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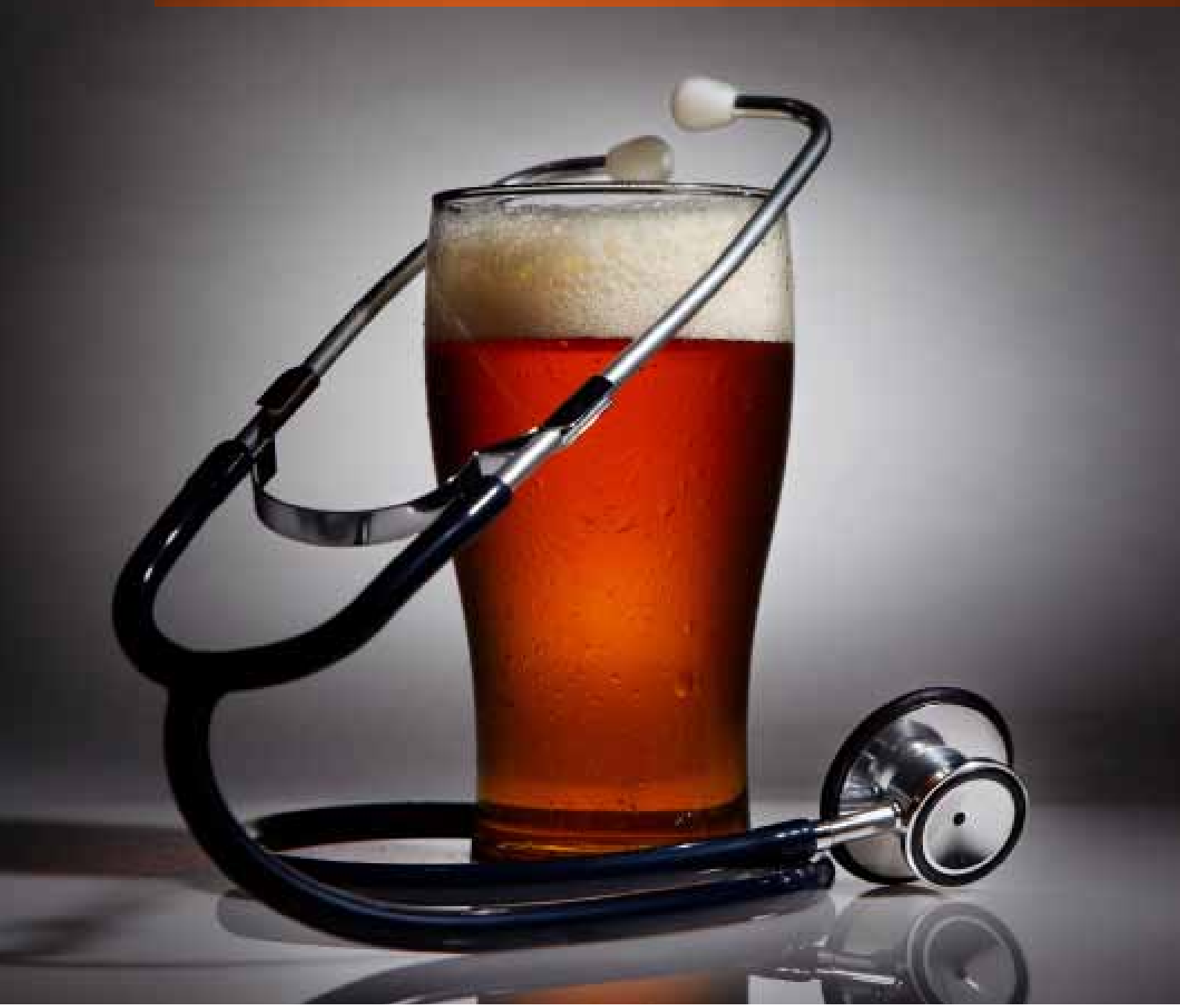
Alcohol's burden of disease in Australia



Caroline Gao, Rowan Ogeil and Belinda Lloyd • July 2014

THIS PROJECT WAS FUNDED BY THE FOUNDATION FOR ALCOHOL RESEARCH AND EDUCATION (FARE) AND VICTORIAN HEALTH PROMOTION FOUNDATION (VICHEALTH)

VicHealth

Turning Point
TREATMENT · RESEARCH · EDUCATION

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About Turning Point

Turning Point was established in 1994, amalgamated with public health provider, Eastern Health in October 2009 and is formally affiliated with Monash University.

Turning Point promotes the health and wellbeing of individuals and communities living with, and affected by alcohol and other drug-related harms. As an organisation, Turning Point aspires to be a world leading treatment and research centre in the drug and alcohol field by:

- creating thriving service delivery, research and development cultures that produce the best possible knowledge
- applying research to promote change and contribute to policy making
- building our community capacity through strategic relationships, partnerships and collaborations

About the Foundation for Alcohol Research and Education (FARE)

The Foundation for Alcohol Research and Education (FARE) is an independent, not-for-profit organisation working to stop the harm caused by alcohol. Alcohol harm in Australia is significant. More than 5,500 lives are lost every year and more than 150,000 people are hospitalised making alcohol one of our nation's greatest preventative health challenges.

For over a decade, FARE has been working with communities, governments, health professionals and police across the country to stop alcohol harms by supporting world-leading research, raising public awareness and advocating for changes to alcohol policy. In that time FARE has helped more than 750 communities and organisations, and backed over 1,400 projects around Australia.

For further information visit FARE's website: www.fare.org.au

About The Victorian Health Promotion Foundation (VicHealth)

A world-first health promotion foundation, VicHealth focuses on promoting good health and preventing chronic disease. We pinpoint and prevent the negative influences of ill health and champion the positive influences of good health. Our pioneering work includes creating and funding world-class interventions; conducting vital research to advance Victoria's population health; producing and supporting public campaigns to promote a healthier Victoria; and providing transformational expertise and insights to government. We work with all levels of government, across political parties and communities, and a range of sectors across health, sports, research, education, the arts and media.

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* The authors consider that the first two authors should be regarded as joint first authors.

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SUMMARY

Burden of Disease (BoD) estimates based on current health and alcohol consumption data are integral in conceptualising the impact of alcohol on the Australian community. Such estimates are needed to assess changing trends of harm in the community related to drinking, and enable comparison of the burden of alcohol across different diseases and injuries. The present report utilises the most up to date methodology for estimating alcohol-related harm and beneficial effects and includes data on consumption statistics for Australia in 2010. This includes application of the latest methods to determine alcohol consumption distribution in population and compensation for underreporting of alcohol consumption in national surveys, and for the first time reports jurisdictional differences in both alcohol consumption and alcohol-related harms across all Australian states and territories. The main findings presented in this report are outlined below.

Alcohol Consumption

- The estimated per capita adult alcohol consumption in Australia in 2010 was 10.42L, with Victoria, South Australia (SA) and New South Wales (NSW) having per capita consumption estimates of less than 10 litres, and Western Australia (WA) and the Northern Territory (NT) having the highest estimates of greater than 12 litres per person per year.
- The recorded level of alcohol consumption for Australian adults has been consistently around 10 litres per capita per year for the past decade. Different trends are evident for different alcoholic beverages, with beer and spirit consumption decreasing since 2007-2008 and wine and cider levels increasing since 2007-2008.

Burden of alcohol attributable diseases in Australia

- There were 5,554 deaths attributable to alcohol in 2010, including 3,467 male deaths and 2,087 female deaths.
- There were 157,132 hospitalisations attributable to alcohol in 2010, including 101,425 for males and 55,707 for females.
- In males, injuries were responsible for the highest proportion of alcohol-related deaths (36%), followed by cancers (25%) and digestive diseases (16%). For females the highest proportion of alcohol-attributable deaths was for cardiovascular diseases (34%) followed by cancers (31%) and injuries (12%).
- Injuries and neuropsychiatric diseases were categories responsible for a substantial proportion of alcohol-related hospitalisations, each being greater than 10% of all alcohol-attributable hospitalisations for 2010.
- The jurisdiction with the highest proportion of alcohol-related deaths for both males and females was the NT with the proportion approximately three times greater than the national average, while Victoria had the lowest proportion of deaths attributable to alcohol for both men and women.
- Beneficial effects due to alcohol consumption were estimated for cardiovascular disease and diabetes, with the majority of benefit in both males (90%) and females (72%) being in the cardiovascular disease category.
- Alcohol was estimated to be responsible for 136,982 Disability Adjusted Life Years (DALYs) in males and 51,556 DALYs in females during 2010. Injuries were responsible for the greatest number of DALYs in males (38%), while cancers were responsible for the greatest number of DALYs in females.
- Alcohol was estimated to cause 84,945 Years of Life Lost (YLL) in Australian men and 35,223 YLL in Australian women in 2010. Injuries were responsible for the greatest proportion of YLL in males (45%), while cancers were responsible for the greatest proportion of YLL in females (39%).
- Alcohol was estimated to cause 52,036 Years of Life lived with a Disability (YLD) in Australian men and 16,334 YLD in Australian women in 2010. Neuropsychiatric diseases in both males and females were responsible for the greatest proportion of YLD being greater than 60%.

This report provides a quantification of the burden of disease and injury in Australia for 2010.Such estimates may form the basis for a future cost of illness study to assess how current funding is allocated to tackling alcohol-related burden in the Australian health care system, and how to determine better estimates for future funding. Given the differences between jurisdictions with respect to alcohol consumption and estimated burden, future work should continue to extend this type of analysis to provide estimates that are relevant to sub-populations, and to support policy responses at jurisdictional and national levels.

ABBREVIATIONS

ABS:	Australian Bureau of Statistics
ACT:	Australian Capital Territory
AAF:	Alcohol Attributable Fraction
AIHW:	Australian Institute of Health and Welfare
AUS:	Australia
BoD:	Burden of Disease
BAC:	Blood Alcohol Concentration
CRA:	Comparative Risk Analysis
DALYs:	Disability Adjusted Life Years
ERP:	Estimated Residential Population
EU:	European Union
g:	grams
GBD:	Global Burden of Disease
HIV:	Human Immunodeficiency Virus
IARC:	International Agency for Research and Cancer
ICD-10:	International Statistical Classification of Diseases and Related Health Problems 10th Edition
IHD:	Ischaemic Heart Disease
MMDS:	Medical Mortality Data System
MVA:	Motor vehicle accidents
NCIS:	National Coroners Information System
NDSHS:	National Drug Strategy Household Survey
NHMRC:	National Health and Medical Research Council
NON-MVA:	non-motor vehicle accidents
NSW:	New South Wales
NT:	Northern Territory
PCA:	Per Capita Consumption of Alcohol
QLD:	Queensland
RR:	Relative Risk
SA :	South Australia
SES :	Socioeconomic Status
VIC :	Victoria
WA:	Western Australia
WHO:	World Health Organization
YLD:	Years of Life lived with Disability
YLL:	Years of Life Lost

CHAPTER 1

Introduction

Burden of disease studies crucially depend on estimates of Relative Risk (RR) of particular diseases and causes of death at different levels of drinking in the population. Estimates of RR are usually based on systematic reviews and meta-analyses of the global literature, which is predominantly composed of studies from high-income countries including Australia. A new round of such analyses has been carried out as part of the current Gates Foundation-funded Global Burden of Disease (GBD) estimates. The relevant alcohol meta-analyses have been completed and most are already published (an overview for 2010 analysis of chronic harms is in Rehm et al. [1]. and for injuries see Taylor et al. [2]).

A series of previous burden studies have been undertaken to estimate alcohol- and drug-caused morbidity and mortality in Australia, and to provide Alcohol-Attributable Fractions (AAFs) which represent an indirect measure of mortality and morbidity due to alcohol use as relevant to Australia (see Table 1).

Table 1. Previous studies estimating the number of lives lost and number of hospital separations due to alcohol in Australia

Authors [Reference]	Year(s) of alcohol consumption data used & data source where noted	Estimated Number of Lives Lost	Estimated Number of Hospital Separations
Holman *et al.* [3]	1986 1983 – National Heart Foundation Risk factor Prevalence Survey (nb. ages 25-64)	5,360	76,467
English *et al.* [4]	1992	3,660	71,593
Donath *et al.* [5]§	1996-1999	2,990	31,092
Ridolfo & Stevenson [6]	1998 1995- National Health Survey, 1997 Survey of Mental Health & Wellbeing; 1998 NDSHS	3,271	71,422

§ Data for Victoria only

The most recent Australian specific data regarding alcohol disease burden comes from analysis undertaken by Begg et al [7], where fourteen risk factors including alcohol were examined, and together accounted for 32.2% of the total BoD and injury in Australia. Tobacco was responsible for the greatest disease burden in Australia (7.8% of total), and alcohol was responsible for the greatest BoD in males under 45 years old (8.1% of total for this age group).

Begg et al [7] characterised burden in their analysis using the summary Disability Adjusted Life Years (DALYs) measure. DALYs are used by the World Health Organization for health monitoring purposes, by the World Bank and in scientific studies including the Global Burden of Disease study [8] and the most recent alcohol-attributable burden of disease in Europe [9]. Begg et al [7] reported that alcohol affected males in Australia (76% of alcohol DALYs) to a much greater degree than females (24% of alcohol DALYs). Alcohol abuse (918 deaths, 0.7% of the total and 34,116 DALYs, 1.3% of the total), suicide (553 deaths, 0.4% of the total and 12,245 DALYs, 0.5% of the total) and road traffic accidents (396 deaths, 0.3% of the total and 11,121 DALYs, 0.4% of the total) contributed two-thirds of the harm attributed to alcohol.

Arriving at AAFs for Australia requires data on distribution of amounts and patterns of drinking in the population. The most recent detailed national survey data on alcohol consumption is from the 2010 National Drug Strategy Household Survey (NDSHS), which is available as a base for the development of updated estimates. The following analyses in this report use mortality data and morbidity data (from the National Hospitals Minimum Dataset) for 2010.

There is a need for a new BoD study in Australia because:

1. The most recent study of alcohol in the Burden of Disease (BoD) by Begg et al [7] is a decade old, estimating alcohol consumption based on 2003 data. Furthermore, the estimate calculated in this study where alcohol contributed a net 2.3% of DALYs is substantially lower than the estimates for New Zealand of 7.4% [10], Europe 10.2% [9] and Canada of 9.3% [11].
2. Previous analyses of alcohol use have estimated consumption using national estimates provided by the Australian Bureau of Statistics (ABS). The present report estimates consumption using the latest methodology [9] incorporating consumption figures from jurisdictions where available and applying these to estimates of alcohol-related burden where appropriate (see Chapter 2).

CHAPTER 2

Methodology

When assessing burden, AAFs are applied to determine the proportion of harms attributable to alcohol. AAFs can be estimated using population alcohol consumption patterns and RRs, which are commonly measured in meta-analyses assessing causal health outcomes for alcohol exposure [16]. Some conditions identified within International Statistical Classification of Diseases and Related Health Problems 10th Edition (ICD-10) are wholly attributable to alcohol such as alcohol cardiomyopathy, and in these cases the AAF equals 1 (see Table 2). In many other disease and injury categories, alcohol has been identified as a component (or partially attributable cause) in the causal relationship and in these cases the AAF is a fraction less than 1. Some sub-disease categories wholly attributable to alcohol were not isolated from their main disease category (e.g. alcohol liver cirrhosis is assigned the same AAF with other liver cirrhosis). This is because RRs were estimated for the main disease category in meta-analyses.

For some diseases only the average volume of alcohol consumption is important in determining the risk for a drinker. For example cancers are directly related to average volume alcohol consumption. Therefore, the greater volume of alcohol consumed, the greater the risk of cancer. Other disease states are more complex than cancer because the RR is not always direct and depends on other factors (such as drinking patterns). For example light and moderate levels of alcohol consumption lead to a decrease in the risk of ischaemic heart disease, but only for some groups such as older adults [12-14], and only if this volume of light-moderate consumption is not coupled with occasional known heavy drinking periods, colloquially known in Australia as "binges" [15]. In calculating AAFs of some diseases and injuries, drinking patterns were also taken into account.

The approach we used to calculate AAFs for partially alcohol-attributable diseases and injuries included the following steps:

1. Modelling consumption distributions (using the NDSHS).
2. Obtaining Relative Risk (RR) functions for different diseases and injuries and calculating AAFs for mortality and morbidity.
3. Calculating alcohol-attributable mortality and morbidity.

AAFs were calculated separately by sex and three age groups (15-34, 35-64 and 65+), given the differences in alcohol consumption within a population based on these factors. The proportion of ex-drinkers is also considered within the calculation of BoD, given that some people have given up drinking alcohol for health-related reasons, but are still at increased risk for some alcohol-related diseases [16]. The following sections of this report present data relevant to alcohol-related mortality and morbidity for Australians aged 15+. The present analysis excluded those younger than 15 because alcohol-related fatalities in this age group are rare [17].

Data

Five data sources were used in this report. Cause of death data, National Hospital Morbidity data, NDSHS, estimated residential population (ERP) from ABS, apparent per capita consumption of alcohol (PCA) from ABS and PCA in Western Australia (WA), Northern Territory (NT) and Queensland from the National Alcohol Sales Project [18].

Deaths

In Australia, the state and territory Registrars of Births Deaths and Marriages record all deaths in Australia certified by a medical practitioner or a

coroner. These data are then provided to ABS to translate to ICD-10 code and compile in the National Causes of Death Database. The ABS uses the Medical Mortality Data System (MMDS) to automate code underlying and associated causes of death from death certificates with supplements from the National Coroners Information System (NCIS).

Alcohol-related causes of death data in year 2010 was requested from ABS, aggregated by age group, gender, state and ICD-10 conditions as listed in Table 2. Numbers between one and four were randomised in the data extraction. Underlying causes and associated causes were both provided in this dataset. In this report only underlying causes were used in the analysis. Total number of deaths by gender and state for Australians aged 15+ in 2010 is downloaded from ABS directly[1].

Errors and ill-defined causes existed in the death data introduced by incomplete records, misreported cause of death, and processing errors of ICD-10 code translation. "Garbage code redistribution" is commonly adopted in global and Australian BoD studies to reduce these errors [7, 19]. "Garbage codes" refer to ICD codes for ill-defined or residual categories of major disease groups (e.g. cardiovascular diseases) that do not provide meaningful information on underlying disease or injury causes of death[2]. However this method was not adopted in this study, as most of those ill-defined ICD-10 categories are either not of sufficient influence to the diseases used in the analysis, or occur in categories which contain only a low number of cases. Deaths caused by birth conditions were not provided by ABS due to confidentiality reasons, hence they were not included in the analysis.

[1] 3302.0-Deaths, Australia, 2010, available at: http://www.abs.gov.au/AUSSTATS/abs@.nsf/DetailsPage/3302.02010?OpenDocument
[2] Definition from the GBD Glossary. Available at: http://www.ncbi.nlm.nih.gov/books/NBK11818/

Table 2. Disease categories and the source of Relative Risk (RR) relationship with alcohol consumption

Condition	ICD-10 code	Source of RR	2010 Global BoD ICD-10 code
Cancers			
Breast cancer	C50	[20]	C50, D0.5-D05.9, D48.6
Colon cancer	C18	[20]	C18-C21, D01.0-D01.3, D37.3-D37.5 (Colon and Rectum cancer combined and rectum cancer risk is applied in this group)
Larynx cancer	C32	[20]	C32, D02.0, D38.0
Liver cancer	C22	[20]	C22, D01.5, D37.6
Oesophagus cancer	C15	[20]	C15-C159, D00.1
Oral cavity and pharynx cancer	C00-C14	[20]	C00-C13
Rectum cancer	C19-21	[20]	-
Cardiovascular diseases			
Alcohol cardiomyopathy‡	I42.6		Not included
Cardiac arrhythmias	I47-I49	[21]	I48 (atrial fibrillation and flutter)
Haemorrhagic stroke†	I60-I62, I69.0, I69.1, I69.2	[22]	I60-I62, I69.0-I69.2, I67.4
Hypertensive disease	I10-I15	[23]	I11(hypertensive heart disease)
Ischaemic heart disease	I20-I25	[24]	I20-I25
Ischaemic stroke	I63-I67, I69.3	[22]	I63, I65-I67(except I67.4), I69.3
Conditions arising before birth			
Fetal alcohol syndrome‡	Q86.0		Not included
Fetus and newborn affected by maternal use of alcohol‡	P04.3		Not included
Maternal care for damage to foetus from alcohol‡	O35.4		Not included
Low birth weight	P05-P07	[25]	Not included
Digestive diseases			
Alcoholic gastritis	K29.2		Not included
Liver Cirrhosis	K70, K73-K74	[26]	I85, K70, K71.7, K72.1-K72.9, K73-K74, K75.2-K75.9, K76.6-K76.7, K76.9
Pancreatitis	K85, K86.0, K86.1	[27]	K85-K86.9
Diabetes			
Diabetes mellitus (Type 2)	E11-E14	[28]	E10-E13 (except E10.2, E11.2, E12.2, E13.2) (Type 1 and Type 2 diabetes combined)

Condition	ICD-10 code	Source of RR	2010 Global BoD ICD-10 code
Infectious and parasitic diseases			
HIV	B20-B24	[29, 30]	B20-B24, C46-C46.9, D84.9
Lower respiratory infections	J10-J22	[31]	J09-J11, J13, J14, J12.1, J12 (except J12.1), J15-J22, J85, P23
Tuberculosis	A15-A19, B90	[32]	A15-A19, B90, P37.0
Injuries			
MVA	§	[2]	V01-V04, V06, V09, V10-V19, V20-V29, Y85.0, V30-V79, V87.2-V87.3, V80, V82 (road injuries)
Drowning	W65-W74	[2]	V05, V81, V83-V86, V88.2, V88.3, V91, V93-V98, W00-W19, V90, V92, W65-W74, X00-X19, X46-X47, X48, X40, X43-X44 W32-W34, W24-W31, W45,W46, Y40-Y84, Y88, X20-X29, W53-W64, W21, W39, W44, W49-W52, W75-W99, X50-X58, X70, X76-X77, X72-X74, X68, X71, X75, X78-X83, X60-X67, X69, X93-X95, X99, X85-X92, X96-X98, Y00-Y08, X30-X39, Y36, Y89.1, Y35, Y89.0
Falling	W00-W19	[2]	
Fires	X00-X09	[2]	
Poisonings	X40-X44, X46-X49, Y10-Y14, Y16-Y19	[2]	
Poisoning and exposure to alcohol‡	T51.0, T51.1, T51.8, T51.9, X45, X65, Y15	[2]	
Self-inflected injury	X60-X64, X66-X84, Y87.0	[2]	
Violence	X85-Y09, Y87.1	[2]	
Other unintentional injuries	Rest of V-series and W20-W64, W75-W99, X10-X39, X50-X59, Y40-Y86, Y88, and Y89	[2]	
Other intentional injury	Y35	[2]	
Other injures with unknown intent	Y20-Y34	[2]	
Neuropsychiatric diseases			
Epilepsy	G40-G41	[33]	G40-G41
Mental and behavioural disorders due to use of alcohol‡	F10		F10, X45, Q86.0
Other alcohol-induced neuropsychiatric conditions‡	G62.1, G31.2, E24.4, G72.1		Not included
Others			
Excess alcohol blood levels‡	R78.0		Not included
Evidence of alcohol involvement determined by blood alcohol level‡	Y90		Not included
Problems related to lifestyle alcohol use‡	Z72.1		Not included

§ V02.1–V02.9, V03.1–V03.9, V04.1–V04.9, V09.2, V09.3, V12.3–V12.9, V13.3–V13.9, V14.3–V14.9, V19.4–V19.6, V20.3–V20.9, V21.3–V21.9, V22.3–V22.9, V23.3–V23.9, V24.3–V24.9, V25.3–V25.9, V26.3–V26.9, V27.3– V27.9, V28.3–V28.9, V29.4–V29.9, V30.4–V30.9, V31.4–V31.9, V32.4–V32.9, V33.4–V33.9, V34.4–V34.9, V35.4–V35.9, V36.4–V36.9, V37.4–V37.9, V38.4–V38.9, V39.4–V39.9, V40.4–V40.9, V41.4–V41.9, V42.4–V42.9, V43.4–V43.9, V44.4–V44.9, V45.4–V45.9, V46.4– V46.9, V47.4–V47.9, V48.4–V48.9, V49.4–V49.9, V50.4–V50.9, V51.4–V51.9, V52.4–V52.9, V53.4–V53.9, V54.4–V54.9, V55.4–V55.9, V56.4–V56.9, V57.4–V57.9, V58.4–V58.9, V59.4–V59.9, V60.4–V60.9, V61.4–V61.9, V62.4–V62.9, V63.4–V63.9, V64.4–V64.9, V65.4– V65.9, V66.4–V66.9, V67.4–V67.9, V68.4–V68.9, V69.4–V69.9, V70.4–V70.9, V71.4–V71.9, V72.4–V72.9, V73.4–V73.9, V74.4–V74.9, V75.4–V75.9, V76.4–V76.9, V77.4–V77.9, V78.4–V78.9, V79.4–V79.9, V80.3–V80.5, V81.1, V82.1, V83.0–V83.3, V84.0–V84.3, V85.0– V85.3, V86.0–V86.3, V87.0–V87.8, V89.2

‡ Diseases wholly attributable to alcohol (AFF=1)

† Include haemorrhagic and other non-ischaemic stroke

Hospital admissions

An alcohol-related patient level dataset was provided by the Australian Institute of Health and Welfare (AIHW) from the National Hospital Morbidity Database (NHMD). The NHMD is a unit level record dataset including patient admission records in all public and private hospitals (acute or psychiatric), and private free standing day hospital facilities. Public sector hospitals not within the jurisdiction of a state or territory health authority were not included. The dataset used in the current project includes all hospital statistical separations in Australia admitted in 2010. Principal diagnoses, other primary diagnoses, external causes, in addition to age, sex and residential state of the patient were provided for each statistical separation.

Where circumstance of the fatality (e.g. car crash) overwrite the nature of the injury (e.g. brain injury) in the underlying cause of death from hospital morbidity data, principal diagnoses were coded as the nature of injury, and the circumstances of the injury were coded in external causes. For example a patient may fall from a bed (W06) and injure their fingers (S60.0). The principal diagnosis should be coded as injury of fingers (S60.0), and the external cause should be coded as a fall (W06). Hence secondary data cleaning was carried out to manually recode external causes (listed in Table 2) to the principal diagnosis. All injuries were categorised to be motor vehicle accidents (MVA) or non-motor vehicle accidents (NON-MVA) to be consistent with the international alcohol BoD methodology [9, 34].

National Drug Strategy Household Surveys (NDSHS)

NDSHS are national stratified random household surveys that have been conducted every three years since 1985, and routinely collect alcohol and drug use information of Australian residents aged 14 years and over (age 12 from 2010). The surveys have previously used face-to-face interview, 'drop and collect' of self-completed booklets and computer assisted telephone interviewing methodologies, though only the 'drop and collect' method was used in 2010. The analysis for the present study used data from the 2010 NDSHS with the absolute person weight.

Prevalence of lifetime abstainers (those who had never have a full serve of alcohol), former drinkers and drinkers were calculated using questions E1 ("Have you ever tried alcohol?"), E2 ("Have you ever had a full serve of alcohol?") and E5 ("Have you had an alcoholic drink of any kind in the last 12 months"). Alcohol consumption quantities of respondents were estimated using the graduated-quantity-frequency questions (E17)[3]. Missing data in the E17 questions were back-filled with the frequency question[4] and the quantity question[5]. When more than 365 drinking days were given by the sum of the graduated-quantity-frequency questions, higher drinking quantities were used in overlapped periods. For example, if a respondent reported drinking 3-4 standard drinks every day and 7-10 standard drinks monthly, the total drinking quantity in the responding year was calculated as:

8.5 standard drinks × 12 days + 3.5 standard drinks × (365 days − 12 days).

Years of Life Lost (YLL) and Years of Life Lost Due to Disability (YLD)

Unit record cause of death data in 2010 has not been released by the ABS due to a currently operating review process of relevant legislation. Hence the YLL summary measure cannot be estimated directly from the deaths data. In the meantime disease prevalence data are also not available. Hence YLL and YLD for Australia for the present study were obtained from the 2010 Global BoD study[6]. There is a mismatch of ICD-10 codes used for some disease categories between the alcohol BoD study and the Global BoD study (see Table 2).

[3] Question E17-"Please recode how often in the last 12 months you have had each of the following number of standard drinks in a day?" with "20 or more standard drinks a day, 11-19 standard drinks a day... Less than 1 standard drinks a day, None" against "Every day, 5-6 days a week...About 1 day a month, Less often, Never"

[4] Question E7 -"In the last 12 months, how often did you have an alcoholic drink of any kind?"

[5] Question E15-"On a day that you have an alcoholic drink, how many standard drinks do you usually have?"

[6] Available at: http://www.healthmetricsandevaluation.org/search-gbd-data

Missing data

Deaths and hospitalisations occurring due to pre-birth conditions were not provided by the ABS and AIHW due to confidentiality reasons. Hence, these conditions are not included in the present study. Principal diagnoses were missing in approximately 0.4% of all hospitalisation records (suppressed to protect confidentiality). Most of these records were treated as missing data, except records including injuries in external causes which were re-coded to injuries.

Population estimates

Estimated Resident Population (ERP) by age, gender and state were obtained from ABS[7].

Alcohol consumption

ABS estimated apparent PCA based on state and territory alcohol sales data until 1996 when most states and territories stopped collecting alcohol sales data. PCA was then estimated using national wholesale data, which reflects alcoholic beverages available for consumption rather than those consumed. In WA, the NT and Queensland, the National Alcohol Sales Data Projects continued to report PCA is based on alcohol sales data [18], which are more accurate estimations.

[7] 3101.0-Australian Demographic Statistics, available at: http://www.abs.gov.au/AUSSTATS/abs@.nsf/DetailsPage/3101.0Jun%202013?OpenDocument

Modelling Consumption Distributions

Alcohol consumption x in a population has been found to be best modelled using a gamma distribution [35], as follows:

$$f(x;k,\theta) = \frac{x^{k-1}}{\int_0^{\infty} x^{k-1}e^{-x}dx}\theta^{-k}e^{-\frac{x}{\theta}}. \quad (1)$$

Where k is the shape parameter and θ is the scale parameter. k and θ can be calculated using the mean consumption, μ, and the standard deviation of consumption, σ:

$$\theta = \frac{\sigma^2}{\mu}, \quad (2)$$

$$k = \frac{\mu^2}{\sigma^2}. \quad (3)$$

A linear relationship has also been found between the mean and the standard deviation of consumption [35]. Therefore, knowing the average PCA, the distribution of alcohol consumption in a drinking population can be estimated. In this study, we divided the total population into 6 age and gender groups: male 15-34, male 35-64, male 65+, female 15-34, female 35-64, and female 65+. We assumed that in each age and gender group the consumption pattern followed a gamma distribution with a linear relationship between the mean and the standard deviation of consumption, as follows:

$$\sigma_{men} = 1.171\,\mu_{men}, \quad (4)$$

$$\sigma_{women} = 2.258\,\mu_{women}. \quad (5)$$

The differences in alcohol consumption among age and gender groups were measured using self-report data collected as part of the 2010 NDSHS. However, national surveys have been found to underestimate true alcohol consumption in a population by as much as 30-70% when compared with sales or taxation data [9]. Therefore, survey data alone should not be used to estimate levels of consumption without adjustment [36]. Underreporting occurs if those surveyed provide lower estimates of their true actual consumption, and because high alcohol consumers in the community such as the homeless or those institutionalised are excluded or are reluctant to participate.

In this study, we uplifted estimated PCAs from NDSHS using the national apparent PCA (average of two financial years: 2009-2010 and 2010-2011)[8]. In Western Australia, Northern Territory and Queensland the uplifted PCAs were corrected using available data in financial year 2009/2010 [18]. To be consistent with the algorithms used in the Global Burden of Disease (GBD) 80% of per capita consumption of alcohol was used as the standard to account for alcohol that was bought but not consumed [17]. The distribution of alcohol consumption in each state, age and gender group was then generated with corrected average alcohol consumption in the population group.

[8] 43070DO001-Apparent Consumption of Alcohol, Australia, 2011-12 released 18/09/2013, available at: http://www.abs.gov.au/AUSSTATS/abs@.nsf/DetailsPage/4307.0.55.0012011-12?OpenDocument

Deriving Alcohol-Attributable Fractions

AAFs for chronic diseases (except ischemic heart disease) and respiratory infectious diseases

AAFs were calculated as the fraction of risk attributable to alcohol among all risks using prevalence of lifetime abstainer ($P_{abstainer}$), former drinker (P_{former}), RR of former drinker (RR_{former}), consumption distribution of current drinker and RRs for causing diseases at different consumption level, see below:

$$AAF = \frac{P_{abstainer}+P_{former}RR_{former}+\int_0^{150} P_{drinker}(x)\,RR_{drinker}(x)\,dx-1}{P_{abstainer}+P_{former}RR_{former}+\int_0^{150} P_{drinker}(x)\,RR_{drinker}(x)\,dx}, \quad (6)$$

Where $P_{drinker}(x)$ is the prevalence of current drinkers consuming x grams of alcohol daily (following the gamma distribution described above), $RR_{drinker}(x)$ is the RR for drinkers drinking x grams of alcohol daily compared with abstainers, and RR_{former} is the RR for former drinkers compared with abstainers (sources of RRs are listed in Table 2). We assumed that the maximum daily consumption was 150 g/day, and the RR of a former drinker is independent from drinking behaviour of the former drinker.

AAF for ischemic heart disease

The protective effect for ischemic heart disease is known to be influenced by both average consumption of alcohol and the presence of "binge drinking" behaviours [37]. In this study, the proportion of binge drinkers (defined as at least one binge drinking occasion of 5+ standard drinks per month) was obtained from the NDSHS, and the protective effect for this population is omitted. The AAFs for non-binge drinking populations was calculated similar to other chronic conditions with the maximum daily consumption set as 50 g/day.

AAFs for injuries

Both average alcohol consumption and drinking patterns were considered for calculating AAFs for injuries. The calculation was as follows:

$$AAF = \frac{P_{abstainer}+P_{former}+P_{non-binge}RR_{non-binge}+P_{binge}RR_{binge}-1}{P_{abstainer}+P_{former}+P_{non-binge}RR_{non-binge}P_{non-binge-risk}+P_{binge}RR_{binge}P_{binge-risk}}, \quad (7)$$

The prevalence of non-binge drinking occasions among drinkers, $P_{non\text{-}binge}$, was calculated as :

$$P_{non-binge} = P_{drinker}(1 - P_{binger}P_{binge/day}), \quad (8)$$

Where P_{binger} is the prevalence of binge drinkers and $P_{binge/day}$ is the probability of a binge drinker binge drinking in a day. Similarly, P_{binge} the prevalence of binge drinking occasions among drinkers and can be calculated as follows:

$$P_{binge} = P_{drinker}P_{binger}P_{binge/day}. \quad (9)$$

Relative risks for non-binge drinking, $RR_{non\text{-}binge}$, and binge drinking, RR_{binger}, were calculated as follows:

$$RR_{non-binger} = (RR_{average} - 1)\,P_{non-bingedays} + 1, \text{ and} \quad (10)$$

$$RR_{binger} = (RR_{average} - 1)\,P_{bingedays} + 1. \quad (11)$$

$RR_{average}$ is RR for non-binge average drinking and was calculated using the average alcohol consumption for drinkers in non-binge drinking occasions. $P_{non\text{-}bingedays}$ and $P_{bingedays}$ are the proportions of a given day during which a person's non-binge drinking or binge drinking is at risks. $P_{non\text{-}bingedays}$ and $P_{bingedays}$ were calculated based on the alcohol metabolism rates [34] using average alcohol consumption for non-binge drinking occasions and binge drinking occasions.

AAF for HIV

Alcohol consumption was modelled by calculating the fraction of alcohol, as a risk factor, contributing to the non-adherence to antiretroviral therapy [38].

$$\text{AAF} = \frac{P_{abstainer}+P_{drinker}RR_{drinker}-1}{P_{abstainer}+P_{drinker}RR_{drinker}} \cdot \frac{P_{adher}+P_{na}RR_{na}-1}{P_{adher}+P_{na}RR_{na}} \cdot P_{treat\_death} \cdot \quad (12)$$

Here $RR_{drinker}$ is the RR of non-adherence due to alcohol consumption for drinkers. RR_{na} is the RR of mortality for those who are not adhering compared with those who are, P_{adher} is the proportion of patients adhering to treatment, and P_{na} is the proportion of patients adhering less than 95% of the time. P_{treat_death} is the proportion of deaths of patients undergoing treatment.

Time course analysis

This report utilised methodology in common with recent Comparative Risk Analysis (CRA) studies in Europe and North America (see [9, 11]), whereby alcohol-attributable burden was calculated as if the consequences of that consumption are immediate. For many diseases, including chronic conditions such as liver cirrhosis [39], this assumption holds true. However, for cancers the effect of alcohol consumption can only be seen after an extended period of time, and for other conditions research on time-lag effects are scant [40]. However, it is important to consider alcohol's contribution to cancer related mortality given that 5% of all cancers in Australia are attributable to long-term alcohol use [41], and also for completeness in estimating alcohol-related burden. As with similar studies conducted in Europe, it is important to note that in interpreting alcohol's effect on mortality and morbidity of diseases, the calculations used in this report assumed uniform exposure to alcohol for at least the previous two decades.

Measuring Alcohol-Attributable BoD

Five indicators were used to measure alcohol-attributable BoD in this report including deaths, hospitalisations, YLL due to premature mortality, YLD and DALYs. It is important to note that totals included in results for all indicators may not reflect a sum of all of the individual numbers, this is because rounding errors can be introduced by calculating the proportion of burden due to alcohol consumption.

Number of deaths attributable to alcohol

The number of deaths attributable to alcohol for different diseases and injuries was calculated by age, gender and state using the estimated AAF for the disease times numbers of deaths identified as primarily caused by the disease (underlying cause). Number of deaths attributable to alcohol was not reported in categories where total number of deaths was less than five.

Number of hospitalisations attributable to alcohol

Unit-level hospital separation records were used to calculate alcohol-attributable hospitalisations by gender, age and state using estimated AAFs for different disease and injury types. When the total number of hospitalisations caused by a disease was less than five, alcohol-attributable hospitalisations were not reported.

Rates per 100,000 population

Both crude and age standardised rates per 100,000 population were calculated separately for men and women in different states using STATA 12. Crude rates include population age differences, which reflect the prevalence of a disease, whereas standardised rates remove the effect of age, enabling comparison of alcohol-attributable burden across different jurisdictions. Standardised rates were calculated using direct standardisation methods in STATA 12. The 2010 Australia ERP was set as the standard population. Rates were not provided when there were fewer than five cases in a disease category.

Proportion attributable to alcohol

The proportion of incidents (deaths or hospitalisations) attributable to alcohol in Australia (by gender and state) was calculated using the total number of incidents (by gender and state), not the total number of incidents caused by conditions listed in Table 2. However, the proportion of incidents attributable to a disease category (e.g. cancers), was calculated using total number of incidents caused by diseases in the disease category listed in Table 2. For example, the proportion of neuropsychiatric diseases attributable to alcohol includes all 1) mental and behavioural disorders due to use of alcohol, 2) epilepsy and 3) other alcohol-induced neuropsychiatric conditions attributable to alcohol. It does not mean that it is an alcohol-attributable proportion for all types of neuropsychiatric diseases. Other neuropsychiatric disease such as Parkinson's disease and polyneuropathies were not included.

YLL

YLL measures the potential years that the person could have lived without premature death. This estimation combines the number of deaths and death ages to indicate potential social and economic consequences of mortality [42].

$$\mathrm{YLL} = \sum_{i=0}^{\infty} N_{deaths}(i)\, L(i). \tag{13}$$

Here N_{deaths} is the number of deaths at age i, and $L(i)$ is the global life expectancy at age i (see [19]).

YLD

YLD is the measurement of equivalent 'healthy' years lost due to disability caused cases of disease or injury in the baseline year, which is calculated as follows:

$$\mathrm{YLD} = N_{prevalence} W_{disease}, \tag{14}$$

Where $N_{prevalence}$ is the number of prevalent cases of a disease and $W_{disease}$ is the disability weight for the disease.

DALYs

DALYs add together YLL and YLD directly, and as such provide a summary measure that incorporates all years of life lost whether to premature mortality, or to living with a disability.

$$\mathrm{DALYs} = \mathrm{YLL} + \mathrm{YLD} \tag{15}$$

CHAPTER 3

Key Indicators of Alcohol Consumption

Background

Harmful alcohol use is risky for both the individual drinker and for others (e.g. people may be involved in a motor vehicle accident or be the victim of violent behaviour that is fuelled by alcohol). Indeed, a study by Laslett et al. [43] reported that 28.5% of a national telephone sample of Australian adults had been harmed by someone known to them in the previous 12 months and alcohol was involved, while 69.8% were adversely affected by a stranger's drinking to any degree in the past year [43].

WHO estimated that per capita consumption of alcohol for persons aged 15+ was 10.0L per year in 2005 [44]. The estimates provided for Australia in this analysis were comparable, with an estimated 10.42L of alcohol consumed per person per year, with males consuming significantly more (14.40L) than females (6.50L), and an overall stable per-capita consumption in Australia between the years 2001 and 2005 [45].

In addition to considering the amount of alcohol consumed, patterns of drinking which reflect the frequency and circumstances of alcohol consumption and the proportion of people who drink to intoxication should be considered [45]. On the summary pattern of drinking score, measured on a scale from 1 (least risky) to 5 (most risky), Australia is given a score of 2, similar to comparable countries including New Zealand and Canada [45]. Heavy episodic drinking is important when considering alcohol-related harms given that it leads to increased levels of serious injury and health problems. WHO estimated that 11.5% of drinkers engage in heavy episodic drinking, defined as 60 grams or more of pure alcohol at least once weekly, and that 9.9% of Australian male drinkers and 2.6% of Australian female drinkers engage in this pattern of drinking [45].

Results

Measures of alcohol consumption

In deriving indicators which reflect consumption habits of Australian drinkers, drinking status was classified in this report as:

1) **Current drinkers:** people who have consumed at least one full serve of alcohol in the previous 12 months (defined as a drink which contains 10g of pure ethanol, such as a 30mL serve of spirits (40% alc. vol), a 100mL serve of white wine (11.5% alc. vol), or 375mL of mid-strength beer (3.5% alc. vol)[9].

2) **Former drinkers:** people who have consumed alcohol in the past, but not in the previous 12 months.

3) **Lifetime abstainers:** people who have never consumed a full serve of alcohol.

Volume of alcohol consumption

The following tables describe key alcohol consumption data for Australians aged 15+. These data were extracted from the 2010 NDSHS dataset [46], and display the proportion of drinkers in the previous year who drank various quantities of alcohol, as well as those who abstained from alcohol or did not drink alcohol in the previous 12 months[10].

[9] Comparative Tables of 'standard drinks' available at: http://www.nhmrc.gov.au/_files_nhmrc/file/your_health/healthy/alcohol/std-drinks-large.jpg

[10] This differs from the NDSHS report (question E28) which includes in the calculation of drinking status the question: "At the present time do you consider yourself? A non-drinker; an ex-drinker;..... a binge drinker".

Table 3. Prevalence of alcohol consumption for men (15+)

State	Abstainers	Former drinkers	0-40g	40-60g	60-100g	>100g	>4 standard drinks per day	>4 standard drinks once‡
NSW	10.96%	6.76%	69.82%	7.34%	3.52%	1.60%	12.46%	47.33%
VIC	10.78%	7.79%	70.56%	5.93%	3.42%	1.52%	10.87%	48.50%
QLD	6.30%	7.12%	70.78%	8.92%	4.18%	2.70%	15.81%	56.76%
SA	8.63%	8.36%	70.31%	8.29%	2.43%	1.98%	12.70%	48.14%
WA	7.07%	6.83%	70.99%	7.54%	5.59%	1.98%	15.11%	54.43%
TAS	3.99%	5.60%	76.95%	7.50%	4.73%	1.22%	13.45%	51.12%
NT	6.82%	6.60%	64.78%	11.12%	6.40%	4.27%	21.79%	59.46%
ACT	6.71%	4.83%	78.25%	5.44%	3.79%	0.99%	10.21%	54.66%
Total (AUS)	9.14%	7.15%	70.61%	7.40%	3.82%	1.88%	13.10%	50.63%
EU*	5.0%	6.1%	62.1%	10.8%	10.9%	5.2%	N/A	N/A

* For Comparison with Rehm et al. (2012) Alcohol consumption, alcohol dependence and attributable burden of disease in Europe. CAMH: Canada.

‡ Drank >4 standard drinks at least once in year 2010

Table 4. Prevalence of alcohol consumption for women (15+)

State	Abstainers	Former drinkers	0-20g	20-40g	40-60g	>60g	>4 standard drinks per day	>4 standard drinks once‡
NSW	16.18%	9.53%	64.87%	6.75%	1.74%	0.93%	2.66%	28.64%
VIC	15.12%	9.00%	65.89%	6.30%	2.08%	1.62%	3.69%	28.77%
QLD	10.18%	10.04%	67.88%	8.14%	2.44%	1.33%	3.76%	35.05%
SA	12.40%	9.95%	68.55%	5.85%	2.47%	0.78%	3.26%	30.25%
WA	11.01%	8.31%	69.33%	7.28%	1.81%	2.26%	4.07%	33.97%
TAS	7.88%	10.38%	73.47%	6.01%	2.01%	0.24%	2.25%	29.56%
NT	8.27%	6.70%	69.04%	8.93%	4.36%	2.69%	7.05%	41.36%
ACT	8.33%	6.93%	75.86%	7.22%	0.86%	0.80%	1.66%	34.89%
Total (AUS)	13.53%	9.36%	66.86%	6.91%	2.04%	1.30%	3.34%	30.83%
EU*	9.50%	8.50%	59.10%	13.60%	5.20%	4.10%	N/A	N/A

* For Comparison[9]

‡ Drank >4 standard drinks in one occasion at least once in year 2010

Table 3 and Table 4 show that for both males and females the highest proportions of abstainers were in NSW and Victoria, and the lowest levels of abstainers were in Tasmania. The proportion of males who consumed more than 4 standard drinks per day on average varied from 10.21% to 21.79%, with a national figure of 13.10%. The proportion of females in this group was lower than for males, and varied from 1.66% in the ACT to 7.05% in the NT. The proportion of the population who consumed over 4 standard drinks in one occasion at least once was about 51% in men and 31% in women, which were much higher than the proportions drinking 4 standard drinks per day on average.

Table 3 and Table 4 also show figures from the most recent study conducted in the European Union (EU) by Rehm et al. [9] for comparison. The proportion of males and females who are lifetime abstainers is higher in Australia than in the EU, while the levels of former drinkers are comparable. Greater proportions of males in the EU drink 40-100g of alcohol compared with Australian males. There was a greater proportion of females in Australia who reported drinking 0-20g per year compared to the EU, while levels of 20-40, 40-60g and >60g were lower in Australian females.

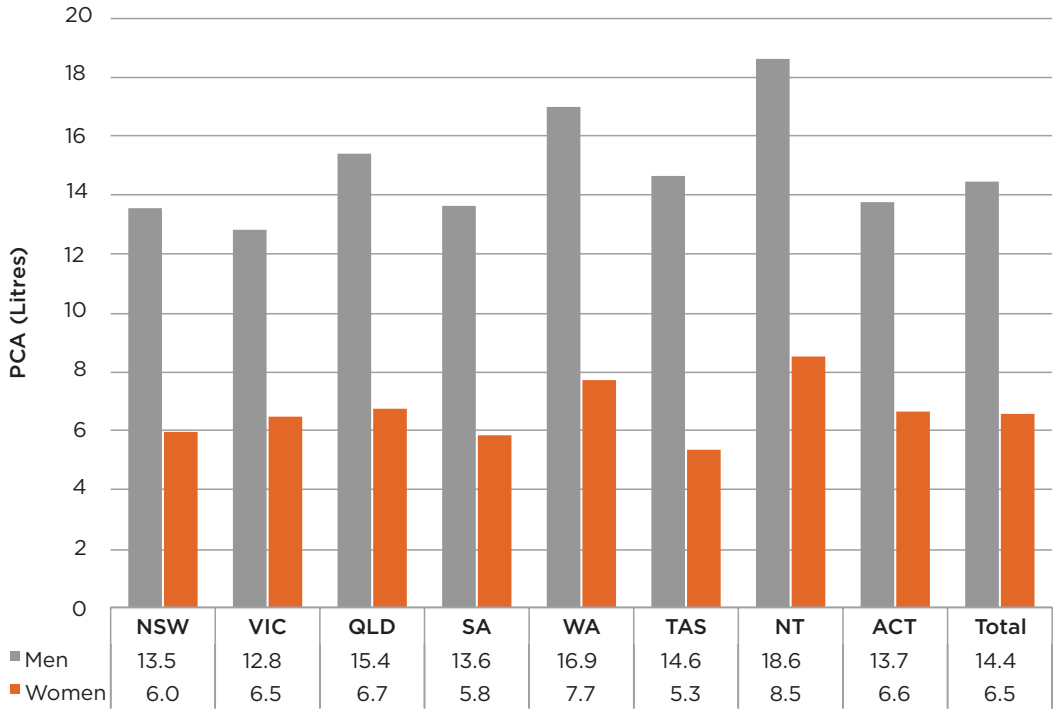
Mean annual PCAs were estimated using the 2010 NDSHS dataset for Australians aged 15+ displayed below in Table 5. Estimated PCAs from NDSHS varied from 5.20L per person per year in Victoria to 8.31L per person per year in the NT. As shown in Table 5, up-lifted and corrected PCAs are approximately 1.8 times higher compared with mean PCAs estimated using NDSHS. Differences between jurisdictions can be noted in Table 5 and Figure 2 below.

Table 5. Estimated adult alcohol consumption

State	Mean PCA (litres pure alcohol)*	Up-lifted PCA (litres pure alcohol)	Corrected PCA (litres pure alcohol) ‡
NSW	5.25	9.68	9.68
VIC	5.20	9.59	9.59
QLD	6.49	11.97	11.03
SA	5.22	9.62	9.62
WA	6.56	12.10	12.37
TAS	5.38	9.91	9.91
NT	8.31	15.32	13.73
ACT	5.51	10.16	10.16
Total (AUS)	5.65	10.42	10.42

* PCA estimated from NDSHS (2010) [46]
‡ Corrected using sales data from ABS figures and from sales data available for three states: QLD, WA, NT [18]

Figure 1. Estimated adult PCA (corrected) by gender and state



	NSW	VIC	QLD	SA	WA	TAS	NT	ACT	Total
Men	13.5	12.8	15.4	13.6	16.9	14.6	18.6	13.7	14.4
Women	6.0	6.5	6.7	5.8	7.7	5.3	8.5	6.6	6.5

Figure 2. Consumption of alcohol by persons aged 15+ in Australian jurisdictions

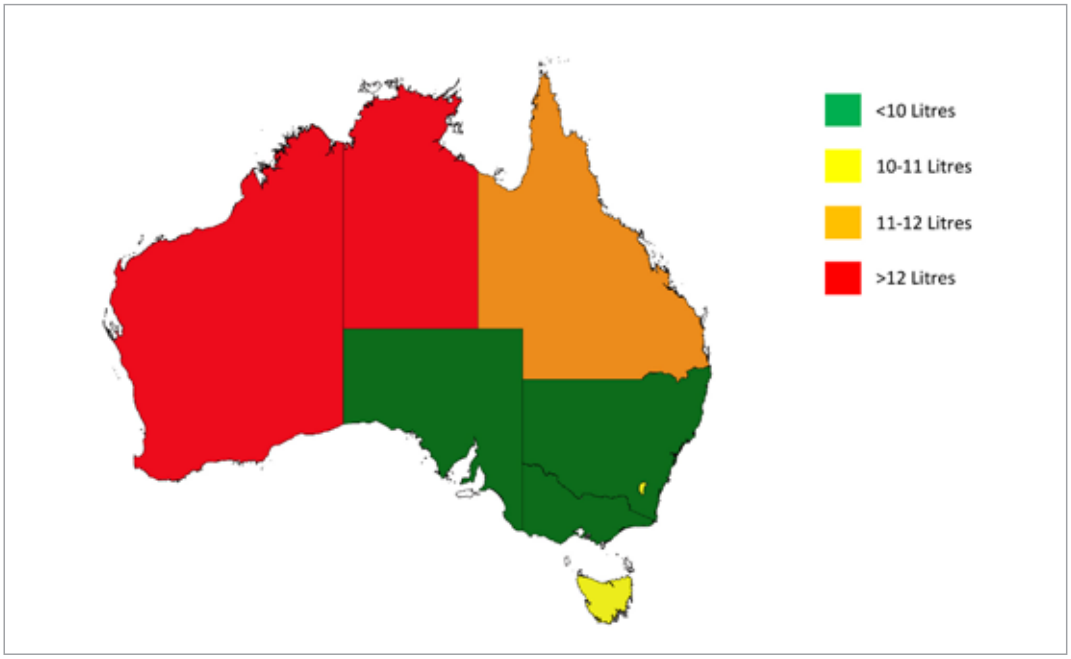


Figure 2 indicates differences in the annual PCA between different Australian jurisdictions once values have been corrected. Victoria, SA and NSW had the lowest PCA, while WA and the NT had the highest PCA, being >12 L per person per year.

Trends in national consumption over time

Recorded alcohol consumption for Australian adults has been consistent around the 10L per year per capita level for the past decade (see Figure 3). Different trends can be seen for the different types of alcohol, with beer and spirit consumption decreasing since 2007-2008 and wine and cider levels increasing during the same period.

Heavy drinking occasions

Consuming multiple alcoholic drinks on a single occasion has been associated with many diseases and illnesses independent of a person's demographic, Socioeconomic Status (SES) characteristics, drug use, psychiatric condition or overall alcohol intake [47]. While national guidelines differ regarding recommended limits to reduce harms associated with drinking [48], the National Health and Medical Research Council (NHMRC) recommends that healthy Australian adults consume no more than 4 standard drinks on a single occasion to minimise short-term (acute) harms [49]. Heavy drinking occasions have also been associated with detrimental outcomes for particular sections of the community such as young males [50, 51], and cancels out any protective effects of light-moderate drinking in older adults [16].

Table 6 and Table 7 show that although about 50% of male respondents and 70% of female respondents aged 15+ reported never consuming over four standard drinks in a single occasion, 19% of male respondents reported consuming more than four drinks at least once per week, and >12% of female adults consumed more than four standard drinks monthly.

Figure 3. Consumption of alcohol by persons aged 15+ in Australia

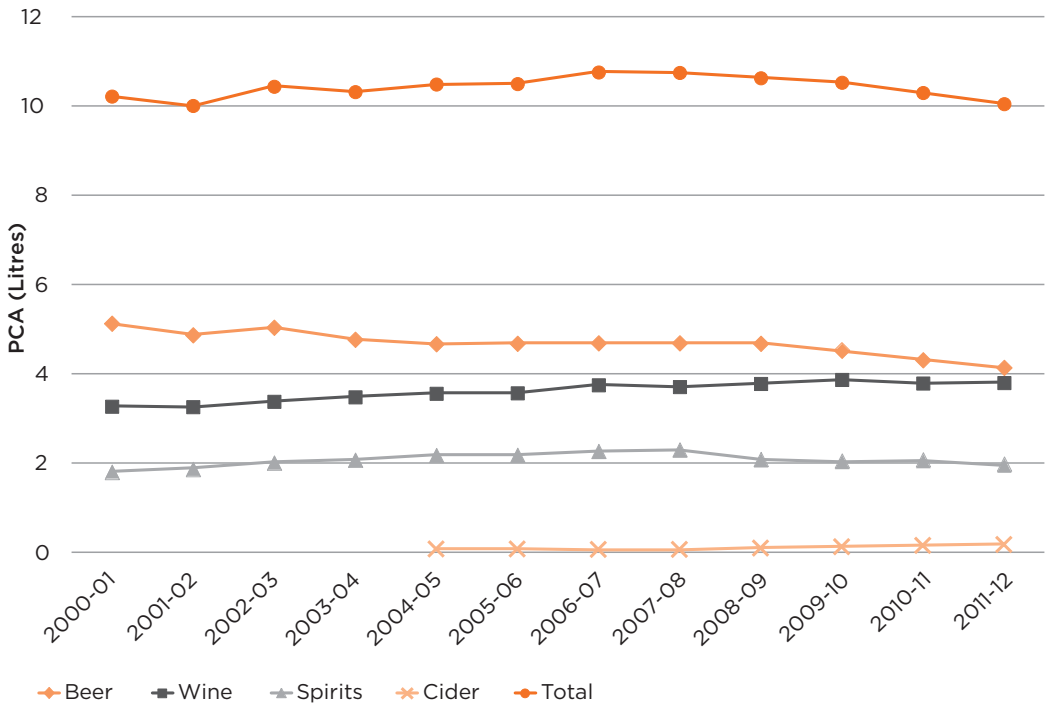


Table 6. Frequency of drinking more than four standard drinks at a time for men (15+)

State	Everyday	5-6 days a week	3-4 days a week	1-2 days a week	2-3 days a month	About 1 day a month	Less often	Never	Do not know
NSW	3.38%	2.36%	3.82%	8.79%	8.67%	11.82%	6.72%	52.67%	1.77%
VIC	2.38%	1.85%	3.97%	7.92%	11.85%	11.76%	7.37%	51.50%	1.40%
QLD	4.40%	3.16%	4.96%	9.18%	13.22%	13.72%	6.25%	43.24%	1.88%
SA	2.70%	2.65%	3.19%	10.09%	9.40%	13.02%	5.85%	51.86%	1.24%
WA	4.43%	3.55%	2.56%	11.46%	11.21%	13.06%	6.86%	45.57%	1.31%
TAS	3.77%	1.94%	5.77%	10.45%	10.79%	10.65%	7.66%	48.88%	0.10%
NT	7.50%	3.28%	5.63%	11.26%	11.06%	15.24%	4.67%	40.54%	0.83%
ACT	2.55%	2.01%	4.49%	8.81%	12.66%	14.91%	8.52%	45.34%	0.71%
Total (AUS)	3.43%	2.53%	3.98%	9.08%	10.83%	12.46%	6.77%	49.37%	1.55%

Table 7. Frequency of drinking more than four standard drinks at a time for women (15+)

State	Everyday	5-6 days a week	3-4 days a week	1-2 days a week	2-3 days a month	About 1 day a month	Less often	Never	Do not know
NSW	0.89%	0.33%	0.61%	3.72%	5.30%	8.77%	6.81%	71.36%	2.20%
VIC	0.61%	0.93%	1.20%	3.51%	5.74%	8.63%	6.82%	71.23%	1.34%
QLD	1.08%	0.55%	1.11%	4.35%	7.73%	10.50%	7.97%	64.95%	1.77%
SA	0.57%	0.46%	0.82%	3.47%	6.34%	9.90%	7.51%	69.75%	1.18%
WA	1.08%	0.36%	1.17%	5.03%	6.66%	9.48%	8.28%	66.03%	1.91%
TAS	0.00%	1.11%	0.46%	1.75%	6.21%	10.41%	7.98%	70.44%	1.63%
NT	0.90%	1.39%	2.28%	7.25%	8.22%	12.45%	7.74%	58.64%	1.13%
ACT	0.00%	0.75%	0.29%	2.68%	9.09%	10.52%	9.22%	65.11%	2.34%
Total (AUS)	0.82%	0.57%	0.94%	3.88%	6.21%	9.33%	7.31%	69.17%	1.77%

CHAPTER 4

Overall Burden of Alcohol-Attributable Diseases in Australia

Background

Alcohol use is involved as a causal or component factor in more than 200 ICD-10 3-digit disease codes, with increased reported lifetime use associated with poorer outcomes [45, 52]. In the recent GBD, Lim et al. [8] estimated that there were 2.7 million deaths attributable to alcohol. This figure represents a rise in the number of deaths calculated during the 1990 GBD study which estimated that 1.9 million deaths were attributable to alcohol worldwide [8].

Results

Deaths and hospitalisations

This chapter presents data on the estimated number of alcohol-attributable deaths and hospitalisations in Australia in 2010. Table 8 shows that in males 3,467 deaths were attributable to alcohol and 101,425 hospitalisations, while in women there were 2,087 deaths and 55,707 hospitalisations. Table 8 also shows that there are gender differences in the conditions responsible for the highest proportion of deaths. In males, injuries were responsible for the highest proportion of alcohol-related deaths (36%), followed by cancers (25%) and digestive diseases (16%). However, in females the highest proportion of alcohol-attributable deaths was for cardiovascular diseases (34%) followed by cancers (31%) and injuries (12%). This table also shows that for hospitalisations in both males and females that injuries and neuropsychiatric diseases were the only categories responsible for more than 10% of alcohol-attributable hospitalisations.

Table 9, Figure 4 and Figure 5 display proportions of total deaths and hospitalisations in Australian men and women (15+) in each state attributable to alcohol in 2010. Figure 4 shows that 4.7% of deaths in Australian men were attributable to alcohol, while 3.0% of deaths in females were attributable to alcohol. The jurisdiction with the highest proportion of deaths for both sexes was the NT, approximately 3 times greater than the national average, while Victoria had the lowest proportion of deaths attributable to alcohol for both men and women. Figure 5 shows that 8.8% of hospitalisations in men and 5.3% in women were alcohol-attributable, with the highest proportion in the NT and the lowest in SA.

Table 8. Alcohol-attributable deaths and hospitalisations in Australia in 2010

Conditions	Deaths (%*)		Hospitalisations (%*)	
	Men	Women	Men	Women
Detrimental effects				
Cancers	861 (25%)	642 (31%)	5,175 (5%)	5,002 (9%)
Cardiovascular diseases	436 (13%)	708 (34%)	7,115 (7%)	3,558 (6%)
Digestive diseases	549 (16%)	237 (11%)	6,726 (7%)	2,970 (5%)
Infectious and parasitic diseases	123 (4%)	123 (6%)	4,990 (5%)	3,704 (7%)
Injuries	1,239 (36%)	256 (12%)	47,189 (47%)	17,779 (32%)
Neuropsychiatric diseases	258 (7%)	122 (6%)	30,231 (30%)	22,695 (41%)
Total	3,467 (100%)	2,087 (100%)	101,425 (100%)	55,707 (100%)
Beneficial effects				
Cardiovascular diseases	359 (90%)	429 (72%)	9,382 (91%)	11,460 (78%)
Diabetes	39 (10%)	169 (28%)	897 (9%)	3,159 (22%)
Total	398 (100%)	598 (100%)	10,279 (100%)	14,620 (100%)

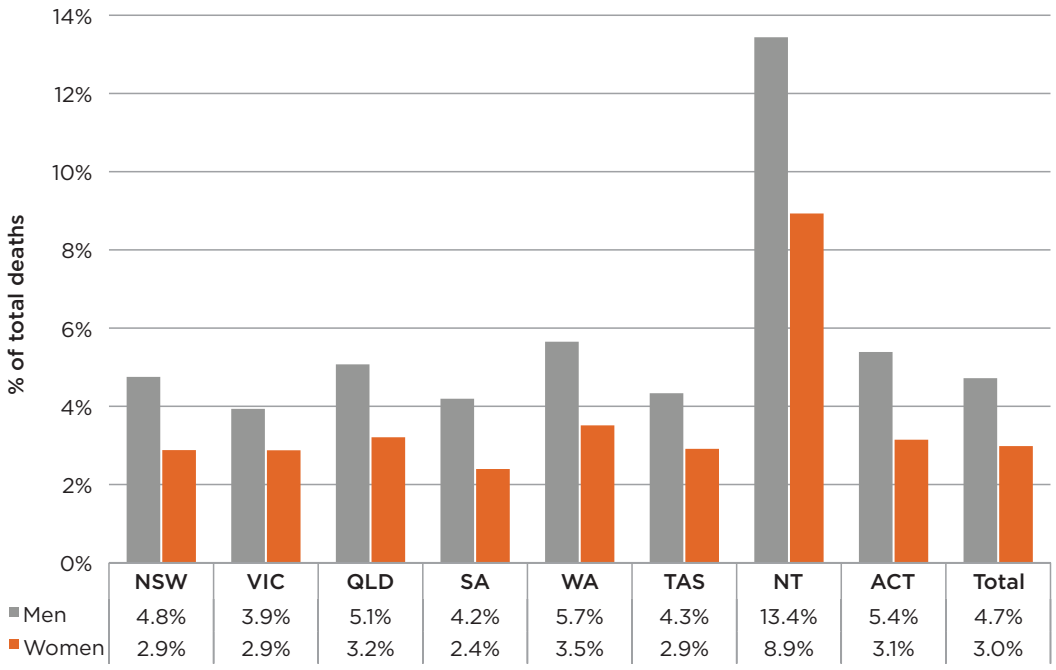
* Percentage of all alcohol-related deaths or hospitalisations.

Table 9. Alcohol-attributable deaths and hospitalisations by state in Australia in 2010

States	Deaths (%*)			Hospitalisations (%*)		
	Men	Women	Total	Men	Women	Total
NSW	1,157 (4.8%)	680 (2.9%)	1,837 (3.8%)	31,464 (9.2%)	16,688 (5.3%)	48,152 (7.3%)
VIC	706 (3.9%)	509 (2.9%)	1,214 (3.4%)	23,718 (8.3%)	15,663 (5.6%)	39,381 (6.9%)
QLD	728 (5.1%)	415 (3.2%)	1,143 (4.2%)	22,207 (8.9%)	11,767 (5.2%)	33,974 (7.1%)
SA	268 (4.2%)	157 (2.4%)	426 (3.3%)	7,222 (8.1%)	3,338 (4.1%)	10,560 (6.2%)
WA	384 (5.7%)	208 (3.5%)	592 (4.7%)	11,699 (9.5%)	5,749 (5.2%)	17,448 (7.5%)
TAS	92 (4.3%)	62 (2.9%)	155 (3.6%)	1,695 (8.2%)	941 (4.9%)	2,636 (6.6%)
NT	84 (13.4%)	32 (8.9%)	116 (11.8%)	1,864 (12.0%)	843 (7.0%)	2,708 (9.8%)
ACT	48 (5.4%)	25 (3.1%)	73 (4.3%)	1,556 (8.5%)	718 (4.4%)	2,273 (6.6%)
Total (AUS)	3,467 (4.7%)	2,087 (3.0%)	5,555 (3.9%)	101,425 (8.8%)	55,707 (5.3%)	157,132 (7.1%)

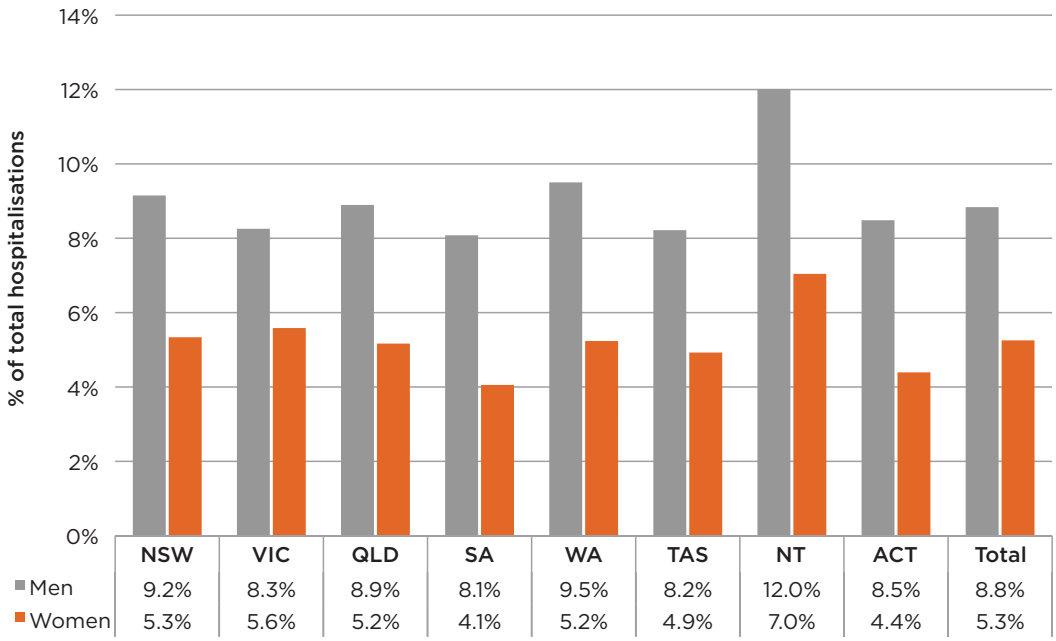
* Percentage of all deaths or hospitalisations.

Figure 4. Proportion of deaths in men and women attributable to alcohol by state in Australia in 2010



	NSW	VIC	QLD	SA	WA	TAS	NT	ACT	Total
Men	4.8%	3.9%	5.1%	4.2%	5.7%	4.3%	13.4%	5.4%	4.7%
Women	2.9%	2.9%	3.2%	2.4%	3.5%	2.9%	8.9%	3.1%	3.0%

Figure 5. Proportion of hospitalisations in men and women attributable to alcohol by state in Australia in 2010



	NSW	VIC	QLD	SA	WA	TAS	NT	ACT	Total
Men	9.2%	8.3%	8.9%	8.1%	9.5%	8.2%	12.0%	8.5%	8.8%
Women	5.3%	5.6%	5.2%	4.1%	5.2%	4.9%	7.0%	4.4%	5.3%

YLL, YLD and DALYs

The following tables present data on alcohol-attributable YLL, YLD and DALYs by disease type for both men and women in Australia in 2010. Table 10 displays that for men; injuries were responsible for the highest proportion of YLLs (45%) and DALYs (38%), while neuropsychiatric diseases had the highest proportion of YLDs (69%). For women, cancers had the highest proportion of YLLs (39%) and DALYs (29%), while neuropsychiatric diseases were responsible for the highest proportion of YLDs (65%). Table 11 displays that there were: 27,378 YLL to alcohol in men and 11,679 in women; 16,670 YLDs to alcohol in men and 5,239 in women; and 44,048 DALYs to alcohol in men and 16,917 in women. Table 11 also presents the breakdown of these summary measures by different jurisdictions. NSW with its large population had the highest number of each summary measure.

Figure 6 displays the summary measures of YLL, YLD and DALYs attributable to alcohol in both men and women in Australia in 2010. This figure shows that alcohol was attributable for more harm in males compared with females.

Table 10. Alcohol-attributable YLL, YLD and DALYs by disease type in Australia in 2010

Disease	YLL (%*)		YLD (%*)		DALYs(%*)	
	Men	Women	Men	Women	Men	Women
Cancers	18,434 (22%)	13,804 (39%)	544 (1%)	1,386 (8%)	18,977 (14%)	15,190 (29%)
Cardiovascular diseases	6,372 (8%)	8,365 (24%)	1,784 (3%)	637 (4%)	8,156 (6%)	9,002 (17%)
Digestive diseases	9,818 (12%)	2,729 (8%)	247 (0%)	83 (1%)	10,065 (7%)	2,812 (5%)
Infectious and parasitic diseases	2,267 (3%)	1,573 (4%)	435 (1%)	237 (1%)	2,702 (2%)	1,810 (4%)
Injuries	38,547 (45%)	6,307 (18%)	13,144 (25%)	3,349 (21%)	51,691 (38%)	9,656 (19%)
Neuropsychiatric diseases	9,508 (11%)	2,445 (7%)	35,883 (69%)	10,642 (65%)	45,391 (33%)	13,087 (25%)
Total	84,945 (100%)	35,223 (100%)	52,036 (100%)	16,334 (100%)	136,982 (100%)	51,556 (100%)

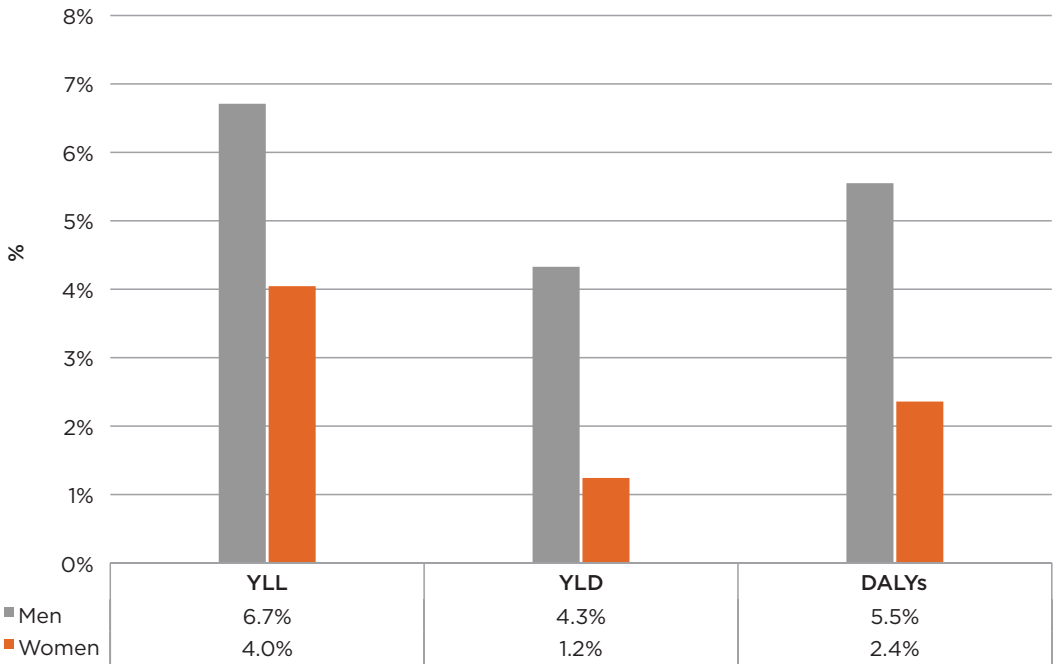
* Percentage of all alcohol-related YLL, YLD and DALYs.

Table 11. Alcohol-attributable YLL, YLD and DALYs by state type in Australia in 2010

States	YLL (%*)			YLD (%*)			DALYS (%*)		
	Men	Women	Total	Men	Women	Total	Men	Women	Total
NSW	27,378 (12.7%)	11,679 (7.9%)	39,057 (10.7%)	16,670 (19.5%)	5,239 (8.6%)	21,908 (15.0%)	44,048 (14.6%)	16,917 (8.1%)	60,965 (12.0%)
VIC	18,965 (11.6%)	8,240 (7.4%)	27,205 (9.9%)	12,445 (19.2%)	4,087 (8.8%)	16,531 (14.9%)	31,410 (13.8%)	12,326 (7.8%)	43,736 (11.3%)
QLD	17,921 (13.9%)	7,199 (8.6%)	25,120 (11.8%)	10,648 (20.7%)	3,261 (9.3%)	13,909 (16.1%)	28,570 (15.9%)	10,460 (8.8%)	39,030 (13.1%)
SA	6,332 (12.3%)	2,603 (7.2%)	8,935 (10.2%)	3,806 (18.9%)	1,176 (8.0%)	4,983 (14.3%)	10,138 (14.2%)	3,779 (7.4%)	13,918 (11.4%)
WA	10,209 (15.4%)	3,830 (9.0%)	14,039 (12.9%)	5,791 (21.7%)	1,781 (9.9%)	7,572 (16.9%)	16,000 (17.2%)	5,611 (9.3%)	21,610 (14.1%)
TAS	1,845 (11.3%)	857 (7.7%)	2,702 (9.9%)	1,198 (18.8%)	360 (8.0%)	1,557 (14.3%)	3,043 (13.4%)	1,217 (7.8%)	4,260 (11.1%)
NT	991 (18.0%)	302 (11.3%)	1,293 (15.8%)	631 (26.7%)	167 (12.8%)	798 (21.7%)	1,621 (20.6%)	469 (11.8%)	2,091 (17.6%)
ACT	1,303 (13.4%)	514 (8.2%)	1,817 (11.3%)	849 (21.3%)	263 (9.5%)	1,111 (16.5%)	2,152 (15.7%)	777 (8.6%)	2,929 (12.8%)
Total (AUS)	84,945 (12.9%)	35,223 (8.0%)	120,168 (10.9%)	52,036 (19.9%)	16,334 (8.9%)	68,370 (15.4%)	136,982 (14.9%)	51,556 (8.2%)	188,538 (12.2%)

* Percentage of all YLL, YLD and DALYs.

Figure 6. Proportion YLL, YLD and DALYs in men and women attributable to alcohol in Australia in 2010



CHAPTER 5

Cancers

Background

Many studies of different designs and within different populations have shown that there is an increased risk of some types of cancer following alcohol consumption. Five percent of all cancers in Australia had been attributed to long-term alcohol use [41].

In 2007 the International Agency for Research on Cancer (IARC) monograph working group concluded that there was sufficient evidence for the carcinogenicity of alcohol, and subsequently classed alcoholic beverages as carcinogenic in humans [53]. The working group established that there was sufficient evidence for a causal link between alcohol consumption and cancers of the: oral cavity, pharynx, larynx, oesophagus, liver, colon, rectum and breast cancer in females and that there was a lack of carcinogenicity in renal-cell and non-Hodgkin's lymphoma. Alcohol was also believed to be a risk factor for stomach and lung cancer, however confounding effects of smoking and dietary habits could not be excluded [16].

A summary section of relevant cancers are provided in the following paragraphs, and reference to relevant articles, meta-analyses and reviews are given in Table A2.

Colorectal cancer

In 2007 the IARC monograph working group concluded that there was sufficient evidence for the carcinogenicity of alcohol and reported that there is an increased risk of colorectal cancers by 1.4 in those who consume on average 50g of alcohol per day [53]. Meta-analyses have determined that there are causal relationships between alcohol consumption and cancer of the colon and rectum [20, 54]. For example, Cho et al. [54] determined that there was an increased risk for colorectal cancer in those with an alcohol intake of 30+g per day for both males and females, with no clear differences between different alcoholic beverage types. Moskal et al. [55] reported that there were stronger associations between alcohol and colorectal cancers in men compared with women, with overall RR increased following doses of >25g/week. More recent research suggested that there are increased risks even in light-moderate drinkers [56].

Cho et al. [54] suggested that acetaldehyde, one of the metabolism products of alcohol, may be the responsible factor in colorectal carcinogens. Alcohol is an antagonist of methyl-group metabolism and may cause carcinogenicity by affecting DNA directly. Alcohol may also act indirectly through a variety of mechanisms including immune suppression, delay of DNA repair, induction of liver procarcinogens, or by changing bile acid composition.

Breast cancer

Epidemiological studies and meta-analyses have shown a consistent link between alcohol consumption and breast cancer [53] with the population attributable risk among drinkers in the USA and UK estimated to be 1.6% and 6% [57]. A significant dose-response relationship has been identified showing an increased risk of breast cancer in women consuming the equivalent of 3 or more drinks per day compared with abstainers [58]. A pooled analysis of more than 50 studies showed that those who consumed on average 50g of alcohol per day had a relative risk of 1.5 compared with non-drinkers [59]. Other analyses have determined that a significant dose-response relationship exists for even low-moderate levels of alcohol intake [58, 59] (increased breast cancer risk following consumption levels as low as 5.0 to 9.9g per day [60]).

Relevant biological mechanisms which link alcohol and breast cancer have been discussed in numerous articles [57, 61]. Alcohol may affect levels of oestrogen [61] or the P450 enzyme resulting in increased risk

for breast cancer. Additionally, alcohol may increase the production of insulin-like growth factors (IGF) thereby stimulating the development or growth of breast cancer in women [62].

Liver cancer

A large number of case control and cohort studies have provided evidence that alcohol consumption is an independent risk factor in the development of liver cancer [4, 63-65]. As noted by the IARC monograph working group, cirrhosis and other liver diseases often occur before the cancer manifests, and patients with these disorders often decrease their alcohol consumption making the effect of alcohol on liver cancer difficult to quantify [53].

Alcohol is metabolised by the enzyme alcohol dehydrogenase in the liver leading to the generation of acetaldehyde and free radicals that bind rapidly to numerous cellular targets, including components of cell signalling pathways and DNA. In addition to direct DNA damage, acetaldehyde depletes glutathione, an antioxidant involved in detoxification [66].

Oesopogeal, mouth, nasopharynx and oropharynx cancers

Strong trends in risk have been reported for cancers of the oral cavity, oesophoagus and larynx [20]. In the developed world, alcohol is one of the main risk factors for oral, pharyngeal, and esophageal cancers [67]. There are differences in the strengths of association between alcohol and these cancer types, possibly due in part to the extent of physical contact between alcohol and the relevant tissue [68]. Daily consumption of 50g of alcohol is associated with a 2-3 times greater risk of these cancers in drinkers compared to non-drinkers [53]. More information on the relative risks at each site have been detailed elsewhere [67, 68].

Results

The following tables present information on the number and proportions of alcohol-attributable cancer deaths and hospitalisations in Australia in 2010, and then give a breakdown by state and territory. Table 12 shows that there were 861 male and 642 female cancer deaths attributable to alcohol, and 5,175 male and 5,002 female hospitalisations for cancer attributable to alcohol. Table 11 also shows that for male deaths, cancers of the oral cavity and pharynx (30% of alcohol-related cancers), and those of the oesophagus (29%) were responsible for the highest proportion of alcohol-related cancer deaths. In contrast, for Australian women, breast cancer constituted the highest proportion, being responsible for >50% of all alcohol-attributable cancer deaths. A similar pattern was evident for alcohol-related hospitalisations in Australian men and women, with these aforementioned cancer-types associated with the greatest burden on the hospital system. Summary data on the mortality and morbidity of each of these conditions is presented in Table 12.

Table 12. Number and percentage of alcohol-attributable cancers deaths and hospitalisations in Australia in 2010

Disease	Deaths (%*)		Hospitalisations (%*)	
	Men	Women	Men	Women
Breast cancer	-	349 (54%)	-	3,239 (65%)
Colon cancer	64 (7%)	71 (11%)	544 (11%)	607 (12%)
Larynx cancer	64 (7%)	7 (1%)	385 (7%)	35 (1%)
Liver cancer	131 (15%)	48 (7%)	395 (8%)	98 (2%)
Oesophagus cancer	247 (29%)	53 (8%)	1,000 (19%)	194 (4%)
Oral cavity and pharynx cancer	257 (30%)	52 (8%)	2,170 (42%)	460 (9%)
Rectum cancer	98 (11%)	63 (10%)	681 (13%)	369 (7%)
Total	861 (100%)	642 (100%)	5,175 (100%)	5,002 (100%)

* Percentage of total alcohol-attributable cancers deaths or hospitalisations

Table 13 shows the number and standardised rate of alcohol-attributable cancer deaths and hospitalisations by different jurisdiction in 2010. This table shows that for Australian men there is a rate of 9.8 per 100,000 population for alcohol attributable cancer deaths, and a standardised rate of 58.7 for hospitalisations. For women, the rate of both of these outcomes was smaller, with a standardised rate of 7.1 for alcohol-related cancer deaths and a rate of 55.4 for hospitalisations. Table 13 also shows that there was marked variation between the different states and territories. For both men and women the standardised rate for alcohol-attributable cancer deaths was highest in the NT and Tasmania. In contrast, the rate of alcohol-attributable hospitalisations for men was highest in Queensland, followed by the NT, while for women the rate was the highest in the ACT followed by Queensland.

Table 13. Number and rate of alcohol-attributable cancers deaths and hospitalisations by state in 2010

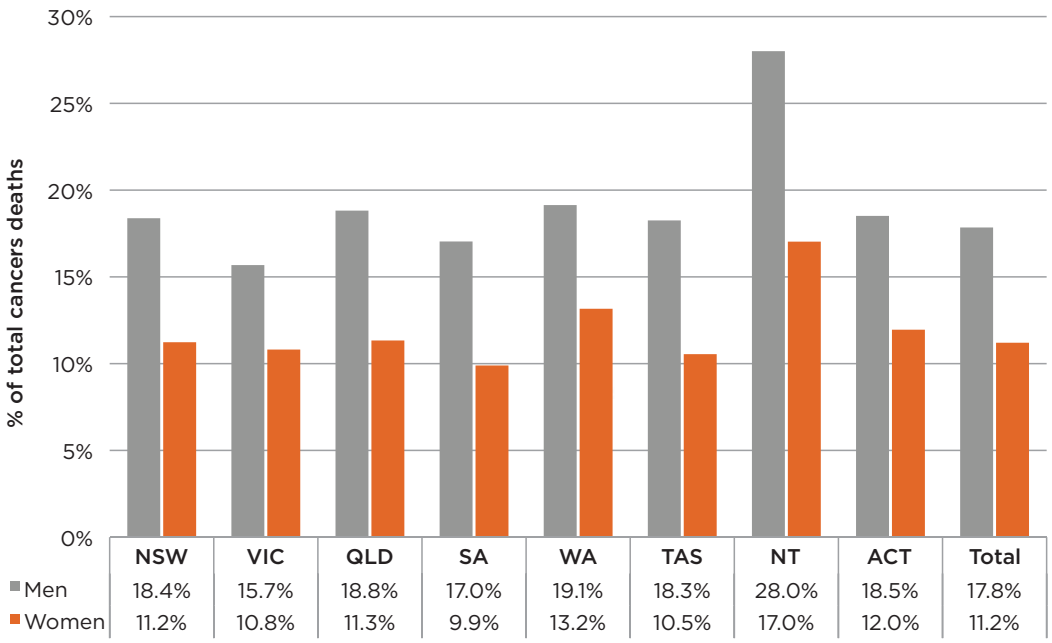
State	Deaths (rate*)		Hospitalisations (rates*)	
	Men	Women	Men	Women
NSW	290 (9.9)	213 (7.1)	1,500 (51.5)	1,560 (52.3)
VIC	185 (8.5)	166 (7.3)	1,199 (55.0)	1,324 (58.4)
QLD	186 (10.9)	120 (7.0)	1,295 (74.8)	1,052 (60.3)
SA	65 (9.2)	49 (6.6)	368 (53.3)	355 (49.8)
WA	86 (9.9)	60 (6.9)	550 (61.6)	484 (54.5)
TAS	29 (13.1)	18 (7.7)	145 (66.4)	107 (47.6)
NT	10 (14.8)	6 (13.1)	53 (72.8)	31 (49.9)
ACT	10 (7.5)	10 (7.4)	65 (51.4)	88 (66.0)
Total (AUS)	861 (9.8)	642 (7.1)	5,175 (58.7)	5,002 (55.4)

* Standardised rate per 100,000 population

The following figures present the proportion of total cancer deaths (Figure 7) and hospitalisations (Figure 8) that were attributed to alcohol within each jurisdiction. These figures show that a similar overall proportion of cancer deaths and hospitalisations were due to alcohol, and that the highest proportions occur in the NT and WA for both men and women.

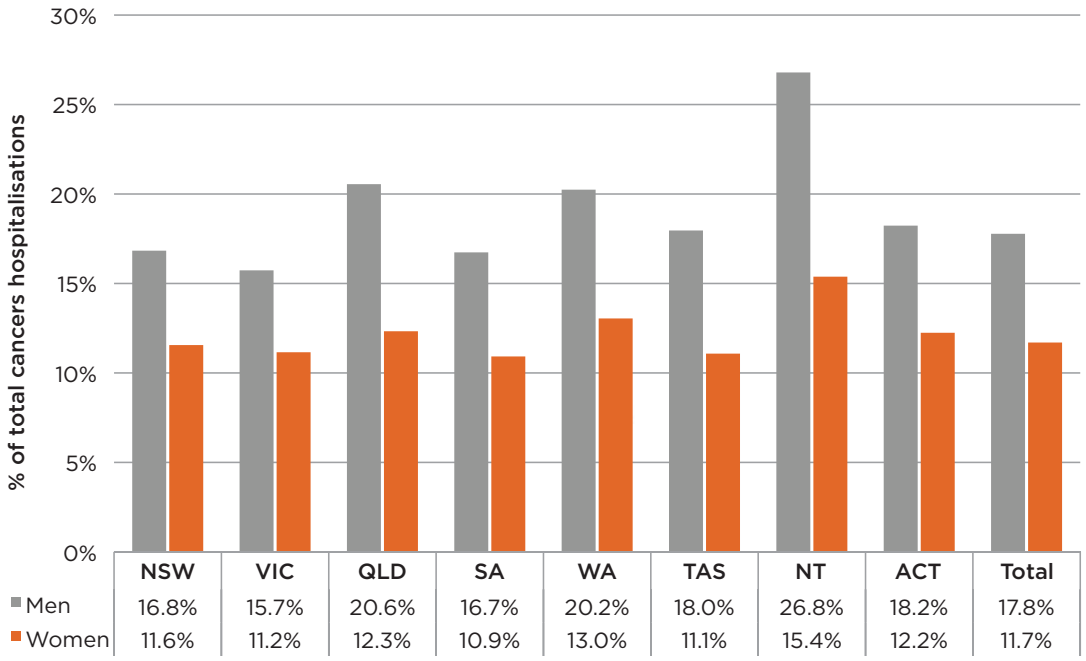
These data were subsequently broken down to show the proportion of cancer deaths (Figure 9) and hospitalisations (Figure 10) attributable to alcohol across the different cancer types. These figures collectively show that the highest rates for both men and women across these two outcomes are attributable to oral cavity and pharynx cancers.

Figure 7. Proportion of cancers deaths attributable to alcohol by state in Australia in 2010



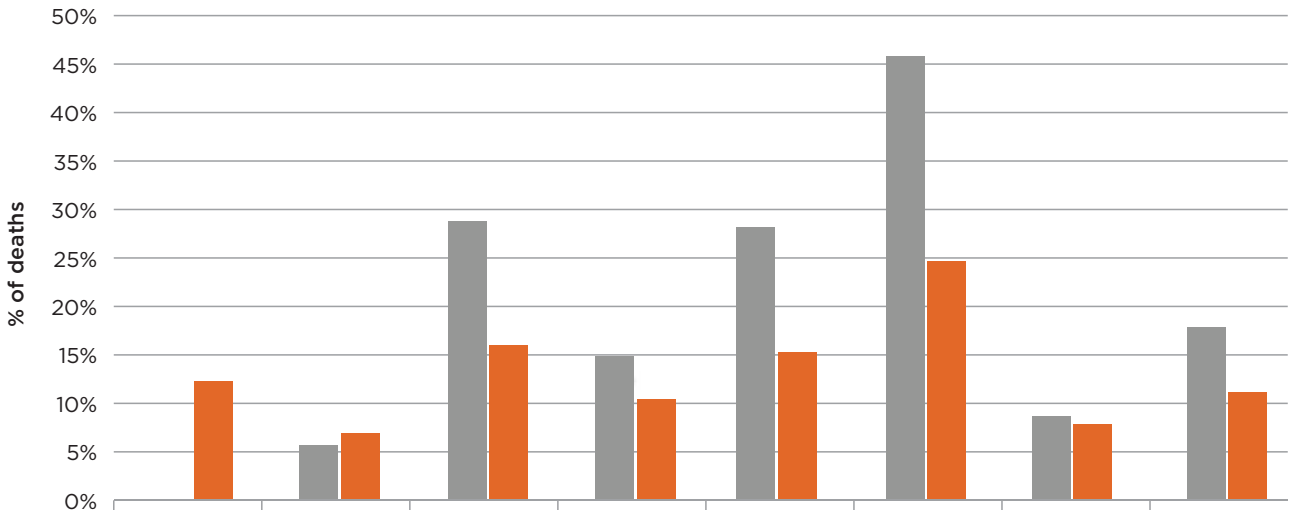
	NSW	VIC	QLD	SA	WA	TAS	NT	ACT	Total
Men	18.4%	15.7%	18.8%	17.0%	19.1%	18.3%	28.0%	18.5%	17.8%
Women	11.2%	10.8%	11.3%	9.9%	13.2%	10.5%	17.0%	12.0%	11.2%

Figure 8. Proportion of cancers hospitalisations attributable to alcohol by state in Australia in 2010



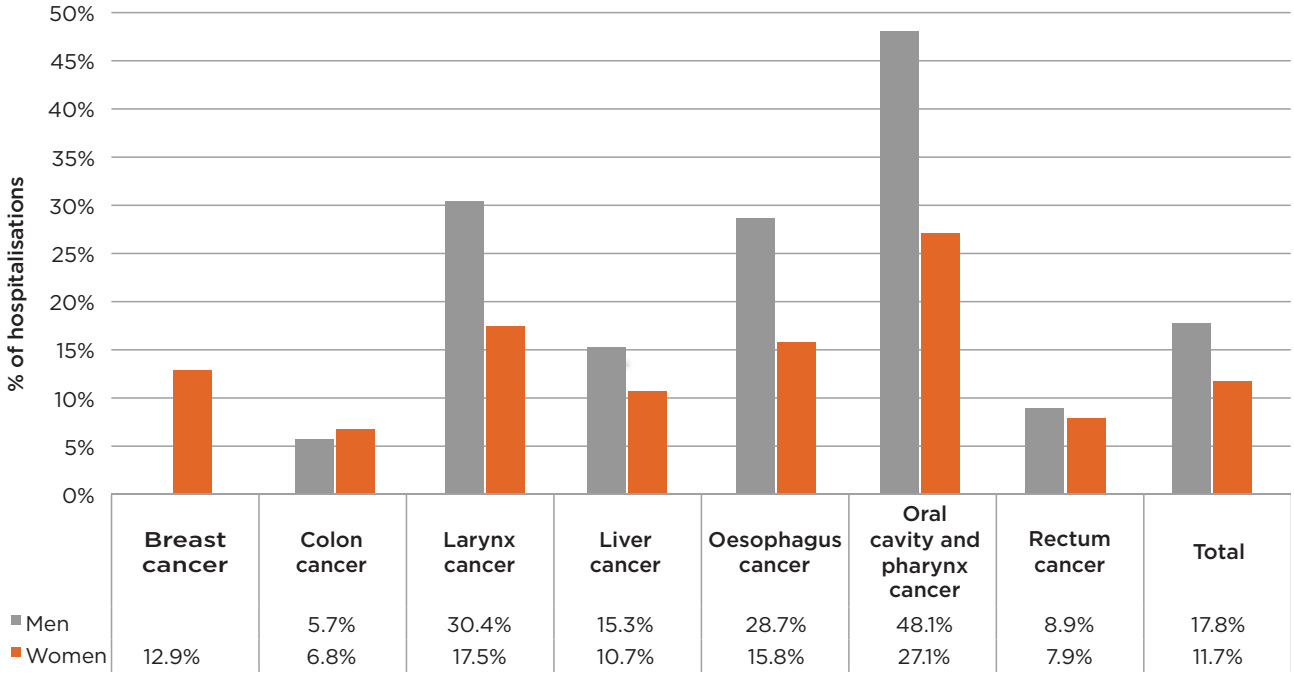
	NSW	VIC	QLD	SA	WA	TAS	NT	ACT	Total
Men	16.8%	15.7%	20.6%	16.7%	20.2%	18.0%	26.8%	18.2%	17.8%
Women	11.6%	11.2%	12.3%	10.9%	13.0%	11.1%	15.4%	12.2%	11.7%

Figure 9. Proportion of cancers deaths attributable to alcohol by disease type in 2010



	Breast cancer	Colon cancer	Larynx cancer	Liver cancer	Oesophagus cancer	Oral cavity and pharynx cancer	Rectum cancer	Total
Men		5.7%	28.8%	14.9%	28.1%	45.8%	8.7%	17.8%
Women	12.3%	6.9%	16.0%	10.5%	15.3%	24.7%	7.9%	11.2%

Figure 10. Proportion of cancers hospitalisations attributable to alcohol by disease type in 2010



	Breast cancer	Colon cancer	Larynx cancer	Liver cancer	Oesophagus cancer	Oral cavity and pharynx cancer	Rectum cancer	Total
Men		5.7%	30.4%	15.3%	28.7%	48.1%	8.9%	17.8%
Women	12.9%	6.8%	17.5%	10.7%	15.8%	27.1%	7.9%	11.7%

CHAPTER 6

Cardiovascular Diseases

Background

Hypertensive disease

Hypertension is a risk factor for many cardiovascular outcomes [23]. However, the relationship between alcohol use and hypertensive disease is complex, and depends on factors related to the volume [69], and pattern [70] of alcohol consumption, in addition to the cardiovascular condition or outcome being considered [71].

A causal relationship between regular alcohol consumption and high blood pressure levels has been clearly established [72]. The mechanisms responsible for hypertensive changes in blood pressure following alcohol have been speculated in many reports, and require further study [71]. Most likely it involves central changes in autonomic nervous system functioning leading to increased heart rate and blood pressure variability with heightened sympathetic drive at rest [69, 73].

In addition, there are sex differences, and Corrao et al [20] reported a detrimental dose-response effect for men, while others have suggested there may be a protective effect following moderate consumption in women [16]. Recent analyses have suggested that light-to-moderate alcohol consumption is associated with a decreased risk for hypertension in women and an increased risk in men, with the threshold above which alcohol became deleterious for hypertension risk emerged at >4 drinks per day in women versus a moderate level of >1 drink per day in men [74]. Recently Taylor et al. [23] reported that for males consuming on average 50g of alcohol per day that there was a RR of 1.57 and for those reporting 100g per day of alcohol consumption a relative risk of 2.57 was calculated. Taylor et al. [23] reported that for females, there was a J-shaped curve, where there were protective effects for the consumption of up to 15g of alcohol per day, but harmful effects in levels above this with a RR of 1.81 at 50g per day, and 2.81 at 100g per day.

Ischemic heart disease (IHD)

The relationship between alcohol and IHD is complex [24], with the amount and pattern of alcohol consumption conferring either beneficial or harmful effects [16]. Low-moderate levels of alcohol consumption are associated with a reduced risk and severity of cardiac events compared with non-drinking [75], while drinking more than two standard drinks per day confers no beneficial effects in relation to cardiac events [76, 77]. Complicating this relationship is the finding that engagement in heavy drinking occasions "bingeing" removes any potentially beneficial effect, and the beneficial effects seem to be confined to older age groups [12, 78].

The mechanism(s) of this beneficial effect on the cardiovascular system may involve changes in multiple mechanisms including changes in insulin sensitivity, high-density lipoprotein cholesterol levels, clotting or inflammatory factors [75, 79]. Nicoll and Henein [77] note that there may be differences in the beneficial effects based on alcohol type, with red wine able to increase coronary flow-velocity reserve, raise high density lipoprotein (HDL) and plasma antioxidant status, and inhibit growth factor beta-receptors that are implicated in atherosclerosis to a significantly greater extent than other beverage types including white wine. However, these mechanisms and findings require further study.

On the other hand, high levels of alcohol consumption, or the inclusion of heavy drinking occasions as part of the drinking pattern, have been found to consistently result in detrimental rather than beneficial effects on IHD [77, 79]. For example, heavy alcohol consumption is linked to cardiomyopathy and cardiac arrhythmias [80]. These harmful effects of alcohol involve numerous mechanisms including oxidative damage, deposition of triglycerides and impaired protein synthesis [81].

Cardiac arrhythmias

Atrial fibrillation (AF) is the most common arrhythmia observed in clinical practice, and a significant risk factor for stroke [82]. Numerous studies have reported associations between alcohol and cardiac arrhythmias see [83]. For example, Lowenstein et al. [84] and Rich et al. [85] each reported that alcohol was responsible for up to two-thirds of new onset diagnoses of atrial fibrillation. The relative association between alcohol use and AF is apparent in high-alcohol consumers, and may involve both the amount of alcohol consumed, and the relevant pattern of alcohol consumption. For example, the Framington heart study [86] aimed to determine relevant risk factors for AF, and reported that consumption of 36g of alcohol on average per day was associated with an increased risk of AF of 34% and that men were more likely to develop AF compared with women [82]. Recent analysis has suggested that these limits may be lower in females, with >2 drinks on average per day associated with increased relative risk of AF [87]. Relative risks from recent analyses have reported that women consuming between 24 and 120g of alcohol on average per day have a relative risk of between 1.07 and 2.02 compared with non-drinkers, while in men, the RR for the same volumes of alcohol were between 1.08 and 2.09 (95% CI: 1.52–2.86)[21].

Different mechanisms supporting the link between alcohol and AF have been proposed. These have included direct toxic effect on cardiac myocytes, and changes in sympathetic and vagal tone or atrial conduction time [88].

Stroke

The relationship between alcohol and the RR of stroke depends on a number of factors including the type of stroke considered (ischemic or haemorrhagic), and the amount and pattern of alcohol consumption [22, 89]. Some authors have argued that more specific sub-types of stroke should be considered when defining RR attributable to alcohol consumption, and for a discussion see [89].

Overall, meta analyses have determined that there is a non-linear relationship between alcohol consumption and total stroke [20]. For example, the consumption of less than 12g of alcohol per day was associated with a decreased RR of stroke, while consumption of >60+ was associated with an increased risk of stroke [90]. In addition, the RR of total stroke is higher in 'binge' drinkers (men who consume >6 drinks in one sitting, and women who consume >4 drinks in one session), with a RR of 1.86 [91].

Ischaemic strokes account for approximately 80% of all strokes [89]. For ischemic stroke, there is a J-shaped relationship between alcohol consumption and RR. Those consuming less than 12g of alcohol on average per day have the lowest risk, while those consuming more than 60 g per day have the highest risk of this form of stroke [90]. In addition, binge drinkers have a higher RR compared with non-binge drinkers of 1.99 [91].

In contrast, for haemorrhagic stroke Reynolds et al. (2003) reported that the relative risk increases linearly at all levels of alcohol consumption compared with abstainers, with the highest risk for those consuming >60g of alcohol per day. Feigin et al.[92] reported increased RR for both men and women consuming both <150g and >150g of alcohol on average per week.

Multiple biological mechanisms are likely involved in the relationship between alcohol use and stroke [14, 52, 90]. Indeed while alcohol has anticoagulant properties which may be beneficial in reducing the risk of ischemic stroke, it may also increase the risk of haemorrhagic stroke. The increased risk of haemorrhagic stroke is thought to involve multiple mechanisms including alcohol-induced hypertension, cardiomyopathy, disorders in coagulation, AF or reduced cerebral blood flow. In contrast the decreased risk of ischemic disease may involve changes in high-density lipoprotein levels and platelet aggregation.

Results

The following tables present information on the number and proportions of cardiovascular deaths and hospitalisations that are attributable to alcohol use (Table 14) or protected by alcohol use (Table 15). Overall, 436 cardiovascular deaths in Australian men and 708 in Australian women were attributable to alcohol, while 7,115 cardiovascular hospitalisations in Australian men and 3,558 in Australian women were attributable to alcohol. These tables show that for Australian men and women, the highest proportion of deaths in the cardiovascular disease category relate to haemorrhagic stroke and ischemic heart disease respectively. In addition there is a beneficial effect estimated due to alcohol with 359 male and 429 female deaths estimated to be prevented by alcohol. The protective factors for deaths are due almost exclusively to ischaemic heart disease in men and ischemic stroke in women.

Table 14. Number and percentage of alcohol-attributable cardiovascular disease deaths and hospitalisations in Australia in 2010

Disease	Deaths (%*)		Hospitalisations (%*)	
	Men	Women	Men	Women
Alcohol cardiomyopathy	47 (11%)	10 (1%)	108 (2%)	5 (0%)
Cardiac arrhythmias	68 (16%)	146 (21%)	5,346 (75%)	3,222 (91%)
Haemorrhagic stroke	186 (43%)	181 (26%)	995 (14%)	0 (0%)
Hypertensive disease	116 (27%)	42 (6%)	559 (8%)	331 (9%)
Ischaemic heart disease	1 (0%)	329 (46%)	0 (0%)	0 (0%)
Ischaemic stroke	19 (4%)	0 (0%)	107 (2%)	0 (0%)
Total	436 (100%)	708 (100%)	7,115 (100%)	3,558 (100%)

* Percentage of total alcohol-attributable cardiovascular diseases deaths or hospitalisations

Table 15. Number and percentage cardiovascular disease deaths and hospitalisations protected by alcohol in Australia in 2010

Disease	Deaths (%*)		Hospitalisations (%*)	
	Men	Women	Men	Women
Alcohol cardiomyopathy	0 (0%)	0 (0%)	0 (0%)	0 (0%)
Cardiac arrhythmias	0 (0%)	0 (0%)	0 (0%)	0 (0%)
Haemorrhagic stroke	0 (0%)	0 (0%)	0 (0%)	732 (6%)
Hypertensive disease	0 (0%)	13 (3%)	0 (0%)	57 (0%)
Ischaemic heart disease	356 (99%)	1 (0%)	9,360 (100%)	9,983 (87%)
Ischaemic stroke	2 (1%)	415 (97%)	22 (0%)	688 (6%)
Total	359 (100%)	429 (100%)	9,382 (100%)	11,460 (100%)

* Percentage cardiovascular diseases deaths or hospitalisations protected by alcohol

The following tables present data on the number and standardised rates for alcohol-attributable harmful effects (Table 16) and protective effects (Table 17) by state and territory. These tables show marked variation between jurisdictions in both the harmful and beneficial effects of alcohol on cardiovascular outcomes. Note that some of these jurisdictions have a small number of events reported, and therefore the rates should be interpreted with caution.

Table 16. Number and rate of alcohol-attributable cardiovascular disease deaths and hospitalisations by state in 2010

States	Deaths (rate*)		Hospitalisations (rate*)	
	Men	Women	Men	Women
NSW	197 (6.7)	251 (8.2)	2,228 (76.4)	1,083 (35.8)
VIC	82 (3.7)	176 (7.7)	1,721 (78.9)	940 (41.3)
QLD	72 (4.2)	138 (8.3)	1,537 (89.0)	757 (44.2)
SA	34 (4.8)	52 (6.7)	632 (91.3)	307 (41.6)
WA	27 (3.2)	58 (6.9)	706 (79.4)	350 (40.8)
TAS	13 (5.6)	24 (10.0)	110 (49.7)	59 (25.1)
NT	7 (14.6)	4 (5.8)	79 (115.2)	24 (41.3)
ACT	5 (4.6)	6 (5.4)	101 (84.2)	39 (32.2)
Total (AUS)	436 (5.0)	708 (7.8)	7,115 (80.8)	3,558 (39.5)

* Standardised rate per 100,000 population

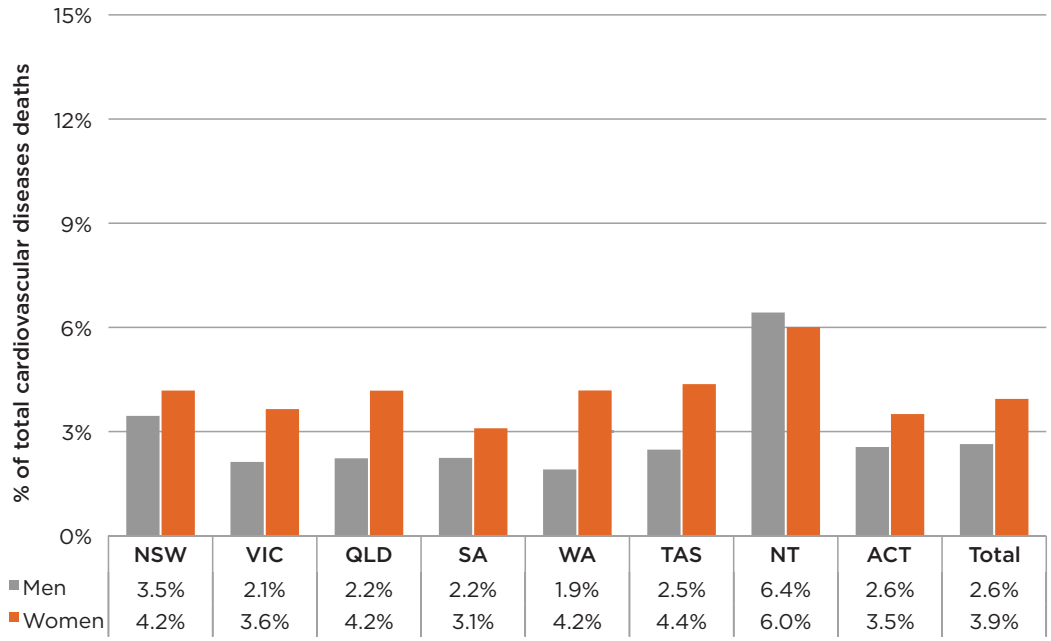
Table 17. Number and rate of cardiovascular disease deaths and hospitalisations protected by alcohol by state in 2010

States	Deaths (rate*)		Hospitalisations (rate*)	
	Men	Women	Men	Women
NSW	124 (4.2)	133 (4.3)	3,007 (102.7)	3,476 (115.1)
VIC	91 (4.2)	107 (4.6)	2,462 (112.7)	3,056 (134.0)
QLD	54 (3.2)	82 (5.0)	1,818 (106.2)	2,414 (141.7)
SA	28 (3.9)	52 (6.7)	730 (103.5)	877 (117.8)
WA	41 (4.8)	30 (3.7)	877 (101.5)	1,076 (124.7)
TAS	14 (6.1)	17 (7.1)	218 (95.3)	228 (99.0)
NT	1 (1.5)	1 (2.9)	83 (125.3)	111 (194.9)
ACT	5 (4.7)	7 (5.6)	187 (154.9)	222 (178.9)
Total (AUS)	359 (4.1)	429 (4.8)	9,382 (106.5)	11,460 (127.1)

* Standardised rate per 100,000 population

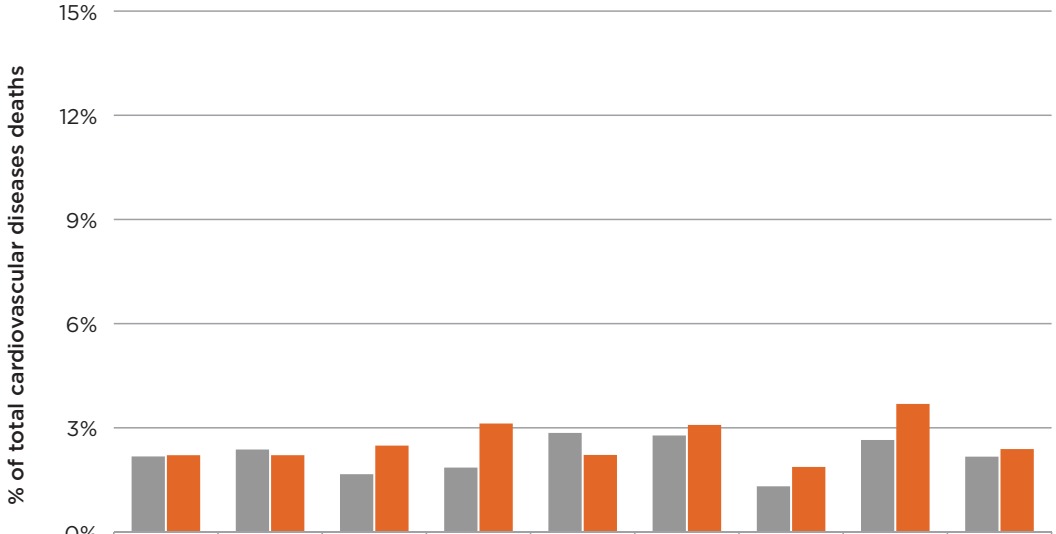
Figure 11 and Figure 12 show the proportion of cardiovascular deaths that were estimated to be caused by alcohol or protected by alcohol for Australian men and women. Figure 11 shows that a higher proportion of total cardiovascular deaths were attributable to women than in men, and that this relationship is observed in all jurisdictions except the NT. In addition, Figure 12 shows that more than 2% of the total in cardiovascular diseases is protected by alcohol in both men and women. There is slight variation in the estimated protective effect between jurisdictions and between men and women.

Figure 11. Proportion of cardiovascular disease deaths attributable to alcohol by state in Australia in 2010



	NSW	VIC	QLD	SA	WA	TAS	NT	ACT	Total
Men	3.5%	2.1%	2.2%	2.2%	1.9%	2.5%	6.4%	2.6%	2.6%
Women	4.2%	3.6%	4.2%	3.1%	4.2%	4.4%	6.0%	3.5%	3.9%

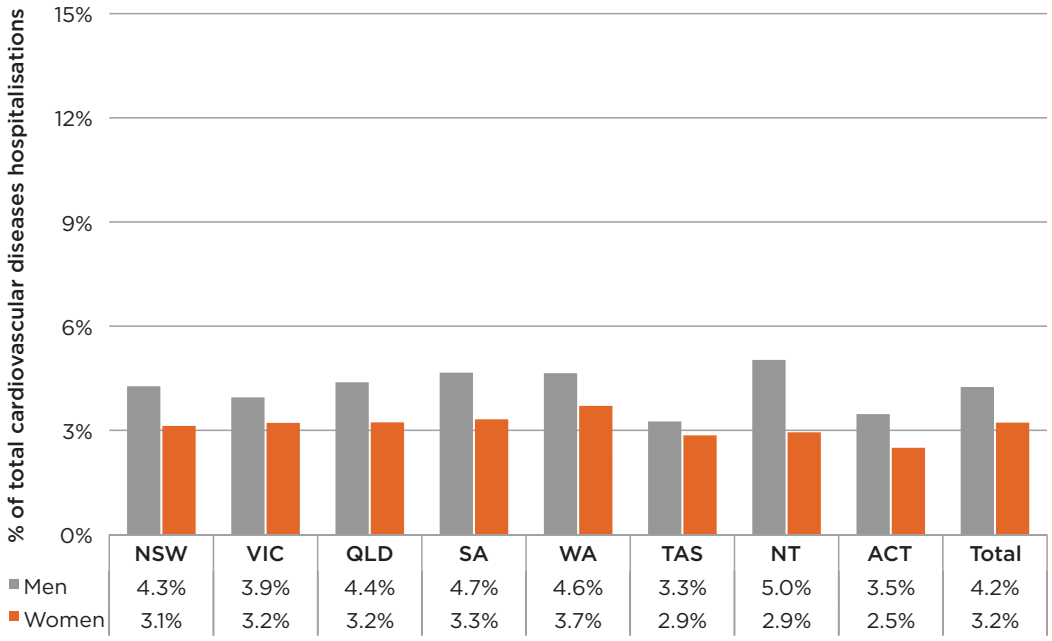
Figure 12. Proportion of cardiovascular disease deaths protected by alcohol by state in Australia in 2010



	NSW	VIC	QLD	SA	WA	TAS	NT	ACT	Total
Men	2.2%	2.4%	1.7%	1.9%	2.9%	2.8%	1.3%	2.6%	2.2%
Women	2.2%	2.2%	2.5%	3.1%	2.2%	3.1%	1.9%	3.7%	2.4%

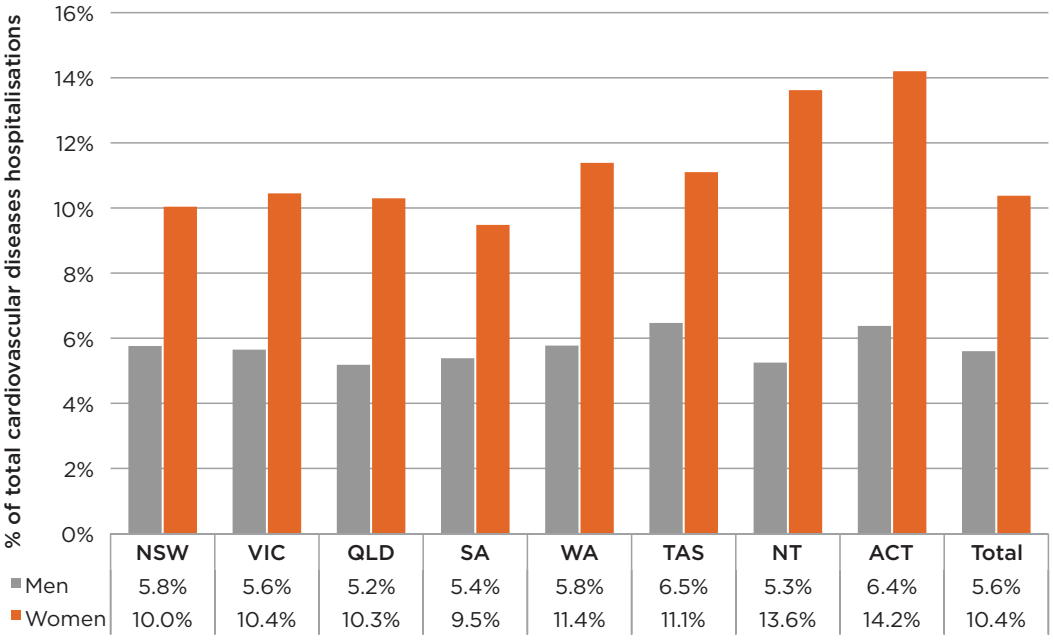
The following figures present the proportion of cardiovascular disease hospitalisations that were either alcohol-attributable (Figure 13) or protected by alcohol (Figure 14). Figure 13 shows that approximately 4% of all cardiovascular hospitalisations in men and approximately 3% in women were alcohol-attributable, with males higher in each jurisdiction. This pattern is reversed when considering the protective effects of alcohol on cardiovascular disease, with approximately double the number of protective effects in women compared to men.

Figure 13. Proportion of cardiovascular disease hospitalisations attributable to alcohol by state in Australia in 2010



	NSW	VIC	QLD	SA	WA	TAS	NT	ACT	Total
Men	4.3%	3.9%	4.4%	4.7%	4.6%	3.3%	5.0%	3.5%	4.2%
Women	3.1%	3.2%	3.2%	3.3%	3.7%	2.9%	2.9%	2.5%	3.2%

Figure 14. Proportion of cardiovascular diseases hospitalisations protected by alcohol by state in Australia in 2010

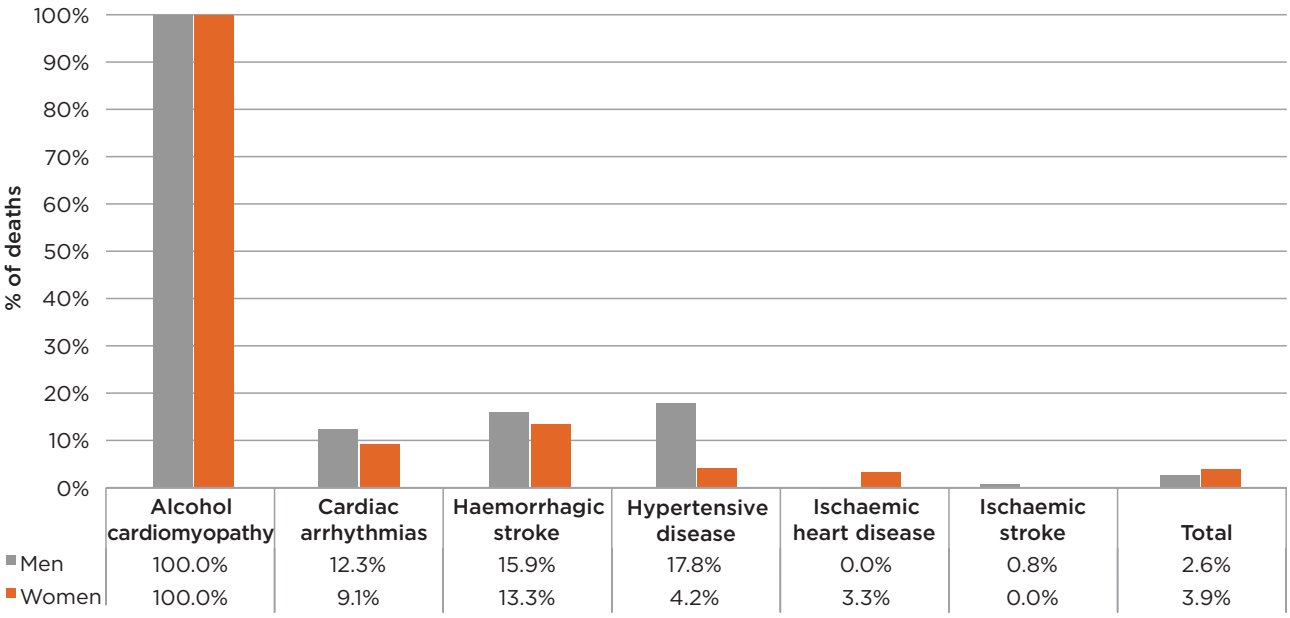


	NSW	VIC	QLD	SA	WA	TAS	NT	ACT	Total
Men	5.8%	5.6%	5.2%	5.4%	5.8%	6.5%	5.3%	6.4%	5.6%
Women	10.0%	10.4%	10.3%	9.5%	11.4%	11.1%	13.6%	14.2%	10.4%

The following figures provide a representation of the proportion of deaths that were attributable to alcohol (Figure 15) or protected by alcohol (Figure 16) by cardiovascular disease category. Collectively these figures show that that the harmful effects of alcohol were seen across multiple categories, with those conditions having less than an AAF of 1 responsible for up to 20% of all cardiovascular disease in 2010. Conversely, the protective effects of alcohol were evident in only a few disease categories with larger effects evident in women, particularly with respect to ischemic stroke.

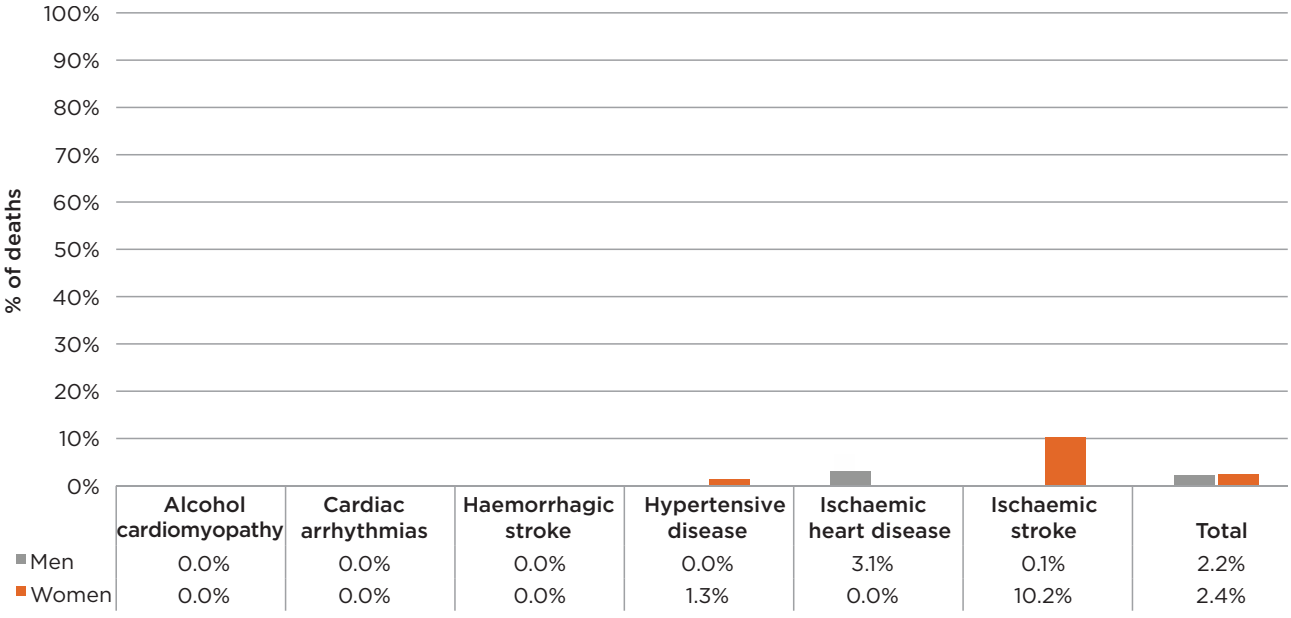
The two figures in this chapter provide a representation of the proportion of hospitalisations that were attributable to alcohol (Figure 17) or 'protected' by alcohol (Figure 18) by cardiovascular disease category. Figure 17 shows that a higher proportion of alcohol-attributable hospitalisations were evident in males across the different outcomes considered, and that these were responsible for >4% of all hospitalisations in men and >3% in women. Figure 18 shows that the protective effect of alcohol on cardiovascular hospitalisations was greater in women compared with men.

Figure 15. Proportion of cardiovascular diseases deaths attributable to alcohol by disease type in 2010



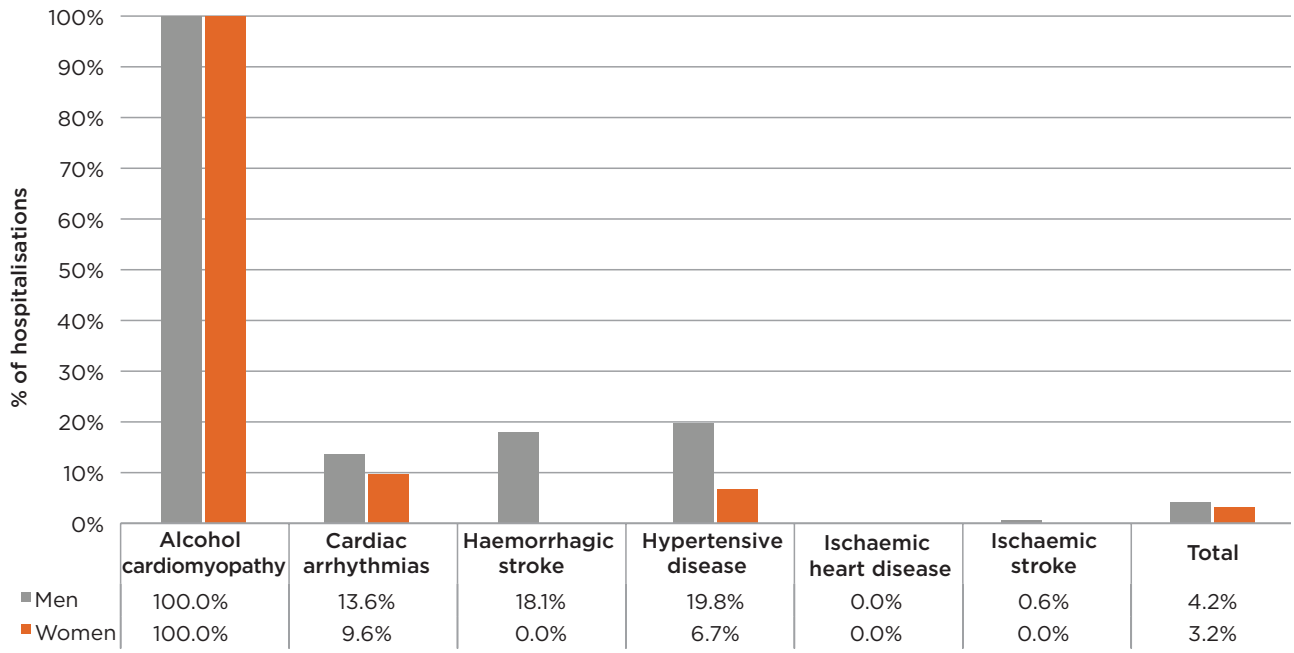
	Alcohol cardiomyopathy	Cardiac arrhythmias	Haemorrhagic stroke	Hypertensive disease	Ischaemic heart disease	Ischaemic stroke	Total
Men	100.0%	12.3%	15.9%	17.8%	0.0%	0.8%	2.6%
Women	100.0%	9.1%	13.3%	4.2%	3.3%	0.0%	3.9%

Figure 16. Proportion of cardiovascular diseases deaths protected by alcohol by disease type in 2010



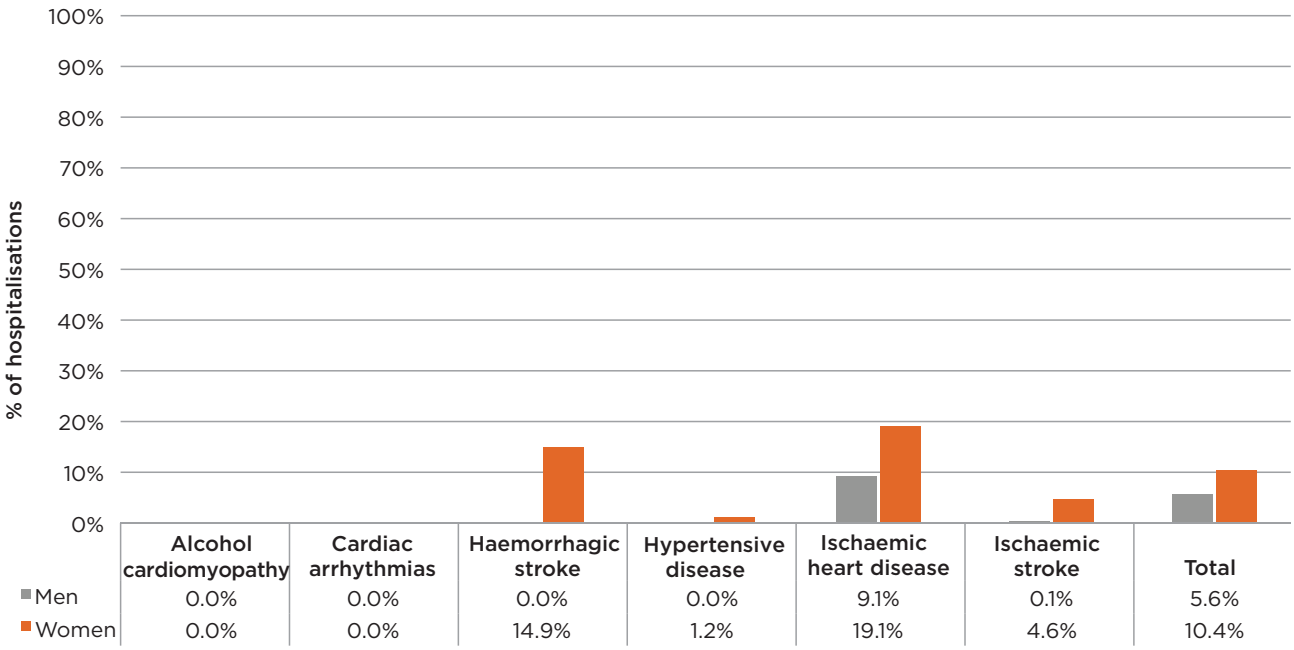
	Alcohol cardiomyopathy	Cardiac arrhythmias	Haemorrhagic stroke	Hypertensive disease	Ischaemic heart disease	Ischaemic stroke	Total
Men	0.0%	0.0%	0.0%	0.0%	3.1%	0.1%	2.2%
Women	0.0%	0.0%	0.0%	1.3%	0.0%	10.2%	2.4%

Figure 17. Proportion of cardiovascular diseases hospitalisations attributable to alcohol by disease type in 2010



	Alcohol cardiomyopathy	Cardiac arrhythmias	Haemorrhagic stroke	Hypertensive disease	Ischaemic heart disease	Ischaemic stroke	Total
Men	100.0%	13.6%	18.1%	19.8%	0.0%	0.6%	4.2%
Women	100.0%	9.6%	0.0%	6.7%	0.0%	0.0%	3.2%

Figure 18. Proportion of cardiovascular diseases hospitalisations protected by alcohol by disease type in 2010



	Alcohol cardiomyopathy	Cardiac arrhythmias	Haemorrhagic stroke	Hypertensive disease	Ischaemic heart disease	Ischaemic stroke	Total
Men	0.0%	0.0%	0.0%	0.0%	9.1%	0.1%	5.6%
Women	0.0%	0.0%	14.9%	1.2%	19.1%	4.6%	10.4%

CHAPTER 7

Diabetes

Background

Type 2 diabetes mellitus is a chronic metabolic disorder caused by deficiencies in the secretion and action of insulin [93]. Moderate alcohol consumption is associated with reduced incidence of diabetes mellitus, with evidence from meta-analyses suggesting that there is a U-shaped relationship between alcohol consumption and subsequent risk for diabetes [94]. Compared with non-drinkers, low-moderate drinkers have an approximately 30% lower risk for diabetes [95]. The RR of diabetes following higher levels of alcohol consumption have been inconsistent, and requires further research. While studies have reported an increased risk of diabetes following high levels of alcohol consumption [94, 95], the proportion of high alcohol consumers included in studies to date assessing the relative risk of diabetes has been low [94]. Koppes et al. [96] presented a series of relative risk for diabetes based on average daily consumption of alcohol consistent with a U shaped relationship, while non-consumers and those who had on average >48g of alcohol had a RR of 1.04, low (<6g/day) and moderate-level (6-12;12-24;24-48 g/day) had relative risks between 0.69 and 0.87 with the largest protective effect evident in the 12-24g/day group. Recent analyses have reported similar effects for both men and women [97].

The development of insulin resistance is a key factor in the pathogenesis of type 2 diabetes, and light to moderate drinking has been associated with enhanced insulin sensitivity [94], and may also involve effects on lipid metabolism and blood pressure [98]. Adverse effects observed in high alcohol consumers on diabetes may be related to increased body weight or poor diet [99].

Results

Table 18 shows the number and standardised rate of alcohol prevented diabetes deaths and hospitalisations by state. There was a beneficial effect on diabetes attributable to alcohol which was responsible for protecting 39 male and 169 female deaths and 897 male and 3,159 female hospitalisations primarily caused by diabetes in Australia in 2010 were protected by alcohol consumption. Most of the protective effects are estimated for females (14.8% of diabetes deaths and 16% of hospitalisations were protected by alcohol in women, however only 3.4% of both diabetes deaths and hospitalisations were protected in men, see Figure 19 and Figure 20). Population rates of alcohol protected diabetes deaths and hospitalisations were similar in most states, except that the population rate of alcohol protected diabetes hospitalisations was much higher in the NT compared with other states. This is due to the fact that both the percentage of diabetes hospitalisations protected by alcohol (20%, see Figure 20) and the prevalence of diabetes hospitalisations were higher in females in the NT.

Table 18. Number and rate of diabetes deaths and hospitalisations protected by alcohol by state in 2010

States	Deaths (rate*)		Hospitalisations (rate*)	
	Men	Women	Men	Women
NSW	9 (0.3)	32 (1.1)	241 (8.3)	837 (27.7)
VIC	10 (0.5)	46 (2.0)	254 (11.6)	920 (40.3)
QLD	11 (0.6)	48 (2.8)	180 (10.4)	598 (34.8)
SA	2 (0.3)	13 (1.7)	63 (9.0)	210 (28.7)
WA	4 (0.5)	18 (2.2)	109 (12.7)	398 (45.9)
TAS	1 (0.6)	6 (2.4)	23 (10.6)	69 (30.3)
NT	0 (0.3)	2 (4.1)	10 (10.4)	83 (121.7)
ACT	1 (0.5)	3 (2.7)	16 (14.1)	45 (36.1)
Total (AUS)	39 (0.4)	169 (1.9)	897 (10.2)	3,159 (35.0)

* Standardised rate per 100,000 population

Figure 19. Proportion of diabetes deaths protected by alcohol by state in Australia in 2010

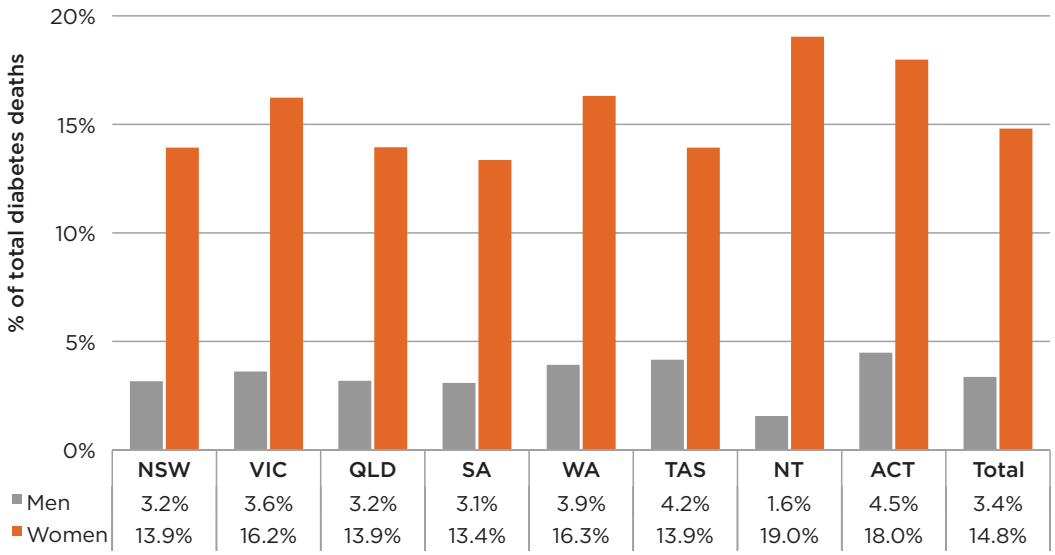
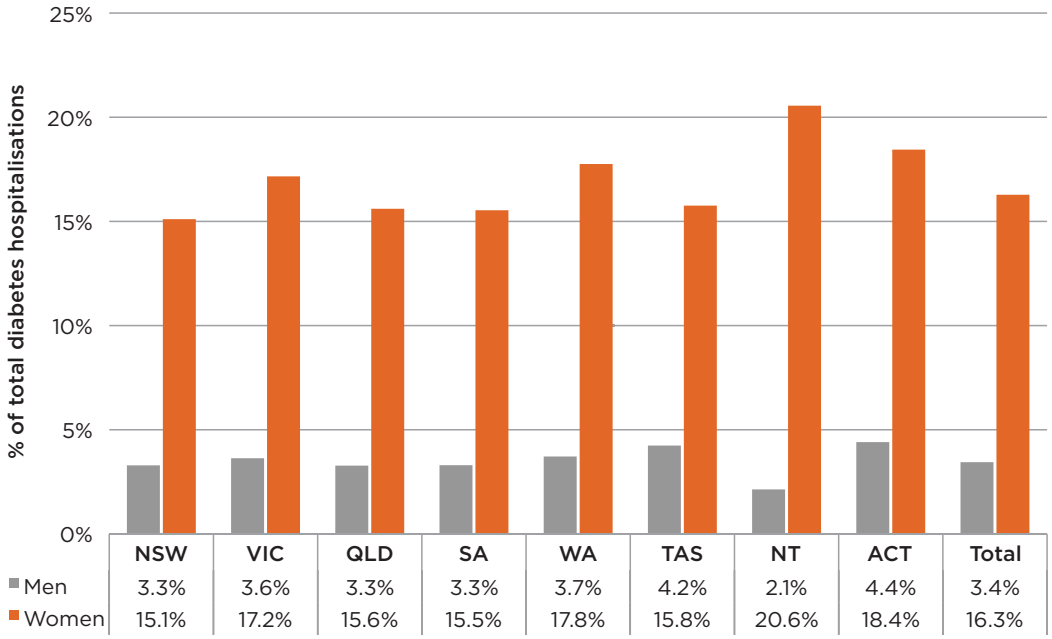


Figure 20. Proportion of diabetes hospitalisations protected by alcohol by state in Australia in 2010



	NSW	VIC	QLD	SA	WA	TAS	NT	ACT	Total
Men	3.3%	3.6%	3.3%	3.3%	3.7%	4.2%	2.1%	4.4%	3.4%
Women	15.1%	17.2%	15.6%	15.5%	17.8%	15.8%	20.6%	18.4%	16.3%

CHAPTER 8

Digestive Diseases

Background

Liver cirrhosis

Cirrhosis of the liver is the most important chronic disease condition caused by alcohol consumption resulting in mortality [100]. A positive association exists between per capita alcohol intake and cirrhosis mortality in both men and women [16, 101]. In addition, the pattern of alcohol consumption is also important in the extent of liver disease [102], for example damage evident in the liver even in the absence of dietary deficiencies [103]. Corrao et al. [20] identified 27 relevant studies dealing with cirrhosis or other chronic liver diseases including a total of more than 2,000 people. A total of 1-2% per year of heavy drinkers will eventually develop cirrhosis [101], with meta-analyses reporting an increased RR of 2.90 following average alcohol intake of 25g/day for cirrhosis. Increased alcohol intake above this level was found to substantially increase risk of cirrhosis. Recent analyses suggested that even amounts equivalent to on average one drink per day are associated with increased risk in women [100].

Lieber and colleagues [103] reviewed the biochemical and molecular pathways involving alcohol and liver disease, while others have reviewed the effects of alcohol on immune function which contribute to the susceptibility of alcohol-related liver disease [104-106].

Pancreatitis

There are two broad categories of pancreatitis relevant for discussion here, acute pancreatitis and chronic pancreatitis [107]. Acute pancreatitis is an acute inflammatory process that involves peri pancreatic tissues and/or remote organ systems. Chronic pancreatitis leads to the progressive and irreversible destruction of exocrine and endocrine glandular pancreatic parenchyma [27]. There is evidence for a link between alcohol consumption and the development of both acute and chronic pancreatitis [108, 109]. Carrao et al. [20] identified 2 relevant studies in their meta-analysis when considering the effects of alcohol on pancreatitis. The RR of pancreatitis is significantly greater (RR=1.34) even at an average of 25g per day. A more recent meta-analysis has been conducted reporting a non-linear association between alcohol consumption and pancreatitis [27]. At low levels of alcohol consumption, RR is relatively flat, but increases significantly to a RR of 1.2 in those who report consuming 36g of alcohol daily.

Ethanol has been found to have both direct toxic effects on the pancreas and indirect effects such as altering the properties of pancreatic juice and toxic effects of ethanol metabolites such as acetaldehyde, reactive oxygen species and fatty acid ethyl esters on pancreatic cells and enzymes [110, 111].

Results

The following tables present information on the number and proportions of digestive disease related deaths and hospitalisations attributable to alcohol, and their breakdown by different jurisdictions. Table 19 shows that 549 male and 237 female digestive disease deaths were attributable to alcohol in 2010, while 6,726 male and 2,971 female hospitalisations for digestive diseases were attributable to alcohol. The majority of deaths in this category for both men and women were due to liver cirrhosis, while hospitalisations involved a spread of burden due to alcoholic gastritis, liver cirrhosis and pancreatitis. Table 20 shows numbers and rates of alcohol-attributable digestive disease deaths

and hospitalisations by state. This table presents a standardised rate of 6.2 deaths in Australian men per 100,000 population and a rate of 2.6 for women due to alcohol-related digestive diseases. For hospitalisations, the standardised rate for Australian men was more than twice the rate reported for women, with the highest rates in the NT and WA for both sexes.

Figure 21 below shows the proportion of digestive disease deaths attributable to alcohol across different jurisdictions. Collectively, alcohol was attributable to the majority of these deaths, with between 55% and 60% of deaths in this disease category attributable to alcohol. In contrast to the data presented related to deaths, hospitalisations due to alcohol-related digestive diseases shows a clear gender difference, with men more adversely affected by liver cirrhosis. This pattern is evident across all of the different jurisdictions presented in Figure 22.

Table 19. Number and percentage of alcohol-attributable digestive diseases deaths and hospitalisations in Australia in 2010

Disease	Deaths (%*)		Hospitalisations (%*)	
	Men	Women	Men	Women
Alcoholic gastritis	N<5	N<5	1,182 (18%)	511 (17%)
Liver cirrhosis	519 (95%)	227 (96%)	2,572 (38%)	1,573 (53%)
Pancreatitis	30 (5%)	9 (4%)	2,971 (44%)	887 (30%)
Total	549 (100%)	237 (100%)	6,726 (100%)	2,971 (100%)

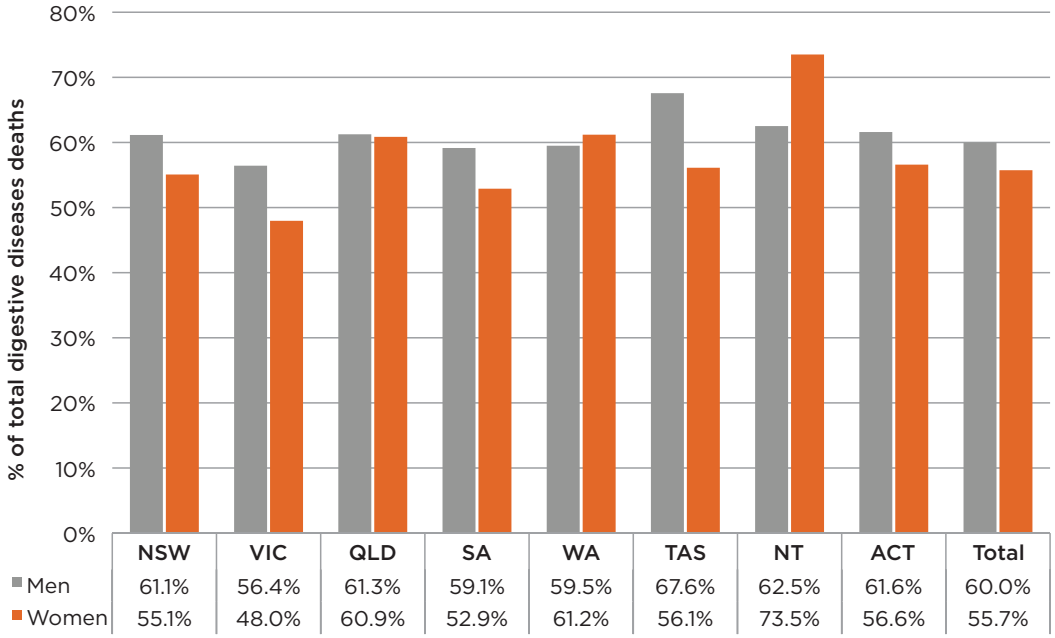
* Percentage of total alcohol-attributable digestive diseases deaths or hospitalisations

Table 20. Number and rate of alcohol-attributable digestive diseases deaths and hospitalisations by state in 2010

States	Deaths (rate*)		Hospitalisations (rate*)	
	Men	Women	Men	Women
NSW	200 (6.9)	73 (2.5)	1,804 (63.0)	701 (23.8)
VIC	111 (5.1)	44 (1.9)	1,638 (75.3)	797 (35.2)
QLD	106 (6.1)	54 (3.1)	1,501 (85.6)	656 (37.0)
SA	50 (7.3)	19 (2.6)	524 (79.0)	229 (33.3)
WA	48 (5.4)	26 (3.0)	824 (88.5)	351 (38.4)
TAS	14 (6.3)	10 (4.8)	115 (54.9)	59 (27.6)
NT	12 (14.9)	8 (14.9)	237 (254.3)	140 (163.4)
ACT	9 (7.0)	2 (1.6)	82 (60.4)	38 (26.8)
Total (AUS)	549 (6.2)	237 (2.6)	6,726 (76.3)	2,971 (33.0)

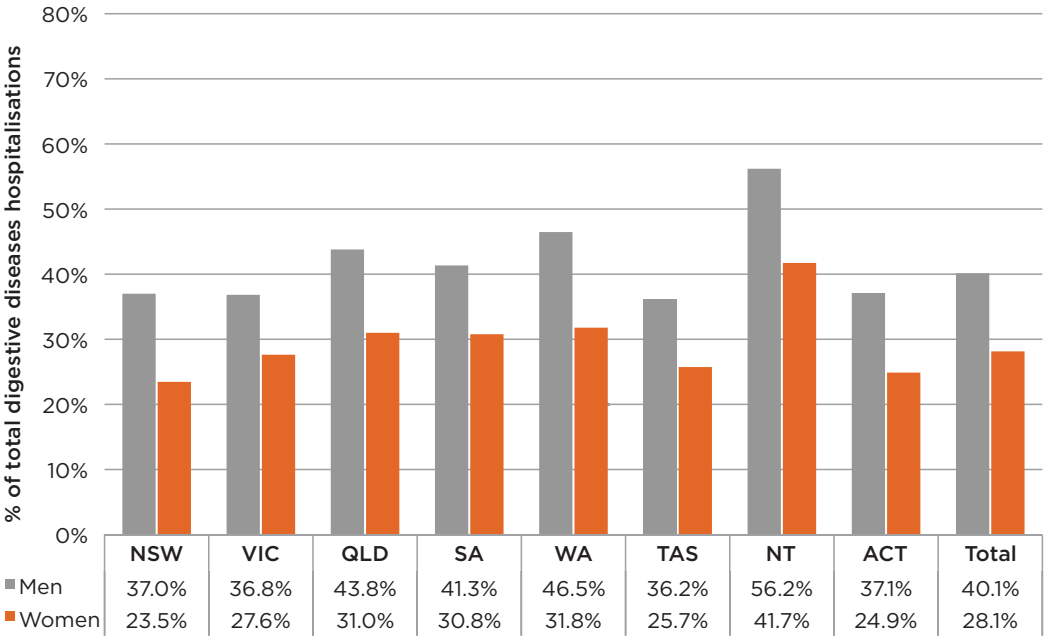
* Standardised rate per 100,000 population

Figure 21. Proportion of digestive diseases deaths attributable to alcohol by state in Australia in 2010



	NSW	VIC	QLD	SA	WA	TAS	NT	ACT	Total
Men	61.1%	56.4%	61.3%	59.1%	59.5%	67.6%	62.5%	61.6%	60.0%
Women	55.1%	48.0%	60.9%	52.9%	61.2%	56.1%	73.5%	56.6%	55.7%

Figure 22. Proportion of digestive diseases hospitalisations attributable to alcohol by state in Australia in 2010



	NSW	VIC	QLD	SA	WA	TAS	NT	ACT	Total
Men	37.0%	36.8%	43.8%	41.3%	46.5%	36.2%	56.2%	37.1%	40.1%
Women	23.5%	27.6%	31.0%	30.8%	31.8%	25.7%	41.7%	24.9%	28.1%

CHAPTER 9

Infectious And Parasitic Diseases

Background

Alcohol consumption, particularly heavy alcohol consumption, has been identified as a risk factor for many respiratory and sexually transmitted diseases [1, 112-114]. Clear links have been established between alcohol consumption and infection with Tuberculosis (TB), pneumonia and Human Immunodeficiency Virus (HIV) [31, 115]. The major pathological reason for this association is that chronic or acute alcohol consumption cause an impaired immune system [1].

The contribution of alcohol exposure to adversely affect the immune system may be both direct and indirect. Alcohol has a broad range of effects on host response against viral and bacterial pathogens, for example alcohol was found to weaken the defensive capability of alveolar macrophages and influence cytokine production and normal T-cell function [116-118]. Another important influence of alcohol on host defence ability is that alcohol induces intestinal leakage and allows bacteria-derived products to enter the liver to create a chronic inflammatory environment aggravating liver injury [119]. These mechanisms together increase alcohol users', particular heavy alcohol users', susceptibility, morbidity and mortality from infection as well as progression of HIV and other liver diseases [119]. Other indirect factors for alcohol consumption contributing to increasing risks of infection include nutritional problems, poor hygiene conditions, risky sex and other social factors [120, 121].

Tuberculosis (TB)

The association between alcohol use and TB has been recognised since 1785 [113]. Many systematic literature reviews and meta-analyses concluded that there is a consistently strong association between heavy drinking and risk of TB infection as well as transmission while controlling for other cofounding variables [74, 79, 122]. The impaired immune system, caused by heavy drinking, increases both individual's susceptibility for TB and risk for onset of clinical symptoms [123]. Although the dose-response relationship between alcohol consumption and TB is still unclear, some studies suggested that risk of TB increases with average alcohol consumption [124]. In the meantime, heavy alcohol drinking is also related with poor clinic outcome and relapse rate of TB [125, 126].

Lower respiratory infections

Alcohol consumption was found to be a risk factor for community-acquired pneumonia (CAP) by many case-control studies [11, 127]. Recent meta-analysis suggested a linear dose-response relationship between alcohol consumption and CAP [31].

HIV

The association between alcohol consumption and HIV is more complicated. Alcohol consumption influences HIV risk through two co-operative pathways: causing immune system function problems and increasing the likelihood of engaging in high risk behaviours [128]. In a review meeting hosted by the Medical Research Council and the WHO in 2008, 25 international experts concluded that the causal relationship between alcohol use and risky sex was still unclear [115]. However, there was a consent from experts that heavy alcohol use worsens the course of HIV due to compromised immunity and negative impact on treatment adherence [115].

Results

The following tables present alcohol related mortality and morbidity caused by infectious and parasitic diseases in Australia in 2010. Table 21 shows that 123 male and female deaths in this category were attributable to alcohol, while 4,990 male and 3,704 hospitalisations were attributable to alcohol. Within this category, lower respiratory infections were responsible for the vast majority of alcohol related infectious diseases deaths and hospitalisations in both genders in this year. According to Table 22, population rates of alcohol-attributed deaths were the same in men and women, but the population rate of alcohol-attributable hospitalisations was higher in men (56.6%) compared with women (41.1%). Similarly with other conditions, NT had the highest population rates of alcohol-attributable infectious diseases deaths and hospitalisations.

Figure 23 and Figure 24 present proportions of infectious and parasitic diseases deaths and hospitalisations attributable to alcohol in each state and territory. Alcohol was attributable for between 8% and 12% of infectious disease related deaths and hospitalisations. The alcohol-attributable proportions were higher in males. There was also a great difference of AAF of infectious diseases deaths among jurisdictions. The proportion of infectious diseases deaths attributable to alcohol in the NT (22.6%), was almost three times as high as the proportion in Tasmania, which is only 8.1%.

Table 21. Number and percentage of alcohol-attributable infectious and parasitic diseases deaths and hospitalisations in Australia in 2010

Disease	Deaths (%*)		Hospitalisations (%*)	
	Men	Women	Men	Women
HIV	2 (2%)	1 (0%)	-	-
Lower respiratory infections	112 (91%)	120 (97%)	4,827 (97%)	3,626 (98%)
Tuberculosis	9 (8%)	3 (2%)	162 (3%)	77 (2%)
Total	123 (100%)	123 (100%)	4,990 (100%)	3,704 (100%)

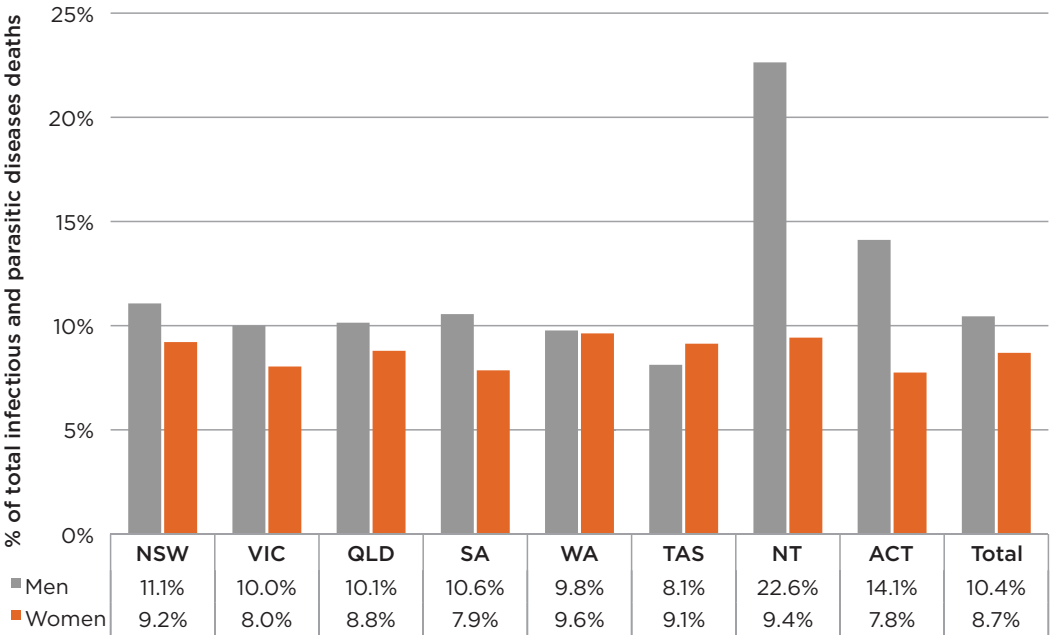
* Percentage of total alcohol-attributable infectious and parasitic diseases deaths or hospitalisations

Table 22. Number and rate of alcohol-attributable infectious and parasitic diseases deaths and hospitalisations by state in 2010

States	Deaths (rate*)		Hospitalisations (rate*)	
	Men	Women	Men	Women
NSW	42 (1.4)	43 (1.4)	1,506 (51.5)	1,094 (36.2)
VIC	33 (1.5)	33 (1.4)	1,371 (62.7)	1,019 (44.7)
QLD	22 (1.3)	20 (1.2)	962 (55.9)	745 (43.5)
SA	12 (1.7)	11 (1.4)	394 (56.6)	289 (39.6)
WA	9 (1.1)	12 (1.4)	494 (55.9)	369 (42.1)
TAS	2 (1.0)	3 (1.4)	76 (34.1)	65 (28.5)
NT	1 (1.7)	1 (1.7)	112 (144.3)	73 (106.6)
ACT	2 (2.0)	1 (1.1)	74 (60.8)	49 (39.5)
Total (AUS)	123 (1.4)	123 (1.4)	4,990 (56.6)	3,704 (41.1)

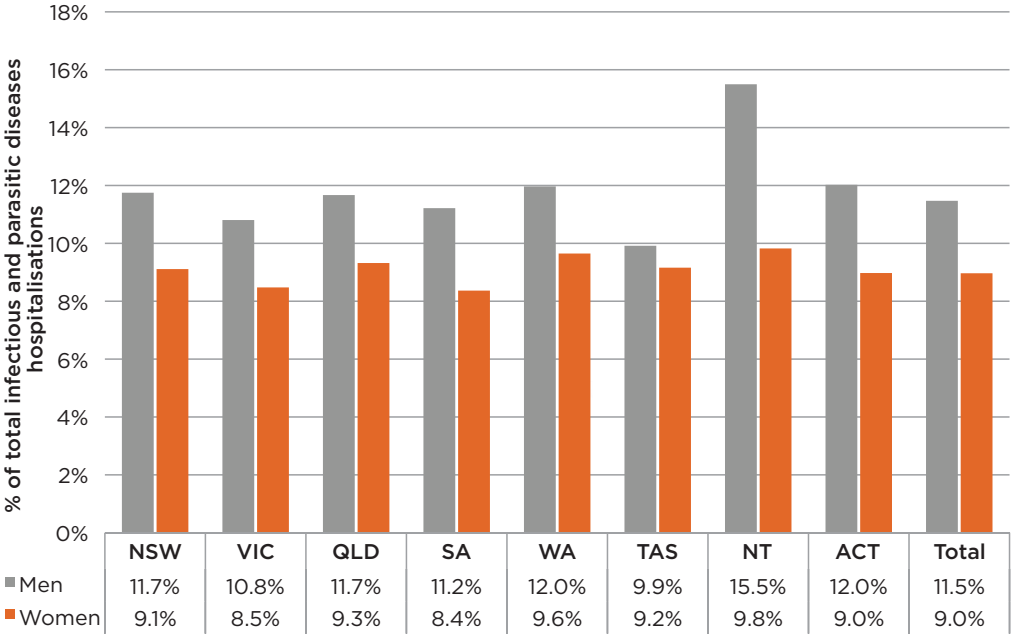
* Standardised rate per 100,000 population

Figure 23. Proportion of infectious and parasitic diseases deaths attributable to alcohol by state in Australia in 2010



	NSW	VIC	QLD	SA	WA	TAS	NT	ACT	Total
Men	11.1%	10.0%	10.1%	10.6%	9.8%	8.1%	22.6%	14.1%	10.4%
Women	9.2%	8.0%	8.8%	7.9%	9.6%	9.1%	9.4%	7.8%	8.7%

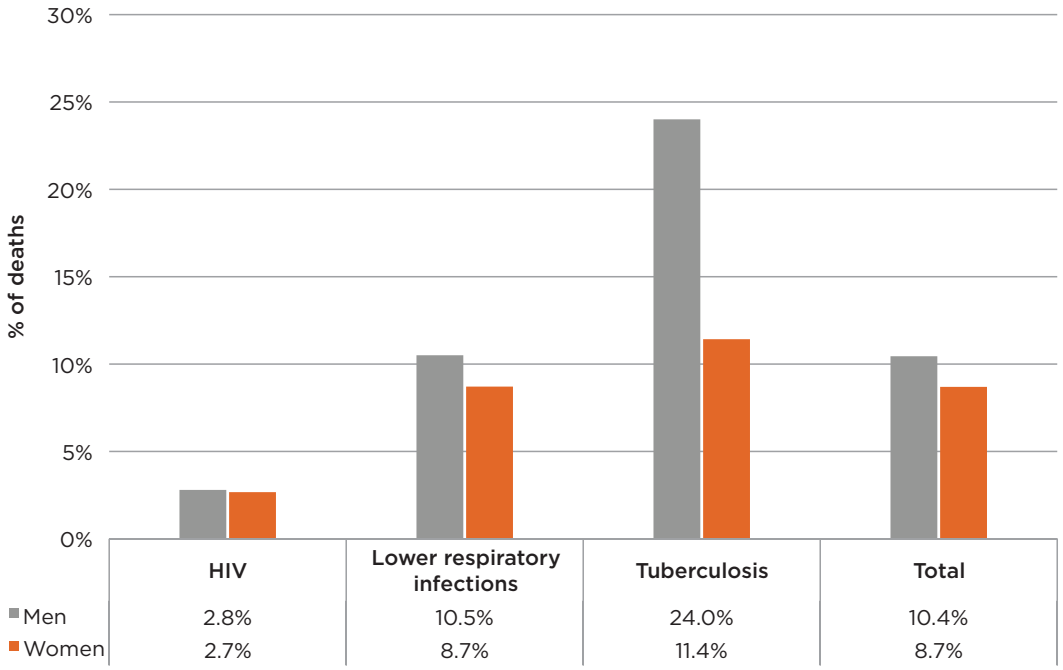
Figure 24. Proportion of infectious and parasitic diseases hospitalisations attributable to alcohol by state in Australia in 2010



	NSW	VIC	QLD	SA	WA	TAS	NT	ACT	Total
Men	11.7%	10.8%	11.7%	11.2%	12.0%	9.9%	15.5%	12.0%	11.5%
Women	9.1%	8.5%	9.3%	8.4%	9.6%	9.2%	9.8%	9.0%	9.0%

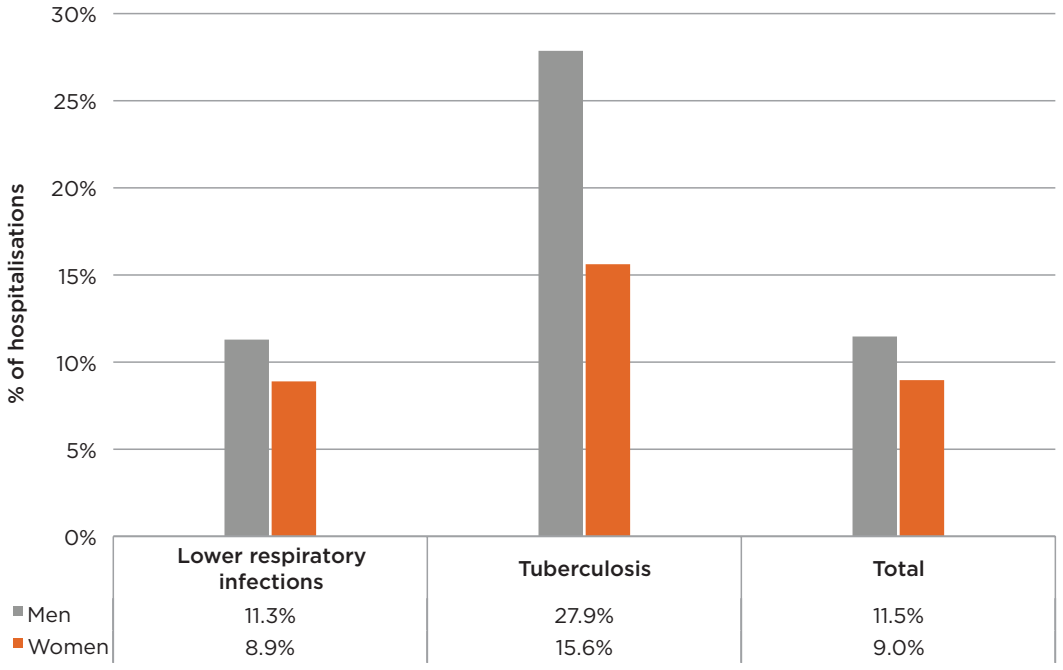
The following figures present proportions of different infectious and parasitic diseases attributable to alcohol. As shown in Figure 25 and Figure 26, tuberculosis had a higher alcohol-attributable burden particularly in males (24% of tuberculosis deaths and 27.9% of hospitalisations in men compared with 11.4% and 15.6% in women). HIV had a lower alcohol-attributable burden in both genders. However, it should be noted that the alcohol burden was calculated only on mortality of HIV not incidence of HIV.

Figure 25. Proportion of infectious and parasitic diseases deaths attributable to alcohol by disease type in 2010



	HIV	Lower respiratory infections	Tuberculosis	Total
Men	2.8%	10.5%	24.0%	10.4%
Women	2.7%	8.7%	11.4%	8.7%

Figure 26. Proportion of infectious and parasitic diseases hospitalisations attributable to alcohol by disease type in 2010



	Lower respiratory infections	Tuberculosis	Total
Men	11.3%	27.9%	11.5%
Women	8.9%	15.6%	9.0%

CHAPTER 10

Injuries

Background

Injuries were responsible for a high proportion of burden, particularly fatal burden, in Australia (estimated to be responsible for 8.3% of non-fatal burden and 11.6% of fatal burden in 2010 [19]). Road injuries rank as the fourth leading cause of mortality burden (YLL), and falls rank as the sixth leading cause of morbidity burden (YLD) in Australia in 2010 [19]. Evidence for causal relationships between alcohol consumption and different types of injuries are clear [2, 37].

Motor vehicle accidents (MVA)

The reasons for alcohol increasing acute risks of MVA are direct. Alcohol consumption has been found to cause impaired performance of multiple mental and motor functions, such as information processing speed, reaction time, visual functions, tracking ability and vigilance [129]. Effects of alcohol on driving skills were also found to be significant for any measured Blood Alcohol Concentration (BAC) above zero, hence Ogden and Moskowitz suggested that there is no risk-free threshold BAC [129]. Many retrospective studies also compared BAC levels of patients who experienced injuries or died from MVA with a control group, and identified an exponential-shape dose-relationship between RR and BAC level [130-132]. Chronic risks of alcohol consumption to MVA were found more related to binge drinking patterns [133]. A recent meta-analysis reviewed 8 studies published from 1994 to 2008 and estimated an increase of 1.24 odds of MVA per 10g increase of consumption [2].

Non-motor vehicle accidents (Non-MVA)

Substantial evidence exists for associations between alcohol consumption and acute risks of falls, drowning, fires, violent behaviours and other self-inflicted injuries [55, 94, 134-137]. Experimental studies have attributed these associations to alcohol consumption causing aggression, reduction of fears of risky behaviours, impaired problem solving ability etc [95, 99, 138, 139]. Other than drinking quantity per occasion, frequency of drinking was found to be associated with aggressive behaviours [140]. There is also an association between alcohol misuse and suicidal behaviours [141]. Chronic alcohol misuse was also found to increase the risk of poor clinical outcomes from injury [142]. Meta-analysis suggested that intentional injuries have the greatest proportional per-drink increase in risk compared with falls, MVA and other unintentional injuries [2].

Results

Table 23 and Table 24 report mortality and morbidity of alcohol-attributable injuries by injury type and state and territory. In total, a substantial number of hospitalisations attributable to alcohol relate to injuries. While 1,239 male and 256 female injury deaths were attributable to alcohol, 47,189 male and 17,779 female hospitalisations were attributable to alcohol. According to Table 23, alcohol-related Non-MVA was responsible for about 85% of alcohol-related injury deaths, and about 95% of alcohol related injuries hospitalisations. Only a small proportion of total alcohol-related injuries were caused by direct alcohol poisoning (total 81 deaths and 1,410 hospitalisations). Population rates of alcohol-attributable injury mortality and morbidity were highest in the NT followed by WA as seen in Table 24.

Table 23. Number and percentage of alcohol-attributable injuries deaths and hospitalisations in Australia in 2010

Disease	Deaths (%*)		Hospitalisations (%*)	
	Men	Women	Men	Women
Alcohol poisoning	60 (5%)	21 (8%)	714 (2%)	690 (4%)
MVA	103 (8%)	17 (7%)	1,812 (4%)	473 (3%)
Non-MVA	1,076 (87%)	218 (85%)	44,663 (95%)	16,616 (93%)
Total	1,239 (100%)	256 (100%)	47,189 (100%)	17,779 (100%)

* Percentage of total alcohol-attributable injuries deaths or hospitalisations

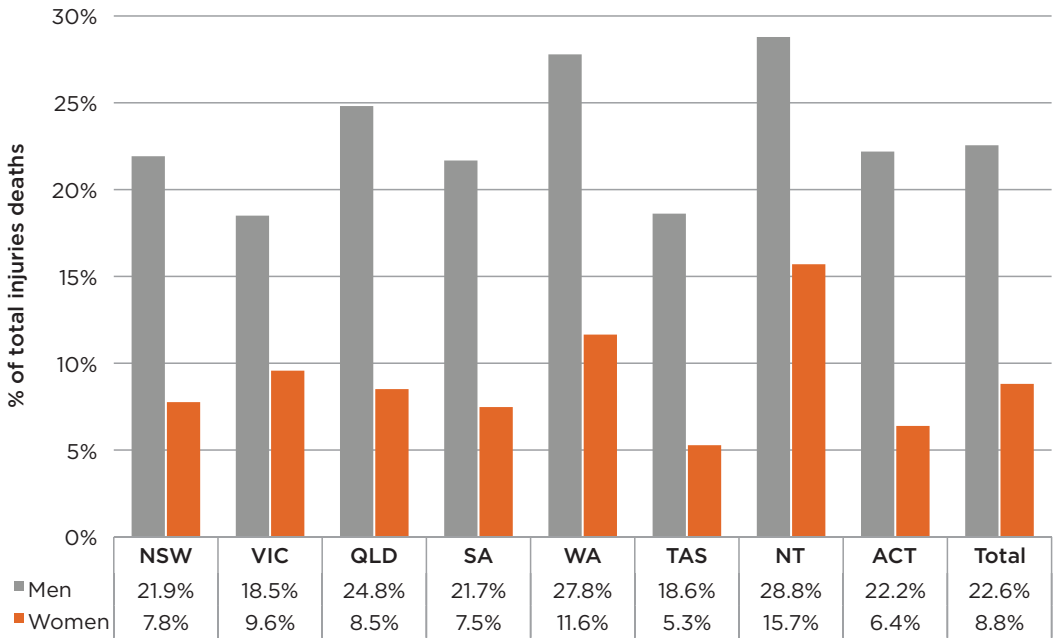
Table 24. Number and rate of alcohol-attributable injuries deaths and hospitalisations by state in 2010

States	Deaths (rate*)		Hospitalisations (rate*)	
	Men	Women	Men	Women
NSW	339 (11.8)	66 (2.2)	14,015 (487.8)	4,958 (167.4)
VIC	238 (10.9)	66 (2.9)	10,117 (462.2)	4,771 (209.9)
QLD	296 (17.0)	52 (2.9)	10,872 (623.7)	3,655 (205.6)
SA	93 (14.1)	17 (2.6)	3,487 (524.7)	1,208 (177.8)
WA	189 (20.3)	41 (4.6)	5,950 (643.1)	2,295 (254.1)
TAS	24 (11.9)	4 (1.9)	858 (419.4)	248 (117.5)
NT	39 (40.3)	6 (6.8)	1,057 (1,147.7)	369 (414.9)
ACT	20 (14.3)	3 (2.5)	833 (605.9)	276 (189.3)
Total (AUS)	1,239 (14.1)	256 (2.8)	47,189 (535.5)	17,779 (197.1)

* Standardised rate per 100,000 population

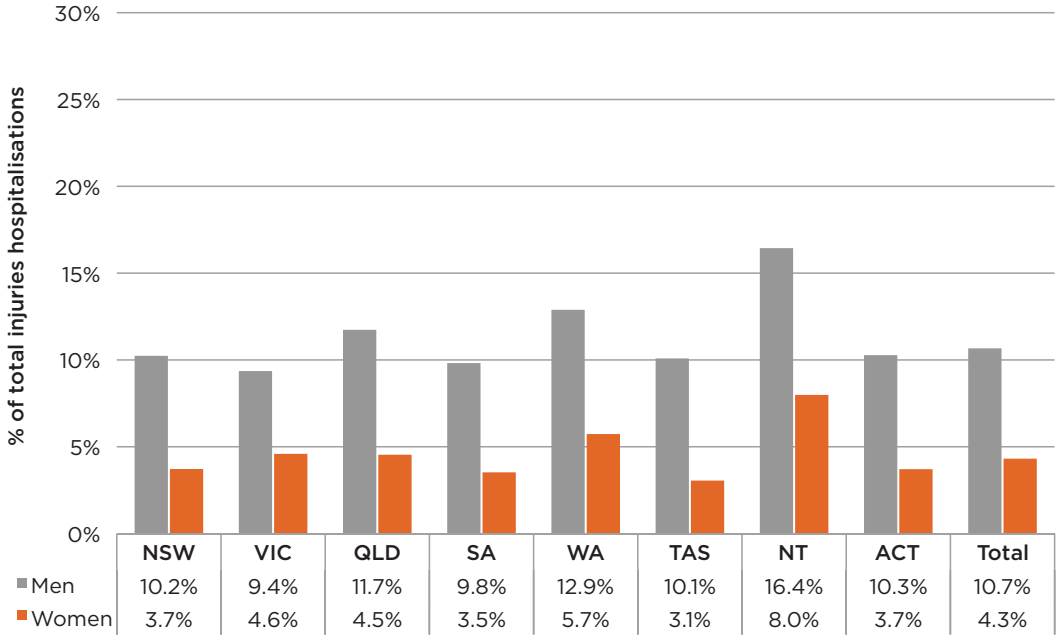
Proportions of injury caused deaths and hospitalisations attributable to alcohol are presented in Figure 27 and Figure 28 for each state and territory. Alcohol contributed proportions were higher for deaths than hospitalisations. The NT had the highest alcohol-attributable proportions for both deaths and hospitalisations, and Tasmania had the lowest proportions and population rates (see Table 24, Figure 27 and Figure 28). According to Figure 29 and Figure 30 alcohol-attributable fractions were higher for Non-MVA than MVA in both genders.

Figure 27. Proportion of injuries deaths attributable to alcohol by state in Australia in 2010



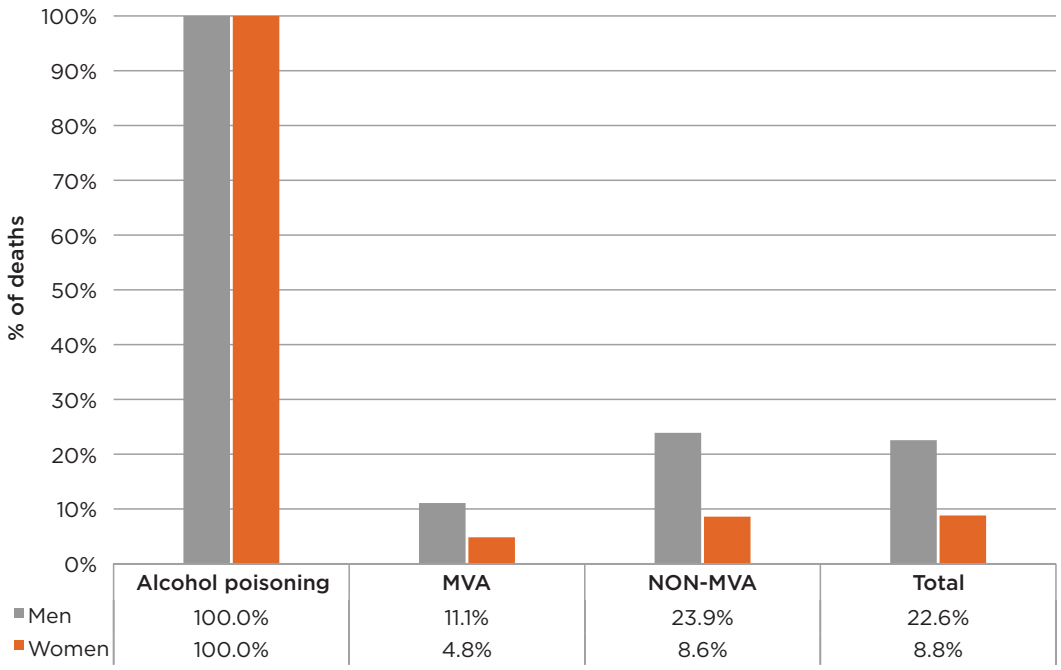
	NSW	VIC	QLD	SA	WA	TAS	NT	ACT	Total
Men	21.9%	18.5%	24.8%	21.7%	27.8%	18.6%	28.8%	22.2%	22.6%
Women	7.8%	9.6%	8.5%	7.5%	11.6%	5.3%	15.7%	6.4%	8.8%

Figure 28. Proportion of injuries hospitalisations attributable to alcohol by state in Australia in 2010



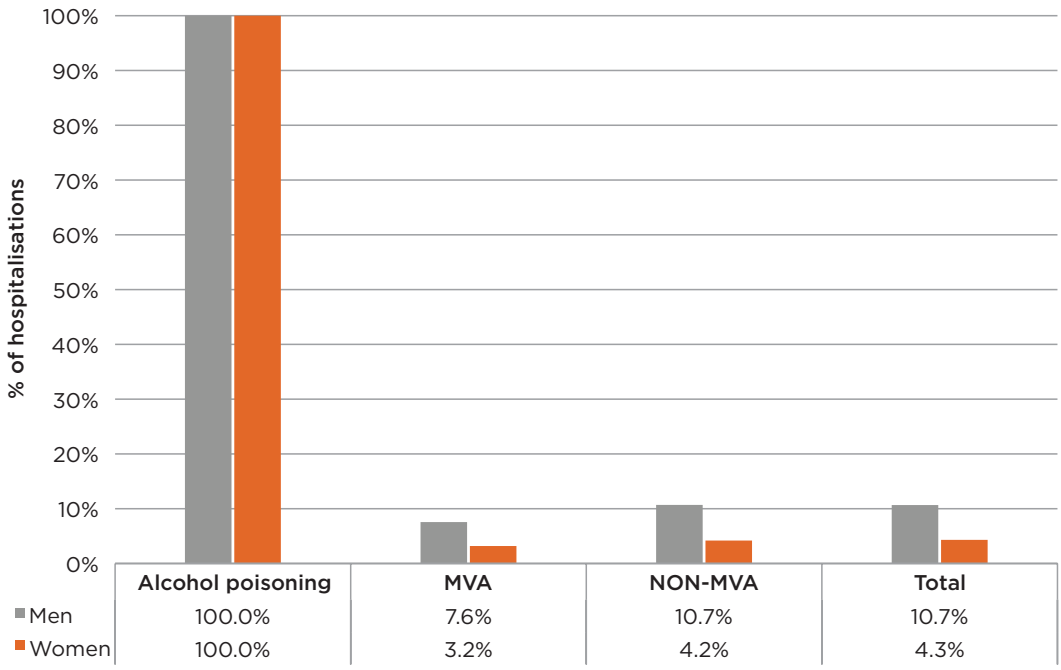
	NSW	VIC	QLD	SA	WA	TAS	NT	ACT	Total
Men	10.2%	9.4%	11.7%	9.8%	12.9%	10.1%	16.4%	10.3%	10.7%
Women	3.7%	4.6%	4.5%	3.5%	5.7%	3.1%	8.0%	3.7%	4.3%

Figure 29. Proportion of injuries deaths attributable to alcohol by disease type in 2010



	Alcohol poisoning	MVA	NON-MVA	Total
Men	100.0%	11.1%	23.9%	22.6%
Women	100.0%	4.8%	8.6%	8.8%

Figure 30. Proportion of injuries hospitalisations attributable to alcohol by disease type in 2010



	Alcohol poisoning	MVA	NON-MVA	Total
Men	100.0%	7.6%	10.7%	10.7%
Women	100.0%	3.2%	4.2%	4.3%

CHAPTER 11

Neuropsychiatric Diseases

Background

The co-morbidity between alcohol misuse and dependence and other neuropsychological and mental conditions is high. This co-morbidity is observed in both clinical samples [120] and in the general population [113, 142]. An Australian study reported that one-third of respondents in the National Survey of Mental Health and Wellbeing who had an alcohol use disorder (abuse or dependence) met the criteria for at least one mental disorder in the previous 12 months [143].

Causality between alcohol use and mental disorders such as depression is hard to define, but more recent Comparative Risk Analysis (CRA) and GBD have assessed the evidence and concluded that the relationship is sufficiently strong for a causal role of alcohol in depression [37, 144]. Such estimates have also been included in the separate analyses completed in Switzerland [145] and New Zealand [146].

Epilepsy

The relationship between alcohol and seizures is complex [139], and a summary of these relationships is provided in Hillbom et al., [147]. In summary, alcohol can act as a central nervous system depressant and increase the normal seizure threshold, while acute alcohol intoxication and rising BAC has also been shown to precipitate seizures in Hillbom et al., [147]. Furthermore, in heavy drinkers, withdrawal from alcohol may also precipitate seizures. The analyses presented in this paper draw from the definition and conditions specified in Rehm et al. [16] that epilepsy is a brain disorder that is characterised by an enduring predisposition to generate epileptic seizures.

Studies have reported a significant dose-response relationship between alcohol use and the onset of epilepsy independent of withdrawal [33, 148]. For example, those consuming on average four, six, or eight drinks had a RR of 1.81, 2.44, and 3.27 compared to non-drinkers. There does not seem to be an increased RR for fewer than four drinks per day [33].

Alcohol has numerous effects on neurotransmitter levels and ion-balance in the central nervous system in particular which may explain the relationship between alcohol use and an increased risk of epilepsy [140, 141]. Samokhalov et al. [165] addressed these mechanisms in more detail, and noted that while there is some evidence that increased risk may be due to brain atrophy or lesions or repeated 'withdrawals' via a "kindling" effect [149], that to date none of the reviewed factors is a unique causative agent of epilepsy or unprovoked seizures.

Results

The number and percentage of alcohol-attributable neuropsychiatric diseases are listed in Table 25. Within this category there was a large neuropsychiatric burden estimated to be attributable to alcohol. Overall, 258 male and 122 female neuropsychiatric deaths were attributable to alcohol, while 30,231 male and 22,695 female hospitalisations were attributable to alcohol. About 17% of alcohol-attributable neuropsychiatric diseases deaths in 2010 were from alcohol-attributable epilepsy, and the rest were caused by mental and behavioural disorders due to use of alcohol including alcohol intoxication, abuse, dependence and other alcohol-induced disorders. This ICD-10 condition (mental and behavioural disorders due to use of alcohol) also contributed >90% of alcohol-attributable neuropsychiatric diseases hospitalisations.

The NT had the highest population rates of alcohol-attributable neuropsychiatric diseases deaths and hospitalisations (see Table 26), among which rates of alcohol-attributed neuropsychiatric deaths were about 10 times higher than other states and territories (death rates were 23.1 per 100,000 population for men and 16.3 per 100,000 for women, whereas in Victoria death rates were only 2.6 and 1.1 per 100,000 population for men and women separately).

Table 25. Number and percentage of alcohol-attributable neuropsychiatric diseases deaths and hospitalisations in Australia in 2010

Disease	Deaths (%*)		Hospitalisations (%*)	
	Men	Women	Men	Women
Epilepsy	44 (17%)	22 (18%)	2,362 (8%)	1,086 (5%)
Mental and behavioural disorders due to use of alcohol	210 (81%)	100 (82%)	27,700 (92%)	21,546 (95%)
Other alcohol-induced neuropsychiatric conditions	N<5	N<5	169 (1%)	63 (0%)
Total	258 (100%)	122 (100%)	30,231 (100%)	22,695 (100%)

* Percentage of total alcohol-attributable neuropsychiatric diseases deaths or hospitalisations

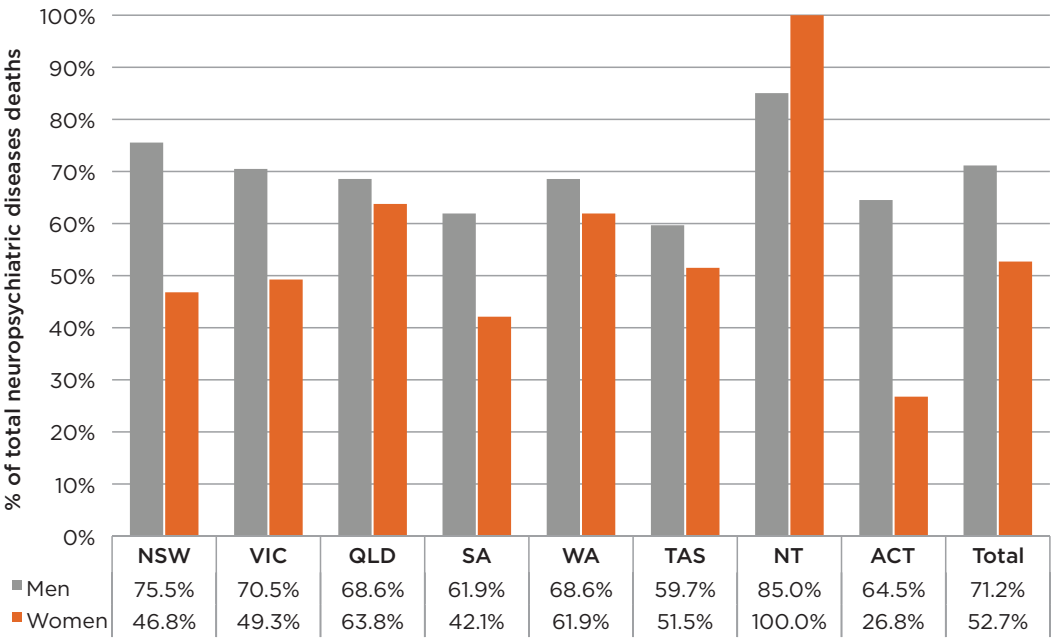
Table 26. Number and rate of alcohol-attributable neuropsychiatric diseases deaths and hospitalisations by state in 2010

States	Deaths (rate*)		Hospitalisations (rate*)	
	Men	Women	Men	Women
NSW	90 (3.1)	33 (1.1)	10,411 (366.0)	7,292 (249.8)
VIC	57 (2.6)	24 (1.1)	7,671 (351.9)	6,811 (302.2)
QLD	46 (2.6)	31 (1.8)	6,040 (345.3)	4,901 (273.9)
SA	15 (2.2)	9 (1.2)	1,816 (277.9)	950 (142.6)
WA	24 (2.7)	12 (1.4)	3,175 (340.2)	1,900 (203.7)
TAS	11 (4.9)	4 (1.6)	391 (188.3)	404 (192.3)
NT	14 (23.1)	7 (16.3)	326 (341.1)	208 (237.0)
ACT	1 (0.9)	2 (1.8)	400 (272.2)	228 (150.1)
Total (AUS)	258 (2.9)	122 (1.4)	30,231 (343.1)	22,695 (251.7)

* Standardised rate per 100,000 population

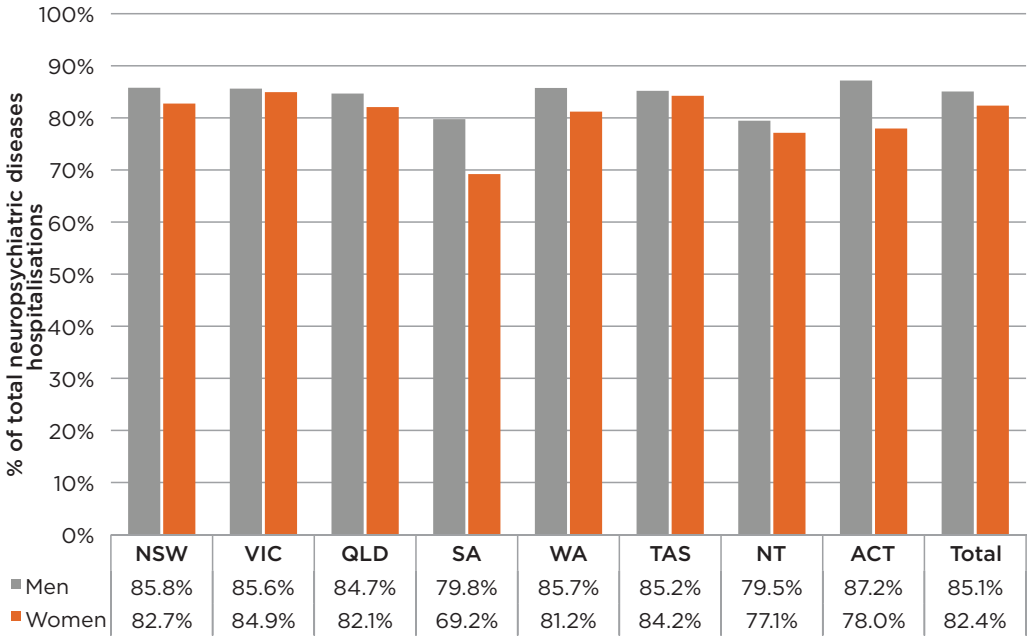
Proportions of neuropsychiatric diseases caused deaths and hospitalisations for each state and territory are listed in Figure 31 and Figure 32. The alcohol-attributable proportion for females in the NT was 100%, this is because there was no death from epilepsy in females in the NT in 2010. Proportions of neuropsychiatric diseases hospitalisations attributable to alcohol were similar in most of states and territories (see Figure 32), and surprisingly the NT did not have the highest proportion. This is caused by a high prevalence of alcohol attributable epilepsy hospitalisations (Table A64) and a low prevalence of hospitalisations for mental and behavioural disorders due to use of alcohol (Table A67).

Figure 31. Proportion of neuropsychiatric diseases deaths attributable to alcohol by state in Australia in 2010



	NSW	VIC	QLD	SA	WA	TAS	NT	ACT	Total
Men	75.5%	70.5%	68.6%	61.9%	68.6%	59.7%	85.0%	64.5%	71.2%
Women	46.8%	49.3%	63.8%	42.1%	61.9%	51.5%	100.0%	26.8%	52.7%

Figure 32. Proportion of neuropsychiatric diseases hospitalisations attributable to alcohol by state in Australia in 2010



	NSW	VIC	QLD	SA	WA	TAS	NT	ACT	Total
Men	85.8%	85.6%	84.7%	79.8%	85.7%	85.2%	79.5%	87.2%	85.1%
Women	82.7%	84.9%	82.1%	69.2%	81.2%	84.2%	77.1%	78.0%	82.4%

Figure 33. Proportion of neuropsychiatric diseases deaths attributable to alcohol by disease type in 2010

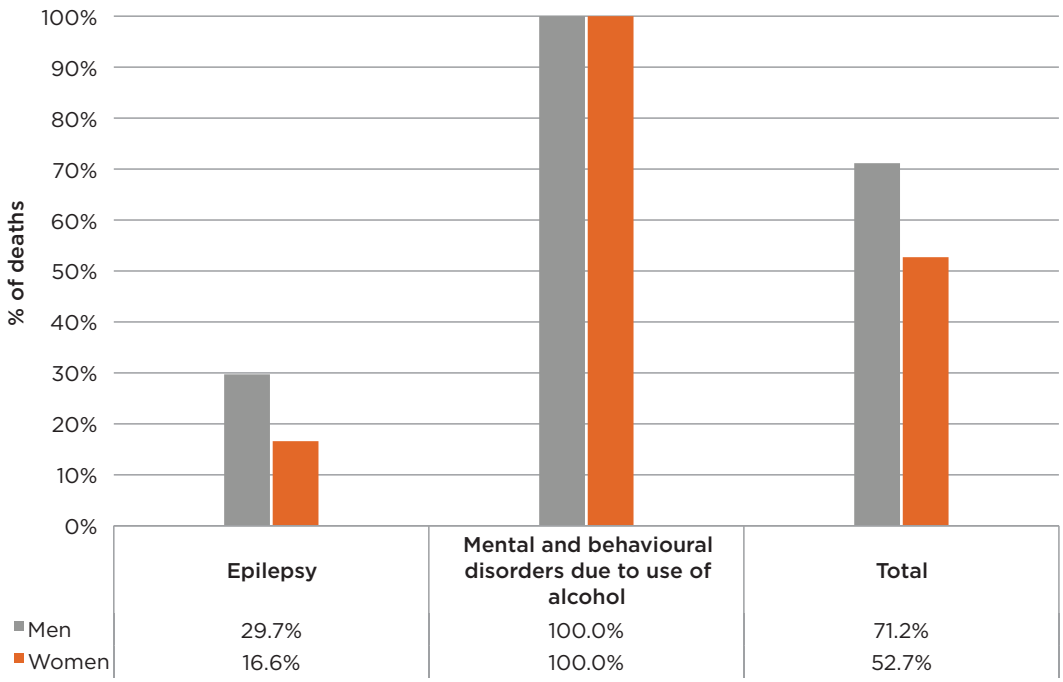
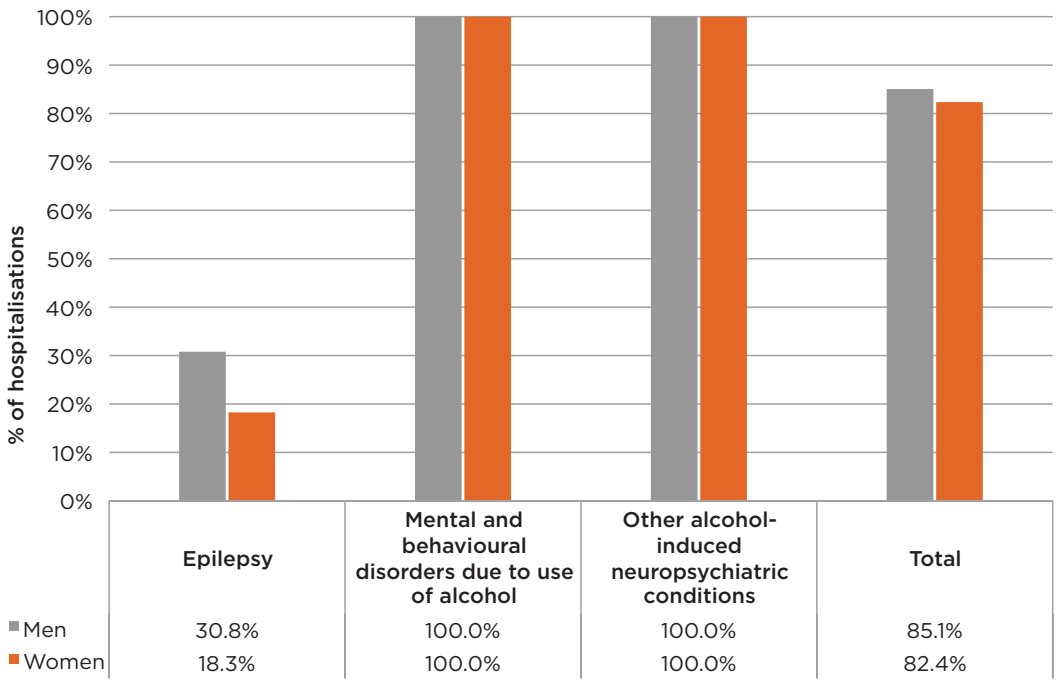


Figure 34. Proportion of neuropsychiatric diseases hospitalisations attributable to alcohol by disease type in 2010



CHAPTER 12

Discussion

Findings

The present report provides an examination of alcohol's contribution to the BoD in Australia in 2010. The methodology underpinning these analyses was based on the current international standard approach, using methods developed in the *Comparative Risk Analyses for the Global Burden of Disease* [9]. The estimates provided in this report were based on consumption and health services data from 2010, and as such form an integral resource for researchers, policy makers and health service workers who wish to gauge the impacts that alcohol has on the Australian health care system. BoD estimates are a valuable tool, enabling an assessment of changing trends of harm in the community, and as such this study builds upon previous Australian work which has investigated the role of alcohol in BoD [3, 4, 6, 7]. This present report is timely given that more than a decade has passed since alcohol's role in the BoD has been investigated in Australia [7]. In addition, recent estimates from comparable countries such as Canada [150], New Zealand [146] and Europe [9] as well as the recent GBD study are available for comparison [8, 151, 152].

Consumption of alcohol in Australia in 2010

PCA estimates reported in these analyses were similar to those reported by WHO for Australia, with a similar gender divide whereby males consumed significantly more alcohol (14.4L) than females (6.5L) on average per year. This finding reflects the stable pattern of alcohol consumption with which Australia has been categorised by WHO [44], suggesting no significant increases in PCA.

One interesting finding refers to reported PCA levels compared to those uplifted based on a triangulation of self-reported survey data with sales and taxation figures collected by the ABS. While mean consumption levels in jurisdictions such as the NT (8.31L), WA (6.56) and Queensland (6.49) were the highest among the states and territories, the proportion of estimated consumption in these states was underestimated by a similar factor to those in states with lower consumption levels such as NSW (5.25L), Victoria (5.20L) and SA (5.22L). This suggests that in all jurisdictions, there are similar difficulties in sampling respondents that are heavy drinkers [52, 153] and this has ramifications for the proportion classified as risky drinkers (estimated based on under-reported survey data). In 5 jurisdictions (NT, Queensland, WA, Tasmania, ACT) more than 50% of male respondents and more than 30% of female respondents reported drinking five or more standard drinks at least once in the past 12 months, and these percentages may be even higher when underreporting problems associated with survey methodology are considered. For example, Mathews and Callinan [153] recently reported that up until age 60, the majority of male drinkers exceed the single drinking occasion limits recommended by the NHMRC at least monthly.

The overall burden of alcohol consumption in Australia

Alcohol has detrimental health effects in a number of disease categories including those that can be classified as acute (e.g. injuries) and chronic conditions such as cardiovascular events, cancers and digestive diseases [144, 154, 155]. In addition, alcohol also has beneficial effects for some conditions including ischemic stroke and ischemic heart disease [12, 20], with these effects larger in females compared with males [16]. However, these beneficial effects are small when considering the overall burden that alcohol plays on the health system. The present report estimates that in 2010 4.7% of deaths in Australian men were attributable

to alcohol and 3.0% of deaths in females were attributable to alcohol.

In addition, this report also provides an examination of differences based on jurisdictions, which have not previously been presented in alcohol-related BoD reports. These analyses showed that the highest proportion of alcohol-attributable deaths for both sexes occurred in the NT, (males: 13.4%, females 8.9%) approximately three-times greater than the national figure (males: 4.7%, females 3.0%), while Victoria (males: 3.9%, females 2.9%) had the lowest proportion of deaths attributable to alcohol. In addition to deaths, 8.8% of hospitalisations for men and 5.3% for women were estimated to be alcohol attributable, with the highest proportion in the NT (males: 12.0%, females 7.1%) and the lowest in SA (males 8.1%, females 4.1%).

These mortality figures present a higher number of deaths attributable to alcohol than that previously estimated by Begg et al [7] (3,430 deaths) and by Ridolfo and Stevenson [6] (3,271 deaths), but are similar to those estimated by Holman et al. [3] (5,360 deaths). More concerning is the large increase in hospitalisations presented in this report compared to previous alcohol-burden studies, with 157,132 hospital separations estimated to be due to alcohol-related causes in Australia in 2010, this number approximately double the estimate of Holman et al. of 76,467. This finding supports recent literature showing increases in alcohol-related harm during a period of relatively stable alcohol consumption [156], particularly morbidity as opposed to mortality [157]. From a BoD perspective, increases in the number of hospital separations can be partly explained by the greater number of conditions that have received sufficient support based on meta-analyses for inclusion in this study compared with previous BoD studies. Alcohol has been identified as either a causal or component factor in more than 200 ICD-10 3-digit disease codes [45, 52] and this number has increased since previous BoD studies reflecting a greater knowledge of alcohol-related effects. This change in hospitalisation numbers may also reflect changes in the drinking patterns amongst high-risk sub-groups, who subsequently require more treatment episodes for alcohol-related conditions such as presentations to emergency departments or alcohol-related ambulance attendances [156]. In addition, utilisation of hospital services has increased. AIHW reported that population rates of hospitalisation separations increased by more than 10% from 2005 to 2010 in Australia [158], and this reflects potential differences in screening, and treatment for a number of conditions including alcohol-related conditions such as breast cancer in women.

Alcohol burden with respect to specific disease conditions

Many conditions included in this report have an AAF of less than 1 (e.g. MVA and certain cancers), because only part of the burden of those conditions is attributable to alcohol [127, 159]. For example, in 2007 IARC monograph working group concluded that there was sufficient evidence for the carcinogenicity of alcohol for a causal link between alcohol consumption and cancers of the oral cavity, pharynx, larynx, oesophagus, liver, colon, rectum and breast cancer in females [53]. The estimated number of deaths in Australian males (861) is greater than that estimated for females (642), however levels of hospitalisation for males and females is similar with 5,175 in males and 5,002 in females. A similar proportion of cancer deaths and hospitalisations due to alcohol were estimated between states and territories, with the highest proportions estimated in the NT and WA for both men and women.

For Australian men and women the highest proportion of deaths in the cardiovascular disease category is for haemorrhagic stroke and ischemic heart disease respectively. In addition, the beneficial effects are due almost exclusively to ischaemic heart disease in men and ischemic stroke in women. Overall, there is estimated to be a higher proportion of total cardiovascular deaths in women than in men, and this relationship is observed in all jurisdictions except the NT. This difference likely reflects the higher reported alcohol consumption among men in the NT compared with other jurisdictions.

It is important to note that for strokes and ischaemic heart disease, where both detrimental and beneficial effects exist (depends on consumption level), the current AAF estimation algorithm cannot separate these two effects in one population group. For example when calculating AAF of ischaemic stroke for females aged 65+, a proportion of this population consumed under a certain amount of alcohol, which has a protective effect (RR lower for this group compared with abstainer), while the rest of drinkers drank over this amount of alcohol (alcohol introduces a higher risk over this amount compared with abstainer). The AAF calculated for females aged 65+ is a neutralisation of protective and detriment effects in these two sub-groups,

which depends on both the prevalence of harmful drinkers and RRs of harmful drinking. The reported numbers of deaths and hospitalisations caused by or protected against by alcohol in these disease categories indicated overall trends of protection or detrimental effects under each age and gender group. Hence when zero deaths or hospitalisation attributable to alcohol are reported for these disease categories for a population, it should not be interpreted as there being no death or hospitalisation caused by alcohol for this population. It should be interpreted as the protective effects exceeding the detrimental effects in the population (a small proportion of this population with heavy drinking behaviours suffering from these conditions caused by alcohol consumption, while the majority of the population with low drinking behaviours benefit from their drinking).

Low to moderate alcohol consumption is associated with reduced risk of type II diabetes [94], with an approximately 30% decrease in observed risk [95]. A greater protective effect was observed in women, likely due to higher levels of low-moderate alcohol consumption reported in females. Estimated rates were similar in most jurisdictions, except the NT. This is likely due to both the proportion of diabetes hospitalisations protected by alcohol being greater, and the prevalence of diabetes hospitalisations being higher in females in the NT.

The present report considers the role of alcohol in the burden of digestive diseases. Within this category, cirrhosis of the liver was the most important chronic disease condition caused by alcohol consumption resulting in mortality [100], with greater burden on males compared with females. The majority of deaths in both men and women were found to be due to liver cirrhosis. Hospitalisations within this category, however, involve a spread of burden due to each of the conditions considered (alcoholic gastritis, liver cirrhosis and pancreatitis), again with a higher burden in men with a standardised rate more than twice that of women and the highest rates of hospitalisations in the NT and WA for both sexes.

Heavy alcohol consumption is a risk factor for many respiratory and sexually transmitted diseases [1, 112-114], likely caused by impairment of the immune system [1]. Within this category, lower respiratory infections were estimated to be responsible for the vast majority of alcohol related infectious diseases deaths and hospitalisations in both genders, but population rates of alcohol-attributable hospitalisations were higher among men (56.7%) compared with women (41.1%). There are also marked differences between different jurisdictions, with the proportion of infectious disease deaths attributable to alcohol in the NT (22.6%) almost three times higher than the proportion in Tasmania (8.1%).

Injures are responsible for a high proportion of both morbidity and mortality in Australia [19], with MVA ranking as the fourth leading cause of overall mortality burden, and falls ranking as the sixth leading cause of morbidity burden in Australia in 2010 [19]. The evidence for causal relationships between alcohol consumption and different types of injuries has been reported in previous work [2, 37]. Within this category, alcohol-related MVA and Non-MVA were responsible for the greatest burden. Non-MVA was responsible for about 85% of alcohol-related injury deaths and about 95% of alcohol related injury hospitalisations. Alcohol burden within this category reflects high rates of deaths compared with hospitalisations, and this likely reflects the burden associated with young road users compared with other conditions included in this report (such as chronic diseases which adversely affect older Australians [34, 127, 160]). The NT had the highest alcohol-attributable proportions for both deaths and hospitalisations and Tasmania had the lowest proportions and population rates.

Approximately 17% of alcohol-attributable neuropsychiatric diseases deaths in 2010 were attributable to alcohol-related epilepsy, with the rest in this category caused by mental and behavioural disorders including alcohol intoxication, abuse and dependence. The NT had the highest population rates of alcohol-attributable neuropsychiatric diseases deaths and hospitalisations with rates approximately 10 times higher than other states and territories (death rates were 23 per 100,000 population for men and 16.3 per 100,000 for women, whereas in Victoria death rates were only 2.6 and 1.1 per 100,000 population for men and women separately). The co-morbidity between alcohol misuse and dependence and other neuropsychological and mental conditions is high [113, 120, 142], with an Australian study finding that one-third of respondents in the National Survey of Mental Health and Wellbeing who had an alcohol use disorder (abuse or dependence) meeting the criteria for at least one mental disorder in the previous 12 months [143].

Despite this, the burden associated with this category is likely underestimated. This is because the causality between alcohol use and mental disorders such as depression is hard to define, even though

some recent studies have noted that the relationship is sufficiently strong for a causal role of alcohol in depression [37, 144].

Limitations

In estimating PCA for the present study, survey data were used from the 2010 NDSHS. However, a limitation with such surveys includes underreporting of alcohol consumption when compared with national sales and taxation figures [36] by between 30-70% [159]. Underreporting in national surveys is a function of respondents providing lower estimates of true actual consumption due to a desire to conceal it, or because high alcohol consumers in the community such as the homeless or those institutionalised are excluded from the sample or are reluctant to participate [156, 159]. To address this limitation, relevant adjustments consistent with GBD methodology were used to overcome underreporting of alcohol consumption (see Chapter 2). Specifically, we first estimated state-level annual PCA using the 2010 NDSHS data, then uplifted these data using the National estimation of PCA[11]. In WA, NT and Queensland the uplifted PCAs were corrected using available sales and taxation data from the 2009/2010 financial year.

In addition to concerns with alcohol-related 'volume' estimates, alcohol-related harm is also dependent on the pattern of consumption, [154, 155, 161] with heavy drinking occasions or 'binges' detrimental in a number of outcomes [161]. To address this issue, we also obtained data of proportions of binge drinkers and frequencies of binge drinking from NDSHS. However there is no alternative data available to assist us to correct the underreported 'binge' drinking occasions reported in the survey. Hence, there is likely an underestimation of alcohol burden for conditions such as injuries, ischaemic heart disease and ischaemic stroke, where drinking patterns also contribute to harm.

The AAF calculations are algorithms that use the distribution of alcohol consumption and drinking patterns in one population, and the RR of a disease obtained from other populations (normally obtained from meta-analysis) to calculate proportion of the disease outcomes attributable to alcohol. Most studies used in meta-analysis for deriving RR were not from Australia. Hence similar with other BoD studies, assuming a similarity between the population where RR was obtained from and the population where RR was applied to may introduce potential bias for our estimated results [127]. However, RRs were predominantly extracted from studies conducted in high-income countries (more comparable with Australia), which may reduce estimation bias caused by this problem.

It is also important to note that the current BoD methodology assumes stable alcohol exposure for individuals during the two decades for chronic conditions [9]. Hence, there is potential bias associated with estimation of alcohol attributable fractions for chronic conditions such as cancers given that drinking patterns may not be stable across this timeframe. Future studies can address this problem by including drinking patterns change in the BoD methodology.

Future Directions

This report provides a quantification of the burden of disease and injury in Australia which the contribution of alcohol to the burden of disease in Australia. For example, these estimates may form the basis for a future cost of illness study to assess how current funding is allocated to tackling alcohol-related burden in the Australian health care system, and how to determine better estimates for future funding. Indeed, given the differences between jurisdictions with respect to alcohol consumption, future work should continue to extend this type of analysis to provide estimates that are relevant to sub-populations, and to support policy responses at jurisdictional and national levels.

AAFs were applied only to principal diagnoses (underlying causes for deaths) not to other primary diagnoses (associated causes for deaths). However in 2010 hospitalisation records, there were an additional 76,681 separations where ICD-10 codes F10 (mental health and behaviour disorders due to use of alcohol) or T51 (toxic effect of alcohol) were coded as other primary diagnoses (records not included in the study due to principal diagnoses not in the study diseases list). The current Alcohol BoD methodology cannot employ both principal and other primary diagnoses, although they are both important in determining overall cost and burden

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attributable to alcohol. Future studies are needed to develop methodology considering both principal and other primary diagnoses to fully understand the contribution of alcohol to BoD in Australia.

Conclusion

This study extends our understanding of the role that alcohol plays with respect to Australian disease, illness and injury and builds upon a strong record of research which has previously investigated these issues [3, 4, 6, 7]. Importantly, this report extends these findings by including the latest methodology associated with Alcohol BoD studies overseas [9, 11, 146], thus including the latest RR derived from meta-analyses and including conditions and illness types not previously considered. Also, this report provides estimates for different states and territories in a number of different disease types and injuries.

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APPENDIX

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Table A1. Frequency of drinking more than four standard drinks at a time for Australians (15+)

State	Everyday	5-6 days a week	3-4 days a week	1-2 days a week	2-3 days a month	About 1 day a month	Less often	Never	Do not know
NSW	2.11%	1.33%	2.19%	6.21%	6.95%	10.27%	6.77%	62.19%	1.99%
VIC	1.48%	1.38%	2.57%	5.69%	8.76%	10.17%	7.09%	61.50%	1.37%
QLD	2.73%	1.84%	3.02%	6.74%	10.45%	12.10%	7.11%	54.17%	1.82%
SA	1.61%	1.53%	1.98%	6.70%	7.83%	11.42%	6.70%	61.01%	1.21%
WA	2.77%	1.97%	1.87%	8.28%	8.96%	11.29%	7.56%	55.69%	1.60%
TAS	1.85%	1.51%	3.06%	6.01%	8.46%	10.53%	7.82%	59.87%	0.88%
NT	4.33%	2.37%	4.02%	9.33%	9.69%	13.90%	6.14%	49.24%	0.97%
ACT	1.26%	1.38%	2.37%	5.72%	10.86%	12.70%	8.87%	55.31%	1.53%
Total	2.11%	1.54%	2.44%	6.45%	8.49%	10.88%	7.04%	59.38%	1.66%

Table A2. Partially alcohol-attributable diseases and injuries identified by reviews and meta-analysis

	Relevant References	Summary Effect of alcohol consumption
Cancers		
Breast cancer	[20, 53, 57, 58, 61]	Detrimental in females
Colon cancer	[20, 53-55]	Detrimental
Larynx cancer	[20, 53]	Detrimental
Liver cancer	[20, 53]	Detrimental
Oral cavity and pharynx cancer	[20, 53]	Detrimental
Rectum cancer	[20, 53, 54]	Detrimental
Cardiovascular Diseases		
Cardiac arrhythmias	[20, 21, 86]	Detrimental
Hypertensive disease	[20, 23, 69]	Detrimental
Ischaemic heart disease (IHD)	[20, 76]	Beneficial in low-moderate amounts, detrimental in higher amounts or where heavy drinking occasions are present
Ischaemic stroke	[20, 22]	Detrimental or beneficial depends on patterns of drinking (similar to IHD)
Haemorrhagic stroke	[20, 22]	Mainly detrimental, except for moderate alcohol consumption
Diabetes		
Diabetes mellitus	[94-96]	Beneficial (low-moderate levels)
Digestive Diseases		
Liver cirrhosis	[20, 100, 103, 162]	Detrimental
Pancreatitis	[20, 27]	Detrimental
Infectious and parasitic diseases		
HIV	[115, 163]	Sufficient evidence of causal impact on course of disease but not incidence
Lower respiratory infections		Detrimental
Tuberculosis	[115, 164]	Detrimental
Injuries		
MVA	[2]	Detrimental
NON-MVA	[2, 134]	Detrimental
Neuropsychiatric diseases		
Epilepsy	[33]	Detrimental

Cancers

Table A3. Crude rate of alcohol-attributable cancers deaths and hospitalisations by state in 2010

State	Crude death rate*		Crude hospitalisation rate*	
	Men	Women	Men	Women
NSW	10.2	7.3	52.6	53.2
VIC	8.4	7.3	54.7	58.4
QLD	10.7	6.8	74.2	59.2
SA	9.8	7.2	56.0	52.3
WA	9.3	6.5	59.3	52.6
TAS	14.2	8.5	71.4	51.2
NT	11.0	7.6	56.8	37.0
ACT	6.6	6.3	44.5	58.1
Total (AUS)	9.8	7.1	58.7	55.4

* Crude rate per 100,000 population

Figure A1. Proportion of cancers YLL, YLD and DALYs attributable to alcohol in Australia in 2010

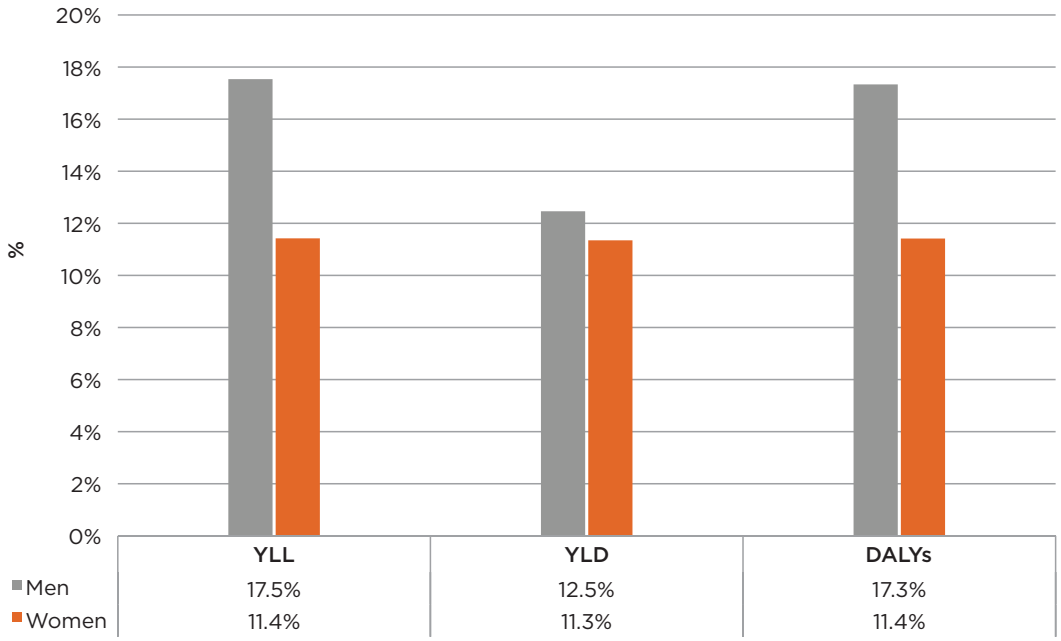

Table A4. Number and proportion of alcohol-attributable breast cancer deaths and hospitalisations by state in 2010 (women only)

State	Deaths (%*)	Hospitalisations (%*)
NSW	119 (12.3%)	1,013 (12.8%)
VIC	90 (11.9%)	865 (12.5%)
QLD	62 (12.4%)	666 (13.5%)
SA	28 (11.3%)	237 (12.3%)
WA	34 (13.8%)	317 (14.0%)
TAS	9 (11.9%)	65 (12.7%)
NT	2 (15.3%)	17 (15.4%)
ACT	6 (12.6%)	59 (12.9%)
Total (AUS)	349 (12.3%)	3,239 (12.9%)

* Proportion of breast cancerdeaths or hospitalisations attributable to alcohol

Table A5. Standardised rate and crude rate of alcohol-attributable breast cancer deaths and hospitalisations by state in 2010 (women only)

State	Death rate (crude rate)*	Hospitalisation rate (crude rate)*
NSW	3.97 (4.07)	34.14 (34.52)
VIC	3.94 (3.95)	38.24 (38.13)
QLD	3.59 (3.48)	37.87 (37.50)
SA	3.82 (4.07)	33.68 (34.85)
WA	3.89 (3.69)	35.34 (34.47)
TAS	4.09 (4.45)	29.42 (31.08)
NT	2.14 (1.79)	23.70 (20.30)
ACT	4.33 (3.74)	43.09 (38.73)
Total (AUS)	3.87 (3.87)	35.89 (35.89)

* Standardised rate (crude rate) per 100,000 population

Table A6. Number and proportion of alcohol-attributable colon cancer deaths and hospitalisations by state in 2010

State	Deaths (%*)		Hospitalisations (%*)	
	Men	Women	Men	Women
NSW	20 (5.8%)	24 (7.3%)	173 (5.8%)	198 (7.1%)
VIC	15 (5.4%)	15 (6.0%)	139 (5.4%)	148 (6.0%)
QLD	13 (5.8%)	15 (7.4%)	114 (5.9%)	135 (7.2%)
SA	6 (5.9%)	7 (6.6%)	46 (5.9%)	49 (6.6%)
WA	7 (5.6%)	5 (6.9%)	49 (5.8%)	46 (6.7%)
TAS	2 (5.0%)	4 (7.8%)	13 (5.2%)	19 (7.7%)
NT	1 (6.5%)	N<5	4 (7.8%)	2 (6.4%)
ACT	1 (5.6%)	1 (7.0%)	7 (5.6%)	9 (6.7%)
Total (AUS)	64 (5.7%)	71 (6.9%)	544 (5.7%)	607 (6.8%)

* Proportion of colon cancer deaths or hospitalisations attributable to alcohol

Table A7. Standardised rate and crude rate of alcohol-attributable colon cancer deaths and hospitalisations by state in 2010

State	Death rate (crude rate)*		Hospitalisation rate (crude rate)*	
	Men	Women	Men	Women
NSW	0.67 (0.69)	0.78 (0.81)	5.88 (6.07)	6.51 (6.75)
VIC	0.70 (0.70)	0.66 (0.67)	6.36 (6.35)	6.49 (6.53)
QLD	0.76 (0.74)	0.90 (0.85)	6.72 (6.59)	7.98 (7.60)
SA	0.85 (0.93)	0.88 (0.99)	6.50 (7.00)	6.65 (7.35)
WA	0.76 (0.70)	0.64 (0.59)	5.63 (5.29)	5.35 (5.00)
TAS	0.78 (0.89)	1.50 (1.67)	5.31 (5.91)	8.18 (9.09)
NT	0.76 (0.54)	N<5	6.85 (4.29)	4.35 (2.39)
ACT	0.69 (0.55)	1.01 (0.80)	5.80 (4.79)	7.51 (6.01)
Total (AUS)	0.72 (0.72)	0.79 (0.79)	6.18 (6.18)	6.73 (6.73)

* Standardised rate (crude rate) per 100,000 population

Table A8. Number and proportion of alcohol-attributable larynx cancer deaths and hospitalisations by state in 2010

State	Deaths (%*)		Hospitalisations (%*)	
	Men	Women	Men	Women
NSW	21 (30.6%)	3 (16.5%)	97 (31.1%)	8 (16.9%)
VIC	15 (27.3%)	N<5	103 (29.0%)	7 (16.9%)
QLD	15 (27.2%)	2 (15.7%)	103 (31.1%)	12 (17.2%)
SA	4 (28.9%)	N<5	33 (30.0%)	1 (14.2%)
WA	5 (29.4%)	N<5	31 (31.6%)	4 (20.1%)
TAS	1 (22.9%)	N<5	6 (23.4%)	N<5
NT	2 (39.3%)	N<5	4 (42.1%)	2 (22.6%)
ACT	N<5	N<5	7 (32.5%)	N<5
Total (AUS)	64 (28.8%)	7 (16.0%)	385 (30.4%)	35 (17.5%)

* Proportion of larynx cancer deaths or hospitalisations attributable to alcohol

Table A9. Standardised rate and crude rate of alcohol-attributable larynx cancer deaths and hospitalisations by state in 2010

State	Death rate (crude rate)*		Hospitalisation rate (crude rate)*	
	Men	Women	Men	Women
NSW	0.71 (0.73)	0.09 (0.09)	3.31 (3.40)	0.27 (0.27)
VIC	0.69 (0.68)	N<5	4.72 (4.70)	0.31 (0.31)
QLD	0.89 (0.87)	0.09 (0.09)	5.96 (5.90)	0.69 (0.68)
SA	0.59 (0.62)	N<5	4.76 (5.02)	0.28 (0.29)
WA	0.61 (0.57)	N<5	3.41 (3.24)	0.56 (0.54)
TAS	0.61 (0.69)	N<5	2.63 (2.95)	N<5
NT	3.21 (2.47)	N<5	4.21 (4.29)	1.15 (1.19)
ACT	N<5	N<5	5.80 (4.79)	N<5
Total (AUS)	0.73 (0.73)	0.08 (0.08)	4.35 (4.35)	0.39 (0.39)

* Standardised rate (crude rate) per 100,000 population

Table A10. Number and proportion of alcohol-attributable liver cancer deaths and hospitalisations by state in 2010

State	Deaths (%*)		Hospitalisations (%*)	
	Men	Women	Men	Women
NSW	49 (15.3%)	16 (10.7%)	132 (15.5%)	35 (10.8%)
VIC	32 (14.2%)	13 (10.1%)	115 (14.8%)	22 (10.2%)
QLD	23 (14.8%)	9 (10.6%)	68 (15.7%)	17 (11.1%)
SA	9 (14.6%)	3 (9.4%)	32 (14.9%)	9 (9.7%)
WA	13 (15.5%)	4 (11.6%)	35 (15.9%)	10 (11.6%)
TAS	3 (13.5%)	1 (10.4%)	4 (12.5%)	2 (10.3%)
NT	1 (17.4%)	1 (11.3%)	5 (18.8%)	1 (11.8%)
ACT	1 (16.1%)	1 (10.8%)	4 (15.9%)	2 (10.8%)
Total (AUS)	131 (14.9%)	48 (10.5%)	395 (15.3%)	98 (10.7%)

* Proportion of liver cancer deaths or hospitalisations attributable to alcohol

Table A11. Standardised rate and crude rate of alcohol-attributable liver cancer deaths and hospitalisations by state in 2010

State	Death rate (crude rate)*		Hospitalisation rate (crude rate)*	
	Men	Women	Men	Women
NSW	1.67 (1.71)	0.52 (0.54)	4.54 (4.63)	1.20 (1.23)
VIC	1.44 (1.44)	0.56 (0.56)	5.29 (5.25)	0.97 (0.97)
QLD	1.36 (1.33)	0.51 (0.49)	3.87 (3.84)	0.99 (0.96)
SA	1.35 (1.43)	0.44 (0.49)	4.60 (4.87)	1.08 (1.18)
WA	1.53 (1.45)	0.46 (0.42)	3.95 (3.78)	1.17 (1.09)
TAS	1.38 (1.53)	0.55 (0.62)	2.21 (2.46)	0.84 (0.96)
NT	2.58 (1.29)	1.95 (0.96)	10.28 (6.44)	1.15 (1.19)
ACT	0.63 (0.55)	0.77 (0.60)	3.25 (2.74)	0.88 (0.67)
Total (AUS)	1.49 (1.49)	0.53 (0.53)	4.49 (4.49)	1.08 (1.08)

* Standardised rate (crude rate) per 100,000 population

Table A12. Number and proportion of alcohol-attributable oesophagus cancer deaths and hospitalisations by state in 2010

State	Deaths (%*)		Hospitalisations (%*)	
	Men	Women	Men	Women
NSW	86 (29.4%)	18 (15.2%)	295 (29.4%)	57 (15.4%)
VIC	53 (26.6%)	14 (15.2%)	244 (27.5%)	60 (15.7%)
QLD	53 (27.6%)	8 (15.0%)	210 (28.5%)	33 (16.5%)
SA	20 (27.6%)	3 (11.8%)	85 (28.3%)	11 (13.0%)
WA	22 (28.9%)	7 (18.3%)	119 (29.7%)	27 (18.5%)
TAS	10 (27.4%)	1 (13.0%)	28 (27.2%)	3 (12.9%)
NT	N<5	2 (19.3%)	5 (38.7%)	N<5
ACT	2 (31.0%)	N<5	13 (31.4%)	3 (16.0%)
Total (AUS)	247 (28.1%)	53 (15.3%)	1,000 (28.7%)	194 (15.8%)

* Proportion of oesophagus cancer deaths or hospitalisations attributable to alcohol

Table A13. Standardised rate and crude rate of alcohol-attributable oesophagus cancer deaths and hospitalisations by state in 2010

State	Death rate (crude rate)*		Hospitalisation rate (crude rate)*	
	Men	Women	Men	Women
NSW	2.95 (3.03)	0.60 (0.62)	10.06 (10.32)	1.85 (1.91)
VIC	2.41 (2.41)	0.62 (0.62)	11.24 (11.19)	2.63 (2.65)
QLD	3.10 (3.05)	0.45 (0.43)	12.24 (12.08)	1.90 (1.86)
SA	2.81 (2.98)	0.39 (0.44)	12.26 (12.94)	1.48 (1.62)
WA	2.55 (2.41)	0.79 (0.74)	13.63 (12.94)	3.24 (3.04)
TAS	4.51 (4.88)	0.60 (0.67)	12.74 (13.79)	1.26 (1.43)
NT	N<5	2.96 (1.79)	7.64 (6.44)	N<5
ACT	1.53 (1.30)	N<5	10.04 (8.90)	2.44 (2.00)
Total (AUS)	2.80 (2.80)	0.59 (0.59)	11.37 (11.37)	2.15 (2.15)

* Standardised rate (crude rate) per 100,000 population

Table A14. Number and proportion of alcohol-attributable oral cavity and pharynx cancer deaths and hospitalisations by state in 2010

State	Deaths (%*)		Hospitalisations (%*)	
	Men	Women	Men	Women
NSW	81 (46.7%)	11 (24.5%)	571 (47.8%)	123 (26.6%)
VIC	45 (43.1%)	17 (25.4%)	423 (45.3%)	123 (26.9%)
QLD	62 (45.9%)	12 (23.0%)	664 (48.8%)	114 (27.0%)
SA	18 (44.0%)	3 (17.6%)	126 (47.4%)	26 (23.3%)
WA	32 (47.8%)	6 (30.6%)	258 (51.1%)	50 (31.5%)
TAS	10 (44.0%)	N<5	73 (48.2%)	6 (23.1%)
NT	4 (56.0%)	2 (32.9%)	29 (55.7%)	7 (32.6%)
ACT	4 (48.2%)	N<5	25 (49.5%)	11 (28.8%)
Total (AUS)	257 (45.8%)	52 (24.7%)	2,170 (48.1%)	460 (27.1%)

* Proportion of oral cavity and pharynx cancer deaths or hospitalisations attributable to alcohol

Table A15. Standardised rate and crude rate of alcohol-attributable oral cavity and pharynx cancer deaths and hospitalisations by state in 2010

State	Death rate (crude rate)*		Hospitalisation rate (crude rate)*	
	Men	Women	Men	Women
NSW	2.76 (2.84)	0.36 (0.37)	19.74 (20.04)	4.12 (4.19)
VIC	2.07 (2.06)	0.73 (0.74)	19.44 (19.31)	5.42 (5.43)
QLD	3.62 (3.57)	0.70 (0.68)	38.17 (38.02)	6.52 (6.42)
SA	2.59 (2.76)	0.34 (0.38)	18.58 (19.18)	3.65 (3.82)
WA	3.55 (3.40)	0.70 (0.66)	28.38 (27.83)	5.59 (5.44)
TAS	4.69 (5.02)	N<5	34.02 (35.95)	3.11 (3.35)
NT	5.93 (4.83)	2.98 (2.03)	38.28 (31.11)	11.94 (8.36)
ACT	3.12 (2.95)	N<5	19.15 (17.12)	8.25 (7.34)
Total (AUS)	2.92 (2.92)	0.58 (0.58)	24.61 (24.61)	5.11 (5.11)

* Standardised rate (crude rate) per 100,000 population

Table A16. Number and proportion of alcohol-attributable rectum deaths and hospitalisations by state in 2010

State	Deaths (%*)		Hospitalisations (%*)	
	Men	Women	Men	Women
NSW	34 (9.0%)	22 (8.2%)	231 (9.1%)	127 (8.1%)
VIC	25 (8.2%)	17 (7.2%)	175 (8.5%)	99 (7.3%)
QLD	19 (8.7%)	13 (8.3%)	136 (9.2%)	75 (8.3%)
SA	7 (8.8%)	5 (7.5%)	46 (9.0%)	23 (7.7%)
WA	7 (8.7%)	3 (8.4%)	58 (9.2%)	28 (8.2%)
TAS	3 (8.3%)	1 (8.5%)	20 (8.4%)	11 (8.5%)
NT	1 (12.2%)	N<5	5 (11.8%)	2 (8.0%)
ACT	1 (9.1%)	N<5	9 (9.1%)	4 (7.8%)
Total (AUS)	98 (8.7%)	63 (7.9%)	681 (8.9%)	369 (7.9%)

* Proportion of rectum cancer deaths or hospitalisations attributable to alcohol

Table A17. Standardised rate and crude rate of alcohol-attributable rectum cancer deaths and hospitalisations by state in 2010

State	Death rate (crude rate)*		Hospitalisation rate (crude rate)*	
	Men	Women	Men	Women
NSW	1.15 (1.19)	0.73 (0.75)	7.87 (8.07)	4.22 (4.33)
VIC	1.15 (1.15)	0.76 (0.76)	8.03 (7.99)	4.40 (4.41)
QLD	1.14 (1.11)	0.78 (0.74)	7.89 (7.79)	4.36 (4.22)
SA	1.07 (1.14)	0.70 (0.76)	6.75 (7.15)	3.15 (3.38)
WA	0.85 (0.79)	0.36 (0.33)	6.49 (6.15)	3.33 (3.15)
TAS	1.17 (1.28)	0.61 (0.67)	9.47 (10.34)	4.83 (5.26)
NT	0.74 (0.75)	N<5	6.58 (5.36)	4.35 (2.39)
ACT	1.23 (1.03)	N<5	6.72 (5.48)	3.11 (2.67)
Total (AUS)	1.11 (1.11)	0.70 (0.70)	7.71 (7.71)	4.11 (4.11)

* Standardised rate (crude rate) per 100,000 population

Cardiovascular Diseases

Table A18. Crude rate of alcohol-attributable cardiovascular diseases deaths and hospitalisations by state in 2010

State	Death rate		Hospitalisation rate	
	Men	Women	Men	Women
NSW	6.9	8.5	78.2	36.9
VIC	3.7	7.8	78.6	41.5
QLD	4.1	7.8	88.0	42.6
SA	5.2	7.6	96.4	45.0
WA	2.9	6.3	76.0	38.1
TAS	6.2	11.3	54.2	27.7
NT	7.5	4.3	84.7	28.7
ACT	3.5	4.2	69.9	26.7
Total (AUS)	5.0	7.8	80.8	39.5

Figure A2. Proportion of cardiovascular disease YLL, YLD and DALYs attributed to alcohol in 2010

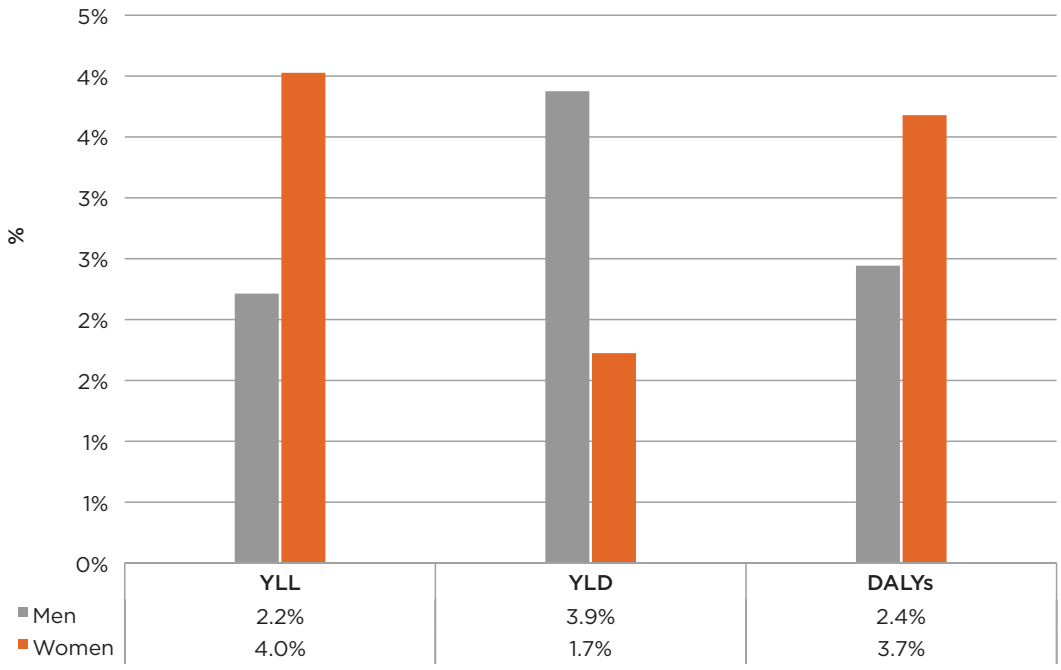

Table A19. Number of alcohol cardiomyopathy deaths and hospitalisations by state in 2010 (100% attributable to alcohol)

State	Deaths		Hospitalisations	
	Men	Women	Men	Women
NSW	20	N<5	46	N<5
VIC	5	5	17	N<5
QLD	13	N<5	20	N<5
SA	N<5	N<5	10	N<5
WA	N<5	N<5	9	N<5
TAS	N<5	N<5	N<5	N<5
NT	N<5	N<5	N<5	N<5
ACT	N<5	N<5	N<5	N<5
Total (AUS)	47	10	108	5

Table A20. Standardised rate and crude rate of alcohol cardiomyopathy deaths and hospitalisations by state in 2010 (100% attributable to alcohol)

State	Death rate (crude rate)*		Hospitalisation rate (crude rate)*	
	Men	Women	Men	Women
NSW	0.68 (0.70)	N<5	1.60 (1.61)	N<5
VIC	0.23 (0.23)	0.22 (0.22)	0.78 (0.78)	N<5
QLD	0.75 (0.74)	N<5	1.14 (1.15)	N<5
SA	N<5	N<5	1.48 (1.52)	N<5
WA	N<5	N<5	1.00 (0.97)	N<5
TAS	N<5	N<5	N<5	N<5
NT	N<5	N<5	N<5	N<5
ACT	N<5	N<5	N<5	N<5
Total (AUS)	0.53 (0.53)	0.11 (0.11)	1.23 (1.23)	0.06 (0.06)

* Standardised rate (crude rate) per 100,000 population

Table A21. Number and proportion of alcohol-attributable cardiac arrhythmias deaths and hospitalisations by state in 2010

State	Deaths (%*)		Hospitalisations (%*)	
	Men	Women	Men	Women
NSW	27 (13.2%)	33 (9.8%)	1,628 (13.8%)	996 (9.9%)
VIC	17 (11.7%)	79 (8.8%)	1,316 (12.9%)	847 (9.2%)
QLD	10 (11.6%)	14 (9.4%)	1,149 (13.8%)	676 (9.8%)
SA	6 (12.1%)	7 (8.3%)	494 (13.4%)	292 (8.9%)
WA	5 (12.4%)	10 (10.6%)	553 (14.3%)	301 (10.6%)
TAS	3 (10.2%)	3 (9.8%)	84 (12.2%)	56 (9.8%)
NT	N<5	N<5	50 (17.4%)	19 (10.7%)
ACT	1 (13.7%)	1 (10.0%)	72 (14.1%)	36 (9.9%)
Total (AUS)	68 (12.3%)	146 (9.1%)	5,346 (13.6%)	3,222 (9.6%)

* Proportion of cardiac arrhythmias deaths or hospitalisations attributable to alcohol

Table A22. Standardised rate and crude rate of alcohol-attributable cardiac arrhythmias deaths and hospitalisations by state in 2010

State	Death rate (crude rate)*		Hospitalisation rate (crude rate)*	
	Men	Women	Men	Women
NSW	0.89 (0.93)	1.06 (1.11)	55.81 (57.14)	32.87 (33.94)
VIC	0.77 (0.78)	3.42 (3.47)	60.33 (60.09)	37.15 (37.38)
QLD	0.58 (0.56)	0.84 (0.79)	66.57 (65.80)	39.68 (38.01)
SA	0.78 (0.85)	0.86 (0.99)	71.16 (75.04)	39.37 (42.79)
WA	0.60 (0.55)	1.19 (1.07)	62.25 (59.55)	35.21 (32.73)
TAS	1.08 (1.23)	1.23 (1.39)	37.85 (41.37)	24.22 (26.78)
NT	N<5	N<5	75.89 (53.63)	36.02 (22.69)
ACT	0.92 (0.68)	1.14 (0.87)	58.71 (48.63)	30.22 (24.70)
Total (AUS)	0.77 (0.77)	1.62 (1.62)	60.63 (60.63)	35.73 (35.73)

* Standardised rate (crude rate) per 100,000 population

Table A23. Number and proportion of alcohol-attributable haemorrhagic stroke deaths and hospitalisations by state in 2010

State	Deaths (%*)		Hospitalisations (%*)	
	Men	Women	Men	Women
NSW	66 (16.7%)	62 (13.3%)	337 (18.5%)	0 (0.0%)
VIC	47 (15.2%)	47 (14.4%)	268 (17.2%)	0 (0.0%)
QLD	32 (15.9%)	32 (12.3%)	187 (18.2%)	0 (0.0%)
SA	18 (15.6%)	13 (9.9%)	74 (17.6%)	0 (0.0%)
WA	13 (15.5%)	19 (17.9%)	80 (18.9%)	0 (0.0%)
TAS	6 (14.4%)	5 (10.0%)	19 (16.0%)	0 (0.0%)
NT	2 (21.9%)	2 (25.3%)	10 (24.0%)	0 (0.0%)
ACT	3 (16.9%)	2 (14.2%)	21 (19.0%)	0 (0.0%)
Total (AUS)	186 (15.9%)	181 (13.3%)	995 (18.1%)	0 (0.0%)

* Proportion of haemorrhagic stroke deaths or hospitalisations attributable to alcohol

Table A24. Number and proportion of alcohol-protected haemorrhagic stroke deaths and hospitalisations by state in 2010

State	Deaths (%*)		Hospitalisations (%*)	
	Men	Women	Men	Women
NSW	0 (0.0%)	0 (0.0%)	0 (0.0%)	228 (14.0%)
VIC	0 (0.0%)	0 (0.0%)	0 (0.0%)	216 (15.4%)
QLD	0 (0.0%)	0 (0.0%)	0 (0.0%)	135 (14.9%)
SA	0 (0.0%)	0 (0.0%)	0 (0.0%)	63 (16.3%)
WA	0 (0.0%)	0 (0.0%)	0 (0.0%)	47 (13.7%)
TAS	0 (0.0%)	0 (0.0%)	0 (0.0%)	23 (18.2%)
NT	0 (0.0%)	0 (0.0%)	0 (0.0%)	5 (13.5%)
ACT	0 (0.0%)	0 (0.0%)	0 (0.0%)	15 (18.0%)
Total (AUS)	0 (0.0%)	0 (0.0%)	0 (0.0%)	228 (14.0%)

* Proportion of haemorrhagic stroke deaths or hospitalisations protected by alcohol

Table A25. Standardised rate and crude rate of alcohol-attributable haemorrhagic stroke deaths and hospitalisations by state in 2010

State	Death rate (crude rate)*		Hospitalisation rate (crude rate)*	
	Men	Women	Men	Women
NSW	2.22 (2.30)	2.04 (2.11)	11.50 (11.83)	0.00 (0.00)
VIC	2.14 (2.14)	2.04 (2.06)	12.26 (12.24)	0.00 (0.00)
QLD	1.90 (1.86)	1.87 (1.80)	10.88 (10.71)	0.00 (0.00)
SA	2.53 (2.76)	1.69 (1.87)	10.51 (11.26)	0.00 (0.00)
WA	1.49 (1.36)	2.22 (2.07)	9.09 (8.63)	0.00 (0.00)
TAS	2.82 (3.10)	2.15 (2.39)	8.56 (9.36)	0.00 (0.00)
NT	2.69 (1.93)	1.73 (1.79)	15.37 (11.80)	0.00 (0.00)
ACT	2.53 (1.99)	1.73 (1.40)	17.83 (14.38)	0.00 (0.00)
Total (AUS)	2.12 (2.12)	2.01 (2.01)	11.31 (11.31)	0.00 (0.00)

* Standardised rate (crude rate) per 100,000 population

Table A26. Standardised rate and crude rate of alcohol-protected haemorrhagic stroke deaths and hospitalisations by state in 2010

State	Death rate (crude rate)*		Hospitalisation rate (crude rate)*	
	Men	Women	Men	Women
NSW	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	7.55 (7.77)
VIC	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	9.48 (9.53)
QLD	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	7.92 (7.60)
SA	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	8.43 (9.26)
WA	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	5.40 (5.11)
TAS	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	9.99 (11.00)
NT	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	8.71 (4.78)
ACT	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	12.96 (10.68)
Total (AUS)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	8.12 (8.12)

* Standardised rate (crude rate) per 100,000 population

Table A27. Number and proportion of alcohol-attributable hypertensive disease deaths and hospitalisations by state in 2010

State	Deaths (%*)		Hospitalisations (%*)	
	Men	Women	Men	Women
NSW	74 (18.8%)	20 (4.2%)	172 (19.9%)	85 (5.4%)
VIC	12 (15.6%)	10 (5.2%)	115 (18.5%)	93 (7.7%)
QLD	12 (16.6%)	1 (0.8%)	154 (20.0%)	81 (6.5%)
SA	6 (16.4%)	1 (1.6%)	45 (18.8%)	15 (3.6%)
WA	7 (16.6%)	8 (12.1%)	51 (21.7%)	48 (14.5%)
TAS	3 (13.6%)	1 (0.3%)	5 (19.7%)	3 (3.8%)
NT	N<5	1 (12.4%)	10 (27.3%)	5 (19.0%)
ACT	1 (19.7%)	0 (0.0%)	7 (20.6%)	2 (4.9%)
Total (AUS)	116 (17.8%)	42 (4.2%)	559 (19.8%)	331 (6.7%)

* Proportion of hypertensive disease deaths or hospitalisations attributable to alcohol

Table A28. Number and proportion of alcohol-protected hypertensive disease deaths and hospitalisations by state in 2010

State	Deaths (%*)		Hospitalisations (%*)	
	Men	Women	Men	Women
NSW	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)
VIC	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)
QLD	0 (0.0%)	5 (3.9%)	0 (0.0%)	33 (2.6%)
SA	0 (0.0%)	5 (5.9%)	0 (0.0%)	20 (5.0%)
WA	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)
TAS	0 (0.0%)	3 (9.1%)	0 (0.0%)	4 (5.9%)
NT	N<5	0 (0.0%)	0 (0.0%)	0 (0.0%)
ACT	0 (0.0%)	1 (0.0%)	0 (0.0%)	1 (0.0%)
Total (AUS)	0 (0.0%)	13 (1.3%)	0 (0.0%)	57 (1.2%)

* Proportion of hypertensive disease deaths or hospitalisations protected by alcohol

Table A29. Standardised rate and crude rate of alcohol-attributable hypertensive disease deaths and hospitalisations by state in 2010

State	Death rate (crude rate)*		Hospitalisation rate (crude rate)*	
	Men	Women	Men	Women
NSW	2.51 (2.60)	0.66 (0.67)	5.93 (6.04)	2.91 (2.93)
VIC	0.56 (0.57)	0.44 (0.45)	5.32 (5.30)	4.05 (4.06)
QLD	0.71 (0.70)	0.06 (0.06)	8.88 (8.82)	4.50 (4.56)
SA	0.85 (0.93)	0.20 (0.19)	6.54 (6.85)	2.25 (2.21)
WA	0.82 (0.74)	0.98 (0.88)	5.52 (5.39)	5.47 (5.22)
TAS	1.13 (1.28)	0.05 (0.05)	2.32 (2.46)	1.47 (1.43)
NT	N<5	1.91 (1.55)	10.19 (10.73)	5.32 (5.97)
ACT	1.11 (0.82)	0.00 (0.00)	5.80 (4.79)	1.35 (1.34)
Total (AUS)	1.32 (1.32)	0.46 (0.46)	6.34 (6.34)	3.68 (3.68)

* Standardised rate (crude rate) per 100,000 population

Table A30. Standardised rate and crude rate of alcohol-protected hypertensive disease deaths and hospitalisations by state in 2010

State	Death rate (crude rate)*		Hospitalisation rate (crude rate)*	
	Men	Women	Men	Women
NSW	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
VIC	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
QLD	0.00 (0.00)	0.31 (0.29)	0.00 (0.00)	2.00 (1.86)
SA	0.00 (0.00)	0.59 (0.68)	0.00 (0.00)	2.55 (2.94)
WA	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
TAS	0.00 (0.00)	1.30 (1.48)	0.00 (0.00)	1.68 (1.91)
NT	N<5	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
ACT	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
Total (AUS)	0.00 (0.00)	0.14 (0.14)	0.00 (0.00)	0.63 (0.63)

* Standardised rate (crude rate) per 100,000 population

Table A31. Number and proportion of alcohol-attributable ischaemic heart disease deaths and hospitalisations by state in 2010

State	Deaths (%*)		Hospitalisations (%*)	
	Men	Women	Men	Women
NSW	0 (0.0%)	136 (4.1%)	0 (0.0%)	0 (0.0%)
VIC	0 (0.0%)	36 (1.5%)	0 (0.0%)	0 (0.0%)
QLD	0 (0.0%)	87 (4.4%)	0 (0.0%)	0 (0.0%)
SA	0 (0.0%)	31 (3.3%)	0 (0.0%)	0 (0.0%)
WA	0 (0.0%)	21 (2.6%)	0 (0.0%)	0 (0.0%)
TAS	0 (0.0%)	16 (5.0%)	0 (0.0%)	0 (0.0%)
NT	1 (0.2%)	1 (1.3%)	0 (0.0%)	0 (0.0%)
ACT	0 (0.0%)	3 (3.0%)	0 (0.0%)	0 (0.0%)
Total (AUS)	1 (0.0%)	329 (3.3%)	0 (0.0%)	0 (0.0%)

* Proportion of ischaemic heart disease deaths or hospitalisations attributable to alcohol

Table A32. Number and proportion of alcohol-protected ischaemic heart disease deaths and hospitalisations by state in 2010

State	Deaths (%*)		Hospitalisations (%*)	
	Men	Women	Men	Women
NSW	124 (3.2%)	1 (0.0%)	3,006 (9.3%)	3,043 (18.6%)
VIC	91 (3.3%)	0 (0.0%)	2,456 (9.2%)	2,625 (19.7%)
QLD	54 (2.3%)	0 (0.0%)	1,818 (8.4%)	2,130 (18.2%)
SA	28 (2.6%)	1 (0.0%)	730 (9.2%)	737 (18.5%)
WA	40 (3.7%)	1 (0.0%)	870 (9.5%)	972 (20.4%)
TAS	13 (3.8%)	0 (0.0%)	212 (10.0%)	182 (20.0%)
NT	1 (1.6%)	1 (0.8%)	83 (7.6%)	102 (20.6%)
ACT	5 (3.9%)	1 (0.2%)	185 (9.3%)	193 (23.3%)
Total (AUS)	356 (3.1%)	1 (0.0%)	9,360 (9.1%)	9,983 (19.1%)

* Proportion of ischaemic heart disease deaths or hospitalisations protected by alcohol

Table A33. Standardised rate and crude rate of alcohol-attributable ischaemic heart disease deaths and hospitalisations by state in 2010

State	Death rate (crude rate)*		Hospitalisation rate (crude rate)*	
	Men	Women	Men	Women
NSW	0.00 (0.00)	4.40 (4.62)	0.00 (0.00)	0.00 (0.00)
VIC	0.00 (0.00)	1.55 (1.57)	0.00 (0.00)	0.00 (0.00)
QLD	0.00 (0.00)	5.28 (4.90)	0.00 (0.00)	0.00 (0.00)
SA	0.00 (0.00)	3.96 (4.56)	0.00 (0.00)	0.00 (0.00)
WA	0.00 (0.00)	2.50 (2.24)	0.00 (0.00)	0.00 (0.00)
TAS	0.00 (0.00)	6.59 (7.51)	0.00 (0.00)	0.00 (0.00)
NT	0.47 (0.21)	1.28 (0.48)	0.00 (0.00)	0.00 (0.00)
ACT	0.00 (0.00)	2.46 (1.87)	0.00 (0.00)	0.00 (0.00)
Total (AUS)	0.00 (0.00)	3.64 (3.64)	0.00 (0.00)	0.00 (0.00)

* Standardised rate (crude rate) per 100,000 population

Table A34. Standardised rate and crude rate of alcohol-protected ischaemic heart disease deaths and hospitalisations by state in 2010

State	Death rate (crude rate)*		Hospitalisation rate (crude rate)*	
	Men	Women	Men	Women
NSW	4.20 (4.35)	0.00 (0.00)	102.71 (105.51)	100.73 (103.70)
VIC	4.17 (4.17)	0.00 (0.00)	112.42 (112.09)	115.09 (115.85)
QLD	3.16 (3.08)	0.00 (0.00)	106.23 (104.11)	125.01 (119.93)
SA	3.90 (4.26)	0.00 (0.00)	103.47 (111.12)	99.07 (108.37)
WA	4.72 (4.28)	0.01 (0.01)	100.54 (93.74)	112.60 (105.58)
TAS	5.58 (6.35)	0.00 (0.00)	93.20 (104.40)	78.86 (87.03)
NT	1.46 (1.50)	0.23 (0.24)	125.32 (89.03)	178.38 (121.79)
ACT	4.67 (3.63)	0.14 (0.13)	153.59 (126.71)	155.54 (128.87)
Total (AUS)	4.05 (4.05)	0.01 (0.01)	106.20 (106.20)	110.69 (110.69)

* Standardised rate (crude rate) per 100,000 population

Table A35. Number and proportion of alcohol-attributable ischaemic stroke deaths and hospitalisations by state in 2010

State	Deaths (%*)		Hospitalisations (%*)	
	Men	Women	Men	Women
NSW	11 (1.3%)	0 (0.0%)	45 (0.8%)	0 (0.0%)
VIC	1 (0.1%)	0 (0.0%)	6 (0.1%)	0 (0.0%)
QLD	5 (0.9%)	0 (0.0%)	27 (0.8%)	0 (0.0%)
SA	2 (1.0%)	0 (0.0%)	9 (0.7%)	0 (0.0%)
WA	1 (0.3%)	0 (0.0%)	13 (0.9%)	0 (0.0%)
TAS	1 (0.1%)	0 (0.0%)	1 (0.1%)	0 (0.0%)
NT	N<5	0 (0.0%)	6 (5.1%)	0 (0.0%)
ACT	1 (0.3%)	0 (0.0%)	0 (0.0%)	0 (0.0%)
Total (AUS)	19 (0.8%)	0 (0.0%)	107 (0.6%)	0 (0.0%)

* Proportion of ischaemic stroke deaths or hospitalisations attributable to alcohol

Table A36. Number and proportion of alcohol-protected ischaemic stroke deaths and hospitalisations by state in 2010

State	Deaths (%*)		Hospitalisations (%*)	
	Men	Women	Men	Women
NSW	0 (0.0%)	133 (9.5%)	1 (0.0%)	205 (4.1%)
VIC	0 (0.0%)	107 (11.1%)	7 (0.2%)	215 (5.2%)
QLD	0 (0.0%)	77 (9.8%)	0 (0.0%)	117 (4.3%)
SA	0 (0.0%)	48 (10.7%)	0 (0.0%)	57 (4.8%)
WA	1 (0.5%)	30 (9.5%)	8 (0.5%)	57 (4.9%)
TAS	1 (1.6%)	14 (11.6%)	5 (1.3%)	19 (5.0%)
NT	N<5	1 (11.0%)	0 (0.0%)	5 (5.8%)
ACT	1 (0.1%)	6 (12.9%)	1 (0.4%)	14 (5.7%)
Total (AUS)	2 (0.1%)	415 (10.2%)	22 (0.1%)	688 (4.6%)

* Proportion of ischaemic stroke deaths or hospitalisations protected by alcohol

Table A37. Standardised rate and crude rate of alcohol-attributable ischaemic stroke deaths and hospitalisations by state in 2010

State	Death rate (crude rate)*		Hospitalisation rate (crude rate)*	
	Men	Women	Men	Women
NSW	0.36 (0.37)	0.00 (0.00)	1.52 (1.58)	0.00 (0.00)
VIC	0.03 (0.03)	0.00 (0.00)	0.28 (0.27)	0.00 (0.00)
QLD	0.29 (0.28)	0.00 (0.00)	1.56 (1.55)	0.00 (0.00)
SA	0.31 (0.33)	0.00 (0.00)	1.25 (1.37)	0.00 (0.00)
WA	0.06 (0.06)	0.00 (0.00)	1.28 (1.29)	0.00 (0.00)
TAS	0.05 (0.05)	0.00 (0.00)	0.47 (0.49)	0.00 (0.00)
NT	N<5	0.00 (0.00)	12.65 (7.51)	0.00 (0.00)
ACT	0.09 (0.07)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
Total (AUS)	0.22 (0.22)	0.00 (0.00)	1.21 (1.21)	0.00 (0.00)

* Standardised rate (crude rate) per 100,000 population

Table A38. Standardised rate and crude rate of alcohol-protected ischaemic stroke deaths and hospitalisations by state in 2010

State	Death rate (crude rate)*		Hospitalisation rate (crude rate)*	
	Men	Women	Men	Women
NSW	0.00 (0.00)	4.32 (4.52)	0.04 (0.04)	6.80 (6.99)
VIC	0.00 (0.00)	4.64 (4.71)	0.32 (0.32)	9.43 (9.49)
QLD	0.00 (0.00)	4.65 (4.34)	0.00 (0.00)	6.79 (6.53)
SA	0.00 (0.00)	6.10 (7.00)	0.00 (0.00)	7.73 (8.38)
WA	0.12 (0.11)	3.66 (3.29)	0.97 (0.86)	6.66 (6.31)
TAS	0.46 (0.54)	5.83 (6.55)	2.10 (2.46)	7.89 (8.61)
NT	N<5	2.68 (1.07)	0.00 (0.00)	9.86 (5.97)
ACT	0.00 (0.00)	5.47 (4.27)	0.71 (0.68)	11.30 (9.35)
Total (AUS)	0.02 (0.02)	4.60 (4.60)	0.25 (0.25)	7.63 (7.63)

* Standardised rate (crude rate) per 100,000 population

Diabetes

Table A39. Crude rate of alcohol-protected diabetes deaths and hospitalisations by state in 2010

State	Death rate		Hospitalisation rate	
	Men	Women	Men	Women
NSW	0.3	1.1	8.5	28.5
VIC	0.5	2.0	11.6	40.6
QLD	0.6	2.7	10.3	33.7
SA	0.4	2.0	9.6	30.9
WA	0.5	2.0	11.8	43.3
TAS	0.7	2.7	11.8	33.0
NT	0.3	2.5	10.7	99.1
ACT	0.4	2.1	11.6	29.4
Total	0.4	1.9	10.2	35.0

Table A40. Number and proportion of alcohol-protected diabetes deaths and hospitalisations by state in 2010

State	Deaths (%*)		Hospitalisations (%*)	
	Men	Women	Men	Women
NSW	9 (3.2%)	32 (13.9%)	241 (3.3%)	837 (15.1%)
VIC	10 (3.6%)	46 (16.2%)	254 (3.6%)	920 (17.2%)
QLD	11 (3.2%)	48 (13.9%)	180 (3.3%)	598 (15.6%)
SA	2 (3.1%)	13 (13.4%)	63 (3.3%)	210 (15.5%)
WA	4 (3.9%)	18 (16.3%)	109 (3.7%)	398 (17.8%)
TAS	1 (4.2%)	6 (13.9%)	23 (4.2%)	69 (15.8%)
NT	1 (1.6%)	2 (19.0%)	10 (2.1%)	83 (20.6%)
ACT	1 (4.5%)	3 (18.0%)	16 (4.4%)	45 (18.4%)
Total (AUS)	39 (3.4%)	169 (14.8%)	897 (3.4%)	3,159 (16.3%)

* Proportion of diabetes mellitus deaths or hospitalisations protected by alcohol

Table A41. Standardised rate and crude rate of alcohol-protected diabetes deaths and hospitalisations by state in 2010

State	Death rate (crude rate)*		Hospitalisation rate (crude rate)*	
	Men	Women	Men	Women
NSW	0.29 (0.30)	1.06 (1.11)	8.26 (8.49)	27.73 (28.52)
VIC	0.45 (0.45)	2.02 (2.04)	11.62 (11.60)	40.35 (40.60)
QLD	0.65 (0.63)	2.83 (2.69)	10.44 (10.25)	34.80 (33.67)
SA	0.35 (0.38)	1.74 (1.99)	9.01 (9.59)	28.71 (30.88)
WA	0.52 (0.46)	2.20 (2.00)	12.71 (11.76)	45.88 (43.28)
TAS	0.64 (0.74)	2.43 (2.73)	10.60 (11.82)	30.26 (32.99)
NT	0.32 (0.32)	4.06 (2.51)	10.36 (10.73)	121.66 (99.10)
ACT	0.49 (0.41)	2.67 (2.14)	14.15 (11.64)	36.06 (29.38)
Total (AUS)	0.44 (0.44)	1.88 (1.88)	10.19 (10.19)	35.03 (35.03)

* Standardised rate (crude rate) per 100,000 population

Digestive Diseases

Table A42. Crude rate of alcohol-attributable digestive diseases deaths and hospitalisations by state in 2010

State	Death rate		Hospitalisation rate	
	Men	Women	Men	Women
NSW	7.0	2.5	63.4	23.9
VIC	5.0	1.9	74.7	35.2
QLD	6.1	3.1	85.9	37.0
SA	7.6	2.8	79.8	33.7
WA	5.2	2.9	88.9	38.2
TAS	6.6	4.8	57.1	28.2
NT	12.8	9.7	254.2	167.2
ACT	6.3	1.5	56.2	25.4
Total (AUS)	6.2	2.6	76.3	33.0

Figure A3. Proportion of digestive diseases YLL, YLD and DALYs attributable to alcohol in 2010

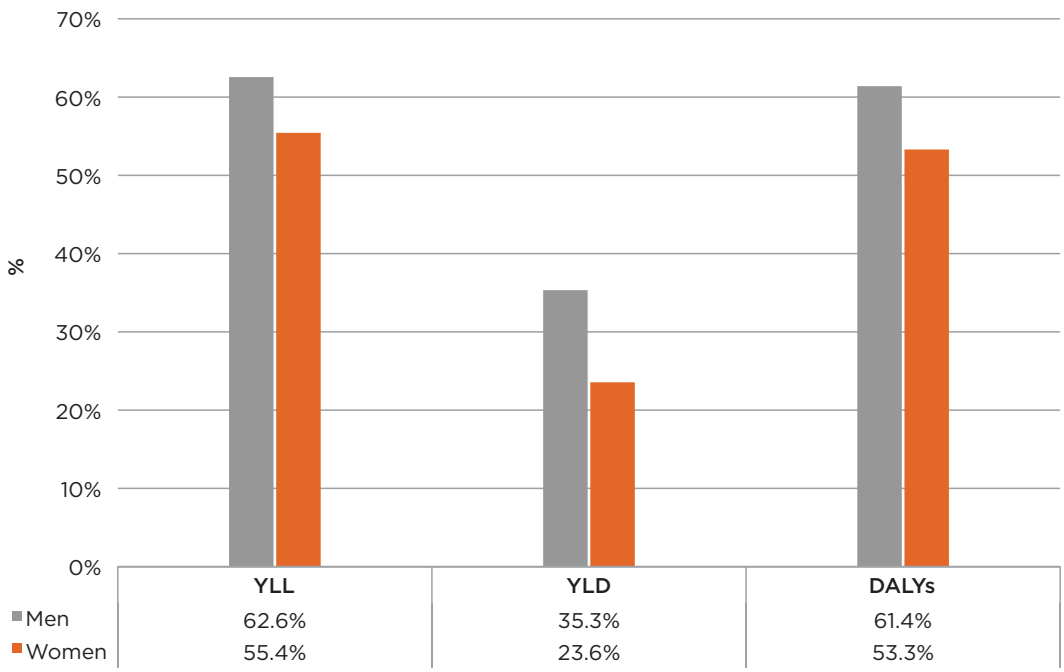

Table A43. Number of alcoholic gastritis deaths and hospitalisations by state in 2010 (100% attributable to alcohol)

State	Deaths		Hospitalisations	
	Men	Women	Men	Women
NSW	N<5	N<5	205	85
VIC	N<5	N<5	232	99
QLD	N<5	N<5	329	118
SA	N<5	N<5	127	45
WA	N<5	N<5	194	82
TAS	N<5	N<5	6	7
NT	N<5	N<5	80	70
ACT	N<5	N<5	9	5
Total (AUS)	N<5	N<5	1,182	511

Table A44. Standardised rate and crude rate of alcoholic gastritis deaths and hospitalisations by state in 2010 (100% attributable to alcohol)

State	Death rate (crude rate)*		Hospitalisation rate (crude rate)*	
	Men	Women	Men	Women
NSW	N<5	N<5	7.20 (7.20)	2.92 (2.90)
VIC	N<5	N<5	10.60 (10.59)	4.37 (4.37)
QLD	N<5	N<5	18.73 (18.84)	6.57 (6.64)
SA	N<5	N<5	19.52 (19.33)	6.87 (6.62)
WA	N<5	N<5	20.55 (20.93)	8.82 (8.92)
TAS	N<5	N<5	2.94 (2.95)	3.62 (3.35)
NT	N<5	N<5	82.84 (85.81)	76.04 (83.58)
ACT	N<5	N<5	6.45 (6.16)	3.10 (3.34)
Total	N<5	N<5	13.41 (13.41)	5.67 (5.67)

* Standardised rate (crude rate) per 100,000 population

Table A45. Number and proportion of alcohol-attributable liver cirrhosis deaths and hospitalisations by state in 2010

State	Deaths (%*)		Hospitalisations (%*)	
	Men	Women	Men	Women
NSW	189 (65.5%)	70 (70.1%)	693 (41.1%)	363 (61.2%)
VIC	104 (62.5%)	41 (69.2%)	751 (40.0%)	467 (60.4%)
QLD	102 (66.0%)	53 (69.6%)	543 (44.0%)	358 (62.9%)
SA	48 (63.3%)	18 (67.4%)	188 (41.2%)	133 (60.9%)
WA	45 (66.0%)	25 (72.5%)	249 (45.0%)	159 (62.9%)
TAS	14 (67.6%)	10 (69.4%)	61 (44.5%)	37 (61.3%)
NT	9 (77.4%)	8 (73.5%)	53 (51.5%)	35 (64.0%)
ACT	9 (66.9%)	N<5	34 (41.8%)	21 (61.1%)
Total	519 (65.1%)	227 (70.0%)	2,572 (42.0%)	1,573 (61.5%)

* Proportion of liver cirrhosis deaths or hospitalisations attributable to alcohol

Table A46. Standardised rate and crude rate of alcohol-attributable liver cirrhosis deaths and hospitalisations by state in 2010

State	Death rate (crude rate)*		Hospitalisation rate (crude rate)*	
	Men	Women	Men	Women
NSW	6.55 (6.64)	2.36 (2.39)	24.14 (24.32)	12.33 (12.40)
VIC	4.78 (4.73)	1.80 (1.80)	34.65 (34.29)	20.65 (20.61)
QLD	5.84 (5.82)	3.06 (2.98)	31.08 (31.15)	20.28 (20.16)
SA	7.04 (7.32)	2.53 (2.68)	27.96 (28.62)	18.94 (19.56)
WA	5.00 (4.84)	2.87 (2.76)	27.12 (26.86)	17.40 (17.18)
TAS	6.32 (6.65)	4.58 (4.59)	29.20 (30.53)	16.54 (17.21)
NT	10.48 (9.87)	14.87 (9.67)	60.75 (56.85)	44.23 (41.79)
ACT	6.55 (5.96)	N<5	25.07 (23.29)	15.42 (14.02)
Total	5.89 (5.89)	2.52 (2.52)	29.21 (29.21)	17.43 (17.43)

* Standardised rate (crude rate) per 100,000 population

Table A47. Number and proportion of alcohol-attributable pancreatitis deaths and hospitalisations by state in 2010

State	Death (%*)		Hospitalisation (%*)	
	Men	Women	Men	Women
NSW	11 (28.0%)	3 (9.6%)	906 (30.3%)	253 (11.0%)
VIC	7 (22.9%)	3 (8.7%)	654 (28.0%)	231 (11.5%)
QLD	4 (22.5%)	1 (9.7%)	628 (33.7%)	180 (12.6%)
SA	2 (20.1%)	1 (9.2%)	209 (30.6%)	51 (10.5%)
WA	3 (25.2%)	1 (11.9%)	382 (37.1%)	110 (14.3%)
TAS	N<5	N<5	48 (27.5%)	15 (9.5%)
NT	3 (37.1%)	N<5	104 (43.6%)	35 (16.8%)
ACT	N<5	N<5	40 (30.0%)	12 (10.8%)
Total	30 (25.5%)	9 (9.5%)	2,971 (31.5%)	887 (11.9%)

* Proportion of pancreatitis deaths or hospitalisations attributable to alcohol

Table A48. Standardised rate and crude rate of alcohol-attributable pancreatitis deaths and hospitalisations by state in 2010

State	Death rate (crude rate)*		Hospitalisation rate (crude rate)*	
	Men	Women	Men	Women
NSW	0.37 (0.38)	0.11 (0.11)	31.61 (31.80)	8.57 (8.62)
VIC	0.31 (0.31)	0.12 (0.12)	30.05 (29.86)	10.18 (10.19)
QLD	0.25 (0.25)	0.07 (0.07)	35.91 (36.02)	10.20 (10.19)
SA	0.22 (0.24)	0.12 (0.13)	31.53 (31.81)	7.30 (7.35)
WA	0.38 (0.36)	0.11 (0.10)	40.86 (41.10)	11.92 (11.85)
TAS	N<5	N<5	22.76 (23.64)	7.43 (7.65)
NT	4.32 (2.79)	N<5	110.75 (111.55)	39.92 (40.60)
ACT	N<5	N<5	28.91 (26.71)	8.92 (8.68)
Total	0.34 (0.34)	0.11 (0.11)	33.70 (33.70)	9.84 (9.84)

* Standardised rate (crude rate) per 100,000 population

Infectious and Parasitic Diseases

Table A49. Crude rate of alcohol-attributable infectious and parasitic diseases deaths and hospitalisations by state in 2010

State	Death rate		Hospitalisation rate	
	Men	Women	Men	Women
NSW	1.5	1.5	52.8	37.3
VIC	1.5	1.5	62.6	45.0
QLD	1.2	1.1	55.1	42.0
SA	1.8	1.5	60.1	42.5
WA	1.0	1.3	53.3	40.1
TAS	1.1	1.5	37.4	31.1
NT	0.8	1.0	120.1	88.4
ACT	1.6	0.9	50.7	32.7
Total	1.4	1.4	56.6	41.1

Figure A4. Proportion of infectious and parasitic diseases YLL, YLD and DALYs attributable to alcohol in 2010

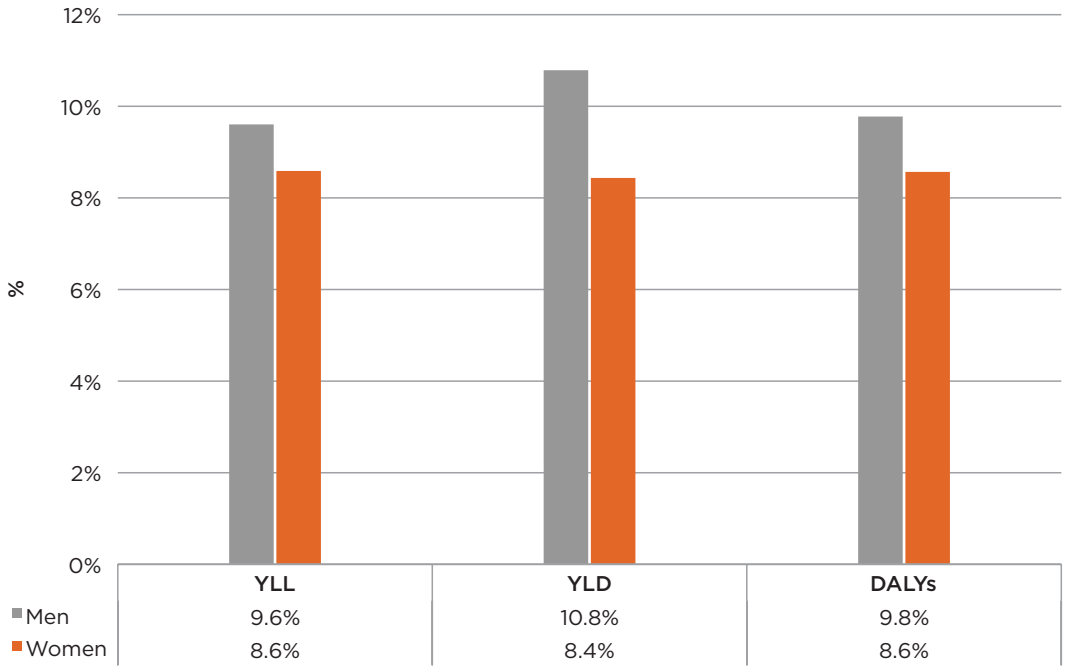

Table A50. Number and proportion of alcohol-attributable HIV deaths by state in 2010

State	Deaths (%*)	
	Men	Women
NSW	1 (3%)	N<5
VIC	1 (3%)	N<5
QLD	1 (3%)	N<5
SA	1 (3%)	N<5
WA	1 (3%)	N<5
TAS	N<5	N<5
NT	N<5	N<5
ACT	N<5	N<5
Total	2 (3%)	1 (3%)

* Proportion of HIV deaths or hospitalisations attributable to alcohol

Table A51. Standardised rate and crude rate of alcohol-attributable HIV deaths by state in 2010

State	Death rate (crude rate)*	
	Men	Women
NSW	0.03 (0.03)	N<5
VIC	0.02 (0.02)	N<5
QLD	0.03 (0.03)	N<5
SA	0.02 (0.02)	N<5
WA	0.02 (0.02)	N<5
TAS	N<5	N<5
NT	N<5	N<5
ACT	N<5	N<5
Total	0.02 (0.02)	0.00 (0.00)

* Standardised rate (crude rate) per 100,000 population

Table A52. Number and proportion of alcohol-attributable lower respiratory infections deaths and hospitalisations by state in 2010

State	Deaths (%*)		Hospitalisations (%*)	
	Men	Women	Men	Women
NSW	38 (11%)	41 (9%)	1,457 (12%)	1,078 (9%)
VIC	31 (10%)	33 (8%)	1,316 (11%)	995 (8%)
QLD	20 (10%)	20 (9%)	929 (11%)	722 (9%)
SA	11 (10%)	10 (8%)	387 (11%)	286 (8%)
WA	9 (10%)	11 (10%)	488 (12%)	363 (10%)
TAS	2 (8%)	3 (9%)	75 (10%)	65 (9%)
NT	N<5	1 (9%)	104 (15%)	70 (10%)
ACT	1 (12%)	1 (9%)	71 (12%)	48 (9%)
Total	112 (11%)	120 (9%)	4,827 (11%)	3,626 (9%)

* Proportion of lower respiratory infections deaths or hospitalisations attributable to alcohol

Table A53. Standardised rate and crude rate of alcohol-attributable lower respiratory infections deaths and hospitalisations by state in 2010

State	Death rate (crude rate)*		Hospitalisation rate (crude rate)*	
	Men	Women	Men	Women
NSW	1.29 (1.34)	1.35 (1.41)	49.77 (51.14)	35.73 (36.77)
VIC	1.40 (1.41)	1.43 (1.45)	60.12 (60.09)	43.65 (43.91)
QLD	1.17 (1.13)	1.18 (1.10)	54.03 (53.20)	42.15 (40.65)
SA	1.50 (1.66)	1.36 (1.54)	55.41 (58.91)	39.11 (42.06)
WA	1.07 (0.96)	1.30 (1.17)	55.23 (52.64)	41.44 (39.47)
TAS	0.84 (0.98)	1.38 (1.53)	33.59 (36.94)	28.46 (31.08)
NT	N<5	1.74 (0.96)	137.06 (112.62)	98.97 (82.39)
ACT	0.99 (0.75)	1.06 (0.80)	59.51 (49.31)	39.47 (32.72)
Total	1.27 (1.27)	1.33 (1.33)	54.80 (54.80)	40.23 (40.23)

* Standardised rate (crude rate) per 100,000 population

Table A54. Number and proportion of alcohol-attributable tuberculosis deaths and hospitalisations by state in 2010

State	Deaths (%*)		Hospitalisations (%*)	
	Men	Women	Men	Women
NSW	3 (25%)	1 (11%)	50 (28%)	16 (14%)
VIC	2 (25%)	N<5	56 (26%)	24 (15%)
QLD	1 (21%)	1 (11%)	33 (29%)	23 (17%)
SA	N<5	N<5	7 (28%)	4 (13%)
WA	N<5	1 (15%)	6 (31%)	6 (18%)
TAS	N<5	N<5	1 (24%)	1 (9%)
NT	N<5	N<5	7 (37%)	4 (18%)
ACT	N<5	N<5	2 (28%)	1 (11%)
Total	9 (24%)	3 (11%)	162 (28%)	77 (16%)

* Proportion of tuberculosis deaths or hospitalisations attributable to alcohol

Table A55. Standardised rate and crude rate of alcohol-attributable tuberculosis deaths and hospitalisations by state in 2010

State	Death rate (crude rate)*		Hospitalisation rate (crude rate)*	
	Men	Women	Men	Women
NSW	0.09 (0.10)	0.04 (0.04)	1.75 (1.75)	0.55 (0.55)
VIC	0.10 (0.10)	N<5	2.54 (2.56)	1.10 (1.10)
QLD	0.08 (0.07)	0.03 (0.03)	1.83 (1.83)	1.28 (1.30)
SA	N<5	N<5	1.08 (1.07)	0.47 (0.44)
WA	N<5	0.09 (0.09)	0.65 (0.65)	0.76 (0.76)
TAS	N<5	N<5	0.47 (0.49)	0.00 (0.00)
NT	N<5	N<5	7.20 (7.51)	3.24 (3.58)
ACT	N<5	N<5	1.30 (1.37)	0.00 (0.00)
Total	0.11 (0.11)	0.03 (0.03)	1.83 (1.83)	0.85 (0.85)

* Standardised rate (crude rate) per 100,000 population

Injuries

Table A56. Crude rate of alcohol-attributable injuries deaths and hospitalisations by state in 2010

State	Death rate		Hospitalisation rate	
	Men	Women	Men	Women
NSW	11.9	2.3	491.9	169.0
VIC	10.9	2.9	461.9	210.5
QLD	17.0	2.9	622.6	205.8
SA	14.2	2.6	530.8	177.6
WA	20.4	4.5	641.7	249.6
TAS	12.0	1.9	422.5	118.1
NT	42.3	7.0	1,133.8	440.6
ACT	13.7	2.3	571.2	184.3
Total	14.1	2.8	535.5	197.1

Figure A5. Proportion of injuries YLL, YLD, DALYs attributable to alcohol in 2010

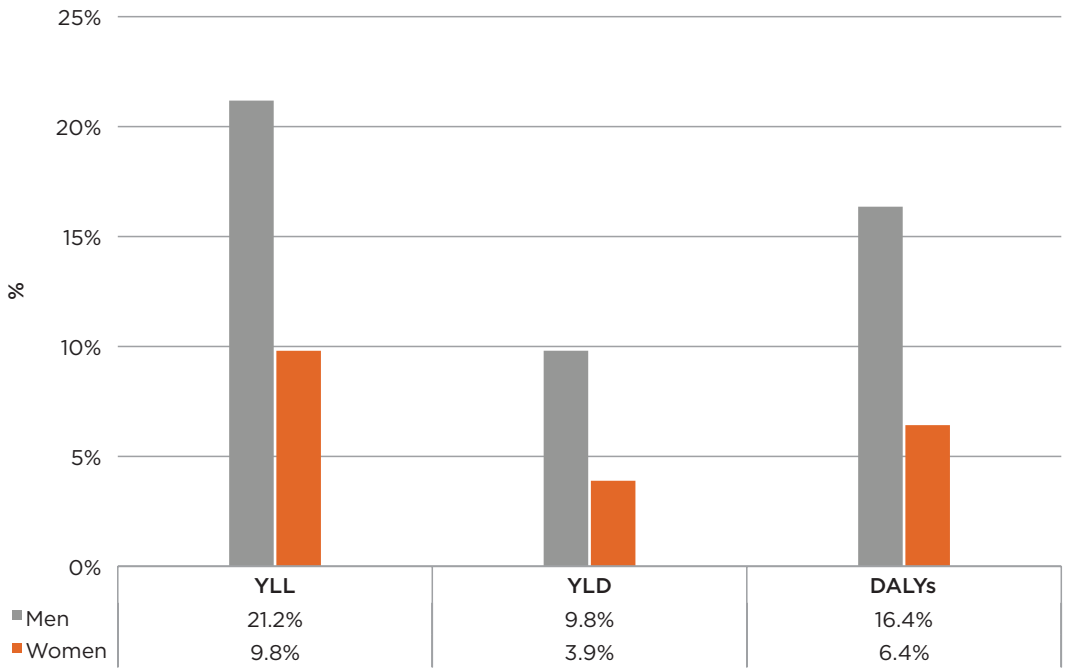

Table A57. Number of alcohol poisoning deaths and hospitalisations by state in 2010 (AAF=1)

State	Deaths		Hospitalisations	
	Men	Women	Men	Women
NSW	13	5	141	122
VIC	16	9	306	323
QLD	11	N<5	129	121
SA	6	N<5	47	46
WA	8	N<5	73	56
TAS	N<5	N<5	6	N<5
NT	N<5	N<5	N<5	N<5
ACT	N<5	N<5	8	15
Total (AUS)	60	21	714	690

Table A58. Standardised rate and crude rate of alcohol poisoning deaths and hospitalisations by state in 2010

State	Death rate (crude rate)*		Hospitalisation rate (crude rate)*	
	Men	Women	Men	Women
NSW	0.45 (0.46)	0.17 (0.17)	4.99 (4.95)	4.18 (4.16)
VIC	0.74 (0.73)	0.40 (0.40)	13.94 (13.97)	14.27 (14.25)
QLD	0.63 (0.63)	N<5	7.35 (7.39)	6.73 (6.81)
SA	0.93 (0.91)	N<5	7.38 (7.15)	6.94 (6.76)
WA	0.87 (0.86)	N<5	7.79 (7.87)	5.98 (6.09)
TAS	N<5	N<5	3.38 (2.95)	N<5
NT	N<5	N<5	N<5	N<5
ACT	N<5	N<5	5.09 (5.48)	9.49 (10.02)
Total (AUS)	0.68 (0.68)	0.23 (0.23)	8.10 (8.10)	7.65 (7.65)

* Standardised rate (crude rate) per 100,000 population

Table A59. Number and proportion of alcohol-attributable MVA deaths and hospitalisations by state in 2010

State	Deaths (%*)		Hospitalisations (%*)	
	Men	Women	Men	Women
NSW	26 (10.5%)	4 (4.3%)	518 (6.9%)	151 (2.9%)
VIC	19 (8.8%)	3 (4.4%)	360 (6.3%)	117 (3.0%)
QLD	25 (12.6%)	4 (5.3%)	428 (8.9%)	83 (3.6%)
SA	8 (10.8%)	2 (4.2%)	132 (7.0%)	34 (2.9%)
WA	18 (13.8%)	3 (5.8%)	260 (9.5%)	60 (4.0%)
TAS	2 (10.2%)	1 (4.5%)	32 (7.7%)	6 (2.5%)
NT	4 (12.5%)	1 (5.9%)	46 (11.0%)	10 (4.8%)
ACT	2 (10.4%)	1 (4.8%)	37 (6.8%)	11 (3.2%)
Total	103 (11.1%)	17 (4.8%)	1,812 (7.6%)	473 (3.2%)

* Proportion of MVA deaths or hospitalisations attributable to alcohol

Table A60. Standardised rate and crude rate of alcohol-attributable MVA deaths and hospitalisations by state in 2010

State	Death rate (crude rate)*		Hospitalisation rate (crude rate)*	
	Men	Women	Men	Women
NSW	0.92 (0.91)	0.12 (0.12)	18.26 (18.18)	5.15 (5.15)
VIC	0.87 (0.87)	0.14 (0.14)	16.42 (16.44)	5.16 (5.16)
QLD	1.42 (1.42)	0.22 (0.22)	24.41 (24.51)	4.70 (4.73)
SA	1.29 (1.26)	0.24 (0.24)	20.47 (20.09)	5.11 (5.00)
WA	1.88 (1.91)	0.33 (0.34)	27.55 (28.05)	6.55 (6.63)
TAS	1.03 (0.98)	0.09 (0.10)	15.91 (15.27)	2.90 (2.87)
NT	3.83 (3.86)	0.90 (0.84)	46.56 (49.34)	9.49 (10.75)
ACT	1.40 (1.44)	0.19 (0.20)	24.55 (25.34)	7.27 (7.34)
Total	1.18 (1.18)	0.18 (0.18)	20.56 (20.56)	5.24 (5.24)

* Standardised rate (crude rate) per 100,000 population

Table A61. Number and proportion of alcohol-attributable non-motor vehicle accidents deaths and hospitalisations by state in 2010

State	Deaths (%*)		Hospitalisations (%*)	
	Men	Women	Men	Women
NSW	303 (23.3%)	58 (7.5%)	13,356 (10.3%)	4,685 (3.7%)
VIC	206 (19.3%)	55 (8.9%)	9,451 (9.3%)	4,331 (4.3%)
QLD	263 (26.4%)	48 (8.9%)	10,315 (11.8%)	3,450 (4.4%)
SA	81 (22.8%)	14 (7.2%)	3,308 (9.8%)	1,128 (3.4%)
WA	166 (30.1%)	34 (11.5%)	5,617 (13.0%)	2,178 (5.7%)
TAS	22 (19.4%)	4 (5.4%)	820 (10.1%)	239 (3.0%)
NT	34 (31.3%)	4 (17.1%)	1,007 (16.8%)	355 (8.0%)
ACT	16 (23.2%)	3 (6.6%)	788 (10.4%)	250 (3.5%)
Total	1,091 (23.9%)	220 (8.6%)	44,663 (10.7%)	16,616 (4.2%)

* Proportion of non-motor vehicle accidents deaths or hospitalisations attributable to alcohol

Table A62. Standardised rate and crude rate of alcohol-attributable non-motor vehicle accidents deaths and hospitalisations by state in 2010

State	Death rate (crude rate)*		Hospitalisation rate (crude rate)*	
	Men	Women	Men	Women
NSW	10.54 (10.63)	1.95 (1.98)	464.48 (468.78)	158.06 (159.66)
VIC	9.42 (9.41)	2.40 (2.41)	431.90 (431.52)	190.46 (191.09)
QLD	15.09 (15.08)	2.72 (2.71)	591.90 (590.68)	194.20 (194.26)
SA	12.16 (12.30)	2.04 (2.06)	496.87 (503.54)	165.76 (165.87)
WA	17.88 (17.91)	3.89 (3.74)	607.87 (605.91)	241.71 (236.94)
TAS	10.51 (10.69)	1.71 (1.72)	400.15 (404.32)	113.55 (114.28)
NT	34.22 (36.15)	5.02 (5.25)	1,098.52 (1,081.20)	400.09 (423.87)
ACT	11.92 (11.30)	2.29 (2.14)	576.25 (540.41)	172.59 (166.92)
Total	12.38 (12.38)	2.44 (2.44)	506.87 (506.87)	184.24 (184.24)

* Standardised rate (crude rate) per 100,000 population

Neuropsychiatric Diseases

Table A63. Crude rate of alcohol-attributable neuropsychiatric diseases deaths and hospitalisations by state in 2010

State	Death rate		Hospitalisation rate	
	Men	Women	Men	Women
NSW	3.2	1.1	365.4	248.5
VIC	2.6	1.1	350.2	300.6
QLD	2.6	1.7	345.9	276.0
SA	2.3	1.4	276.4	139.7
WA	2.6	1.3	342.6	206.7
TAS	5.3	1.7	192.6	193.2
NT	15.6	8.4	348.6	249.5
ACT	0.9	1.5	273.3	151.6
Total	2.9	1.4	343.1	251.7

Figure A6. Proportion of neuropsychiatric diseases YLL, YLD and DALYs attributable to alcohol by disease type in 2010

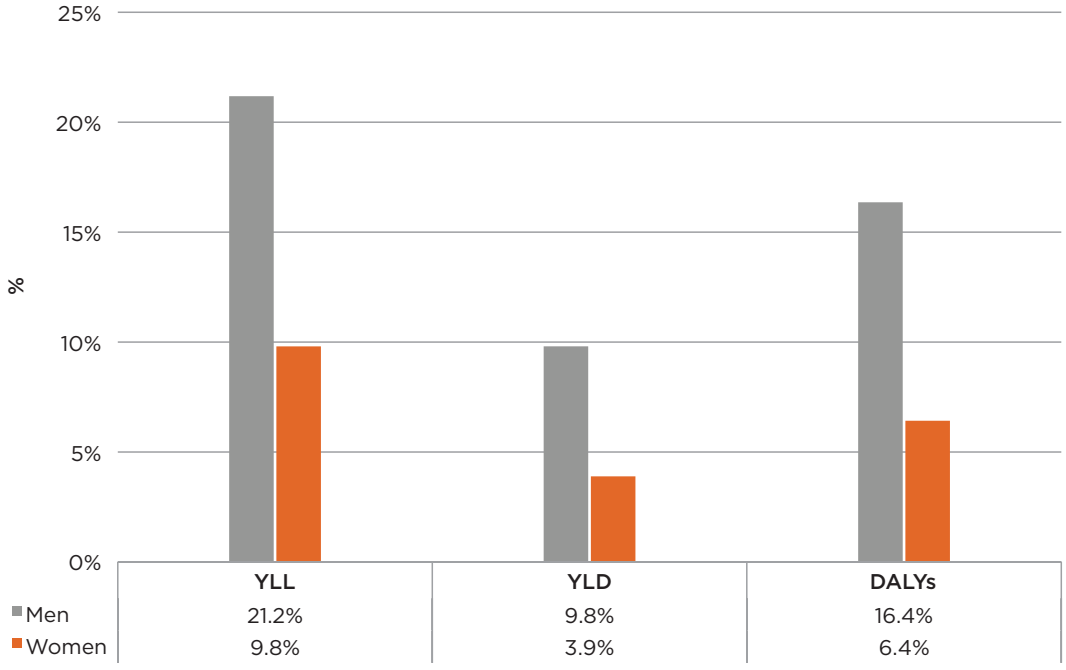

Table A64. Number and proportion of alcohol-attributable epilepsy deaths and hospitalisations by state in 2010

State	Deaths (%*)		Hospitalisations (%*)	
	Men	Women	Men	Women
NSW	12 (29.0%)	7 (16.1%)	737 (29.9%)	316 (17.2%)
VIC	9 (27.6%)	5 (17.1%)	521 (28.8%)	270 (18.3%)
QLD	10 (32.1%)	4 (17.2%)	521 (32.3%)	253 (19.1%)
SA	4 (29.7%)	2 (15.1%)	199 (30.2%)	85 (16.8%)
WA	5 (31.2%)	2 (19.6%)	278 (34.5%)	115 (20.7%)
TAS	3 (27.4%)	N<5	30 (30.7%)	15 (16.1%)
NT	N<5	N<5	50 (37.1%)	17 (21.9%)
ACT	N<5	1 (16.3%)	25 (29.9%)	14 (17.5%)
Total	44 (29.7%)	22 (16.6%)	2,362 (30.8%)	1,086 (18.3%)

* Proportion of epilepsy deaths or hospitalisations attributable to alcohol

Table A65. Standardised rate and crude rate of alcohol-attributable epilepsy deaths and hospitalisations by state in 2010

State	Death rate (crude rate)*		Hospitalisation rate (crude rate)*	
	Men	Women	Men	Women
NSW	0.41 (0.42)	0.24 (0.25)	25.85 (25.87)	10.78 (10.77)
VIC	0.42 (0.42)	0.22 (0.23)	23.82 (23.79)	11.95 (11.96)
QLD	0.57 (0.57)	0.20 (0.20)	29.83 (29.89)	14.15 (14.25)
SA	0.59 (0.59)	0.33 (0.34)	30.33 (30.29)	12.62 (12.50)
WA	0.55 (0.54)	0.20 (0.20)	29.92 (30.10)	12.54 (12.61)
TAS	1.30 (1.33)	N<5	14.88 (14.77)	7.18 (7.17)
NT	N<5	N<5	52.05 (52.56)	21.47 (21.49)
ACT	N<5	0.93 (0.80)	16.47 (16.44)	8.73 (8.68)
Total	0.50 (0.50)	0.24 (0.24)	26.79 (26.79)	12.05 (12.05)

* Standardised rate (crude rate) per 100,000 population

Table A66. Number of mental and behavioural disorders due to use of alcohol deaths and hospitalisations by state in 2010(100% attributable to alcohol)

State	Deaths		Hospitalisations	
	Men	Women	Men	Women
NSW	78	26	9,616	6,953
VIC	45	19	7,115	6,528
QLD	35	27	5,488	4,636
SA	11	7	1,598	861
WA	19	10	2,877	1,781
TAS	8	N<5	360	384
NT	13	7	273	190
ACT	N<5	N<5	373	213
Total	210	100	27,700	21,546

Table A67. Standardised rate and crude rate of mental and behavioural disorders due to use of alcohol deaths and hospitalisations by state in 2010 (100% attributable to alcohol)

State	Death rate (crude rate)*		Hospitalisation rate (crude rate)*	
	Men	Women	Men	Women
NSW	2.69 (2.74)	0.87 (0.89)	338.13 (337.51)	238.29 (236.95)
VIC	2.07 (2.05)	0.83 (0.84)	326.48 (324.86)	289.64 (288.10)
QLD	2.02 (2.00)	1.56 (1.52)	313.68 (314.26)	259.12 (261.04)
SA	1.59 (1.67)	0.91 (1.03)	244.80 (243.24)	129.39 (126.61)
WA	2.18 (2.05)	1.17 (1.09)	308.02 (310.35)	190.68 (193.66)
TAS	3.58 (3.94)	N<5	172.93 (177.29)	182.85 (183.61)
NT	21.60 (13.94)	16.26 (8.36)	285.86 (292.82)	214.41 (226.86)
ACT	N<5	N<5	254.33 (255.48)	140.69 (142.22)
Total	2.38 (2.38)	1.11 (1.11)	314.35 (314.35)	238.91 (238.91)

* Standardised rate (crude rate) per 100,000 population

Table A68. Number of other alcohol-induced neuropsychiatric conditions due to use of alcohol deaths and hospitalisations by state in 2010(100% attributable to alcohol)

State	Deaths		Hospitalisations	
	Men	Women	Men	Women
NSW	N<5	N<5	58	23
VIC	N<5	N<5	35	13
QLD	N<5	N<5	31	12
SA	N<5	N<5	19	N<5
WA	N<5	N<5	20	N<5
TAS	N<5	N<5	N<5	5
NT	N<5	N<5	N<5	N<5
ACT	N<5	N<5	N<5	N<5
Total	N<5	N<5	169	63

Table A69. Standardised rate and crude rate of other alcohol-induced neuropsychiatric conditions due to use of alcohol deaths and hospitalisations by state in 2010 (100% attributable to alcohol)

State	Death rate (crude rate)*		Hospitalisation rate (crude rate)*	
	Men	Women	Men	Women
NSW	N<5	N<5	2.00 (2.04)	0.78 (0.78)
VIC	N<5	N<5	1.61 (1.60)	0.58 (0.57)
QLD	N<5	N<5	1.77 (1.78)	0.67 (0.68)
SA	N<5	N<5	2.81 (2.89)	N<5
WA	N<5	N<5	2.25 (2.16)	N<5
TAS	N<5	N<5	N<5	2.31 (2.39)
NT	N<5	N<5	N<5	N<5
ACT	N<5	N<5	N<5	N<5
Total	N<5	N<5	1.92 (1.92)	0.70 (0.70)

* Standardised rate (crude rate) per 100,000 population

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