

The burden of disease and injury in Australia

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November 1999

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Foreword

This report presents the first national burden of disease study for Australia. It uses the disability-adjusted life year or DALY to measure the total impact of mortality and non-fatal health outcomes in a consistent way across a comprehensive range of diseases and illnesses. The DALY was developed for the Global Burden of Disease Study (GBD), undertaken in the first half of the 1990s by researchers at the Harvard School of Public Health and the World Health Organization. The GBD has generated considerable interest among health policy makers and researchers, and an increasing number of national burden of disease studies are now underway.

Over the last 18 months, AIHW has undertaken an Australian burden of disease study with the assistance of funding from the Commonwealth Department of Health and Aged Care. This study builds on Australian and international work to generate summary population health information using the DALY metric and provide inputs on the size and causes of health problems in Australia to assist national and State planning and priority setting for public health, health services and research.

This report addresses the need for comprehensive and comparable information on the causes of loss of health in the Australian population. The study provides the first detailed and internally consistent estimates for Australia of the incidence, prevalence, duration, mortality and disease burden for more than 175 disease and injury categories. It has also taken first steps towards quantifying the burden associated with a range of risk factors and health determinants, and with socioeconomic disadvantage.

Burden of disease analysis provides a unique perspective on health—one that integrates fatal and non-fatal outcomes, yet allows the two classes of outcomes to be examined separately as well. This study is a first step towards exploring the usefulness of burden of disease methods for Australia. The estimates published here should be seen as provisional and developmental. If the types of information provided by burden of disease analysis are seen to be useful, there will need to be further work to refine and further develop these analyses, and to explore how to assess the disability associated with health conditions in the Australian context.

Richard Madden

Director

November 1999

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Abbreviations

ABS	Australian Bureau of Statistics
AIDS	Acquired Immune Deficiency Syndrome
AIHW	Australian Institute of Health and Welfare
AMI	Acute myocardial infarction
ANZDATA	Australian and New Zealand Register of Dialysis and Transplant Patients
BDQ	Brief Disability Questionnaire (used in MHS'97)
BEACH	Bettering the Evaluation and Care of Health: A study of general practice activity
BMES	Blue Mountains Eye Study
BMI	Body Mass Index
CD`	Collector's District
CIDI	Composite Diagnostic Interview
COPD	Chronic obstructive pulmonary disease
CVD	Cardiovascular disease
DALE	Disability-adjusted life expectancy
DALY	Disability-adjusted life year
DASETT	Department of the Arts, Sport, the Environment, Tourism and Territories
dBHTL	Decibels Hearing Threshold Level
DFLE	Disability-free life expectancy
DHAC	Department of Health and Aged Care
DHFS	Department of Health and Family Services
DHS	Department of Human Services (Victoria)
DISMOD	Disease modelling software package (refer to note 26 in Appendix A)
DSM-III	Diagnostic and Statistical Manual of Mental Disorders – 3rd Edition
ELD	Expected years lived with disability
EME	Established Market Economies
EQ-5D+	EuroQol-5 dimensions plus additional cognitive impairment dimension
GAD	Generalised anxiety disorder
GBD	Global Burden of Disease Study
GHQ	General Health Questionnaire
HDL	High-density lipoprotein
HIV	Human Immunodeficiency Virus
HUI3	Health Utilities Index Version 3
ICD-10	International Classification of Diseases, 10th revision
ICD-9	International Classification of Diseases, 9th revision
ICIDH	International Classification of Impairments, Disabilities, and Handicaps
IHD	Ischaemic heart disease

IRSD	Index of Relative Socioeconomic Disadvantage
kHz	Kilohertz
l	Litres
LDL	Low density lipoprotein
LE	Life expectancy
MHS'97	ABS National Mental Health Survey 1997
NCSCCH	National Cancer Statistics Clearing House
Nec	Not elsewhere classified
NHMRC	National Health and Medical Research Council
NHPA	National Health Priority Area
NMSC	Non-melanoma skin cancer
NZMOH	New Zealand Ministry of Health
OCD	Obsessive-compulsive disorder
OECD	Organization for Economic Co-operation and Development
PAF	Population attributable fraction
PTO	Person trade-off valuation method
PTSD	Post-traumatic stress disorder
PVD	Peripheral vascular disease
PYLL	Potential years of life lost
QALY	Quality-adjusted life year
REVES	International Network on Health Expectancy (Réseau Espérance de Vie en Santé)
RR	Relative risk
SAS	Statistical Analysis System software package
SEIFA	Socio-economic Indexes for Areas
SF-12	Medical Outcomes Study 12 Item Short-Form Health Survey
SF-36	Medical Outcomes Study 36 Item Short-Form Health Survey
SG	Standard gamble valuation method
SLA	Statistical Local Area
STD	Sexually transmitted disease
TTO	Time trade-off valuation method
WHO	World Health Organization
YLD	Years lost due to disability
YLL	Years of life lost (due to mortality)

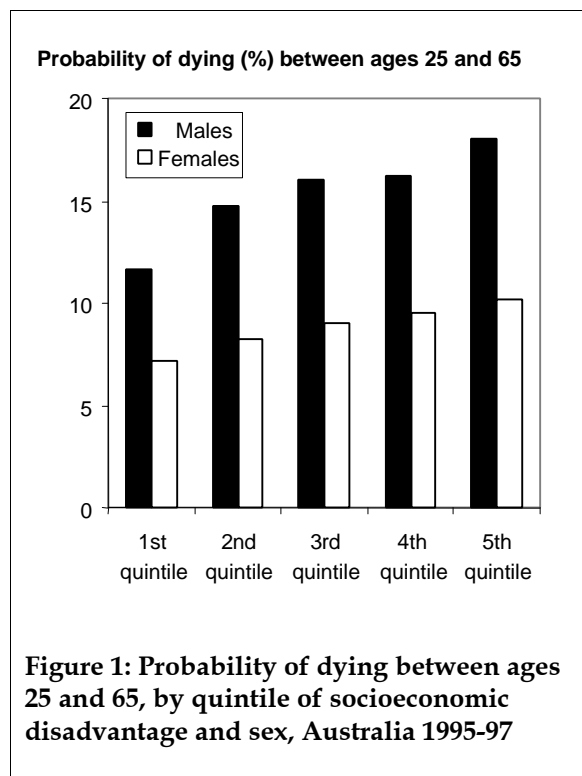
Highlights

This report provides an overview of results from the Australian Burden of Disease and Injury Study undertaken by the AIHW during 1998 and 1999. The Study uses the methods developed for the Global Burden of Disease Study, adapted to the Australian context and drawing extensively on Australian sources of population health data. It provides a comprehensive assessment of the amount of ill health and disability, the 'burden of disease' in Australia in 1996.

Mortality, disability, impairment, illness and injury arising from 176 diseases, injuries and risk factors are measured using a common metric, the Disability-Adjusted Life Year or DALY. One DALY is a lost year of 'healthy' life and is calculated as a combination of years of life lost due to premature mortality (YLL) and equivalent 'healthy' years of life lost due to disability (YLD). This report provides estimates of the contribution of fatal and non-fatal health outcomes to the total burden of disease and injury measured in DALYs in Australia in 1996.

Key findings—mortality (YLL)

- Life expectancy at birth in 1996 was 75.6 years for Australian males and 81.3 years for Australian females. Male life expectancy is six years lower than female life expectancy.
- Australia ranks around 10th in the world in terms of total life expectancy at birth. Australia ranks fifth best in the world, behind Japan, Greece, Sweden and Italy in terms of the probability of dying between ages 15 and 59.
- Males lost 26% more years of life than females. Cardiovascular disease, cancers and injury were responsible for 72% of the total mortality burden in both males and females.
- In people aged 75 years and over, cardiovascular diseases account for more than half the years of life lost, whereas cancers are a more important cause than cardiovascular disease for all ages below 75. Injuries are the main cause of lost years of life in young adults and children aged 5-14 years, and neonatal conditions the main cause in children aged under five.
- Overall, the age-adjusted mortality burden in Australia has declined by 27% in the 15 years between 1981 and 1996. There have been substantial declines in the mortality burden of cardiovascular diseases, road traffic accidents, low birthweight, and stomach cancer for both males and females.
- The burden of smoking-related diseases has decreased in males but increased substantially in females. In the 15 years from 1981 to 1996, the per capita mortality burden for lung cancer and chronic obstructive pulmonary disease (COPD) decreased by 15% and 16% respectively for males, but increased by 62% and 70% respectively for females.
- The largest increases in mortality burden have occurred for HIV/AIDS, suicide and prostate cancer in males, and for senile dementias and heroin dependence and abuse in both sexes, and for lung cancer and COPD in women.
- The mortality burden is significantly higher among socioeconomically disadvantaged people. The most disadvantaged quintile of the Australian population lost 35% more years of life than the least disadvantaged quintile in 1996.



- For Australians aged less than 65, the differential burden between the lowest and highest quintile is even greater, with a 60% excess burden in the most disadvantaged group.
- The overall inequality in mortality burden is 50% larger for males than females in Australia. When analysed by disease group, the inequality in mortality burden is greatest for maternal mortality, followed by ill-defined conditions (sudden infant death syndrome) in both sexes, followed by digestive system diseases and injuries in males.
- Men in the bottom quintile of socioeconomic disadvantage have a 40% higher chance of dying between

- Between 1986 and 1996, these socioeconomic differentials have remained similar for females and for adult and older males, but have widened for boys and young men aged 15-24 years, particularly for motor vehicle accidents and suicide. They have narrowed for drug overdose deaths (rates have increased faster in the top quintile than the bottom between 1986 and 1996).

Key findings—disability (YLD)

- Mental disorders are the leading cause of years of life lost due to disability (YLD), accounting for nearly 30% of the non-fatal burden of disease in Australia.
- Nervous system and sense organ disorders are each responsible for 16% of the disability burden.
- Depression is the leading cause of non-fatal disease burden in Australia, causing 8% of the total YLD in 1996. Hearing loss and alcohol dependence and harmful use are the second and third leading contributors to non-fatal burden for males. Dementia and osteoarthritis are the second and third leading contributors for females (Figure 2).
- In contrast to the mortality burden, the disability burden is almost identical for males and females. The non-fatal burden of nervous system disorders, mental disorders and musculoskeletal disorders are all higher for females than for males. The male burden is higher for cardiovascular disease, diabetes, chronic respiratory diseases and cancers.
- Australian males born in 1996 can expect to live the equivalent of 68.7 years of good health, compared to 73.6 years for females. Approximately 9% of total life expectancy at birth is 'lost' due to disability for both males and females in Australia.

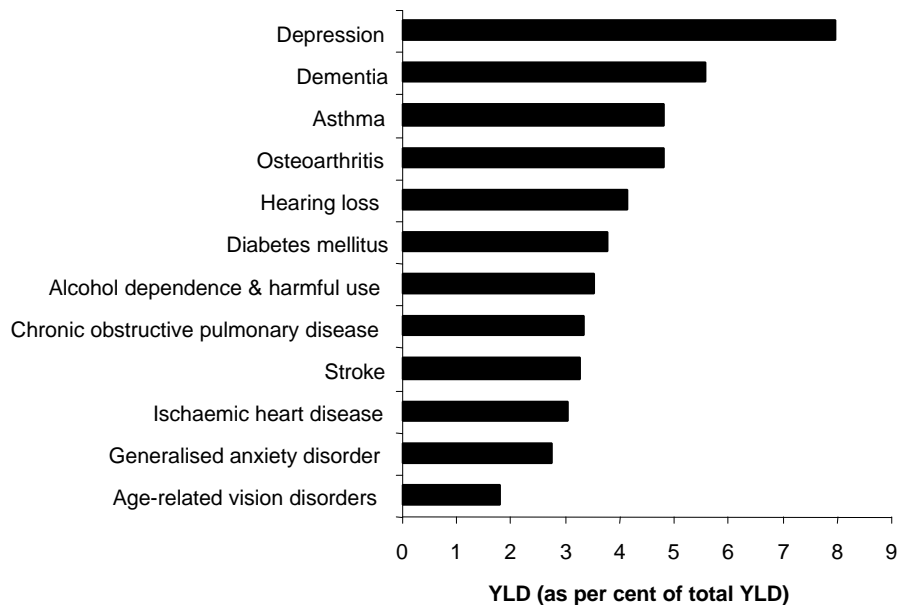


Figure 2: Leading causes of years of life lost due to disability (YLD), Australia 1996

Key findings—burden of disease and injury (DALYs)

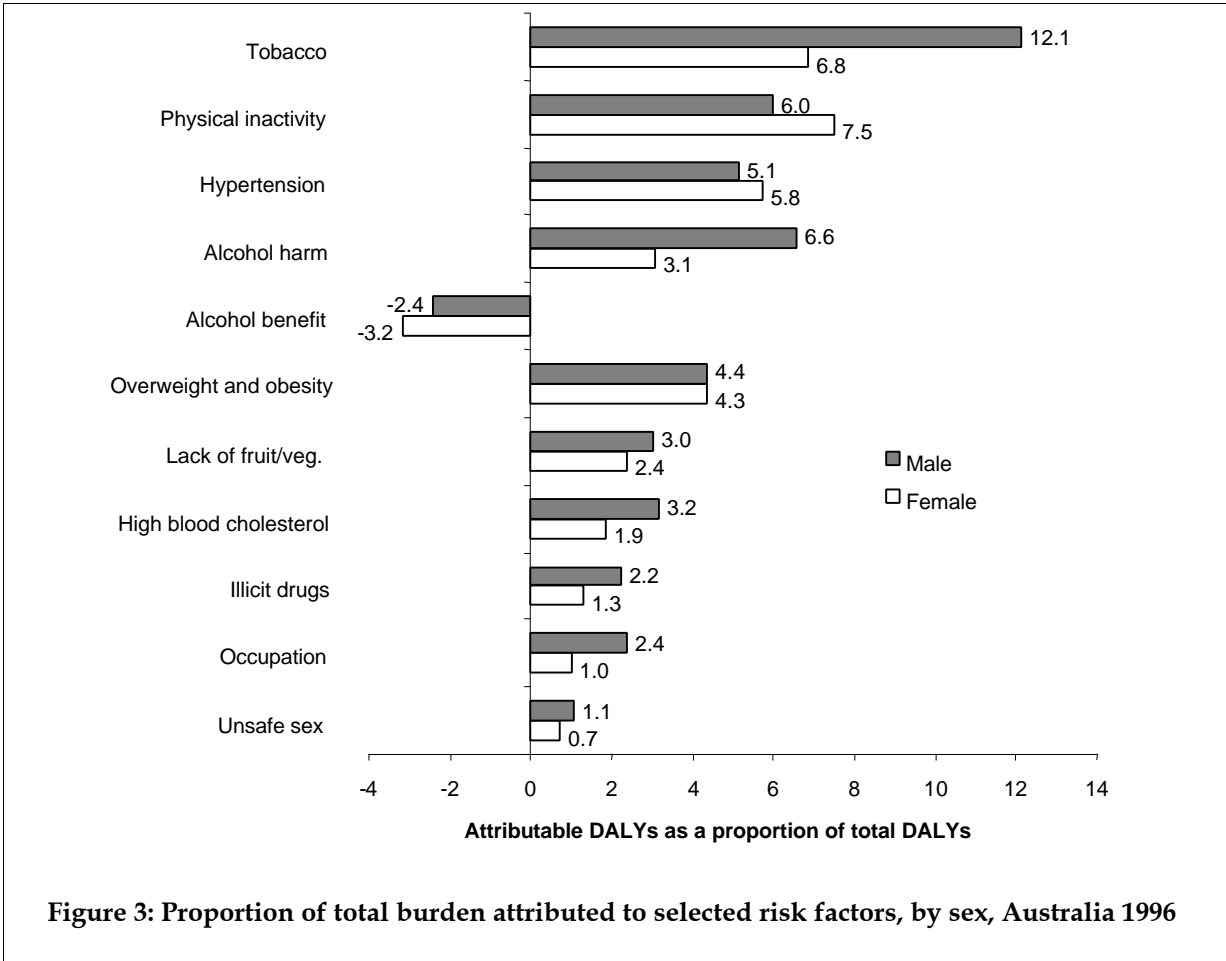
- Inclusion of non-fatal health outcomes provides a substantially different picture to that provided by traditional mortality statistics: mental disorders are now the third leading cause of overall burden (14% of total) after cardiovascular diseases (20%) and cancers (19%). Central nervous system and chronic respiratory conditions are almost as large a contributor to total burden as injuries.
- The male burden (in total DALYs) is 13% higher than the female burden.
- The ten leading causes of the burden of disease in Australia for males and females are shown below.

Males	Contribution to total burden (per cent of total DALYs)	Females	Contribution to total burden (per cent of total DALYs)		
1	Ischaemic heart disease	13.6	1	Ischaemic heart disease	11.1
2	Stroke	4.8	2	Stroke	6.1
3	Lung cancer	4.5	3	Depression	4.8
4	COPD	4.2	4	Dementia	4.7
5	Suicide and self-inflicted injuries	3.3	5	Breast cancer	4.6
6	Road traffic accidents	3.0	6	COPD	3.2
7	Diabetes mellitus	3.0	7	Asthma	3.1
8	Depression	2.7	8	Diabetes mellitus	3.0
9	Colorectal cancer	2.7	9	Osteoarthritis	2.9
10	Dementia	2.5	10	Colorectal cancer	2.7

- The total burden of disease and injury in Australia in 1996 is estimated to be 2.5 million DALYs or 137 DALYs lost per 1,000 population. In other words, among each 1,000 people in the Australian population, during 1996 the lost years of healthy life represented 13.7% of the total life years lived.
- Ischaemic heart disease and stroke lead the list, together causing nearly 18% of the total disease burden. Chronic obstructive pulmonary disease and lung cancer (also smoking-related diseases) are the third and fifth leading cause of disease burden, accounting for another 7.3% of the total burden. Depression is the fourth leading cause of disease burden in Australia, accounting for nearly 4% of the total burden.
- Inclusion of the attributable burden of cardiovascular disease due to diabetes increases the burden of diabetes from 3% to 5% of total DALYs. Inclusion of the attributable burden of suicide and ischaemic heart disease increases the total burden of depression also from 3% to 5%, so that depression and diabetes are equal third leading causes of burden of disease in Australia.
- The six National Health Priority Areas account for 70% of the total burden of disease and injury in Australia, comprising 81% of the YLL and 57% of the YLD.
- Seven cancers have been identified as the focus of the cancer priority area – lung cancer, skin cancer, cancer of the cervix, breast cancer, colorectal cancer, prostate cancer and non-Hodgkin’s lymphoma. These cancers together account for around 61% of the burden of cancer (DALYs) for men and 63% for women.
- The burden of mental disorders in Australia is dominated by affective disorders, substance use disorders and anxiety disorders. Substance use disorders are the leading cause of mental disorder for males, accounting for 33% of their mental health DALYs. Alcohol abuse accounts for 59% of male substance use disorder DALYs. The major cause of mental disorder for women is affective disorders, accounting for 39% of women’s mental health DALYs. This is almost entirely depression (87%).
- The injury burden in Australia is dominated by suicide and self-inflicted injuries and road traffic accidents, each of which accounts for 27% of the total injury burden. These two causes, together with accidental falls, account for 64% of the total injury burden.
- Overall, diabetes causes almost as much disability burden (43% of total DALYs) as mortality burden. The burden is relatively evenly shared between males and females, with males responsible for 54% of the total burden of diabetes. Below age 55, the burden is predominantly due to diabetes and its complications. Over age 55, more than 60% of the burden is due to cardiovascular disease (heart disease, stroke and peripheral vascular disease) attributable to diabetes.
- Asthma is responsible for 4.8% of YLD (non-fatal burden) and 2.6% of DALYs (total burden) in Australia. The majority of the asthma burden is incident in childhood.

Key findings—attributable burden of risk factors

- Risk factors such as smoking, physical inactivity, obesity, high blood pressure and high cholesterol are responsible for a sizable proportion of the total burden of disease in Australia as shown in Figure 3.
- To the extent possible, these estimates are based on studies that examined each risk factor independent of other risk factors, but it is likely that the complexity of the interaction between risk factors has not been captured fully. Therefore, caution is warranted in the interpretation of these results. Despite these reservations, the conclusion remains that each of these risk factors is responsible for large amounts of ill health, ranking in size with the top-ten diseases. This suggests that large health gains can be expected from effective public health interventions.
- Tobacco smoking is the risk factor responsible for the greatest burden of disease in Australia, responsible for about 12% of the total burden of disease in males and 7% in females.
- Physical inactivity is responsible for about 7% of the total burden of disease and overweight and obesity for more than 4%.
- Hypertension causes over 5% of the total burden of disease and injury, and high blood cholesterol nearly 3%.



- Inadequate fruit and vegetable intake is also responsible for around 3% of the total disease burden. This burden relates to average consumption of less than 5 serves of fruit or vegetables per day. Inadequate fruit and vegetable intake causes an estimated 11% of the total cancer burden in Australia.
- The net harm associated with alcohol consumption is around 2.2% of total burden, as the injury and chronic disease burden associated with harmful and hazardous levels of alcohol consumption are offset by the burden of cardiovascular disease prevented by alcohol consumption. The protective effect is only relevant after age forty-five, whereas the harmful effects of alcohol are apparent at all ages.
- Illicit drugs are responsible for a similar level of harm to alcohol for males, at 2.2% of total male burden. Just over half this burden is due to premature mortality, the other half to YLD resulting from drug dependence or harmful use. Illicit drugs account for about 1.3% of the total female burden.
- Unsafe sex is responsible for around 1% of the total burden of disease in Australia in 1996. HIV/AIDs accounts for 58% of the total burden of disease that is attributable to unsafe sex, followed by cervix cancer (23%) and other sexually transmitted diseases (8%). Table 7.18 shows the proportion of the total for males (1.1%) and females (0.8%).
- Occupational exposures to toxic chemicals and injury risks were responsible for an estimated total of 2,005 deaths in Australia in 1996—1.6% of total deaths. Because many of these deaths occur at younger ages, the mortality burden is a somewhat higher proportion (2.0%) of the total mortality burden. The attributable burden of occupational exposures is 1.7% of the total burden of disease and injury in 1996. Cancers are responsible for 41% of this attributable burden, followed by injuries (33%) and other chronic diseases (25%).

Conclusions

This report has addressed the need for comprehensive and comparable information on the causes of loss of health in the Australian population.

- The study provides the first detailed and internally consistent estimates for Australia of the incidence, prevalence, duration, mortality and disease burden for an exhaustive and mutually exclusive set of disease and injury categories.
- It has also taken first steps towards quantifying the burden associated with a range of risk factors and health determinants, including socioeconomic disadvantage.

While every attempt has been made to identify the best available information in relation to each disease, injury and risk factor category, and to consult as widely as possible, it must be emphasised that the estimates published here should be seen as provisional and developmental. It is hoped that others will contribute to future improvements in data, disease models and disability weights.

Burden of disease analysis provides a unique perspective on health—one that integrates fatal and non-fatal outcomes, yet allows the two classes of outcomes to be examined separately as well. This study, together with the parallel Victorian study (DHS 1999) are a first step towards exploring the usefulness of burden of disease methods to provide information to assist in health planning and priority setting in Australia.