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Impact of alcohol and illicit drug use on the burden of disease and injury in Australia

Australian Burden of Disease Study 2011

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Abbreviations

ABDS	Australian Burden of Disease Study
ABS	Australian Bureau of Statistics
ACT	Australian Capital Territory
AIHW	Australian Institute of Health and Welfare
ASR	age-standardised rate
COAG	Council of Australian Governments
DALY	disability-adjusted life years
GBD	Global Burden of Disease Study
GHB	gamma hydroxybutyrate
LSD	lysergic acid diethylamide
ICD-10	International Statistical Classification of Diseases and Related Health Problems, Tenth Revision
NAS	National Alcohol Strategy
NDS	National Drug Strategy
NDSHS	National Drug Strategy Household Survey
NHMD	National Hospital Morbidity Database
NHMRC	National Health and Medical Research Council
NSW	New South Wales
NSMHW	National Survey of Mental Health and Wellbeing
NT	Northern Territory
PAF	Population Attributable Fraction
Qld	Queensland
SA	South Australia
SEIFA	Socio-Economic Indexes for Areas
RR	Relative risk

Tas	Tasmania
TMRED	theoretical minimum risk exposure distribution
Vic	Victoria
WA	Western Australia
YLD	years lived with disability
YLL	years of life lost

Symbols

%	per cent
. .	not applicable
+	plus / and over
–	minus
<	less than
>	greater than
≤	less than or equal to
≥	greater than or equal to
g	gram
n.p.	not publishable because of small numbers, confidentiality or other concerns about the quality of data

Summary

Alcohol and illicit drug use are serious and complex issues that contribute to substantial illness, disease, injury, and deaths in Australia. Alcohol consumption is associated with an increased risk of chronic disease, injury and premature death. Illicit drug use can have severe health effects, including poisoning, mental illness, self-harm, suicide and death by accidental poisoning (overdose).

This report provides insight into the health impact of alcohol and illicit drug use in Australia, including as risk factors for other diseases and injuries. The health impact comprises fatal burden (for example, dying prematurely from *Accidental poisoning*) and non-fatal burden (for example, living with *Alcohol dependence*). The report revises and extends estimates previously published in the Australian Burden of Disease Study (ABDS) 2011 (AIHW 2016c).

This new analysis includes, for the first time, the impact of individual drugs and unsafe injecting practices on the Australian population and analysis by sub-national group. It also estimates the potential effect of alcohol and illicit drug use on disease burden in the Australian population over the next decade.

Nearly 5% of all deaths are from alcohol and illicit drug use

Together, alcohol and illicit drug use were responsible for:

- 4.5% of all deaths (6,660 deaths) in 2011
- 6.7% of the total burden of all disease and injuries in Australia in 2011 (9.1% for males and 3.8% for females). 'Total burden' reflects the impact of dying early and of living with disease or injury.

Burden of disease from alcohol and illicit drug use (6.7%) was less than the 9% attributed to tobacco use in the ABDS 2011 (AIHW 2016c).

One-third of road traffic injuries due to alcohol use

By itself, alcohol use was responsible for 4.6% of the total burden in 2011. One-third of this burden was due to *Alcohol dependence*.

Alcohol use was also responsible for almost one-third (30%) of the burden of *Road traffic injuries—motor vehicle occupants* and even more for *motorcyclists* (33%).

One-third of illicit drug use burden due to accidental poisoning

Illicit drug use (which includes opioids, amphetamines, cannabis, cocaine, other illicit drugs, as well as unsafe injecting practices) was responsible for 2.3% of total burden in 2011.

One-third (33%) of this burden was from *Accidental poisoning* and a further third (31%) was from *Illicit drug dependence*.

Opioids are the largest contributor to the illicit drug use burden

Opioids accounted for the largest proportion (41%) of the illicit drug use burden in 2011, followed by amphetamines (18%), cocaine (8%) and cannabis (7%). In addition, 18% was from diseases contracted through unsafe injecting practices.

Opioid use was responsible for around half (51%) of the total disease burden from *Accidental poisoning*.

Amphetamine use was responsible for 7.5% of the total burden of *Road traffic injuries—motor vehicle occupants* and 9% of the total burden of *Road traffic injuries—motorcyclists*.

Unsafe injecting practices were responsible for about one-quarter (26%) of the burden of *Chronic liver disease*, and one-fifth (21%) of *Liver cancer* disease burden.

The burden is higher for some population groups

Males experienced around three-quarters of the total burden from alcohol use and illicit drug use in Australia in 2011. Compared to females, males experienced a greater proportion of burden due to alcohol use for most associated diseases, but most notably from *Homicide and violence* (27%, compared with 10% for females) and from *Other unintentional injuries* (23%, compared with 7.2% for females).

The burden from alcohol use and illicit drug use (calculated separately) varied according to where a person lived and their socioeconomic position. Age-standardised rates were higher in:

- the lowest socioeconomic group (1.9 times and 2.6 times as high for alcohol use and illicit drug use, respectively), when compared with the highest socioeconomic group
- *Very remote* areas (2.4 times as high) for alcohol use, when compared with *Major cities*
- *Remote* and *Very remote* areas for illicit drug use compared with *Major cities* and regional areas (however this varied by type of drug, with opioid burden being highest in *Major cities*).

Burden due to alcohol use expected to fall over time

The age-standardised rate of burden from alcohol use fell slightly between 2003 and 2011. A further reduction is expected by 2020, based on these trends.

Increases in burden by 2020 expected for amphetamines and cannabis

The age-standardised rate of burden from all illicit drug use fell slightly between 2003 and 2011. There was a large fall in the rate of burden of *Road traffic injuries—motor vehicle occupants* due to illicit drug use over this period, based on self-reported survey data on driving a motor vehicle under the influence of illicit drugs.

Based on trends over the last 2 decades in illicit drug use and unsafe injecting practices, between 2011 and 2020, the age-standardised rate of burden due to:

- amphetamines use is projected to rise by 14%
- cannabis use is projected to rise by 36% for females and remain steady for males
- cocaine use is projected to fall by 24% for males and remain steady for females
- unsafe injecting practices is projected to fall by 21% for males and 17% for females.

1 Introduction

Alcohol and illicit drug use are responsible for substantial health burden in Australia, both as distinct dependency disorders and as risk factors for other diseases and injuries. The consumption and misuse of alcohol and illicit drugs is widely recognised as a major cause of ill health and social harms to the individual user, their family and friends, and to the community in general. Immediate consequences include anti-social behaviour and exposure to violence (including domestic and family violence), accidents, injury, crime and housing difficulties (Laslett et al. 2011, Stafford & Burns 2015). Chronic impacts range from chronic health conditions, such as cardiovascular diseases and cancer, to mental health problems and dependency disorders (AIHW 2014a).

Burden of disease analysis measures the combined impact of dying prematurely, as well as of living with disease. It takes into account age at death and severity of disease for all diseases, conditions and injuries, in a consistent and comparable way. As well as describing the disease burden, the analysis estimates the contribution of various risk factors (termed 'attributable burden') to this health loss. The estimates produced from a burden of disease study are considered the best summary measure of a population's health (Richardson 2002).

The Australian Burden of Disease Study (ABDS) 2011 estimated the burden of around 200 specific diseases and injuries, and the contribution of 30 risk factors to this disease burden, for the Australian and Aboriginal and Torres Strait Islander populations in 2011 and 2003. It included estimates of the burden due to *Alcohol dependence* and *Illicit drug dependence*. The contribution of alcohol and illicit drug use as risk factors for diseases and injuries was also quantified. While the ABDS 2011 quantified the health loss due to consumption and misuse of alcohol and illicit drugs and their related diseases, the broader societal impacts such as anti-social behaviour, crime and harms to family and friends are not measured.

This report expands on the ABDS analysis to provide further insight into the health burden of alcohol and illicit drugs, and to highlight the importance of reducing the harm caused by these drugs. It comprises of estimates of the burden of intentional and unintentional injury to the drug user and others. Estimates of the burden due to alcohol and illicit drug use are reported by individual drugs, and additional burden from unsafe injecting practices and by different population groups (state and territory, remoteness, socioeconomic group) for the first time. These estimates highlight the varying and complex association between drug use and health, and they can be used to prioritise actions to minimise the harms of each drug. This report also presents estimates of the potential burden due to alcohol and illicit drug use in 2020 and 2025 if current trends continue.

1.1 Aims of this report

This report:

- revises estimates of disease burden attributable to alcohol and illicit drug use based on the latest evidence on linked diseases and relative risks
- provides estimates of burden attributable to alcohol and illicit drug use by linked disease, focusing on rates of burden due to alcohol and illicit drug dependence
- provides estimates of burden attributable to alcohol and illicit drug use and dependence for subnational groups (by state and territory, remoteness and socioeconomic group)

- provides detailed reporting for illicit drug use by specific drugs including cannabis, amphetamine, cocaine, opioids and illicit drugs, and from unsafe injecting practices
- provides estimates of changes in rates of burden attributable to alcohol and illicit drug use between 2003 and 2011
- provides estimates of the potential disease burden due to alcohol and illicit drug use expected in 2020 and 2025 based on current trends continuing.

Box 1.1: Key terms used in this report

attributable burden: The disease burden attributed to a particular risk factor. It is the reduction in fatal and non-fatal burden that would have occurred if exposure to the risk factor had been avoided (or, more precisely, had been at its theoretical minimum).

burden of disease (and injury): The quantified impact of a disease or injury on a population, using the disability-adjusted life year (DALY) measure.

comparative risk assessment: The process for estimating the burden of disease attributable to selected risk factors. It involves 5 key steps: selection of risk-outcome pairs; estimation of exposure distribution; estimation of effect sizes; choice of theoretical minimum risk exposure level; and the calculation of attributable burden.

confounding: When an observed association is due, in whole or part, to a third factor that is associated both with the exposure and with the outcome of interest.

DALY (disability-adjusted life years): Measure (in years) of healthy life lost, either through premature death defined as dying before the ideal life span (years of life lost, or YLL) or, equivalently, through living with ill health due to illness or injury (years lived with disability, or YLD).

disease: A broad term that can be applied to any health problem. It is often used synonymously with condition, disorder or problem.

disability weight: A factor that reflects the severity of non-fatal health loss from a particular health state on a scale from 0 (perfect health) to 1 (equivalent to death).

fatal burden: The burden from dying 'prematurely' as measured by years of life lost. Often used synonymously with YLL, and also referred to as 'life lost'.

health state: Consequences of diseases and conditions reflecting key differences in symptoms and functioning.

illicit drug use: The use of illegal drugs (such as cannabis, cocaine, heroin and amphetamines) and probable misuse of opioids (pharmaceutical) (see Box 1.3 for further detail).

illicit drug dependence: The inability to control the urge to use the drug and can range in severity which reflects the impact of the drug on the user—such as the ability to perform daily tasks, sleep loss, and fatigue.

incidence: The number of new cases (of an illness or injury) occurring during a given period.

linked disease: a disease or condition on the causal pathway of the risk factor, therefore more likely to develop if exposed to the risk.

(continued)

Box 1.1 (continued): Key terms used in this report

non-fatal burden: The burden from living with ill-health as measured by years lived with disability. It is often used synonymously with YLD, and also referred to as 'health loss' in this report.

prevalence: The number of cases of a disease or injury in a population at a given time. The prevalence rate is the number of cases existing at a point in time (point prevalence) or over a specific period (period prevalence).

relative risk (RR): The risk of an event relative to exposure, calculated as the ratio of the probability of the event occurring in the exposed group to the probability of it occurring in the non-exposed group A relative risk of 1 implies no difference in risk; RR <1 implies the event is less likely to occur in the exposed group; RR >1 implies the event is more likely to occur in the exposed group.

risk factor: Any factor that causes or increases the likelihood of a health disorder or other unwanted condition or event.

sequela: Consequence of diseases; often used in the plural, **sequelae**.

TMRED (theoretical minimum risk exposure distribution): The risk factor exposure distribution that will lead to the lowest conceivable disease burden.

YLD (years lived with disability): A measure of the years of what could have been a healthy life but were instead spent in states of less than full health. YLD represent non-fatal burden.

YLL (years of life lost): Years of life lost due to premature death defined as dying before the ideal life span. YLL represent fatal burden.

1.2 Alcohol use in Australia

Alcohol consumption is a major health issue in Australia and is associated with increased risk of chronic disease, injury and premature death (AIHW 2016c). Findings from the self-reported data in the National Drug Strategy Household Survey (NDSHS) 2016 show that:

- about 3 in 4 (77%) of Australians aged 14 and over had consumed alcohol in the past year and about 1 in 17 (5.9%) drank every day
- almost 1 in 5 (17%) of persons aged 14 and over consumed more than 2 standard drinks per day on average, exceeding the lifetime risk guidelines (AIHW 2017f).

Nationally, alcohol has consistently accounted for the largest proportion of treatment episodes for persons receiving specialist drug and alcohol treatment (AIHW 2014b).

Although alcohol consumption is a significant contributor to burden of disease in Australia, some positive trends have emerged. In 2016, more Australians abstained from alcohol, particularly young people aged 12–17, than in 2013, and fewer people were drinking at levels that place them at lifetime risk of harm than in previous years (AIHW 2017f).

The National Health and Medical Research Council (NHMRC) has produced Australian guidelines to reduce health risks from drinking alcohol (Box 1.2) (NHMRC 2009).

Box 1.2: The Australian alcohol guidelines

The Australian guidelines to reduce health risks from drinking alcohol aim to assist Australians with decisions about whether to drink alcohol and, if so, how much. Under these guidelines, pregnant women and young people (aged under 18) are advised not to drink at all.

Guideline 1: Drinking no more than 2 standard drinks on any day reduces the lifetime risk of harm from alcohol-related disease or injury.

Guideline 2: Drinking no more than 4 standard drinks on a single occasion reduces the risk of alcohol-related injury arising from that occasion.

Guideline 3: For children and young people aged under 18, not drinking alcohol is the safest option. Alcohol may adversely affect brain development and lead to alcohol-related problems in later life.

Guideline 4: For women who are pregnant or planning a pregnancy, or are breastfeeding, not drinking is the safest option. Maternal alcohol consumption can harm the developing foetus or breastfeeding baby.

Source: NHMRC 2009.

1.3 Illicit drug use in Australia

Illicit drug use has severe health effects, such as dependence, poisoning, mental illness, self-harm and suicide (AIHW 2016c). The use of unsafe injection practices with some illicit drugs can also cause the transmission of blood-borne viruses, including *HIV/AIDS*, *Hepatitis C* and *Hepatitis B*. Box 1.3 provides a general definition of illicit drug use as well as what this term refers to in the context of burden of disease estimates presented in this report.

Box 1.3: Definition of illicit use of drugs

Illicit drug use can encompass a number of broad categories, including:

• the use of an illegal drug—a drug that is prohibited from manufacture, sale or possession in Australia—for example, cannabis, cocaine, heroin and amphetamine-type stimulants

• misuse, non-medical or extra-medical use of pharmaceuticals—a drug that is available from a pharmacy, over-the-counter or by prescription, which may be subject to misuse—for example, opioid-based pain relief medications, opioid substitution therapies, benzodiazepines, over-the-counter codeine and steroids

• use of other psychoactive substances—legal or illegal, potentially used in a harmful way—for example, kava, synthetic cannabis and other synthetic drugs, or inhalants such as petrol, paint or glue (MDFA 2017).

For the purposes of this report, the term '**illicit drug use**' has been used to refer to the use of the illegal drugs cannabis, cocaine, heroin, amphetamines and others; and the probable misuse of opioids (noting that it cannot be assumed that all overdoses are due to misuse).

The burden due to drug dependence and drug use is described in this report.
'**Drug dependence**' is defined as the inability to control the urge to use the drug and can range in severity, reflecting the impact of the drug on the user such as the ability to perform daily tasks, sleep loss, and fatigue.

(continued)

Box 1.3 (continued): Definition of illicit use of drugs

Amphetamines in this report refer to the broad category of amphetamines in the Australian Standard Classification of Drugs of Concern, which includes both amphetamine and methamphetamine (ABS 2011). It is noted that the vast majority of amphetamine in Australia is actually methamphetamine.

The NDSHS 2016 reported that:

- around 3.1 million (16%) of people in Australia aged 14 and over were estimated to have used illicit drugs in the previous 12 months
- people aged 20–29 were most likely to have used an illicit drug in the previous 12 months (28% of all people in that age group)
- the most commonly used illicit drugs in the previous 12 months in 2016 were cannabis (10%), followed by pain-killers for non-medical purposes (3.6%) and cocaine (2.5%) (AIHW 2017f).

The proportion of people using illicit drugs has remained relatively stable over the last 10 years—around 15% of adults in Australia, and around 5% of the global adult population (AIHW 2017f; UNODC 2015). However, over this time, changes have occurred in the use of specific drugs, in the forms of drugs being used; and in the way drugs are taken. Of all illicit drugs, changes in the use of amphetamines have been 1 area of increasing community concern. The proportion of population who had used amphetamines in the previous 12 months fell between 2001 and 2016 (from 3.4% to 1.4%), but people are now more likely to use crystal (ice) than powder, which has a greater potential for dependence (addiction) and chronic physical and mental problems (DoH 2013). This decreasing trend in overall use of amphetamines may be due to an increased tendency to under-report use—due to social stigma associated with amphetamine use—instead of change in actual use (Chalmers et al. 2016).

The Australian Criminal Intelligence Commission has identified significant changes in the nature and scale of the methamphetamine market since 2010. The purity has increased and crystal methamphetamine is now the dominant form of the drug (ACC 2015). This was reflected in the NDSHS 2016, where, among recent users aged 14 and over, the use of powder methamphetamine fell from 51% in 2010 to 20% in 2016, while the use of crystal methamphetamine more than doubled, from 22% to 57% (AIHW 2017f). The proportion of methamphetamine users reporting daily or weekly crystal methamphetamine use also more than doubled, rising from 12% in 2010 to 32% in 2016 (ACC 2015; AIHW 2017f).

The non-medical use of pharmaceuticals is also an emerging issue. In 2016, 4.8% of persons aged 14 and over reported having misused a pharmaceutical drug in the past 12 months (AIHW 2017f). Although not directly comparable, earlier data on non-medical use of pharmaceuticals indicated this was increasing, from 3.6% in 2007 to 4.7% in 2013.

1.4 Policy context

A variety of factors contribute to the use of alcohol and illicit drugs, including an individual's social, cultural, economic and physical environment (Spooner & Hetherington 2005). Employment status, education level, income, ethnicity, religion, age and residence all contribute to the wellbeing of individuals and of communities. As such, government policy targeted at reducing drug use in the community sits within broader economic, social and welfare policy (Ritter et al. 2011).

This section provides an overview of recent Australian Government policies and strategies that are relevant to reducing the harms associated with alcohol and illicit drug use in Australia.

The National Alcohol Strategy

The National Alcohol Strategy (NAS) 2006–2011 was developed in response to patterns of high-risk alcohol consumption in Australia, and the harms and costs associated with this consumption. The strategy's broad goal and challenge was to influence Australia's drinking culture to produce healthier and safer outcomes. The strategy's priority areas were: intoxication; public safety and amenity; health impacts; cultural place and availability.

The NAS identified the many areas of influence that state, territory and local governments also had in reducing the harms associated with alcohol. For example, state and territory governments are involved in developing and implementing strategies to reduce alcohol-related harm (such as trading-hour restrictions), as well as liquor-licensing review. Local governments oversee events, functions and festivals where alcohol is served, and are ideally placed to support both national and state and territory government strategies; they also work with businesses, industry and community groups at a local level, and deliver harm-minimisation programs through service delivery, land-use planning and co-enforcement with other regulatory agencies.

The National Drug Strategy

Australia has had a coordinated approach to dealing with alcohol and illicit drugs since 1985. The National Drug Strategy (NDS) 2017–2026 is the latest cooperative strategy between the Australian Government, state and territory governments and the non-government sector. It has an overarching approach of harm minimisation and encompasses 3 pillars, each with specific objectives (MCDS 2017):

- prevent the uptake and/or delay the onset of drug use; reduce misuse; and support persons to recover from dependence
- prevent, stop, disrupt or otherwise reduce the production and supply of illegal drugs; and control, manage and/or regulate the availability of legal drugs
- reduce the adverse health, social and economic consequences for the drug user, their families and the community.

National Ice Action Strategy

The Australian Government launched a National Ice Taskforce to develop the National Ice Action Strategy to tackle the use of ice and its harmful effects (DoH 2013). The taskforce delivered the National Ice Action Strategy report to the Council of Australian Governments (COAG) in December 2015 <http://www.dpmc.gov.au/taskforces/national-ice-taskforce>.

The strategy aims to:

- reduce the prevalence of ice use and resulting harms across the Australian community
- ensure early intervention and treatment services are better tailored to respond to ice and meet the needs of the population
- better target law enforcement efforts to disrupt the supply of ice (COAG 2015).

Alcohol and illicit drug treatment services also play an important role in efforts to reduce the recent trends in methamphetamine use (AIHW 2011).

1.5 What is burden of disease?

'Burden of disease' analysis is a technique used to assess and compare the health impact of different diseases, conditions or injuries, and risk factors on a population. It uses information from a range of sources to quantify the fatal (for example, dying from drug overdose) and non-fatal (for example, living with alcohol dependence or with diseases contracted through unsafe injecting practices) effects of these diseases in a consistent manner, so that they can then be combined into a summary measure of health called 'disability-adjusted life years', or DALY. Put simply, a DALY combines the impact of dying early and living with illness. It combines the estimates of 'years of life lost' due to premature death (YLL) and 'years lived in ill health or with disability' (YLD) to count the total years of healthy life lost from disease and injury. These and other key terms are defined in Box 1.1.

This health loss represents the difference between the current health status of the population and the ideal situation where everyone lived a long life, free of disease. Burden of disease estimates capture both the quantity and quality of life, and reflect the magnitude, severity and impact of disease and injury within a population. The analysis also estimates the contribution of various risk factors to health loss, known as the attributable burden. Burden of disease does not attempt to quantify the social or financial consequences of disease and injury.

The quality of underlying disease burden estimates from the ABDS 2011 used in this report was high for most diseases. Fatal burden estimates for all diseases are considered to be of high quality; however, there were some variations, by disease, in the quality of non-fatal estimates, which ranged from medium to high. For more information on the quality of the disease burden estimates in the ABDS 2011, see *Australian Burden of Disease Study 2011: methods and supplementary material* (AIHW 2016a). Burden of disease estimates can be used to inform population health monitoring, health policy formulation, health service planning and health promotion and management strategies.

For detailed information about the ABDS 2011, and further information on the methods used to calculated disease burden, see the *Australian Burden of Disease Study: impact and causes of illness and death in Australia 2011* (AIHW 2016c) and *Australian Burden of Disease Study: methods and supplementary material* (AIHW 2016a). The AIHW has also published a number of reports that enhance and extend estimates from the ABDS 2011 for selected risk factors and diseases. This includes reports on physical inactivity, overweight and obesity, diabetes and chronic kidney disease as risk factors, risk factors for dementia, cancer, musculoskeletal conditions and chronic respiratory diseases (AIHW 2016e; AIHW 2016f, AIHW 2017a; AIHW 2017b; AIHW 2017c; AIHW 2017d; AIHW 2017e).

To improve understanding in this report, changes were made to the names of some of the diseases and risk factors in the ABDS 2011 as described in Box 1.4.

Box 1.4: Changes to the names of diseases and risk factors reported in ABDS 2011

For ease of reading and understanding, the names of a number of diseases, injuries and risk factors from the ABDS 2011 have been changed in this report. These include:

- 'Alcohol use disorders' changed to 'alcohol dependence'
- 'Drug use disorders (excluding alcohol)' changed to 'illicit drug dependence'
- 'Poisoning' changed to 'accidental poisoning'
- Risk factor 'drug use' changed to 'illicit drug use'.

How is the contribution of risk factors measured?

Information on the impact of various risk factors including alcohol and illicit drug use on the health of the population can be used to measure the proportion of the burden of disease due to these risk factors. These estimates show how much of the disease burden could have been averted if the population's actual exposure to the risk had been modified to the lowest level (known as the theoretical minimum risk exposure distribution or TMRED)—for example, if everyone had 1 or less standard drinks of alcohol a day.

The calculations use information on which diseases are linked to the various risk factors, the amount of extra risk of developing or dying from that disease caused by exposure to the risk factor (relative risks), and the number of people in the population exposed to the risk factor.

1.6 Key developments since the Australian Burden of Disease Study 2011

This report improves and extends the analyses undertaken in the ABDS 2011 which were largely based on the methodology from the Global Burden of Disease (GBD) study 2010 (Degenhardt et al. 2013, Lim et al. 2012 and Taylor et al. 2010) and builds on work done by Ridolfo and Stevenson (AIHW 2001) on the quantification of drug-caused mortality and morbidity in Australia. It is the first study to quantify disease burden in Australia due to alcohol and illicit drug use disaggregated by socioeconomic group, remoteness and state/territory.

The estimates of attributable burden due to alcohol and illicit drugs use the best available evidence from recent studies and meta-analyses relevant to the Australian population. However, see Box 1.5 for a summary of the major limitations of this report.

Alcohol use

In this revised analysis, 26 diseases were linked to alcohol use (Table A1), including hypertensive heart disease which was not in the ABDS 2011 but has since been added in the GBD 2015 (GBD 2015 Risk Factors Collaborators 2016). The relative risks for all linked diseases were sourced from either the GBD 2015 study or the AIHW review of the literature and are detailed in Appendix A.

Health loss for former drinkers of alcohol and current drinkers were included in this study (and in ABDS 2011). Former drinkers have been shown to remain at risk for adverse health outcomes, although the association is smaller than for current drinkers (GBD 2015 Risk Factors Collaborators 2016).

Illicit drug use

In total, 13 diseases and injuries are linked to illicit drug use in this report (Table A2). This study included 6 additional diseases linked to illicit drug use (*Accidental poisoning, Road traffic injuries—motorcyclists, Road traffic injuries—motor vehicle occupants, Depressive disorders, Schizophrenia* and *Anxiety disorders*) each having suitable levels of evidence of a causal association. These additional linked diseases were not previously included in the ABDS 2011 and—except *Accidental poisoning*—were not included in GBD 2015 (GBD 2015 Risk Factors Collaborators 2016). Relative risks for these additional diseases were sourced directly from selected studies. See Appendix A for a review of the linked

diseases and the relative risks selected. *Accidental poisoning* was included in GBD 2015 but not ABDS 2011 and has been included in these revised estimates.

The role of drug use causing mental health disorders was examined in this study. Cannabis dependence or heavy cannabis use was assessed based on the literature to cause *Depressive disorders*, *Schizophrenia* and *Anxiety disorders* (Kedzior & Laeber 2014; Lev-Ran et al. 2013; Marconi et al. 2016).

The proportions of *Liver cancer* and *Chronic liver disease* due to illicit drug use were revised from those in the ABDS 2011 using Australian-specific data on the proportion of liver cancer and chronic liver disease due to chronic hepatitis B and chronic hepatitis C and the lagged proportion of Hepatitis B and Hepatitis C due to unsafe injecting practices.

These revised estimates better align with—although are still higher than—a recent Australian study that investigated the proportion of various cancers due to a number of infectious agents. That study estimated that 19% of *Liver cancer* in 2010 was due to Hepatitis C infection and 16% was due to Hepatitis B infection (Antonsson et al. 2015). Additionally, a New South Wales study linking notifiable infections and cancer registry data, reported that 16% of *Liver cancer* between 1990 and 2002 was due to Hepatitis B infection and 13% due to Hepatitis C infection (Amin et al. 2007). As these estimates are not disaggregated by the method of acquiring infection, the proportion of *Liver cancer* solely due to drug use would be less than the estimates reported in the respective studies.

Alcohol, illicit drug use and injury

This report developed a revised method to estimate the contribution of driving under the influence of drugs on burden from *Road traffic injuries—motor vehicle occupants* and *motorcyclists*. This report used relative risks from the latest research and a different measure of exposure to driving under the influence of drugs when compared with the report by Ridolfo and Stevenson (AIHW 2001). The contribution of alcohol to the burden from *Road traffic injuries* was also estimated in this report and in the ABDS 2011 (AIHW 2016c).

Alcohol and illicit drug use are a cause of unintentional injury (*Accidental poisoning*) as well as intentional injuries to the drug user (*Suicide and self-inflicted injuries*) and to others (*Homicide and violence*). In this report, the contribution of alcohol use and illicit drug use to all these types of injuries was estimated, with the exception of illicit drug use causing intentional injuries to others, as no literature could be found to identify appropriate relative risks for mortality or morbidity.

While the health loss due to alcohol and illicit drug use is measured for the individual in this report, the broader societal impacts—such as anti-social behaviour, crime and harms to family and friends—are not measured in burden of disease analysis.

Potential burden in 2020 and 2025

This report illustrates the use of burden of disease data to undertake modelling of potential burden by looking at how changes in the population's drug use levels may affect future disease burden. The results indicate the level of associated disease burden that could be expected in 2020 and 2025 if current trends in the use of alcohol, different drugs and unsafe injecting practices continue into the future.

1.7 Where do the data come from?

Alcohol and illicit drug dependence

Data for *Alcohol*, *Cannabis* and *Cocaine dependence* were obtained from the 2007 National Survey of Mental Health and Wellbeing which used diagnostic criteria to assess for mental and substance use disorders. For ABDS 2011, this survey was considered the most recent data source of diagnosed prevalence for a number of substance use disorders in Australia for persons aged 16–85 years.

Data for *Amphetamine dependence* and *Opioid dependence* were based on a combination of Australian treatment services, hospitalisations and pharmacotherapy data as analysed by the National Drug and Alcohol Research Centre (Degenhardt et al. 2004; Degenhardt et al. 2016). For more detail, see the section 'Measuring the non-fatal burden of alcohol and illicit drug dependency' in Appendix A.

Diseases linked to alcohol use

The proportions of the Australian population that are current drinkers, former drinkers or never drank alcohol in 2011 were sourced from self-reported data in the NDSHS 2010. However, the amount of alcohol self-reported to be consumed by current drinkers in this and other surveys is known to be an underestimate of actual consumption (Rehm et al. 2010).

To overcome this issue, alcohol sales data were used to inflate the self-reported survey estimates. As part of the calculation of the inflation factor, the amount of alcohol consumed was assumed to be 80% of the total alcohol sold (to allow for spillage, wastage and breakage)—an assumption was based on methods used by GBD 2013 (GBD 2013 Risk Factors Collaborators 2015). The adjusted amount of alcohol sold in Australia was compared with the amount of self-reported alcohol consumed in the NDSHS, and resulted in an inflation factor of 30%. This method to account for under-reporting was used because it aligned with the estimate of an appropriate inflation factor by Livingston and Callinan (2015).

Diseases linked to Illicit drug use

A range of data sources were used to estimate the proportion of linked diseases due to illicit drug use. For some linked diseases—such as *Accidental poisoning* and *Hepatitis B*—the proportion was estimated from direct evidence as detailed in Appendix A. For these linked diseases, the proportion due to illicit drug use was calculated from high quality data sources such as the National Mortality Database and the National Notifiable Diseases Surveillance System published in the annual surveillance reports by the Kirby Institute (Kirby Institute 2012, 2013).

In addition, there are 2 types of exposure to drug use estimated for the risk factor illicit drug use: drug dependence and driving under the influence of illicit drugs. The exposure to drug dependence was sourced from the prevalence estimates used to estimate the non-fatal burden for each type of drug dependence in the ABDS 2011.

The method used to estimate exposure of driving under the influence of illicit drugs was based on a person's self-reported use of illicit drugs while driving a motor vehicle, as recorded in the NDSHS. This was considered better quality than estimates of persons who tested positive to illicit drugs while driving because the coverage for roadside testing varies

over time, and is often targeted to times and locations when drugged drivers are most likely to be found. As well, not all illicit drugs are tested.

The NDSHS estimate did not include data on which drug was being taken while driving (AIHW 2017f). Analysis by Elvik (2013) showed that for each drug type, the relative risk varied (from 1.35 for cannabis to 6.19 for amphetamine use), and not having data on the type of drug taken does affect the estimates of attributable burden. Using drugs in combination was also noted by Elvik (2013) to greatly increase the size of the relative risk but this increase was not able to be quantified, and no method is currently available to take this into account (Elvik 2013). The individual type of drug used while driving was estimated from the relative prevalence of the use of each drug in the NDSHS.

The 2016 NDSHS found cannabis was the most common illicit drug used (AIHW 2017f). In comparison, the most common illicit drug detected by roadside drug testing in different states was amphetamines, although this varied by type of vehicle (Davey et al. 2013; Palamara et al. 2014; Rowden et al. 2011). These differences may be due to the quantity and frequency of use, the time-period of the studies and the different strategies used to target roadside drug testing to at risk populations. However, it may also reflect the use of illicit drugs by drivers, and their impact on driving behaviour that may lead to being pulled over by officers—hence estimates of *Road traffic injuries* due to illicit drug use need to be interpreted with these factors in mind.

Box 1.5: Summary of data limitations for this study

Self-reported survey data was used to estimate exposure to alcohol use, which was adjusted for under-reporting using alcohol sales data in Australia and the assumption that the amount of alcohol consumed is approximately 80% of the total alcohol sold. There is little evidence in Australia to validate this assumption however it aligns with work undertaken by Livingston and Callinan (2015) on under-reporting of alcohol use in Australian survey data.

For non-fatal burden estimates of illicit drug use, fairly old Australian data had to be relied upon for prevalence estimates for most of the drug dependences as there have been no recent national data that provide information on clinically diagnosed dependence. For example, estimates of the burden of *Cannabis* and *Cocaine dependence* are based on prevalence information from the 2007 National Survey of Mental Health and Wellbeing. Estimates of the burden due to *Opioid dependence* are based on analysis by the National Drug and Alcohol Research Centre of a study of regular heroin users in NSW and Australia for the period 1997 to 2002 (Degenhardt et al. 2004).

There was limited data available to estimate the type of drug people used while driving under the influence in Australia. Burden estimates of *Road traffic injuries* due to specific illicit drugs reported in this study therefore need to be interpreted with caution.

Comparable data for estimates of potential burden in 2020 and 2025 on *Opioid dependence* or opioid use were not available for the time period of interest for this study. The AIHW is currently undertaking a project on opioid-related harm in Australia which will explore data on trends in opioid use which may be able to be used in future analyses of burden of disease. That report is expected to be published in late 2018.

Minor to moderate transformations were required to overcome data gaps in age-distributions, state/territory breakdowns, and changes over time for non-fatal estimates of alcohol dependence and illicit drug use dependence in this study. See Table A13 for the quality ratings given to these estimates in the ABDS 2011.

1.8 Future directions

The AIHW is currently updating burden of disease estimates in Australia to 2015 for which results are expected to be available in early 2019. This and future updates will allow it to monitor and update the estimates in this report as new evidence emerges about the association between alcohol and illicit drug use and linked diseases, and as alcohol and illicit drug use in the population changes over time.

As reported by the NDSHS, drugs are commonly taken in combination (AIHW 2017f), and the association between drug use and health outcomes may increase when this occurs. In the absence of a risk estimate specific for the combined effect of alcohol use and illicit drug use and disease development—as well as its applicability to estimating attributable burden—the standard combined effect formula used in recent burden of disease studies was used (see Appendix A for further details of combined effects). Further work is required to develop a more refined method to accurately account for the interactions between 2 or more specific risk factors. The ability to accurately quantify the combined contribution of alcohol and illicit drug use is necessary to determine the overall effect of these risks on disease burden in Australia.

There was no difference in the estimate of the association (relative risk) between alcohol and linked diseases if alcohol was consumed through binge drinking or through drinking daily amounts of the same quantity, either in the ABDS 2011 or in this study. Future work could investigate a method to compare the burden of different drinking patterns.

It was not possible to estimate the burden of *Fetal alcohol syndrome* potentially attributable to alcohol use. *Fetal alcohol syndrome* has not been well recognised and diagnosed at birth and there are currently no national data to estimate total prevalence in Australia (Burns et al. 2013). Other neonatal outcomes of maternal drug use and respiratory diseases linked to cannabis use were also not included as linked diseases in this study, due to a lack of evidence of a causal association and the associated relative risk estimates.

The link between drug use and mental health conditions can be circular—drug use can cause mental health conditions and having mental health conditions can lead to drug use. The meta-analyses used to estimate the association between *Cannabis dependence* and mental health conditions in this report included only studies where a diagnosis of a mental health condition was not recorded prior to drug use. Future work could look at estimating the drug use that is a result of a mental health condition.

Alcohol and illicit drug use is also prevalent among Aboriginal and Torres Strait Islander persons. Estimates reported from the ABDS 2011 indicated that Indigenous Australians had rates of attributable burden due to alcohol use at 3.1 times and illicit drug use at 4.2 times the rate of non-Indigenous Australians in 2011 (AIHW 2016b). An analysis of the effect of alcohol and illicit drug use in the Indigenous population would be an important area of work for future burden of disease studies.

This report does not include the economic cost of alcohol and illicit drug use burden on the Australian health care system. Further analyses linking disease burden to health expenditure will provide further insight into the effect of alcohol and illicit drug use on the Australian health care system. As part of work to update Australia's burden of disease estimates to the 2015 reference year, AIHW will also be updating and extending its most recent disease expenditure estimates to align with burden of disease categories which will enable a comparison of health system expenditure and corresponding disease burden.

1.9 Structure of this report

This report quantifies the burden attributable to alcohol and illicit drug use in Australia in 2011.

Chapter 1 includes background information on alcohol and illicit drugs in Australia, the policy context and an overview of burden of disease analysis.

Chapter 2 provides estimates of the combined effect of both alcohol and illicit drug use in Australia for 2011.

Chapter 3 presents estimates of alcohol use burden by sex, age and linked disease and Chapter 4 by state and territory, remoteness and socioeconomic group in 2011.

Chapter 5 compares rates of alcohol use burden in 2003 and 2011; and presents estimates of the potential burden expected in 2020 and 2025, based on current trends.

Chapter 6 presents estimates of overall illicit drug use burden by sex, age and linked disease and Chapter 7 by state and territory, remoteness and socioeconomic group in 2011.

Chapter 8 compares rates of illicit drug use burden in 2003 and 2011.

Chapter 9 presents estimates of illicit drug use burden in 2011 by specific drugs and unsafe injecting practices by sex, age and linked disease.

Chapter 10 presents a summary of burden by specific drugs and practices, by state and territory, remoteness and socioeconomic group in 2011.

Chapter 11 compares the burden attributed to each drug type in 2003 and 2011 and presents estimates of the potential burden expected in 2020 and 2025, based on current trends.

Appendix A provides more detailed information on the methods and data sources used in this report.

Appendix B includes additional tables and figures on results from this study.

2 Alcohol and illicit drug use

This chapter presents estimates of the total, non-fatal and fatal burden due to the combined effect of alcohol and illicit drug use in Australia for 2011. Chapters that follow provide detail of the separate burden from alcohol and illicit drug use.

2.1 Burden from alcohol and illicit drug use

Alcohol and illicit drug use were jointly responsible for 6.7% of the total burden of disease and injuries in 2011, equivalent to 300,169 DALY (Table 2.1).

The DALY attributable to alcohol and illicit drug use combined was almost 3 times as high in males (220,061 DALY) as in females (80,108 DALY). The proportion of total disease burden due to alcohol and illicit drug use was also greater in males (9.1%) than females (3.8%).

After taking account of the different age structures of male and female populations by using age-standardised rates (ASR) per 1,000 persons, the rate of burden attributable to alcohol and illicit drug use was almost 3 times as high in males (19.8) as in females (7.1).

Table 2.1: Burden (DALY) attributable to the combined effect of alcohol and illicit drug use by sex, 2011

	Attributable DALY		
	Number	**% of total DALY**	**Age-standardised rate (per 1,000)**
Males	220,061	9.1	19.8
Females	80,108	3.8	7.1
Persons	**300,169**	**6.7**	**13.4**

Note: The age standardised rate has been age-standardised to the 2001 Australian Standard Population.

Source: AIHW analysis of burden of disease database, 2011.

Type of burden

Together, alcohol and illicit drug use were jointly responsible for 4.5% of deaths in Australia in 2011, equivalent to 6,660 deaths (Table 2.2). The number of deaths attributable to alcohol and illicit drug use was much higher in males (4,244) than females (2,417).

After taking into account the age at which these deaths occur, alcohol and illicit drug use were responsible for 183,442 YLL which was 8.1% of total fatal burden in Australia in 2011 (Table 2.2). A higher proportion of fatal burden in males was attributable to alcohol and illicit drug use (10.1% of YLL) when compared with females (5.3%).

In addition, alcohol and illicit drug use were jointly responsible for 5.2% of total non-fatal burden in Australia in 2011, equivalent to 116,728 YLD (Table 2.2). Non-fatal burden was almost 3 times as high in males (8.0% of YLD) as in females (2.7%).

Table 2.2: Deaths, fatal (YLL) and non-fatal (YLD) burden attributable to the combined effect of alcohol and illicit drug use by sex, 2011

Sex	Attributable deaths and burden					
	Deaths	% of total deaths	YLL	% of total YLL	YLD	% of total YLD
Males	4,244	5.6	133,538	10.1	86,523	8.0
Females	2,417	3.4	49,904	5.3	30,205	2.7
Persons	**6,660**	**4.5**	**183,442**	**8.1**	**116,728**	**5.2**

Source: AIHW analysis of burden of disease database, 2011.

3 Alcohol use

This chapter presents revised estimates of the burden due to alcohol use in Australia. It presents the total, non-fatal and fatal attributable burden by sex, age group and linked disease for 2011, followed by further detail on the disease burden of *Alcohol dependence*.

The list of diseases linked to alcohol use included in this analysis can be found in Table A1.

Note that exposure data for alcohol use in children under 15 were not included in the estimates of burden presented here.

3.1 Burden from alcohol use

The revised analysis shows that alcohol use was responsible for 4.6% of the total burden of disease and injuries in 2011, equivalent to 207,777 DALY (Table 3.1). This was 0.5 percentage points lower than that reported in the ABDS 2011 (227,666 DALY; 5.1%). The difference between the original and revised estimates reported was largely due to revised relative risks for alcohol use, most of which have been revised downwards, based on the latest available evidence and updates made in GBD 2015. See Box A1 for the key developments since the ABDS 2011, and the DALY impact of these differences.

The DALY attributable to alcohol use was almost 3 times as high in males (151,149 DALY) as in females (56,628 DALY). The proportion of total disease burden due to alcohol use was also greater in males (6.3%) than females (2.7%).

After taking account of the different age structures of male and female populations the age-standardised rate of attributable burden due to alcohol use was 3 times higher in males (13.5) compared with females (4.7).

Table 3.1: Burden (DALY) attributable to alcohol use by sex, 2011

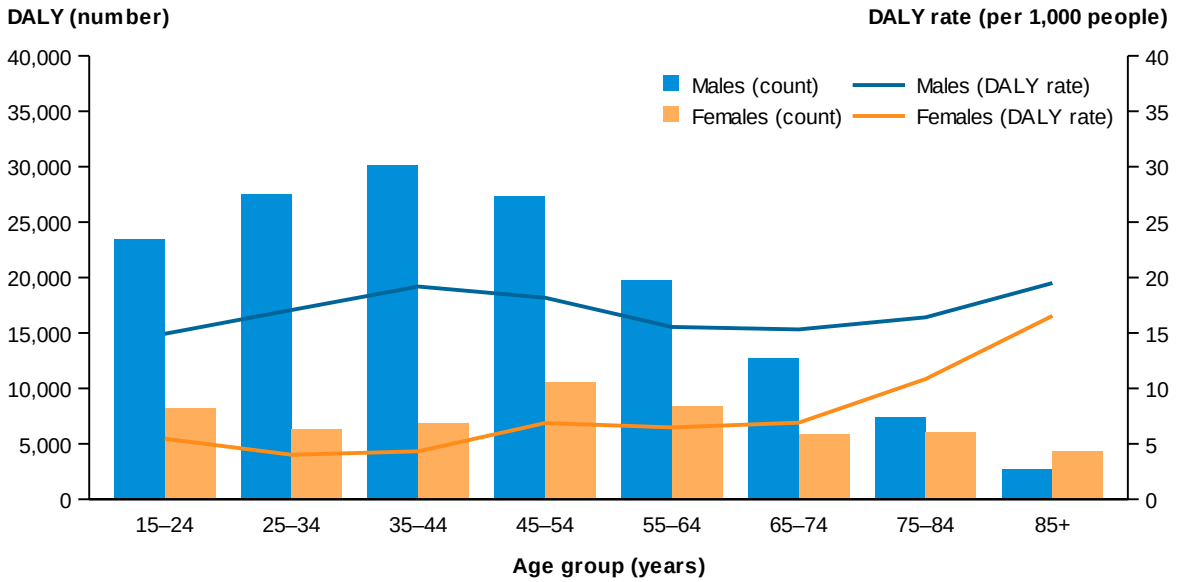
	Attributable DALY		
	Number	**% of total DALY**	**Age-standardised rate (per 1,000)**
Males	151,149	6.3	13.5
Females	56,628	2.7	4.7
Persons	**207,777**	**4.6**	**9.1**

Note: The age standardised rate has been age-standardised to the 2001 Australian Standard Population.

Source: AIHW analysis of burden of disease database, 2011.

Figure 3.1 shows the burden due to alcohol use (DALY counts and rates) in males and females in 2011. The burden due to alcohol use in males is highest in the younger age groups, with most of the burden experienced by those aged 15–54. This pattern is not reflected in females, with the attributable burden varying only slightly across the life course. DALY counts are highest in women aged 15–24, 45–54 and 55–64.

More burden due to alcohol use was experienced by males than females, up to age 84; as reflected in the higher DALY rates. For males, the rate was highest in the 35–44 age group (20 per 1,000) and in this age group, the rate in males was 5 times as high as in females (4.5 per 1,000).



Source: AIHW analysis of burden of disease database, 2011.

Figure 3.1: Burden (DALY and DALY rate) attributable to alcohol use, by age and sex, 2011

Type of burden

Alcohol use was responsible for 3.4% of deaths in Australia in 2011, equivalent to 5,039 deaths (Table 3.2). The number of deaths attributable to alcohol use was much higher in males (3,077) than in females (1,962).

After taking into account the age at which these deaths occur, alcohol use was responsible for 122,135 YLL which was 5.4% of total fatal burden in Australia in 2011 (Table 3.2). A higher proportion of fatal burden in males was attributable to alcohol use (6.6% of YLL), compared with females (3.7% of YLL).

In addition, alcohol use was responsible for 3.9% of non-fatal burden in Australia in 2011, equivalent to 85,642 YLD (Table 3.2). Non-fatal burden was 3 times as high in males (5.9% of YLD) as in females (1.9% of YLD).

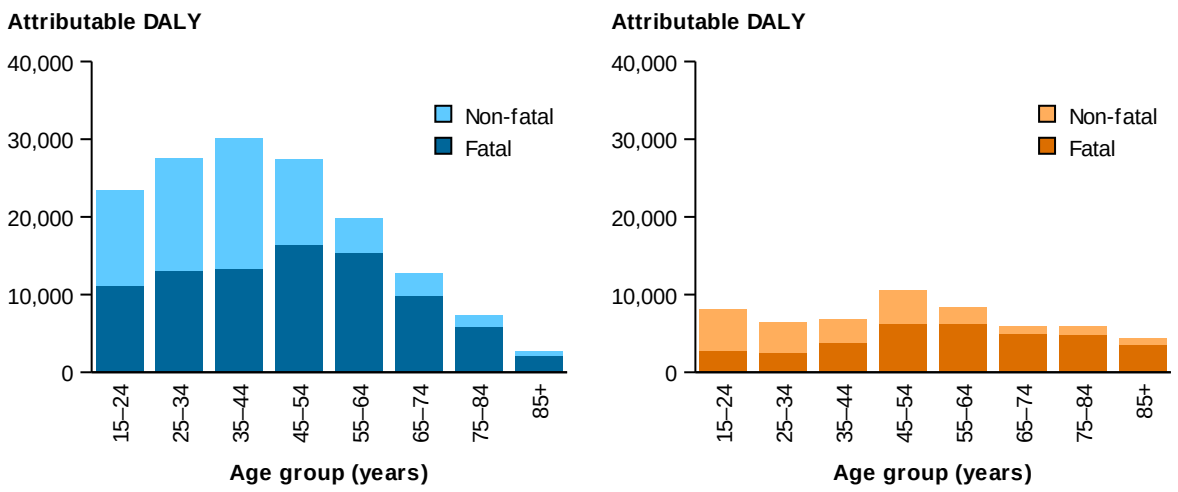
Table 3.2: Deaths, fatal (YLL) and non-fatal (YLD) burden attributable to alcohol use by sex, 2011

	Attributable deaths and burden					
Sex	**Deaths**	**% of total deaths**	**YLL**	**% of total YLL**	**YLD**	**% of total YLD**
Males	3,077	4.1	87,156	6.6	63,993	5.9
Females	1,962	2.7	34,979	3.7	21,650	1.9
Persons	**5,039**	**3.4**	**122,135**	**5.4**	**85,642**	**3.9**

Source: AIHW analysis of burden of disease database, 2011.

Around 59% of the burden attributable to alcohol use was due to fatal burden; however, this varied by age, sex and linked disease.

Fatal burden was the main contributor to alcohol attributed burden in both males and females aged 55 and over (Figure 3.2). The contribution of non-fatal burden was higher in adolescents and young adults.



Source: AIHW analysis of burden of disease database, 2011.

Figure 3.2: Burden attributable to alcohol use due to fatal and non-fatal burden, by age, males (a) and females (b), 2011

Box 3.1: Examples of how the amount of linked disease burden is attributable to each risk factor

Example 1: Comparative risk assessment method

Exposure to cannabis use (dependency) was found to be a risk factor for a number of mental health conditions, including schizophrenia in this study (based on a review of the literature undertaken at the time). This example summarises the calculations to estimate the proportion of schizophrenia burden that is due to cannabis use in the Australian population.

This proportion is estimated using a population attributable fraction (PAF) which takes into account the number of people exposed to the risk factor (in this case cannabis use) in each age group and sex, and the size of the association between the risk factor and the linked disease (in this case schizophrenia).

Using females aged 40–44 as an example, the PAF calculation uses the number of females in this age range who have cannabis dependency (0.13%) and the relative risk of developing schizophrenia due to cannabis use (3.9 (from Marconi et al. 2016)). This is calculated using the following formula:

$$PAF = \frac{P(RR-1)}{P(RR-1)+1}$$

Using this formula for schizophrenia and cannabis use, we get:

$$PAF = \frac{0.0013(3.9-1)}{0.0013(3.9-1)+1}$$

$PAF = 0.00376$

(continued)

Box 3.1 (continued): Examples of how the amount of linked disease burden is attributable to each risk factor

The PAF is then multiplied by the number of DALY for the linked disease (In 2011, 1,104 DALY were estimated for schizophrenia in Australian women aged 40–44) to estimate the attributable burden as follows:

Attributable Burden = PAF x DALY

Attributable Burden = 0.00376 x 1,104

Attributable Burden = 4.1

Therefore, 4 DALY from schizophrenia in females aged 40–44 were attributable to cannabis use. Note that these calculations are done separately for each age group and sex and then summed to estimate the total attributable burden number (555 DALY) and proportion for schizophrenia due to cannabis use (0.3%).

Example 2: Direct evidence method

For some linked diseases, there was high quality evidence from a comprehensive national data source that could be used to estimate the proportion of the linked disease due to the risk factor. For these linked diseases the direct evidence from this data source was used to estimate the PAF. For example, the proportion of acute hepatitis B burden due to unsafe injecting practices and illicit drug use was estimated directly from data from the National Notifiable Diseases Surveillance System, published in the annual surveillance reports by the Kirby Institute (Kirby Institute 2012 and 2013). The PAF is the proportion of people that registered as having *Hepatitis B* with an exposure of injecting drug use in 2011. For example, if this was 40% of females that were diagnosed with *Hepatitis B* that recorded an exposure type that was due to injecting drug use then the attributable burden would be calculated as follows:

Attributable Burden = PAF x DALY

Attributable Burden = 0.4 x 82 DALY

Attributable Burden = 32.8 DALY

Therefore, 32.8 DALY from *Hepatitis B* in females were attributable to unsafe injecting practices. Note that these calculations are done separately for each age group and sex and then summed to estimate the total attributable burden number (103 DALY) and proportion for acute *Hepatitis B* burden due to unsafe injecting practices and illicit drug use (42.8%).

3.2 Burden from alcohol use by linked disease

Alcohol dependence accounted for just under one third (66,042 DALY; 32%) of burden due to alcohol use in 2011. *Alcohol dependence* is wholly attributable to alcohol use. The burden of *Alcohol dependence* is explored in greater detail in the following section.

A further 34% of the burden attributable to alcohol use in Australia was from *Injuries* (70,712 DALY). Within this disease group, 10% of the entire disease burden due to alcohol use was due to *Road traffic injuries* (21,282 DALY), 7.8% due to *Suicide and self-inflicted injuries* (16,264 DALY) and 2.6% due to *Homicide and violence* (5,472 DALY).

Cancers accounted for 17% of the burden due to alcohol use (36,322 DALY). Of these, *Liver cancer*, *Breast cancer* in females and *Mouth and pharyngeal cancer* were responsible for the greatest number of DALY (25,383 DALY; 12%).

Cardiovascular diseases, primarily *Stroke* (4,563) and *Atrial fibrillation and flutter* (3,410), were responsible for 3.8% of the burden due to alcohol use. Note that evidence from GBD (2015) shows that alcohol use does not cause burden due to *Coronary heart disease* in males and only in females aged over 65 years.

The remaining linked diseases were responsible for about 12% of the total disease burden due to alcohol use (Table 3.3).

Table 3.3: Burden (DALY) attributable to alcohol use, by linked disease and sex, 2011

	Males		Females		Persons	
Linked disease	**Number**	**%**	**Number**	**%**	**Number**	**%**
Cardiovascular diseases						
Stroke	3,142	2.1	1,421	2.5	4,563	2.2
Atrial fibrillation and flutter	1,915	1.3	1,495	2.6	3,410	1.6
Coronary heart disease	. .	. .	2,951	5.2	2,951	1.4
Hypertensive heart disease	475	0.3	201	0.4	676	0.3
All cardiovascular diseases	*5,532*	*3.7*	*6,068*	*10.7*	*11,600*	*5.6*
Cancers						
Breast cancer	. .	. .	7,238	12.8	7,238	3.5
Liver cancer	8,447	5.6	3,203	5.7	11,650	5.6
Mouth and pharyngeal cancer	5,657	3.7	839	1.5	6,495	3.1
Oesophageal cancer	4,343	2.9	670	1.2	5,013	2.4
Bowel cancer	2,562	1.7	2,448	4.3	5,010	2.4
Laryngeal cancer	837	0.6	79	0.1	916	0.4
All cancers	*21,846*	*14.5*	*14,477*	*25.6*	*36,322*	*17.5*
Injuries						
Suicide and self-inflicted injuries	14,149	9.4	2,115	3.7	16,264	7.8
Road traffic injuries—motor vehicle occupants	10,701	7.1	3,013	5.3	13,714	6.6
Accidental poisoning	6,448	4.3	2,394	4.2	8,842	4.3
Falls	5,892	3.9	947	1.7	6,840	3.3
Homicide and violence	4,831	3.2	641	1.1	5,472	2.6
Other unintentional injuries	4,755	3.1	428	0.8	5,183	2.5
Road traffic injuries—motorcyclists	3,977	2.6	195	0.3	4,172	2.0
Other land transport injuries	3,348	2.2	728	1.3	4,077	2.0
Other road traffic injuries	2,820	1.9	576	1.0	3,396	1.6
Drowning	1,515	1.0	125	0.2	1,640	0.8
Fire, burns and scalds	954	0.6	158	0.3	1,112	0.5
All injuries	*59,390*	*39.3*	*11,320*	*20.0*	*70,712*	*34.0*
Other linked diseases						
Alcohol dependence	49,335	32.6	16,707	29.5	66,042	31.8
Chronic liver disease	8,665	5.7	4,619	8.2	13,284	6.4
Epilepsy	4,870	3.2	2,321	4.1	7,191	3.5
Lower respiratory infections	1,221	0.8	976	1.7	2,197	1.1
Pancreatitis	290	0.2	141	0.2	431	0.2
Total	**151,149**	**100.0**	**56,628**	**100.0**	**207,777**	**100.0**

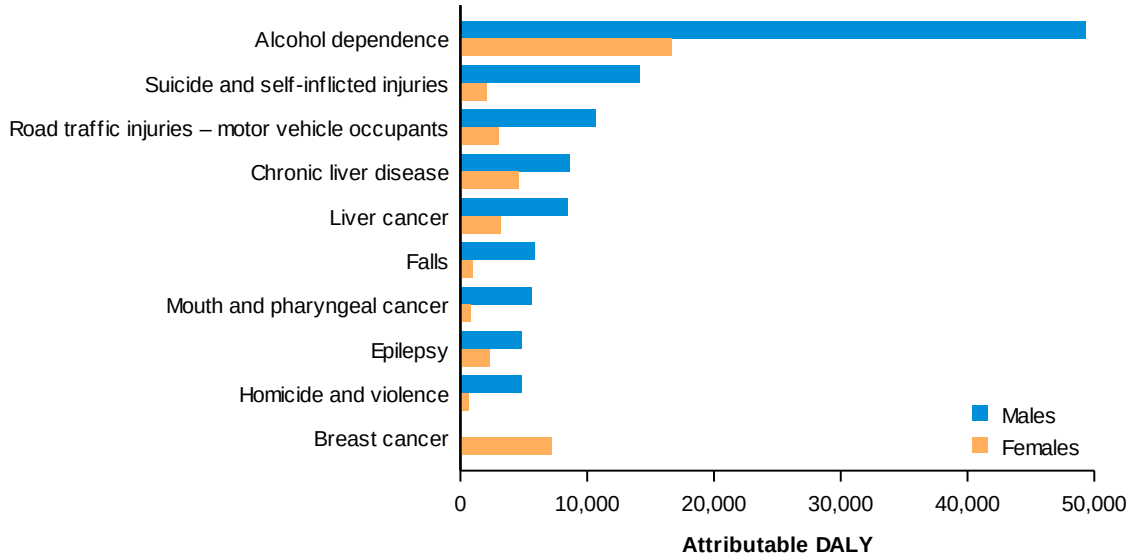
Source: AIHW analysis of burden of disease database, 2011.

The number of DALY due to alcohol use varied by sex for each linked disease (Figure 3.3; Table 3.3). Males experienced a greater amount of burden attributable to alcohol use than females, for all diseases.

The burden of *Alcohol dependence* attributable to alcohol use in males (49,335 DALY; 33%) was 3 times that for females (16,707 DALY; 30%), but accounted for a similar proportion of the total burden due to alcohol use.

Males experienced almost 6 times the amount of *Injury* burden attributable to alcohol use (59,390 DALY; 39%), than females (11,320 DALY; 20%). This was primarily due to males experiencing greater burden due to *Road traffic injuries*; *Falls*; *Suicide and self-inflicted injuries*; and *Homicide and violence*, compared with females.

In females, *Breast cancer* (7,238 DALY), *Chronic liver disease* (4,619) and *Liver cancer* (3,203) accounted for a further 27% of the burden attributable to alcohol use (Table 3.3).



Note: Breast cancer burden attributable to alcohol use is reported for females only.

Source: AIHW analysis of burden of disease database, 2011.

Figure 3.3: Burden (DALY) due to alcohol use, by sex and selected linked diseases, 2011

Total burden by age and sex

Burden due to alcohol use varied across age groups and by sex (Figure 3.4). This is particularly due to the increased risky behaviours in adolescents and young adults and also to the occurrence of chronic conditions in later life (AIHW 2016d). Note that there were no diseases linked to alcohol use in infants and children under 15 years in this study.

Adolescents and young adults aged 15–24

In adolescents aged 15–24, *Alcohol dependence* and *Injuries* were the main diseases contributing to the burden attributable to alcohol use. In particular, young males and females in this age group contributed 16% and 14% (males 23,429 DALY; females 8,168 DALY) of total attributable burden for male and females, respectively. For males, around 51% of the attributable burden in this age group was due to *Injuries*, followed by *Alcohol dependence* (46%). For females, 59% of the attributable burden was due to *Alcohol dependence* and 35% to *Injuries*.

Adults aged 25–44

This age group experienced the greatest proportion of burden due to alcohol use. Males aged 25–44 contributed 38% of the total male burden due to alcohol use (57,596 DALY), while females in this age group contributed 23% (13,244 DALY) of the total female burden. The attributable burden was largely due to *Alcohol dependence* and *Injuries* for both males and females.

Adults aged 45–64

Males aged 45–64 contributed 31% of the total males burden (47,127 DALY) due to alcohol use, and females in this age group contributed 33% (18,887 DALY) of the total female burden. In this age group, linked *Injuries*, linked *Cancers* and *Alcohol dependence* contributed most of the attributable burden for males (34%, 25% and 23%, respectively). Linked *cancers* and *Alcohol dependence* contributed most of the attributable burden for females in this age group (35% and 29%, respectively).

Cardiovascular diseases and *Chronic liver disease* became increasing contributors to alcohol attributable burden, contributing 3.3% and 11%, respectively for males and 3.5% and 12% for females.

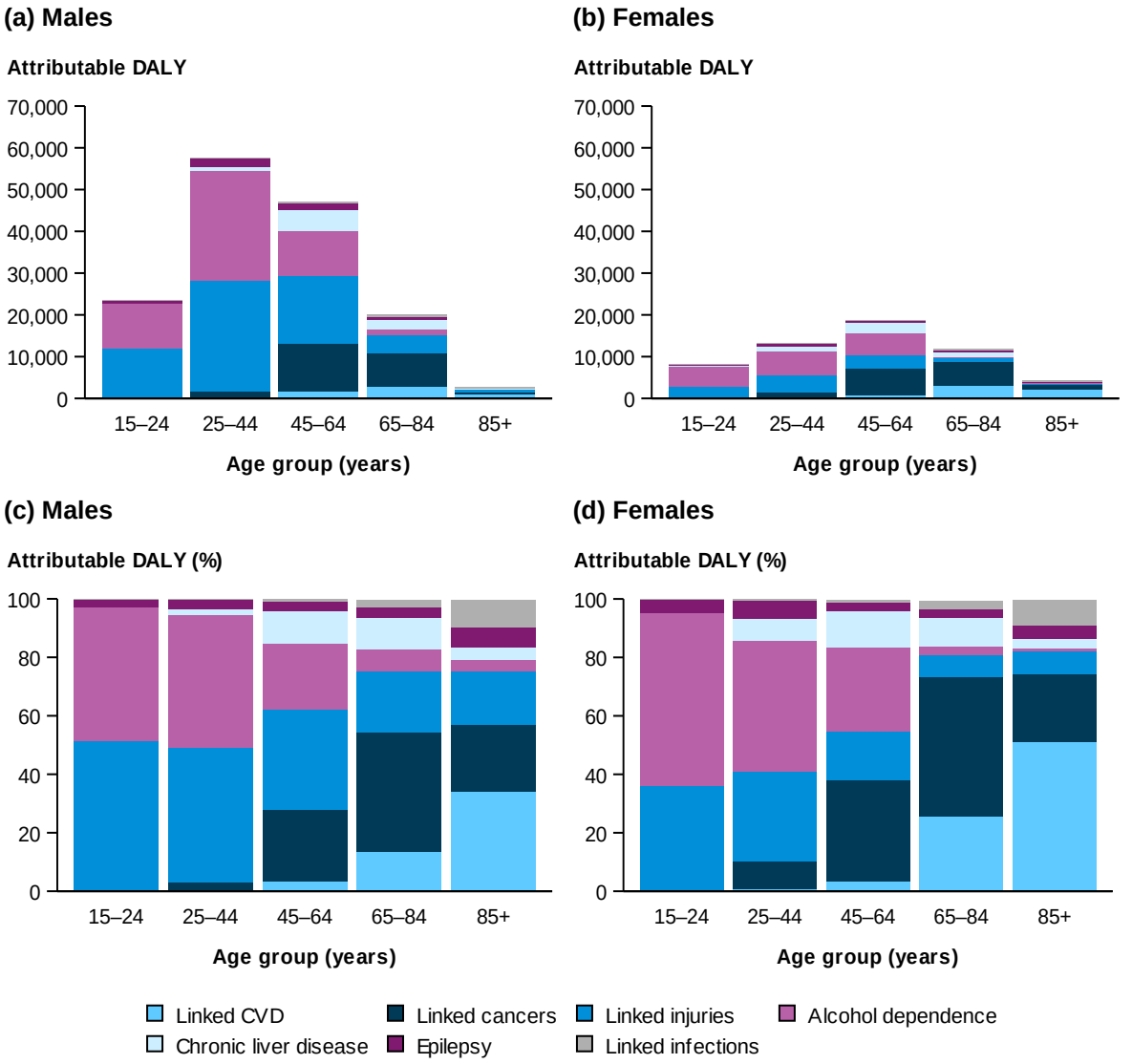
Adults aged 65–84

Males aged 65–84 contributed 13% of the total male burden due to alcohol use (20,108 DALY), while females in this age group contributed 21% (11,875 DALY) of the total female burden. *Linked cancers* were the main contributor to attributable burden for males (41%) and females (48%) in this age group.

The burden of *Alcohol dependence* and *Injuries* became less evident contributors to alcohol-attributable burden for adults aged 65 and over.

Adults aged 85+

In older Australians, the impact of alcohol use was mainly due to linked *Cardiovascular diseases* in males and females (928 DALY for males; 2,236 DALY for females). They were the main contributors to the attributable burden due to alcohol use in this age group (34% for males; 51% for females).



Source: AIHW analysis of burden of disease database, 2011.

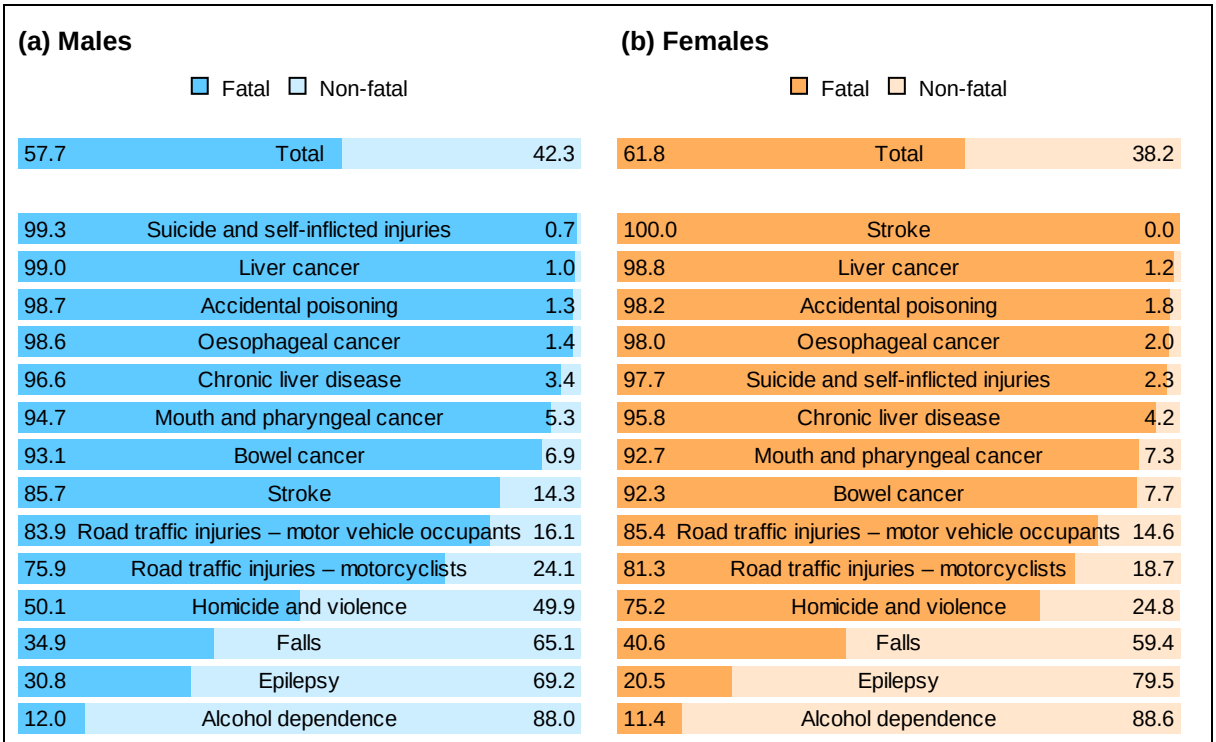
Figure 3.4: Burden attributable to alcohol use, by linked disease age and sex, DALY (a) and proportion within each age group DALY (b), 2011

Type of burden

Figure 3.5 shows the fatal and non-fatal proportions for the leading diseases linked to alcohol use in males and females in 2011.

In both males and females, attributable burden from linked *Cancers*, *Accidental poisoning*, *Suicide and self-inflicted injuries*, *Stroke* and *Chronic liver disease* were mostly due to fatal burden, whereas the attributable burden from *Alcohol dependence*, *Epilepsy*, and *Falls* was mostly non-fatal. Females had a slightly greater proportion than males of fatal burden for *Road traffic injuries* and *Homicide and violence*.

The contribution of fatal and non-fatal burden for each of the linked diseases by sex in this analysis can be found in Table B2.



Source: AIHW analysis of burden of disease database, 2011.

Figure 3.5: Burden attributable to alcohol use due to fatal and non-fatal burden, by selected linked disease and sex, 2011

Proportion of burden for each linked disease due to alcohol use

Alcohol use was responsible for 100% of the burden due to *Alcohol dependence*, and responsible for under half of the burden of *Road traffic injuries—motorcyclists* (33%), *Road traffic injuries—motor vehicle occupants* (30%), *Other land transport injuries* (35%) and *Other road traffic injuries* (30%). Alcohol use was responsible for about one-third of the burden of *Mouth and pharyngeal cancer* (37%) and *Chronic liver disease* (28%) (Table 3.4).

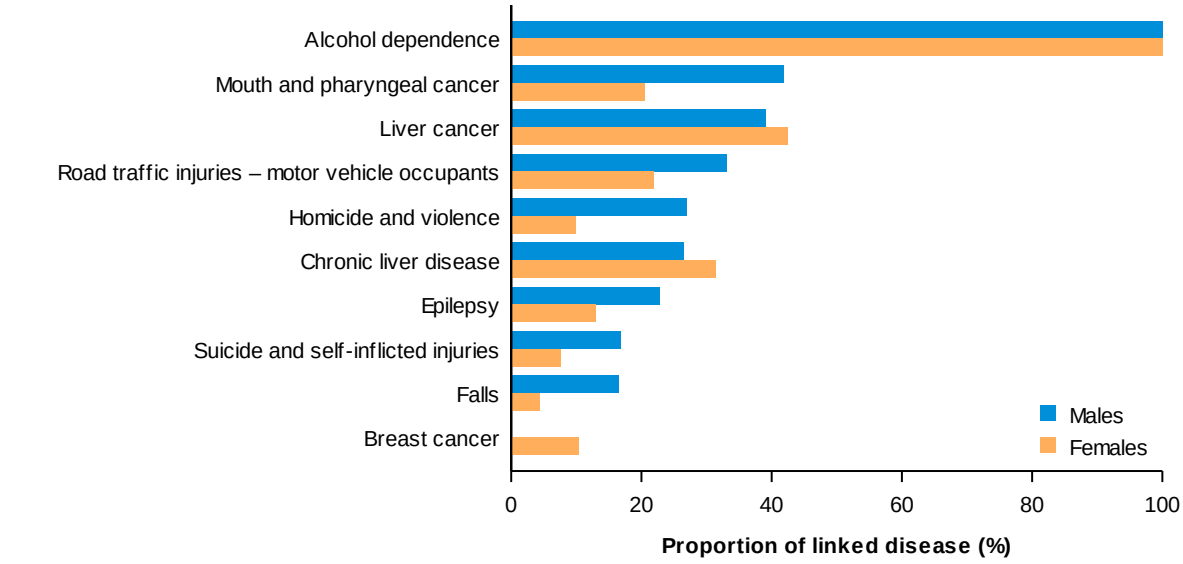
Table 3.4: Number and proportion of disease due to alcohol use (attributable DALY), by linked disease, 2011

Linked disease	Total DALY	DALY attributable to alcohol use	% of linked disease burden due to alcohol use
Alcohol dependence	66,042	66,042	100.0
Suicide and self-inflicted injuries	112,217	16,264	14.5
Road traffic injuries - motor vehicle occupants	46,101	13,714	29.7
Chronic liver disease	47,398	13,284	28.0
Liver cancer	29,124	11,650	40.0
Accidental poisoning	51,131	8,842	17.3
Breast cancer	70,268	7,238	10.3
Epilepsy	39,340	7,191	18.3
Falls	57,267	6,840	11.9
Mouth and pharyngeal cancer	17,606	6,495	36.9
Homicide and violence	24,349	5,472	22.5
Other unintentional injuries	26,852	5,183	19.3
Oesophageal cancer	23,773	5,013	21.1
Bowel cancer	92,413	5,010	5.4
Stroke	266,203	4,563	1.7
Road traffic injuries - motorcyclists	12,659	4,172	33.0
Other land transport injuries	11,683	4,077	34.9
Atrial fibrillation and flutter	37,423	3,410	9.1
Other road traffic injuries	11,245	3,396	30.2
Coronary heart disease	114,701	2,951	2.6
Lower respiratory infections	27,168	2,197	8.1
Drowning	7,976	1,640	20.6
Fire, burns and scalds	6,245	1,112	17.8
Laryngeal cancer	4,070	916	22.5
Hypertensive heart disease	7,146	676	9.5
Pancreatitis	3,890	431	11.1
Unlinked diseases	3,280,137	. .	. .
All diseases and injuries	**4,494,427**	**207,777**	**4.6**

Note: The % column is the attributable DALY divided by the linked disease burden in 2011 of that row and all diseases and injuries row includes the burden from all diseases and injuries in the ABDS 2011.

Source: AIHW analysis of burden of disease database, 2011.

The proportion of disease burden due to alcohol use varied by sex and linked disease (Figure 3.6). Males experienced a greater proportion of disease burden due to alcohol use than females from most linked disease, but most notably from *Homicide and violence* (27%, compared with 10% for females), *Other unintentional injuries* (23%, compared with 7.2% for females), *Mouth and pharyngeal cancer* (42%, compared with 21% for females) and *Drowning* (23%, compared with 8.3% for females). Males experienced a slightly lower proportion of disease burden due to alcohol use from *Stroke*, *Bowel* and *Liver cancer* compared with females (Table B1).



Source: AIHW analysis of burden of disease database, 2011.

Figure 3.6: Proportion of selected linked disease burden (DALY) due to alcohol use, by sex and selected linked diseases, 2011

3.3 Burden of alcohol dependence

In 2011, *Alcohol dependence* was responsible for 1.5% (2.0% males; 0.8% females) of the total disease burden in Australia (AIHW 2016c) and was the 19th leading cause of burden with 66,042 DALY.

Males experienced 3 times the amount and rate of burden from *Alcohol dependence* compared with females (Table 3.5).

Table 3.5: Burden of alcohol dependence (DALY) by sex, 2011

	DALY			
Sex	**Number**	**%**	**Crude rate[(a)]**	**ASR[(a)]**
Males	49,335	74.7	4.4	4.5
Females	16,707	25.3	1.5	1.5
Persons	**66,042**	**100.0**	**3.0**	**3.0**

(a) Rates are expressed per 1,000 persons. The standardised rate has been age-standardised to the 2001 Australian Standard Population.

Source: AIHW analysis of burden of disease database, 2011.

The overall burden of *Alcohol dependence* was mostly experienced by adolescents and adults aged 15–44 (72% of total DALY). Males experienced a far greater rate of burden, more than double the female rate for ages 15–24 and 45–64, and was more than 4 times the female rate for ages 25–44 (Table 3.6).

Table 3.6: Burden of alcohol dependence (DALY) by age and sex, 2011

	Males		Females	
Age groups	**Number**	**Rate[a]**	**Number**	**Rate[a]**
0–14	176	0.1	78	0.0
15–24	10,702	6.8	4,823	3.2
25–44	26,088	8.2	5,943	1.9
45–64	10,742	3.9	5,486	1.9
65–74	1,139	1.4	229	0.3
75–84	383	0.9	100	0.2
85+	105	0.8	47	0.2
Total[b]	**49,335**	**4.5**	**16,707**	**1.5**

(a) Rates are expressed per 1,000 persons.

(b) Rates for the total row were age-standardised to the 2001 Australian Standard Population and are expressed per 1,000 persons.

Source: AIHW analysis of burden of disease database, 2011.

Comparisons to other diseases

In comparison to other diseases, *Alcohol dependence* is ranked 19th of the leading diseases in total burden and accounted for a large proportion of health loss for ages 15–44.

For males aged 15–24, it was the second leading cause of burden, contributing to 7.1% of burden in this age group. For males aged 25–44, it was ranked third, and contributed to 5.7% of burden in this age group (Figure 3.7). Note that alcohol use disorders refers to *Alcohol dependence*. Also note that the diseases and injuries are coloured based on the disease group they are part of in the ABDS 2011—such as cancer (yellow), cardiovascular diseases (orange) and mental and substance use disorders (purple).

For females aged 15–24, *Alcohol dependence* was the10th leading cause of burden, contributing to 3.8% of burden in this age group (Figure 3.8).

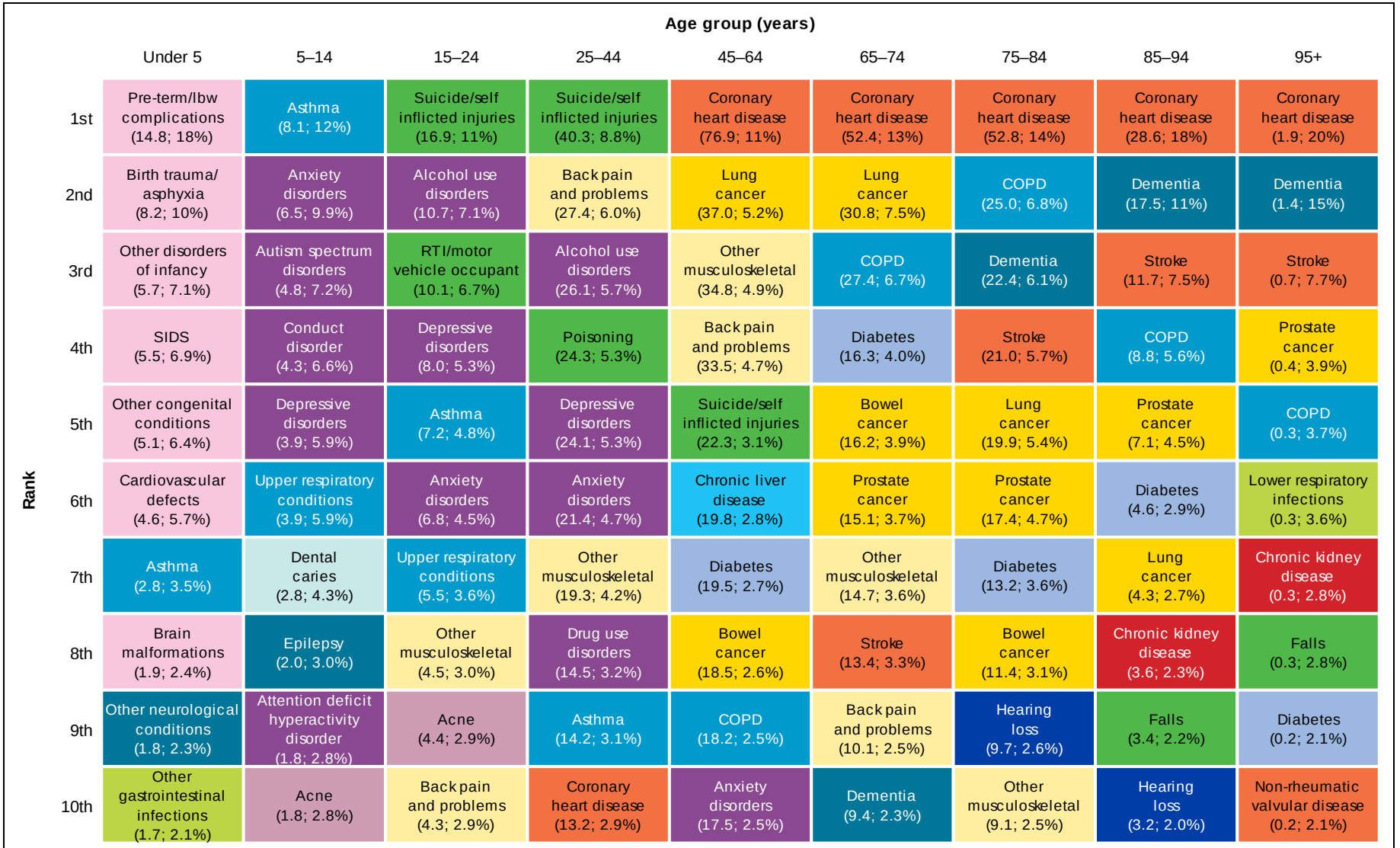


Figure 3.7: Leading causes of total burden (DALY '000, proportion %) for males, by age group, 2011

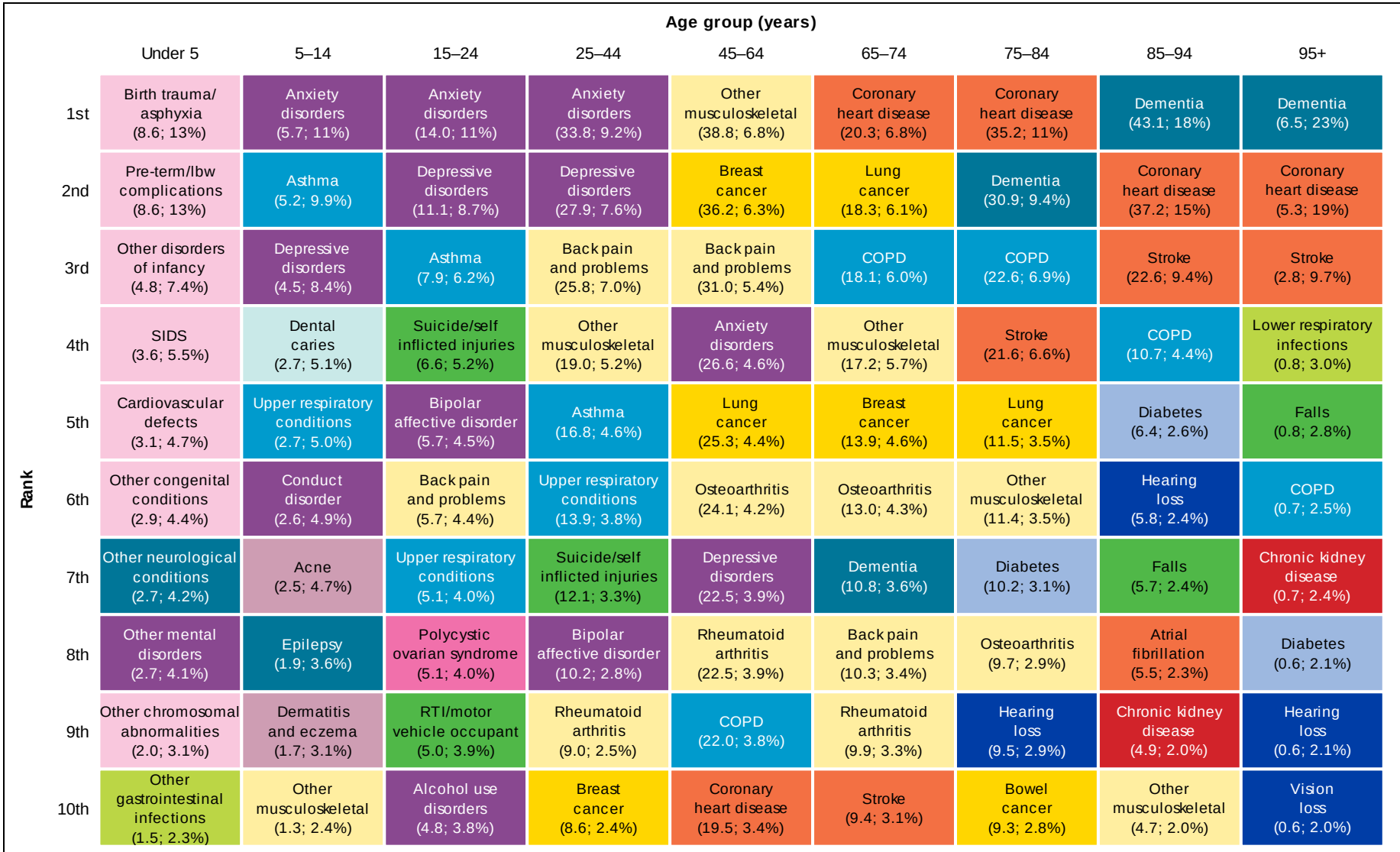


Figure 3.8: Leading causes of total burden (DALY '000, proportion %) for females, by age group, 2011

Type of burden

The ABDS 2011 estimated 282 deaths from *Alcohol dependence* (209 males; 73 females) in 2011; responsible for 7,831 YLL (Table 3.7). Fatal burden accounted for 12% of the total burden due to *Alcohol dependence*. Males contributed to over three-quarters (76%) of this burden. After adjusting for age, the age-standardised rates were 0.5 YLL per 1,000 for males and 0.2 YLL per 1,000 for females.

Table 3.7: Fatal burden (YLL) of alcohol dependence by sex, 2011

	Deaths	YLL			
Sex	**Number**	**Number**	**%**	**Crude rate[(a)]**	**ASR[(a)]**
Males	209	5,919	75.6	0.5	0.5
Females	73	1,912	24.4	0.2	0.2
Persons	**282**	**7,831**	**100.0**	**0.4**	**0.3**

(a) Rates are expressed per 1,000 persons. The standardised rate has been age-standardised to the 2001 Australian Standard Population.

Source: AIHW analysis of burden of disease database, 2011.

In the ABDS 2011, it was estimated that around 249,000 Australians had an *Alcohol use disorder* on a given day in 2011 (177,400 males and 71,500 females) which corresponds to 1.1% of the population (AIHW unpublished).

Non-fatal burden accounted for 88% of the total burden due to *Alcohol dependence* (58,211 YLD). Adolescents and adults aged 15–44 contributed the most to this burden (82% for males; 70% for females) (Table 3.8).

In comparison to other diseases, *Alcohol dependence* was the leading cause of non-fatal health loss for males aged 15–24, and it was the eighth leading cause of non-fatal burden for females in the same age group.

Table 3.8: Non-fatal burden (YLD) of alcohol dependence by sex, 2011

	Males		Females		Persons	
Age groups	**Number**	**Rate[(a)]**	**Number**	**Rate[(a)]**	**Number**	**Rate[(a)]**
0–14	176	0.1	78	0.0	254	0.1
15–24	10,701	6.8	4,823	3.2	15,525	5.1
25–44	24,909	7.8	5,499	1.7	30,408	4.8
45–64	7,142	2.6	4,395	1.6	11,537	2.1
65–74	311	0.4	0	0.0	311	0.2
75–84	134	0.3	0	0.0	134	0.1
85+	41	0.3	0	0.0	41	0.1
Total[(b)]	**43,416**	**4.0**	**14,795**	**1.3**	**58,211**	**2.7**

(a) Rates are expressed per 1,000 persons.

(b) Rates for the total row were age-standardised to the 2001 Australian Standard Population and are expressed per 1,000 persons.

Source: AIHW analysis of burden of disease database, 2011.

Burden of alcohol dependence by severity

For non-fatal burden of *Alcohol dependence*, health loss was determined based on the severity of the condition. Severity of *Alcohol dependence* was based on the 2007 National Survey of Mental Health and Wellbeing (NSMHW) which was related to the impact of alcohol on the ability to perform daily tasks and other impacts such as sleep loss, and fatigue. More details on the definitions of the severity levels are provided in tables 3.9 and A10.

Table 3.9: Definitions for the health states for alcohol dependence

Health state	Definitions[(a)]
Alcohol use disorder: very mild	Person drinks alcohol daily and has difficulty controlling the urge to drink. When sober, the person functions normally.
Alcohol use disorder: mild	Person drinks a lot of alcohol and sometimes has difficulty controlling the urge to drink. While intoxicated, the person has difficulty performing daily activities.
Alcohol use disorder: moderate	Person drinks a lot, gets drunk almost every week and has great difficulty controlling the urge to drink. Drinking and recovering cause great difficulty in daily activities, sleep loss, and fatigue.
Alcohol use disorder: severe	Gets drunk almost every day and is unable to control the urge to drink. Drinking and recovering replace most daily activities. The person has difficulty thinking, remembering and communicating, and feels constant pain and fatigue.

(a) Sourced from GBD 2013 Collaborators 2015.

The non-fatal burden of *Alcohol dependence* was mostly due to moderate (37%) and mild (27%) dependence (Table 3.10). *Severe alcohol dependence* contributed 22% to the non-fatal burden. This suggests that there are more people in these milder categories and thus the population burden is greater, than the severe category. The proportion of *Severe alcohol dependence* contributing to non-fatal burden was higher in males (27%) than in females (7%). Females had a higher proportion of *Mild severity alcohol dependence* contributing to non-fatal burden (34%) compared with males (25%).

Table 3.10: Non-fatal burden (YLD) of alcohol use, by severity, 2011

Severity	Number	%
Very mild	8,274	14.2
Mild	15,856	27.2
Moderate	21,418	36.8
Severe	12,663	21.8
Total	**58,211**	**100.0**

Source: AIHW analysis of burden of disease database, 2011.

4 Alcohol use in key population groups

The results in this section present the burden attributable to alcohol use by state and territory, remoteness and socioeconomic group. Each section presents the burden attributable to alcohol use as a risk factor across all linked diseases, followed by further detail on the disease burden of *Alcohol dependence*, which is wholly attributable to alcohol use.

4.1 Burden from alcohol use by state and territory

Variations in patterns of disease burden across states and territories reflect a complex interaction of many factors such as demographic (including the age structure of the population and the proportion of the population that is Indigenous), socioeconomic and environmental variations.

For example, the Northern Territory is different from other states and territories. Not only does it have the smallest population, but also its population is younger, less likely to live in or near the capital city and more likely to identify as Aboriginal and Torres Strait Islander Australian compared with other states and territories. By comparison, Tasmania also has a relatively small population; however, the population tends to be older, a larger proportion lives in or near the capital city, and a much smaller proportion identifies as Aboriginal and Torres Strait Islander Australian.

This section focuses on the variability of alcohol-attributable burden across states and territories, rather than the detailed estimates for each jurisdiction. Results are presented as age-standardised rates, a method that removes the influence of differences in age structure but not those for other demographic, socioeconomic or environmental factors.

Table 4.1 shows the total burden attributable to alcohol use by state and territory. New South Wales experienced the greatest number of DALY attributable to alcohol use (61,660 DALY) and the Australian Capital Territory experienced the lowest (2,669 DALY). This is reflective of the size of the populations in each state and territory.

The Northern Territory had the highest proportion of total disease burden attributable to alcohol use (8.5% of all DALY in 2011), followed by Western Australia (5.6%) and Queensland (5.4%). The lowest proportion of disease burden attributable to alcohol use was in Tasmania (3.8%) and New South Wales (4.2%) (Table 4.1).

Table 4.1: Burden (DALY) attributable to alcohol use by state and territory, 2011

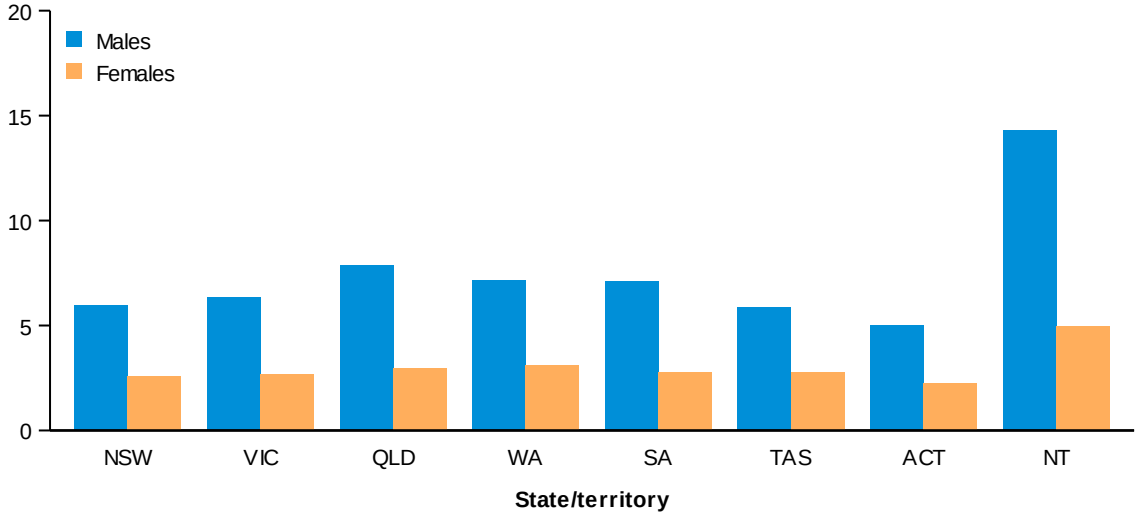
State/territory	Total DALY ('000)	Attributable DALY			
		Number ('000)	% total DALY	ASR per 1,000	Rate ratio
New South Wales	1,464	62	4.2	8.5	0.9
Victoria	1,095	50	4.5	9.0	1.0
Queensland	907	49	5.4	10.8	1.2
Western Australia	435	24	5.6	10.3	1.1
South Australia	373	16	4.3	9.8	1.1
Tasmania	118	4	3.8	8.7	0.9
Australian Capital Territory	62	3	4.3	7.3	0.8
Northern Territory	54	5	8.5	19.8	2.1
Australia	**4,494**	**208**	**4.6**	**9.1**	**1.0**

Notes

1. Columns do not add to the total for Australia due to state/territory-specific exposure used in the analysis.
2. Rates were age-standardised to the 2001 Australian Standard Population and are expressed per 1,000 persons.
3. Rate ratios divide the ASR by the ASR for Australia.

Source: AIHW analysis of burden of disease database, 2011.

After taking account of the different age structures of the states and territories (using age-standardised rates), the Northern Territory experienced a rate of burden attributable to alcohol use that was 2.1 times that of Australia (Table 4.1). By comparison, the Australian Capital Territory rate of burden was 0.8 times that of Australia. In all states and territories, the rate of burden attributable to alcohol use for males was more than twice that of females (Figure 4.1).



Note: Rates were age-standardised to the 2001 Australian Standard Population and are expressed per 1,000 persons.

Source: AIHW analysis of burden of disease database, 2011.

Figure 4.1: Age-standardised attributable DALY rate due to alcohol use (per 1,000 persons), by state and territory and sex, 2011

Table 4.2 presents a picture of age-standardised DALY rates by state and territory for the different diseases linked to alcohol use, increasing from light blue (low, less than 0.5 DALY per 1,000) to purple (high, 3.0 DALY or more per 1,000 persons). This provides a simple way to pinpoint those linked diseases and jurisdictions experiencing greater burden attributable to alcohol use.

Table 4.2 shows that the age-standardised rate of alcohol-attributable burden for most linked diseases was similar across jurisdictions, with the following exceptions:

- *Alcohol dependence*, for which the attributable burden rates were noticeably higher in the Northern Territory (5.0 DALY per 1,000) compared with other states and territories. Queensland, Victoria and Western Australia also had slightly higher age-standardised rates (3.7, 3.3 and 3.3 per 1,000, respectively). This is explored in more detail in the following section.
- *Road traffic injuries—motor vehicle occupants*, for which attributable burden rates ranged from a low of 0.3 per 1,000 persons in the Australian Capital Territory to a high of 2.3 per 1,000 in the Northern Territory.
- *Suicide and self-inflicted injuries*, for which attributable burden rates were also higher in the Northern Territory (2.2 per 1,000) compared with other states and territory (rates between 0.4 and 1.2 per 1,000).
- *Chronic liver disease*, for which attributable burden rates were also highest in the Northern Territory, with an age-standardised rate 3 times that of the other states and territories.
- *Accidental poisoning*, for which the attributable burden rate due to alcohol use was lowest in Victoria, the Australian Capital Territory and the Northern Territory (all with age-standardised rates of 0.3 per 1,000) and highest in Tasmania (0.5 per 1,000).

This result largely reflects the different alcohol consumption in these jurisdictions (AIHW 2017f).

Table 4.2: Linked diseases with attributable burden (DALY ASR per 1,000) due to alcohol use, by state and territory, 2011

Linked diseases	Total	NSW	Vic	Qld	WA	SA	Tas	ACT	NT
Alcohol dependence	3.0	2.4	3.3	3.7	3.3	2.9	2.0	2.1	5.0
Suicide and self-inflicted injuries	0.7	0.4	0.7	1.2	1.0	0.9	0.6	0.4	2.2
Road traffic injuries—motor vehicle occupants	0.6	0.5	0.5	0.7	0.8	0.6	0.5	0.3	2.3
Chronic liver disease	0.6	0.6	0.6	0.6	0.6	0.6	0.5	0.6	1.8
Liver cancer	0.5	0.6	0.6	0.4	0.5	0.6	0.5	0.6	1.2
Accidental poisoning	0.4	0.4	0.3	0.4	0.4	0.4	0.5	0.3	0.3
Epilepsy	0.3	0.4	0.2	0.4	0.3	0.3	0.4	0.5	0.7
Breast cancer	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
Falls	0.3	0.3	0.3	0.3	0.4	0.3	0.2	0.3	1.0
Mouth and pharyngeal cancer	0.3	0.3	0.2	0.3	0.3	0.3	0.4	0.1	0.9
Homicide and violence	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.1	0.8
Other unintentional injuries	0.2	0.2	0.2	0.3	0.2	0.2	0.2	0.2	0.7
Oesophageal cancer	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.2	0.3
Bowel cancer	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.2	0.3
Stroke	0.2	0.3	0.2	0.3	0.3	0.3	0.2	0.2	0.2
Road traffic injuries—motorcyclists	0.2	0.1	0.1	0.2	0.2	0.2	0.2	0.3	0.2
Other land transport injuries	0.2	0.2	0.2	0.2	0.1	0.2	0.2	0.1	0.3
Other road traffic injuries	0.2	0.1	0.1	0.2	0.2	0.2	0.2	0.1	0.7
Atrial fibrillation and flutter	0.1	0.2	0.2	0.2	0.2	0.2	0.1	0.2	0.2
Coronary heart disease	0.1	0.2	0.1	0.2	0.3	0.2	0.3	0.1	0.2
Lower respiratory infections	0.1	0.1	0.1	0.1	0.1	0.2	0.1	0.1	0.2
Drowning	0.1	0.1	0.0	0.1	0.1	0.0	0.1	0.1	0.2
Fire, burns and scalds	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.3
Laryngeal cancer	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Hypertensive heart disease	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0
Pancreatitis	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
Total	**9.1**	**8.5**	**9.0**	**10.8**	**10.3**	**9.8**	**8.7**	**7.3**	**19.8**

0 to <0.5 per 1,000	0.5 to <1.0 per 1,000	1.0 to <3.0 per 1,000	≥3.0 per 1,000

Source: AIHW analysis of burden of disease database, 2011.

Burden of alcohol dependence

There were variations in the burden of *Alcohol dependence* across the different states and territories. The age-standardised DALY rate in the Northern Territory was 1.7 times the national rate. Tasmania, the Australian Capital Territory and New South Wales had slightly lower DALY rates than nationally (with rate ratios less than 1.0) (Table 4.3).

In comparison to other diseases, *Alcohol dependence* was ranked as the ninth leading cause of burden for the Northern Territory.

This variation in total burden due to *Alcohol dependence* is predominantly due to variations in fatal burden across the states and territories. Age-standardised rates of fatal burden varied from 0.2 YLL per 1,000 persons in Western Australia to 0.9 YLL per 1,000 persons in the Northern Territory.

By comparison, there was less variation in age-standardised rates for non-fatal burden of *Alcohol dependence* across jurisdictions. Rates ranged from 1.4 YLD per 1,000 persons in Tasmania to 4.1 YLD per 1,000 persons in the Northern Territory (Table 4.3).

Table 4.3: Alcohol dependence YLL, YLD and DALY counts, age-standardised rates and rate ratios, by state and territory, 2011

	Fatal burden			Non-fatal burden			Total burden		
Jurisdiction	**YLL**	**ASR**	**Rate ratio**	**YLD**	**ASR**	**Rate ratio**	**DALY**	**ASR**	**Rate ratio**
NSW	2,366	0.3	0.9	14,327	2.1	0.8	16,694	2.4	0.8
Vic	1,822	0.3	1.0	16,273	3.0	1.1	18,095	3.3	1.1
Qld	2,026	0.5	1.4	14,207	3.3	1.2	16,234	3.7	1.2
WA	424	0.2	0.5	7,435	3.2	1.2	7,859	3.3	1.1
SA	525	0.3	0.9	4,059	2.6	1.0	4,584	2.9	1.0
Tas	338	0.6	1.7	668	1.4	0.5	1,006	2.0	0.7
ACT	115	0.3	0.9	703	1.8	0.7	818	2.1	0.7
NT	224	0.9	2.8	1,036	4.1	1.5	1,259	5.1	1.7
Australia	**7,831**	**0.3**	**1.0**	**58,211**	**2.7**	**1.0**	**66,042**	**3.0**	**1.0**

Notes

1. Rates were age-standardised to the 2001 Australian Standard Population and are expressed per 1,000 persons.
2. Rate ratios compare the state/territory rate of burden with the Australian rate of burden.

Source: AIHW analysis of burden of disease database, 2011.

4.2 Burden from alcohol use by remoteness

For estimates of burden due to alcohol use and dependence in this report, remoteness is divided into *Major cities*, *Inner regional*, *Outer regional*, *Remote* and *Very remote* areas. These categories are defined by an area's relative distance to services (ABS 2013). Most (88%) of Australia's population lives in *Major cities* and *Inner regional* areas.

There is a range of important demographic, socioeconomic and environmental factors that differ by remoteness which will influence health status, For example:

- each remoteness area has a different population age structure as well as different population sizes
- persons living in more remote areas are often disadvantaged with regard to educational and employment opportunities, income, and access to goods and services. Health behaviours and risks may also differ by remoteness. There are also higher proportions of Aboriginal and Torres Strait Islander persons in more remote areas (AIHW 2014a).

The key aim of this section is to describe the variation in burden attributable to alcohol use across remoteness areas. Results are presented as age-standardised rates, a method that removes the influence of differences in age structure but not those for other demographic, socioeconomic or environmental factors. As *Major cities* are generally considered to experience the best health status overall, age-standardised rates are compared with *Major cities* using rate ratios.

As would be expected due to population sizes, the greatest alcohol attributable burden was experienced in *Major cities* (141,119 DALY) and the smallest in *Very remote* areas (4,382 DALY) (Table 4.4).

Table 4.4: Burden (DALY) attributable to alcohol use by remoteness, 2011

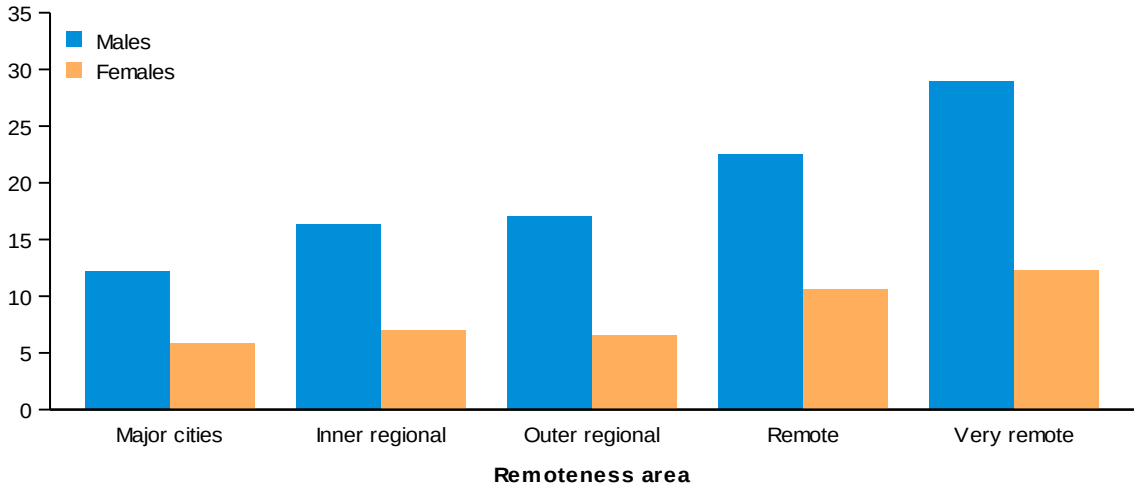
Remoteness area	Total DALY ('000)	Attributable DALY			
		Number ('000)	Per cent of total DALY	ASR per 1,000	Rate ratio
Major cities	2,961	141	4.8	9.0	1.0
Inner regional	950	48	5.0	11.7	1.3
Outer regional	456	24	5.3	11.9	1.3
Remote	73	5	7.3	17.0	1.9
Very remote	52	4	8.5	21.5	2.4

Notes

1. Rates were age-standardised to the 2001 Australian Standard Population and are expressed per 1,000 persons.
2. Rate ratios divide the ASR by the ASR for *Major cities*.

Source: AIHW analysis of burden of disease database, 2011.

Adjustment for population size and age structure shows that there was a clear pattern of attributable burden increasing as remoteness increased, with *Very remote* regions experiencing 2.4 times the burden attributable to alcohol use, compared with *Major cities* (Table 4.4; Figure 4.2).

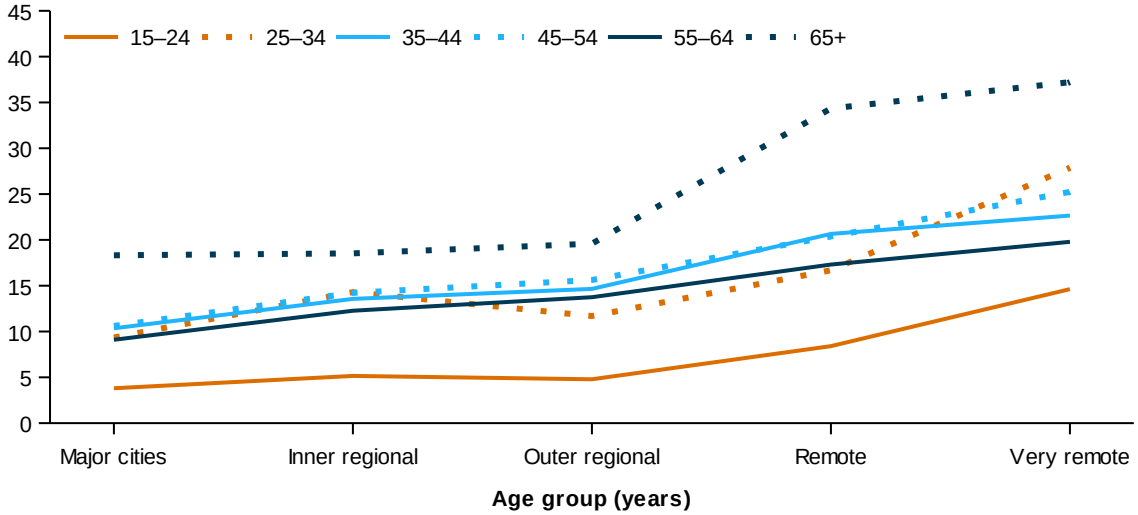


Note: Rates were age-standardised to the 2001 Australian Standard Population and are expressed per 1,000 persons.

Source: AIHW analysis of burden of disease database, 2011.

Figure 4.2: Age-standardised attributable DALY rate due to alcohol use (per 1,000 persons), by remoteness and sex, 2011

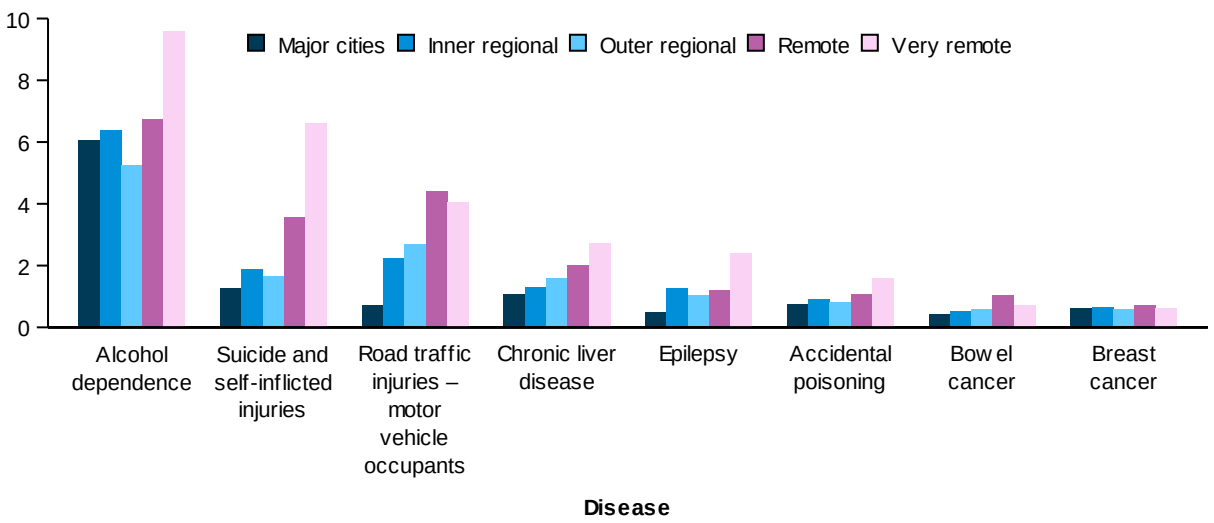
The gradient of attributable burden increasing when remoteness increased was generally maintained across all age groups, with the exception of those aged 25–34 (Figure 4.3). For all remoteness areas, except *Very remote*, the age-standardised rate of burden attributable to alcohol use follows a similar pattern of lower rates in those aged 15–24, is relatively stable between 25 and 64, and higher in those aged 65 and over. The more variable rates in *Very remote* areas are likely to be a result of small numbers.



Source: AIHW analysis of burden of disease database, 2011.

Figure 4.3: Age-specific attributable DALY rate due to alcohol use (per 1,000 persons), by remoteness and sex, 2011

Disparity across remoteness areas was seen in most linked diseases (Table B3). Figure 4.4 shows the age-standardised DALY rate for selected diseases attributable to alcohol use. This shows a general pattern of the burden due to alcohol use increasing as remoteness increased for *Road traffic injuries—motor vehicle occupants* (a rate ratio for *Very remote to Major cities* of 5.7), *Suicide and self-inflicted injuries* (a rate ratio 5.2), and *Epilepsy* (a rate ratio 4.9). The rates were similar across remoteness areas for *Accidental poisoning* and *Breast cancer*, while the rate for *Bowel cancer* was higher for *Remote*.



Note: Rates were age-standardised to the 2001 Australian Standard Population and are expressed per 1,000 persons.

Source: AIHW analysis of burden of disease database, 2011.

Figure 4.4: Age-standardised attributable DALY rate due to alcohol use for selected linked diseases, by remoteness, 2011

Burden of alcohol dependence

As would be expected due to population sizes, the greatest proportion of burden of *Alcohol dependence* was experienced in *Major cities* and the smallest proportion in *Remote* and *Very remote* areas. After adjusting for population size and age-structure, *Very remote* areas had the highest rate of burden of *Alcohol dependence*, with the age-standardised rate 1.7 times as high as for *Major cities*. Other areas showed little difference in age-standardised rates (Table 4.5).

This variation is driven mostly by variations in fatal burden, with less variation in non-fatal burden, particularly the higher rate of fatal burden of *Alcohol dependence* in *Very remote* areas (3.3 times that in *Major cities*) (Table 4.5; Figure 4.5).

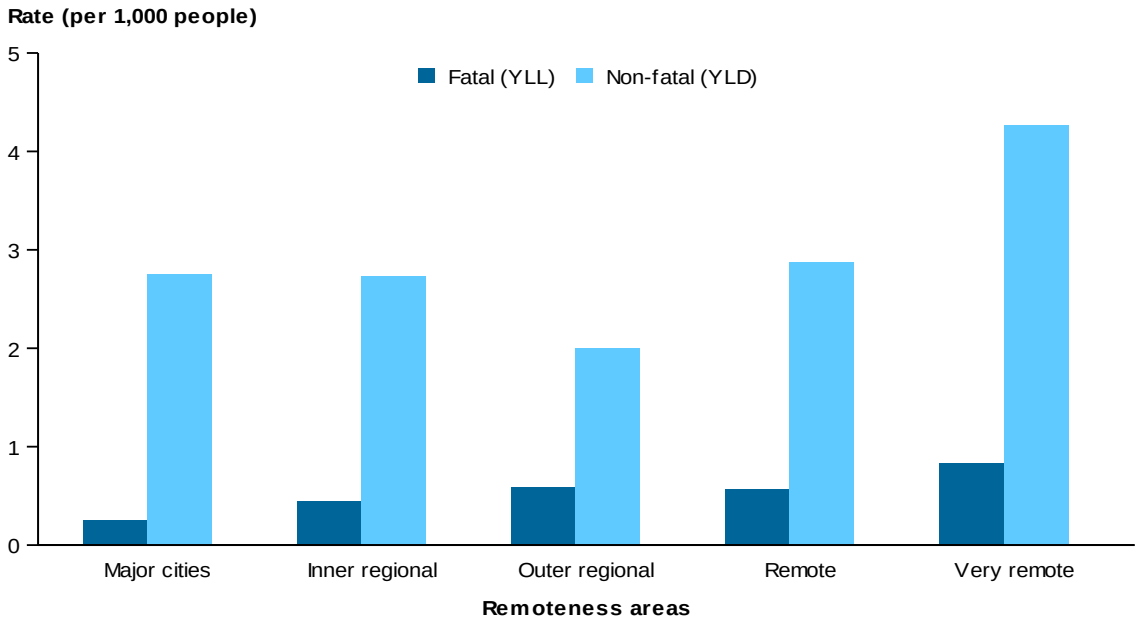
Table 4.5: Alcohol dependence YLL, YLD and DALY counts, age-standardised rates and rate ratios, by remoteness, 2011

	Fatal burden			Non-fatal burden			Total burden		
Remoteness area	**YLL**	**ASR**	**Rate ratio**	**YLD**	**ASR**	**Rate ratio**	**DALY**	**ASR**	**Rate ratio**
Major cities	4,106	0.3	1.0	43,525	2.8	1.0	47,631	3.0	1.0
Inner regional	2,040	0.4	1.8	9,923	2.7	1.0	11,963	3.2	1.1
Outer regional	1,304	0.6	2.4	3,645	2.0	0.7	4,949	2.6	0.9
Remote	198	0.6	2.3	883	2.9	1.0	1,081	3.4	1.1
Very remote	179	0.8	3.3	916	4.3	1.5	1,095	5.1	1.7

Notes

1. Rates were age-standardised to the 2001 Australian Standard Population and are expressed per 1,000 persons.
2. Rate ratios compare the remoteness area rate of burden with the rate of burden for *Major cities*.

Source: AIHW analysis of burden of disease database, 2011.



Note: Rates were age-standardised to the 2001 Australian Standard Population and are expressed per 1,000 persons.

Source: AIHW analysis of burden of disease database, 2011.

Figure 4.5: Alcohol dependence age-standardised rates for fatal (YLL) and non-fatal (YLD) burden, by remoteness, 2011

4.3 Burden from alcohol use, by socioeconomic groups

In this report, disaggregation by socioeconomic position is defined by groups using an index of relative socioeconomic disadvantage based on the area in which a person lives. This index is determined by factors such as household income, employment and education level, and is developed as part of the Socio-Economic Indexes for Areas by the ABS (ABS 2010).

Socioeconomic groups are presented as quintiles in this analysis. Quintile 1 (Q1) represents the 20% of the population living in areas with the lowest socioeconomic characteristics. The level of socioeconomic position increases with each quintile, through to the 20% of the population living in areas with the highest socioeconomic characteristics (Q5).

Poorer health outcomes are generally observed more in lower socioeconomic groups. This disparity is caused by a complex and interrelated set of social and economic factors, including reduced access to both health services and resources, and the influence of the uptake of risky behaviours (AIHW 2014a).

Each quintile has a similar number of persons; however, the lower socioeconomic groups have a larger proportion of elderly persons compared with the higher groups. Over 90% of the highest socioeconomic group live in *Major cities* compared with just over half from the lowest socioeconomic group. A greater proportion of the Indigenous population and of individuals with disability are also found in the lowest socioeconomic group (ABS 2010).

Table 4.6 shows the total burden attributable to alcohol use, by socioeconomic group. The lowest socioeconomic group (Q1) experienced the greatest amount of burden attributable to alcohol use (55,807 DALY; 5.2% of total DALY), compared with 31,281 DALY (4.4%) in the highest socioeconomic group (Q5).

Table 4.6: Burden (DALY) attributable to alcohol use by socioeconomic group, 2011

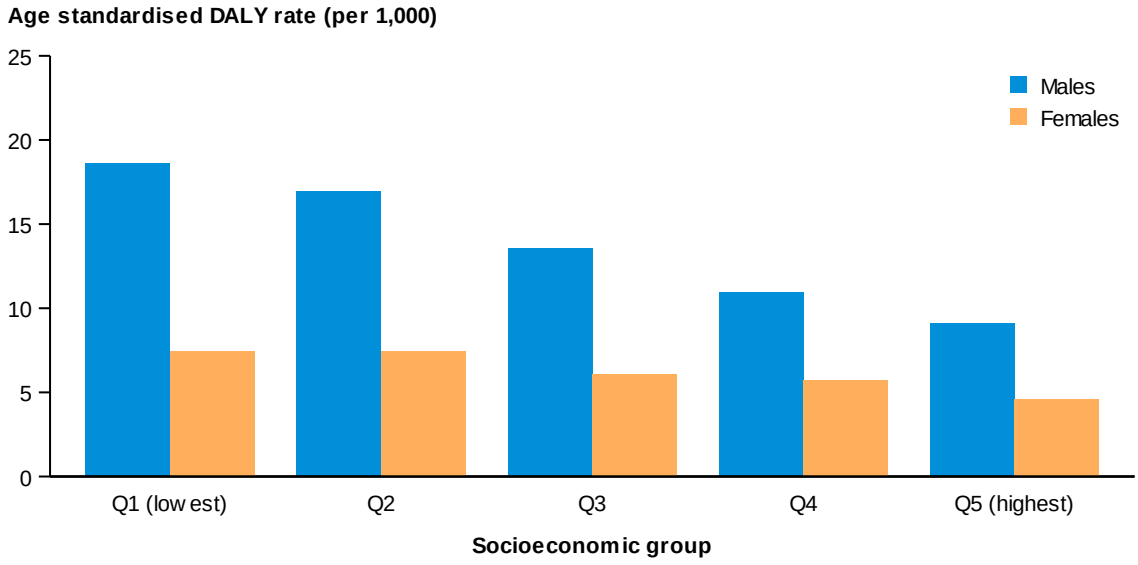
Socioeconomic group	Total DALY ('000)	Attributable DALY			
		Number ('000)	% total DALY	ASR per 1,000	Rate ratio
Q1 (lowest)	1,067	56	5.2	13.1	1.9
Q2	1,020	54	5.3	12.2	1.8
Q3	922	44	4.8	9.8	1.4
Q4	800	38	4.8	8.3	1.2
Q5 (highest)	708	31	4.4	6.8	1.0

Notes

1. Rates were age-standardised to the 2001 Australian Standard Population and are expressed per 1,000 persons.
2. Rate ratios divide the ASR by the ASR for Q5.

Source: AIHW analysis of burden of disease database, 2011.

Adjustment for the age structure of each quintile shows that the rate of burden attributable to alcohol use increased as socioeconomic position decreased, with the lowest quintile experiencing a rate of attributable burden that was 1.9 times that of the highest quintile (Table 4.6). There was a clear pattern of burden decreasing as socioeconomic position increased, for both males and females (Figure 4.6).

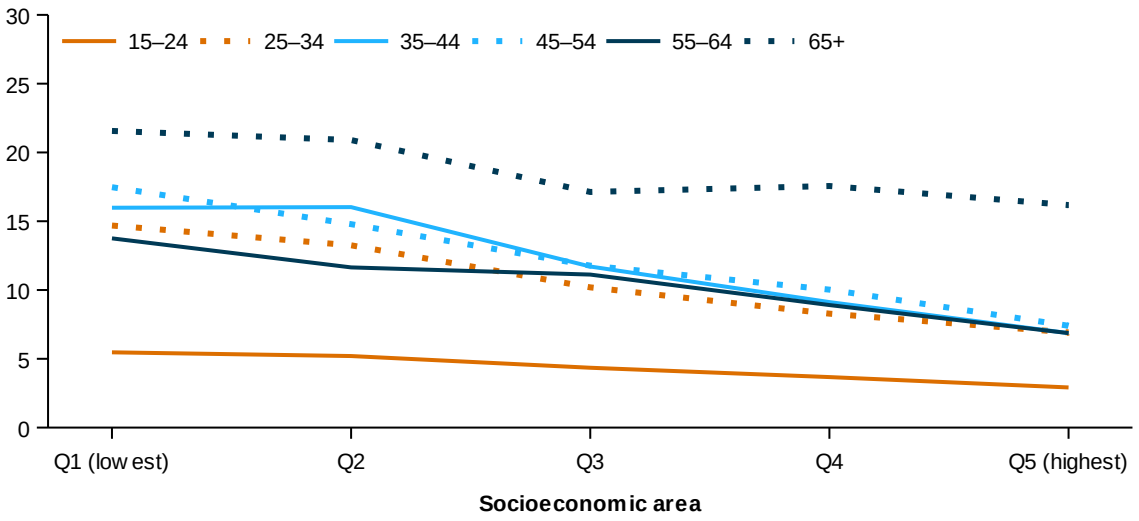


Note: Rates were age-standardised to the 2001 Australian Standard Population and are expressed per 1,000 persons.

Source: AIHW analysis of burden of disease database, 2011.

Figure 4.6: Age-standardised attributable DALY rate due to alcohol use (per 1,000 persons), by socioeconomic group and sex, 2011

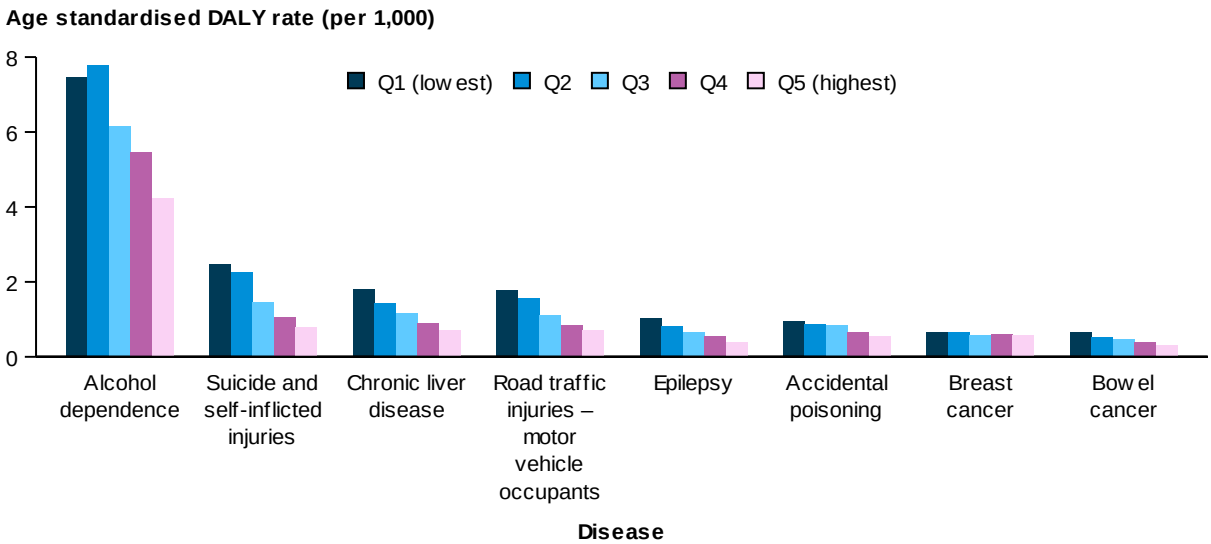
The gradient of attributable burden decreasing with socioeconomic position increased was generally maintained across all age groups, with the exception of those aged 55–64. Each socioeconomic group showed a steady rate of burden attributable to alcohol use between ages 25 to 54, a decrease in age 55–64 and increase in ages 65 and over (Figure 4.7). The greatest increase was seen in the lowest socioeconomic group. The disparity in attributable burden by socioeconomic group was most evident in the 45–54 age group, where the rate of burden due to alcohol use in the lowest socioeconomic group was more than twice that of the highest socioeconomic group (17 DALY compared with 7.4 DALY per 1,000 persons).



Source: AIHW analysis of burden of disease database, 2011.

Figure 4.7: Age-specific attributable DALY rate due to alcohol use (per 1,000 persons), by socioeconomic group and sex, 2011

This disparity across socioeconomic groups was seen in all the linked diseases (Table B5). Figure 4.8 shows the age-standardised DALY rate for the leading diseases attributable to alcohol use. This shows a general pattern of burden due to alcohol use decreasing as socioeconomic group increases for most linked diseases—with the most noticeable gradients observed for *Suicide and self-inflicted injuries* (3.1), *Epilepsy* (2.7), *Chronic liver disease* (2.6) and *Road traffic injuries—motor vehicle occupants* (2.5).



Note: Rates were age-standardised to the 2001 Australian Standard Population and are expressed per 1,000 persons.

Source: AIHW analysis of burden of disease database, 2011.

Figure 4.8: Age-standardised attributable DALY rate due to alcohol use for selected linked diseases, by socioeconomic group, 2011

Burden of alcohol dependence

After adjusting for age, the rate of burden of *Alcohol dependence* increased as socioeconomic position decreased. Persons in the lowest 2 socioeconomic groups (Q1 & Q2) experienced burden rates of *Alcohol dependence* at almost twice those of persons in the highest socioeconomic group. The same pattern was evident for both fatal and non-fatal burden (Table 4.7; Figure 4.9).

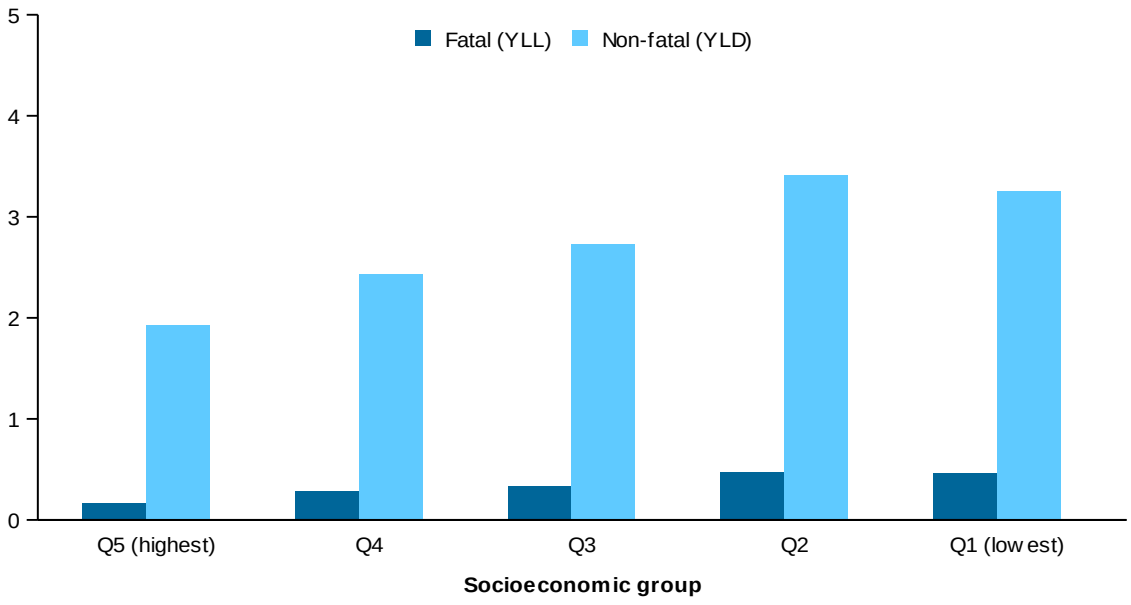
Table 4.7: Alcohol dependence YLL, YLD and DALY counts, age-standardised rates and rate ratios, by socioeconomic group, 2011

	Fatal burden			Non-fatal burden			Total burden		
Socioeconomic group	YLL	ASR	Rate ratio	YLD	ASR	Rate ratio	DALY	ASR	Rate ratio
Q5 (highest)	766	0.2	1.0	8,864	1.9	1.0	9,630	2.1	1.0
Q4	1,314	0.3	1.8	11,347	2.4	1.3	12,661	2.7	1.3
Q3	1,596	0.3	2.1	11,933	2.7	1.4	13,528	3.1	1.5
Q2	2,110	0.5	2.9	14,294	3.4	1.8	16,405	3.9	1.9
Q1 (lowest)	2,068	0.5	2.9	12,949	3.3	1.7	15,017	3.7	1.8

Notes

1. Rates were age-standardised to the 2001 Australian Standard Population and are expressed per 1,000 persons.
2. Rate ratios compare the socioeconomic group rate of burden with the rate of burden in the highest quintile.

Source: AIHW analysis of burden of disease database, 2011.



Note: Rates were age-standardised to the 2001 Australian Standard Population and are expressed per 1,000 persons.

Source: AIHW analysis of burden of disease database, 2011.

Figure 4.9: Alcohol dependence age-standardised rates for fatal (YLL) and non-fatal (YLD) burden, by socioeconomic group, 2011

5 Alcohol use over time

This section presents the changes in burden of alcohol use over time, and the potential burden in the years 2020 and 2025 based on current trends.

5.1 Changes in burden from alcohol use between 2003 and 2011

This section compares the burden attributable to alcohol use in 2003 and 2011. It presents the burden in 2003 and 2011 attributable to alcohol use as a risk factor across all linked diseases, followed by further detail on the change in the disease burden of *Alcohol dependence* between these 2 time points.

The total burden attributable to alcohol use was 2.9% higher in 2011 than in 2003 (207,777 DALY in 2011 compared with 201,826 DALY in 2003) (Table 5.1). This was due to a small increase in the prevalence of alcohol use for males and to small increases in total burden for the linked diseases between 2003 and 2011. However, when taking into account differences between 2011 and 2003 population size and age structure, the age-standardised attributable DALY rate showed a small decrease between 2003 and 2011 (rate ratio of 0.9).

The attributable burden was similar in most age groups in 2011 and 2003, with the greatest differences observed for ages 35–54 (Figure 5.1). The age-specific DALY rates in 2011 were similar to those in 2003 for persons aged under 55. In persons aged 55 and over, the rates diverged with increasing age, where the rates were lower in 2011 than in 2003.

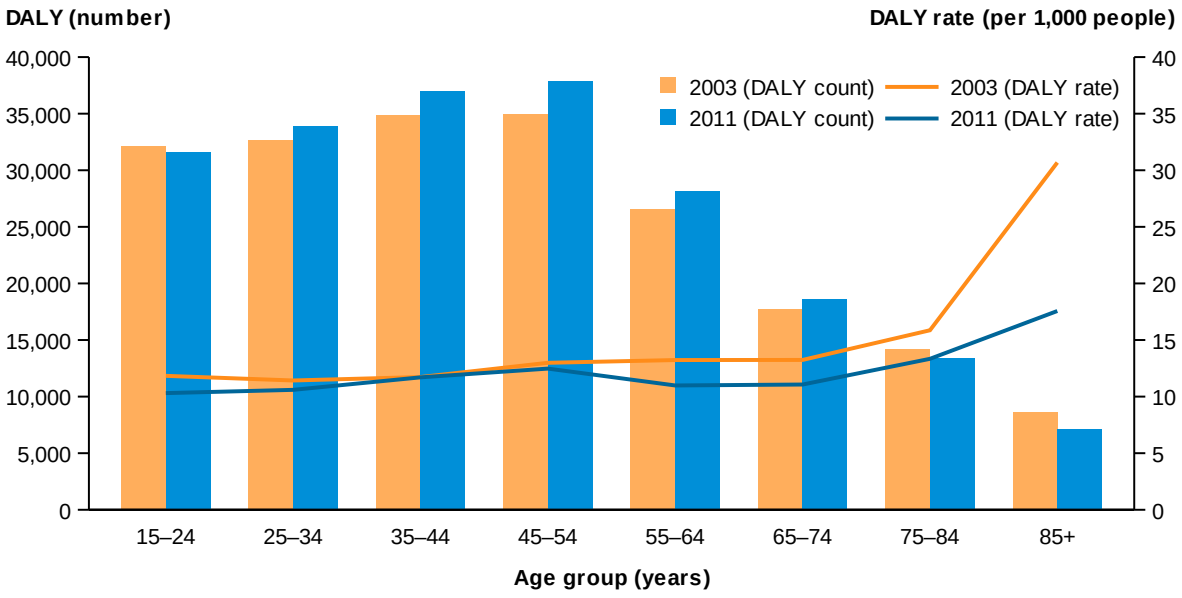
Table 5.1: Comparison of burden (DALY) attributable to alcohol use, 2003 and 2011

	Attributable DALY			% total DALY		DALY ASR (per 1,000)		
Sex	**2003**	**2011**	**Change in DALY (%)**	**2003**	**2011**	**2003**	**2011**	**ASR rate ratio 2011:2003**
Males	144,262	151,149	4.6	6.4	6.3	14.9	13.5	0.9
Females	57,564	56,628	-1.7	3.0	2.7	5.5	4.7	0.9
Persons	**201,826**	**207,777**	**2.9**	**4.8**	**4.6**	**10.2**	**9.1**	**0.9**

Notes

1. The '% of total DALY' column is the number of DALY divided by the total DALY in Australia for that row.
2. Rates were age-standardised to the 2001 Australian Standard Population and are expressed per 1,000 persons.

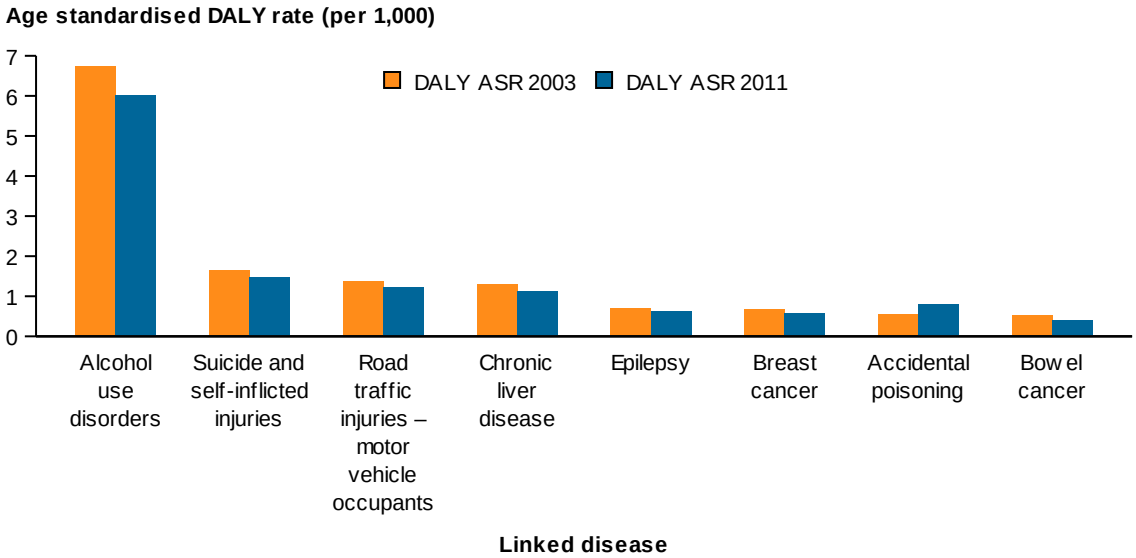
Source: AIHW analysis of burden of disease database, 2011.



Source: AIHW analysis of burden of disease database, 2011.

Figure 5.1: Number and rates of burden (DALY per 1,000 persons) attributable to alcohol use, by age, 2003 and 2011

Between 2003 and 2011, there was a small decrease in the age-standardised rate of attributable burden due to alcohol for most linked diseases, including *Alcohol dependence*, *Road traffic injuries—motor vehicle occupants*, *Suicide and self-inflicted injuries*, *Chronic liver disease*, *Epilepsy*, *Breast cancer* and *Bowel cancer* (rate ratios of 0.8–0.9) (Figure 5.2). However, there was an increase in the age-standardised attributable DALY rate for *Accidental poisoning* (rate ratio of 1.4).



Note: ASR (age-standardised rate) were age-standardised to the 2001 Australian Standard Population and are expressed per 1,000 persons.

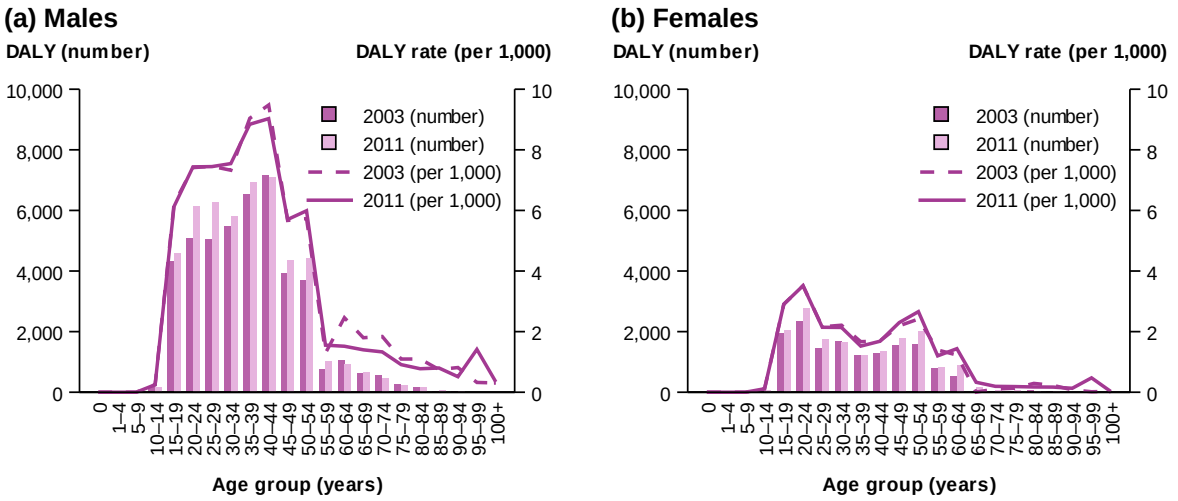
Source: AIHW analysis of burden of disease database, 2011.

Figure 5.2: Age-standardised rates of burden (DALY per 1,000 persons) attributable to alcohol use, by age, 2003 and 2011 by linked disease

Changes in burden of alcohol dependence between 2003 and 2011

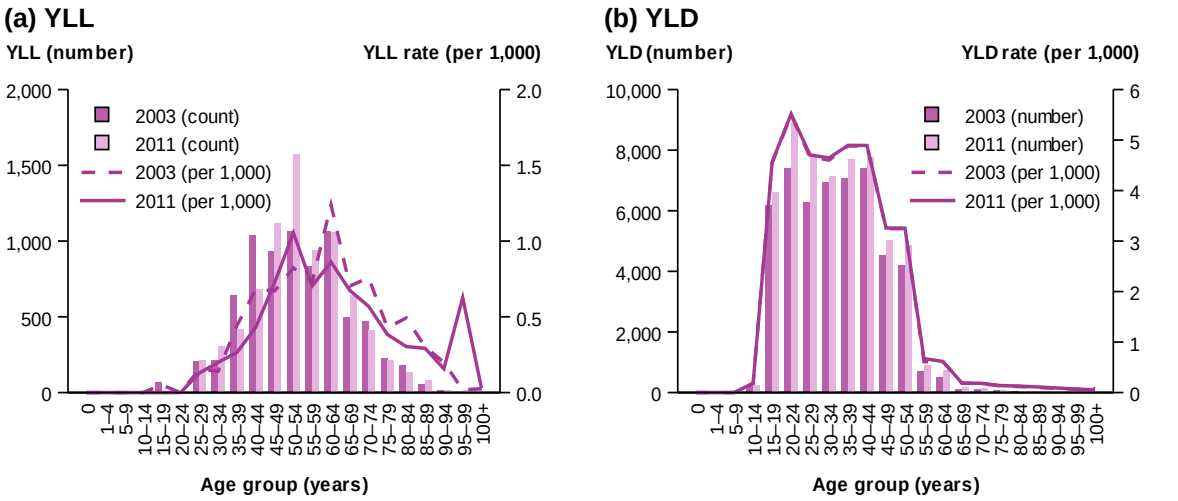
The number of DALY for *Alcohol dependence* was higher in 2011 (66,042 DALY) than in 2003 (59,483 DALY). The DALY counts were higher in 2011 across most age groups, in particular the 20–29 and 45–54 age groups, for both males and females (Figure 5.3).

Despite the increase in DALY, age-specific DALY rates were similar in 2003 and 2011 for most age groups for both males and females (Figure 5.3). For males aged 60–84, the rates were slightly lower in 2011 than in 2003, though this variation may be due to small numbers (Figure 5.3a). There were some variations in the age-specific YLL rates between 2003 and 2011, while the YLD rates were similar (Figure 5.4).



Source: AIHW analysis of burden of disease database, 2011.

Figure 5.3: Changes in total burden due to alcohol dependence (DALY) for males and females, by age (number and rate), 2003 and 2011



Source: AIHW analysis of burden of disease database, 2011.

Figure 5.4: Changes in fatal (YLL) and non-fatal (YLD) burden due to alcohol dependence, by age (number and rate), 2003 and 2011

After taking account of population increase and ageing using age-standardised rates, the overall rate of burden of *Alcohol dependence* was similar in 2003 and 2011 (an age-standardised rate of 3.0 DALY per 1,000 for both years). There was also little difference in rates of fatal and non-fatal burden between 2003 and 2011 (Table 5.2).

Table 5.2: Age-standardised rates for burden of alcohol dependence (YLL, YLD and DALY), 2003 and 2011

Burden type	2003	2011	Rate difference[(a)]	Rate ratio[(b)]
Fatal	0.4	0.3	–0.05	0.9
Non-fatal	2.7	2.7	0.02	1.0
Total burden	**3.0**	**3.0**	**–0.03**	**1.0**

(a) Rate differences are 2011 ASR minus 2003 ASR.

(b) Rate ratios divide 2011 ASRs by corresponding 2003 ASRs.

Note: Rates were age-standardised to the 2001 Australian Standard Population and are expressed per 1,000 persons.

Source: AIHW analysis of burden of disease database, 2011.

5.2 Potential burden from alcohol use in 2020 and 2025

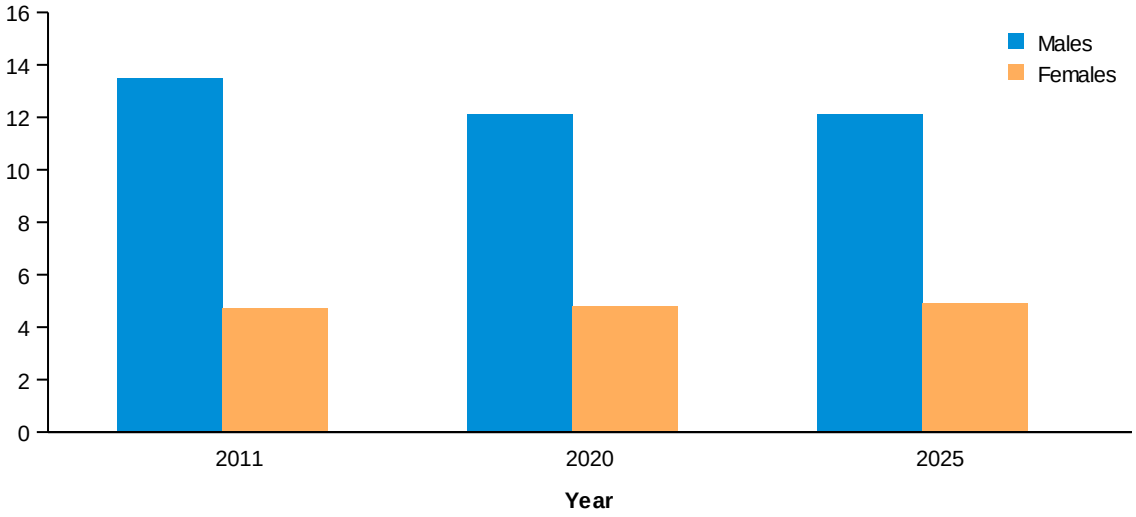
Estimates of the potential burden due to alcohol use in 2020 and 2025 are based on current trends in measures of exposure to the risk factor, or trends in the proportion of the outcome due to the risk factor when using direct evidence. The quality of data underlying these trends varies by measures of exposure and linked disease. For more details on the methods used for these estimates, see Appendix A.

Determined association between chronic diseases and associated chronic disease burden in the future is complex. Hence, linked disease and injury burden estimates in 2020 and 2025 used in the potential burden calculations were based on the underlying assumption that disease prevalence rates from the ABDS 2011 would stay the same to the year 2020 and 2025, with increases due to popualtion growth and ageing alone.

Figure 5.5 and Table B7 present the potential burden attributable to alcohol use in 2020 and 2025, by sex.

In 2020, the potential burden attributable to alcohol use is estimated to be 226,881 DALY, an increase of 9.2% from 2011. This is mainly due to increase in attributable burden in females (20%; males 5.0%). In 2025, the potential burden attributable to alcohol use is estimated to be 247,239 DALY, an increase of 19% from 2011. This is again mainly due to increase in attributable burden in females (33%), compared with males (14%).

After taking account of the different age structures of male and female populations by using age-standardised rates, the rate of attributable burden due to alcohol use is projected to decrease by 6.9% from 9.1 DALY per 1,000 in 2011 to 8.5 DALY per 1,000 in 2020 and 2025 (a rate ratio 0.9) (Table B7). The decline projected by 2020 and 2025 is greater for males (ratio of 0.9) than for females (a ratio of 1.0) (Figure 5.5). This is due to projected decreases in alcohol exposure, where consumed alcohol is expected to further decline. The NDSHS 2016 reported the proportion of Australians who drank daily has continued to decline since 2004 (AIHW 2017f).



Note: Rates were age-standardised to the 2001 Australian Standard Population and are expressed per 1,000 persons.

Source: AIHW analysis of burden of disease database, 2011.

Figure 5.5: Actual 2011 standardised attributable DALY rate due to alcohol use (per 1,000 persons), and expected rate in 2020 and 2025 by sex

6 Illicit drug use

This chapter presents revised estimates of the burden due to illicit drug use in Australia. It presents the total, non-fatal and fatal attributable burden by sex, age group and linked disease for 2011, followed by further detail on the disease burden of *Illicit drug dependence*, which are wholly attributable to illicit drug use.

The list of diseases linked to illicit drug use included in this analysis can be found in Table A2.

Note that exposure data for illicit drug use in children under 15 are not included in the estimates of burden presented here.

6.1 Burden from illicit drug use

The revised analysis shows that illicit drug use was responsible for 2.3% of the total burden of disease and injuries in Australia in 2011, equivalent to 101,865 DALY (Table 6.1). This revised estimated is higher than the attributable burden reported in the ABDS 2011 (1.8%; 79,741 DALY). This is largely due to the inclusion of additional diseases associated with illicit drug use, based on the latest evidence. Refer to Box A1 for the developments since ABDS 2011 and their impact.

The burden attributable to illicit drug use was much higher in males (76,298 DALY) than in females (25,567 DALY). The proportion of total disease burden due to illicit drug use was also greater in males (3.2%) than in females (1.2%). This includes burden from the linked diseases: *Road traffic injuries—motor vehicle occupants* and *Road traffic injuries—motorcyclists*. Due to the limited data available to estimate the type of drug persons used while driving in Australia, the estimate of attributable burden for these linked diseases should to be interpreted with caution. If these linked diseases were excluded from the analysis, 2.1% of total burden of disease or 96,125 DALY is estimated to be attributable to illicit drug use in Australia in 2011.

After taking account of the different age structures of male and female populations by using age-standardised rates per 1,000 persons, the rate of attributable burden due to illicit drug use was 3 times as high in males (6.9 DALY per 1,000) as in females (2.3 DALY per 1,000) (Table 6.1).

Table 6.1: Burden (DALY) attributable to illicit drug use by sex, 2011

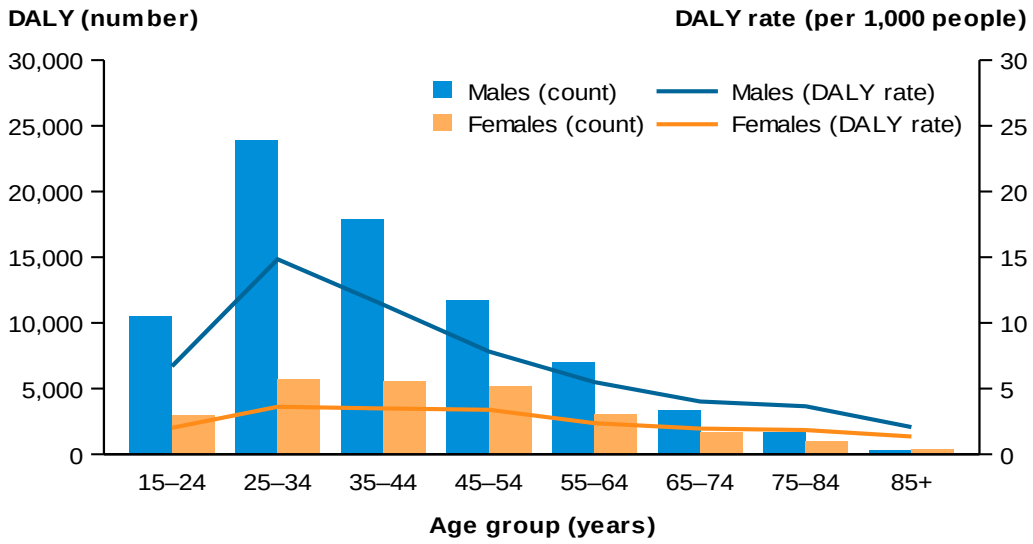
	Attributable DALY		
	Number	**% of total DALY**	**Age standardised rate (per 1,000)**
Males	76,298	3.2	6.9
Females	25,567	1.2	2.3
Persons	**101,865**	**2.3**	**4.6**

Note: The age standardised rate has been age-standardised to the 2001 Australian Standard Population.
Source: AIHW analysis of burden of disease database, 2011.

Figure 6.1 shows the burden due to illicit drug use (DALY counts and rates per 1,000 persons) in males and females by age group. The burden due to illicit drug use is highest in the younger age groups, with most of the burden experienced between ages 15 and 54.

In females, the attributable burden is also highest in the younger age groups, with most of the burden in those aged between 25 and 54.

More burden due to illicit drug use was experienced by males than females, up to age 74; as reflected in the higher DALY rates. For males, the rate was highest in the 25–34 age group and, in this age group the rate in males was 4 times as high as in females.



Source: AIHW analysis of burden of disease database, 2011.

Figure 6.1: Burden (DALY and DALY rate) attributable to illicit drug use by age and sex, 2011

Type of burden

Illicit drug use was responsible for 1.3% of deaths in Australia in 2011, equivalent to 1,937 deaths (Table 6.2). The number of deaths attributable to illicit drug use was much higher in males (1,392) than in females (545).

After taking into account the age at which these deaths occurred, illicit drug use was responsible for 70,419 YLL which was 3.1% of the total fatal burden in Australia in 2011 (Table 6.4). A higher proportion of fatal burden in males was attributable to illicit drug use (4.0% of YLL), when compared with females (1.8% of YLL). The ratio of YLL to deaths is high, with 36.4 YLL per death.

In addition, illicit drug use was responsible for 1.4% of non-fatal burden in Australia in 2011, equivalent to 31,447 YLD (Table 6.3). Non-fatal burden was also higher in males (2.1% of YLD) compared with females (0.8% of YLD).

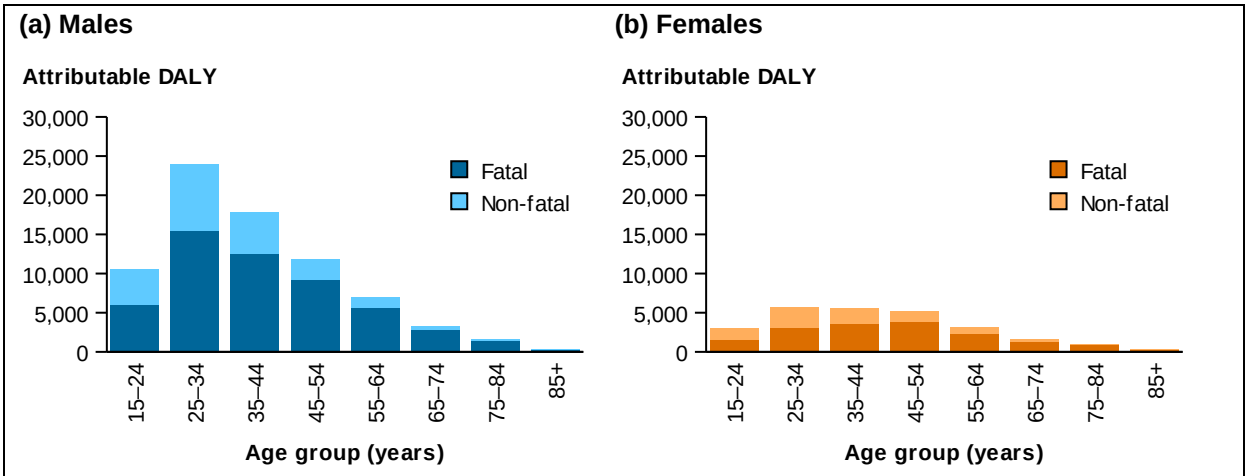
Table 6.2: Deaths, fatal (YLL) and non-fatal (YLD) burden attributable to illicit drug use, by sex, 2011

	Attributable deaths and burden					
Sex	**Deaths**	**% of total Deaths**	**YLL**	**% of total YLL**	**YLD**	**% of total YLD**
Males	1,392	1.8	53,469	4.0	22,829	2.1
Females	545	0.8	16,950	1.8	8,617	0.8
Persons	**1,937**	**1.3**	**70,419**	**3.1**	**31,447**	**1.4**

Source: AIHW analysis of burden of disease database, 2011.

More than two-thirds (69%) of the burden attributable to illicit drug use was due to years of life lost from premature death (fatal burden); however this varied by age, sex and linked disease.

Compared with non-fatal burden, fatal burden represented a higher proportion of attributable burden due to illicit drug use, in all age groups, in both males and females (Figure 6.2), particularly in older age groups. The highest proportion of non-fatal burden attributable to illicit drug use is in the younger age groups in both males and females aged 15 to 44.



Source: AIHW analysis of burden of disease database, 2011.

Figure 6.2: Burden attributable to illicit drug use due to fatal and non-fatal burden, by age, males (a) and females (b), 2011

6.2 Overview of burden from illicit drug use by linked disease

A small number of linked diseases accounted for the majority of burden due to illicit drug use. One third (33%) of the burden due to illicit drug use in Australia in 2011 was due to *Accidental poisoning* (33,671 DALY). This was followed by *Illicit drug dependence* (31% of total illicit drug use burden), *Chronic liver disease* (12%), *Suicide and self-inflicted injuries* (11%) and *Liver cancer* (6%) (Table 6.3).

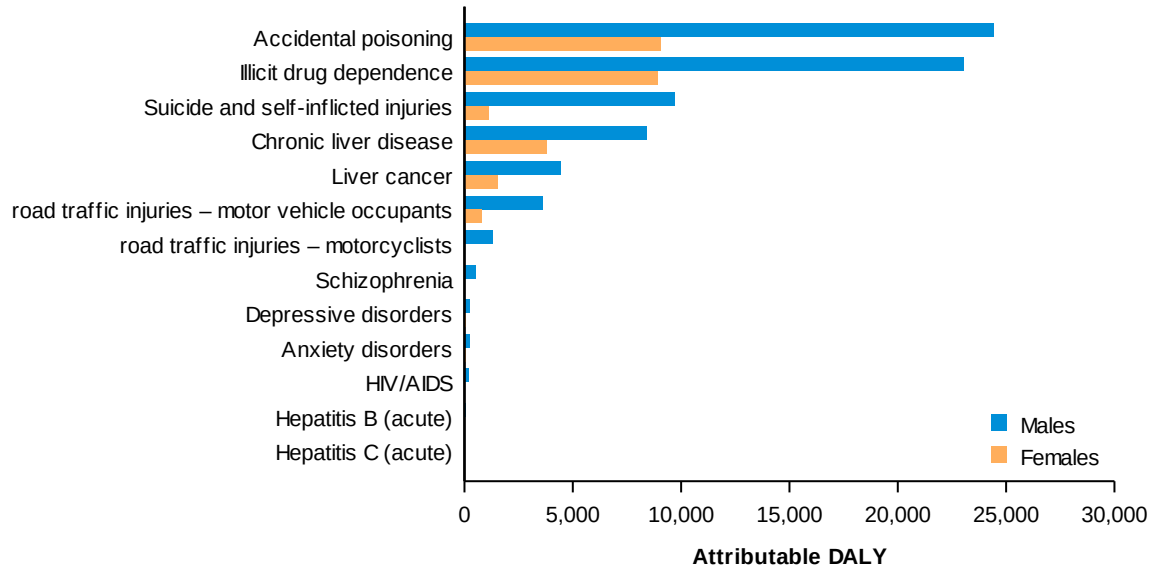
The number of DALY due to illicit drug use varied by sex for each linked disease. Males experienced a much greater amount of attributable burden from every disease linked to illicit drug use. This is due to males contributing to a greater amount of underlying burden from these diseases and having a higher exposure to illicit drug use.

The proportion each linked disease contributed to the total DALY attributable to illicit drug use was similar between males and females, with the exception of *Suicide and self-inflicted injuries* which had a higher proportion of burden attributable to illicit drug use in males (12.7%) when compared with females (4.7%) (Table 6.3; Figure 6.3).

Table 6.3: Burden due to illicit drug use by linked disease and sex, 2011

	Males		Females		Persons	
Linked disease	**Number**	**%**	**Number**	**%**	**Number**	**%**
Accidental poisoning	24,422	32.0	9,069	35.5	33,491	32.9
Illicit drug dependence	23,039	30.2	8,912	34.9	31,951	31.3
Chronic liver disease	8,411	11.0	3,787	14.8	12,198	12.0
Suicide and self-inflicted injuries	9,724	12.7	1,144	4.5	10,868	10.7
Liver cancer	4,477	5.9	1,565	6.1	6,042	5.9
Road traffic injuries—motor vehicle occupants	3,600	4.7	792	3.1	4,393	4.3
Road traffic injuries—motorcyclists	1,301	1.7	46	0.2	1,347	1.3
Schizophrenia	519	0.7	36	0.1	555	0.5
Anxiety disorders	236	0.3	79	0.3	314	0.3
Depressive disorders	243	0.3	58	0.2	301	0.3
HIV/AIDS	215	0.3	39	0.2	254	0.2
Hepatitis B (acute)	68	0.1	35	0.1	103	0.1
Hepatitis C (acute)	42	0.1	6	0.0	49	0.0
Total	**76,298**	**100.0**	**25,567**	**100.0**	**101,865**	**100.0**

Source: AIHW analysis of burden of disease database, 2011.



Source: AIHW analysis of burden of disease database, 2011.

Figure 6.3: Burden (DALY) due to illicit drug use, by sex and selected linked diseases, 2011

Patterns by age and sex

Burden due to illicit drug use varied across age groups and by sex (Figure 6.4). The burden attributable to illicit drug use shifted from predominantly immediate adverse impacts in younger persons, to more chronic long-term outcomes later in life.

The disease burden of *Illicit drug dependence* are disaggregated in the following analysis to better describe the change in drug use by age and sex. The specific Illicit drug dependencies reported are *Amphetamine dependence*, *Opioid dependence*, *Cannabis dependence*, *Cocaine dependence* and *Other illicit drug dependence*. Note that there were no diseases linked to illicit drug use in infants and children under 15 years estimated in this report.

Adolescents and young adults aged 15–24

In adolescents and young adults aged 15–24, *Suicide and self-inflicted injuries* (2,312 DALY), *Road traffic injuries—motor vehicle occupants* (1,690), *Amphetamine dependence* (1,562) and *Cannabis dependence* (908) were the main diseases contributing to the burden of illicit drug use.

Males in this age group contributed 10% (10,514 DALY) of total attributable burden of illicit drug use, while females contributed 3.0% (3,009 DALY).

For males aged 15–24, around 21% of the illicit drug use attributable burden was from *Accidental poisoning* followed by *Suicide and self-inflicted injuries* (19%). For females aged 15–24, 26% of the attributable burden was due to *Accidental poisoning* and 14% from *Road traffic injuries—motor vehicle occupants*.

Adults aged 25–34

This age group experienced the greatest amount of burden due to illicit drug use. Males aged 25–34 accounted for 23% of the burden (23,901 DALY) attributable to illicit drug use, while females in this age group accounted for 5.6% (5,725 DALY).

Accidental poisoning contributed 36% of this attributable burden in both males (8,606 DALY) and females (2,053) aged 25–34. In males, *Suicide and self-inflicted injuries* contributed 18% (4,267 DALY) and *Opioid dependence* contributed 14% (3,415 DALY) of burden attributable to illicit drug use in this age group. In females, *Opioid dependence* contributed 20% of the attributable burden (1,145 DALY).

Adults aged 35–44

Males aged 35–44 accounted for 18% of the burden (17,861 DALY) due to illicit drug use, and females in this age group accounted for 5.5% (5,554 DALY). *Accidental poisoning* was the leading cause of burden in this age group contributing to 41% of burden attributable to illicit drug use in males and 40% in females.

Adults aged 45–54

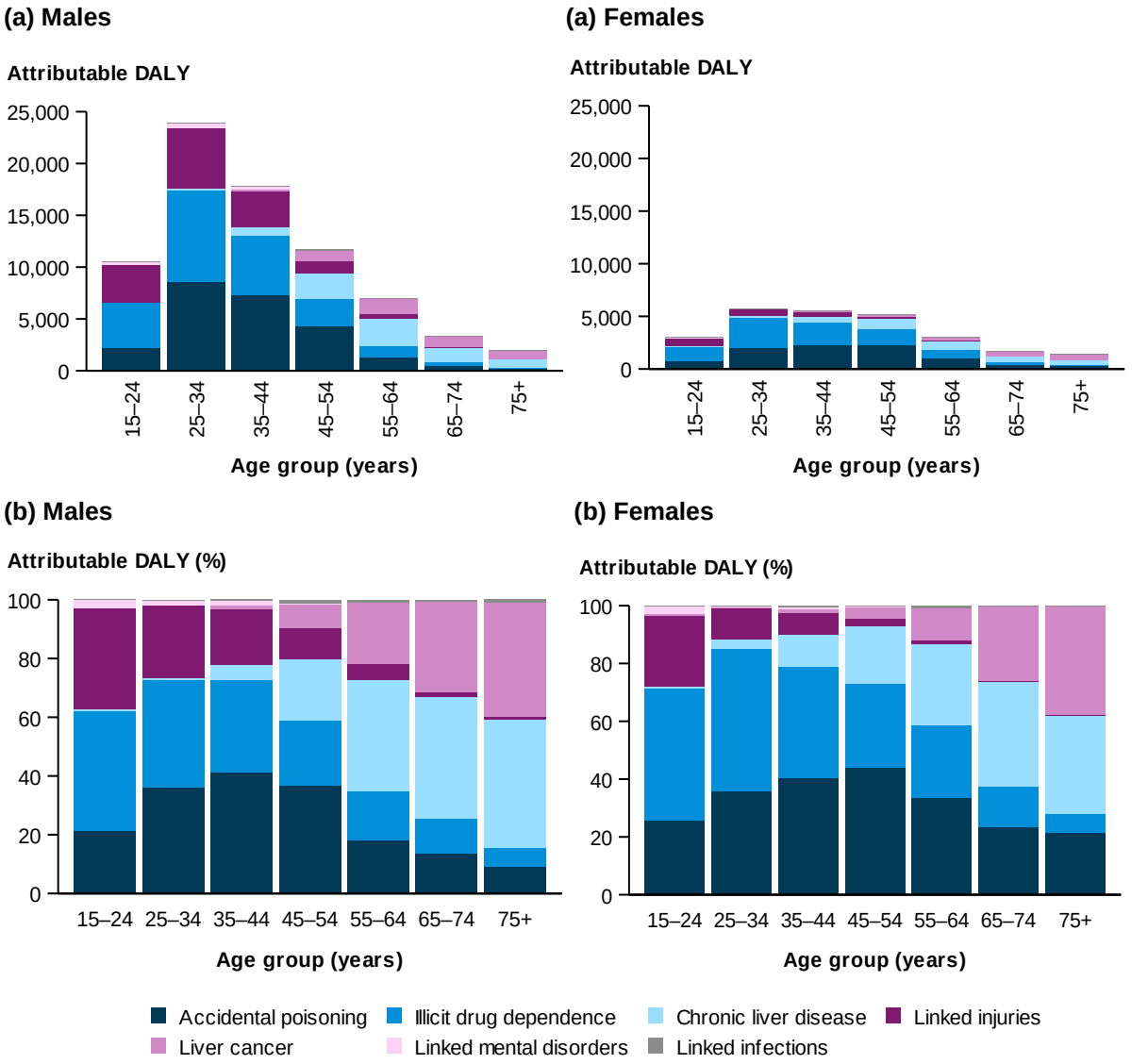
Males aged 45–54 contributed 12.0% of the total burden due to illicit drug use (11,762 DALY), while females in this age group contributed 5.1% (5,189 DALY). *Accidental poisoning* was the main contributor to burden attributable to illicit drug use for males (37%, 4,311 DALY) and for females (44%, 2,288 DALY). *Chronic liver disease* contributed 21% of the attributable burden in males (2,448) and 20% in females (1,038).

Adults aged 55–64

Of the total burden attributable to illicit drug use, 6.8% (6,992 DALY) was from males aged 55–64 and 3.0% (3,050 DALY) from females in this age group. In males, *Chronic liver disease* (38%), *Liver cancer* (21%) and *Accidental poisoning* (18%) were the leading causes of burden attributable to illicit drug use in this age group. In females, the leading diseases contributing to attributable burden were *Accidental poisoning* (34%), *Chronic liver disease* (28%) and *Illicit drug dependence* (14%).

Adults aged 65+

Around 5% of total burden (5,267 DALY) attributable to illicit drug use was experienced by males over the aged 65 and over and 3% (3,040) by females in this age group. The attributable burden was mostly from *Chronic liver disease* and *Liver cancer* as long term outcomes from unsafe injecting practices.



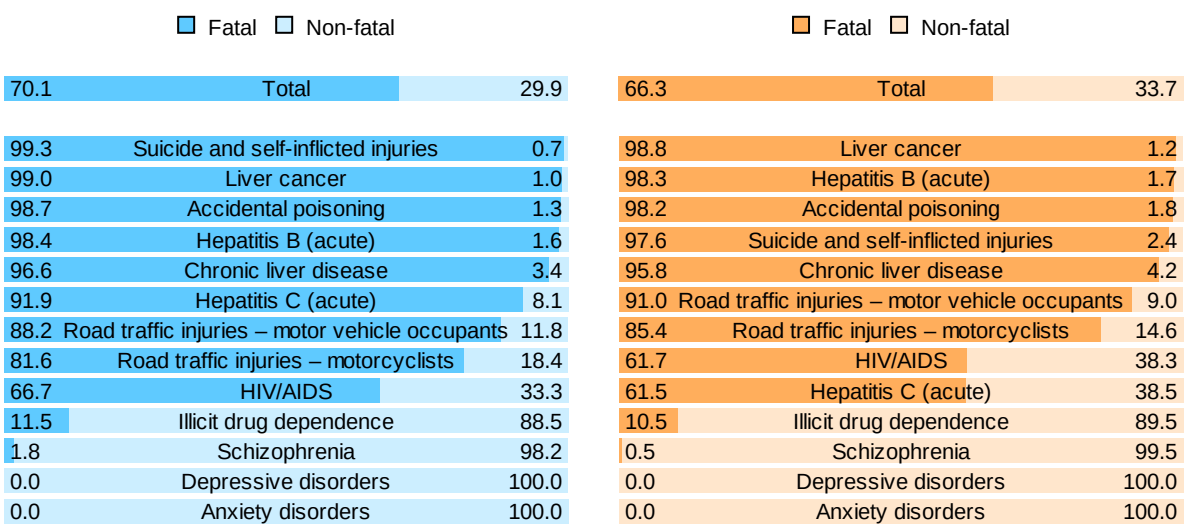
Note: Linked injuries includes *Road traffic injuries—motor vehicle occupants*, *Road traffic injuries—motorcyclists* and *Suicide and self-inflicted injuries*. Linked mental disorders includes *Schizophrenia*, *Anxiety disorders* and *Depressive disorders*.

Source: AIHW analysis of burden of disease database, 2011.

Figure 6.4: Burden attributable to illicit drug use, by linked disease age and sex, DALY (a) and proportion within each age group DALY (b), 2011

Type of burden

Figure 6.5 shows the fatal and non-fatal proportions for the diseases linked to illicit drug use in both males and females. Attributable burden from *Suicide and self-inflicted injuries*; *Liver cancer*; *Accidental poisoning*; *Hepatitis B, Hepatitis C*; *Chronic liver disease* and *Road traffic injuries* was mostly fatal burden, whereas attributable burden from *Illicit drug dependence*; *Schizophrenia*; *Depressive disorders* and *Anxiety* was mostly non-fatal burden.



Source: AIHW analysis of burden of disease database, 2011.

Figure 6.5: Burden attributable to illicit drug use due to fatal and non-fatal burden, by linked disease and sex, 2011

Proportion of each linked disease due to illicit drug use

Illicit drug use was responsible for 65% of the *Accidental poisoning* burden and 100% of *Illicit drug dependence* in both males and females. For other linked diseases, illicit drug use was responsible for 43% of *Hepatitis B* burden, 26% of *Chronic liver disease* burden, and 21% of *Liver cancer* burden (Table 6.4, Figure 6.6).

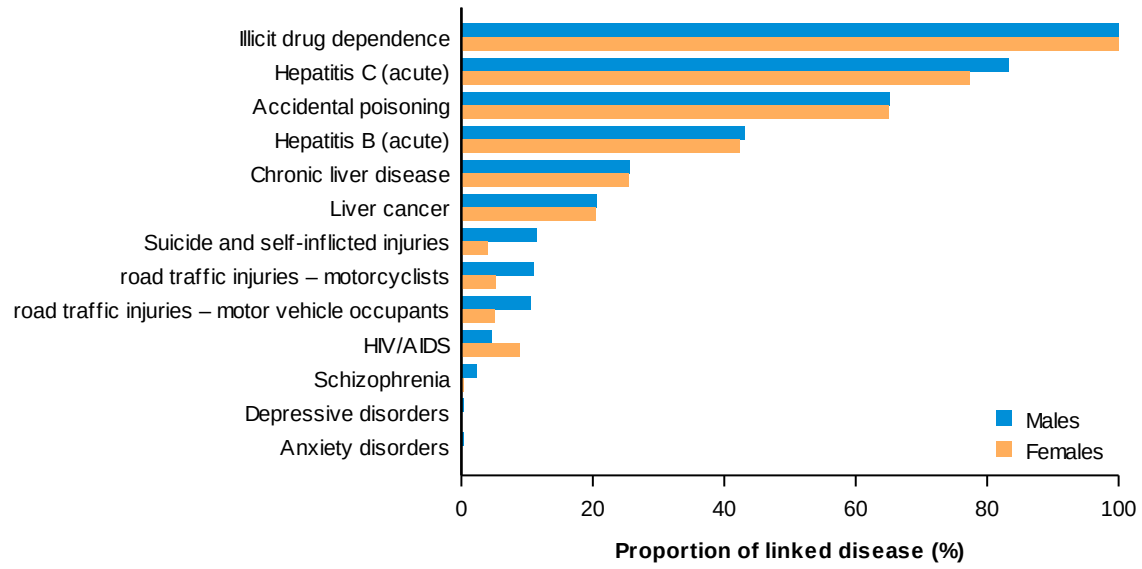
In males, illicit drug use was responsible for a higher proportion of burden of *Hepatitis C* (83%); *Suicide and self-inflicted injuries* (12%); *Road traffic injuries—motorcyclists* (11%) and *Road traffic injuries—motor vehicle occupants* (11%) than in females (77%, 4%, 5% and 5%, respectively). A higher proportion of *HIV/AIDS* burden in females (9.0%) was attributable to illicit drug use than in males (4.6%)—however the number of DALY was higher in males (215 in males, 39 in females).

Table 6.4: Number and proportion of disease burden attributable to illicit drug use, by linked disease, 2011

	Males			Females		
Linked disease	Total DALY	DALY attributable to illicit drug use	% of linked disease burden	Total DALY	DALY attributable to illicit drug use	% of linked disease burden
Accidental poisoning	37,461	24,422	65.2	13,946	9,069	65.0
Illicit drug dependence	23,039	23,039	100.0	8,912	8,912	100.0
Suicide and self-inflicted injuries	84,920	9,724	11.5	28,550	1,144	4.0
Chronic liver disease	32,785	8,411	25.7	14,819	3,787	25.6
Liver cancer	21,743	4,477	20.6	7,632	1,565	20.5
Road traffic injuries—motor vehicle occupants	34,158	3,600	10.5	15,343	792	5.2
Road traffic injuries—motorcyclists	11,796	1,301	11.0	881	46	5.2
Schizophrenia	22,743	519	2.3	11,587	36	0.3
Depressive disorders	54,364	243	0.4	73,295	58	0.1
Anxiety disorders	56,048	236	0.4	84,922	79	0.1
HIV/AIDS	4,639	215	4.6	434	39	9.0
Hepatitis B (acute)	158	68	43.1	82	35	42.3
Hepatitis C (acute)	51	42	83.3	8	6	77.4
All diseases and injuries	**2,412,531**	**76,298**	**3.2**	**2,081,896**	**25,567**	**1.2**

Note: The % column is the attributable DALY divided by the linked disease burden in 2011 of that row and the 'all diseases and injuries' row includes the burden from all diseases and injuries in the ABDS 2011.

Source: AIHW analysis of burden of disease database, 2011.



Source: AIHW analysis of burden of disease database, 2011.

Figure 6.6: Proportion of linked disease burden (DALY) due to illicit drug use, by sex and linked diseases, 2011

6.3 Burden of illicit drug dependence

The disease burden of *Illicit drug dependence* encompasses the health loss from dependency on opioids, amphetamine, cocaine, cannabis or other illicit drugs (these include; for example, sedatives, benzodiazepines and hallucinogens).

Collectively, *Illicit drug dependence* was responsible for an estimated 31,951 DALY in 2011—or 1.0% (1.0% males, 0.4% females) of the total burden of disease. The burden from *Illicit drug dependence* was mostly non-fatal, accounting for 89% of the total burden from *Illicit drug dependence* (28,375 YLD; 3,577 YLL).

A higher amount of burden was experienced by males (72%) compared with females (28%), with the male rate of burden more than double the female rate (Table 6.5).

Table 6.5: Burden of illicit drug dependence (DALY) by sex, 2011

	DALY			
Sex	**Number**	**%**	**Crude rate[a]**	**ASR[a]**
Males	23,039	72.1	2.1	2.1
Females	8,912	27.9	0.8	0.8
Persons	**31,951**	**100.0**	**1.4**	**1.5**

(a) Rates are expressed per 1,000 persons. The standardised rate has been age-standardised to the 2001 Australian Standard Population.

Source: AIHW analysis of burden of disease database, 2011.

Patterns by age and sex

The overall burden of *Illicit drug dependence* was mostly experienced by adults aged 25–44 (61% of total DALY). Males experienced a higher rate of burden, almost 3 times the female rate in this age group (Table 6.6). The burden decreased gradually after age 55 (Figure 6.7).

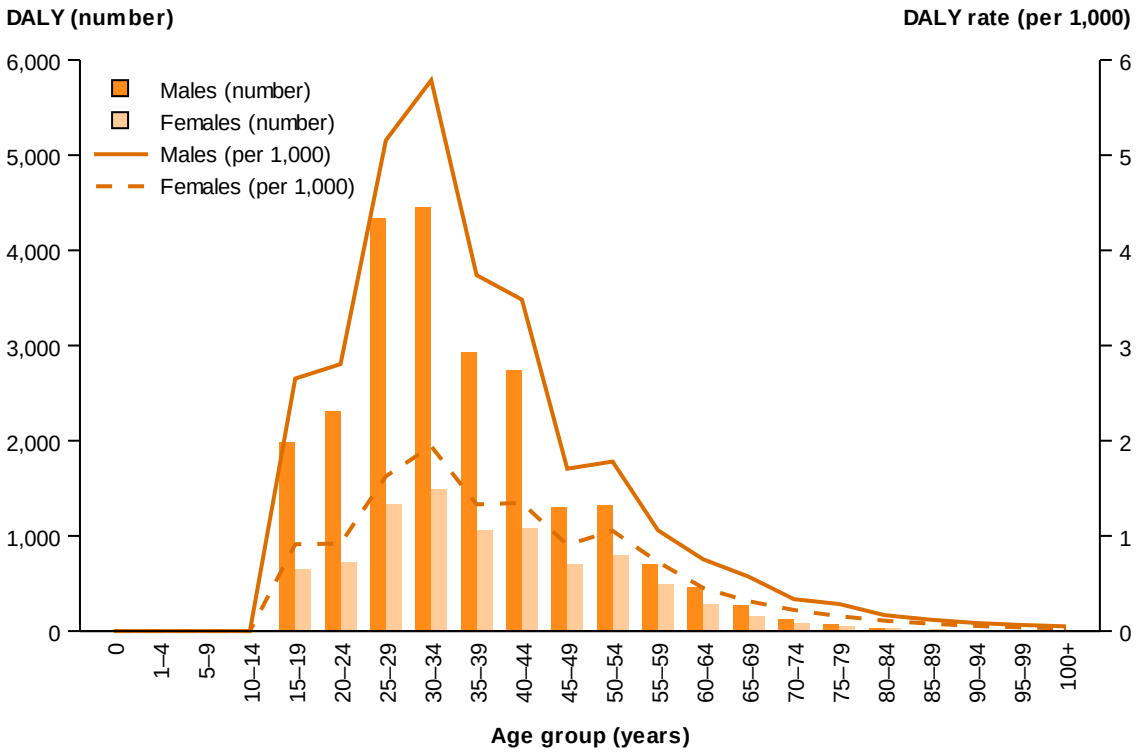
Table 6.6: Burden of illicit drug dependence (DALY) by age and sex, 2011

	Males		Females	
Age groups	**Number**	**Rate[a]**	**Number**	**Rate[a]**
0–14	0	0.0	0	0.0
15–24	4,291	2.7	1,369	0.9
25–44	14,454	4.5	4,951	1.6
45–64	3,783	1.4	2,267	0.8
65–74	391	0.5	233	0.3
75–84	105	0.2	75	0.1
85+	15	0.1	18	0.1
Total[b]	**23,039**	**2.1**	**8,912**	**0.8**

(a) Rates are expressed per 1,000 persons.

(b) Rates for the total row were age-standardised to the 2001 Australian Standard Population and are expressed per 1,000 persons.

Source: AIHW analysis of burden of disease database, 2011.



Source: AIHW analysis of burden of disease database, 2011.

Figure 6.7: Number and rates of illicit drug dependence (DALY), by age and sex, 2011

Comparisons to other diseases

In comparison to other diseases, *Illicit drug dependence* accounted for a large proportion of health loss for those aged 25–44. For males, it was the eighth leading cause of burden, contributing to 3.2% of burden in this age group (Figure 3.7).

For females aged 25–44, *Illicit drug dependence* was ranked within the top 20 diseases that cause the most burden, contributing to 1.4% of burden in this age group (Figure 3.8).

Type of burden

The ABDS 2011 estimated 79 deaths resulting from *Illicit drug dependence* (58 males; 21 females), responsible for 3,577 YLL (Table 6.7). The fatal burden accounted for 11% of the total burden of *Illicit drug dependence*. The age-standardised rate was 0.2 YLL per 1,000 persons. Males accounted for almost three-quarters (74%) of this burden.

Table 6.7: Fatal burden (YLL) of illicit drug dependence by sex, 2011

	Deaths	YLL			
Sex	**Number**	**Number**	**%**	**Crude rate[(a)]**	**ASR[(a)]**
Males	58	2,645	74.0	0.2	0.3
Females	21	931	26.0	0.1	0.1
Persons	**79**	**3,577**	**100.0**	**0.2**	**0.2**

(a) Rates are expressed per 1,000 persons. The standardised rate has been age-standardised to the 2001 Australian Standard Population.

Source: AIHW analysis of burden of disease database, 2011.

In 2011, the non-fatal burden accounted for 89% of the total burden of illicit drug dependence (28,375 YLD) (Table 6.8). Adults aged 25–44 contributed the most to this burden (62% for males; 55% for females).

In comparison to other diseases, *Illicit drug dependence* was the eighth leading cause of non-fatal health loss for males aged 25–44.

Table 6.8: Non-fatal burden (YLD) of illicit drug dependence by sex, 2011

	Males		Females		Persons	
Age groups	**Number**	**Rate[(a)]**	**Number**	**Rate[(a)]**	**Number**	**Rate[(a)]**
0–14	0	0.0	0	0.0	0	0.0
15–24	4,141	2.6	1,349	0.9	5,490	1.8
25–44	12,547	3.9	4,401	1.4	16,948	2.7
45–64	3,253	1.2	1,906	0.7	5,159	0.9
65–74	345	0.4	233	0.3	578	0.3
75–84	93	0.2	74	0.1	167	0.2
85+	15	0.1	18	0.1	33	0.1
Total[(b)]	**20,394**	**1.9**	**7,981**	**0.7**	**28,375**	**1.3**

(a) Rates are expressed per 1,000 persons.

(b) Rates for the total row were age-standardised to the 2001 Australian Standard Population are expressed per 1,000 persons.

Source: AIHW analysis of burden of disease database, 2011.

7 Illicit drug use in key population groups

The results in this section present the burden attributable to illicit drug use by state and territory, remoteness area and socioeconomic group. Each section presents the burden attributable to illicit drug use as a risk factor across all linked diseases, followed by further detail on the disease burdens of *Illicit drug dependence*, which are wholly attributable to illicit drug use.

7.1 Burden from illicit drug use by state and territory

Table 7.1 shows the total burden attributable to illicit drug use by state and territory. New South Wales experienced the greatest burden attributable to illicit drug use (33,655 DALY), while the Australian Capital Territory experienced the lowest burden (1,631 DALY).

The Northern Territory and Western Australia experienced a larger proportion of the total burden attributable to illicit drug use (3.8% and 3.1% of all DALY in 2011, respectively) than other states and territories. In Tasmania illicit drug use was responsible for 1.7% of the total disease burden.

After taking account of the different age structures of the states and territories by using age-standardised rates, the Northern Territory experienced a rate of burden attributable to illicit drug use that was 1.9 times that of Australia (Table 7.1). Western Australia (a rate ratio of 1.2) and South Australia (a rate ratio of 1.2) also experienced a greater burden due to illicit drug use than was the case nationally. In all states and territories, the rate of burden attributable to illicit drug use for males was more than doubled that of females (Figure 7.1).

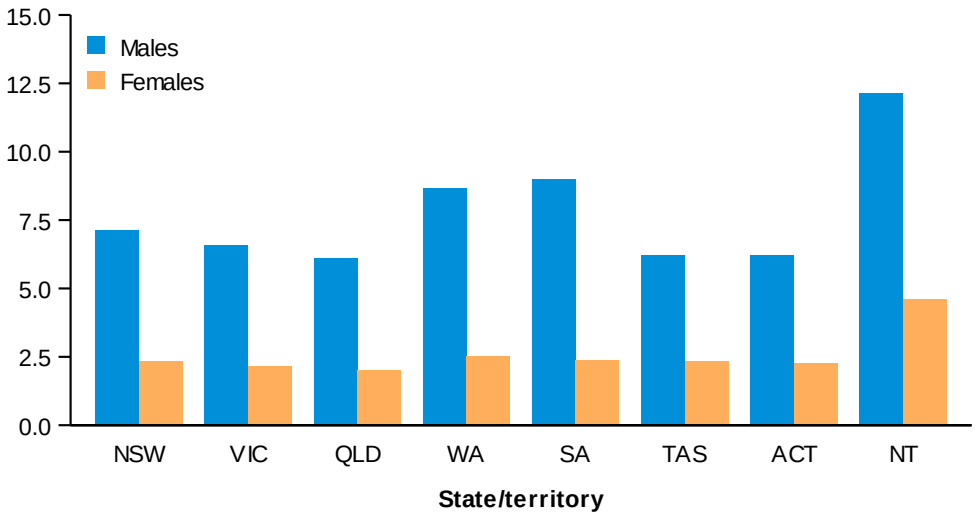
Table 7.1: Burden (DALY) attributable to illicit drug use (number, proportion, age-standardised rate (ASR) and rate ratio), by state and territory, 2011

		Attributable DALY			
State/territory	**Total DALY ('000)**	**Number ('000)**	**% total DALY**	**ASR per 1,000**	**Rate ratio**
New South Wales	1,464	34	2.3	4.7	1.0
Victoria	1,095	24	2.2	4.4	1.0
Queensland	907	18	2.0	4.1	0.9
Western Australia	435	13	3.1	5.6	1.2
South Australia	373	9	2.4	5.7	1.2
Tasmania	118	2	1.7	4.3	0.9
Australian Capital Territory	62	2	2.6	4.2	0.9
Northern Territory	54	2	3.8	8.6	1.9
Australia	**4,494**	**102**	**2.3**	**4.6**	**1.0**

Notes

1. Columns do not add to the total for Australia due to state/territory-specific exposure used in the analysis.
2. Rates were age-standardised to the 2001 Australian Standard Population and are expressed per 1,000 persons.
3. Rate ratios divide the ASR by the ASR for Australia.
4. Columns do not add to the total for Australia due to state/territory-specific exposure used in the analysis.

Source: AIHW analysis of burden of disease database, 2011.



Note: Rates were age-standardised to the 2001 Australian Standard Population and are expressed per 1,000 persons.

Source: AIHW analysis of burden of disease database, 2011.

Figure 7.1: Age-standardised attributable DALY rate due to illicit drug use (per 1,000 persons), by state and territory and sex, 2011

Table 7.2 presents a picture of age-standardised DALY rates for the different diseases linked to illicit drug use, increasing from light blue (low, less than 0.5 DALY per 1,000) to purple (high, 2.0 DALY or more per 1,000 persons). This provides a simple way to pinpoint those linked diseases and jurisdictions experiencing greater burden attributable to illicit drug use.

Table 7.2 shows that the age-standardised attributable DALY rate of most diseases linked to illicit drug use was less than 1.0 per 1,000 persons in most jurisdictions, with the following exceptions:

- The rate of burden from *Illicit drug dependence* was lower in Queensland (0.8 per 1,000) and Tasmania (1.3 per 1,000) compared with other states (rates 1.5–1.9 per 1,000).
- The rate of burden of *Accidental poisoning* due to drug use was similar across all states and territories, except for the Northern Territory and the Australian Capital Territory where the attributable burden was noticeably lower, and the Queensland and Western Australia where it was slightly higher.
- Age-standardised rates of attributable burden for *Road traffic injuries—motor vehicle occupants* ranged from a low of 0.1 per 1,000 persons in the Australian Capital Territory to a high of 2.4 per 1,000 in the Northern Territory.
- Attributable burden rates for *Suicide and self-inflicted injuries* and *Chronic liver disease* were higher in the Northern Territory (with rates 1.6 and 1.6 per 1,000, respectively) compared with other states and territory (with rates under 1.0 and 0.7 per 1,000, respectively).

Table 7.2: Age standardised rate of burden for the top 7 diseases linked to illicit drug use (DALY ASR per 1,000), by state and territory, 2011

Linked diseases	NSW	Vic	Qld	WA	SA	Tas	ACT	NT
Illicit drug dependence	1.6	1.5	0.8	1.8	1.9	1.3	1.7	1.7
Accidental poisoning	1.4	1.4	1.6	1.5	1.3	1.1	0.9	0.5
Chronic liver disease	0.5	0.5	0.5	0.5	0.5	0.4	0.5	1.6
Suicide and self-inflicted injuries	0.4	0.4	0.3	0.8	1.0	0.7	0.3	1.6
Liver cancer	0.3	0.3	0.2	0.2	0.3	0.2	0.3	0.6
Road traffic injuries—motor vehicle occupants	0.3	0.3	0.4	0.7	0.5	0.3	0.1	2.4
Road traffic injuries—motorcyclists	0.1	0.1	0.1	0.2	0.2	0.1	0.2	0.2

0 to <0.5 per 1,000 | 0.5 to <1.0 per 1,000 | 1.0 to <1.5 per 1,000 | 1.5 to <2.0 per 1,000 | ≥2.0 per 1,000

Source: AIHW analysis of burden of disease database, 2011.

Burden of illicit drug dependence

There was little variation (1.3–1.9 DALY per 1000 persons) in the age-standardised rates of total burden of *Illicit drug dependence* across states and territories, with the exception of Queensland, which had a DALY rate of 0.5 times the national rate (0.8 DALY per 1,000 persons) (Table 7.3).

There was little variation in the age-standardised rate of fatal burden across the states and territories—though, due to the low rates, the rate ratio compared with 'Australia' varied from 0.4 for South Australia to 1.5 for Victoria. There was greater variation in the rates of non-fatal burden across jurisdictions (0.6–1.8 YLD per 1,000 persons). The rate of YLD in Queensland was 0.5 times the national rate, while in South Australia the rate was 1.4 times the national rate (Table 7.3).

Table 7.3: Drug dependence YLL, YLD and DALY counts, age-standardised rates and rate ratios, by state and territory, 2011

	Fatal burden			Non-fatal burden			Total burden		
Jurisdiction	YLL	ASR	Rate ratio	YLD	ASR	Rate ratio	DALY	ASR	Rate ratio
NSW	648	0.1	0.5	10,532	1.5	1.2	11,180	1.6	1.1
Vic	1,393	0.3	1.5	6,892	1.3	1.0	8,285	1.5	1.0
Qld	750	0.2	1.1	2,719	0.6	0.5	3,469	0.8	0.5
WA	531	0.2	1.4	3,620	1.5	1.2	4,151	1.8	1.2
SA	115	0.1	0.4	2,795	1.8	1.4	2,910	1.9	1.3
Tas	68	0.1	0.8	542	1.2	0.9	610	1.3	0.9
ACT	59	0.2	0.9	597	1.5	1.2	656	1.7	1.1
NT	n.p.	n.p.	n.p.	414	1.6	1.3	418	1.7	1.1
Australia	**3,577**	**0.2**	**1.0**	**28,375**	**1.3**	**1.0**	**31,951**	**1.5**	**1.0**

Notes

1. Rates were age-standardised to the 2001 Australian Standard Population and are expressed per 1,000 persons.
2. Rate ratios compare the state/territory rate of burden with the Australian rate of burden.

Source: AIHW analysis of burden of disease database, 2011.

7.2 Burden from illicit drug use by remoteness

As would be expected due to population sizes, *Major cities* experienced the greatest burden attributable to illicit drug use (76,951 DALY) and *Very remote* areas the least (1,322 DALY), but there were similar proportions of the total disease burden in each area (1.7%–2.7%) (Table 7.4).

Adjustment for population size and age structure shows differences in the overall rate of burden attributable to illicit drug use across the different areas. When compared with *Major cities,* the burden was slightly lower in *Inner regional* (with a rate ratio of 0.9) and similar in *Outer regional* areas (rate ratio 1.0) and higher for both *Remote* and *Very remote areas* (rate-ratios of 1.3 each) (Table 7.4). In all areas the rate for males was more than double that for females (Figure 7.2).

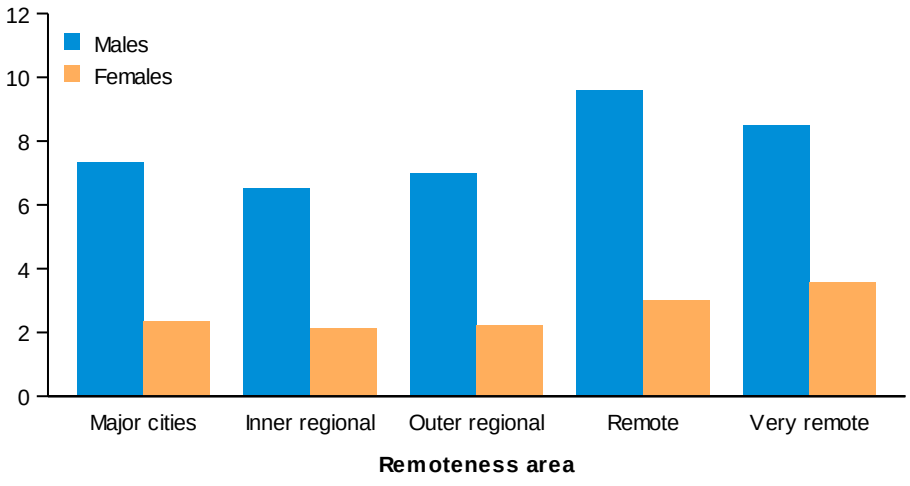
Table 7.4: Burden (DALY) attributable to illicit drug use (number, proportion, age-standardised rate (ASR) and rate ratio), by remoteness, 2011

Remoteness area	Total DALY ('000)	Attributable DALY			
		Number ('000)	% of total DALY	ASR per 1,000	Rate ratio
Major cities	2,961	77	2.6	4.8	1.0
Inner regional	950	16	1.7	4.3	0.9
Outer regional	456	9	1.9	4.6	1.0
Remote	73	2	2.7	6.5	1.3
Very remote	52	1	2.6	6.3	1.3

Notes

1. Rates were age-standardised to the 2001 Australian Standard Population and are expressed per 1,000 persons.
2. Rate ratios divide the ASR by the ASR for *Major cities*.

Source: AIHW analysis of burden of disease database, 2011.



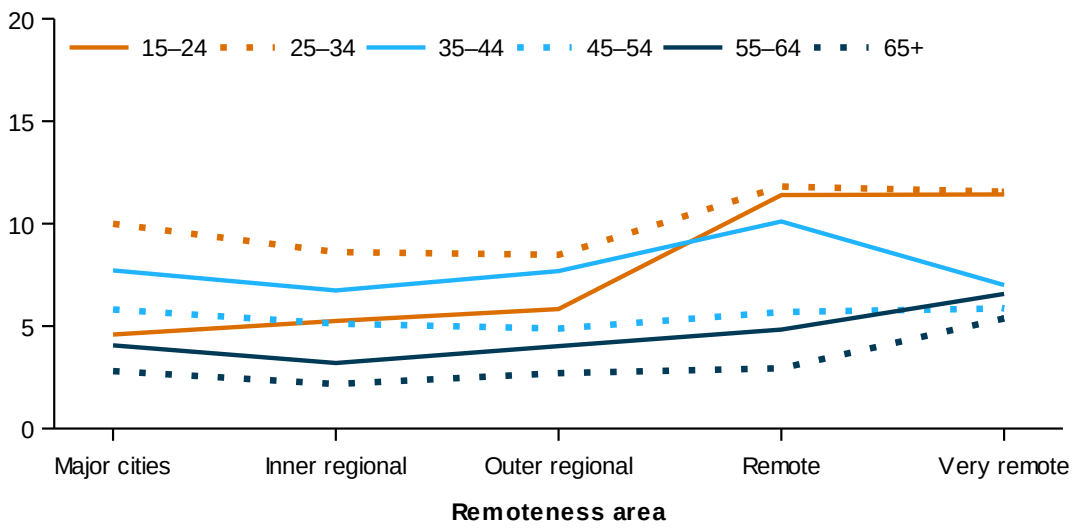
Note: Rates were age-standardised to the 2001 Australian Standard Population and are expressed per 1,000 persons.

Source: AIHW analysis of burden of disease database, 2011.

Figure 7.2: Age-standardised attributable DALY rate due to illicit drug use (per 1,000 persons), by remoteness and sex, 2011

Variability in age-specific rates increased with increasing remoteness—most likely due to smaller populations. Generally, compared with other remoteness areas, higher rates of burden due to illicit drug use were seen in *Very remote* areas in all age groups (except for those aged 35–54), while *Inner regional* areas had a lower rate of burden for all age groups except for those aged 25–34.

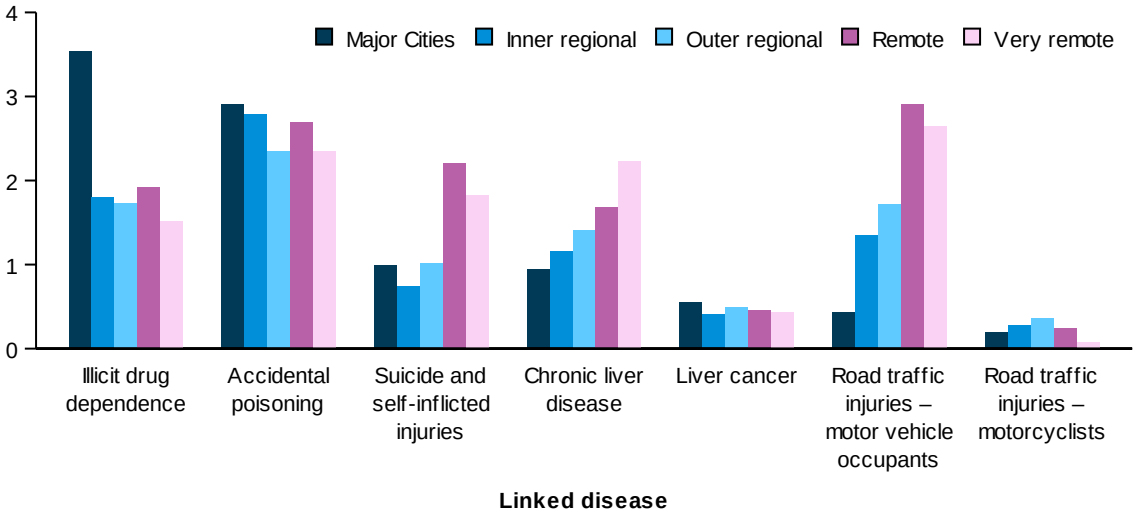
The rate of burden due to illicit drug use in *Remote* and *Very remote* areas was more than 2 times that of *Major cities* (11 DALY compared with 4.6 DALY per 1,000 persons), for persons aged 15–24 (Figure 7.3).



Source: AIHW analysis of burden of disease database, 2011.

Figure 7.3: Age-specific attributable DALY rate due to illicit drug use (per 1,000 persons), by remoteness and sex, 2011

Disparity across remoteness areas varied by linked diseases. Figure 7.4 shows the age-standardised attributable DALY rate for selected diseases attributable to illicit drug use. The rates were similar across remoteness for *Accidental poisoning* and *Liver cancer*, while the rate for *Illicit drug dependence* was much higher in Major cities (3.5 per 1,000) when compared with other areas (which ranged from 1.5–1.9 per 1,000). The rate of burden due to illicit drug use increased as remoteness increased, for *Suicide and self-inflicted injuries*, *Chronic liver disease* and *Road traffic injuries—motor vehicle occupants*.



Note: Rates were age-standardised to the 2001 Australian Standard Population and are expressed per 1,000 persons.

Source: AIHW analysis of burden of disease database, 2011.

Figure 7.4: Age-standardised attributable DALY rate due to illicit drug use for selected linked diseases, by remoteness, 2011

Burden of illicit drug dependence

The higher rates of burden of *Illicit drug dependence* in *Major cities* compared with other remoteness areas, were largely driven by regional variations in non-fatal burden, with the age-standardised rate in *Major cities* (1.6 YLD per 1,000), close to double that of the other remoteness areas, but there was less variation in the age-standardised rates of fatal burden across remoteness areas (Table 7.5).

Table 7.5: Drug dependence YLL, YLD and DALY counts, age-standardised rates and rate ratios, by remoteness, 2011

	Fatal burden			Non-fatal burden			Total burden		
Remoteness area	**YLL**	**ASR**	**Rate ratio**	**YLD**	**ASR**	**Rate ratio**	**DALY**	**ASR**	**Rate ratio**
Major cities	2,466	0.2	1.0	25,618	1.6	1.0	28,084	1.8	1.0
Inner regional	769	0.2	1.4	2,433	0.7	0.4	3,202	0.9	0.5
Outer regional	298	0.2	1.0	1,284	0.7	0.4	1,582	0.9	0.5
Remote	21	0.1	0.4	294	1.0	0.6	315	1.0	0.6
Very remote	21	0.1	0.7	164	0.8	0.5	185	0.9	0.5

Notes

1. Rates were age-standardised to the 2001 Australian Standard Population and are expressed per 1,000 persons.
2. Rate ratios compare the remoteness area rate of burden with the rate of burden for *Major cities*.

Source: AIHW analysis of burden of disease database, 2011.

7.3 Burden from illicit drug use by socioeconomic group

Table 7.6 shows the total burden attributable to illicit drug use by socioeconomic group. The second lowest socioeconomic group (Q2) experienced the greatest amount of burden attributable to illicit drug use (30,640 DALY), compared with 11,964 DALY in the highest socioeconomic group (Q5). The proportion of total disease burden attributable to illicit drug use ranged from 1.7% in the highest socioeconomic group to 3.0% in the second lowest group.

Adjustment for the age structure of each quintile shows that the rate of burden attributable to illicit drug use increased with decreasing socioeconomic position, with the lowest quintile experiencing a rate of attributable burden that was 2.6 times that of the highest quintile (Table 7.6). There was a general pattern of burden decreased as socioeconomic position increased for both males and females (Figure 7.5) with the population in the second lowest quintile experiencing the highest rate of attributable burden.

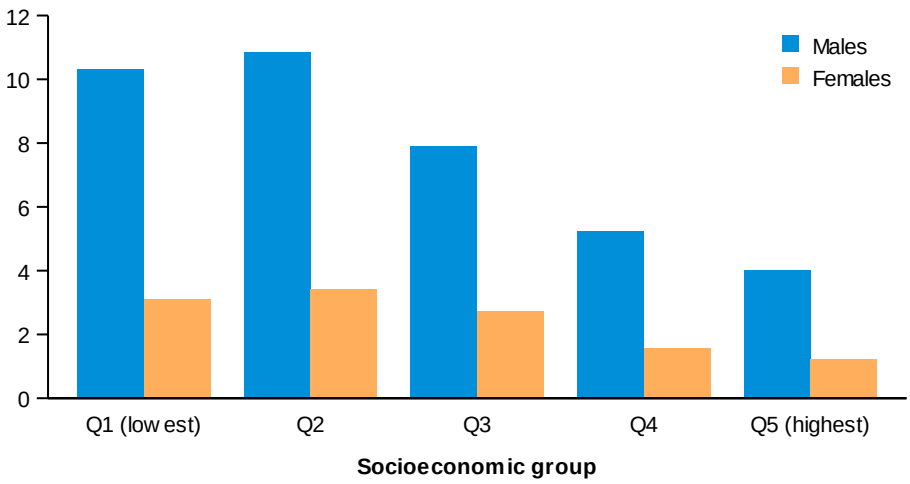
Table 7.6: Burden (DALY) attributable to illicit drug use (number, proportion, age-standardised rate (ASR) and rate ratio), by socioeconomic group, 2011

		Attributable DALY			
Socioeconomic group	**Total DALY ('000)**	**Number ('000)**	**% of total DALY**	**ASR per 1,000**	**Rate ratio**
Q1 (lowest)	1,067	28	2.6	6.7	2.6
Q2	1,020	31	3.0	7.2	2.8
Q3	922	24	2.6	5.3	2.0
Q4	800	16	2.0	3.4	1.3
Q5 (highest)	708	12	1.7	2.6	1.0

Notes

1. Rates were age-standardised to the 2001 Australian Standard Population and are expressed per 1,000 persons.
2. Rate ratios divide the ASR by the ASR for Q5.

Source: AIHW analysis of burden of disease database, 2011.

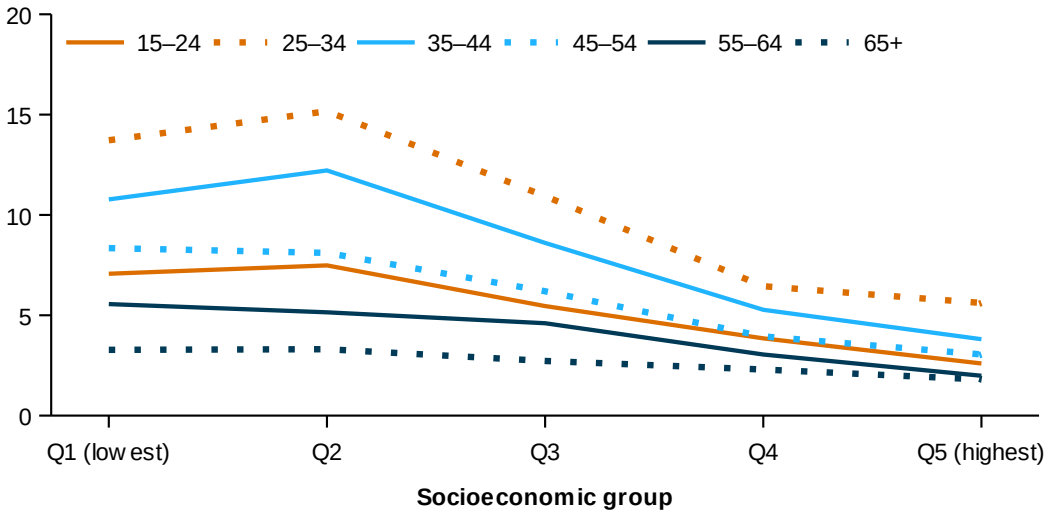


Note: Rates were age-standardised to the 2001 Australian Standard Population and are expressed per 1,000 persons.

Source: AIHW analysis of burden of disease database, 2011.

Figure 7.5: Age-standardised attributable DALY rate due to illicit drug use (per 1,000 persons), by socioeconomic group and sex, 2011

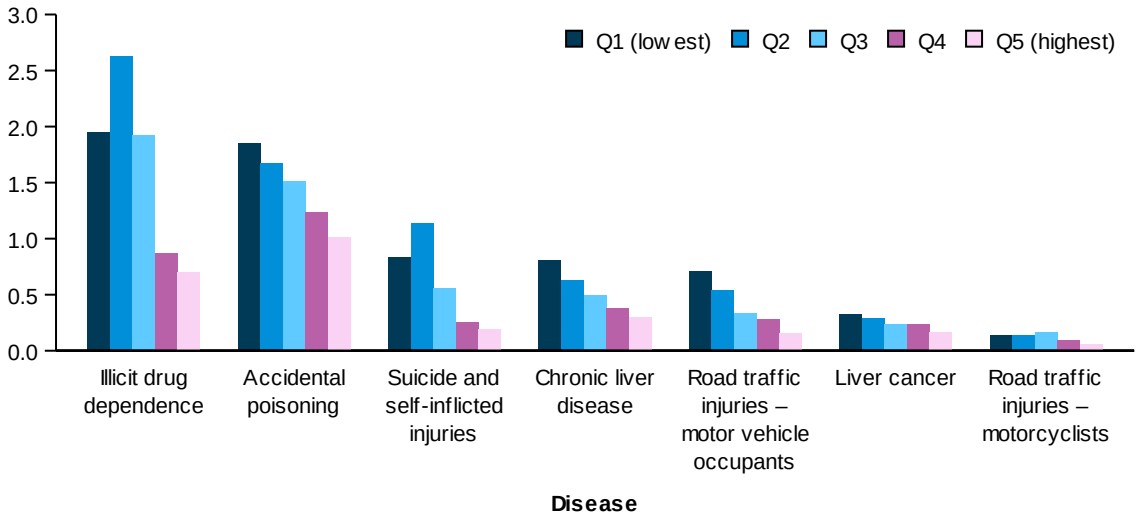
The gradient of burden decreasing as socioeconomic position increased was generally maintained across all age groups. Each socioeconomic group showed a peak in the rate of burden due to illicit drug use at age 25–34 and from age 35–44 there was a steady decrease in the rate of burden as age increased (Figure 7.6). The rate of burden due to illicit drug use in the lowest socioeconomic group was more than double that in the highest socioeconomic group in all ages from 15 to 64.



Source: AIHW analysis of burden of disease database, 2011.

Figure 7.6: Age-specific attributable DALY rate due to illicit drug use (per 1,000 persons), by socioeconomic group and sex, 2011

This disparity of burden across socioeconomic groups was seen in all the diseases linked to illicit drug use. Figure 7.7 shows the age-standardised DALY rate for the leading diseases attributable to illicit drug use. This shows a general pattern of the burden due to illicit drug use decreasing as socioeconomic group increased, with the strongest gradients observed for *Road traffic injuries—motor vehicle occupants* (with a Q1:Q5 rate ratio of 4.6); *Suicide and self-inflicted injuries* (4.4); *Illicit drug dependence* (2.8) and *Chronic liver disease* (2.7).



Note: Rates were age-standardised to the 2001 Australian Standard Population and are expressed per 1,000 persons.

Source: AIHW analysis of burden of disease database, 2011.

Figure 7.7: Age-standardised attributable DALY rate due to illicit drug use for selected linked diseases, by socioeconomic group, 2011

Burden of illicit drug dependence

After adjusting for age, the rate of burden of *Illicit drug dependence* generally increased as socioeconomic position decreased. Persons in the second lowest socioeconomic group (Q2) experienced the greatest burden, at almost 4 times the rate of persons in the highest socioeconomic group (Table 7.7). The same pattern was evident for non-fatal burden.

Table 7.7: Drug dependence YLL, YLD and DALY counts, age-standardised rates and rate ratios, by socioeconomic group, 2011

	Fatal burden			Non-fatal burden			Total burden		
Socioeconomic group	YLL	ASR	Rate ratio	YLD	ASR	Rate ratio	DALY	ASR	Rate ratio
Q5 (highest)	480	0.1	1.0	2,683	0.6	1.0	3,163	0.7	1.0
Q4	521	0.1	1.0	3,537	0.8	1.3	4,058	0.9	1.2
Q3	679	0.2	1.5	7,798	1.8	3.0	8,476	1.9	2.7
Q2	1,003	0.2	2.2	10,078	2.4	4.0	11,081	2.6	3.8
Q1 (lowest)	915	0.2	2.2	6,887	1.7	2.9	7,802	2.0	2.8

Notes

1. Rates were age-standardised to the 2001 Australian Standard Population and are expressed per 1,000 persons.
2. Rate ratios compare the socioeconomic group rate of burden with the rate of burden in the highest quintile.

Source: AIHW analysis of burden of disease database, 2011.

8 Illicit drug use over time

This chapter presents the change in burden attributable to illicit drug use over time. Changes in the attributable burden for specific individual drugs and practices between 2011 and 2003, and potential burden in 2020 and 2025 by specific drugs and practices, are presented in Chapter 11.

8.1 Changes in burden from illicit drug use between 2003 and 2011

This section presents estimates of the burden attributable to illicit drug use in Australia in 2011 compared with 2003.

This revised analysis shows that overall burden due to illicit drug use was 6.9% higher in 2011 (101,865 DALY) than in 2003 (94,750 DALY) (Table 8.1). Females had a greater increase in burden due to illicit drug use (15%) compared with males (4%). This increase in attributable DALY between 2003 and 2011 is substantially smaller than the 22.3% reported for persons in the ABDS 2011 (AIHW 2016c).

When taking into account changes in the age structure of the Australian population between 2011 and 2003, the revised age-standardised attributable DALY rate was lower in 2011 (4.6 DALY per 1,000 persons) than in 2003 (4.8) (rate ratio of 0.9)—which is different to the increase in attributable burden reported in ABDS 2011 (a rate ratio of 1.1).

These differences in the results between the original ABDS 2011 estimates and the revised estimates presented here are because of a number of key developments introduced in this current study (described in Box A1): in particular, a lower proportion of *Liver cancer* and *Chronic liver disease* attributable to illicit drug use in the revised analysis and additional linked diseases that are included in both the 2003 and 2011 results.

Table 8.1: Comparison of burden (DALY) attributable to illicit drug use, 2003 and 2011

	DALY (number)		Change in DALY (%)	% of total DALY		DALY ASR		ASR rate ratio 2011:2003
	2003	2011		2003	2011	2003	2011	
Males	73,048	76,298	4.3	3.2	3.2	7.5	6.9	0.9
Females	21,702	25,567	15.1	1.1	1.2	2.2	2.3	1.0
Persons	**94,750**	**101,865**	**7.0**	**2.3**	**2.3**	**4.8**	**4.6**	**0.9**

Notes

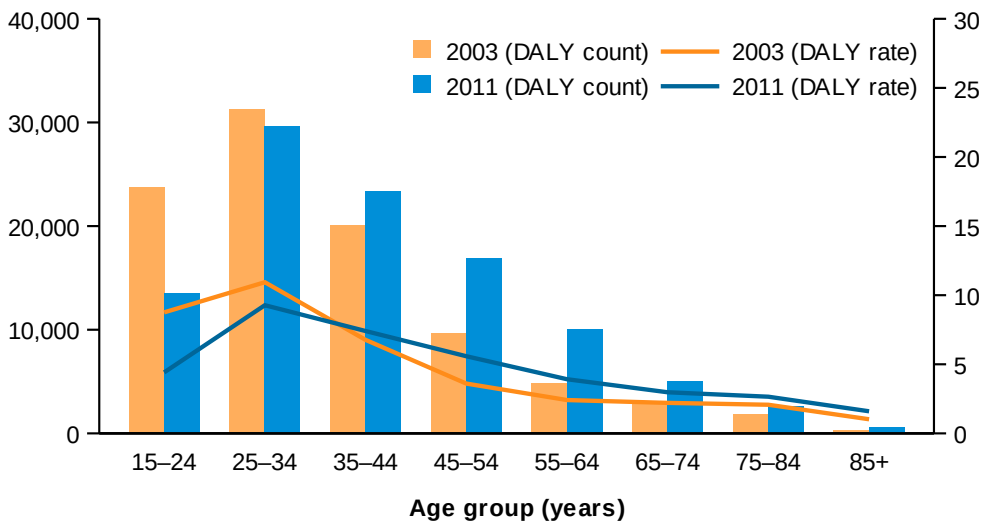
1. The '% of total DALY' column is the number DALY divided by the total DALY in Australia of that row.
2. Rates were age-standardised to the 2001 Australian Standard Population and are expressed per 1,000 persons.
3. Rate ratios compare the rate of burden in 2011 with the rate of burden in 2003.

Source: AIHW analysis of burden of disease database, 2011.

The burden from illicit drug use was higher in most age groups in 2011 compared with 2003, with the exception of persons aged 15–34 years (Figure 8.1). For adolescents and young adults aged 15–24, attributable burden from illicit drug use fell from 23,732 DALY in 2003 to 13,523 DALY in 2011. For those aged 25–34, the number of DALY attributable to illicit drug use also fell slightly (from 31,265 in 2003 to 29,626 in 2011). In persons aged 35 and over, the number of attributable DALY was higher in 2011 than in 2003.

In both 2003 and 2011, the age-specific rate of illicit drug use attributable burden peaked at age 25–34 and decreased with age (Figure 8.1). For those aged 15–24 and 25–34, the rate of attributable burden was higher in 2003 than in 2011. In persons aged 35 years and over, the rate of attributable burden was higher in 2011 than in 2003.

These changes in attributable burden, by age, over time are driven by changes in burden from the individual diseases linked to illicit drug use. This includes burden from *Road traffic injuries* due to illicit drug use decreasing, and burden from *Illicit drug dependence* increasing, in older age groups between 2003 and 2011; these changes are described in the following section.



Source: AIHW analysis of burden of disease database, 2011.

Figure 8.1: Number and rates of burden (DALY per 1,000 persons) attributable to illicit drug use, by age, 2003 and 2011

Change in burden by linked disease

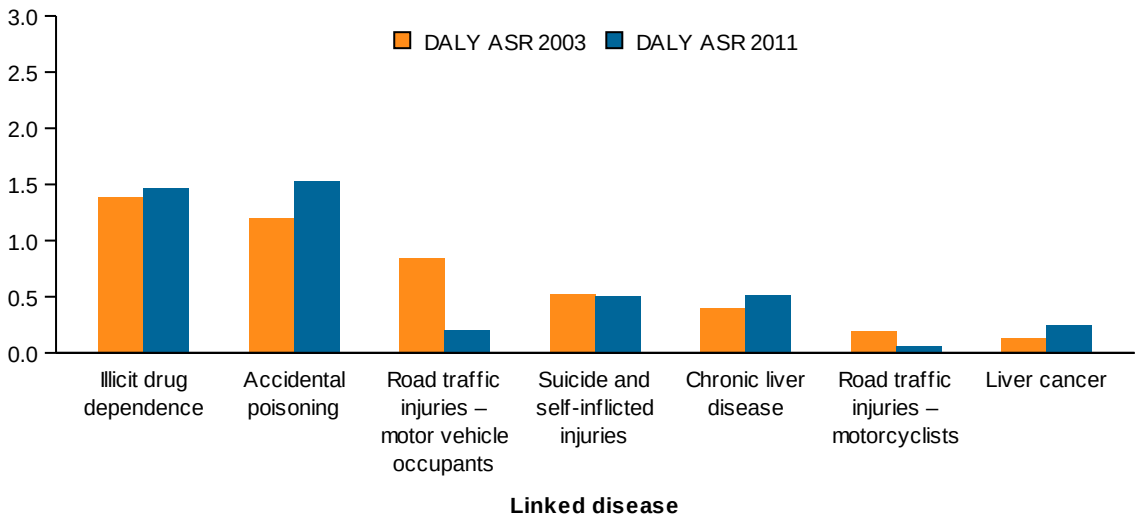
The burden attributable to illicit drug use from each linked disease influenced the amount and rate of overall burden between 2003 and 2011. The rate of attributable burden from each linked disease is compared after taking into consideration differences in the age structure of the populations between years using the age-standardised attributable DALY rate.

For *Suicide and self-inflicted injuries* (rate ratio 1.0), *Depressive disorders* (1.0), *Anxiety disorders* (1.0) and *Schizophrenia* (1.0), the rate of attributable burden due to illicit drug use was similar in 2003 and 2011 (Figure 8.2).

The rate of *Liver cancer* burden attributable to illicit drug use doubled between 2003 and 2011 (2.0 rate ratio). Increases were also reported for *Accidental poisoning* (1.3), *Chronic liver disease* (1.3) and *Illicit drug dependence* (1.1) over this period.

There were falls in the age-standardised rate of drug use attributable burden for *Road traffic injuries—motor vehicle occupants* (0.2 rate ratio) and *Motorcyclists* (0.3). This is largely due to the prevalence of driving under the influence of illicit drugs falling between 2003 and 2011. This was informed by trends in self-reports in the National Drug Strategy Household Survey of driving a motor vehicle under the influence of, or affected by, illicit drugs. The prevalence peaked at 4% of people aged 15 and over in 2001, then fell to 3.4% in 2004 and further, to 2.4%, in 2010. The prevalence has since remained steady at 2.1% in 2013 and 2016.

There were also large decreases in the rate of attributable burden from acute infectious diseases linked to illicit drug use, including *HIV/AIDS* (0.4), *Hepatitis B* (0.4) and *Hepatitis C* (0.0). This may be due to fewer persons being exposed to infectious conditions while using injecting drugs, or a rising proportion of these infectious conditions caused by other risk factors.



Note: ASR (age-standardised rate) were age-standardised to the 2001 Australian Standard Population and are expressed per 1,000 persons.

Source: AIHW analysis of burden of disease database, 2011.

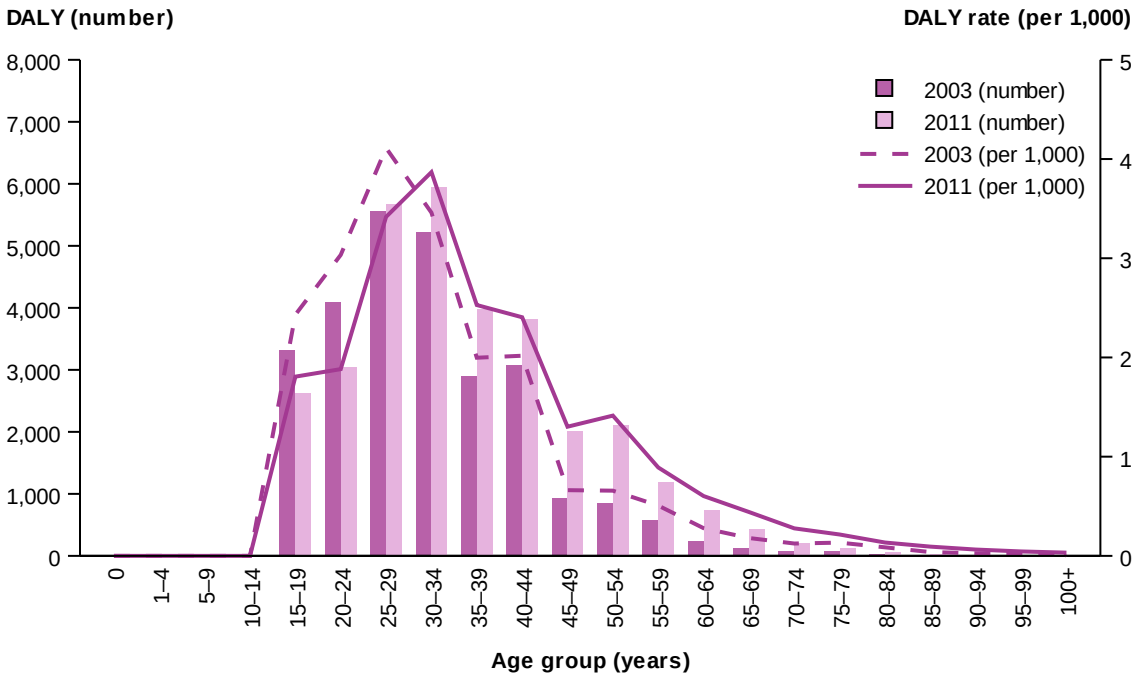
Figure 8.2: Age-standardised attributable DALY rate for the top 7 diseases linked to illicit drug use, 2003 and 2011

Changes in burden of illicit drug dependence between 2003 and 2011

The number of DALY from *Illicit drug dependence* was 5.6% higher in 2011 (31,951 DALY) than in 2003 (27,054 DALY). This was due to a 30% increase in YLD between 2003 and 2011 (from 21,775 to 28,375 YLD), while the YLL decreased by 32% (from 5,279 to 3,577 YLL).

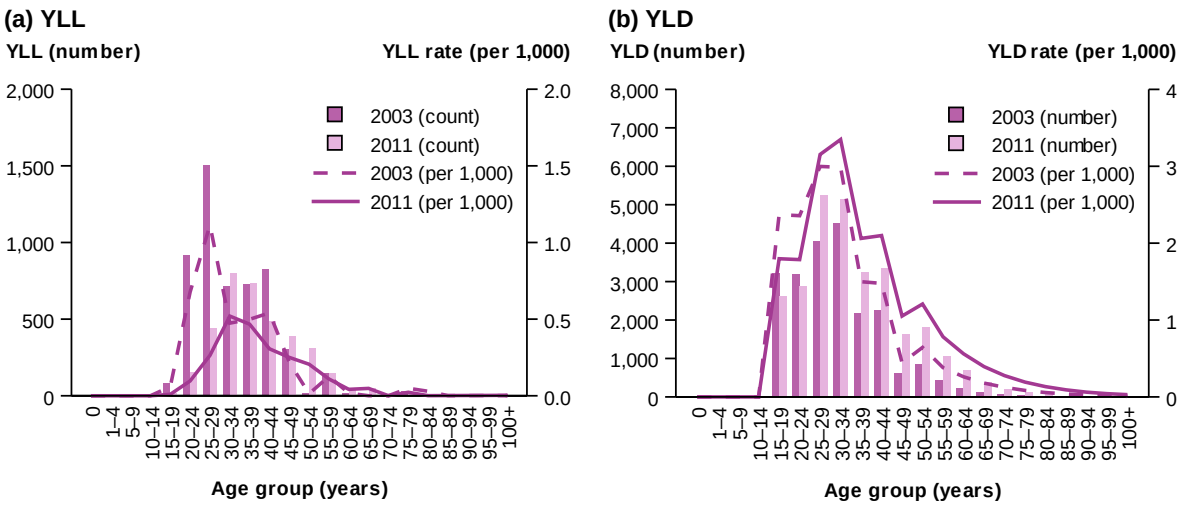
Age-specific rates of total burden were lower in persons aged 15–29 and higher in persons aged 30 and over in 2011 when compared with 2003 (Figure 8.3). This was driven by changes in the fatal and non-fatal burden between these 2 time points.

Age-specific rates of non-fatal burden (the main driver of total burden of *Illicit drug dependence*) were lower in persons aged 15–24 and higher in persons aged 25 and over in 2011 when compared with 2003 (Figure 8.4b). Age-specific rates of fatal burden were also lower in persons aged 15–29 in 2011 compared with 2003, but they were similar in other age groups (Figure 8.4a).



Source: AIHW analysis of burden of disease database, 2011.

Figure 8.3: Changes in total burden of illicit drug dependence (DALY), by age (number and rate), 2003 and 2011



Source: AIHW analysis of burden of disease database, 2011.

Figure 8.4: Changes in fatal (YLL) (a) and non-fatal (YLD) (b) burden of illicit drug dependence, by age (number and rate), 2003 and 2011

After taking account of the impact of the increasing age of the population using age-standardised rates, the overall rate of burden for *Illicit drug dependence* was similar between 2003 and 2011, with rates of 1.4 and 1.5 DALY per 1,000, respectively. The rate decreased for fatal burden (rate ratio of 0.6), while it increased for non-fatal burden (rate ratio of 1.2) between 2003 and 2011 (Table 8.2).

Table 8.2: Age-standardised rates for burden of drug dependence (YLL, YLD and DALY), 2003 and 2011

Burden type	2003	2011	Rate difference[(a)]	Rate ratio[(b)]
Fatal	0.3	0.2	–0.10	0.63
Non-fatal	1.1	1.3	0.19	1.17
Total burden	**1.4**	**1.5**	**0.08**	**1.06**

(a) Rate differences are 2011 ASR minus 2003 ASR.

(b) Rate ratios divide 2011 ASRs by corresponding 2003 ASRs.

Note: Rates were age-standardised to the 2001 Australian Standard Population and are expressed per 1,000 persons.

Source: AIHW analysis of burden of disease database, 2011.

9 Specific illicit drugs and unsafe injecting practices

A number of different types of drugs contribute to the burden attributable to illicit drug use. Different diseases, such as dependence, mental health disorders and injuries, were linked to the use of each specific drug type and practice.

In addition to burden from particular drugs, burden is also acquired as a result of the method of delivery. In particular, some infectious diseases are acquired through unsafe injecting practices. As a result, burden attributable to unsafe injecting practices is also included in this section, and may be associated with any type of illicit drug that is used through injection such as amphetamines, opioids (such as heroin), cocaine and other illicit drugs.

This section presents revised estimates of the illicit drug use burden by specific drugs including burden due to amphetamines, opioids, cocaine, cannabis, other illicit drugs and unsafe injecting practices in Australia. Each chapter presents the burden attributable to these drugs as a risk factor across all linked diseases, followed by further detail on the disease burden of dependence to the drug.

The list of diseases linked to illicit drug use by drug type and practice included in this analysis can be found in Table A2.

Note that due to small numbers, rates of non-fatal burden for specific drug dependencies are expressed per 10,000 persons.

9.1 Contribution of specific drugs and practice to illicit drug use burden

In 2011, the majority of the total burden due to illicit drug use was from opioid use (41%), followed by amphetamine use (18%) (Table 9.1). Cocaine use and cannabis use contributed a further 8% and 7%, respectively. Unsafe injecting practices accounted for an additional 18% of burden due to illicit drug use.

Table 9.1: Burden (DALY) attributable to illicit drug use by sex and drug type, 2011

	Males			Females			Persons		
Drug type	Attributable DALY	% of illicit drug use DALY	% of total DALY	Attributable DALY	% of illicit drug use DALY	% of total DALY	Attributable DALY	% of illicit drug use DALY	% of total DALY
Opioid use	31,400	41.2	1.3	10,693	41.8	0.5	42,093	41.3	0.9
Amphetamine use	14,387	18.9	0.6	3,732	14.6	0.2	18,119	17.8	0.4
Cocaine use	6,767	8.9	0.3	1,406	5.5	0.1	8,172	8.0	0.2
Cannabis use	5,373	7	0.2	1,358	5.3	0.1	6,731	6.6	0.1
Other illicit drug use	5,158	6.8	0.2	2,947	11.5	0.1	8,105	8.0	0.2
Unsafe injecting practices	13,213	17.3	0.5	5,432	21.2	0.3	18,645	18.3	0.4
All illicit drug use	**76,298**	**100.0**	**3.2**	**25,568**	**100.0**	**1.2**	**101,865**	**100.0**	**2.3**

Source: AIHW analysis of burden of disease database, 2011.

Patterns by age and sex

The drugs and practices contributing the most to the total burden due to illicit drug use in Australia in 2011 varied across age groups (Figure 9.1) and by sex. This is largely due to the higher amount of drug usage in the younger age groups and in males for most drugs.

Adolescents and young adults aged 15–24

Opioid use and amphetamine use contributed the most to illicit drug use attributable burden in this age group (34% and 32%, respectively) in both males and females. Cocaine use (25%) and cannabis use (25%) also contributed substantially to the illicit drug use burden in this age group compared with older age groups (Figure 9.1).

Adults aged 25–44

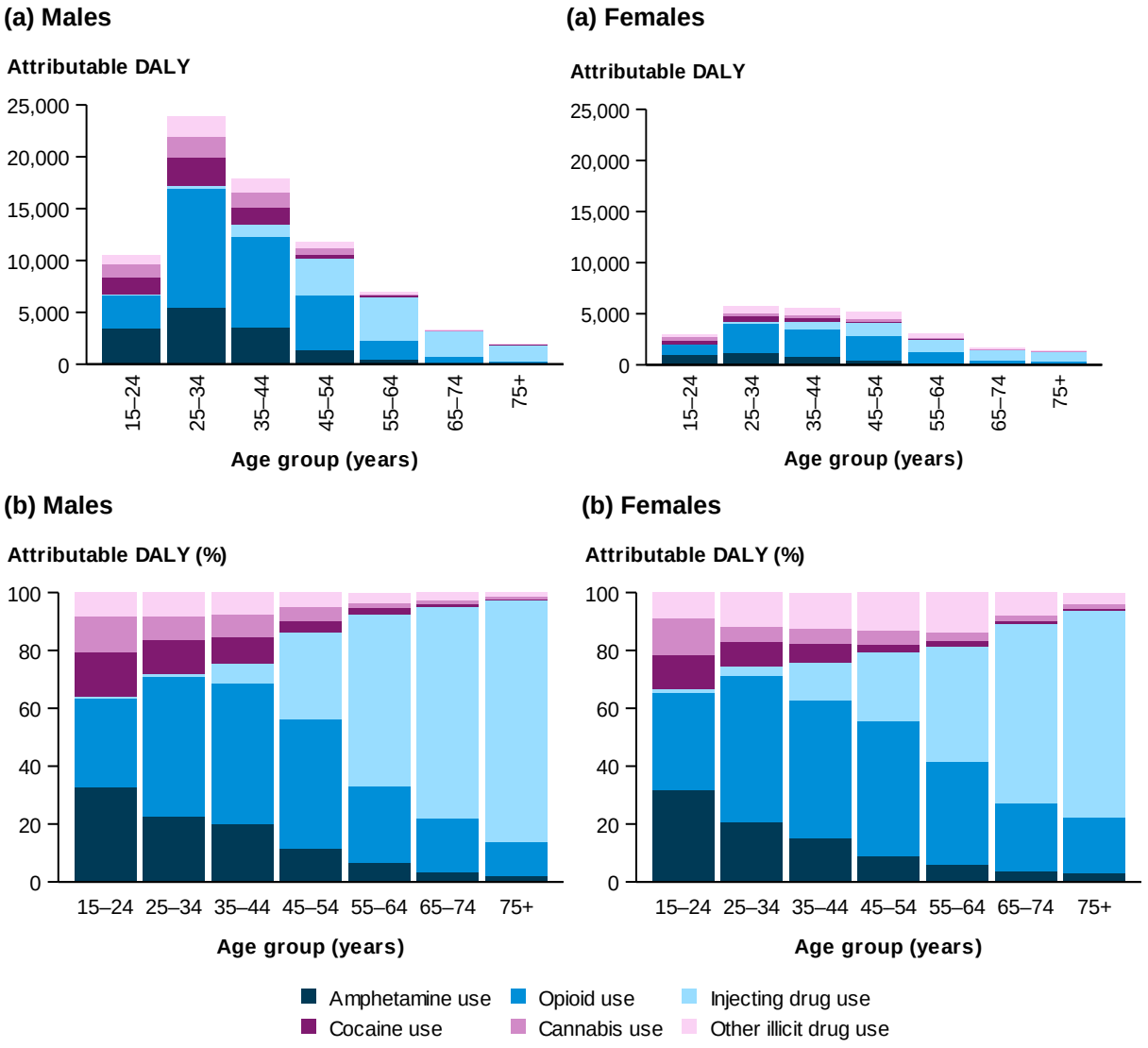
Opioid use contributed around half of the attributable burden of illicit drug use in this age group, (males: 48%–49%; females: 48%–50%) and amphetamine use around one-quarter (23% in both males and females).

Adults aged 45–64

Opioid use continued to be the main drug type that contributed to illicit drug use burden in those aged 45–54 (45% in males and 47% in females) falling to 26% in males aged 55–64 and 36% in females.

Adults aged 65+

The attributable burden due to illicit drug use in adults aged 65 years and over was mostly due the long term outcomes from unsafe injecting practices (83% in males and 71% in females)—*Chronic liver disease* and *Liver cancer*.



Source: AIHW analysis of burden of disease database, 2011.

Figure 9.1: Burden attributable to illicit drug use by age, sex and drug type or practice, DALY (a) and proportion within each age group DALY (b), 2011

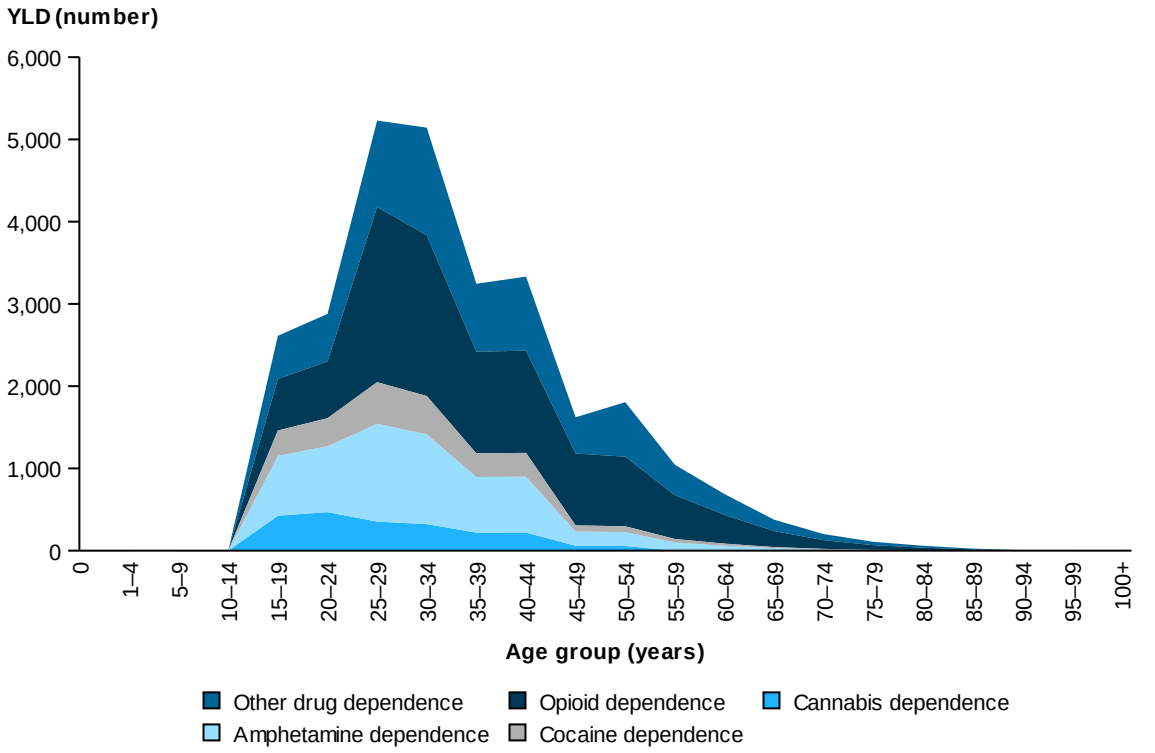
Non-fatal burden by type of drug dependence

Most of the non-fatal burden due to *Illicit drug dependence* was due to *Opioid dependence* (38%), and *Amphetamine dependence* (20%) (Table 9.2; Figure 9.2). *Cocaine dependence* and *Cannabis dependence* represented 9% and 8% of the burden, respectively.

Box 9.1: Why is only non-fatal burden due to drug dependence presented here?

Fatal and non-fatal burden due to drug dependency—called Drug use disorders (excluding alcohol) were estimated in the ABDS 2011. In this report we have presented detailed estimates of the non-fatal burden due to dependency on individual drugs, calculated as part of the ABDS 2011 and summed to estimate the non-fatal burden due to Illicit drug dependence.

However, fatal burden due to Illicit drug dependence was not estimated by drug type in the ABDS 2011. In this report, modelling was used to estimate the fatal burden by drug type (presented only in the drug use sections).



Source: AIHW analysis of burden of disease database, 2011.

Figure 9.2: Non-fatal burden (YLD) of illicit drug dependence by age, 2011

A higher proportion of non-fatal burden was evident in males, compared with females, from each of the types of drug dependences examined. YLD rates for *Opioid* and *Cannabis dependence* were up to 3 times as high in males as in females (Table 9.2; Figure 9.3).

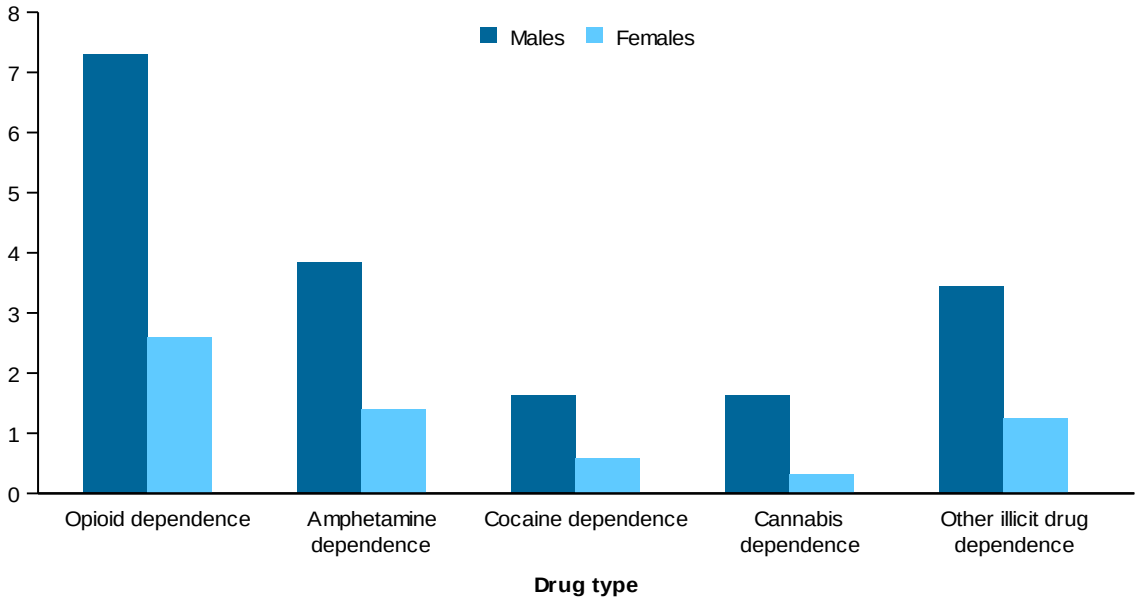
Table 9.2: Non-fatal burden (YLD) of illicit drug dependence by type of drug dependence and sex, 2011

	Males			Females			Persons		
Drug use disorder	**Number**	**%**	**ASR[(a)]**	**Number**	**%**	**ASR[(a)]**	**Number**	**%**	**ASR[(a)]**
Opioid dependence	8,033	39.4	7.3	2,851	35.7	2.6	10,884	38.4	4.9
Amphetamine dependence	4,217	20.7	3.9	1,508	18.9	1.4	5,725	20.2	2.6
Cocaine dependence	1,794	8.8	1.6	641	8.0	0.6	2,435	8.6	1.1
Cannabis dependence	1,784	8.7	1.6	342	4.3	0.3	2,126	7.5	1.0
Other illicit drug dependence	4,566	22.4	3.5	2,639	33.1	1.2	7,205	25.4	2.4
Total[(b)]	**20,394**	**100.0**	**1.9**	**7,981**	**100.0**	**0.7**	**28,375**	**100.0**	**1.3**

(a) Rates were age-standardised to the 2001 Australian Standard Population are expressed per 10,000 persons.

(b) Rates for the Total row were age-standardised to the 2001 Australian Standard Population are expressed per 10,000 persons.

Source: AIHW analysis of burden of disease database, 2011.



Note: Rates were age-standardised to the 2001 Australian Standard Population and are expressed per 10,000 persons.

Source: AIHW analysis of burden of disease database, 2011.

Figure 9.3: Non-fatal burden (YLD) of illicit drug dependence by drug type and sex, 2011

9.2 Burden from opioid use

Opioid use was responsible for 0.9% of the total burden of disease and injuries in 2011, equivalent to 31,400 DALY (1.3%) in males and 10,693 DALY (0.5%) in females (Table 9.1).

Most of the burden due to opioid use was due to 2 linked diseases: *Accidental poisoning* and *Opioid dependence*. *Accidental poisoning* contributed to 63% (26,435 DALY) and *Opioid dependence* 30% (12,259 DALY) of the burden due to opioid use. A further 7.8% of the burden due to opioid use was from *Suicide and self-inflicted injuries* (Table 9.3).

Table 9.3: Burden due to opioid use by linked disease and sex, 2011

	Males		Females		Persons	
Linked disease	**DALY**	**%**	**DALY**	**%**	**DALY**	**%**
Accidental poisoning	19,277	61.4	7,158	66.9	26,435	62.8
Opioid dependence	9,075	28.9	3,183	29.8	12,259	29.1
Suicide and self-inflicted injuries	2,955	9.4	337	3.1	3,292	7.8
Road traffic injuries—motor vehicle occupants	68	0.2	14	0.1	82	0.2
Road traffic injuries—motorcyclists	25	0.1	1	0.0	25	0.1
Total	**31,400**	**100.0**	**10,693**	**100.0**	**42,093**	**100.0**

Source: AIHW analysis of burden of disease database, 2011.

Proportion of burden for each linked disease due to opioid use

Just over half (51%) of *Accidental poisoning* burden, 100% of *Opioid dependence* and 3% of *Suicide and self-inflicted injuries* was due to opioid use (Table 9.4).

Table 9.4: Number and proportion of disease burden due to opioid use (attributable DALY), by linked disease, 2011

Linked disease	Total DALY	DALY attributable to opioid use	% of linked disease burden due to opioid use
Accidental poisoning	51,406	26,435	51.4
Opioid dependence	12,259	12,259	100.0
Suicide and self-inflicted injuries	113,470	3,292	2.9
Road traffic injuries—motor vehicle occupants	49,501	82	0.2
Road traffic injuries—motorcyclists	12,677	25	0.2

Source: AIHW analysis of burden of disease database, 2011.

Burden of opioid dependence

Non-fatal burden of opioid dependence

In 2011, *Opioid dependence* was responsible for 10,884 YLD and contributed to 38% of the total non-fatal burden of *Illicit drug dependence*. A higher proportion of non-fatal burden was evident in males (74%) compared with females (26%), with the age-standardised rate almost 3 times as high for males (Table 9.5).

Table 9.5: Non-fatal burden (YLD) of opioid dependence by sex, 2011

	YLD			
Sex	**Number**	**%**	**Crude rate[(a)]**	**ASR[(a)]**
Males	8,033	73.8	7.2	7.3
Females	2,851	26.2	2.5	2.6
Persons	**10,884**	**100.0**	**4.9**	**4.9**

(a) Rates are expressed per 10,000 persons. The standardised rate has been age-standardised to the 2001 Australian Standard Population.

Source: AIHW analysis of burden of disease database, 2011.

Non-fatal burden of opioid dependence by severity

The non-fatal burden of *Opioid dependence* was mostly due to moderate-severe dependence (78%) (Table 9.6). Mild dependence contributed 22% to the non-fatal burden of *Opioid dependence*. It was assumed that there was no difference in the proportions of non-fatal burden by severity between males and females.

Box 9.2: Severity levels for illicit drug dependence

Severity levels for *Illicit drug dependence* are defined as mild or moderate to severe. For the mild category, it defines the person uses the illicit drug at least once a week and has some difficulty controlling the habit; when not using the drug, the person functions normally.

In the 'moderate to severe' category, the person uses the illicit drug more frequently and has difficulty controlling the habit. The person may have mood swings, anxiety, paranoia, hallucinations and sleep problems, and have some difficulty in daily activities (GBD 2013; Collaborators 2015).

More details on the definitions of the severity levels are provided in Table A10.

Table 9.6: Non-fatal burden (YLD) of opioid dependence, by severity, 2011

Severity	**Number**	**%**
Mild	2,427	22.3
Moderate to severe	8,457	77.7
Total	**10,884**	**100.0**

Source: AIHW analysis of burden of disease database, 2011.

9.3 Burden from amphetamine use

Amphetamine use was responsible for 0.4% of the total burden of disease and injuries in 2011, equivalent to 14,387 DALY in males (0.6%) and 3,732 DALY in females (0.2%) (Table 9.1).

Of the burden due to amphetamine use, *Amphetamine dependence* contributed 36% (6,448 DALY), *Accidental poisoning* 21% (3,733) and *Road traffic injuries—motor vehicle occupants* 20% (3,694). Other diseases that contributed burden due to amphetamine use included *Suicide and self-inflicted injuries* 17% (3,105 DALY) and *Road traffic injuries—motorcyclists* 6% (1,139) (Table 9.7).

Table 9.7: Burden due to amphetamine use by linked disease and sex, 2011

	Males		Females		Persons	
Linked disease	**DALY**	**%**	**DALY**	**%**	**DALY**	**%**
Amphetamine dependence	4,763	33.1	1,684	45.1	6,448	35.6
Accidental poisoning	2,722	18.9	1,011	27.1	3,733	20.6
Road traffic injuries—motor vehicle occupants	3,025	21.0	669	17.9	3,694	20.4
Suicide and self-inflicted injuries	2,776	19.3	329	8.8	3,105	17.1
Road traffic injuries—motorcyclists	1,100	7.6	39	1.0	1,139	6.3
Total	**14,387**	**100.0**	**3,732**	**100.0**	**18,119**	**100.0**

Source: AIHW analysis of burden of disease database, 2011.

Proportion of burden for each linked disease due to amphetamine use

All of *Amphetamine dependence* was attributable to amphetamine use. Around 7.5% of *Road traffic injuries—motor vehicle occupants* burden and 9% of *Road traffic injuries—motorcyclists* burden was due to amphetamine use (Table 9.8). These proportions were much higher in males compared with females (for example 8.9% compared to 4.4% for *Road traffic injuries—motor vehicle occupants* burden) (Table B10).

Table 9.8: Number and proportion of disease burden due to amphetamine use (attributable DALY), by linked disease, 2011

Linked disease	Total DALY	DALY attributable to amphetamine use	% of linked disease burden due to amphetamine use
Amphetamine dependence	6,448	6,448	100.0
Accidental poisoning	51,406	3,733	7.3
Road traffic injuries—motor vehicle occupants	49,501	3,694	7.5
Suicide and self-inflicted injuries	113,470	3,105	2.7
Road traffic injuries—motorcyclists	12,677	1,139	9.0

Source: AIHW analysis of burden of disease database, 2011.

Burden of amphetamine dependence

Non-fatal amphetamine dependence burden

In 2011, *Amphetamine dependence* was responsible for 5,725 YLD and contributed to 20% of the total non-fatal burden of *Illicit drug dependence*. Males experienced a higher proportion (74%) of the non-fatal burden, with 2.8 times the age-standardised rate of females (Table 9.9).

Table 9.9: Non-fatal burden (YLD) of amphetamine dependence by sex, 2011

	YLD			
Sex	**Number**	**%**	**Crude rate[(a)]**	**ASR[(a)]**
Males	4,217	73.7	3.8	3.9
Females	1,508	26.3	1.3	1.4
Persons	**5,725**	**100.0**	**2.6**	**2.6**

(a) Rates are expressed per 10,000 persons. The standardised rate has been age-standardised to the 2001 Australian Standard Population.

Source: AIHW analysis of burden of disease database, 2011.

Non-fatal amphetamine dependence burden by severity

Around half of the non-fatal burden of *Amphetamine dependence* was due to mild dependence (51%), and the remaining burden was due to moderate-severe dependence (49%) (Table 9.10). It was assumed that there was no difference in the proportions of non-fatal burden by severity between males and females.

Table 9.10: Non-fatal burden (YLD) of amphetamine dependence by severity, 2011

Severity	**Number**	**%**
Mild	2,912	50.9
Moderate to severe	2,813	49.1
Total	**5,725**	**100.0**

Source: AIHW analysis of burden of disease database, 2011.

9.4 Burden from cocaine use

Cocaine use was responsible for 0.2% of the total burden of disease and injuries in 2011, equivalent to 6,767 DALY in males (0.3%) and 1,406 DALY in females (0.1%) (Table 9.1).

Of the burden due to cocaine use, *Suicide and self-inflicted injuries* accounted for 55% (4,471 DALY) and cocaine dependence 34% (2,743) (Table 9.11).

Table 9.11: Burden due to cocaine use by linked disease and sex, 2011

	Males		Females		Persons	
Linked disease	**DALY**	**%**	**DALY**	**%**	**DALY**	**%**
Suicide and self-inflicted injuries	3,992	59.0	479	34.1	4,471	54.7
Cocaine dependence	2,027	30.0	716	50.9	2,743	33.6
Accidental poisoning	410	6.1	152	10.8	562	6.9
Road traffic injuries—motor vehicle occupants	253	3.7	55	3.9	309	3.8
Road traffic injuries—motorcyclists	85	1.3	3	0.2	88	1.1
Total	**6,767**	**100.0**	**1,406**	**100.0**	**8,172**	**100.0**

Source: AIHW analysis of burden of disease database, 2011.

Proportion of burden for each linked disease due to cocaine use

All of cocaine dependence and 4% of *Suicide and self-inflicted injuries* were due to cocaine use (Table 9.12).

Table 9.12: Number and proportion of disease burden due to cocaine use (attributable DALY), by linked disease, 2011

Linked disease	Total DALY	DALY attributable to cocaine use	% of linked disease burden due to cocaine use
Suicide and self-inflicted injuries	113,470	4,471	3.9
Cocaine dependence	2,743	2,743	100.0
Accidental poisoning	51,406	562	1.1
Road traffic injuries—motor vehicle occupants	49,501	309	0.6
Road traffic injuries—motorcyclists	12,677	88	0.7

Source: AIHW analysis of burden of disease database, 2011.

Burden of cocaine dependence

Non-fatal cocaine dependence burden

In 2011, *Cocaine dependence* was responsible for 2,435 YLD and contributed to 8.6% of the total non-fatal burden of *Illicit drug dependence*. Males experienced a higher proportion (74%) of the non-fatal burden, 2.7 times the age-standardised rate of females (Table 9.13).

Table 9.13: Non-fatal burden (YLD) of cocaine dependence by sex, 2011

	YLD			
Sex	**Number**	**%**	**Crude rate[(a)]**	**ASR[(a)]**
Males	1,794	73.7	1.6	1.6
Females	641	26.3	0.6	0.6
Persons	**2,435**	**100.0**	**1.1**	**1.1**

(a) Rates are expressed per 10,000 persons. The standardised rate has been age-standardised to the 2001 Australian Standard Population.

Source: AIHW analysis of burden of disease database, 2011.

Non-fatal cocaine dependence burden by severity

The non-fatal burden of *Cocaine dependence* was mostly due to moderate-severe dependence (60%) (Table 9.14). Mild dependence contributed 40% to the non-fatal burden of cocaine dependence. It was assumed that there was no difference in the proportions of non-fatal burden by severity between males and females.

Table 9.14: Non-fatal burden (YLD) of cocaine dependence by severity, 2011

Severity	Number	%
Mild	966	39.7
Moderate to severe	1,469	60.3
Total	**2,435**	**100.0**

Source: AIHW analysis of burden of disease database, 2011.

9.5 Burden from cannabis use

Cannabis use was responsible for 0.1% of the total burden of disease and injuries in 2011, equivalent to 5,373 DALY in males (0.2%) and 1,358 DALY in females (0.1%) (Table 9.1).

In this study, cannabis use is linked to *Accidental poisoning*, *Cannabis dependence*, *Schizophrenia*, *Anxiety disorders*, *Depressive disorders*, *Road traffic injuries—motor vehicle occupants* and *Road traffic injuries—motorcyclists*.

Accidental poisoning (2,761 DALY, 41%) and *Cannabis dependence* (2,397 DALY, 36%) contributed most to the burden due to cannabis use (Table 9.15).

Table 9.15: Burden due to cannabis use by linked disease and sex, 2011

	Males		Females		Persons	
Linked disease	**DALY**	**%**	**DALY**	**%**	**DALY**	**%**
Accidental poisoning	2,013	37.5	748	55.1	2,761	41.0
Cannabis dependence	2,015	37.5	382	28.1	2,397	35.6
Schizophrenia	519	9.7	36	2.6	555	8.2
Anxiety disorders	236	4.4	79	5.8	314	4.7
Road traffic injuries—motor vehicle occupants	254	4.7	54	4.0	308	4.6
Depressive disorders	243	4.5	58	4.3	301	4.5
Road traffic injuries—motorcyclists	92	1.7	3	0.2	95	1.4
Total	**5,373**	**100.0**	**1,358**	**100.0**	**6,731**	**100.0**

Source: AIHW analysis of burden of disease database, 2011.

Proportion of burden for each linked disease due to cannabis use

Only a small proportion (less than 2%) of the burden of *Schizophrenia*, *Anxiety disorders*, *Road traffic injuries* and *Depressive disorders* was attributable to cannabis use (Table 9.16). This is largely due to the low prevalence of *Cannabis dependence*.

Table 9.16: Number and proportion of disease burden due to cannabis use (attributable DALY), by linked disease, 2011

Linked disease	Total DALY	DALY attributable to cannabis use	% of linked disease burden due to cannabis use
Accidental poisoning	51,406	2,761	5.4
Cannabis dependence	2,397	2,397	100.0
Schizophrenia	34,331	555	1.6
Anxiety disorders	140,971	314	0.2
Road traffic injuries—motor vehicle occupants	49,501	308	0.6
Depressive disorders	127,659	301	0.2
Road traffic injuries—motorcyclists	12,677	95	0.8

Source: AIHW analysis of burden of disease database, 2011.

Burden of cannabis dependence

Non-fatal cannabis dependence burden

In 2011, *Cannabis dependence* was responsible for 2,126 YLD and contributed to 7.5% of the total non-fatal burden of *Illicit drug dependence*. A higher proportion of non-fatal burden was evident in males (84%) compared with females (16%), with the age-standardised rate 5 times as high for males (Table 9.17).

Table 9.17: Non-fatal burden (YLD) of cannabis dependence by sex, 2011

	YLD			
Sex	**Number**	**%**	**Crude rate[(a)]**	**ASR[(a)]**
Males	1,784	83.9	1.6	1.6
Females	342	16.1	0.3	0.3
Persons	**2,126**	**100.0**	**1.0**	**1.0**

(a) Rates are expressed per 10,000 persons. The standardised rate has been age-standardised to the 2001 Australian Standard Population.

Source: AIHW analysis of burden of disease database, 2011.

Non-fatal cannabis dependence burden by severity

Just over half of the non-fatal burden of *Cannabis dependence* was due to mild dependence (53%), and the remaining burden was due to moderate/severe dependence (47%) (Table 9.18). It was assumed that there was no difference in the proportions of non-fatal burden, by severity between males and females.

Table 9.18: Non-fatal burden (YLD) of cannabis dependence by severity, 2011

Severity	**Number**	**%**
Mild	1,123	52.8
Moderate to severe	1,003	47.2
Total	**2,126**	**100.0**

Source: AIHW analysis of burden of disease database, 2011.

9.6 Burden from other illicit drug use

Drugs captured under ‘other illicit drug use’ include sedatives, hallucinogens (such as LSD and ecstasy), ketamine, GHB, inhalants, solvents, multiple drug use and psychoactive substances.

Other illicit drug use was responsible for 0.2% of the total burden of disease and injuries in 2011, equivalent to 8,105 DALY (Table 9.1).

All of the burden attributable to other illicit drug use is from dependence on drugs other than those specified in the preceding sections. No other diseases or injuries were linked to this residual grouping because of its’ heterogeneous nature.

Burden of other illicit drug dependence

Non-fatal other illicit drug dependence burden

One-quarter (25%) of the non-fatal burden of *Illicit drug dependence* was due to dependence on the drugs captured under the category '*Other illicit drug dependence*' as defined in this section (7,205 YLD). A higher proportion of non-fatal burden was evident in males (63%) compared with females (37%), with the age-standardised rate for males almost twice that for females (Table 9.19).

Table 9.19: Non-fatal burden (YLD) of other illicit drug dependence by sex, 2011

	YLD			
Sex	**Number**	**%**	**Crude rate[(a)]**	**ASR[(a)]**
Males	4,566	63.4	4.1	4.2
Females	2,639	36.6	2.4	2.3
Persons	**7,205**	**100.0**	**3.2**	**3.3**

(a) Rates are expressed per 10,000 persons. The standardised rate has been age-standardised to the 2001 Australian Standard Population.

Source: AIHW analysis of burden of disease database, 2011.

Non-fatal other illicit drug dependence burden by severity

The non-fatal burden of *Other illicit drug dependence* was mostly due to moderate-severe dependence (66%) (Table 9.20). Mild dependence contributed about 34% to the non-fatal burden of *Other illicit drug dependence*. The proportion of mild dependence contributing to non-fatal burden was slightly higher in males (35%) than in females (32%). Females had a higher proportion of moderate-severe dependence contributing to non-fatal burden (68%) compared with males (65%).

Table 9.20: Non-fatal burden (YLD) of other illicit drug dependence by severity, 2011

Severity	**Number**	**%**
Mild	2,444	33.9
Moderate to severe	4,761	66.1
Total	**7,205**	**100.0**

Source: AIHW analysis of burden of disease database, 2011.

9.7 Burden from unsafe injecting practices

Injecting use was responsible for 0.4% of the total burden of disease and injuries in 2011, equivalent to 13,213 DALY in males (0.5%) and 5,432 DALY in females (0.3%) (Table 9.1).

Unsafe injecting practices is linked to *Hepatitis B*, *Hepatitis C*, *HIV/AIDS*, *Liver cancer* and *Chronic liver disease*. *Liver cancer* and *Chronic liver disease* are the long term consequences of contracting hepatitis B and hepatitis C infection. *Chronic liver disease* was responsible for 65% (12,198 DALY) and *Liver cancer* 32% (6,042) of the burden due to unsafe injecting practices (Table 9.21).

Table 9.21: Burden due to unsafe injecting practices by linked disease and sex, 2011

	Males		Females		Persons	
Linked disease	**DALY**	**%**	**DALY**	**%**	**DALY**	**%**
Chronic liver disease	8,411	63.7	3,787	69.7	12,198	65.4
Liver cancer	4,477	33.9	1,565	28.8	6,042	32.4
HIV/AIDS	215	1.6	39	0.7	254	1.4
Hepatitis B (acute)	68	0.5	35	0.6	103	0.6
Hepatitis C (acute)	42	0.3	6	0.1	49	0.3
Total	**13,213**	**100.0**	**5,432**	**100.0**	**18,645**	**100.0**

Source: AIHW analysis of burden of disease database, 2011.

Proportion of burden for each linked disease due to unsafe injecting practices

Of the burden due to *Chronic liver disease* and *Liver cancer*, 26% and 21%, respectively were attributable to unsafe injecting practices (Table 9.22). The amount and proportion of attributable burden reported here are lower than in the ABDS 2011 as these revised estimates are based on Australian estimates and not international data.

While *Hepatitis B* and *Hepatitis C* contributed only a small number of DALY to the total disease burden, a high proportion of the total DALY due to these diseases was attributable to unsafe injecting practices (*Hepatitis B* 43% and *Hepatitis C* 83%).

Table 9.22: Number and proportion of disease burden due to unsafe injecting practices (attributable DALY), by linked disease, 2011

Linked disease	Total DALY	DALY attributable to unsafe injecting practices	% of linked disease burden due to unsafe injecting practices
Chronic liver disease	47,604	12,198	25.6
Liver cancer	29,376	6,042	20.6
HIV/AIDS	5,073	254	5.0
Hepatitis B (acute)	240	103	42.8
Hepatitis C (acute)	59	49	82.5

Source: AIHW analysis of burden of disease database, 2011.

10 Specific illicit drugs and unsafe injecting practices in key population groups

This chapter presents estimates of the burden due to specific illicit drugs (amphetamines, cannabis, cocaine and opioids) and unsafe injecting practices by state and territory, remoteness area and socioeconomic group. This includes variation in the total burden attributed to each specific illicit drug, as well as variation in non-fatal burden by type of *Illicit drug dependence*.

10.1 Burden by state and territory

Variation in total burden from specific illicit drugs and practices

Table 10.1 presents a picture of age-standardised DALY rates, by state and territory for the different illicit drugs and practices, increasing from light blue (low, less than 0.5 DALY per 1,000) to purple (high, 2.0 DALY or more per 1,000 persons). This provides a simple way to pinpoint those jurisdictions experiencing greater burden attributable to each type of drug.

Age-standardised rates of attributable burden were similar across jurisdictions, with the following exceptions:

- Amphetamine use and unsafe injecting practices attributable burden rates were noticeably higher in the Northern Territory (3.5 DALY per 1,000 and 2.2 DALY per 1,000, respectively) compared with other states and territories.
- Cocaine use attributable burden rates were highest in the Northern Territory (1.1 DALY per 1,000), Western Australia (0.7 per 1,000) and South Australia (0.7 DALY per 1,000).
- Opioid use attributable burden rates were highest in New South Wales, Victoria and Western Australia, and lowest in the Northern Territory and Tasmania.

Table 10.1: Age standardised rate of burden attributable to specific illicit drugs and practices (DALY ASR per 1,000), by state and territory, 2011

Drug type or practice	NSW	Vic	Qld	WA	SA	Tas	ACT	NT
Opioid use	2.0	1.9	1.8	1.9	1.5	1.3	1.5	1.1
Amphetamine use	0.9	0.8	0.8	1.5	1.8	1.1	0.7	3.5
Cocaine use	0.4	0.3	0.2	0.7	0.7	0.6	0.3	1.1
Cannabis use	0.3	0.2	0.4	0.4	0.4	0.3	0.4	0.3
Unsafe injecting practices	0.8	0.8	0.7	0.7	0.8	0.6	0.8	2.2

0 to <0.5 per 1,000 | 0.5 to <1 per 1,000 | 1 to <1.5 per 1,000 | 1.5 to ≤2 per 1,000 | 2 > per 1,000

Source: AIHW analysis of burden of disease database, 2011.

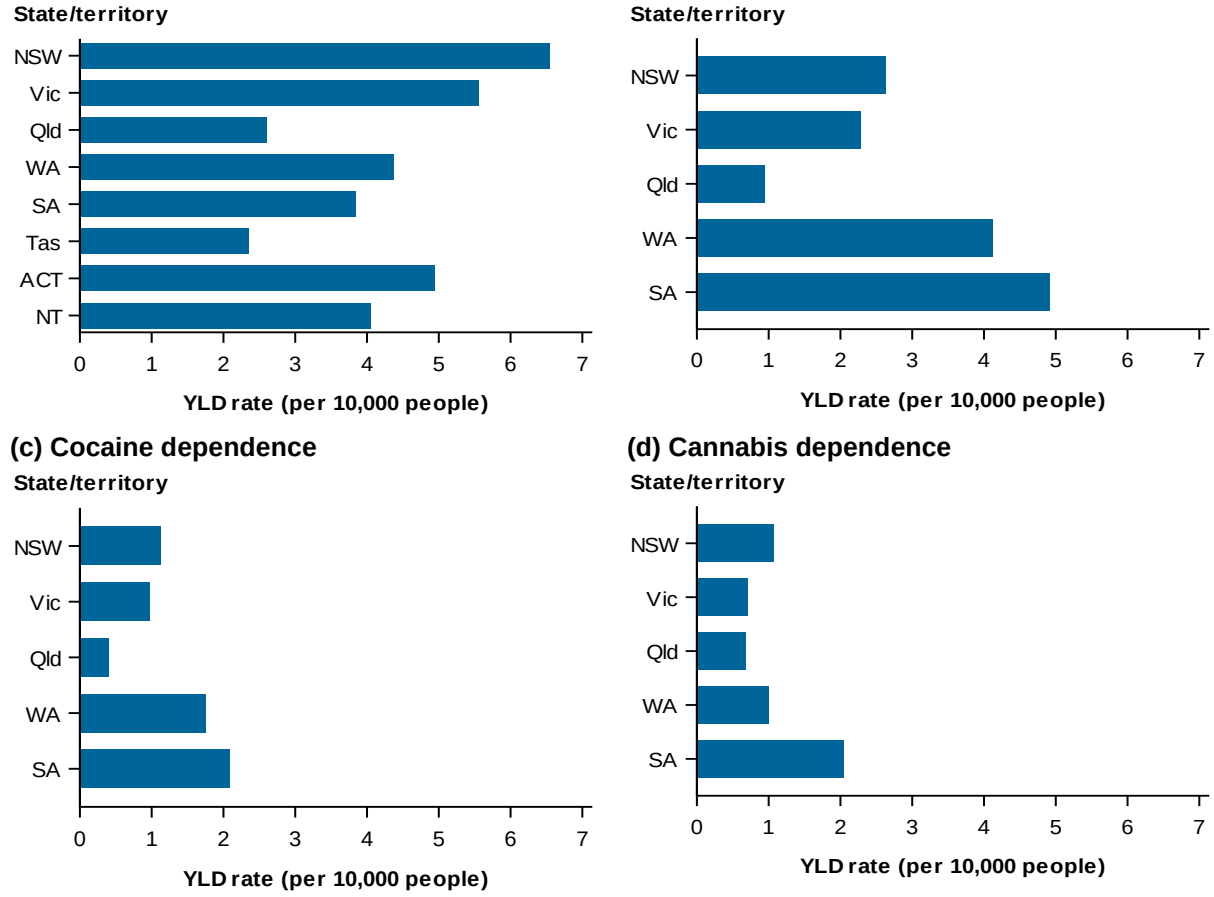
Variation in non-fatal burden by type of illicit drug dependence

This section presents age-standardised rates of non-fatal burden by type of *Illicit drug dependence* across states and territories in 2011. Estimates are only presented for states

and territories with sufficient numbers and data quality to produce robust estimates by drug type. As such, estimates for Tasmania, the Australian Capital Territory and the Northern Territory are not reported for *Amphetamine*, *Cocaine* and *Cannabis dependence*.

Different patterns emerged when looking at rates of non-fatal burden by type of illicit drug dependence across states and territories.

- For *Opioid dependence*, New South Wales had the highest age-standardised rate of non-fatal burden (6.5 YLD per 10,000 persons), while Tasmania had the lowest rate (2.3) (Figure 10.1a).
- For *Amphetamine*, *Cocaine* and *Cannabis dependence*, of the 5 states for which burden estimates are reported, South Australia had the highest burden rates—*Amphetamine* (4.9 YLD per 10,000 persons), *Cocaine* (2.1) and *Cannabis* (2.1); and Queensland had the lowest burden rates—*Amphetamine* (0.9), *Cocaine* (0.4) and *Cannabis* (0.7).



Notes

1. Rates were age-standardised to the 2001 Australian Standard Population and are expressed per 10,000 persons.
2. Estimates are only presented for states and territories with sufficient numbers and data quality to produce robust estimates by drug type. As such, estimates for Tasmania, the Australian Capital Territory and the Northern Territory are not reported for *Amphetamine*, *Cocaine* and *Cannabis dependence* (see Appendix A).

Source: AIHW burden of disease database 2011.

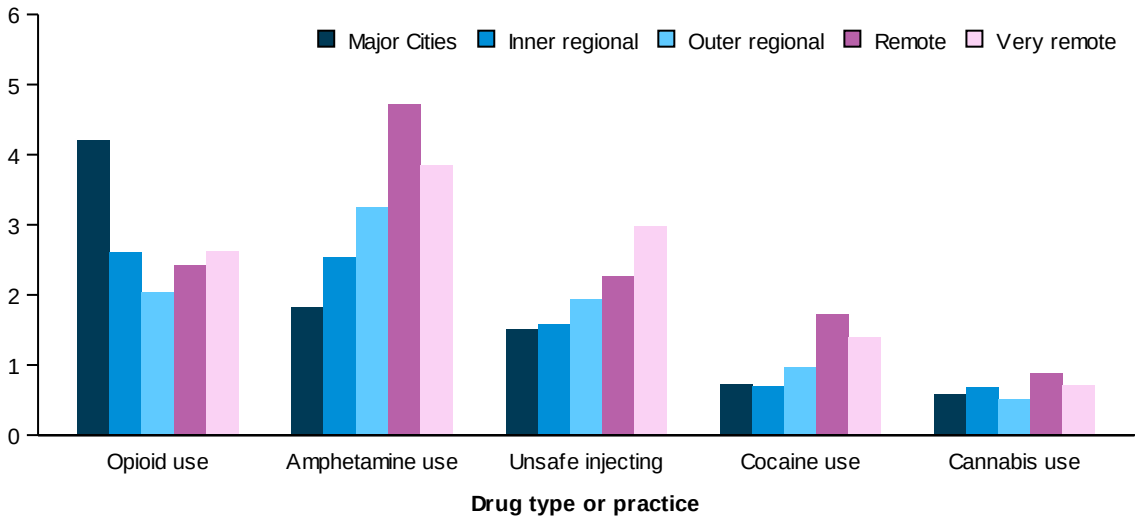
Figure 10.1: Non-fatal burden (YLD) of illicit drug dependence ASR (per 10,000 persons), by drug type and state and territory, 2011

10.2 Burden by remoteness

Variation in total burden from specific illicit drugs and practices

Figure 10.2 shows the age-standardised attributable DALY rate for each illicit drug type, as well as for unsafe injecting practices, across remoteness areas in 2011.

- There was a general pattern of attributable burden increasing as remoteness increased, for amphetamine use, unsafe injecting practices and cocaine use.
- *Major cities* have a rate of burden attributed to opioid use that was 1.6 to 2 times as high as other remoteness areas.
- For cannabis use there was no clear pattern by remoteness.



Note: Rates were age-standardised to the 2001 Australian Standard Population and are expressed per 1,000 persons

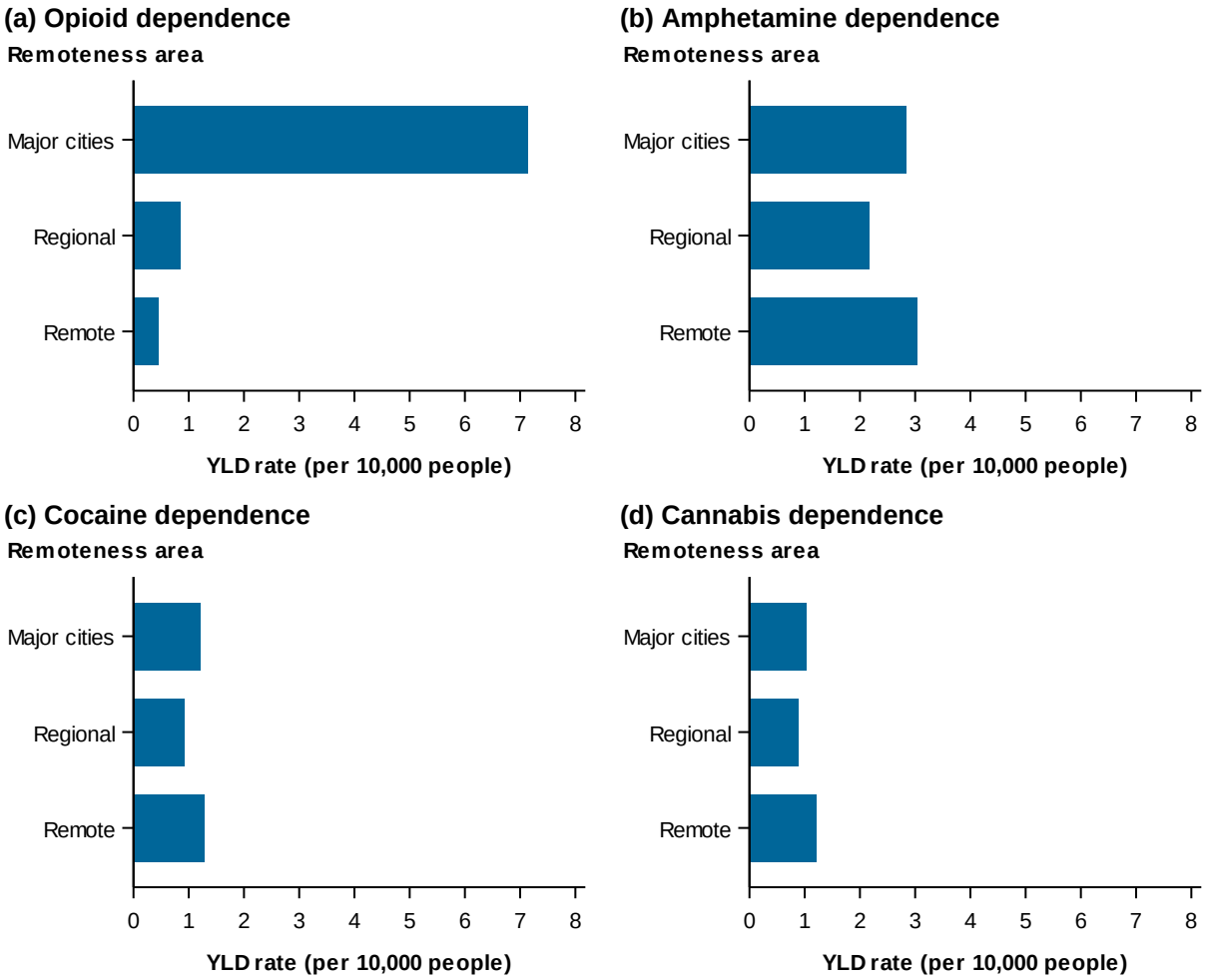
Source: AIHW analysis of burden of disease database, 2011.

Figure 10.2: Age-standardised attributable DALY rate due to illicit drug use, by drug type and remoteness, 2011

Variation in non-fatal burden by type of illicit drug dependence

This section presents age-standardised rates of non-fatal burden by type of illicit drug dependence across remoteness areas in 2011. Due to limitations in data, *Inner regional* and *Outer regional* are combined to form *Regional*, and *Remote* and *Very remote* areas combined to form *Remote* categories.

- Large variation in rates of non-fatal burden can be seen for *Opioid dependence* where *Major cities* had the highest burden (7.1 YLD per 10,000 persons), almost 8 times that in regional areas (0.9) and almost 18 times that in remote areas (0.4).
- Less regional variation was observed for *Amphetamine*, *Cocaine* and *Cannabis dependence*, although YLD rates were generally slightly higher in *Major cities* and *Remote* areas than in *Regional areas* (Figure 10.3).
- For *Other illicit drug dependence*, *Major cities* had the highest burden (3.9 YLD per 10,000 persons).



Notes

1. Rates were age-standardised to the 2001 Australian Standard Population and are expressed per 10,000 persons.
2. *Inner regional* and *Outer regional* areas are combined as 'Regional', and *Remote* and *Very remote* areas are combined as 'Remote' due to small numbers in these areas.

Source: AIHW burden of disease database 2011.

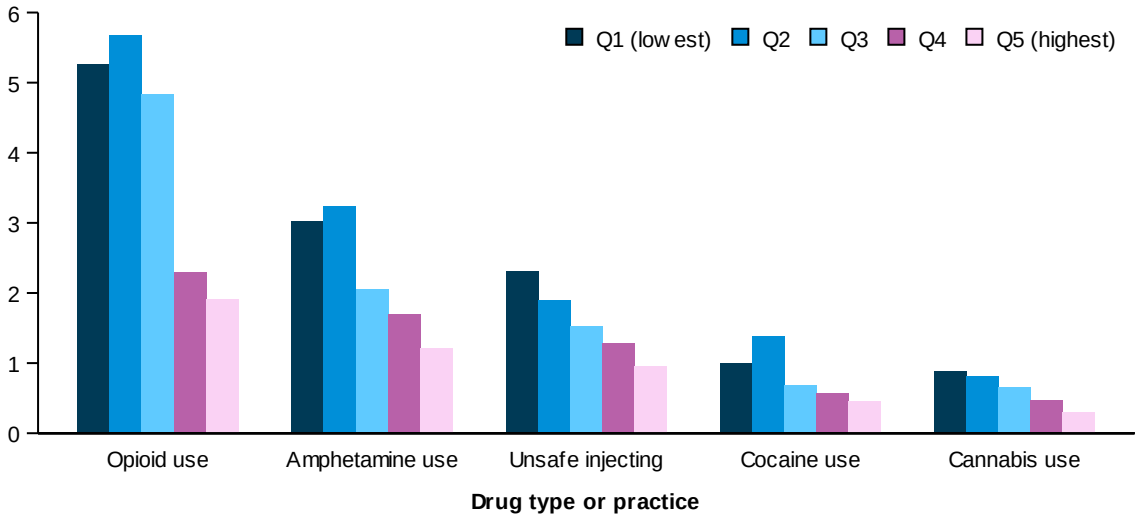
Figure 10.3: Non-fatal burden (YLD) of illicit drug dependence ASR (per 10,000 persons), by drug type and remoteness area, 2011

10.3 Burden by socioeconomic group

Variation in total burden from specific illicit drugs and practices

Figure 10.4 shows the age-standardised attributable DALY rate by illicit drug type or practice, across socioeconomic group in 2011.

- For all illicit drug types and for unsafe injecting practices, there was a general pattern of burden decreasing as socioeconomic position increased.
- The lowest socioeconomic group (Q1) experienced rates of attributable burden due to opioid use and cannabis use that were 2.8 and 2.9 times those of the highest socioeconomic group (Q5), respectively.



Note: Rates were age-standardised to the 2001 Australian Standard Population and are expressed per 1,000 persons

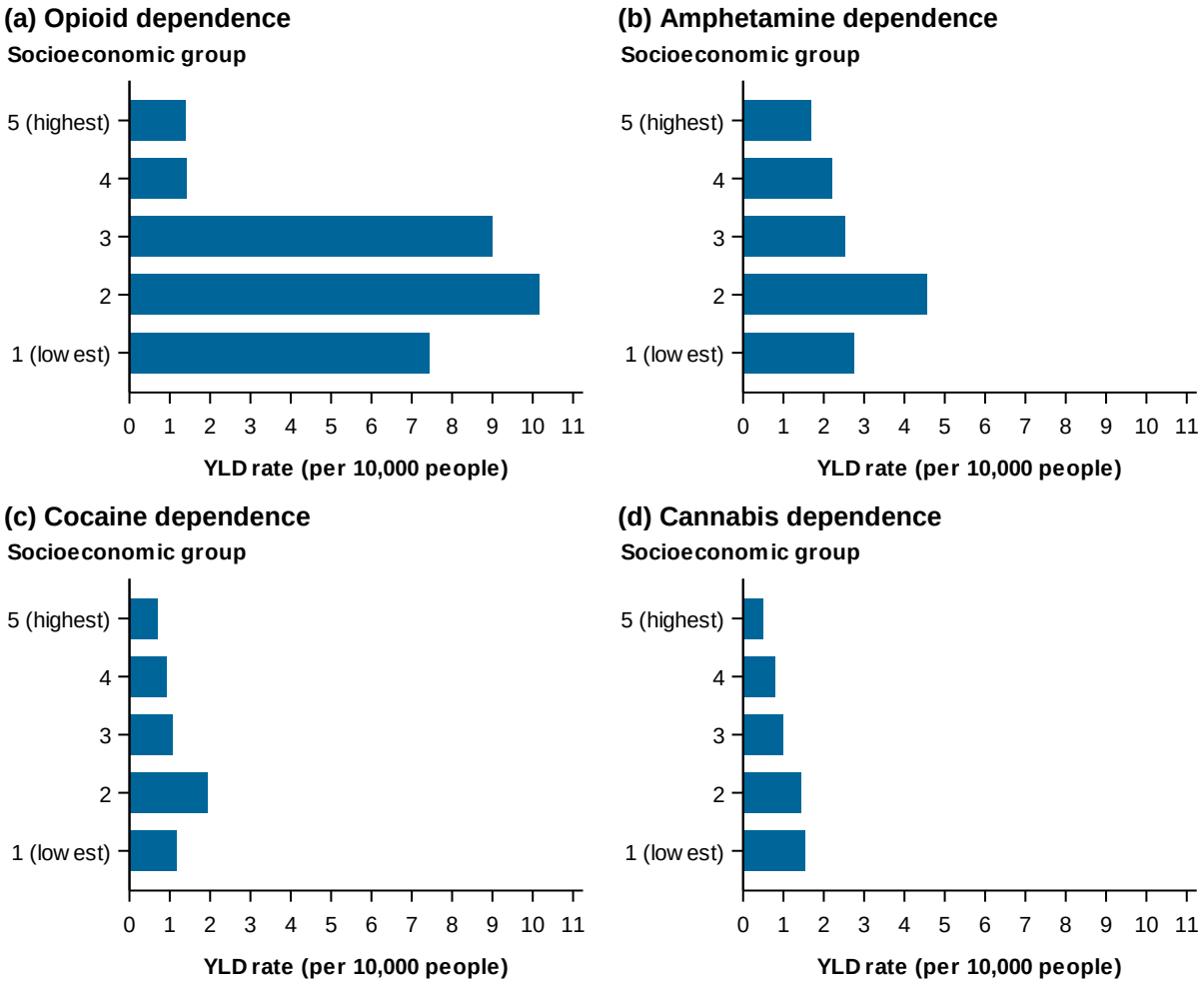
Source: AIHW analysis of burden of disease database, 2011.

Figure 10.4: Age-standardised attributable DALY rate due to illicit drug use, by drug type or practice and socioeconomic group, 2011

Variation in non-fatal burden by type of illicit drug dependence

This section presents age-standardised rates of non-fatal burden by type of illicit drug dependence by socioeconomic group in 2011.

- For all illicit drugs and practices, there was a general pattern of burden increasing as socioeconomic position increased.
- Large disparities were observed for *Opioid dependence,* where persons in the lowest 3 socioeconomic groups (Q1, Q2 and Q3) experienced rates of non-fatal burden at between 5 and 7 times the rates of persons in the highest 2 socioeconomic groups (Q4 and Q5) (Figure 10.5).



Note: Rates were age-standardised to the 2001 Australian Standard Population and are expressed per 10,000 persons.

Source: AIHW burden of disease database 2011.

Figure 10.5: Non-fatal burden (YLD) of illicit drug dependence, ASR (per 10,000 persons), by drug type and socioeconomic group, 2011

11 Specific illicit drugs and unsafe injecting practices over time

This chapter presents changes in the burden attributable to specific illicit drugs (amphetamines, cannabis, cocaine and opioids) and unsafe injecting practices between 2011 and 2003. It also compares rates of non-fatal burden due to specific drug dependencies in 2003 and 2011. Lastly, estimates of the potential attributable burden expected in 2020 and 2025 based on current trends are presented for amphetamine use, cannabis use, cocaine use and unsafe injecting practices. Potential burden estimates for opioid use are not presented as comparable data on *Opioid dependence* or opioid use were not available for the time period of interest.

11.1 Changes in burden from specific illicit drugs and practices between 2003 and 2011

Table 11.1 presents estimates of the burden (DALY) attributable to specific illicit drugs and practices between 2011 and 2003. These changes in attributable burden reflect changes in the number of persons exposed to each type of illicit drug dependence over the period, changes in the prevalence of driving under the influence of illicit drugs, as well as changes in linked disease burden.

Table 11.1: Comparison of burden (DALY) attributable to illicit drug use by drug type, 2003 and 2011

Drug type or practices	DALY count		Change in DALY (%)	% of total DALY(a)		DALY ASR		ASR rate ratio 2011:2003
	2003	2011		2003	2011	2003	2011	
Opioid use	33,999	42,093	19.2	0.8	0.9	1.7	1.9	1.1
Amphetamine use	28,877	18,119	-59	0.7	0.4	1.5	0.8	0.6
Cocaine use	8,111	8,172	0.8	0.2	0.2	0.4	0.4	0.9
Cannabis use	4,562	6,731	32.2	0.1	0.1	0.2	0.3	1.3
Other illicit drug use	6,413	8,105	20.9	0.2	0.2	0.3	0.4	1.1
Unsafe injecting practices	12,788	18,645	31.4	0.3	0.4	0.6	0.8	1.2
Total	**94,750**	**101,865**	**7.0**	**2.3**	**2.3**	**4.8**	**4.6**	**1.0**

Source: AIHW analysis of burden of disease database, 2011.

Amphetamine use

Overall burden due to amphetamine use was 59% lower in 2011 (18,119 DALY), compared with 2003 (28,877 DALY). The age-standardised attributable DALY rate was also lower (at 1.7) in 2011 than in 2003 (3.0) (a rate ratio of 0.6). This demonstrates that, after accounting for changes in the age structure of the Australian population between 2011 and 2003, the burden due amphetamine use has decreased over time (Table 11.1). However, it is reported that people are now more likely to use crystal (ice) than powder, which has a greater potential for dependence (addiction) and chronic physical and mental problems (DoH 2013).

The change in attributable burden due to amphetamine use varied by linked disease. There was a large decrease in the burden from *Road traffic injuries—motor vehicle occupants* (3,694 DALY in 2011 to 14,791 DALY in 2003) and *Road traffic injuries—motorcyclists* (1,139 DALY in 2011 to 3,408 DALY in 2003) attributable to amphetamine use between 2011 and 2003 (Table B10). A decrease in exposure to driving under the influence of drugs (as self-reported in the NDSHS) contributed to these results.

The burden due to *Accidental poisoning* linked to amphetamine use was 47% higher in 2011 (3,733 DALY) than in 2003 (1,962 DALY). The age-standardised rate of burden was also higher in 2011 (0.2 per 1,000) compared with 0.1 per 1,000 in 2003 (a rate ratio of 1.7).

Opioid use

The burden attributable to opioid use was 19% higher in 2011 (42,093 DALY) compared with 2003 (33,999 DALY) (Table 11.1). The age-standardised rate also increased from 1.9 DALY per 1,000 in 2003 to 1.7 DALY per 1,000 in 2011 (rate ratio 1.1). The change in attributable burden due to opioid use varied by linked disease.

There was an increase in the age-standardised DALY rate for *Opioid dependence* (rate ratio 1.1) and for *Accidental poisoning* (a rate ratio of 1.2) between 2003 and 2011. The age-standardised attributable DALY rate for *Suicide and self-inflicted injuries* did not change over this period (with a rate ratio of 1.0), and there was a substantial decrease in the age-standardised DALY rate for *Road traffic injuries—motor vehicle occupants* (rate ratio 0.2) and motorcyclists (a rate ratio 0.3) (Table B10).

Cocaine use

The burden due to cocaine use in 2011 and 2003 was similar, and the age-standardised DALY rate remained steady in 2011 and 2003 (0.2 per 1,000) (a rate ratio of 0.9) (Table 11.1). The age-standardised DALY rate fell slightly over this period for most diseases linked to cocaine use, including *Suicide and self-inflicted injuries*, *Accidental poisoning*, *Road traffic injuries—motor vehicle occupants* and *Road traffic injuries—motorcyclists* (Table B10).

Cannabis use

Cannabis use attributable burden was 32% higher in 2011 (6,731 DALY) than in 2003 (4,562 DALY) (Table 11.1). The age-standardised rate also increased to 0.3 DALY per 1,000 in 2011 from 0.2 DALY per 1,000 in 2003 (rate ratio 1.3). The change in attributable burden due to cannabis use varied by linked disease.

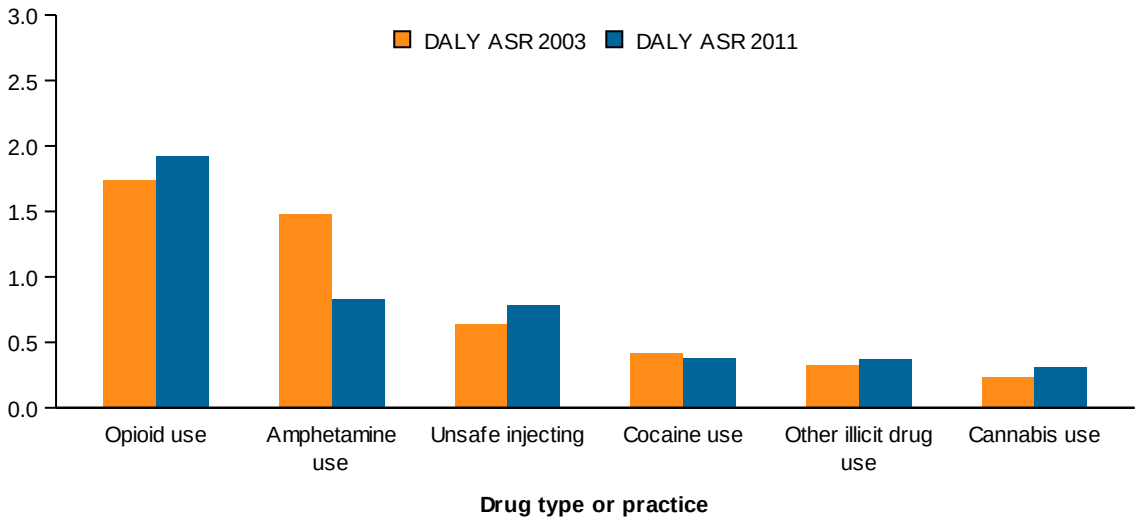
The increase in burden due to cannabis use was mostly due to an increase in *Accidental poisoning* burden due to cannabis use between 2011 and 2003. The age-standardised rate increased to 0.13 DALY per 1,000 in 2011 from 0.02 DALY per 1,000 in 2003 (rate ratio 5.7) (Table B10). This is due to a notable increase in the number of deaths with a mention of cannabis poisoning as a cause of the *Accidental poisoning* (from 5 in 2003 to 72 in 2011).

Between 2003 and 2011, the ABS practices for identifying cause of death information for coroner-certified deaths changed, from assessment of paper-based records to assessment of electronic records, including toxicology beginning around 2007 (ABS 2010a). These methodological changes resulted in significant increases in data quality in cause of death for coroner-certified deaths. It is possible that the increase in the mention of cannabis on the death certificates between 2003 and 2011 may be, in part, a result of the enhanced means of investigating causes on coroner-certified deaths.

Unsafe injecting practices

Unsafe injecting practices attributable burden was 31% higher in 2011 (18,645 DALY) than in 2003 (12,788 DALY) (Table 11.1). The age-standardised rate increased to 0.8 DALY per 1,000 in 2011 from 0.6 DALY per 1,000 in 2003 (rate ratio 1.2). The change in attributable burden due to unsafe injecting practices varied by linked disease.

There was a decrease in the age-standardised rate of burden from some of the diseases linked to unsafe injecting practices, including *Hepatitis C* (rate ratio 0.03), *Hepatitis B* (rate ratio 0.4) and *HIV/AIDS* (rate ratio 0.4) (Table B10). In contrast, there was an increase in the age-standardised attributable DALY rate for *Liver cancer* (rate ratio 2.0) and *Chronic liver disease* (rate ratio 1.3).



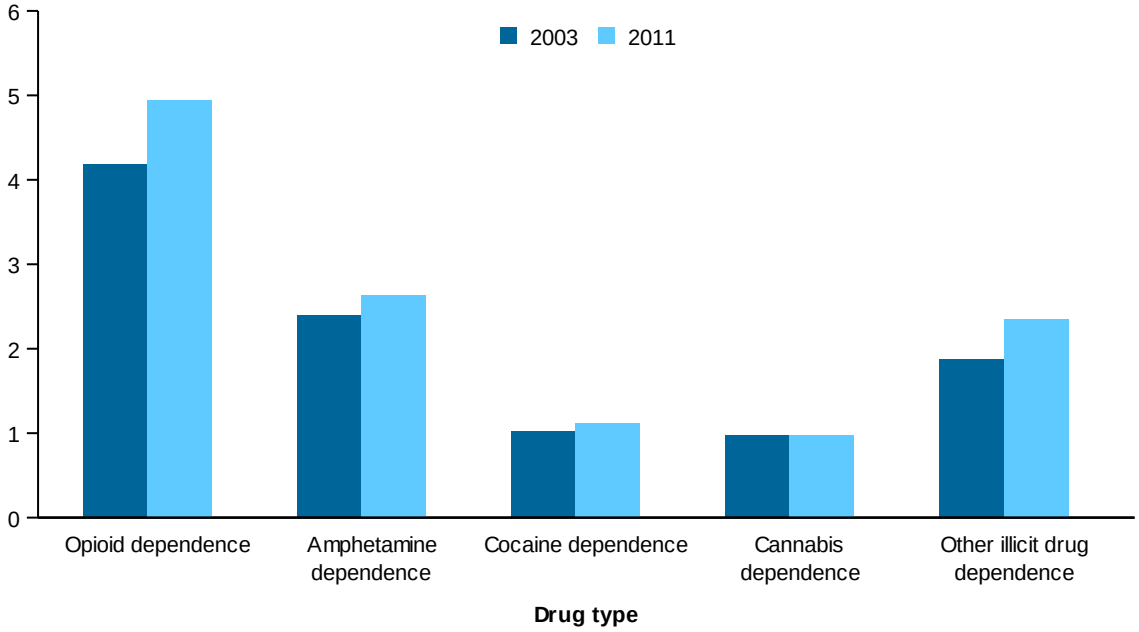
Note: ASR (Age-standardised rates) were age-standardised to the 2001 Australian Standard Population and are expressed per 1,000 persons.

Source: AIHW analysis of burden of disease database, 2011.

Figure 11.1: Age-standardised attributable DALY rate for illicit drug use, by drug type or practice, 2003 and 2011

11.2 Changes in non-fatal burden of specific drug dependencies between 2003 and 2011

Figure 11.2 and Table 11.2 present age-standardised rates of non-fatal burden (YLD) by type of drug dependence in 2011 and 2003. Age-standardised rates are expressed YLD per as 10,000 persons due to small numbers. In 2011, the age-standardised rate of non-fatal burden due to *Opioid dependence* was 18% higher (4.9 YLD per 10,000 persons) compared with 2003 (4.2). Non-fatal burden rates for *Amphetamine*, *Cocaine* and *Cannabis dependence* were similar in 2011 and 2003. The age-standardised rate for *Other illicit drug dependence* increased by 28% to 3.3 YLD per 10,000 in 2011 from 2.6 YLD per 10,000 persons in 2003.



Note: Rates were age-standardised to the 2001 Australian Standard Population and are expressed per 10,000 persons.

Source: AIHW analysis of burden of disease database, 2011.

Figure 11.2: Change in non-fatal burden (YLD) between 2003 and 2011, by type of illicit drug dependence

Table 11.2: Change in non-fatal burden (YLD) between 2003 and 2011, by type of illicit drug dependence

Type of drug dependence	2003 YLD (number)	2011 YLD (number)	Change in YLD (number)	Change in YLD (%)	2003 YLD ASR	2011 YLD ASR	Change in ASR	ASR rate ratio 2011:2003
Opioid dependence	8,185	10,884	2,699	33.0	4.2	4.9	0.8	1.2
Amphetamine dependence	4,681	5,725	1,044	22.3	2.4	2.6	0.2	1.1
Cocaine dependence	1,991	2,435	445	22.3	1.0	1.1	0.1	1.1
Cannabis dependence	1,901	2,126	225	11.8	1.0	1.0	0.0	1.0
Other illicit drug dependence	5,018	7,205	2,187	43.6	2.6	3.3	0.7	1.3
Total	**21,775**	**28,375**	**6,600**	**30.3**	**1.1**	**1.3**	**0.2**	**1.2**

Notes

1. Rates were age-standardised to the 2001 Australian Standard Population and are expressed per 10,000 persons.
2. Change in YLD is 2011 YLD minus 2003 YLD, expressed as a percentage of 2003 YLD.
3. Change in ASR is 2011 ASR minus 2003 ASR.
4. Rate ratios divide 2011 ASRs by corresponding 2003 ASRs.

Source: AIHW analysis of burden of disease database, 2011.

11.3 Potential burden from specific illicit drugs and practices in 2020 and 2025

The potential burden due to specific types of illicit drug use in 2020 and 2025 is based on trends of the last 2 decades in drug dependence or drug use (using data spanning 2001 to 2016), and trends in the proportion of the linked disease due to the risk factor when using direct evidence. The quality of data underlying these trends varies by type of exposure, data source and drug type.

The estimates of illicit drug use attributable burden in 2020 and 2025 presented below exclude the burden due to opioid use, as comparable data on opioid dependence or opioid use were not available for the period of interest. AIHW is currently undertaking a project on opioid-related harm in Australia which willl explore data on trends in opioid use which may be able to be used in future analyses of burden of disease. That report is expected to be published in late 2018.

Quantifying the association between chronic diseases and associated chronic disease burden in the future is complex. Hence, linked disease and injury burden estimates in 2020 and 2025 used in the potential burden calculations were based on the underlying assumption that prevalence rates for linked diseases from the ABDS 2011 would stay the same to the year 2020 and 2025, with increases due to population growth and ageing alone.

For more details on the methods used for these estimates, see Appendix A.

Potential burden in 2020 and 2025

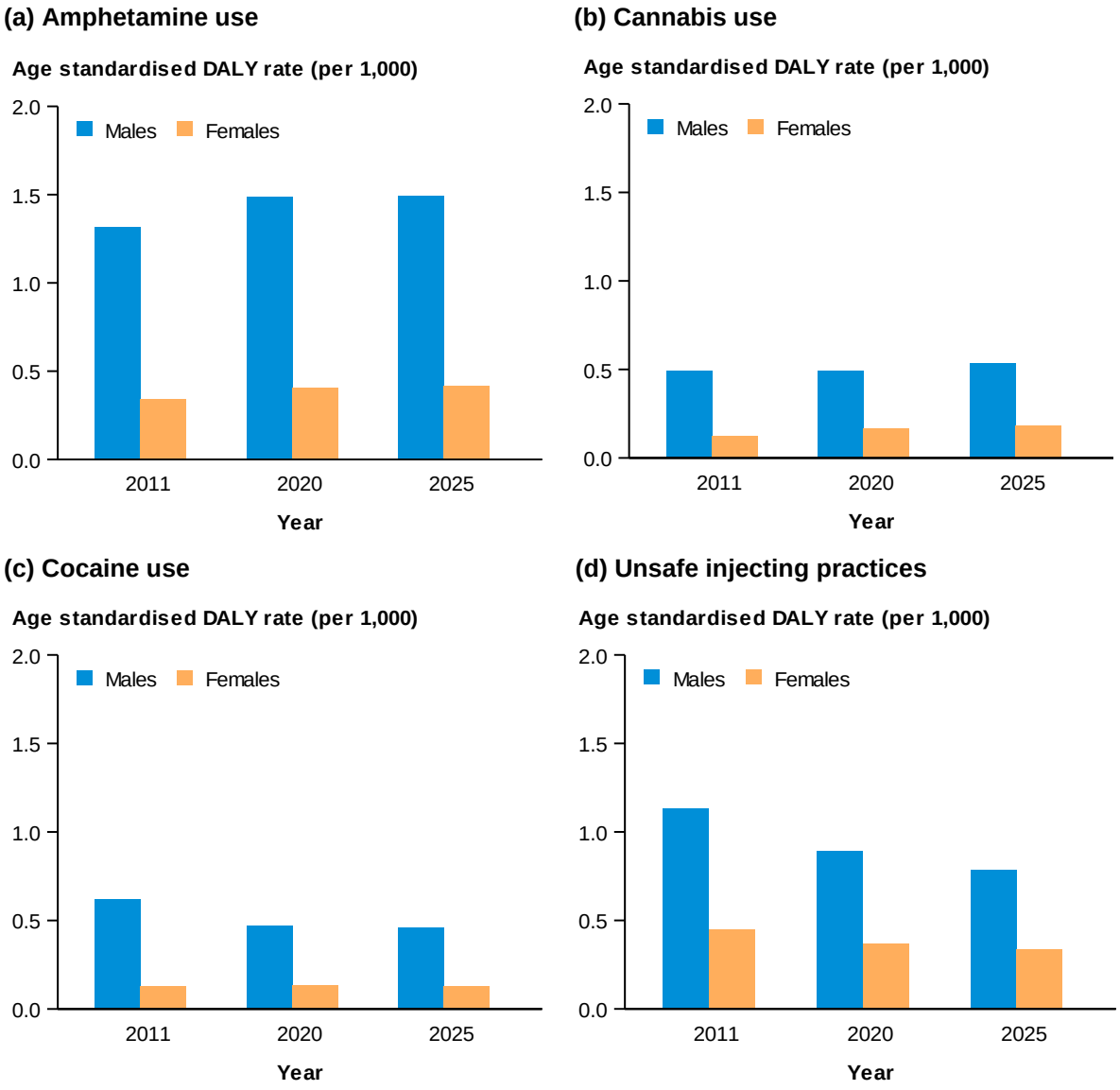
Figure 11.3 presents the potential rates of burden attributable to specific drug use in 2020 and 2025 for males and females, standardised to account for population increase and ageing. Table B11 provides estimates and rates for males, females and persons.

The rate of burden attributable to amphetamine use is expected to increase by 14% between 2011 and 2020 (rate ratio of 1.1) and by a further 1% in 2025. This is likely to be driven by expected increasing upward trends in the burden of *Suicide and self-inflicted injuries*, *Amphetamine dependence* and *Accidental poisoning* due to amphetamine use; and expected slowing of the decline in the burden of *Road traffic injuries—motor vehicle occupants* due to amphetamine use between 2011 and 2020 (rate ratio 0.8) compared with 2003 and 2011 (rate ratio of 0.6).

Rates of burden attributable to cannabis use are projected to remain steady in males between 2011, 2020 and 2025 at 0.5 DALY per 1,000. In females the rate of cannabis use burden is projected to increase by 36% between 2011 and 2020 (rate ratio 1.4) and by a further 9% in 2025 (rate ratio 1.5).

The rate of burden attributable to cocaine use is projected to decrease by 24% for males between 2011 and 2020 (rate ratio 0.8), and this decrease is expected to continue to 2025 (rate ratio 0.8). The burden attributable to cocaine use in females is projected to remain steady from 2011 to 2020 and 2025 (rate ratios of 1.0).

The rate of burden attributable to unsafe injecting practices is projected to decrease by 21% for males (rate ratio 0.8) and 17% for females (rate ratio 0.8) between 2011 and 2020 and by a further 12% in males and 10% in females by 2025 (rate ratios of 0.7 and 0.8, respectively).



Note: Rates were age-standardised to the 2001 Australian Standard Population and are expressed per 1,000 persons.

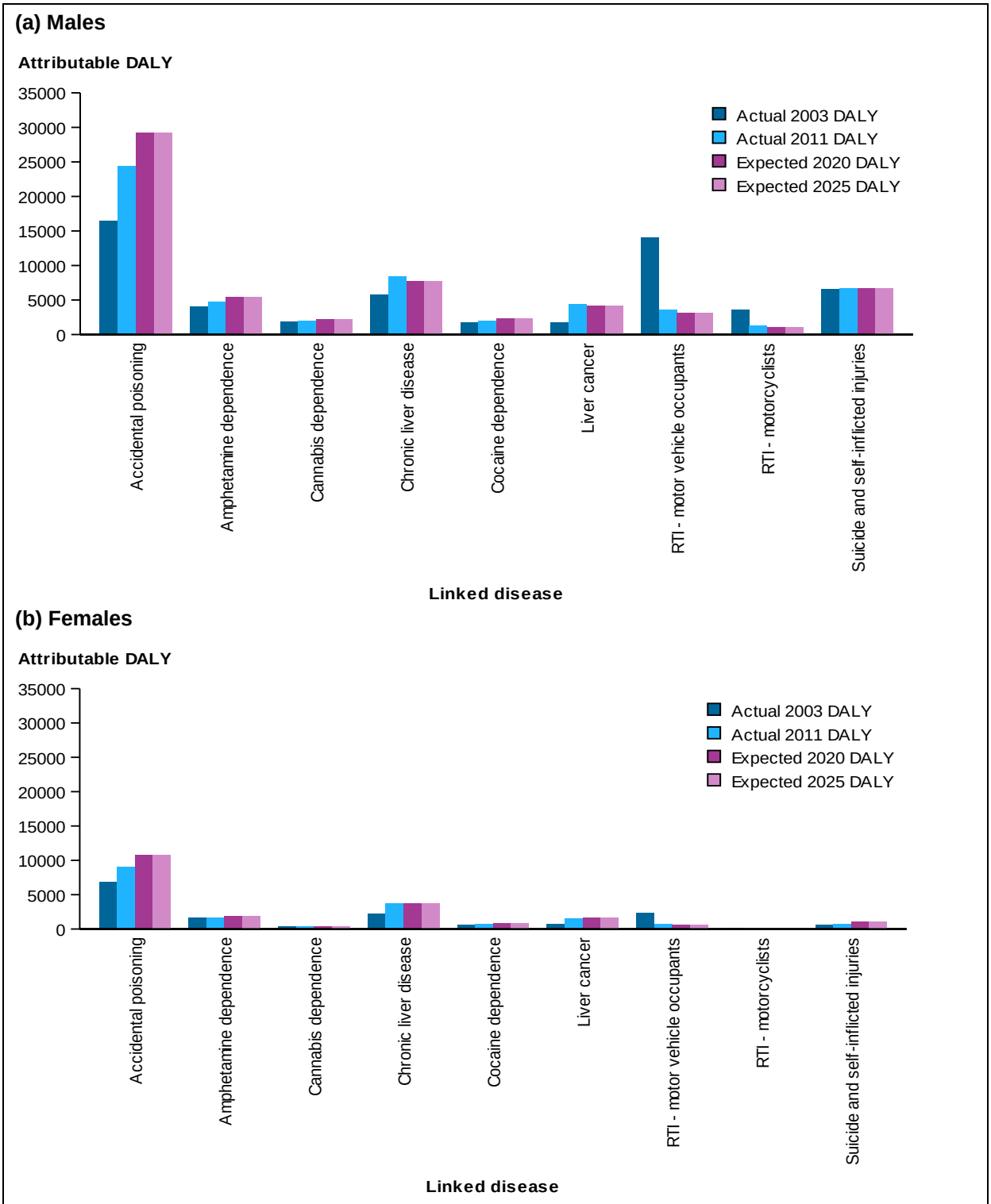
Source: AIHW analysis of burden of disease database, 2011.

Figure 11.3: Actual 2011 age-standardised attributable DALY rate due to specific illicit drug use (per 1,000 persons), and expected rate in 2020 and 2025, by drug type and sex

Figure 11.4 presents estimates of the potential burden attributable to total illicit drug use in 2020 and 2025 by linked disease for males and females. For most linked diseases, rates of burden due to illicit drug use are expected to be lower in 2020 and 2025 than in 2011 after accounting for population increase and ageing using age-standardised rates.

For example, rates of *Liver cancer* and *Chronic liver disease* burden attributable to illicit drug use are both projected to decrease by 20% between 2011 and 2020 (rate ratios of 0.8 and 0.8) (Table B12). Attributable burden due to *Hepatitis B* (rate ratio 0.7) and *Hepatitis C* (rate ratio 0.9) are also projected to decrease between 2011 and 2020. This is due to a decreasing trend in the proportion of acute *Hepatitis B* and *C* infections due to illicit drug use.

Decreases are also expected in *Road traffic injury* burden attributed to illicit drug use by 2020, based on current trends which suggest a decline in self-reports of driving under the influence of illicit drugs as described above.



Note: RTI = Road traffic injuries.

Source: AIHW analysis of burden of disease database, 2011.

Figure 11.4 Actual burden (DALY) in 2003 and 2011 and potential burden (DALY) in 2020 and 2025, attributable to illicit drug use by linked disease, males (a) and females (b)

Appendix A: Methods

How is burden measured?

The health loss associated with alcohol and *Illicit drug dependence* and all other diseases and injuries estimated as part of the ABDS 2011, was calculated in DALY using burden of disease methodology, as the sum of the non-fatal burden and the fatal burden.

$$DALY = YLD + YLL$$

YLD measure the number of healthy years of life lost due to disease in the year. For *Alcohol* and *Illicit drug dependence*, this is calculated by estimating the amount of time in the year a person lived in ill health or with disability (including long-term effects) due to dependence, multiplied by a *disability weight* indicating the severity of the health loss experienced for that drug. Total YLD are influenced by the number of persons with dependence on each drug (prevalent cases); the time spent in ill health or disability; and the disability weights defined for each drug type. The disability weights used in this study are drawn from the Global Burden of Disease Study (GBD) 2013 and represent the health loss (and not the social or other costs) caused by the consequences of each disease.

YLL measure the years lost between the age at which a person dies and an *ideal life span*. In this study, the ideal remaining expectancy varies at each age, but starts as a life expectancy at birth of 86.0 years for both men and women (see Table A8 for the full standard life expectancy table). This ideal life span is drawn from the GBD 2010 and is based on the lowest observed death rates at each age group from multiple countries (Murray et al. 2012). Total YLL are influenced by both the total number of deaths, and the ages at which those deaths occur.

Constructed in this way, the DALY is a summary measure of the overall population health for the year being reported, enabling diseases, population groups and points in time to be compared.

How is attributable burden measured?

Burden attributable to alcohol and illicit drug use was estimated using the comparative risk assessment methodology—a standard approach used in burden of disease risk factor analysis globally (Murray et al. 2003; Forouzanfar et al. 2016). This involves:

- selecting risk-outcome pairs (linked diseases) and effect size (relative risks)
- determining exposure to alcohol and illicit drug use in the population
- defining the theoretical minimum risk exposure distribution (TMRED)
- calculating the population attributable fraction
- quantifying the disease burden due to alcohol and illicit drug use.

Where a population attributable fraction can be estimated directly available from a comprehensive national data source (such as a registry), this is used directly in preference to comparing the exposure of the population to a TMRED.

Diseases which were identified as having a causal association with alcohol or illicit drug use are referred to as ‘linked diseases’. Diseases were only included in the analysis if it was considered there was ‘convincing’ or ‘probable’ level of evidence supporting a causal association, on review of the literature at the time of the study, according to criteria set by the World Cancer Research Fund (WCRF/AICR 2007).

Alcohol and illicit drug use have been associated with a range of other conditions that were not included in this study because they did not meet the level of evidence criteria for causal association used in this study. Box A1 provides further information on why certain conditions were excluded from this report.

Box A1: Key developments since the Australian Burden of Disease Study 2011

In this report, a number of methodological developments have occurred since the ABDS 2011 was published. The updated methods used in this report and the impact on the final results are summarised here.

1. Key developments for measuring the attributable burden of alcohol use

- Relative risks for all diseases linked to alcohol use (excluding *Injury*) have been updated to those based on the latest evidence, published in GBD 2015 (GBD 2015 Risk Factors Collaborators 2016). These are based on finer groupings of alcohol consumption (now measured per 10 grams of alcohol) than in ABDS 2011. The relative risks identified in GBD 2015 were generally lower than those used in ABDS 2011 and therefore reduced the overall attributable burden due to alcohol use compared with ABDS 2011.
- Compared with ABDS 2011, diseases linked to alcohol use have been extended to include *Hypertensive heart disease*. This change increased the attributable burden due to alcohol use by 676 DALY, when compared with those published in ABDS 2011.
- *Influenza*, which was included as a linked disease in ABDS 2011 has been excluded in this study due to insufficient evidence of a causation/association with alcohol use. This change reduced the attributable burden due to alcohol use by 141 DALY.
- The TMRED of average daily alcohol consumption was reduced to 10 g of alcohol consumed per day, from 20 g of alcohol per day, for diseases linked to alcohol use.
- The *Chronic liver disease* burden and *Liver cancer* burden attributable to alcohol use was estimated to be higher than in ABDS 2011, due to updated inputs from GBD 2016. The attributable burden increased by 1,909 DALY and 4,893 DALY, respectively, when compared with those published in ABDS 2011.
- The *Accidental poisoning* burden attributable to alcohol use was estimated using direct evidence based on Australian data, rather than indirect methods. This change increased the attributable burden due to alcohol use by 8,842 DALY when compared with those published in ABDS 2011.
- The injury burden (excluding *Accidental poisoning*) attributable to alcohol use has been estimated from relative risks based on an AIHW review of the literature. The methods used are the same as those used in ABDS 2011 for all injuries (except *Suicide and self-inflicted injuries*, see below).
- Relative risks for *Suicide and self-inflicted injuries* have been revised to be linked to exposure to alcohol dependency and are based on the latest evidence as determined by AIHW (Ferrari et al. 2014).

The overall impact of these revised inputs resulted in a reduction of 19,889 attributable DALY, compared with those published in ABDS 2011. The revised analysis shows that alcohol use was responsible for 4.6% of the total disease burden in Australia in 2011. This was 0.5 percentage points lower than that reported in the ABDS 2011 (5.1%). The difference between the original and revised estimates was largely due to the revised relative risk for alcohol use and updated linked diseases, based on the latest available evidence and on updates made in GBD 2015.

(Continued)

Box A1 (continued): Key developments since the Australian Burden of Disease Study 2011

2. Key developments for measuring the attributable burden of illicit drug use

- Exposure of illicit drug use has been expanded to include driving under the influence of illicit drugs. This expanded the number of causally-related diseases to include *Road traffic injuries—motorcyclists* and *Road traffic injuries—motor vehicle occupants*. This change increased the burden attributable to illicit drug use by 5,740 DALY when compared with those published in ABDS 2011.
- Diseases linked to illicit drug use were extended to include *Accidental poisoning*, *Depressive disorders, Schizophrenia* and *Anxiety disorders*. This change increased the attributable burden due to illicit drug use by 34,661 DALY, when compared with those published in ABDS 2011, mostly due to the addition of *Accidental poisoning*.
- Relative risks for *Suicide and self-inflicted injuries* linked to specific drug dependencies have been updated to those based on the latest evidence as determined by AIHW (described below).
- The method used to estimate the proportion of *Liver cancer* and *Chronic liver disease* attributable to illicit drug use was revised to be based on Australian data and this change decreased the attributable burden in these revised estimates by 21,753 DALY, when compared with those published in ABDS 2011.

The overall impact of these revised inputs resulted in an increase of 22,922 attributable DALY from the burden attributable to illicit drug use published in ABDS 2011.

Diseases with a strong causal association with alcohol and illicit drug use (termed 'linked diseases'), were included in the study following review of the literature. The burden of diseases attributable to alcohol or illicit drug use was estimated using direct evidence or through a comparative risk assessment approach.

For the comparative risk assessment, the quantified associated risk for each linked disease to the risk factor—known as 'relative risks'—were also selected in this process. The degree of additional risk was combined with categorical alcohol and illicit drug use prevalence data to determine the proportion of each disease burden due to alcohol and illicit drug use.

For some linked diseases, the proportion of disease burden due to alcohol and illicit drug use was estimated directly from high-quality data sources such as registry data.

For all linked diseases, the proportions estimated were combined with disease burden estimates from the ABDS 2011 to quantify the disease burden due to alcohol and illicit drug use in the population.

Selection of linked diseases

Linked diseases were included in the analysis if there was an association with alcohol and illicit drug use based on high quality epidemiological studies—preferably from a meta-analysis or prospective studies—considered to be at a 'convincing' or 'probable' level, based on the World Cancer Research Fund criteria to judge the level of association.

Each potential linked disease was categorised based on the robustness and volume of studies demonstrating a relationship. 'Convincing' evidence describes a causal relationship that is 'robust enough to be highly unlikely to be modified in the foreseeable future as new evidence accumulates' (WCRF/AICR 2007). 'Probable' evidence suggests that a causal

relationship is often described and that this is unlikely to change with increased knowledge. The main reason for classification as 'probable' evidence was that a meta-analysis had not been conducted, or only a few high-quality studies were available from which to select. An 'insufficient' level of evidence was where there were inconsistent findings from studies, or where reverse causality presented an issue.

To be included in this analysis, the linked disease also had to have had burden estimated in, or could be estimated appropriately from, the ABDS 2011.

Each relative risk was applied to both or either fatal and non-fatal burden, based on the evidence from the literature.

Linked diseases and exposure to alcohol use

In this revised analysis, 26 diseases were linked to alcohol use (Table A1), which includes hypertensive heart disease which was not in the ABDS 2011 but has since been added in the GBD 2015 study (GBD 2015 Risk Factors Collaborators 2016). The relative risks for all linked diseases were sourced from the GBD 2015 study, as well as the AIHW review of the literature and are detailed in Table A5. Some relative risks from GBD 2015 were excluded because they were protective; as described in more detail in Box A2.

In this study, *Influenza* as a linked disease has been excluded, due to insufficient evidence of causation. For injuries linked to alcohol use, the method has not changed since ABDS 2011; the size of the association (relative risks) were from Taylor and colleagues (2010), and included other transport injuries and other unintentional injuries.

Fetal alcohol syndrome was not included as a disease linked to alcohol use in this study; it was not estimated separately in the ABDS 2011, due to a lack of comprehensive national data to estimate the prevalence in Australia.

The calculation of burden attributable to alcohol use includes exposure to being a former drinker; the average daily alcohol consumption by current drinkers and the prevalence of alcohol dependence (Table A1). The burden attributable to each of these measures of exposure are added together to estimate the total burden attributable to alcohol use. Cohort studies have found that many former drinkers stopped drinking because of the impacts of alcohol on their health, and it has been identified that they are still at risk of a large number of health outcomes—however the relative level of risk is lower than that for current drinkers (Samokhvalov et al. 2015).

For some diseases linked to alcohol use, exposure was not measured. Instead, direct evidence was obtained from the data source for the linked disease or outcome, such as for *Accidental poisoning*, *Chronic liver disease* and *Liver cancer*. The proportion of deaths from *Accidental poisoning* due to alcohol use was obtained from the National Mortality Database, as described in more detail below.

Table A1: Disease and injury linked to different exposures to alcohol use

Risk factor	Drug used	Exposure estimated	Linked disease or injury	TMRED
Alcohol use	Alcohol	Former drinkers	Atrial fibrillation and flutter, Bowel cancer, Breast cancer, Coronary heart disease, Diabetes, Epilepsy, Laryngeal cancer, Lower respiratory infections, Mouth and pharyngeal cancer, Oesophageal cancer, Pancreatitis, Stroke	Never consumed alcohol
		Average daily alcohol consumption by current drinkers	Atrial fibrillation and flutter, Bowel cancer, Breast cancer, Coronary heart disease, Diabetes, Epilepsy, Hypertensive heart disease, Laryngeal cancer, Lower respiratory infections, Mouth and pharyngeal cancer, Oesophageal cancer, Pancreatitis, Stroke, Drowning, Falls, Fire, burns and scalds, Homicide and violence, Road traffic injuries—motor vehicle occupants, Road traffic injuries—motorcyclists, Other unintentional injuries, Other land transport injuries, Other road traffic injuries	10 g of alcohol/day
		Alcohol dependence	Suicide and self-inflicted injuries	No alcohol dependence
		. . [(a)]	Alcohol dependence, Accidental poisoning, Liver cancer and Chronic liver disease.	. . [(a)]

(a) No exposure was measured and no theoretical minimum risk definition required as the proportion due to the risk factor was estimated from direct evidence.

Box A2: Protective effect of alcohol for coronary heart disease and diabetes

This study largely adopted relative risks from the GBD 2015 study. For coronary heart disease and diabetes, the relative risks for some measures of exposure to alcohol use equalled 1, indicating the exposure was associated with no risk, or less than 1, indicating the exposure was associated with a reduction in risk of linked diseases. For coronary heart disease, this results in a negative burden in males and a small positive burden for females due to alcohol use. For diabetes, this results in a negative burden for both males and females.

For this study, negative attributable burden was not reported, as the focus is the harmful effects of alcohol use; however, the protective effects for some measures of exposure to alcohol use are acknowledged. By excluding these relative risks for alcohol use, the method aligns with other risk factors, as no other risk factors include protective effects.
(For example, the burden of high physical activity on injuries is not included for the risk factor 'physical inactivity').

Linked diseases and exposure to illicit drug use

In total, 13 diseases and injuries were linked to illicit drug use (Table A2). Of these *Road traffic injuries—motorcyclists*, *Road traffic injuries—motor vehicle occupants*, *Depressive disorders*, *Schizophrenia* and *Anxiety disorders* were not previously included in the ABDS 2011 and are not included in GBD 2015. Relative risks for these additional diseases were sourced directly from selected studies. *Accidental poisoning* was included in GBD 2015 but not ABDS 2011 and has been included in these revised estimates.

The exposures to illicit drug use that were found in the literature to cause health loss from different linked disease were *Illicit drug dependence* (which includes C*annabis, Amphetamine, Cocaine, Opioid and Other illicit drug dependence)* and driving under the influence of illicit drugs (Table A2). Exposure to different specific drugs and practices are associated with different linked diseases (Table A2). The burden attributable to these measures is added together to estimate the total burden from illicit drug use and the burden due to specific drugs and practices.

For some diseases linked to illicit drug use, the PAF was measured from direct evidence and no exposure was estimated (Table A2). For example, a registry of all cases of *Hepatitis C* was available. From this data source, the proportion of the outcome that resulted from exposure to drug use was used to calculate the population attributable fraction.

Table A2: Disease and injury linked to illicit drug use

Risk factor	Drug used or practice	Exposure estimated	Linked disease or injury	TMRED
Illicit drug use	Cannabis use	Cannabis dependence	Depressive disorders, Schizophrenia and Anxiety disorders.	No cannabis dependence
		Driving under the influence of cannabis	Road traffic injuries—motorcyclists and Road traffic injuries—motor vehicle occupants.	No driving under the influence of cannabis
		. . [(a)]	Accidentals poisoning and Cannabis dependence.	. . [(a)]
	Amphetamine, cocaine and opioid use	Amphetamine, cocaine and opioid or dependence	Suicide and self-inflicted injuries	No amphetamine, cocaine or opioid dependence
		Driving under the influence of amphetamine, cocaine or opioids	Road traffic injuries—motorcyclists and Road traffic injuries—motor vehicle occupants.	No driving under the influence of amphetamine, cocaine or opioids
		. . [(a)]	Amphetamine dependence, Cocaine dependence, Opioid dependence and Accidental poisoning.	. . [(a)]
	Other illicit drug use	Other illicit drug dependence	Other illicit drug dependence	. . [(a)]
	Unsafe injecting practices	. . [(a)]	Hepatitis B, Hepatitis C, HIV/AIDS, Chronic liver disease, Liver cancer	. . [(a)]

(a) No exposure was measured and no theoretical minimum risk definition required as the proportion due to the risk factor was estimated from direct evidence.

Linked diseases and associated risk factors not included in analysis

There are several conditions associated with alcohol and illicit drug use that were not included in this report due, to either not meeting the study's selection criteria, or because the attributable burden could not be quantified as they were not explicitly estimated as a disease in ABDS 2011. It is important to note that exclusion of these conditions does not disregard the current evidence, and does not indicate that alcohol and illicit drug use does not play a role in development of some of these conditions. For some conditions, it indicates further evidence is required to describe the causal association.

Fetal alcohol syndrome and neonatal outcomes of maternal drug use are conditions which were excluded as they were not explicitly estimated as diseases in the ABDS 2011. As such, it was not possible to calculate the burden of these conditions due to alcohol and illicit drug

use. Other conditions which were excluded because of insufficient evidence include *Maternal haemorrhage*; *Birth trauma and asphyxia*: and *Pre-term birth and Low birth weight complications*.

Theoretical minimum risk exposure distribution

The estimated contribution of a risk factor to disease burden is calculated by comparing the observed risk factor distribution to an alternative, hypothetical distribution (the counterfactual scenario). This scenario could be an increase or decrease in levels of exposure or changes in behaviour compared with what is currently observed in the population. In the ABDS 2011, as in previous burden of disease studies, a 'theoretical-minimum-risk exposure distribution' (TMRED) scenario was adopted. This involves determining the exposure distribution that will lead to the lowest conceivable disease burden.

The TMRED for alcohol and illicit drug uses are described in tables A1 and A2.

Calculation of population attributable fractions using direct evidence

Direct population attributable fractions (PAF)—which demonstrate the proportion of disease due to the risk factor—were estimated for some linked diseases, by age group, sex and population group. For alcohol use, direct PAFs were calculated for *Chronic liver disease*, *Liver cancer*, *Accidental poisoning* and *Alcohol dependence*. For illicit drug use direct PAF were calculated for *Hepatitis B*, *Hepatitis C*, *HIV/AIDS*, *Chronic liver disease*, *Liver cancer*, *Accidental poisoning* and *Illicit drug dependence*.

Alcohol use

In the GBD study, the linked diseases '*Chronic liver disease* due to alcohol' and '*Liver cancer* due to alcohol' were entirely attributed to alcohol use, and no relative risks were published to use in the comparative risk assessment approach. In the ABDS 2011, diseases of *Chronic liver disease* and *Liver cancer* were not broken down to this level. The PAF for *Chronic liver disease* was estimated from the proportion represented by *Chronic liver disease* due to alcohol of all *Chronic liver disease* burden, as estimated for Australia by GBD 2010 (AIHW 2016). The same method was used to estimate the PAF for *Liver cancer*. The burden of *Alcohol dependence* was fully attributed to alcohol use.

Direct evidence was used to derive the PAF for *Accidental poisoning* linked to alcohol use, using the National Mortality Database. Collectively, 1,181 deaths were due to *Accidental poisoning* (Table A3). Of these, 978 had at least one mention of the involvement of a specific drug (opioids, alcohol, amphetamine, cannabis and cocaine), noting that in a single death more than one drug type could be involved. The PAF was calculated as a three-step process. First, the proportion of the number of deaths with a mention of alcohol use of all mentions of specific drugs was calculated. Secondly, this proportion was applied to the number of deaths due to *Accidental poisoning* from any specific drugs to calculate an adjusted number of deaths from specific substances. Finally, the PAF was estimated as the number of adjusted deaths from specific drug divided by the total number of deaths from specific drugs.

Table A3: Number of deaths due alcohol, illicit drug use and other substances, 2011

Cause	Number of deaths	Step 1: Per cent of mentions of specific drugs	Step 2: Number of deaths from specific drugs adjusted by the proportion of mentions	Step 3: PAF calculated
Deaths from specific drugs[a, b]	978	. .	. .	. .
Opioids	*691*	62.5	611	51.7
Alcohol	*231*	20.9	204	17.3
Amphetamine	*97*	8.8	86	7.3
Cannabis	*72*	6.5	64	5.4
Cocaine	*15*	1.4	13	1.1
Deaths from other substances	203	. .	. .	. .
Deaths from accidental poisoning	**1,181**	**. .**	**. .**	**. .**

(a) The following ICD-10 codes were used for deaths from accidental poisoning, extracted from the NMD:

Cannabis: X42 and X44 with T40.7 for accidental deaths due to poisoning cross-classified with cannabis poisoning.

Cocaine: X42 and X44 with T40.5 for accidental deaths due to poisoning cross-classified with cocaine poisoning.

Amphetamine: X41 with T43.6 for accidental deaths due to poisoning cross-classified with amphetamine poisoning.

Opioids: X42 and X44 with T40.0–T40.4, T40.6 for accidental deaths due to poisoning cross-classified with opioids poisoning.

Alcohol: X45 with T51.0–T51.9 for accidental deaths due to poisoning cross-classified with alcohol poisoning.

(b) A person may have been counted to more than one drug type. For example, a person may have died from accidental poisoning from alcohol and opioids intake.

Note: The number of deaths were adjusted for redistribution.

Source: AIHW analysis of burden of disease database, 2011, AIHW National Mortality Database.

Unsafe injecting practices

PAFs for the linked diseases for unsafe injecting practices (*HIV/AIDS*, *Hepatitis B and Hepatitis C*, liver disease and *Liver cancer*) were calculated from the National Notifiable Diseases Surveillance System published in the annual surveillance reports by the Kirby Institute (Kirby Institute 2012 and 2013).

HIV/AIDS

For *HIV/AIDS*, direct PAFs were calculated from the proportion of diagnosed AIDS cases in 2011 with an exposure category of unsafe injecting practices with or without homosexual contact.

Acute hepatitis B and C

For acute *Hepatitis B and Hepatitis C* the direct PAFs were calculated from the proportion of newly acquired *Hepatitis B* or Hepatitis *C* infections in 2011 with an exposure of unsafe injecting practices with or without homosexual contact.

Chronic liver disease and liver cancer

In the ABDS 2011, the PAFs for *Chronic liver disease* and *Liver cancer* due to illicit drug use were derived from the proportion of newly acquired Hepatitis B and Hepatitis C infections with an exposure of unsafe injecting practices, from the earliest available data (AIHW 2016a) to account for the time lag between acquiring and infection and development of the chronic condition. For *Hepatitis C*, exposure data from the year 2000–2001 were used to indicate the

chronic disease outcomes for the year 2011. For *Hepatitis B,* exposure data were from the year 1997.

These were multiplied by the proportion of *Chronic liver disease* or *Liver cancer* due to *Hepatitis B* and *Hepatitis C*, estimated from GBD 2010 which were based on international meta-analyses.

When compared with recent Australian studies, the proportion of *Chronic liver disease* or *Liver cancer* due to hepatitis B and C was overestimated for Australia when based on GBD 2010. A recent Australian study that investigated the proportion of various cancers due to a number of infectious agents estimated that 19% of *Liver cancer* in 2010 was due to hepatitis C infection and 16% due to hepatitis B infection (Antonsson et al. 2015). Additionally, a New South Wales study linking notifiable infections and cancer registry data, reported that 16% of *Liver cancer* between 1990 and 2002 was due to hepatitis B infection and 13% due to hepatitis C infection (Amin et al. 2007). As these estimates are not disaggregated by the method of acquiring infection, the proportion of *Liver cancer* solely due to unsafe injecting practices would be less than the estimates reported in the respective studies.

Revised estimates were based on modelled prevalence data of chronic outcomes of hepatitis B and hepatitis C, as well as newly acquired hepatitis C infections due to unsafe injecting practices data from the Kirby Institute (Kirby Institute 2012 and 2013). Disease prevalence of total *Chronic liver disease* and *Liver cancer* from the ABDS 2011 was also used to estimate the proportion of *Liver cancer* and *Chronic liver disease* due to *Hepatitis B* acquired through unsafe injecting practices.

Chronic hepatitis C infection

The rate of decompensated cirrhosis (*Chronic liver disease*), hepatocellular carcinoma (*Liver cancer*) and liver transplants due to *Hepatitis C* for 2006–2015 is published in the 2016 annual surveillance reports by the Kirby Institute. This was multiplied by the earliest exposure data estimates to determine the proportion of hepatitis C related morbidity due to unsafe injecting practices.

The proportion of *Chronic liver disease* and *Liver cancer* due to unsafe injecting practices was then estimated by quantifying the rate of hepatitis C-related morbidity from the total prevalence for *Liver cancer* and *Chronic liver disease* in 2011, as estimated in the ABDS 2011.

Chronic hepatitis B infection

The Kirby Institute reported that 5.7% of persons living with chronic hepatitis B in 2015 was due to unsafe injecting practices. This is similar to Australian estimates reported by other published studies for the years 2011 (5.7%) and the year 2000 (4.7%) (MacLachlan et al. 2013; O'Sullivan 2004).

The proportion of these chronic outcomes being *Chronic liver disease* or *Liver cancer* was then estimated, using total disease prevalence data from the ABDS 2011.

Accidental poisoning

The direct PAF for *Accidental poisoning* linked to specific alcohol and illicit drugs and practices was estimated from the National Mortality Database. This was estimated by the number of deaths due to *Accidental poisoning* due to specific drugs and practices compared with the total number of *Accidental poisoning* deaths in the National Mortality Database for the years 2011 and 2003. As described above for alcohol use. The PAF were also applied to non-fatal burden due to *Accidental poisoning*.

Estimates of accidental poisoning

In the ABDS 2011, *Accidental poisoning* was captured as a specific injury within the injuries disease group. It included poisoning by accidental overdose and deaths due to the use of alcohol, drugs other than alcohol (such as opioids, amphetamine, cocaine, cannabis and other illicit drugs) and other substances.

The burden of accidental poisoning is presented using the external cause of injury perspective in the ABDS 2011 (see Box A3).

Box A3: Perspectives of injury burden

In the ABDS 2011, two perspectives were used to report injury burden:

1. External cause: which describes the environmental events and circumstances that led to the injury—for example, road traffic injuries, suicide, self-inflected injuries, falls or poisoning (such as toxic effects of medicinal substances).
2. Nature of injury: which describes the functional characteristics or the type of injury resulting from trauma—for example, hip fracture, traumatic brain injury or poisoning (such as accidental ingestion of poisonous substances).

Each perspective has policy relevance. Understanding the circumstances (external causes) that give rise to injuries is particularly important for informing public health initiatives to target injury prevention efforts to particular events or circumstances.

The 'nature of injury' perspective offers similar advantages, such as describing the different types of injuries and trauma that are most likely to impact on the health system. This can be used to guide policy and planning for health care (for example, trauma care). It also provides a consistent approach across the ABDS that was largely reported by body system.

Further details are available in *Australian Burden of Disease Study 2011: methods and supplementary material* (AIHW 2016a).

Illicit drug dependence

All of the burden due to drug dependence (including alcohol, cannabis, amphetamine, cocaine, opioid and other illicit drug dependence) was attributable to alcohol or illicit drug use (a PAF of 1) as appropriate.

Calculation of population attributable fractions using the comparative risk assessment approach

For the PAF calculation, the population exposure to alcohol and illicit drug use were treated as categorical variables. The categories for alcohol use describe the range of total alcohol consumed per day by current drinkers, the proportion of former drinkers and the proportion that never drank alcohol.

The adjusted litres of alcohol consumed nationally were distributed among self-reported current drinkers using a 2-parameter gamma distribution. This informed the percentage of the population that consumed alcohol in the categories (1–10 g). The relative risks relevant to these categories of alcohol use were used to calculate the population attributable fractions.

For drug use, the exposure measures are categorical and include the prevalence of drug dependence and driving under the influence of illicit drugs. These were estimated for the drugs and practices: amphetamine, cocaine, cannabis and opioid use.

Alcohol and illicit drug use is associated with excess mortality and an increased risk of developing a number of chronic conditions and injuries. However, the strength of association and quality of evidence supporting the level of risk varies for each linked disease or injury. The sections below describe the relative risks used in this report.

Estimates of exposure to alcohol use

The proportions of the Australian population that are current drinkers, former drinkers or never drank alcohol were sourced from self-reported data in the National Drug Strategy Household Survey (NDSHS) 2010. However, the amount of alcohol self-reported to be consumed by current drinkers in this and other surveys is known to be an underestimate of actual consumption (Rehm et al. 2010).

To overcome this issue, alcohol sale data were used to inflate the self-reported survey estimates.

The total volume of alcohol sold in Australia was sourced from the ABS data on apparent consumption of alcohol data from the ABS (ABS 2012). These data provide an estimate of the amount of alcohol available for consumption of beer, wine, spirits, pre-mixed beverages, and cider in a given year, based on excise, import and sales figures. While these data are a better measure of the overall volume of alcohol consumed annually, they cannot be broken down by age and sex. In ABDS 2011, self-reported daily consumption from the NDSHS, by age and sex, was inflated to match alcohol sales data in each reference year, based on the methods described by Rehm and colleagues (2010) and GBD 2013 (GBD 2013 Risk Factors Collaborators 2015).

From the NDSHS, the proportion of self-reported lifetime abstainers and ex-drinkers was assumed to be correct. Among current drinkers, the mean number of standard drinks self-reported per day was converted into litres of self-reported alcohol consumption for that year. In 2010, this amounted to almost 114 million litres of alcohol (Table A4). By comparison, 182 million litres of alcohol were available for consumption in Australia in the financial year 2010–11 (ABS 2012).

Table A4: Self-reported annual alcohol consumption compared with national alcohol sales figures

Year	Self-reported alcohol consumption (litres)	Alcohol sales (litres)	Alcohol assumed consumed (80% of sales) (litres)	Adjustment factor
2003	97,595,127	163,620,000	130,896,000	1.34
2011	113,987,831	184,907,000	147,925,600	1.30

Source: NDSHS 2004 & 2010; AIHW analysis of ABS data.

Following methods used in GBD 2010, 80% of the alcohol available nationally was assumed to have been consumed (that is, almost 148 million litres) (Lim et al. 2012). Only a proportion (80%) of alcohol sold in Australia was used, because these figures include alcohol discarded due to changes in stocks, alcohol consumed by overseas travellers, alcohol that has been stored or cellared, and alcohol that has been used to prepare food or discarded as waste.

The same approach was used to inflate the 2003 self-reported alcohol data. Self-reported alcohol consumption was inflated by more than 30% in both reference years to account for under-reporting.

The adjusted litres of alcohol consumed nationally were distributed among self-reported current drinkers using a 2-parameter gamma distribution, which has been found to be the best model to shift the distribution of survey data to fit sales data (Rehm et al. 2010). While this approach brings self-reported alcohol consumption in line with known alcohol sales, a limitation is that it assumes the degree of under-reporting of alcohol consumption is uniform across all age and sex groups.

This distribution was used to estimate the proportion of the population that consumed alcohol in categories relevant to the relative risks.

Estimates of exposure to illicit drug use in Australia

There are 2 types of exposure to drug use estimated for the risk factor illicit drug use: drug dependence and driving under the influence of illicit drugs. Estimates of the exposure to drug dependence are sourced from prevalence estimates from the ABDS 2011 of non-fatal burden due to drug dependence. Exposure to drug dependence—not drug use—was used in this study as described in Box A4.

Exposure to driving under the influence of illicit drugs was estimated from the NDSHS—specifically, the proportion of the population that responded yes to the question: 'In the last 12 months did you undertake the activity—drove a motor vehicle—while under the influence of or affected by illicit drugs?'. However, these data do not provide details on the type of drug used while driving.

The type of drug used while driving was sourced by the relative prevalence of the use of different drugs self-reported in the NDSHS. This data source was used as a source of drug type in preference to roadside drug testing, as it included the full range of illicit drugs associated with driving impairment and was not impacted by the ability to measure the presence of the drug in saliva tests.

Box A4: Prevalence of drug dependence versus drug use

In burden of disease analysis, prevalence of illicit drug dependence was used to calculate the non-fatal burden (YLD) of *Alcohol* and *Illicit drug dependence*. Exposure to drug dependence—not drug use—was estimated because evidence from the literature found that exposure to dependence and not use alone was a risk factor for the linked diseases.

All drugs have the potential for dependence, but not all drug use leads to dependence.

There is a range of symptoms that indicate if someone is dependent on a drug. These include:

- need for more of the drug to get the same effect
- having withdrawal symptoms, including irritability, panic attacks, anxiety, tiredness, extreme hunger
- spending large amounts of time seeking out the drug, using it or recovering from it.

If these behaviours are affecting home life, work life, or schooling, this is also an indicator that someone is dependent (Mayo Clinic 2014).

Relative risks for alcohol use

A review of current evidence identified 26 diseases and injuries linked to alcohol use (Table A1). These included the 25 estimated in the ABDS 2011 and an additional disease (hypertensive heart disease) (Table A5).

Of the diseases linked to alcohol use that used the comparative risk assessment approach to estimate the PAF, the relative risks were sourced from GBD 2015.

Of the injuries linked to alcohol use (*Drowning; Falls*; *Fire, burns and scalds*; *Homicide and violence*; *Road traffic injuries—motor vehicle occupants* and *Road traffic injuries—motorcyclists*), the relative risks were sourced from Taylor and colleagues (2010). For *Suicide and self-inflicted injuries* linked to alcohol use, the relative risk was from Ferrari and colleagues (2014).

The relative risks for former drinkers for the linked diseases (*Lower respiratory infections; Mouth and pharyngeal cancer; Oesophageal cancer; Bowel cancer; Laryngeal cancer; Atrial fibrillation and flutter; Pancreatitis* and *Epilepsy*) were 1.21 in males and 1.44 in females. For the linked disease, *Coronary heart disease,* they were 1.36 in females and for *Stroke* 1.31 in males and 1.15 in females. These relative risks applied to both morbidity and mortality for persons aged 15 years and over. Former drinkers had no increased risk for *Hypertensive heart disease* or *Injuries*.

Table A5: Relative risks and sources for linked diseases; relative to the harmful impact on current drinkers of alcohol

Exposure measure	Linked disease	Burden type	Age (years)	Relative risk (95% CI)		Relative risk source	Level of evidence
				Males	Females		
Current drinkers of 10–120+ g alcohol	Lower respiratory infections	Both	15–100+	1.05–1.77	1.05–1.77	GBD 2015	Convincing
Current drinkers of 10–120+ g alcohol	Mouth and pharyngeal cancer	Both	15–100+	1.30–12.20	1.30–12.20	GBD 2015	Convincing
Current drinkers of 10–120+ g alcohol	Oesophageal cancer	Both	15–100+	1.14–4.75	1.14–4.75	GBD 2015	Convincing
Current drinkers of 10–120+ g alcohol	Bowel cancer	Both	15–100+	1.02–1.26	1.02–1.26	GBD 2015	Convincing
Current drinkers of 10–120+ g alcohol	Laryngeal cancer	Both	15–100+	1.15–5.26	1.15–5.26	GBD 2015	Convincing
Current drinkers of 10–120+ g alcohol	Brest cancer	Both	15–64	—	1.09–2.87	GBD 2015	Convincing
Current drinkers of 40–120+ g alcohol	Coronary heart disease	Both	15–100+	<1[(a)]	1–1.36	GBD 2015	Convincing

(Continued)

Table A5 (continued): Relative risks and sources for linked diseases; relative to the harmful impact on current drinkers of alcohol

Exposure measure	Linked disease	Burden type	Age (years)	Relative risk (95% CI)		Relative risk source	Level of evidence
				Males	Females		
Current drinkers of 40–120+ g alcohol	Stroke	Non-fatal	15–100+	1–1.82	1–2.22	GBD 2015	Convincing
Current drinkers of 10–120+ g alcohol	Stroke	Fatal	15–100+	1–1.82	1.16–5.81	GBD 2015	Convincing
Current drinkers of 10–120+ g alcohol	Hypertensive heart disease	Both	15–100+	1.08–2.29	<1[a]	GBD 2015	Convincing
Current drinkers of 10–120+ g alcohol	Atrial fibrillation and flutter	Both	15–100+	1.06–1.97	1.06–1.97	GBD 2015	Convincing
Current drinkers of 10–120+ g alcohol	Pancreatitis	Both	15–100+	1.02–3.98	1.02–3.98	GBD 2015	Convincing
Current drinkers of 10–120+ g alcohol	Epilepsy	Both	15–100+	1.02–4.40	1.14–4.40	GBD 2015	Convincing
Alcohol dependence	Suicide and self-inflicted injuries	Both	15–100+	9.8	9.8	Ferrari et al. 2014	Convincing
Current drinkers of 20+ g alcohol	Road traffic injuries—motorcyclists	Both	15–100+	1.24+[b]	1.24+[b]	Taylor et al. 2010	Convincing
Current drinkers of 20+ g alcohol	Road traffic injuries—motor vehicle occupants	Both	15–100+	1.24+[b]	1.24+[b]	Taylor et al. 2010	Convincing
Current drinkers of 20+ g alcohol	Other road traffic injuries	Both	15–100+	1.24+[b]	1.24+[b]	Taylor et al. 2010	Convincing
Current drinkers of 20+ g alcohol	Other land transport injuries	Both	15–100+	1.30+[b]	1.30+[b]	Taylor et al. 2010	Convincing
Current drinkers of 20+ g alcohol	Falls	Both	15–100+	1.25+[b]	1.25+[b]	Taylor et al. 2010	Convincing
Current drinkers of 20+ g alcohol	Fire, burns and scalds	Both	15–100+	1.32+[b]	1.32+[b]	Taylor et al. 2010	Convincing
Current drinkers of 20+ g alcohol	Drowning	Both	15–100+	1.32+[b]	1.32+[b]	Taylor et al. 2010	Convincing
Current drinkers of 20+ g alcohol	Other unintentional injuries	Both	15–100+	1.32+[b]	1.32+[b]	Taylor et al. 2010	Convincing
Current drinkers of 20+ g alcohol	Homicide and violence	Both	15–100+	1.38+[b]	1.38+[b]	Taylor et al. 2010	Convincing

(a) Relative risks of less than 1 were not included in the analysis for this report.

(b) Relative risk increases linearly per 10 g of alcohol consumed.

Relative risks for illicit drug use

A review of current evidence identified 13 diseases and injuries linked to illicit drug use. These included the 7 estimated in the ABDS 2011 and an additional 6 diseases and injuries (*Accidental poisoning*; *Road traffic injuries—motorcyclists; Road traffic injuries—motor vehicle occupants; Depressive disorders; Schizophrenia* and *Anxiety disorders*).

Of the diseases linked to drug use that used the comparative risk assessment approach to estimate the PAF (*Suicide and self-inflicted injuries; Road traffic injuries—motorcyclists; Road traffic injuries—motor vehicle occupants; Depressive disorders; Schizophrenia* and *Anxiety disorders*) the relative risks were sourced from the literature (Table A6). There were no age or sex specific PAF from the available studies however the type of burden was specified for driving under the influence of drugs due to specific drugs and practices.

Table A6: Relative risks and sources for linked diseases; relative to no drug dependency or drug driving

Exposure measure	Linked disease	Burden type	Age (years)	Relative risk (95% CI)	Relative risk source	Level of evidence
Cannabis driving	Road traffic injuries	Both	15–100+	1.35	Røgeberg & Elvik 2016	Convincing
Amphetamine driving	Road traffic injuries	Non-fatal	15–100+	6.19	Elvik 2013	Probable
Amphetamine driving	Road traffic injuries	Fatal	15–100+	5.17	Elvik 2013	Probable
Cocaine driving	Road traffic injuries	Fatal	15–100+	2.96	Elvik 2013	Probable
Opioid driving	Road traffic injuries	Non-fatal	15–100+	1.68	Elvik 2013	Probable
Opioid driving	Road traffic injuries	Fatal	15–100+	1.91	Elvik 2013	Probable
Amphetamine dependence	Suicide and self-inflicted injuries	Both	15–100+	4.5	Ferrari et al. 2014	Convincing
Cocaine dependence	Suicide and self-inflicted injuries	Both	15–100+	16.9	Ferrari et al. 2014	Convincing
Opioid dependence	Suicide and self-inflicted injuries	Both	15–100+	6.9	Ferrari et al. 2014	Convincing
Cannabis dependence	Depressive disorders	Both	15–100+	1.62	Lev-Ran et al. 2013	Convincing
Cannabis dependence	Anxiety disorders	Both	15–100+	1.68	Kedzior & Laeber 2014	Convincing
Cannabis dependence	Schizophrenia	Both	15–100+	3.9	Marconi et al. 2016	Convincing

The possible physiological mechanisms for disease development and selection of relative risks are discussed further for each individual disease.

Injuries

The evidence for linking drug-driving as a cause of death or injury from road traffic accidents has been increasing over the past 2 decades and includes studies on driver culpability and meta-analysis of cohort studies. Drugs impair cognitive function and hence the ability to drive. For example cannabis has been found to impact driving behaviours such as reaction-time, attention, tracking, time and distance perception, steering, speed and lateral

positioning (Kelly et al. 2009). However it is important to note that they may not be the cause of an accident even in an impaired driver.

A recent large international meta-analysis by Elvik (2013) analysed the evidence from 66 studies for the impact of drug use on fatal and non-fatal motor vehicle injuries. A significant association was found for injury and driving under the influence of the drugs amphetamine, cocaine and opioid.

Although the study by Elvik in 2013 did not find a significant association between cannabis use and fatal and non-fatal injuries from motor vehicle accident, Røgeberg and Elvik (2016) reviewed the evidence again in 2016 and found a significant association of 1.36 between cannabis use and fatal and non-fatal outcomes from motor vehicle accidents (this relative risk was later revised down to 1.35 following expert review).

Suicide and self-inflicted injuries were included as an linked disease in the ABDS 2011, for the risk factor illicit drug use based on exposure to *Amphetamine*, *Cocaine* and *Opioid dependence*, in the ABDS 2011 and the relative risks were sourced from the report by US Burden of Disease Collaborators (2013). The relative risks were: *Amphetamine dependence* (8.81), *Cocaine dependence* (8.81) and *Opioid dependence* (7.04).

These relative risks are different to those published by Ferrari and colleagues as part of GBD 2010. This study estimated the relative risk of suicide due to mental and substance use disorders to be *Amphetamine dependence* (4.5); *Cocaine dependence* (16.9); *Opioid dependence* (6.90) and *Psycho-stimulant dependence* (8.2) (Ferrari et al. 2014). The relative risks for drug use and suicide have not been published by GBD in the 2013 or 2015 updates (GBD 2013 Risk Factors Collaborators 2015). For estimates of suicide burden due to *Amphetamine, Cocaine* and *Opioid dependence* we have used the relative risks from Ferrari and colleagues (2014) because of the more recent publication of this study, the detailed description of the source of these relative risks and the inclusion of relative risks for alcohol use.

Mental disorders

A number of international meta-analyses have found an association between *Cannabis dependence* and selected mental health conditions.

A meta-analysis by Lev-Ran and colleagues (2013) found a moderate association between *Cannabis dependence* and *Depressive disorders* with a relative risk of 1.62. This meta-analysis only included cohort studies from high-income countries that controlled for participants having depression at baseline.

Another meta-analysis has also found a positive association between *Cannabis dependence* and *Anxiety disorders* (relative risk 1.68) (Kedzior & Laeber 2014). This study also found a significant association between *Cannabis dependence* and comorbid anxiety and depression (relative risk 1.68). This meta-analysis included 31 studies from 10 high income countries.

Cannabis use has also been shown to have a dose response relationship with the symptoms of psychosis. A recent meta-analysis by Marconi and colleagues. (2016) estimated—for heavy cannabis users—an odds ratio of 3.9 for the risk of *Schizophrenia* and other psychosis-related outcomes In order to use this estimate of effect size for *Schizophrenia* as a disease linked to *Cannabis dependence.* This report has included the relative risk from Marconi and colleagues and assumed that heavy cannabis use approximates exposure to *Cannabis dependence*. The meta-analysis by Marconi and colleagues included cohort and cross-sectional studies from high-income countries.

Calculation of population attributable fractions

Population attributable fractions (PAFs) determine the proportion of a particular disease that could have potentially been avoided if the population had never been exposed to a risk factor (Box 1.3).

The calculation of PAFs requires the input of:

- the effect size, or the relative risk (RR), of the risk factor on the outcome of interest
- the prevalence of exposure in the population (P).

The **population attributable fraction (PAF)** is calculated as:

$$PAF = \frac{P(RR-1)}{P(RR-1)+1}$$

Calculation of attributable burden

The burden attributable to alcohol and illicit drug use can be estimated using the calculated PAFs (using the direct or comparative risk assessment approach) for each linked disease and the total burden estimated in the ABDS 2011.

Attributable burden (AB) is calculated as:

$$AB = PAF \times C$$

where:

C is the total burden (DALY) of a specific outcome(for example, stroke).

For detailed information about the most recent ABDS, and further information on the methods used to calculated disease burden, please refer to *Australian Burden of Disease Study: impact and causes of illness and death in Australia 2011* (AIHW 2016c) and *Australian Burden of Disease Study:* methods and supplementary material (AIHW 2016a).

Estimating the combined effect

In the ABDS 2011 and in this study, alcohol and illicit drug use were assessed as independent risk factors. Therefore, the attributable burden estimates in this report, and other attributable burden estimates for various risk factors in the ABDS 2011, cannot be added together. This is due to the complex relationships and interactions between risk factors.

To overcome this issue, the combined effect (known as the 'joint effect' in other reports) of selected risk factors can be estimated. In this study, the PAF for each linked disease (except *Accidental poisoning*) was estimated using the combined effect of alcohol use and illicit drug use. The PAF for *Accidental poisoning* was the sum of the PAF for these 2 risk factors as they were calculated from direct evidence based on the portion of deaths in the NMD with mentions of alcohol and illicit drug combined.

The **PAF for the combined effect** is calculated as:

$$\mathrm{PAF} = 1 - \prod (1 - PAF_{\mathrm{r}})$$

where:

- PAF is the population attributable fraction of burden attributable to a disease from the risk factors combined

- PAF_r is the population attributable fraction for risk factor '*r*' and linked disease
- the product Π applies to all risk factors within the cluster.

This formula has been used in several other burden of disease studies. Desirably, it caps the estimated combined attributable burden to 1 for each linked disease, therefore avoiding the possibility of the proportion's exceeding the total disease burden.

Estimates for sub-national populations

Sub-national estimates were produced by:

- state and territory for all 8 Australian jurisdictions
- remoteness categories—based on the 2011 Australian Statistical Geographic Standard, which is divided into 5 remoteness areas: *Major cities*, *Inner regional*, *Outer regional*, *Remote* and *Very remote*
- socioeconomic groups—presented as quintiles of lowest to highest socioeconomic position, based on the relative socioeconomic characteristics of the area of residence as defined by the Socio-Economic Indexes for Areas (SEIFA).

Analysis by state/territory, remoteness and socioeconomic group was based on:

- the risk exposure by these disaggregations
- disease burden estimates by these disaggregations from the ABDS 2011
- the PAFs for alcohol and illicit drug use for these population groups.

State and territory

Variations in patterns of burden attributable to alcohol use across states and territories reflect a complex interaction of many factors: demographic (including the age structure of the population and the proportion of the population that is Indigenous); socioeconomic; and environmental variations.

The variation by age in the mean amount of alcohol consumed by current drinkers in Tasmania, the Australian Capital Territory and the Northern Territory was modelled from the variation by age in the national population. For other states and territories it was estimated directly from the survey.

Due to the small number of deaths from *Accidental poisoning* in some states, the direct PAF for *Accidental poisoning* was calculated using 5 years of data (2009–2014) combined, from the AIHW National Mortality Database.

No data were available to estimate the PAF for the diseases linked to unsafe injecting practices (*Hepatitis B*; *Hepatitis C*; *HIV/AIDS; Chronic liver disease; Liver cancer*) by state and territory. As such, the national PAFs were applied to all states and territories.

Remoteness

In this report, remoteness is divided into *Major cities*, *Inner regional*, *Outer regional*, *Remote* and *Very remote* areas. These categories are defined by an area's relative distance to services (ABS 2013). Most (88%) of Australia's population lives in *Major cities* and *Inner regional* areas.

The NDSHS combined exposure estimates for remote and very remote areas. The PAF based on these data were therefore the same for both areas.

Due to the small number of deaths from *Accidental poisoning* in some remoteness areas, the direct PAF for *Accidental poisoning* was calculated using 5 years of data (2009–2014) combined from the AIHW National Mortality Database.

Five categories of remoteness are reported for *Alcohol dependence* and *Illicit drug dependence* combined. However, due to small numbers, 3 categories of remoteness—*Major cities, Regional* and *Remote*—are reported for estimates by individual type of drug dependence.

No data was available to estimate PAF for the diseases linked to unsafe injecting practices (*Hepatitis B*; *Hepatitis C*; *HIV/AIDS; Chronic liver disease*; *Liver cancer*) by remoteness. As such, the national PAFs were applied to all remoteness categories.

Socioeconomic group

In this report, socioeconomic groups are based on an index of relative socioeconomic disadvantage, developed as part of the 2011 SEIFA by the Australian Bureau of Statistics (ABS) (ABS 2010b). This index relates to a particular geographic area and is based on a number of characteristics, including household income, employment and education level. In this analysis, the index is allocated based on the individual's residential area. The actual socioeconomic properties of individuals can vary within the same area.

Socioeconomic groups are presented as quintiles in this analysis. Quintile 1 (Q1) represents the 20% of the population with the lowest socioeconomic characteristics. The level of socioeconomic position increases with each quintile, through to the 20% of the population with the highest socioeconomic characteristics (Q5).

Each quintile has a similar number of persons. However, the lower socioeconomic groups have a larger proportion of persons aged 65 years and over than the higher groups. A greater proportion of Aboriginal and Torres Strait Islander persons and individuals with disability are also found in the lowest socioeconomic group (ABS 2010b).

Because of the small number of deaths from *Accidental poisoning,* when compared by socioeconomic group, the direct PAF for *Accidental poisoning* was calculated using 5 years of data (2009–14), combined, from the AIHW National Mortality Database.

No data was available to estimate the PAF for the diseases linked to unsafe injecting practices (*Hepatitis B*, *Hepatitis C*, *HIV/AIDS Chronic liver disease*, *Liver cancer*) by socioeconomic group. As such, the national PAFs were applied to all socioeconomic groups.

Estimates over time

Attributable burden in 2003

To enable comparison over time and projections into the future, the burden attributable to alcohol and illicit drug use was also estimated for 2003 as part of this analysis. To make this comparison, population exposure to alcohol use and drug driving was obtained from trends in the NDSHS (2004), as well as the burden for each linked disease estimated for 2003, as previously calculated in the ABDS 2011.

Exposure to drug dependence was estimated from the prevalence of drug dependence in the ABDS 2011 for the year 2003.

Potential burden in 2020 and 2025

The ‘potential burden’ reported in this study estimates the level of future burden assuming current trends in alcohol and illicit drug use continue. The potential burden due to alcohol and illicit drug use in the years 2020 and 2025 was calculated based on trends in alcohol and illicit drug use, using data from the NDSHS and the ABDS 2011.

These projections are mathematical extrapolations of current trends and assume that the most recent trend will continue into the near future. Although not forecasts (which may take into acount other changes such as treatment and the prevalence of other risk factors), they do illustrate what the future might reasonably be expected to look like if current trends continue.

The analysis aimed to estimate the potential or projected amount of future burden, assuming current trends in alcohol and illicit drug use continue. We have used the term ‘projected’ throughout this report.

The prevalence of driving under the influence of drugs and alcohol was projected using the log-linear trends of actual prevalence in Australia, using successive NDSHS between 2001–2016.

For *HIV/AIDS* the PAFs for 2020 and 2025 were estimated by the linear trend in the rate of diagnosed AIDs due to unsafe injecting practices from 1995–2009, by sex, from the annual surveillance reports by the Kirby Institute (Kirby Institute 2012, 2013). For acute *Hepatitis B and Hepatitis C*, trends in the proportion of newly acquired *Hepatitis B and C* infection for the years 2002–2013 are also available from these annual surveillance reports.

As there is no single source of data on the trend in *Chronic liver disease* and *Liver cancer* from *Hepatitis B* and *Hepatitis C* acquired through unsafe injecting practices, alternative trend data were used as a proxy. PAFs for 2020 and 2025 were estimated by adjusting the 2011 PAF by the percentage change in the linear trend in the average rate of acute *Hepatitis B* and *Hepatitis C* infection due to unsafe injecting practices between 2002 and 2013.

The linear trend in deaths due to accidental poisoning from specific drugs as a portion of total accidental poisoning deaths in the National Mortality Database for the years 2001 to 2015 was used to estimate the PAF for 2020 and 2025 for *Accidental poisoning* due to alcohol and illicit drug use.

Amphetamine dependence prevalence was estimated by the log-linear trend estimates from the ABDS in 2003 and 2011, and the percentage of change over time was used to estimate burden from *Amphetamine dependence* in 2020 and 2025. *Cannabis dependence* and *Cocaine dependence* prevalence was estimated by the log linear trend estimates of drug use in successive NDSHS between 2001–2014, and the percentage of change over time was used to estimate burden from *Cannabis dependence* and *Cocaine dependence* in 2020 and 2025.

The 2011 linked disease burden rates (except drug dependence) were assumed to be the same in 2020 and 2025, adjusting only for expected changes in population structure. Due to the complexity of possible associations between diseases, expected future changes in linked disease burden will require more consideration. This assumption was made for simplicity in our analysis.

It was not posible to estimate trends in the burden of *Opioid dependence,* and hence the burden due to opioid use, as comparable data on opioid use was not available for the time period of interest. This is because opioid drugs can be from illicit and non-illicit sources and further analysis of the NDSHS is needed to estimate appropriate trends. It was also not

possible to estimate trends in *Other illicit drug dependence* due to the diverse types of drugs that contribute to this burden.

Measuring the fatal burden of alcohol and illicit drug dependency

The fatal burden from *Alcohol* and *Illicit drug dependence* was sourced from deaths registered in the National Mortality Database up to and including 2013, based on the underlying cause of death according to the International Statistical Classification of Diseases and Related Health Problems, Tenth Revision (ICD-10) codes in Table A7.

Table A7: ICD-10 classification of alcohol and illicit drug dependence used in the ABDS 2011

ABDS 2011 cause	ICD-10 codes
Alcohol dependence	F10
Illicit drug dependence	F11–F16; F18–F19

Applying the reference life table

Years of life lost (YLL) for alcohol and drug use were estimated by applying the weightings shown in Table A8. The ABDS 2011 uses the standard reference life table used in GBD 2010 and 2013 (Murray et al. 2012) when calculating YLL for the Australian, sub-national and Indigenous populations.

Table A8: YLL, by age at death used in the ABDS 2011

Age at death	YLL	Age at death	YLL	Age at death	YLL	Age at death	YLL
0	86.02	27	59.43	54	33.32	81	10.32
1	85.21	28	58.44	55	32.38	82	9.65
2	84.22	29	57.45	56	31.47	83	8.98
3	83.23	30	56.46	57	30.55	84	8.31
4	82.24	31	55.48	58	29.64	85	7.64
5	81.25	32	54.49	59	28.73	86	7.12
6	80.25	33	53.50	60	27.81	87	6.61
7	79.26	34	52.52	61	26.91	88	6.09
8	78.26	35	51.53	62	26.00	89	5.57
9	77.27	36	50.56	63	25.10	90	5.05
10	76.27	37	49.58	64	24.20	91	4.70
11	75.28	38	48.60	65	23.29	92	4.35
12	74.28	39	47.62	66	22.42	93	4.00
13	73.29	40	46.64	67	21.55	94	3.66
14	72.29	41	45.67	68	20.68	95	3.31
15	71.29	42	44.71	69	19.80	96	3.09
16	70.30	43	43.74	70	18.93	97	2.88
17	69.32	44	42.77	71	18.10	98	2.66
18	68.33	45	41.80	72	17.28	99	2.44
19	67.34	46	40.85	73	16.45	100	2.23
20	66.35	47	39.90	74	15.62	101	2.11
21	65.36	48	38.95	75	14.80	102	1.99
22	64.37	49	38.00	76	14.04	103	1.87
23	63.38	50	37.05	77	13.27	104	1.75
24	62.39	51	36.12	78	12.51	105	1.63
25	61.40	52	35.19	79	11.75		
26	60.41	53	34.25	80	10.99		

Source: Murray et al. 2012.

Measuring the non-fatal burden of alcohol and illicit drug dependency

Non-fatal burden (YLD)

Data used to develop the YLD estimates for *Alcohol* and *Illicit drug dependence* were obtained from a number of sources. Prevalence data mainly came from the 2007 National Survey of Mental Health and Wellbeing (NSMHW) applied to the 2011 population as this is the latest available data on diagnosed prevalence of alcohol and drug dependence. Prevalence for *Amphetamine* and *Opioid dependence* were based on analysis by the National Drug and Alcohol Research Centre (AIHW 2016a) which used a combination of Australian treatment services, hospitalisations and pharmacotherapy data.

YLD estimates in the ABDS 2011 are based on prevalence cases (the number of persons experiencing each disease) at a given point in time. They are calculated from the **point prevalence** (the number of persons experiencing health loss from the condition on a given day—the ABDS 2011 estimated point prevalence as at 30 June 2011 or 2003 as

appropriate). This differs from **period prevalence**, which refers to the number of cases during a period of time, such as 1 year. The point prevalence is then multiplied by a disability weight (from the 2013 Collaborators 2015). Point prevalence is referred to in this report as 'prevalence' for brevity.

As such, YLD should be interpreted as the total number of years spent in less than full health by the population in the reference year (for example, 2011), weighted according to the health loss associated with each disease.

Sequelae

The ABDS 2011 adopted sequelae, health states and disability weights used by the GBD 2013 to derive the non-fatal burden (Table A9) (GBD 2013 Collaborators 2015). The definitions for the health states are provided in Table A9. Durations and assumptions are outlined in the following subsections.

Table A9: Sequelae, health states and disability weights for alcohol and illicit drug dependence

Disease	Sequela	Health state	Disability weight[(a)]
Alcohol dependence	Alcohol dependence	Very mild	0.123
		Mild	0.235
		Moderate	0.373
		Severe	0.570
Illicit drug dependence	Opioid dependence	Mild	0.335
		Moderate to severe	0.697
	Amphetamine dependence	Mild	0.079
		Moderate to severe	0.486
	Cocaine dependence	Mild	0.116
		Moderate to severe	0.479
	Cannabis dependence	Mild	0.039
		Moderate to severe	0.266

(a) Sourced from GBD 2013 Collaborators 2015.

Defining alcohol and illicit drug dependence

The ABDS 2011 is divided into 17 separate disease groups, based approximately on the groupings in the 10th Revision of the International Classification of Diseases (ICD-10). One of these disease groups covers mental and behavioural disorders, including alcohol and drug dependence.

The ABDS 2011 included estimates of fatal burden (years of life lost—YLL) and non-fatal burden (years lived with disability—YLD) separately for *Alcohol dependence* and *Illicit drug dependence*. Within *Illicit drug dependence,* non-fatal burden was separately estimated for 5 different drug dependencies):

- *Opioid dependence*
- *Amphetamine dependence*
- *Cocaine dependence*
- *Cannabis dependence*

- *Other illicit drug dependence*—including sedatives, hallucinogens (such as LSD and ecstasy), ketamine, GHB, inhalants, solvents, multiple drug use and psychoactive substances.

These conditions are defined by the inability to control the urge to use the drug. Severity is related to the impact of the drug on the ability to perform daily tasks and other impacts such as hallucinations and sleep problems. More details on the definitions of these conditions and their sequelae are provided in Table A10.

Equivalent estimates of fatal burden were not available from the study at the specific drug level, as these were calculated for overall *Illicit drug dependence*. As such, the burden presented in this report for specific drugs will focus on non-fatal burden.

Table A10: Definitions for the health states for alcohol and illicit drug dependence

Health state	Definitions[(a)]
Alcohol use disorder: very mild	Person drinks alcohol daily and has difficulty controlling the urge to drink. When sober, the person functions normally.
Alcohol use disorder: mild	Person drinks a lot of alcohol and sometimes has difficulty controlling the urge to drink. While intoxicated, the person has difficulty performing daily activities.
Alcohol use disorder: moderate	Person drinks a lot, gets drunk almost every week and has great difficulty controlling the urge to drink. Drinking and recovering cause great difficulty in daily activities, sleep loss, and fatigue.
Alcohol use disorder: severe	Gets drunk almost every day and is unable to control the urge to drink. Drinking and recovering replace most daily activities. The person has difficulty thinking, remembering and communicating, and feels constant pain and fatigue.
Heroin and other opioid dependence: mild	Person uses heroin (or methadone) daily and has difficulty controlling the habit. When not using, the person functions normally.
Heroin and other opioid dependence	Person uses heroin daily and has difficulty controlling the habit. When the effects wear off, the person feels severe nausea, agitation, vomiting and fever. The person has a lot of difficulty in daily activities.
Amphetamine dependence: mild	Person uses stimulants (drugs) at least once a week and has some difficulty controlling the habit. When not using, the person functions normally.
Amphetamine dependence: moderate to severe	Person uses stimulants (drugs) and has difficulty controlling the habit. The person sometimes has depression, hallucinations and mood swings, and has difficulty in daily activities.
Cocaine dependence: mild	Person uses cocaine at least once a week and has some difficulty controlling the habit. When not using, the person functions normally.
Cocaine dependence: moderate to severe	Person uses cocaine and has difficulty controlling the habit. The person sometimes has mood swings, anxiety, paranoia, hallucinations and sleep problems, and has some difficulty in daily activities.
Cannabis dependence: mild	Person uses marijuana at least once a week and has some difficulty controlling the habit. When not using, the person functions normally.
Cannabis dependence: moderate to severe	Person uses marijuana daily and has difficulty controlling the habit. The person sometimes has mood swings, anxiety and hallucinations, and has some difficulty in daily activities.

(a) Sourced from GBD 2013 Collaborators 2015.

Prevalence estimation

Data sources

Key data sources to estimate prevalence for *Alcohol dependence* and *Illicit drug dependence*, and *Accidental poisoning* are shown in Table A11.

Table A11: Key data sources for alcohol dependence and illicit drug dependence and accidental poisoning morbidity estimates

Data source	Disease
2007 National Survey of Mental Health and Wellbeing	Alcohol dependence, cannabis use disorders and cocaine use disorders
National Drug and Alcohol Research Centre analyses (see Degenhardt et al. 2004; Degenhardt et al. 2016)	Amphetamine use disorders and opioid use disorders
National Hospital Morbidity Database and the National Non-admitted Patient Emergency Department Care Database (NNAPEDCD)	Accidental poisoning

Estimating point prevalence

For *Alcohol dependence*, estimates obtained from the 2007 NSMHW were for 12-month prevalence. To estimate point prevalence, it was assumed that 30-day prevalence would approximate point prevalence, given the long-term nature of the disorders reflected in diagnostic criteria.

As the 30-day prevalence in this survey did not reflect diagnostic criteria as closely, a 30-day-to-12-month prevalence adjustment factor applied to the 12-month estimates was derived from the 1997 NSMHW, based on expert advice.

Prevalence estimates of *Illicit drug dependence* were calculated by applying a hospitalisation ratio to each of the estimates for the defined drug dependence (cannabis, amphetamine, cocaine and opioid use disorders). The corresponding ICD-10-AM codes were F11.2, F12.2, F14.2 and F15.2 for defined drug dependence, and F13.2, F16.2, F18.2 and F19.2 for *Illicit drug dependence*. This ratio reflected the relationship between hospitalisations for '*Illicit drug dependence*' and 'defined drug dependence', that is, those listed above.

In this report, *Accidental poisoning* was reported from an external cause perspective of injury burden (Box A3). The YLD were calculated according to the nature of the injury, then converted to external cause using matrices that describe the relationship between the injury and the external cause. Prevalence for the nature of injury perspective involved estimation of short- and long-term consequences, see *Australian Burden of Disease Study 2011: methods and supplementary material* (AIHW 2016a) for further details on injury sequelae and the matrices used.

Severity distributions and other health states

For non-fatal burden, estimates of the conditions by severity were derived where possible. Severity of *Alcohol dependence* was based on the 2007 NSMHW. The severity variable of interest indicated the 'average severity of interference across all domains in the month when alcohol use most severe', with possible options being 'none,' 'mild,' 'moderate,' 'severe,' and 'very severe'. The 'severe' and 'very severe' categories were grouped together and it was assumed that half of the prevalence in the 'mild' category would be classed in the 'very mild' category.

Severity distributions for drug dependence were based on GBD 2013 (Burstein et al. 2015) and can be found in Table A12.

Population estimates underpinning all estimates were sourced from the Australian Demographic Statistics from the ABS.

Further details on the various data sources and standard inputs are available in *Australian Burden of Disease Study 2011: methods and supplementary material* (AIHW 2016a).

Severity distributions for *Illicit drug dependence* were based on GBD 2013 distributions published by Burstein and colleagues (2015) (Table A12). Severity for *Alcohol dependence* was based on the (self-reported) extent that alcohol use interfered across various aspects of life in the 2007 NSMHW.

Table A12: Severity distributions from GBD 2013 (for use in ABDS 2011)

	Severity of drug use disorder[(a)] (%)		
Drug use disorder	**None (asymptomatic)**	**Mild**	**Moderate to severe**
Opioid dependence	52	42	6
Amphetamine dependence	55	39	7
Cocaine dependence	50	43	7
Cannabis dependence	58	36	6

(a) Based on GBD 2013 severity distribution for high income countries as published by Burstein and colleagues (2015).

Subnational estimates

Where possible, the 2007 NSMHW was analysed to calculate total prevalence rate ratios for each socioeconomic group, remoteness area (*Very remote* areas were not sampled), and state/territory. These were then applied to the national prevalence rates for *Alcohol dependence* and *Illicit drug dependence*.

For state and territory estimates, where rate ratios from the NSMHW were unreliable due to small sample sizes, a proxy rate ratio was used in the ABDS 2011, usually from a nearby state/territory. For stimulant use disorders, rate ratios for the Australian Capital Territory and the Northern Territory were based on New South Wales and South Australia, respectively. These rate ratios were used for *Amphetamine* and *Cocaine dependence*, and as such, their estimates for the Australian Capital Territory and the Northern Territory are not presented in this report. Further, due to small numbers, estimates for *Amphetamine* and *Cocaine dependence* are not presented for Tasmania, and estimates for *Cannabis dependence* are not reported for Tasmania, the Australian Capital Territory and the Northern Territory.

As described previously, for estimates by remoteness areas presented in this report, 3 categories *Major cities*, regional (*Inner regional* combined with *Outer regional*) and remote (*Remote* combined with *Very remote*) —are reported, due to small numbers and to a lack of available data in *Very remote* areas for some drug disorders. In the ABDS 2011, *Very remote* rate ratios were based on principal diagnosis hospitalisation rate ratios (comparing *Very remote* to *Outer regional/Remote* areas). The same remoteness rate ratios were applied to both *Amphetamine* and *Cocaine dependence* (based on remoteness distributions for stimulant use disorders, and combined separations with a principal diagnosis of ICD-10-AM codes F14 and F15). Due to low numbers, *Alcohol* and *Illicit drug dependence* were analysed at the level of 'any use disorder' rather than dependence. For opioid use disorders in *Outer regional* and *Remote* areas, there were no identified cases. To estimate *Opioid dependence* in these areas, the 0.22 rate ratio for *Inner regional* areas was halved and applied.

For *Alcohol dependence*, estimates from the NSMHW were large enough to produce robust estimates for all states and territories. *Opioid dependence* rate ratios were based on the National Drug and Alcohol Research Centre analysis (Degenhardt et al. 2004) which also provided estimates for all states and territories.

For estimates by socioeconomic group, the NSMHW was used to derive estimates by SEIFA quintile for all *illicit drug dependence*. For *opioid dependence*, there were no reported cases in the highest quintile (Q5) and as such the rate ratio for Q4 was extended to Q5.

Non-fatal burden by types of drug dependence

In this report, sub-national non-fatal burden estimates by types of drug dependence are reported. For calculation of age-standardised rates by remoteness, *Inner regional* and *Outer regional* areas are combined as 'regional', and *Remote* and *Very remote* areas are combined as 'remote' due to small YLD numbers and a lack of available data in *Very remote* areas for some drug disorders.

For state and territory estimates, for *Illicit drug dependence,* rate ratios for the Australian Capital Territory and the Northern Territory were based on New South Wales and South Australia, respectively. Detailed estimates of non-fatal burden due to *Illicit drug dependence* by state and territory are presented in this report for only those jurisdictions with sufficient YLD numbers and data quality.

2003 estimates

The burden due to *Alcohol* and *Illicit drug dependence* in 2003 and 2011 are compared in this report. Comparisons of burden can only be made where the same methods have been used to produce the non-fatal, fatal and total burden. The data from 2003 have been analysed using the methods from the ABDS 2011 to produce comparable estimates.

The estimates for 2003 contained here cannot be compared with those estimates for 2003 from the previous Australian study (Begg et al. 2007), as they were developed using different methodologies. As the 2003 estimates are point-in-time estimates, their comparison with the 2011 estimates does not constitute a time-series analysis.

In addition, interpretation of changes over time needs to consider other aspects, such as the impact of confounders over time related to the estimates, and changes in metadata between reference periods. In particular:

- YLD and YLL may change by differing proportions, thus make differing contributions to the change in DALY
- the impact of population changes (for example, ageing) may mask changes in underlying disease prevalence and/or severity. To account for differences in the population age structure and size, age-standardisation has been used to compare estimates for 2003 and 2011
- definitional changes (such as coding rules for poisoning) may impact comparisons. Where possible, adjustments were made for definitional changes between the 2 time points.

For *Alcohol dependence*, *Cannabis dependence* and *Cocaine dependence*, prevalence rates were considered stable between 2003 and 2011, based on expert advice or lack of available evidence to suggest a significant change over this period. The 2003 opioid prevalence estimates were based on estimates of prevalence in 2002, as reported by Degenhardt and colleagues (2004). These estimates were then adjusted for change over time, based on data from the National Opioid Pharmacotherapy Statistical Annual Data collection.

The data source for *Amphetamine dependence* (Degenhardt et al. 2016) included estimates for 2003–04 and 2011–12, so each of these was used for the corresponding reference year.

Prevalence estimates for *Other illicit drug use dependence* were based on hospitalisation ratios for the 2003 calendar year.

Quality of estimates

All estimates within the ABDS 2011 were produced using the best possible data that were available within the scope and timeframe of the study.

While uncertainty (or confidence) intervals used to describe the reliability of estimates in some burden of disease studies were not produced as part of the ABDS 2011, a two-dimensional quality index (based on the relevance and quality of the source data, and the methods used to transform that data into a form required for analysis) were provided to help users understand the quality and limitations of the estimates.

The fatal burden estimates for *Alcohol* and *Illicit drug dependence* were calculated using deaths registered in the NMD and are considered to be of high quality.

The non-fatal burden estimates of *Alcohol dependence* were assessed as reasonably high quality as they were obtained from the 2007 NSMHW which used diagnostic criteria and severity was partially available from the study and partially from GBD 2013. Some transformations were required to overcome gaps in age distribution.

The non-fatal burden estimates for *Illicit drug dependence* were obtained from a variety of data sources and varied in quality from *Cannabis dependence* estimates which were based on the 2007 NSMHW, to estimates of cocaine which were based on proxy measures. All severity distributions were from GBD 2013. Moderate transformations were required to overcome data gaps.

The quality ratings for *Alcohol dependence*, *Illicit drug dependence* and *Accidental poisoning* can be found in Table A13. A full description of the quality index used in the ABDS 2011 is available in Appendix F of the report *Australian Burden of Disease Study 2011: methods and supplementary material* (AIHW 2016a).

ABDS 2011 quality index

To help users understand the potential sources of uncertainty associated with the YLD estimates from the ABDS 2011, a 2-dimensional index was derived based on:

- the relevance of the underlying epidemiological data
- the methods used to transform that data into a form required by this analysis.

The index was designed to help users understand the reliability and limitations of the estimates, especially which patterns and differences were likely to be genuine, and which could be influenced by uncertainties in the data or methods that made them less reliable. Generally, the higher the index the more relevant and accurate the estimate was.

For it to be useful in assessing the impact of different data sources and transformation methods, the final index also took into account the contribution of the underlying data to the overall estimate. For example, a particular data source might have contributed a large proportion of the overall YLD for a single disease, while another might have contributed only a small proportion.

This index was developed to assess national estimates from the ABDS 2011.

Based on the processes required to produce the various estimates for burden of disease, and the experience of the ABDS project team in collating and analysing data for this purpose, key assumptions and core dimensions were developed to provide users with a succinct and coherent assessment of the quality of the estimates. See *Australian Burden of Disease Study: methods and supplementary material* (AIHW 2016a) for further details. The quality ratings for *Alcohol dependence* and *Illicit drug dependence* are presented in Table A13.

Table A13: National YLD quality ratings

Disease	Data	Method	Statement
Alcohol dependence	B	B	National prevalence estimates were obtained from the 2007 National Survey of Mental Health and Wellbeing and the 2013–14 Young Minds Matter Survey, which used diagnostic criteria to assess for mental health conditions. Severity was partially available from the study, partially from GBD 2013. Some transformations were required to overcome gaps in age distribution.
Illicit drug dependence	C	C	National estimates were obtained from a variety of sources depending on the drug. These varied in quality from cannabis dependence estimates—which were based on the 2007 National Survey of Mental Health and Wellbeing—to estimates of cocaine—which were based on proxy measures. All severity distributions were from the GBD 2013. Moderate transformations were required to overcome data gaps.
Accidental poisoning (by nature of injury)	A	D	Short-term prevalence was estimated from the NHMD, and adjusted to account for non-admitted cases, based on estimates from the National Non-admitted Patient Emergency Department Care Database. Severity distribution was obtained from GBD 2013. Long-term estimates were modelled in DISMOD II using New Zealand Burden of Disease Study parameters for the probability of these injuries having long-term consequences, annual remission and excess mortality (see NZMOH 2012).

Source: AIHW 2016a.

Appendix B: Additional tables and figures

Table B1: Attributable burden (DALY) due to alcohol use by linked disease and sex, 2011

	Males			Females		
Linked disease	**Total DALY**	**Attributable DALY**	**% of linked disease**	**Total DALY**	**Attributable DALY**	**% of linked disease**
Accidental poisoning	37,461	6,448	17.2	13,946	2,394	17.2
Alcohol dependence	49,335	49,335	100.0	16,707	16,707	100.0
Atrial fibrillation and flutter	19,441	1,915	9.9	18,085	1,495	8.3
Bowel cancer	53,084	2,562	4.8	39,338	2,448	6.2
Breast cancer	407	. .	. .	70,268	7,238	10.3
Chronic liver disease	32,785	8,665	26.4	14,819	4,619	31.2
Coronary heart disease	226,021	. .	. .	120,629	2,951	2.4
Drowning	8,539	1,515	17.7	2,184	125	5.7
Epilepsy	23,969	4,870	20.3	20,765	2,321	11.2
Falls	36,842	5,892	16.0	22,274	947	4.3
Fire, burns and scalds	4,863	954	19.6	2,906	158	5.4
Homicide and violence	18,527	4,831	26.1	7,530	641	8.5
Hypertensive heart disease	3,562	475	13.3	3,584	201	5.6
Laryngeal cancer	3,436	837	24.4	634	79	12.5
Liver cancer	21,743	8,447	38.8	7,632	3,203	42.0
Lower respiratory infections	15,352	1,221	8.0	14,213	976	6.9
Mouth and pharyngeal cancer	13,517	5,657	41.9	4,100	839	20.5
Oesophageal cancer	18,420	4,343	23.6	5,353	670	12.5
Other land transport injuries	9,845	3,348	34.0	3,430	728	21.2
Other road traffic injuries	9,685	2,820	29.1	3,231	576	17.8
Other unintentional injuries	23,010	4,755	20.7	7,661	428	5.6
Pancreatitis	2,102	290	13.8	1,866	141	7.6
Road traffic injuries—motor vehicle occupants	34,158	10,701	31.3	15,343	3,013	19.6
Road traffic injuries—motorcyclists	11,796	3,977	33.7	881	195	22.1
Stroke	65,689	3,142	4.8	71,081	1,421	2.0
Suicide and self-inflicted injuries	84,920	14,149	16.7	28,550	2,115	7.4
Unlinked diseases	1,584,022	. .	. .	1,564,886	. .	. .
Total	**2,412,531**	**151,149**	**6.3**	**2,081,896**	**56,629**	**2.7**

Notes

1. The % column is the attributable DALY divided by the linked disease burden in 2011 of that row.
2. *Breast cancer* burden attributable to alcohol use is reported for females only.

Source: AIHW analysis of burden of disease database, 2011.

Table B2: Proportion of fatal and non-fatal burden due to alcohol use, by linked disease and sex, 2011

	Males (%)		Females (%)	
Linked disease	**Fatal burden**	**Non-fatal burden**	**Fatal burden**	**Non-fatal burden**
Accidental poisoning	98.7	1.3	98.2	1.8
Alcohol dependence	12.0	88.0	11.4	88.6
Atrial fibrillation and flutter	23.5	76.5	39.2	60.8
Bowel cancer	93.1	6.9	92.3	7.7
Breast cancer	. .	. .	89.8	10.2
Chronic liver disease	96.6	3.4	95.8	4.2
Coronary heart disease	. .	. .	78.3	21.7
Drowning	96.7	3.3	93.9	6.1
Epilepsy	30.8	69.2	20.5	79.5
Falls	34.9	65.1	40.6	59.3
Fire, burns and scalds	43.9	56.1	43.5	56.5
Homicide and violence	50.1	49.9	75.2	24.8
Hypertensive heart disease	98.6	1.4	98.6	1.4
Laryngeal cancer	93.5	6.5	95.1	4.9
Liver cancer	99.0	1.0	98.8	1.2
Lower respiratory infections	90.0	10.0	89.3	10.7
Mouth and pharyngeal cancer	94.7	5.3	92.7	7.3
Oesophageal cancer	98.6	1.4	98.0	2.0
Other land transport injuries	52.4	47.6	50.2	49.8
Other road traffic injuries	65.1	34.9	66.0	34.0
Other unintentional injuries	60.3	39.7	64.3	35.7
Pancreatitis	86.4	13.6	89.0	11.0
Road traffic injuries—motor vehicle occupants	83.9	16.1	85.4	14.6
Road traffic injuries—motorcyclists	75.9	24.1	81.3	18.7
Stroke	85.7	14.3	100.0	0.0
Suicide and self-inflicted injuries	99.3	0.7	97.7	2.3
Total	**57.7**	**42.3**	**61.8**	**38.2**

Note: Breast cancer burden attributable to alcohol use is reported for females only.

Source: AIHW analysis of burden of disease database, 2011.

Table B3: Age-standardised DALY rates per 1,000 persons of burden attributable to alcohol use, by remoteness and linked disease, 2011

		Remoteness area					
Linked disease	**Total**	**Major cities**	**Inner regional**	**Outer regional**	**Remote**	**Very remote**	**Rate ratio**
Alcohol dependence	6.00	6.05	6.39	5.24	6.73	9.58	1.6
Suicide and self-inflicted injuries	1.48	1.28	1.89	1.66	3.55	6.60	5.2
Road traffic injuries—motor vehicle occupants	1.22	0.71	2.25	2.69	4.41	4.04	5.7
Chronic liver disease	1.12	1.06	1.31	1.60	2.01	2.73	2.6
Liver cancer	0.95	1.14	0.85	1.05	1.32	0.98	0.9
Accidental poisoning	0.81	0.76	0.90	0.82	1.07	1.60	2.1
Epilepsy	0.62	0.49	1.26	1.04	1.22	2.40	4.9
Breast cancer	0.58	0.61	0.66	0.59	0.71	0.63	1.0
Falls	0.56	0.58	0.71	0.77	1.48	1.81	3.1
Mouth and pharyngeal cancer	0.53	0.46	0.58	0.83	0.89	1.47	3.2
Homicide and violence	0.49	0.34	0.58	0.70	1.36	1.73	5.0
Other unintentional injuries	0.45	0.31	0.64	0.78	1.21	1.01	3.3
Oesophageal cancer	0.41	0.34	0.54	0.59	0.80	0.66	1.9
Bowel cancer	0.39	0.43	0.54	0.58	1.04	0.72	1.7
Road traffic injuries—motorcyclists	0.37	0.3	0.47	0.57	0.43	0.17	0.6
Other land transport injuries	0.36	0.26	0.52	0.61	0.85	0.86	3.2
Stroke	0.33	0.48	0.54	0.67	1.31	1.20	2.5
Other road traffic injuries	0.30	0.24	0.36	0.52	0.54	1.44	6.0
Atrial fibrillation and flutter	0.25	0.37	0.44	0.48	0.93	1.12	3.0
Coronary heart disease	0.16	0.32	0.44	0.44	1.78	1.83	5.8
Lower respiratory infections	0.15	0.28	0.30	0.35	0.63	1.19	4.3
Drowning	0.14	0.10	0.23	0.18	0.10	0.28	2.9
Fire, burns and scalds	0.10	0.07	0.14	0.16	0.34	0.44	6.8
Laryngeal cancer	0.07	0.07	0.09	0.12	0.15	0.02	0.3
Hypertensive heart disease	0.05	0.07	0.10	0.11	0.12	0.15	2.1
Pancreatitis	0.03	0.03	0.04	0.05	0.12	0.32	10.0

Notes

1. Rates were age-standardised to the 2001 Australian Standard Population and are expressed per 1,000 persons.
2. Rate ratios divide the ASR for *Very remote* by the ASR for *Major cities*.

Source: AIHW analysis of burden of disease database, 2011.

Table B4: Age-standardised DALY rates and rate ratio of burden attributable to alcohol use, by remoteness, 2011

	Males			Females			Persons		
Remoteness area	**DALY ('000)**	**ASR per 1,000**	**Rate ratio**	**DALY ('000)**	**ASR per 1,000**	**Rate ratio**	**DALY ('000)**	**ASR per 1,000**	**Rate ratio**
Major cities	95	12.2	1.0	46	5.8	1.0	141	9.0	1.0
Inner regional	33	16.3	1.3	15	7.1	1.2	48	11.7	1.3
Outer regional	18	17.0	1.4	7	6.5	1.1	24	11.9	1.3
Remote	4	22.6	1.8	2	10.6	1.8	5	17.0	1.9
Very remote	3	29.0	2.4	1	12.3	2.1	4	21.5	2.4

Notes

1. Rates were age-standardised to the 2001 Australian Standard Population and are expressed per 1,000 persons.
2. Rate ratios divide the ASR by the ASR for *Major cities*.

Source: AIHW analysis of burden of disease database, 2011.

Table B5: Age-standardised DALY rates per 1,000 persons of burden attributable to alcohol use, by socioeconomic group and linked disease, 2011

Linked disease	Total	Socioeconomic group					Rate ratio
		Q1 (lowest)	Q2	Q3	Q4	Q5 (highest)	
Alcohol dependence	6.00	7.46	7.77	6.14	5.46	4.23	1.8
Suicide and self-inflicted injuries	1.48	2.47	2.25	1.44	1.06	0.80	3.1
Road traffic injuries - motor vehicle occupants	1.22	1.78	1.55	1.10	0.84	0.70	2.5
Chronic liver disease	1.12	1.80	1.43	1.16	0.89	0.69	2.6
Liver cancer	0.95	1.35	1.23	1.01	1.00	0.79	1.7
Accidental poisoning	0.81	0.94	0.88	0.84	0.64	0.53	1.8
Epilepsy	0.62	1.04	0.82	0.66	0.56	0.39	2.7
Breast cancer	0.58	0.67	0.65	0.58	0.60	0.58	1.1
Falls	0.56	0.72	0.64	0.57	0.63	0.68	1.1
Mouth and pharyngeal cancer	0.53	0.76	0.58	0.47	0.43	0.42	1.8
Homicide and violence	0.49	0.78	0.50	0.43	0.30	0.23	3.4
Other unintentional injuries	0.45	0.48	0.51	0.45	0.33	0.33	1.5
Oesophageal cancer	0.41	0.53	0.48	0.45	0.33	0.29	1.8
Bowel cancer	0.39	0.66	0.53	0.48	0.38	0.31	2.1
Road traffic injuries - motorcyclists	0.37	0.36	0.40	0.47	0.28	0.24	1.5
Other land transport injuries	0.36	0.46	0.38	0.40	0.26	0.25	1.8
Stroke	0.33	0.70	0.56	0.45	0.50	0.42	1.7
Other road traffic injuries	0.30	0.40	0.33	0.27	0.25	0.24	1.6
Atrial fibrillation and flutter	0.25	0.44	0.45	0.36	0.38	0.37	1.2
Coronary heart disease	0.16	0.61	0.59	0.38	0.20	0.07	8.2
Lower respiratory infections	0.15	0.38	0.33	0.28	0.25	0.23	1.7
Drowning	0.14	0.21	0.12	0.14	0.07	0.10	2.1
Fire, burns and scalds	0.10	0.15	0.11	0.07	0.07	0.05	3.2
Laryngeal cancer	0.07	0.12	0.09	0.08	0.06	0.04	2.9
Hypertensive heart disease	0.05	0.09	0.08	0.07	0.10	0.06	1.4
Pancreatitis	0.03	0.06	0.05	0.04	0.03	0.02	3.1

Notes

1. Rates were age-standardised to the 2001 Australian Standard Population and are expressed per 1,000 persons.
2. Rate ratios divide the ASR for Q1 by the ASR for Q5.

Source: AIHW analysis of burden of disease database, 2011.

Table B6: Age-standardised DALY rates and rate ratio of burden attributable to alcohol use, by socioeconomic group, 2011

	Males			Females			Persons		
Socioeconomic group	DALY ('000)	ASR per 1,000	Rate ratio	DALY ('000)	ASR per 1,000	Rate ratio	DALY ('000)	ASR per 1,000	Rate ratio
Q1 (lowest)	40	18.6	2.1	16	7.5	1.6	56	13.1	1.9
Q2	37	17.0	1.9	16	7.4	1.6	54	12.2	1.8
Q3	30	13.6	1.5	14	6.1	1.3	44	9.8	1.4
Q4	25	11.0	1.2	13	5.7	1.3	38	8.3	1.2
Q5 (highest)	21	9.1	1.0	11	4.6	1.0	31	6.8	1.0

Notes

1. Rates were age-standardised to the 2001 Australian Standard Population and are expressed per 1,000 persons.
2. Rate ratios divide the ASR by the ASR for Q5.

Source: AIHW analysis of burden of disease database, 2011.

Table B7: Expected burden (DALY) attributable to alcohol use in 2020 and 2025, and percentage change from 2011, by sex

	2011			2020				2025			
	Attributable DALY	% of total DALY	ASR (per 1,000)	Expected attributable DALY	% change from 2011	Expected ASR (per 1,000)	ASR ratio 2020:2011	Expected attributable DALY	% change from 2011	Expected ASR (per 1,000)	ASR ratio 2020:2011
Males	151,149	6.3	13.5	158,741	5.0	12.1	0.9	171,710	13.6	12.1	0.9
Females	56,628	2.7	4.7	68,140	20.3	4.8	1.0	75,529	33.4	4.9	1.0
Persons	**207,777**	**4.6**	**9.1**	**226,881**	**9.2**	**8.5**	**0.9**	**247,239**	**19.0**	**8.5**	**0.9**

Note: Rates were age-standardised to the 2001 Australian Standard Population and are expressed per 1,000 persons.

Source: AIHW analysis of burden of disease database, 2011.

Table B8: Expected burden (DALY) attributable to alcohol use in 2020, and percentage change from 2011, by sex and linked disease

	Males				Females				Persons			
Linked disease	Expected attributable DALY	% change from 2011	Expected ASR	ASR ratio 2020:2011	Expected attributable DALY	% change from 2011	Expected ASR	ASR ratio 2020:2011	Expected attributable DALY	% change from 2011	Expected ASR	ASR ratio 2020:2011
Accidental poisoning	7,315	13.4	0.6	1.0	2,699	12.7	0.2	1.0	10,014	13.3	0.4	1.0
Alcohol dependence	55,804	13.1	4.5	1.0	18,696	11.9	1.5	1.0	74,500	12.8	3.0	1.0
Atrial fibrillation and flutter	2,911	52.0	0.2	1.2	2,577	72.4	0.1	1.3	5,488	60.9	0.2	1.2
Bowel cancer	3,623	41.4	0.2	1.1	3,531	44.2	0.2	1.1	7,154	42.8	0.2	1.1
Breast cancer[(a)]	—	—	—	—	12,178	68.3	0.8	1.4	12,178	68.3	0.4	1.4
Chronic liver disease	10,387	19.9	0.7	1.0	5,500	19.1	0.4	1.0	15,887	19.6	0.6	1.0
Coronary heart disease[(b)]	—	—	—	—	—	—	—	—	—	—	—	—
Drowning	787	–48.1	0.1	0.5	57	–54.2	0.0	0.4	844	–48.5	0.0	0.4
Epilepsy	5,662	16.3	0.4	1.0	3,667	58.0	0.3	1.3	9,329	29.7	0.3	1.1
Falls	3,766	–36.1	0.3	0.5	538	–43.2	0.0	0.5	4,304	–37.1	0.1	0.5
Fire, burns and scalds	552	–42.2	0.0	0.5	83	–47.6	0.0	0.4	634	–42.9	0.0	0.5
Homicide and violence	2,835	–41.3	0.2	0.5	318	–50.4	0.0	0.4	3,152	–42.4	0.1	0.5
Hypertensive heart disease	708	49.0	0.0	1.2	181	–9.9	0.0	0.8	889	31.5	0.0	1.1
Laryngeal cancer	1,125	34.4	0.1	1.1	151	90.3	0.0	1.5	1,275	39.2	0.0	1.1
Liver cancer	10,585	25.3	0.7	1.0	4,133	29.0	0.3	1.0	14,718	26.3	0.5	1.0

(continued)

Table B8 (continued): Expected burden (DALY) attributable to alcohol use in 2020, and percentage change from 2011, by sex and linked disease

	Males				Females				Persons			
Linked disease	**Expected attributable DALY**	**% change from 2011**	**Expected ASR**	**ASR ratio 2020:2011**	**Expected attributable DALY**	**% change from 2011**	**Expected ASR**	**ASR ratio 2020:2011**	**Expected attributable DALY**	**% change from 2011**	**Expected ASR**	**ASR ratio 2020:2011**
Lower respiratory infections	1,826	49.5	0.1	1.1	1,636	67.6	0.1	1.3	3,462	57.6	0.1	1.2
Mouth and pharyngeal cancer	6,880	21.6	0.5	1.0	1,537	83.2	0.1	1.5	8,416	29.6	0.3	1.1
Oesophageal cancer	5,603	29.0	0.4	1.0	1,250	86.5	0.1	1.5	6,853	36.7	0.2	1.1
Other land transport injuries	2,809	–16.1	0.2	0.7	643	–11.7	0.0	0.8	3,452	–15.3	0.1	0.7
Other road traffic injuries	2,395	–15.1	0.2	0.7	523	–9.2	0.0	0.8	2,918	–14.1	0.1	0.7
Other unintentional injuries	2,753	–42.1	0.2	0.5	224	–47.6	0.0	0.4	2,977	–42.6	0.1	0.5
Pancreatitis	298	2.8	0.0	0.8	197	39.2	0.0	1.1	494	14.8	0.0	0.9
Road traffic injuries—motor vehicle occupants	8,329	–22.2	0.7	0.7	2,411	–20.0	0.2	0.7	10,741	–21.7	0.4	0.7
Road traffic injuries—motorcyclists	3,141	–21.0	0.2	0.7	168	–13.9	0.0	0.8	3,309	–20.7	0.1	0.7
Stroke	2,737	–12.9	0.2	0.7	2,905	104.5	0.2	1.6	5,642	23.7	0.2	1.0
Suicide and self-inflicted injuries	15,912	12.5	1.3	1.0	2,338	10.5	0.2	1.0	18,250	12.2	0.7	1.0
Total	**158,741**	**5.0**	**12.1**	**0.9**	**68,140**	**20.3**	**4.8**	**1.0**	**226,881**	**9.2**	**8.5**	**0.9**

(a) *Breast cancer* burden attributable to alcohol use is reported for females only.

(b) Estimates of attributable burden for coronary heart disease in 2020 resulted in negative burden in males and females, as the relative risks for some measures of exposure to alcohol use equalled 1 or less than 1, and there were potential changes in exposure in 2020. For this study, negative attributable burden is not reported.

Note: Rates were age-standardised to the 2001 Australian Standard Population and are expressed per 1,000 persons.

Source: AIHW analysis of burden of disease database, 2011.

Table B9: Expected burden (DALY) attributable to alcohol use in 2025, and percentage change from 2011, by sex and linked disease

	Males				Females				Persons			
Linked disease	Expected attributable DALY	% change from 2011	Expected ASR	ASR ratio 2025:2011	Expected attributable DALY	% change from 2011	Expected ASR	ASR ratio 2025:2011	Expected attributable DALY	% change from 2011	Expected ASR	ASR ratio 2025:2011
Accidental poisoning	8,082	25.3	0.6	1.0	3,000	25.3	0.2	1.0	11,082	25.3	0.4	1.0
Alcohol dependence	59,858	21.3	4.5	1.0	19,847	18.8	1.5	1.0	79,705	20.7	3.0	1.0
Atrial fibrillation and flutter	3,391	77.1	0.2	1.2	3,049	104.0	0.1	1.4	6,440	88.9	0.2	1.2
Bowel cancer	4,095	59.9	0.2	1.1	4,036	64.9	0.2	1.2	8,131	62.3	0.2	1.1
Breast cancer[(a)]	—	—	—	—	13,729	89.7	0.8	1.4	13,729	89.7	0.4	1.4
Chronic liver disease	11,388	31.4	0.8	1.0	6,019	30.3	0.4	1.0	17,408	31.0	0.6	1.0
Coronary heart disease[(b)]	—	—	—	—	—	—	—	—	—	—	—	—
Drowning	781	–48.4	0.1	0.4	64	–48.7	0.0	0.4	846	–48.4	0.0	0.4
Epilepsy	6,113	25.5	0.4	1.0	4,033	73.7	0.3	1.3	10,146	41.1	0.3	1.1
Falls	4,120	–30.1	0.3	0.5	668	–29.5	0.0	0.5	4,788	–30.0	0.1	0.5
Fire, burns and scalds	578	–39.3	0.0	0.5	99	–37.6	0.0	0.5	677	–39.1	0.0	0.5
Homicide and violence	2,919	–39.6	0.2	0.5	363	–43.3	0.0	0.5	3,283	–40.0	0.1	0.5
Hypertensive heart disease	814	71.2	0.0	1.2	234	16.6	0.0	0.9	1,048	55.0	0.0	1.1
Laryngeal cancer	1,283	53.3	0.1	1.1	173	119.0	0.0	1.5	1,456	59.0	0.0	1.1
Liver cancer	11,833	40.1	0.7	1.0	4,729	47.6	0.3	1.0	16,562	42.2	0.5	1.0

(Continued)

Table B9 (continued): Expected burden (DALY) attributable to alcohol use in 2025, and percentage change from 2011, by sex and linked disease

	Males				Females				Persons			
Linked disease	**Expected attributable DALY**	**% change from 2011**	**Expected ASR**	**ASR ratio 2025:2011**	**Expected attributable DALY**	**% change from 2011**	**Expected ASR**	**ASR ratio 2025:2011**	**Expected attributable DALY**	**% change from 2011**	**Expected ASR**	**ASR ratio 2025:2011**
Lower respiratory infections	2,122	73.8	0.1	1.1	1,890	93.7	0.1	1.3	4,012	82.6	0.1	1.2
Mouth and pharyngeal cancer	7,553	33.5	0.5	1.0	1,757	109.5	0.1	1.5	9,310	43.3	0.3	1.1
Oesophageal cancer	6,259	44.1	0.4	1.0	1,458	117.5	0.1	1.5	7,717	53.9	0.2	1.1
Other land transport injuries	2,936	–12.3	0.2	0.7	691	–5.2	0.0	0.8	3,627	–11.0	0.1	0.7
Other road traffic injuries	2,515	–10.8	0.2	0.7	576	0.0	0.0	0.8	3,091	–9.0	0.1	0.7
Other unintentional injuries	2,869	–39.7	0.2	0.5	269	–37.2	0.0	0.5	3,137	–39.5	0.1	0.5
Pancreatitis	335	15.8	0.0	0.8	227	61.0	0.0	1.1	563	30.6	0.0	0.9
Road traffic injuries—motor vehicle occupants	8,508	–20.5	0.6	0.7	2,532	–16.0	0.2	0.7	11,040	–19.5	0.4	0.7
Road traffic injuries—motorcyclists	3,224	–18.9	0.2	0.7	183	–6.3	0.0	0.8	3,406	–18.4	0.1	0.7
Stroke	3,200	1.8	0.2	0.7	3,430	141.4	0.2	1.7	6,630	45.3	0.2	1.0
Suicide and self-inflicted injuries	16,934	19.7	1.3	1.0	2,473	16.9	0.2	1.0	19,407	19.3	0.7	1.0
Total	**171,710**	**13.6**	**12.1**	**0.9**	**75,529**	**33.4**	**4.9**	**1.0**	**247,239**	**19.0**	**8.5**	**0.9**

(a) *Breast cancer* burden attributable to alcohol use is reported for females only.

(b) Estimates of attributable burden for coronary heart disease in 2020 resulted in negative burden in males and females, as to the relative risks for some measures of exposure to alcohol use equalled 1 or less than 1, and there were potential changes in exposure in 2020. For this study, negative attributable burden is not reported.

Note: Rates were age-standardised to the 2001 Australian Standard Population and are expressed per 1,000 persons.

Source: AIHW analysis of burden of disease database, 2011.

Table B10: Comparison of burden (DALY) attributable to illicit drug use by drug type and linked disease, 2003 and 2011

		DALY (number)			DALY ASR		
Drug type	Cause name	2003	2011	Change in DALY (%)	2003	2011	ASR rate ratio 2003:2011
Amphetamine use	Amphetamine dependence	5,737	6,448	12	0.29	0.30	1.0
	Accidental poisoning	1,962	3,733	90	0.10	0.17	1.7
	Road traffic injuries—motor vehicle occupants	14,791	3,694	–75	0.75	0.17	0.2
	Road traffic injuries—motorcyclists	3,408	1,139	–67	0.18	0.05	0.3
	Suicide and self-inflicted injuries	2,979	3,105	4.2	0.15	0.14	0.9
Cannabis use	Anxiety disorders	281	314	12	0.01	0.01	1.0
	Cannabis dependence	2,273	2,397	5.5	0.12	0.11	0.9
	Depressive disorders	270	301	11	0.01	0.01	1.0
	Accidental poisoning	436	2,761	533	0.02	0.13	5.7
	Road traffic injuries—motor vehicle occupants	658	308	–53	0.03	0.01	0.4
	Road traffic injuries—motorcyclists	154	95	–38	0.01	0.00	0.5
	Schizophrenia	489	555	13	0.03	0.03	1.0
Cocaine use	Cocaine dependence	2,440	2,743	12	0.13	0.13	1.0
	Accidental poisoning	545	562	3.1	0.03	0.03	0.9
	Road traffic injuries—motor vehicle occupants	697	309	–56	0.04	0.01	0.4
	Road traffic injuries—motorcyclists	150	88	-41	0.01	0.00	0.5
	Suicide and self-inflicted injuries	4,279	4,471	4.5	0.22	0.21	0.9
Unsafe injecting practices	Chronic liver disease	8,033	12,198	52	0.40	0.51	1.3
	HIV/AIDS	613	254	–59	0.03	0.01	0.4
	Hepatitis B (acute)	245	103	–58	0.01	0.00	0.4
	Hepatitis C (acute)	1,357	49	–96	0.07	0.00	0.0
	Liver cancer	2,540	6,042	138	0.13	0.25	2.0
Opioid use	Opioid dependence	10,191	12,259	20	0.52	0.56	1.1
	Accidental poisoning	20,458	26,435	29	1.04	1.21	1.2
	Road traffic injuries—motor vehicle occupants	352	82	–77	0.02	0.00	0.2
	Road traffic injuries—motorcyclists	82	25	–70	0.00	0.00	0.3
	Suicide and self-inflicted injuries	2,916	3,292	13	0.15	0.15	1.0
Other illicit drug use	Other illicit drug dependence	6,413	8,105	26	0.33	0.37	1.1

Note: Rates were age-standardised to the 2001 Australian Standard Population and are expressed per 1,000 persons.

Source: AIHW analysis of burden of disease database, 2011

Table B11: Expected burden (DALY) attributable to illicit drug use in 2020 and 2025, and percentage change from 2011, by drug type

Drug type and practices		2011			2020				2025			
		Attributable DALY	% of total DALY	ASR (per 1,000)	Expected attributable DALY	% change from 2011	Expected ASR	ASR ratio 2020:2011	Expected attributable DALY	% change from 2011	Expected ASR	ASR ratio 2025:2011
Amphetamine use	Males	14,387	0.6	2.6	18,520	28.7	3.0	1.1	19,723	37.1	3.0	1.1
	Females	3,732	0.2	0.7	5,024	34.6	0.8	1.2	5,528	48.1	0.8	1.2
	Persons	**18,119**	**0.4**	**1.7**	**23,544**	**29.9**	**1.9**	**1.1**	**25,251**	**39.4**	**1.9**	**1.2**
Cannabis use	Males	5,373	0.2	1.0	6,163	14.7	1.0	1.0	7,073	31.6	1.1	1.1
	Females	1,358	0.1	0.2	2,112	55.5	0.3	1.4	2,460	81.1	0.4	1.5
	Persons	**6,731**	**0.1**	**0.6**	**8,275**	**22.9**	**0.7**	**1.1**	**9,533**	**41.6**	**0.7**	**1.2**
Cocaine use	Males	6,767	0.3	1.2	5,863	–13.4	0.9	0.8	6,057	–10.5	0.9	0.7
	Females	1,406	0.1	0.3	1,650	17.4	0.3	1.0	1,701	21.0	0.3	1.0
	Persons	**8,172**	**0.2**	**0.8**	**7,514**	**–8.1**	**0.6**	**0.8**	**7,758**	**–5.1**	**0.6**	**0.8**
Unsafe injecting practices	Males	13,213	0.5	2.3	12,531	–5.2	1.8	0.8	12,070	–8.6	1.6	0.7
	Females	5,432	0.3	0.9	5,453	0.4	0.7	0.8	5,451	0.4	0.7	0.8
	Persons	**18,645**	**0.4**	**1.6**	**17,984**	**–3.5**	**1.3**	**0.8**	**17,521**	**–6.0**	**1.1**	**0.7**

Note: Rates were age-standardised to the 2001 Australian Standard Population and are expressed per 1,000 persons.

Source: AIHW analysis of burden of disease database, 2011.

Table B12: Expected burden (DALY) attributable to illicit drug use in 2020 and percentage change from 2011, by sex, for selected linked diseases

	Males				Females				Persons			
Linked disease	Expected attributable DALY	% change from 2011	Expected ASR	ASR ratio 2020:2011	Expected attributable DALY	% change from 2011	Expected ASR	ASR ratio 2020:2011	Expected attributable DALY	% change from 2011	Expected ASR	ASR ratio 2020:2011
Accidental poisoning	29,247	19.8	2.3	1.0	10,791	19.0	0.8	1.0	40,038	19.5	1.6	1.0
Chronic liver disease	7,703	–8.4	0.6	0.8	3,753	–0.9	0.3	0.8	11,456	–6.1	0.4	0.8
Suicide and self-inflicted injuries	6,755	–0.2	0.5	0.9	1,086	34.4	0.1	1.2	7,840	3.5	0.3	0.9
Amphetamine dependence	5,437	14.1	0.4	1.0	1,919	13.9	0.2	1.0	7,357	14.1	0.3	1.0
Liver cancer	4,236	–5.4	0.3	0.8	1,636	4.5	0.1	0.8	5,872	–2.8	0.2	0.8
Road traffic injuries —motor vehicle occupants	3,156	–12.3	0.3	0.8	679	–14.3	0.1	0.8	3,835	–12.7	0.2	0.8
Cocaine dependence	2,331	15.0	0.2	1.0	819	14.4	0.1	1.0	3,150	14.8	0.1	1.0
Cannabis dependence	2,262	12.3	0.2	1.0	419	9.7	0.0	1.0	2,681	11.9	0.1	1.0
Road traffic injuries —motorcyclists	1,141	–12.3	0.1	0.8	39	–14.0	0.0	0.8	1,181	–12.4	0.0	0.8
HIV/AIDS	498	132.0	0.0	2.0	23	–41.7	0.0	0.5	521	105.3	0.0	1.8
Schizophrenia	347	–33.2	0.0	0.6	139	291.0	0.0	3.3	486	–12.4	0.0	0.8
Anxiety disorders	180	–23.4	0.0	0.7	245	212.1	0.0	2.7	426	35.5	0.0	1.2
Depressive disorders	169	–30.6	0.0	0.6	188	225.3	0.0	2.8	357	18.5	0.0	1.0
Hepatitis B (acute)	53	–22.6	0.0	0.7	35	–0.1	0.0	0.8	87	–15.0	0.0	0.7
Hepatitis C (acute)	41	–2.9	0.0	0.9	6	–2.5	0.0	0.8	47	–2.9	0.0	0.9

Notes

1. Linked disease *Suicide and self-inflicted injuries* excludes burden due to *Opioid dependence*, because no trend in *Opioid dependence* could be calculated for this study.
2. Rates were age-standardised to the 2001 Australian Standard Population and are expressed per 1,000 persons.

Source: AIHW analysis of burden of disease database, 2011.

Table B13: Expected burden (DALY) attributable to illicit drug use in 2025 and percentage change from 2011, by sex, for selected linked diseases

	Males				Females				Persons			
Linked disease	Expected attributable DALY	% change from 2011	Expected ASR	ASR ratio 2025:2011	Expected attributable DALY	% change from 2011	Expected ASR	ASR ratio 2025:2011	Expected attributable DALY	% change from 2011	Expected ASR	ASR ratio 2025:2011
Accidental poisoning	31,819	30.3	2.4	1.1	11,810	30.2	0.9	1.1	43,629	30.3	1.6	1.1
Chronic liver disease	7,358	–12.5	0.5	0.7	3,712	–2.0	0.2	0.8	11,070	–9.2	0.4	0.7
Suicide and self-inflicted injuries	7,190	6.2	0.5	0.9	1,157	43.2	0.1	1.2	8,346	10.2	0.3	0.9
Amphetamine dependence	5,814	22.1	0.4	1.0	2,049	21.6	0.2	1.0	7,862	21.9	0.3	1.0
Liver cancer	4,098	–8.5	0.3	0.7	1,675	7.0	0.1	0.8	5,773	–4.5	0.2	0.7
Cocaine dependence	2,506	23.6	0.2	1.0	876	22.4	0.1	1.0	3,382	23.3	0.1	1.0
Road traffic injuries—motor vehicle occupants	2,611	–27.5	0.2	0.6	560	–29.4	0.0	0.6	3,171	–27.8	0.1	0.6
Cannabis dependence	2,409	19.5	0.2	1.0	447	17.0	0.0	1.0	2,855	19.1	0.1	1.0
Road traffic injuries—motorcyclists	947	–27.2	0.1	0.6	32	–28.9	0.0	0.6	979	–27.3	0.0	0.6
HIV/AIDS	529	146.2	0.0	2.0	24	–37.6	0.0	0.5	553	118.0	0.0	1.8
Schizophrenia	371	–28.5	0.0	0.6	149	318.0	0.0	3.3	520	–6.3	0.0	0.8
Anxiety disorders	193	–18.1	0.0	0.7	260	231.4	0.0	2.7	453	44.3	0.0	1.2
Depressive disorders	181	–25.6	0.0	0.6	200	246.1	0.0	2.8	381	26.6	0.0	1.0
Hepatitis B (acute)	46	–32.3	0.0	0.5	33	–4.3	0.0	0.7	79	–22.8	0.0	0.6
Hepatitis C (acute)	40	–6.2	0.0	0.8	6	–2.4	0.0	0.8	46	–5.7	0.0	0.8

Notes

1. Linked disease *Suicide and self-inflicted injuries* excludes burden due to *Opioid dependence*, because no trend in *Opioid dependence* could be calculated for this study.
2. Rates were age-standardised to the 2001 Australian Standard Population and are expressed per 1,000 persons.

Source: AIHW analysis of burden of disease database, 2011.

Glossary

all-cause mortality: The total deaths in a population, irrespective of cause of death.

attributable burden: The disease burden attributed to a particular risk factor. It is the reduction in burden that would have occurred if exposure to the risk factor had been avoided or had been reduced to its **theoretical minimum risk exposure distribution (TMRED)**.

chronic disease: A disease that tends to be long lasting and persistent in its symptoms or development.

comparative risk assessment: The process for estimating the burden of disease attributable to selected risk factors. It involves 5 key steps: selection of linked diseases, estimation of exposure distribution, estimation of effect sizes, choice of theoretical minimum risk exposure level, and calculation of attributable burden.

confounding: Describes an observed association that is due, in whole or part, to a third factor associated both with the exposure and with the outcome of interest.

disability-adjusted life year (DALY): A year of healthy life lost, either through premature death or, equivalently, through living with disability due to illness or injury.

effect size: A statistical measure of the strength of the relationship between 2 variables (in this context, between a risk exposure and a disease outcome), expressed, for example, as a relative risk or odds ratio.

linked disease: A disease or condition on the causal pathway of the risk factor, which is therefore more likely to develop if exposed to the risk.

population attributable fraction (PAF): For a particular risk factor and causally linked disease or injury, the percentage reduction in burden that would occur for a population if exposure to the risk factor were avoided or reduced to its theoretical minimum.

relative risk (RR): The risk of an event relative to exposure, calculated as the ratio of the probability of the event's occurring in the exposed group to the probability of its occurring in the non-exposed group. A RR of 1 implies no difference in risk; RR <1 implies the event is less likely to occur in the exposed group; and RR >1 implies the event is more likely to occur in the exposed group.

relative standard error: The standard error expressed as a percentage of the estimate. This indicates the percentage of errors likely to have occurred due to sampling.

risk factor: Any factor that causes or increases the likelihood of a health disorder or other unwanted condition or event.

theoretical minimum risk exposure distribution (TMRED): The risk factor exposure distribution that will lead to the lowest conceivable disease burden.

years lived with disability (YLD): A measure of the years of what could have been a healthy life that were instead spent in states of less than full health. This is also referred to as non-fatal burden.

years of life lost (YLL): A measure of the years of life lost due to premature mortality. This is also referred to as fatal burden.

References

ABS (Australian Bureau of Statistics) 2008. National Survey of Mental Health and Wellbeing: summary of results, 2007. ABS cat. no. 4326.0. Canberra: ABS. Viewed: 2 October 2017, <http://www.abs.gov.au/ausstats/abs@.nsf/mf/4326.0>.

ABS 2010a. Causes of death, Australia, 2008. ABS cat. no. 3303.0. Canberra: ABS. Viewed 22 November 2017, <http://www.abs.gov.au/ausstats/abs@.nsf/detailspage/3303.02008>.

ABS 2010b. Measures of Australia's progress, 2010. ABS cat. no. 1370.0. Canberra: ABS. Viewed: 28 April 2017, <http://www.abs.gov.au/ausstats/abs@.nsf/Lookup/by%20Subject/1370.0~2010~Main%20Features~Home%20page%20(1)>.

ABS 2011. Australian standard classification of drugs of concern, 2011. ABS cat. no. 1248.0. Canberra: ABS.

ABS 2012. Apparent Consumption of Alcohol, Australia, 2010–11. ABS cat. no. 4307.0.55.001. Canberra: ABS.

ABS 2013. Australian Statistical Geography Standard (ASGS): Volume 5—Remoteness Structure, July 2011. ABS cat. no. 1270.0.55.005. Canberra: ABS.

ACC (Australian Crime Commission) 2015. The Australian methylamphetamine market—the national picture. Canberra: ACC.

AIHW (Australian Institute of Health and Welfare) 2001. The quantification of drug-caused mortality and morbidity in Australia, 1998. Drug statistics series no. 7. Cat. no. PHE 29. Canberra: AIHW.

AIHW 2011. Drugs in Australia 2010: tobacco, alcohol and other drugs. Drug statistics series no. 27. Cat. no. PHE 154. Canberra: AIHW.

AIHW 2014a. Australia's health 2014. Australia's health series no. 14. Cat. no. AUS 178. Canberra: AIHW.

AIHW 2014b. National Drug Strategy Household Survey detailed report 2013. Drug statistics series no. 28. Cat. no. PHE 183. Canberra: AIHW.

AIHW 2016a. Australian Burden of Disease Study 2011: methods and supplementary material. Australian Burden of Disease Study series no. 5. Cat. no. BOD 6. Canberra: AIHW.

AIHW 2016b. Australian Burden of Disease Study: impact and causes of illness and death in Aboriginal and Torres Strait Islander people 2011. Australian Burden of Disease Study series no. 6. Cat. no. BOD 7. Canberra: AIHW.

AIHW 2016c. Australian Burden of Disease Study: Impact and causes of illness and death in Australia 2011. Australian Burden of Disease Study series no. 3. BOD 4. Canberra: AIHW.

AIHW 2016d. Australia's health 2016. Australia's health series no. 15. Cat. no. AUS 199. Canberra: AIHW.

AIHW 2016e. Contribution of vascular diseases and risk factors to the burden of dementia in Australia: Australian Burden of Disease Study 2011. Australian Burden of Disease Study series no. 9. Cat. no. BOD 10. Canberra: AIHW.

AIHW 2016f. Diabetes and chronic kidney disease as risks for other diseases. Australian Burden of Disease Study 2011. Australian Burden of Disease Study series no. 8. Cat. no. BOD 9. Canberra: AIHW.

AIHW 2017a. Burden of cancer in Australia: Australian Burden of Disease Study 2011. Australian Burden of Disease Study series no. 12. Cat. no. BOD 13. Canberra: AIHW.

AHIW 2017b. The burden of chronic respiratory conditions in Australia: a detailed analysis of the Australian Burden of Disease Study 2011. Australian Burden of Disease Study series no. 14. Cat. no. BOD 15. Canberra: AIHW.

AIHW 2017c. The burden of musculoskeletal conditions in Australia: a detailed analysis of the Australian Burden of Disease Study 2011. Australian Burden of Disease Study series no. 13. Cat. no. BOD 14. Canberra: AIHW.

AIHW 2017d. Impact of overweight and obesity as a risk factor for chronic conditions: Australian Burden of Disease Study. Australian Burden of Disease Study series no. 11. Cat. no. BOD 12. Canberra: AIHW.

AIHW 2017e. Impact of physical inactivity as a risk factor for chronic conditions: Australian Burden of Disease Study. Australian Burden of Disease Study series no. 15. Cat. no. BOD 16. Canberra: AIHW.

AIHW 2017f. National Drug Strategy Household Survey 2016: detailed findings. Drug statistics series no. 31. Cat. no. PHE 214. Canberra: AIHW.

Amin J, O'Connell D, Bartlett M, Tracey E, Kaldor J, Law M et al. 2007. Liver cancer and hepatitis B and C in New South Wales, 1990–2002: a linkage study. Australian and New Zealand Journal of Public Health, 31(5):475–82. doi:10.1111/j.1753-6405.2007.00121.

Antonsson A, Wilson LF, Kendall BJ, Bain CJ, Whiteman DC & Neale RE 2015. Cancers in Australia in 2010 attributable to infectious agents. Australian and New Zealand Journal of Public Health, 39(5):446–51. doi:org/10.1111/1753-6405.12445.

Begg S, Vos T, Barker B, Stevenson C, Stanley L & Lopez AD 2007. The burden of disease and injury in Australia 2003. Cat. no. PHE 82. Canberra: AIHW.

Burns L, Breen C, Bower C, O'Leary C & Elliott EJ 2013. Counting fetal alcohol spectrum disorders in Australia: the evidence and the challenges. Drug and Alcohol Review 32(5):461–67.

Burstein R, Fleming T, Haagsma J, Salomon JA, Vos T, & Murray CJL 2015. Estimating distributions of health state severity for the global burden of disease study. Population Health Metrics 13(31):1–19.

Chalmers J, Lancaster K & Hughes C 2016. The stigmatisation of 'ice' and under-reporting of meth/amphetamine use in general population surveys: A case study from Australia. The International Journal of Drug Policy 36:15–24.

COAG (Council of Australian Governments) 2015. National Ice Action Strategy 2015. Canberra: Commonwealth of Australia.

Davey J, Armstrong K & Martin P 2013. Results of the Queensland 2007–2012 roadside drug-testing program: the prevalence of three illicit drugs. Accident Analysis and Prevention 65:11–17.

Degenhardt L, Larney S, Chan G, Dobbins T, Weier M, Roxburgh A et al. 2016. Estimating the number of regular and dependent methamphetamine users in Australia, 2002–2014. Medical Journal of Australia 204(4):1.e2–6.

Degenhardt L, Whiteford HA, Ferrari AJ, Baxter AJ, Charlson FJ, Hall WD et al, 2013. Global burden of disease attributable to illicit drug use and dependence: findings from the Global Burden of Disease Study 2010. Lancet 382(9904):1564-74. doi: 10.1016/S0140-6736(13)61530-5.

Degenhardt L, Rendle V, Hall W, Gilmour S & Law M 2004. Estimating the number of current regular heroin users in NSW and Australia 1997–2002. Sydney: National Drug and Alcohol Research Centre.

DoH (Department of Health) 2013. Alcohol and other drugs. Canberra: DoH. Viewed 3 April 2017, <http://www.drugs.health.gov.au/internet/drugs/publishingcp.nsf/content/home>.

Elvik R 2013.Risk of road accident associated with the use of drugs: a systematic review and meta-analysis of evidence from epidemiological studies. Accident Analysis and Prevention 60:254–267.

Ferrari AJ, Norman RE, Freedman G, Baxter AJ, Pirkis JE, Harris MG et al. 2014. The burden attributable to mental and substance use disorders as risk factors for suicide: findings from the Global Burden of Disease Study 2010. PLoS ONE 9(4):e91936. doi:10.1371/journal.pone.0091936.

Forouzanfar MH, Afshin A, Alexander LT, Anderson HR, Bhutta ZA, Biryukov S et al. 2016. Global, regional, and national comparative risk assessment of 79 behavioural, environmental and occupational, and metabolic risks or clusters of risks, 1990–2015. The Lancet 388(10053):1659–1724.

GBD (Global Burden of Disease Study) 2013 Collaborators. Global, regional, and national incidence, prevalence, and years lived with disability for 301 acute and chronic diseases and injuries in 188 countries, 1990–2013: a systematic analysis for the Global Burden of Disease Study 2013. The Lancet 386(9995):743–800. doi.org/10.1016/S0140-6736(15)60692-4.

GBD 2013 Risk Factors Collaborators. Supplement to: Global, regional, and national comparative risk assessment of 79 behavioural, environmental and occupational, and metabolic risks or clusters of risks in 188 countries, 1990–2013: a systematic analysis for the Global Burden of Disease Study 2013. The Lancet 386(10010):S1–711. doi.org/10.1016/S0140-6736 (15)00128-2.

GBD 2015 Risk Factors Collaborators 2016. Global, regional, and national comparative risk assessment of 79 behavioural, environmental and occupational, and metabolic risks or clusters of risks, 1990–2015: a systematic analysis for the Global Burden of Disease Study 2015. The Lancet 388(10053):1659–1724.

Kedzior KK & Laeber LT 2014. A positive association between *Anxiety disorders* and cannabis use or cannabis use disorders in the general population—a meta-analysis of 31 studies. BMC Psychiatry 14:136.

Kelly E, Darke S & Ross J 2009. A review of drug use and driving: epidemiology, impairment, risk factors and risk perceptions. Drug and Alcohol Review 23(3):319–344.

Kirby Institute 2012. HIV, viral hepatitis and sexually transmitted infections in Australia: annual surveillance report 2012. Sydney: Kirby Institute, UNSW.

Kirby Institute 2013. National blood-borne virus and sexually transmissible infections surveillance and monitoring report 2013. Sydney: Kirby Institute, UNSW.

Laslett AM, Room R, Ferris J, Wilkinson C, Livingston M & Mugavin J 2011. Surveying the range and magnitude of alcohol's harm to others in Australia. Addiction 106(9):1603–11.

Lev-Ran S, Roerecke M, Le Foll B, George TP, McKenzie K & Rehm J 2013. The association between cannabis use and depression: a systematic review and meta-analysis of longitudinal studies. Psychological Medicine 44(4):797–810. doi:101017/S0033291713001438.

Lim SS, Vos T, Flaxman AD, Danaei G, Shibuya K, Adair-Rohani H et al. 2012. A comparative risk assessment of burden of disease and injury attributable to 67 risk factors and risk factor clusters in 21 regions, 1990-2010: a systematic analysis for the Global Burden of Disease Study 2010. Lancet 380(9859): 2224–2260.

Livingston M & Callinan S 2015. Underreporting in alcohol surveys: whose drinking is underestimated? Journal of Studies on Alcohol and Drugs 76(1):158–64.

MacLachlan JH, Allard N, Towell V & Cowie BC 2013. The burden of chronic hepatitis B virus infection in Australia, 2011. Australian and New Zealand Journal of Public Health 37(5):416–22.

Marconi A, Di Forti M, Lewis CM, Murray RM & Vassos E 2016. Meta-analysis of the association between the level of cannabis use and risk of psychosis. Schizophrenia Bulletin 42(5):1262–69. doi: 10.1093/schbul/sbw003.

Mayo Clinic (Mayo Foundation for Medical Education and Research) 2014. Diseases and conditions: drug addiction (substance use disorder)—symptoms. Viewed 1 May 2017, <http://www.mayoclinic.org/diseases-conditions/drug-addiction/basics/symptoms/con-20020970>.

MDAF (Ministerial Drug and Alcohol Forum) 2017. The National Drug Strategy 2017–2026. Canberra: Commonwealth of Australia. Viewed 1 October 2017, <http://www.health.gov.au/drugstrategy>.

Murray CJ, Ezzati M, Flaxman AD, Lim S, Lozano R, Michaud C et al. 2012. GBD 2010: design, definitions and metrics. Lancet 380:2063–6.

Murray CJ, Ezzati M, Lopez AD, Rodgers A & Vander Hoorn S 2003. Comparative quantification of health risks conceptual framework and methodological issues. Population Health Metrics 1(1):1.

NHMRC (National Health and Medical Research Council) 2009. Australian guidelines to reduce health risks from drinking alcohol. Canberra: NHMRC.

NZMOH (New Zealand Ministry of Health) 2012. Ways and means: a report on methodology from the New Zealand Burden of Diseases, Injuries and Risk Factors Study, 2000–2016. Wellington: New Zealand Ministry of Health.

O'Sullivan BG, Gidding HF, Law M, Kaldo JM, Gilbert GL & Dore GJ 2004. Estimates of chronic hepatitis B virus infection in Australia, 2000. Australian and New Zealand Journal of Public Health 28(3):212–16.

Palamara P, Broughton M & Chambers F 2014. Illicit drugs and driving: an investigation of fatalities and traffic offences in Western Australia. Perth, WA: Curtin-Monash Accident Research Centre RR 13–001.

Rehm J, Kehoe T, Gmel G, Stinson F, Grant B & Gmel G 2010. Statistical modelling of volume of alcohol exposure for epidemiological studies of population health: the US example. Population Health Metrics 8(3):1–12.

Richardson J 2002. Evaluating summary measures of population health. In: Murray CJL, Salomon JA, Mathers CD & Lopez AD (eds). Summary measures of population health: concepts, ethics, measurement and applications. Geneva: World Health Organization 147–60.

Ritter A, Lancaster K, Grech K & Reuter P 2011. Monograph no. 21: An assessment of illicit drug policy in Australia (1985–2010): themes and trends. DPMP Monograph Series. Sydney: National Drug and Alcohol Research Centre.

Røgeberg O & Elvik R 2016. The effects of cannabis intoxication on motor vehicle collision revisited and revised. Addiction 111(8): 1348–59.

Rowden P, Mazurski E, Withaneachi D & Stevens M 2011. Roadside drug testing in New South Wales. Paper presented at the Australasian Road Safety Research, Policing, and Education Conference, Perth WA.

Samokhvalov A, Rehm J & Roerecke M 2015. Alcohol misuse and pancreatitis: a lesson from meta-analysis. EBioMedicine 2(12):1860–61.

Spooner C & Hetherington K 2005. Social determinants of drug use. Technical report number 228. Sydney: National Drug and Alcohol Research Centre, University of New South Wales.

Stafford J & Burns L 2015. Australian Drug Trends. 2014. Findings from the Illicit Drugs Reporting System (IDRS). Australian Drug Trend Series no. 127. Sydney: National Drug and Alcohol Research Centre, University of New South Wales.

Taylor B, Irving HM, Kanteres F, Room R, Borges G, Cherpitel C et al. 2010. The more you drink, the harder you fall: a systematic review and meta-analysis of how acute alcohol consumption and injury or collision risk increase together. Drug and Alcohol Dependence 110(1-2):108–16.

US Burden of Disease Collaborators 2013. The state of US health, 1990–2010: burden of diseases, injuries, and risk factors. The Journal of the American Medical Association 210(6):591–606.

UNODC (United Nations Office on Drugs and Crime) 2015. World drug report 2015. Vienna: United Nations.

WCRF/AICR (World Cancer Research Fund/American Institute for Cancer Research) 2007. Food, nutrition, physical activity, and the prevention of cancer: a global perspective. Washington DC: AICR.

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Related publications

This report *Impact of alcohol and illicit drug use on the burden of disease and injury in Australia* other AIHW publications can be downloaded for free from the AIHW website <http://www.aihw.gov.au>.

The website also includes information on ordering printed copies.

The following related AIHW publications might also be of interest:

- AIHW 2016a. Australian Burden of Disease Study 2011: methods and supplementary material. Australian Burden of Disease Study series no. 5. Cat. no. BOD 6. Canberra: AIHW.
- AIHW 2016c. Australian Burden of Disease Study: impact and causes of illness and death in Australia 2011. Australian Burden of Disease Study series no. 3. Cat. no. BOD 4. Canberra: AIHW.

This report quantifies the health impact that alcohol and illicit drug use place on Australia, including as risk factors for other diseases and injuries. It estimates that alcohol and illicit drugs were collectively responsible for 6.7% of Australia's disease burden in 2011. The report highlights that health inequalities exist, with lower socioeconomic groups and more remote areas generally experiencing higher rates of disease burden due to alcohol and illicit drug use.

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