (0.95-1.07)	1.07 (1.01-1.13)	0.99 (0.88-1.12)	1.05 (0.87-1.25)	0.99 (0.82-1.19)	0.98 (0.97-1.00)
	95/96	1.02 (0.99-1.04)	1.01 (0.97-1.05)	0.90 (0.87-0.94)	1.04 (0.98-1.1)	1.02 (0.96-1.08)	1.24 (1.11-1.39)	1.07 (0.9-1.28)	1.00 (0.83-1.2)	1.00 (0.98-1.01)
	96/97	1.02 (1-1.05)	1.11 (1.07-1.15)	0.99 (0.96-1.03)	0.98 (0.92-1.03)	1.00 (0.95-1.06)	1.35 (1.21-1.5)	0.97 (0.81-1.16)	1.08 (0.91-1.3)	1.03 (1.02-1.05)
	97/98	1.05 (1.02-1.08)	1.22 (1.17-1.26)	0.97 (0.94-1.0)	1.02 (0.96-1.07)	1.06 (1.01-1.12)	1.30 (1.16-1.45)	1.06 (0.89-1.26)	1.08 (0.90-1.29)	1.07 (1.05-1.08)
	98/99	1.05 (1.03-1.08)	1.21 (1.17-1.26)	0.99 (0.96-1.03)	1.01 (0.95-1.07)	1.19 (1.13-1.25)	1.36 (1.22-1.52)	1.02 (0.86-1.21)	1.11 (0.93-1.33)	1.09 (1.07-1.1)
	99/00	1.08 (1.06-1.11)	1.34 (1.3-1.39)	1.09 (1.05-1.12)	1.11 (1.05-1.17)	1.17 (1.11-1.23)	1.41 (1.26-1.57)	0.99 (0.83-1.18)	1.27 (1.07-1.5)	1.15 (1.13-1.17)
	00/01	1.11 (1.08-1.13)	1.44 (1.39-1.49)	1.13 (1.09-1.16)	1.19 (1.13-1.26)	1.22 (1.16-1.29)	1.62 (1.45-1.8)	1.14 (0.97-1.34)	1.29 (1.09-1.53)	1.20 (1.19-1.22)
	01/02	1.16 (1.13-1.19)	1.54 (1.49-1.60)	1.14 (1.10-1.17)	1.13 (1.07-1.19)	1.22 (1.15-1.28)	1.58 (1.42-1.76)	1.32 (1.12-1.55)	1.35 (1.15-1.6)	1.24 (1.22-1.26)
	02/03	1.16 (1.13-1.19)	1.62 (1.57-1.68)	1.24 (1.20-1.28)	1.18 (1.11-1.24)	1.26 (1.20-1.33)	1.92 (1.74-2.13)	1.29 (1.1-1.52)	1.31 (1.11-1.54)	1.29 (1.28-1.31)
	03/04	1.29 (1.26-1.32)	1.80 (1.74-1.86)	1.26 (1.22-1.30)	1.20 (1.14-1.27)	1.19 (1.13-1.25)	1.91 (1.73-2.11)	1.35 (1.15-1.57)	1.41 (1.2-1.66)	1.38 (1.36-1.4)
	04/05	1.34 (1.31-1.37)	1.97 (1.91-2.03)	1.32 (1.28-1.36)	1.30 (1.23-1.37)	1.30 (1.23-1.36)	1.80 (1.62-1.99)	1.57 (1.35-1.83)	1.72 (1.47-2.01)	1.46 (1.44-1.49)

Table 2: IRR and confidence intervals of alcohol-attributable deaths for all age groups, relative to 1994

		IRR (95%CL)								
		NSW	Vic.	Qld	SA	WA	Tas.	NT	ACT	Aus.
Age	Year									
15-29 years	1995	1.10 (0.86-1.40)	0.97 (0.72-1.32)	1.13 (0.87-1.48)	1.07 (0.68-1.68)	1.03 (0.70-1.50)	0.88 (0.42-1.85)	1.30 (0.74-2.29)	1.00 (0.29-3.46)	1.07 (0.94-1.22)
	1996	0.97 (0.76-1.25)	1.03 (0.76-1.4)	1.14 (0.87-1.49)	0.94 (0.59-1.51)	1.05 (0.72-1.53)	0.96 (0.46-1.98)	0.87 (0.47-1.61)	1.40 (0.45-4.42)	1.03 (0.90-1.17)
	1997	1.02 (0.80-1.31)	1.13 (0.84-1.52)	0.92 (0.69-1.22)	0.92 (0.57-1.47)	0.99 (0.68-1.44)	0.62 (0.27-1.42)	0.76 (0.40-1.44)	1.42 (0.45-4.48)	0.98 (0.86-1.12)
	1998	0.94 (0.73-1.21)	0.98 (0.72-1.33)	0.82 (0.61-1.1)	1.01 (0.64-1.59)	1.15 (0.80-1.66)	0.56 (0.24-1.33)	1.07 (0.59-1.92)	1.02 (0.30-3.54)	0.95 (0.83-1.09)
	1999	0.95 (0.74-1.22)	0.94 (0.69-1.29)	0.73 (0.54-0.98)	0.96 (0.6-1.53)	0.98 (0.67-1.44)	0.79 (0.36-1.72)	0.98 (0.54-1.78)	1.03 (0.30-3.57)	0.90 (0.79-1.03)
	2000	0.85 (0.66-1.1)	0.82 (0.59-1.13)	0.73 (0.54-0.99)	1.13 (0.73-1.77)	0.99 (0.68-1.44)	0.73 (0.33-1.63)	0.99 (0.54-1.79)	1.04 (0.30-3.59)	0.86 (0.75-0.99)
	2001	0.84 (0.64-1.08)	0.91 (0.66-1.24)	0.77 (0.57-1.03)	0.72 (0.43-1.20)	0.86 (0.58-1.27)	0.60 (0.25-1.41)	0.78 (0.41-1.47)	1.24 (0.38-4.07)	0.82 (0.72-0.95)
	2002	0.77 (0.59-1.01)	0.87 (0.63-1.19)	0.77 (0.57-1.03)	0.81 (0.49-1.32)	0.85 (0.57-1.26)	0.53 (0.22-1.29)	1.07 (0.59-1.94)	0.41 (0.08-2.12)	0.80 (0.70-0.92)
	2003	0.71 (0.54-0.93)	0.74 (0.53-1.03)	0.61 (0.44-0.83)	0.89 (0.55-1.44)	0.79 (0.53-1.18)	0.52 (0.21-1.28)	1.09 (0.60-1.96)	0.41 (0.08-2.11)	0.73 (0.63-0.84)
	2004	0.55 (0.41-0.74)	0.66 (0.47-0.93)	0.56 (0.40-0.77)	0.65 (0.38-1.1)	0.60 (0.39-0.93)	0.81 (0.37-1.77)	0.85 (0.45-1.60)	0.41 (0.08-2.11)	0.61 (0.52-0.71)
	2005	0.50 (0.37-0.68)	0.75 (0.54-1.05)	0.56 (0.41-0.77)	0.91 (0.56-1.47)	0.65 (0.43-0.99)	0.59 (0.25-1.39)	0.79 (0.42-1.50)	0.82 (0.22-3.06)	0.63 (0.55-0.73)

Age	Year	IRR (95%CL)								
		NSW	Vic.	Qld	SA	WA	Tas.	NT	ACT	Aus.
30-44 years	1995	0.85 (0.69-1.05)	1.13 (0.86-1.50)	1.08 (0.84-1.39)	1.00 (0.67-1.49)	1.11 (0.77-1.60)	1.51 (0.62-3.68)	1.06 (0.62-1.81)	0.57 (0.17-1.95)	1.01 (0.90-1.14)
	1996	0.90 (0.73-1.11)	1.10 (0.83-1.45)	1.16 (0.91-1.49)	0.92 (0.61-1.39)	1.07 (0.74-1.54)	2.40 (1.05-5.49)	1.31 (0.79-2.18)	0.71 (0.23-2.25)	1.05 (0.94-1.18)
	1997	0.92 (0.75-1.13)	1.25 (0.95-1.64)	0.91 (0.70-1.18)	0.91 (0.61-1.38)	0.88 (0.60-1.29)	1.66 (0.69-4.01)	0.95 (0.55-1.64)	0.72 (0.23-2.27)	0.99 (0.87-1.11)
	1998	0.92 (0.75-1.14)	1.00 (0.75-1.33)	0.80 (0.61-1.04)	0.93 (0.62-1.4)	0.87 (0.59-1.28)	1.43 (0.58-3.55)	1.38 (0.84-2.27)	0.73 (0.23-2.29)	0.94 (0.83-1.06)
	1999	0.88 (0.72-1.09)	1.03 (0.78-1.37)	0.85 (0.65-1.10)	1.01 (0.68-1.51)	0.95 (0.65-1.38)	1.97 (0.83-4.64)	1.11 (0.66-1.87)	1.02 (0.36-2.9)	0.95 (0.84-1.07)
	2000	0.85 (0.69-1.05)	0.90 (0.67-1.20)	0.78 (0.59-1.02)	0.82 (0.54-1.25)	0.96 (0.66-1.39)	2.25 (0.97-5.21)	1.06 (0.63-1.79)	1.01 (0.35-2.88)	0.89 (0.78-1.00)
	2001	0.79 (0.63-0.97)	0.98 (0.73-1.30)	0.85 (0.65-1.10)	0.87 (0.57-1.33)	0.88 (0.60-1.29)	2.28 (0.98-5.27)	1.12 (0.66-1.87)	0.86 (0.29-2.56)	0.89 (0.79-1.01)
	2002	0.87 (0.71-1.07)	1.02 (0.77-1.35)	0.79 (0.61-1.03)	0.92 (0.61-1.39)	0.73 (0.49-1.08)	2.30 (0.99-5.33)	0.97 (0.57-1.66)	0.29 (0.06-1.38)	0.90 (0.79-1.01)
	2003	0.74 (0.60-0.92)	0.98 (0.74-1.30)	0.85 (0.65-1.10)	0.75 (0.48-1.16)	0.75 (0.51-1.12)	2.32 (1.00-5.37)	1.25 (0.75-2.07)	1.15 (0.42-3.16)	0.86 (0.77-0.98)
	2004	0.65 (0.52-0.81)	0.85 (0.63-1.14)	0.66(0.50-0.87)	0.67 (0.42-1.05)	0.78 (0.53-1.16)	2.06 (0.87-4.86)	1.21 (0.73-2.01)	1.01 (0.35-2.88)	0.76 (0.67-0.86)
	2005	0.73 (0.58-0.90)	0.79 (0.59-1.06)	0.65 (0.50-0.86)	0.97 (0.64-1.46)	0.73 (0.49-1.09)	2.51 (1.09-5.77)	1.13 (0.68-1.90)	1.01 (0.36-2.89)	0.80 (0.70-0.90)

		IRR (95%CL)								
		NSW	Vic.	Qld	SA	WA	Tas.	NT	ACT	Aus.
Age	Year									
45+ years	1995	1.03 (0.94-1.13)	0.89 (0.79-1.00)	0.90 (0.78-1.02)	0.93 (0.77-1.12)	0.95 (0.78-1.15)	1.04 (0.77-1.42)	1.52 (0.91-2.56)	0.92 (0.53-1.60)	0.96 (0.91-1.02)
	1996	0.97 (0.89-1.07)	0.87 (0.78-0.98)	0.90 (0.79-1.02)	0.99 (0.83-1.19)	0.96 (0.79-1.16)	0.95 (0.69-1.3)	1.63 (0.98-2.72)	0.92 (0.54-1.59)	0.94 (0.89-1.00)
	1997	0.95 (0.86-1.04)	0.90 (0.80-1.01)	0.87 (0.76-0.99)	0.87 (0.72-1.04)	0.94 (0.77-1.13)	0.82 (0.59-1.14)	1.66 (1-2.74)	0.82 (0.47-1.43)	0.92 (0.87-0.97)
	1998	0.87 (0.79-0.95)	0.78 (0.70-0.88)	0.83 (0.73-0.94)	0.86 (0.72-1.04)	0.78 (0.64-0.95)	0.85 (0.62-1.17)	1.29 (0.77-2.18)	1.02 (0.61-1.72)	0.84 (0.79-0.89)
	1999	0.86 (0.79-0.95)	0.82 (0.73-0.92)	0.79 (0.70-0.91)	0.76 (0.63-0.92)	0.82 (0.67-0.99)	0.75 (0.54-1.05)	0.73 (0.41-1.31)	0.99 (0.59-1.66)	0.82 (0.78-0.87)
	2000	0.82 (0.74-0.90)	0.73 (0.65-0.83)	0.74 (0.65-0.85)	0.90 (0.75-1.07)	0.78 (0.64-0.94)	0.76 (0.55-1.05)	0.99 (0.58-1.7)	0.74 (0.42-1.29)	0.79 (0.74-0.83)
	2001	0.82 (0.74-0.90)	0.70 (0.62-0.79)	0.81 (0.71-0.92)	0.84 (0.70-1.01)	0.70 (0.58-0.85)	0.93 (0.68-1.26)	0.89 (0.51-1.53)	0.84 (0.49-1.43)	0.79 (0.74-0.83)
	2002	0.86 (0.78-0.94)	0.73 (0.64-0.82)	0.73 (0.64-0.83)	0.83 (0.69-1.00)	0.75 (0.62-0.91)	0.92 (0.68-1.25)	1.10 (0.65-1.85)	0.88 (0.52-1.49)	0.80 (0.75-0.84)
	2003	0.75 (0.68-0.82)	0.71 (0.63-0.80)	0.77 (0.67-0.87)	0.80 (0.66-0.96)	0.72 (0.59-0.87)	0.84 (0.62-1.15)	0.89 (0.52-1.53)	0.89 (0.53-1.49)	0.75 (0.71-0.80)
	2004	0.75 (0.68-0.82)	0.68 (0.61-0.77)	0.72 (0.63-0.81)	0.73 (0.61-0.89)	0.73 (0.61-0.89)	0.64 (0.46-0.89)	0.75 (0.43-1.31)	0.84 (0.50-1.42)	0.72 (0.68-0.77)
	2005	0.71 (0.65-0.78)	0.69 (0.61-0.77)	0.71 (0.62-0.81)	0.73 (0.61-0.88)	0.68 (0.56-0.83)	0.80 (0.59-1.09)	1.02 (0.61-1.71)	1.23 (0.76-2.00)	0.72 (0.68-0.76)