The burden of disease and injury in Australia
Summary report

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Summary report

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Preface

This report is a summary of the Australian Institute of Health and Welfare's report on the Australian Burden of Disease and Injury Study. The Study used 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. This report 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 10 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).

The report addresses the need for comprehensive and comparable information on the causes of loss of health in the Australian population. Information on the size and causes of health problems in Australia will assist national and State planning and priority setting for public health, health services, and health and medical research. The study provides the first detailed and internally consistent estimates for Australia of the incidence, prevalence, duration, mortality and disease burden for the 176 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 socieconomic 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 develop these analyses and to improve the assessment of disability associated with health conditions.

The full report is published by the AIHW and titled *The Burden of Disease and Injury in Australia* (Mathers, Vos & Stevenson 1999). It includes detailed information on methods, assumptions, data sources and results. The full report is available on the Institute's website at <http://www.aihw.gov.au> or may be ordered from Government Info Shops in each capital city or from AusInfo mail order sales (toll-free phone 132 447).

Acknowledgments

The Commonwealth Department of Health and Aged Care contributed financial resources to help the Australian Institute of Health and Welfare carry out this study. The Steering Committee for the AIHW project oversighted the project and provided valuable inputs. It comprised Dr Richard Madden (Chair), Dr Colin Mathers, Ms Liz Furler (DHAC), Dr Theo Vos (Department of Human Services, Victoria), Dr David Roder (NHMRC), Dr Martin Tobias (NZ Ministry of Health), Professor Jeff Richardson (Monash University) and Assoc. Professor Richard Taylor (University of Sydney). We also wish to acknowledge the encouragement and advice of Professor Chris Murray (WHO) and Dr Alan Lopez (WHO), who carried out the Global Burden of Disease Study.

The principal work in conceiving and developing the Australian Burden of Disease and Injury Study was carried out by Colin Mathers. The Australian Institute of Health and Welfare project team comprised Colin Mathers, Chris Stevenson, Simon Eckermann and James Morris. Methodology and analyses were developed jointly with the Victorian Burden of Disease project led by Theo Vos. Without his experience in the use of burden of disease methodology and contributions to the analysis of many disease groups, it would not have been possible to carry out the Australian study in the available time. Theo Vos played a major role in the analysis of many of the disease groups, particularly mental disorders and injuries.

We thank Bruno Ridolfo for advice on tobacco and alcohol aetiological fractions and for provision of revised estimates for some of these. We also thank the many people in Australia who provided advice and information to assist in the analyses summarised here or who reviewed aspects of the analyses. This includes staff in the Australian Institute of Health and Welfare, in the Commonwealth Department of Health and Aged Care, and in State and Territory health authorities, as well as health researchers and clinical experts, who provided advice to either the AIHW study or the Victorian Burden of Disease Study.

1 Introduction

Mortality and fertility rates are decreasing across the globe, resulting in ageing populations and higher life expectancies. Developments in knowledge and medical technology are contributing to a growing demand for health services and, in some cases, higher costs of providing these services. These and other factors are placing increasing pressure on health budgets. In Australia and elsewhere there will be increasing focus on making choices, while seeking both optimum health gain for health expenditure and fair and equitable access to health interventions. There is also increasing public and policy concern to ensure that non-fatal conditions (such as mental health problems and musculoskeletal disorders) are appropriately reflected in health planning and priority setting.

Good information is available in Australia on disease causes of mortality, but these data provide, at best, only indirect information on the health of the living and the causes of poor health. Most 'health' data in Australia relate to the health care system, and then mainly its inputs and throughputs. We know far more about the costs of health care and the numbers of patients treated than we do about the health impacts of the treatments and the health of the population in general.

This report addresses the need for a detailed assessment of the magnitude and impact of health problems in the population, including information on the causes of loss of health. It 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.

The Australian Burden of Disease and Injury Study

The Australian Burden of Disease and Injury Study has been carried out by the Australian Institute of Health and Welfare using methods based on those developed for the Global Burden of Disease Study. The project commenced in June 1998 and funding was contributed by the Commonwealth Department of Health and Aged Care. The Victorian Department of Human Services has also carried out a State-level analysis of the burden of disease for Victoria under the leadership of Dr Theo Vos (Department of Human Services 1999a, 1999b). The two project teams have worked closely together and shared methods and analyses. The Australian studies have adapted the DALY methodology to suit the Australian context and the need for greater detail in measuring the size of health problems that are important in Australia.

This booklet summarises the findings of the Australian Burden of Disease and Injury Study. Details of the methods are presented in the full report (see Preface for details). While every attempt has been made to identify the best available information in relation to each disease and injury category, and to consult as widely as possible, it must be emphasised that the estimates summarised here should be seen as provisional and developmental. The analyses carried out for this study will provide a framework for more detailed analysis of particular conditions and guidance in identifying data gaps

and deficiencies. It is hoped that further improvements over time in methods, models and data will result in increasing accuracy and certainty in estimates of the burden of disease and injury in Australia.

A single measure of population health

The simplest and most widely used method for producing population health statistics is to aggregate data on individuals in order to generate statistics such as the proportion of the population (or of a particular age–sex group) suffering from a particular health problem or in a particular health state. This approach rapidly becomes unwieldy when a number of problems are being monitored and we want to make comparisons over time, across population groups, or before and after some health intervention. We are then faced with an explosion in the numbers of statistics that must be compared.

The Global Burden of Disease Study (GBD) developed a new summary measure of population health, the disability-adjusted life year or DALY, that combines information on the impact of premature death and of disability and other non-fatal health outcomes (Murray & Lopez 1996). This was used to provide a comprehensive assessment of the global burden of disease and injury for the World Bank (World Bank 1993) and to inform global priority setting for health research, and has subsequently been adopted by the World Health Organization as an information tool to inform global health planning.

The DALY methodology provides a way to link information on disease causes and occurrence to information on both short-term and long-term health outcomes, including impairments, functional limitations (disability), restrictions in participation in usual roles (handicap), and death. The burden of disease methodology is designed to inform health policy in relation to the prevention and treatment (cure or reduction in severity) of these health outcomes. It is not designed to inform policy for the provision of social support or welfare services for people with long-term disability or handicap.

A substantially different picture of health problems

Inclusion of non-fatal health outcomes in summary measures of health status produces a substantially different picture to that provided by traditional mortality statistics, or even by statistics on hospital admissions or doctor visits. For example, this study finds that mental disorders are the third leading cause of overall disease burden in Australia (14% of the total) after cardiovascular diseases (20%) and cancers (19%). Nervous system disorders and chronic respiratory conditions each make about as large a contribution as injury to ill-health in Australia.

The 15 leading causes of the burden of disease in Australia are shown in Table 1. Together, these 15 causes account for more than 50% of the total disease burden in Australia. Among these top 15 causes are four non-fatal or low-fatality diseases: depression, asthma, osteoarthritis and hearing loss. The burdens of mental illnesses such as depression and alcohol dependence, and of non-fatal diseases such as osteoarthritis and hearing loss, have been seriously underestimated by traditional approaches that take into account only deaths and not disability:

Table 1: The 15 leading causes of burden of disease and injury in Australia, 1996

	Per cent of total burden
1 Ischaemic heart disease	12.4
2 Stroke	5.4
3 Chronic obstructive pulmonary disease[(a)]	3.7
4 Depression	3.7
5 Lung cancer	3.6
6 Dementia	3.5
7 Diabetes mellitus	3.0
8 Colorectal cancer	2.7
9 Asthma	2.6
10 Osteoarthritis	2.2
11 Suicide and self-inflicted injuries	2.2
12 Road traffic accidents	2.2
13 Breast cancer	2.2
14 Hearing loss	1.9
15 Alcohol dependence and harmful use	1.8

(a) Chronic bronchitis and emphysema.

- If the burden of suicide and self-inflicted injury attributable to depression is included with the disability burden of depression, the total burden of depression rises to 4.9%, making it the third leading cause of burden of disease in Australia, after ischaemic heart disease and stroke.
- If the burden of cardiovascular diseases attributable to diabetes is included with diabetes, its total attributable burden rises to 4.9%, making it equal with depression as the third leading cause of disease burden.
- If the burden of diseases and injuries caused by alcohol use is included with its direct burden in terms of mental health, the attributable burden of alcohol use rises to 2.2% (see Section 8).

The leading causes of mortality burden (YLL) are summarised in Section 3, the leading causes of disability (YLD) in Section 4, and the leading causes of overall burden of disease (DALYs) in Sections 5 and 6. Socioeconomic differentials in disease burden are summarised in Section 7 and the burden attributable to 10 risk factors in Section 8.

2 Measuring the health of Australians

The disability-adjusted life year

Summary measures of population health such as the DALY are measures that combine information on mortality and non-fatal health outcomes to represent population health in a single number. The DALY was designed

- to provide a common metric for fatal and non-fatal health outcomes;
- to allow estimates of health impact to be mapped to causes, whether in terms of disease and injury or of risk factors and broader social determinants;
- to provide a common metric for estimating population health impact and cost-effectiveness of interventions; and
- to use common values and health standards for all regions of the world.

In order to include the impact of both fatal and non-fatal health outcomes, a common currency or metric is required. The DALY uses time as a common currency, as do most other summary measures developed to date.

DALYs for a disease or health condition are calculated as the sum of the years of life lost due to premature mortality (YLL) in the population and the years lost due to disability (YLD) for incident cases of the health condition:

$$DALY = YLL + YLD$$

The DALY extends the concept of potential years of life lost due to premature death (PYLL) to include equivalent years of 'healthy' life lost by virtue of being in states of poor health or disability.

One DALY is one lost year of 'healthy' life.

To calculate YLD for a given condition in the Australian population, we must estimate the number of new cases (incidence) of the condition occuring in the time period of interest. For each new case, the number of years of healthy life lost is obtained by multiplying the average duration of the condition (to remission or death) by a severity weight that quantifies the equivalent loss of healthy years of life due to living with the health condition.

Explicit social value choices built into the DALY

All summary measures of population health involve explicit or implicit social value choices. In particular, the DALY measures the gap between a population's actual health status and some 'ideal' or reference status. In developing the DALY indicator, Murray and Lopez (1996) identified five value choices that should be explicitly made:

- How long 'should' people in good health expect to live?

- Is a year of healthy life gained now worth more to society than a year of healthy life gained in 20 years' time?
- How should we compare years of life lost through death with years lived with poor health or disability of various levels of severity?
- Are lost years of healthy life valued more at some ages than others?
- Are all people equal? Do all people lose the same amount of health through death at a given age, even if there are variations in current life expectancies between population groups?

The Global Burden of Disease Study used the same values for all regions of the world and chose to value a year of life at young adult ages more than in old age or infancy. This study has used the same values for all Australians. In particular, it uses the same life expectancy 'ideal' standard for all population subgroups, whether or not their current life expectancy is lower than that of other groups; it uses the same 'disability weight' for everyone living a year in a specified health state; and it gives equal value to a year of healthy life lost at any age (equal 'age weights').

How long should people live?

To estimate how many years of life are lost through death at any given age, we must decide on the number of years that a person at that age should expect to survive. The GBD used a standard life table with a life expectancy at birth of 82.5 years for females and 80.0 years for males to estimate this. This study has used Australian cohort life expectancies for 1996.

The usually quoted Australian life expectancies are based on current mortality patterns at each age in a given period (say, 1996) and are referred to as period life expectancies. Cohort life expectancies take into account projected trends in mortality rates to estimate the average life expectancies likely to be achieved by people currently alive. The cohort life expectancies for Australian infants born in 1996 are 81.5 years for males and 85.7 years for females, compared with period life expectancies in 1996 of 75.6 and 81.3 years respectively. The male–female difference is around 4.2 years compared with 5.7 years for the period life expectancies and 2.5 years for the GBD.

The years of life lost (YLL) due to a death at any given age are shown in Figure 1. Note that YLLs are lost due to deaths at every age. A death at age 95 results in a loss of YLLs. Unlike most potential years of life lost (PYLL) measures, YLLs do not exclude deaths above a certain age level or years of life lost above that age level.

Is a year of healthy life now worth more than in 20 years time?

The DALY measures the future stream of healthy years of life lost due to each incident case of disease or injury. It is thus an incidence-based measure rather than a prevalence-based measure. The GBD applied a 3% time discount rate to years of life lost in the future to estimate the net present value of years of life lost. With this discount rate, a year of healthy life gained in 20 years' time is worth 45% less than one gained now. A male infant death results in 30 years of life lost with discounting at 3%, compared with 81 years without discounting (Figure 1).

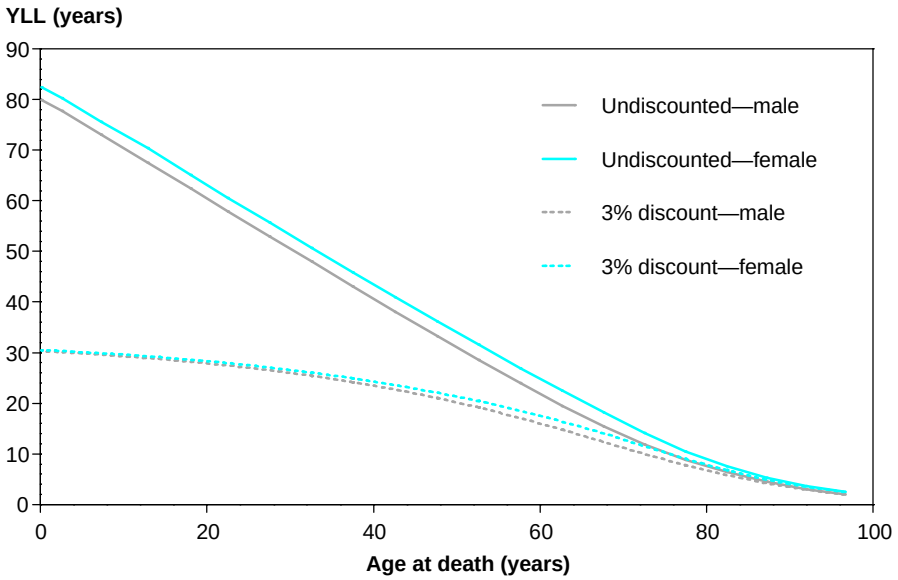


Figure 1: Years of life lost due to death at various ages

The US Panel on Cost-Effectiveness in Health and Medicine recently recommended that a 3% real discount rate be used in health economic analyses to adjust both costs and health outcomes (Weinstein et al. 1996). The Australian Burden of Disease and Injury Study has used a 3% discount rate for DALYs. Because there are arguments for and against discounting health outcomes, the study also calculated undiscounted DALYs for Australia. The full report contains an analysis of the effects of discounting and summary information on undiscounted DALYs.

How do we compare time lived in different health states?

In order to use time as a common currency for non-fatal health states and for years of life lost due to mortality, we must numerically value time lived in non-fatal health states. This formalises and quantifies social preferences for different states of health as health state *weights*.

This is a critical step in combining information on mortality and non-fatal health outcomes into summary measures. Without the use of such weights, summary measures of population health cannot be responsive to changes in the severity distribution of health states in the population. Depending on how these weights are derived, they are variously referred to as quality-adjusted life year (QALY) weights, health state preferences or utilities.

What aspects of health should be included in a weight?

The International Classification of Impairments, Disabilities and Handicaps (ICIDH) has used the terms *disability* to refer to functional limitation at the level of the individual and *handicap* to refer to the impact of impairments and disabilities in carrying out usual

roles, given the particular social context of the individual. In the current draft revision of the ICIDH, *disability* is used more broadly to refer to impairments, functional limitations and participation restrictions (handicap).

The term *disability* is used broadly in this report to refer to departures from good or ideal health in any of the important domains of health. These include mobility, self-care, participation in usual activities, pain and discomfort, anxiety and depression, and cognitive impairment. Note that disability may be short-term or long-term. A day with a common cold is a day with disability.

While death is not difficult to define, non-fatal health states are. Non-fatal outcomes of disease are different from each other in their impact on the individual, and the impact on the individual is mediated by personal characteristics and by the physical and social environment. Non-fatal outcomes of disease involve multiple domains of health: on what basis can we weight and then aggregate various aspects of an individual's health such as mobility, anxiety and pain?

How do we obtain disability weights?

A number of methods have been developed to quantify preferences for health states. Burden of disease analyses use the person trade-off (PTO) method, which is described in the full report. The PTO method is thought to better capture societal preferences for health states than the other methods. A deliberative approach is used with small groups of people to ensure that the people involved understand and are aware of the implications of their choices.

There is a growing consensus among health economists that health state preferences should reflect the preferences of the general population when they are to be used as part of a process of broad health policy development, priority setting or resource allocation. However, the preferences of the individual come into play when deciding on choices or allocations for an individual client or patient.

The GBD used internationally representative groups of health experts to determine weights for several hundred conditions of global importance (Murray & Lopez 1996). The Netherlands has also carried out a project to measure weights for 53 diseases of public health importance using methods consistent with the GBD (Stouthard et al. 1997). Some examples of disability weights from the Dutch study are shown in Table 2.

No comprehensive Australian measurements of disability weights have yet been undertaken. For this first Australian Burden of Disease and Injury Study we have used Dutch weights where possible. The Dutch weights relate to conditions of most relevance to the health of the Australian population and differentiate between different stages and severity levels, allowing Australian information on severity to be taken into account in estimating YLD.

For disease and injury categories where Dutch weights are not available, we have generally used the GBD weights if these are available. There are 54 disease and injury categories in the Australian study where Dutch weights were used and GBD weights are also available. Figure 2 compares the Dutch and GBD disability weights for these 54 conditions. There is a good correlation between the two sets of weights, suggesting that the two studies generally valued the same conditions in a similar way, and that it is reasonably valid to use GBD and Dutch weights in the same study. In the longer term

it would be desirable to carry out weighting exercises in Australia to examine how appropriate the international weights are in the Australian context.

Table 2: Some examples of disability weights from the Dutch study

Weight	Disease stage, severity level or sequela
0.00–0.01	Gingivitis, dental caries
0.01–0.05	Mild asthma, mild vision loss, mild hearing loss, basal cell skin cancer
0.05–0.10	Low back pain, uncomplicated diabetes case, mild stable angina (NYHA 1–2)
0.10–0.15	Mild depression, osteoarthritis (radiological grade 2) of hip or knee, epilepsy
0.15–0.20	Mild/moderate panic disorder, spina bifida (sacral), HIV seropositive
0.20–0.30	Non-invasive breast cancer or tumour <2 cm (diagnostic/treatment phase), anorexia, mild/moderate obsessive–compulsive disorder
0.30–0.40	Moderate depression, multiple sclerosis in relapsing-remitting phase, severe asthma, chronic hepatitis B infection with active viral replication, deafness
0.40–0.50	Severe vision loss, medium-level spina bifida (L3–L5), osteoarthritis (grade 3–4), operable small cell lung cancer, moderate intellectual disability (IQ 35–49)
0.50–0.65	Paraplegia, AIDS (first stage), severe chronic bronchitis or emphysema
0.65–0.80	Disseminated breast cancer, severe depression, moderately severe brain injury resulting in permanent impairments, extreme intellectual disability (IQ <20)
0.80–1.00	Severe schizophrenia, disseminated colorectal cancer, severe dementia, alcoholic psychosis, quadriplegia, stroke with multiple permanent impairments, end-stage Parkinson's disease

Source: Stouthard et al. 1997.

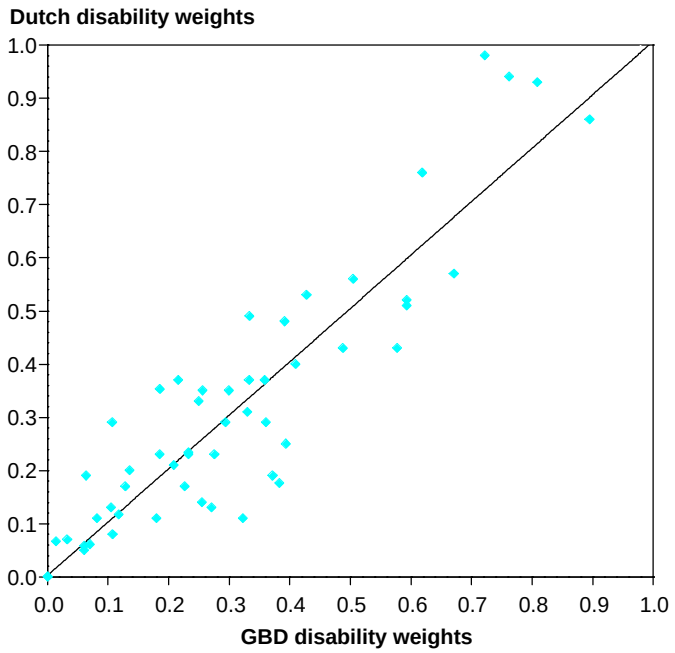


Figure 2: Comparison of GBD and Dutch weights for 54 comparable disease and injury categories

Interpreting disability weights

The disability weights used in DALY calculations represent societal preferences for different health states. They range from 0 representing a state of good or ideal health (preferred to all other states) to 1 representing states equivalent to being dead. These weights do not represent the lived experience of any disability or health state, or imply any societal value of the person in a disability or health state. Rather they reflect societal preferences for a health state in relation to the societal 'ideal' of good health.

Thus a weight for paraplegia of 0.57 does not mean that a person in this health state is 'half dead', that they experience their life as halfway between life and death, or that society values them as a person less than anyone else. It means that, on average, society judges a year with blindness (weight 0.43) to be preferable to a year with paraplegia (weight 0.57), and a year with paraplegia to be preferable to a year with unremitting unipolar major depression (weight 0.76). It also means that, on average, society would prefer a person to have a year in good health followed by death than a year with paraplegia followed by death. As well, society would prefer a person to live three years with paraplegia followed by death than have one year of good health followed by death.

All other things being equal, society would prefer to prevent or cure a case of paraplegia (weight 0.57) rather than a case of low back pain (weight 0.06), if each case could be restored to full function for the same cost and there were insufficient resources to do both. However, the use of health state preferences and DALY or QALY measures to quantify health loss or gain does not imply that society will necessarily choose the maximisation of health gain as the main or only goal for the health system.

Differences between this study and the GBD

This study departs from the GBD methodology in the following five areas:

- The Australian study uses Australian cohort life expectancies for 1996 to calculate YLL. These are slightly higher than the standard life expectancies used in the GBD, but the differences are negligible when discounting is also used.
- The GBD discounted DALYs using a 3% time discount rate and applied age weights that gave higher weight to a year of life in young and mid-adult years and lower weight to a year of life at very young and older years. The Australian project also uses a 3% discount rate but does not use age weights.
- The Australian study uses a set of Dutch weights for conditions common in developed countries, supplemented by weights used in the GBD for other conditions.
- The Australian study includes a wider range of disease and injury categories than the GBD and provides a more detailed age breakdown of the burden of disease.
- The GBD did not attempt to deal with the effects of comorbidities on YLD estimates for individual diseases. The Australian study adjusts YLD estimates for comorbidities between mental disorders and between physical disorders at older ages.

3 Years of life lost due to mortality

Australia, like other developed countries, has almost complete registration of deaths and relatively good information on causes of death. This section summarises the distribution and causes of the burden of premature mortality in Australia in 1996 using years of life lost (YLL).

Deaths in 1996

Table 3 compares the 10 leading causes of death for Australia with the GBD estimates for developed regions of the world ('developed regions' includes established market economies and former socialist economies). Dementia, prostate cancer and breast cancer appear in the top 10 causes for Australia but not for developed regions, whereas road traffic accidents are in the top 10 for developed regions but not for Australia.

Table 3: Ten leading causes of death, Australia, 1996, and developed regions of the world, 1990

Australia, 1996	Ranking in developed regions	No. of deaths	Per cent of total	Developed regions, 1990	Ranking in Australia	Per cent of total
1. Ischaemic heart disease	1	32,681	25.4	1. Ischaemic heart disease	1	24.7
2. Stroke	2	12,839	10.0	2. Stroke	2	13.1
3. Lung cancer	3	7,307	5.6	3. Lung cancer	3	4.8
4 COPD[(a)]	5	6,163	4.8	4. LRTI[(b)]	12	3.5
5. Colorectal cancer	6	4,973	3.9	5. COPD[(a)]	4	3.0
6. Dementia	14	3,897	3.0	6. Colorectal cancer	5	2.5
7. Diabetes mellitus	10	2,997	2.4	7. Stomach cancer	19	2.2
8. Prostate cancer	15	2,846	2.2	8. Road accidents	11	2.0
9. Breast cancer	11	2,823	2.2	9. Suicide	10	1.8
10. Suicide	9	2,515	1.9	10. Diabetes mellitus	7	1.6

(a) Chronic obstructive pulmonary disease (chronic bronchitis and emphysema).

(b) Lower respiratory tract infections (influenza, acute bronchitis and pneumonia).

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.

The burden of premature mortality

In 1996 premature mortality was responsible for 1.35 million years of life lost (discounted at 3% per annum) in Australia. Males lost 26% more years of life than females. If male YLL are calculated using the cohort life expectancies for females (so that there is no male–female difference in years of life lost due to a death at a given age), the male excess mortality burden rises to 43%.

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 5 years.

Ischaemic heart disease (IHD) is by far the largest cause of years of life lost in both males and females (see Figure 3). IHD is followed by stroke and breast cancer in females and by lung cancer and suicide in males. Heroin overdose deaths are in the top 20 causes of years of life lost for males, resulting in almost as many years of life lost as HIV/AIDS or leukemia.

Because YLL give greater weight to deaths at younger ages, causes such as breast cancer, suicide and road traffic accidents rank more highly in terms of mortality burden than in terms of numbers of deaths (see Figure 3).

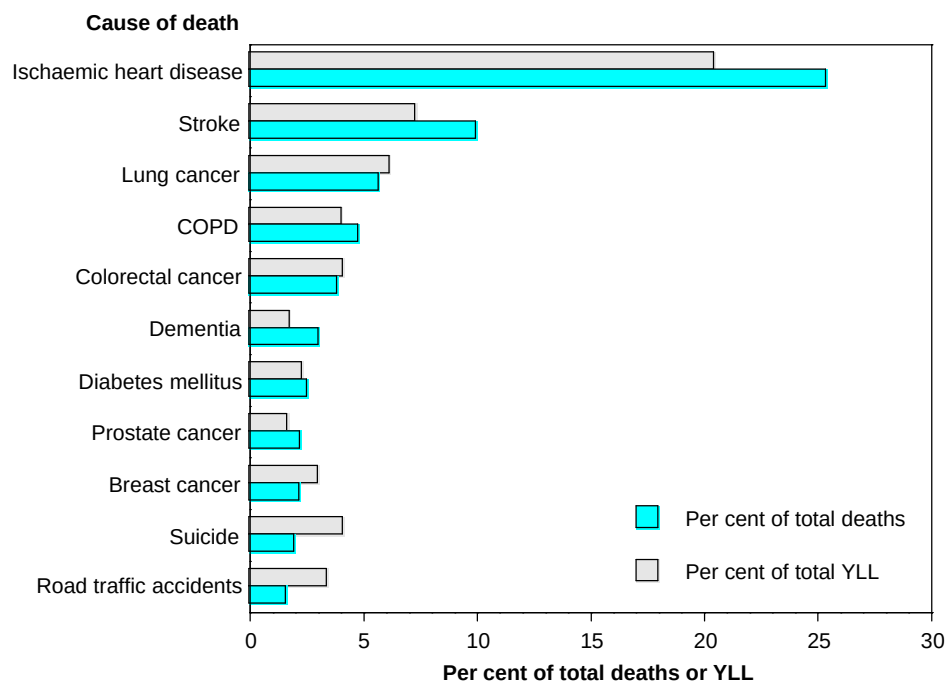


Figure 3: Leading causes of mortality burden (YLL), by sex, Australia, 1996

Recent trends in mortality burden

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, for senile dementias and heroin dependence and abuse in both sexes, and for lung cancer and COPD in women.

State and Territory differences in mortality burden

State and Territory differences in mortality burden are shown in Figure 4. A complete analysis of the mortality burden of disease in Victoria has been carried out by the Victorian Burden of Disease Study (Department of Human Services 1999a).

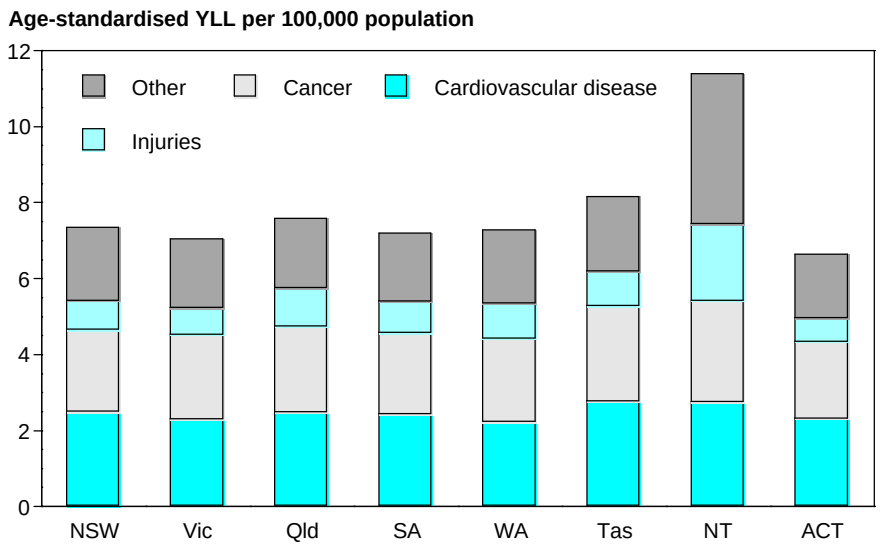


Figure 4: Years of life lost per 1,000 population, by State and Territory, 1996

4 Years of 'healthy' life lost due to disability

This section summarises the final results of the Australian Burden of Disease and Injury Study for years of life lost due to disability (YLD), by age, sex and cause, for 1996. These results quantify the burden of non-fatal health outcomes using a single measure, YLD.

How are YLD assessed?

A disease or injury may have various levels of severity of symptoms (e.g. asthma, depression, dementia), various stages (e.g. cancers), and multiple disabling effects, or sequelae. For example, diabetes may result in retinopathy, neuropathy, diabetic foot, amputation or renal failure. To estimate YLD for each disease, the study estimated the amount of time lived in each of the stages, severity levels, and with various sequelae. For each of these, the average duration was multiplied by the number of incident cases and the relevant disability weight, and discounted at 3%, to obtain YLD.

YLD estimates were made for a comprehensive set of 176 disease and injury categories involving analysis of 1,260 disease stages, severity levels and sequelae. For some conditions, numbers of incident cases were available directly from disease registers or epidemiological studies, but for most conditions only prevalence data are available. In these cases a software program called DISMOD© was used to model incidence and duration from estimates of prevalence, remission, case fatality and background mortality.

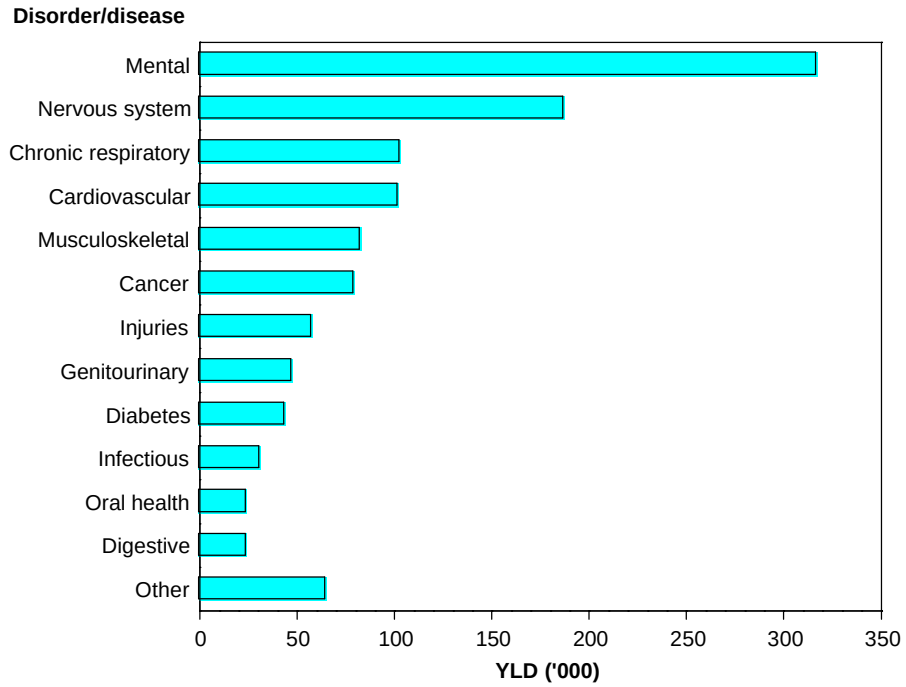
Many different sources of information were used to calculate YLD. Where no data were available and relevant estimates could not be found in Australian or international epidemiological and medical literature, expert judgment was relied on. For most disease and injury groups, Australian experts were consulted during the development and revision of YLD estimates. Complete worksheets for each disease group were given to selected experts for comment. Assumptions, models and estimates were revised where necessary.

Incidence and prevalence of conditions

Although most results of this study are reported in terms of YLL, YLD and DALYs, these are based on comprehensive estimates of the incidence, prevalence and durations of a large number of diseases and injuries and their disabling sequelae. The full report contains estimates of the total number of incident and prevalent cases in 1996 for each of the diseases and injuries included in the study.

Leading causes of the disability burden

Figure 5 shows the YLD contributions for the major disease groups and injury to the total non-fatal burden of disease and injury in Australia in 1996. The non-fatal disease burden presents a substantially different picture than that provided by traditional



Note: Acute respiratory infections included with infectious diseases category in this figure.

Figure 5: Non-fatal burden of disease (YLD) for major disease groups, Australia, 1996

mortality statistics. 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 disorders are responsible for 16% of the disability burden. The latter category is dominated by senile dementias and hearing loss.

Table 4 shows the top 10 causes of years lost due to disability for males and females in Australia. Detailed information on YLD by sex and age group for all disease and injury categories is given in the full report.

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 6 shows the top 10 causes of disability burden in Australia for males and females combined.

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.

Table 4: Top 10 causes of disability burden: per cent of total YLD, by sex, Australia, 1996

Males	Per cent of total	Females	Per cent of total
1 Depression	6.2	1 Depression	9.8
2 Adult-onset hearing loss	5.7	2 Dementia	6.8
3 Alcohol dependence/abuse	4.9	3 Osteoarthritis	5.7
4 Dementia	4.4	4 Asthma	5.3
5 Asthma	4.3	5 Generalised anxiety disorder	3.5
6 COPD[(a)]	4.2	6 Diabetes mellitus[(b)]	3.5
7 Diabetes mellitus[(b)]	4.1	7 Vision disorders	2.9
8 Stroke	3.9	8 Stroke	2.7
9 Osteoarthritis	3.9	9 Adult-onset hearing loss	2.6
10 Ischaemic heart disease	3.9	10 COPD[(a)]	2.5

(a) Chronic obstructive pulmonary disease (chronic bronchitis and emphysema).

(b) Includes Type 1 and Type 2 diabetes.

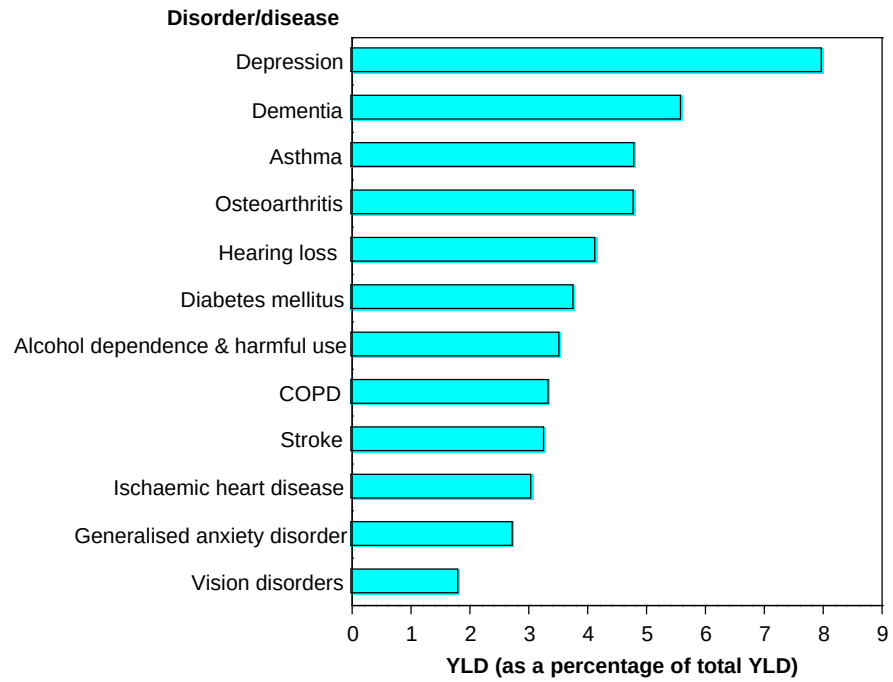


Figure 6: Leading causes of years of life lost due to disability (YLD), Australia, 1996

Prevalent burden of disability

Although the primary emphasis of this study is on incident years lost due to disability, we have also calculated undiscounted prevalence-based YLD which reflect prevalent disability at each age. This gives a measure of the loss of health experienced in 1996 in each age–sex group in the population. The standard YLD give a measure of the

disability arising in 1996 and future years from new cases of disease occuring in each age–sex group in the population in 1996.

The main causes of the prevalence YLD at various ages are shown in Figure 7. For most disease groups, the prevalent burden is concentrated at older ages. The main exceptions are mental disorders (largest at young adult and middle ages) and chronic respiratory conditions (with a peak for asthma in children and another for chronic obstructive pulmonary disease in older people).

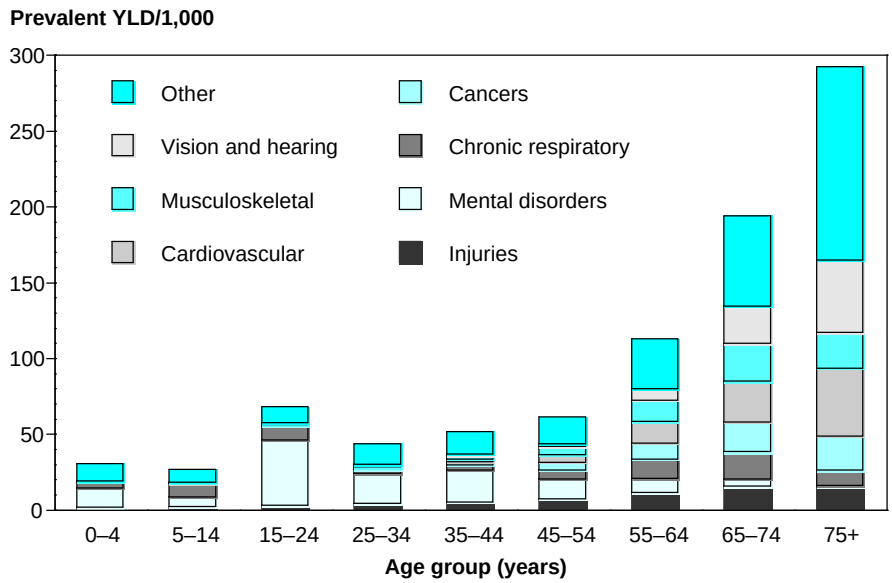


Figure 7: Causes of prevalent YLD, by age, 1996

Disability-adjusted life expectancy

The Australian prevalence YLD estimates have also been used to estimate disability-adjusted life expectancy (DALE) for Australian males and females in 1996. These represent the average equivalent years of good health that a person can expect to have. Australian males born in 1996 can expect to live the equivalent of 68.7 years of good health, compared with 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.

5 The burden of disease and injury in Australia in 1996

This section summarises the results of the Australian Burden of Disease and Injury Study for the total disease burden measured in DALYs. The DALYs quantify the combined burden of mortality (YLL) and non-fatal health outcomes (YLD).

Figure 8 shows the YLL and YLD contributions to total DALYs for the major disease and injury groups. Inclusion of non-fatal health outcomes provides a substantially different picture than that provided by traditional mortality statistics: mental disorders are now the third leading cause of overall burden (14% of the total), after cardiovascular diseases (20%) and cancers (19%). Central nervous system and chronic respiratory conditions are almost as large a contributor to the total burden as injuries.

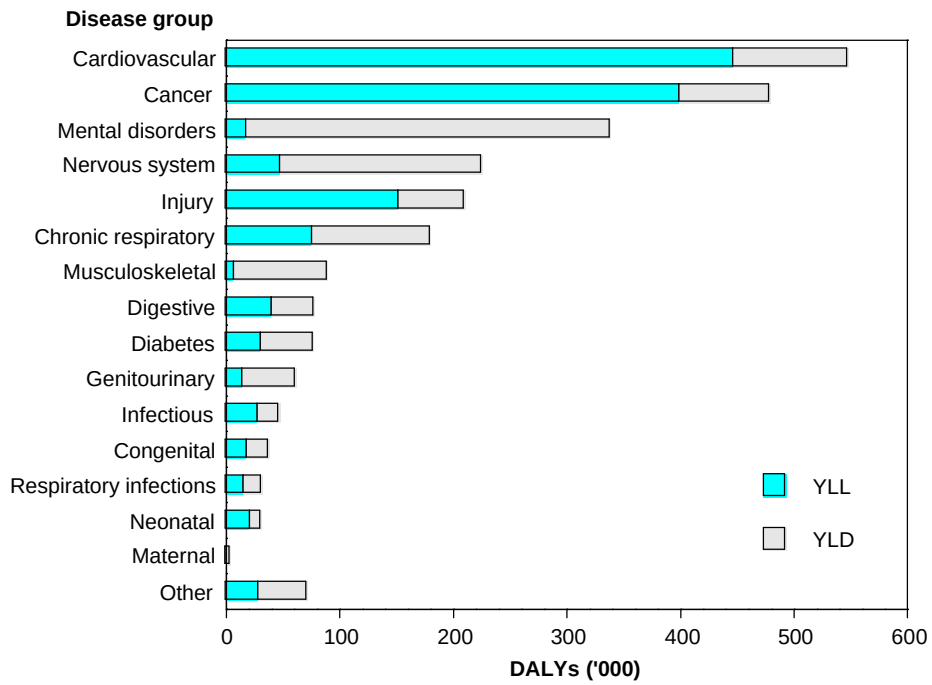


Figure 8: Burden of disease (YLL, YLD and total DALYs) for major disease groups, Australia, 1996

Note that the burden of diabetes shown here does not include the burden of cardiovascular disease attributable to diabetes as a risk factor. The inclusion of the attributable cardiovascular disease burden increases the total burden of diabetes from 3.0% of total DALYs to 4.9%.

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.

The male burden (total DALYs) is 13% higher than the female burden (Figure 9). Non-fatal outcomes (YLD) are responsible for 43% of the male burden and 49% of the female burden.

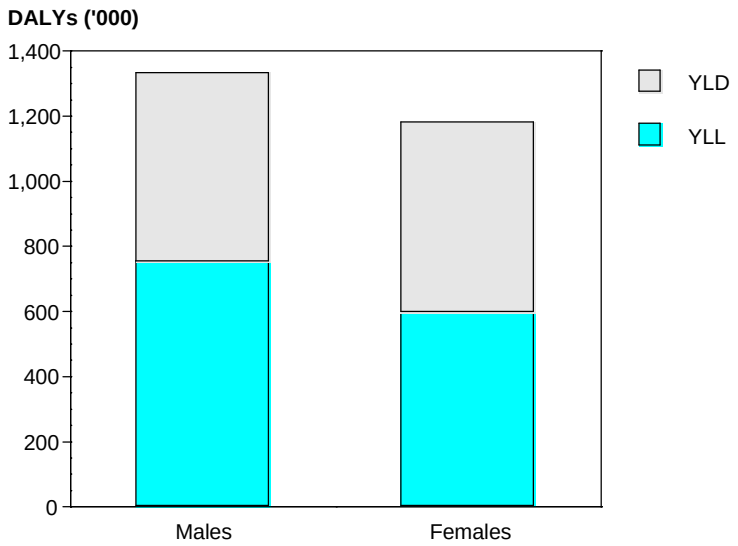


Figure 9: Total burden of disease and injury (YLL, YLD and DALYs), by sex, Australia, 1996

The 10 leading causes of the burden of disease in Australia for males and females are shown in Table 5. Table 1 shows the 15 leading causes for males and females combined. 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.

Australian children aged 0–14

Asthma is the leading cause of disease burden for Australian children, accounting for over 18% of their total disease burden. This is followed by low birthweight and attention-deficit hyperactivity disorder. Neonatal conditions and congenital anomalies together account for 27% of the total disease burden in children (Figure 10).

Table 5: The 10 leading causes of the burden of disease and injury, by sex, Australia, 1996

Males	Per cent of total DALYs	Females	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[(a)]	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[(a)]	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

(a) Chronic obstructive pulmonary disease.

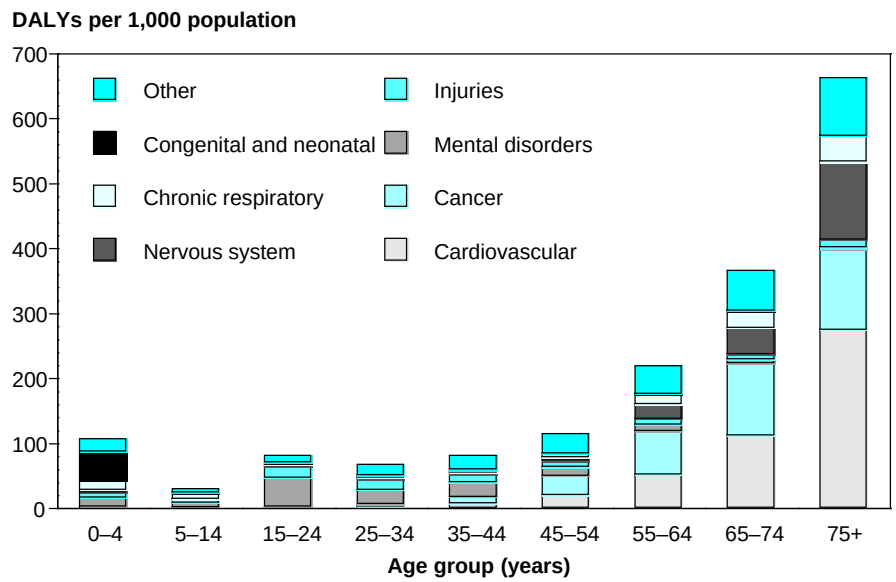


Figure 10: Major causes of disease burden, by age, Australia, 1996

Young Australians aged 15–24

Alcohol dependence and harmful use and road traffic accidents are the leading causes of disease burden for young Australians aged 15–24 years, each accounting for over 9% of their total disease burden. These are followed by depression, bipolar affective disorder (manic depression), and suicide and self-inflicted injuries, which together account for 22% of the total disease burden for this age group. Heroin dependence and

harmful use is the fifth leading cause of disease burden for 15–24 year olds, accounting for 6% of the total disease burden for this age group. In total, mental disorders account for 55% of the total disease and injury burden for young adults (Figure 10).

Australian adults aged 25–64 years

Although most deaths occur at ages 65 and over, the burden of disease arising at ages 25–64 is almost as large in absolute terms as that arising at ages 65 and over. Ischaemic heart disease is the leading cause of disease burden in adults aged 25–64 years, accounting for 8.5% of total DALYs. Depression is the second leading cause, at 6.3%.

These are followed by chronic obstructive pulmonary disease (4.0%), suicide and self-inflicted injuries (4.0%), and diabetes mellitus (3.9%). All cancers combined account for 20% of the total disease burden in adults aged 25–64 years (Figure 10).

Older Australians

Ischaemic heart disease and stroke are the leading causes of disease burden among older Australians (aged 65 years and over), together accounting for 32% of the total disease burden. These are followed by senile dementias (7.2%), lung cancer (5.0%) and chronic obstructive pulmonary disease (4.9%). Hearing loss and benign prostate enlargement are among the top 10 causes of disease burden for older men. Vision loss and osteoarthritis are among the top 10 causes for older women.

6 National Health Priority Areas

The National Health Priority Areas (NHPA) initiative is a collaborative effort involving the Commonwealth and State and Territory governments. It seeks to focus public attention and health policy on those areas that are considered to contribute significantly to the burden of disease in Australia and for which there is potential for health gain. The NHPA initiative recognises that in order to reduce the burden of disease, strategies should be holistic, encompassing the continuum of care from prevention through to treatment and management.

The six National Health Priority Areas (shown in Figure 11) account for 70% of the total burden of disease and injury in Australia, comprising 81% of the YLL and 57% of the YLD. This section summarises the burden of disease associated with the six NHPAs. The burden of cardiovascular disease and renal failure attributable to diabetes has been included with the diabetes burden.

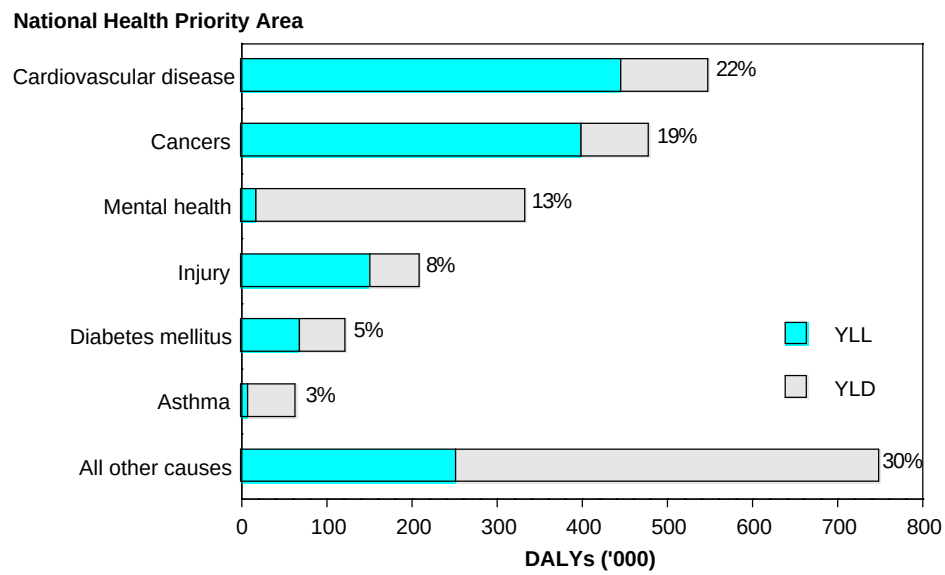


Figure 11: Contribution of NHPAs to total burden of disease and injury in Australia, 1996

The burden of cardiovascular disease is dominated by ischaemic heart disease (also known as coronary heart disease) and stroke, which account for almost 57% and 25% of the cardiovascular DALYs respectively. The burden of ischaemic heart disease is 38% higher for men than women, while the burden of stroke is 12% higher for women than men.

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 leading causes of cancer burden are shown in Figure 12. Non-Hodgkin's lymphoma causes 93% of the DALYs for lymphoma.

Although cancer of the cervix has been identified as one focus of the cancer priority area, it does not appear in the top 10 cancers for women listed in Figure 12. In fact it contributes the 12th highest number of DALYs. This is an illustration of the fact that the size of a health problem is not the only determinant of whether or not it should be a priority. Cancer of the cervix is a priority cancer because it is one of the few cancers where precancerous lesions are cost-effectively detectable and treatable. Hence, mortality from this cancer can be largely prevented with current screening and treatment methods.

The burden of mental disorders in Australia is dominated by affective disorders (depression and manic depression), substance use disorders and anxiety disorders (Figure 13). 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, followed by heroin use (30%). 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%).

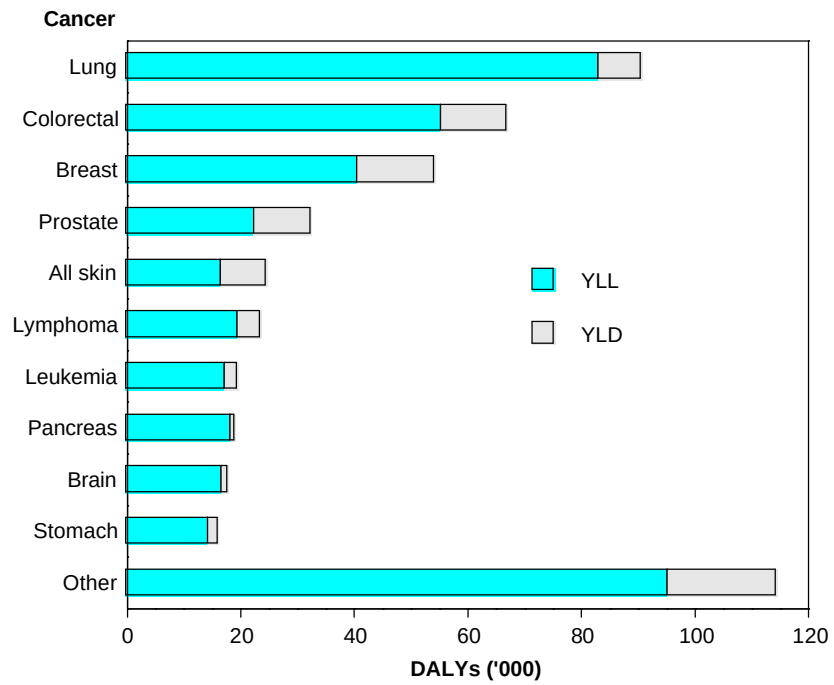


Figure 12: The burden of cancer, by site, all persons, 1996

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.

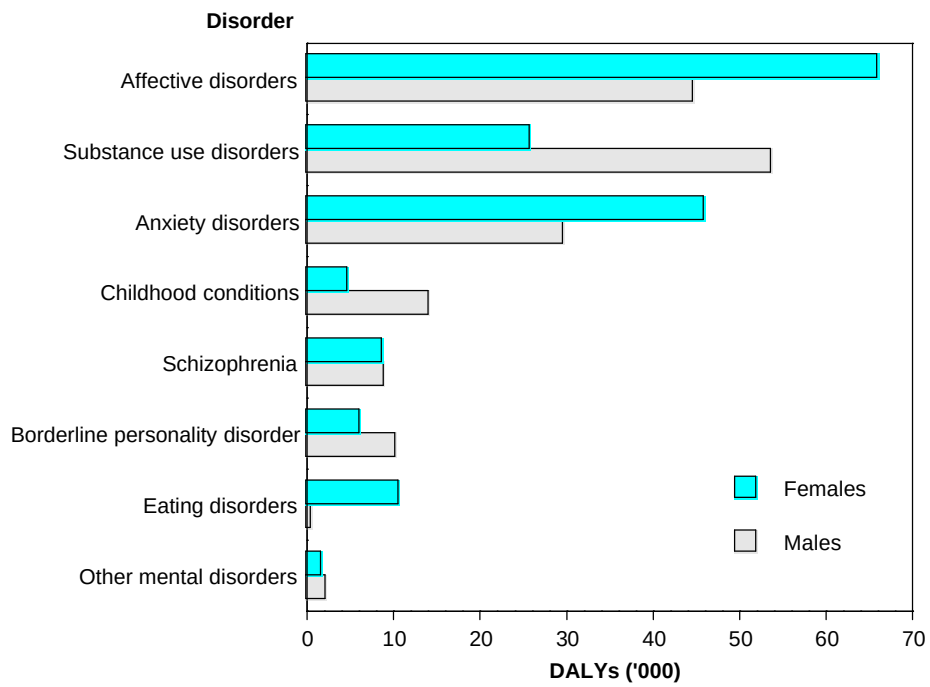


Figure 13: The burden of mental illness, by sex and major category of mental disorder, 1996

7 Socioeconomic inequalities

One of the longer term aims of this study is to develop estimates of the burden of disease for different groups within the Australian population, including groups defined in terms of relative socioeconomic status. This study has undertaken analyses of inequalities in the burden of mortality and disability using an area-of-residence–based measure of socioeconomic disadvantage, the SEIFA index of relative socioeconomic disadvantage (ABS 1998).

Australians were classified into quintiles of socioeconomic disadvantage according to the value of the index for their statistical local area (SLA) of usual residence, with the first quintile corresponding to the highest socioeconomic group and the fifth quintile the lowest. SLAs were grouped into quintiles so that each quintile contained approximately 20% of the total Australian population.

YLL inequalities

The burden of premature mortality 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 quintile.

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 ages 25 and 65 than men in the top quintile (Figure 14). There is a 3.6 year gap in life expectancy at birth for males between the bottom and top quintiles, and a 1.9 year gap for females.

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 (death rates have increased faster in the top quintile than the bottom between 1986 and 1996).

YLD inequalities

Inequality in disability burden was assessed for selected mental disorders using data from the 1997 National Survey of Mental Health and Wellbeing. For the combined burden of substance use disorders, affective disorders, anxiety disorders and borderline personality disorder, there is a marked gradient in the YLD burden with socioeconomic disadvantage.

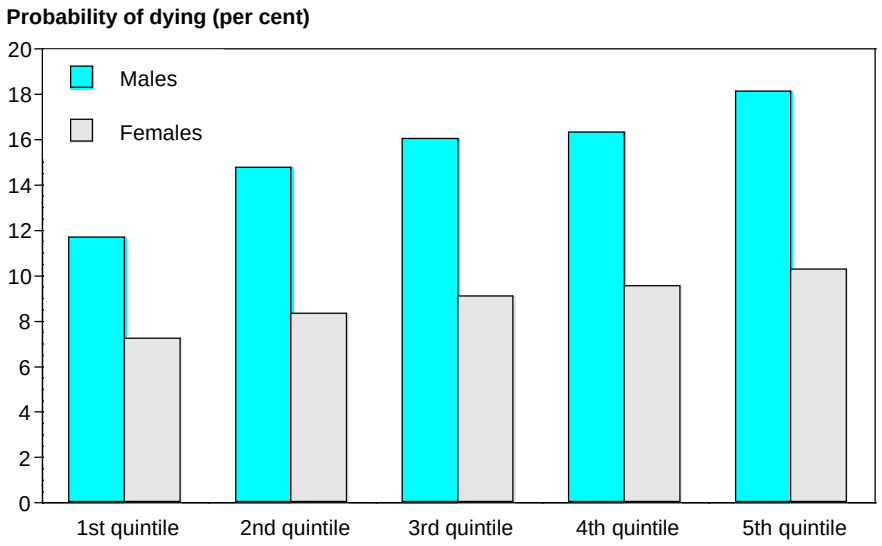


Figure 14: Probability of dying between ages 25 and 65, by quintile of socioeconomic disadvantage and sex, Australia 1996

The YLD burden in the bottom quintile (most disadvantaged) is 45% higher for males and 41% higher for females than for those in the top quintile (least disadvantaged). Inequalities in burden would be even greater for disadvantaged groups defined in terms of individual circumstances rather than small area average disadvantage.

DALY inequalities

Provisional estimates of differentials in burden of disease measured in DALYs for the main disease and injury groups are included in the full report. The total disease burden per 1,000 population in the bottom quintile is 37% higher for males and 27% higher for females than the burden for males and females in the top quintile.

Compared with the top quintile (least disadvantaged), the excess disease burden in the other quintiles is almost 20% of total male burden and around 15% of total female burden. If it were possible to reduce disease and injury incidence and mortality in all areas to a level equivalent to that of the least disadvantaged quintile, the potential savings in lost years of 'healthy' life would be at least 17% of the total disease burden. This is larger than the burden attributable to risk factors such as tobacco smoking, hypertension or physical inactivity, although some of the effects of socioeconomic disadvantage are mediated through these and other 'lifestyle' risk factors.

8 The burden attributable to risk factors

The proportions of the burden of disease and injury attributable to various risk factors are summarised in this section. 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 15 and Table 6.

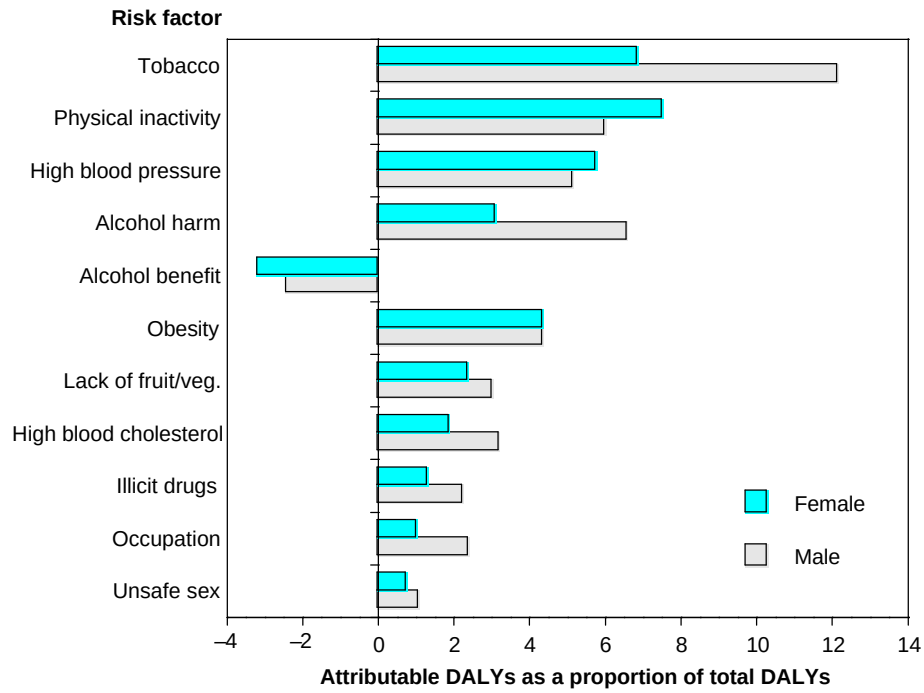


Figure 15: Proportion of total burden attributed to selected risk factors, by sex, Australia, 1996

For each of the 10 risk factors analysed in the full report, the attributable burden estimates are based on information on the prevalence of the risk factor in the Australian population and best estimates of the relative risks of incidence or mortality for each health condition causally associated with exposure to the risk factor.

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 inter-action between risk factors has not been captured fully. Therefore, caution is warranted

Table 6: The burden of disease attributable to 10 major risk factors, Australia, 1996

	Per cent of total DALYs		
	Males	**Females**	**Persons**
Tobacco	12.1	6.8	9.7
Physical inactivity	6.0	7.5	6.7
High blood pressure	5.1	5.8	5.4
Alcohol harm	6.6	3.1	4.9
Alcohol benefit	–2.4	–3.2	–2.8
Obesity	4.3	4.3	4.3
Lack of fruit and vegetables	3.0	2.4	2.7
High blood cholesterol	3.2	1.9	2.6
Illicit drugs	2.2	1.3	1.8
Occupation	2.4	1.0	1.7
Unsafe sex	1.1	0.7	0.9

in the interpretation of these results and the attributable burdens for different risk factors should not be added together to estimate the combined burden of all the risk factors. 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 10 diseases. This suggests that large health gains can be expected from effective public health interventions.

Tobacco smoking is the risk factor causing the greatest burden of disease in Australia. It is 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 obesity for more than 4%.

High blood pressure 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.

Harm caused by alcohol consumption accounts for 4.9% of the total disease burden. This harm is distributed relatively evenly across all age groups (Figure 16). Road traffic accidents and liver cirrhosis are the leading causes of death contributing to the mortality burden of alcohol in Australia. Alcohol dependence and harmful use is by far the leading cause of years lost due to disability among conditions caused by alcohol.

Deaths from cardiovascular disease averted by alcohol consumption outweigh the deaths due to injuries, cancers and other chronic diseases in Australia. However, the burden of disease and injury averted by alcohol consumption is substantially lower than that caused by alcohol consumption for men. For women, the harm and benefit are almost equally balanced. Overall, the benefit of alcohol consumption in averting disease corresponds to around 2.8% of the current disease burden.

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 45, whereas the harmful effects of alcohol are apparent at all ages (Figure 16). Over 80% of the alcohol benefit is due to premature mortality, whereas mortality and disability contribute almost equally to the alcohol harm.

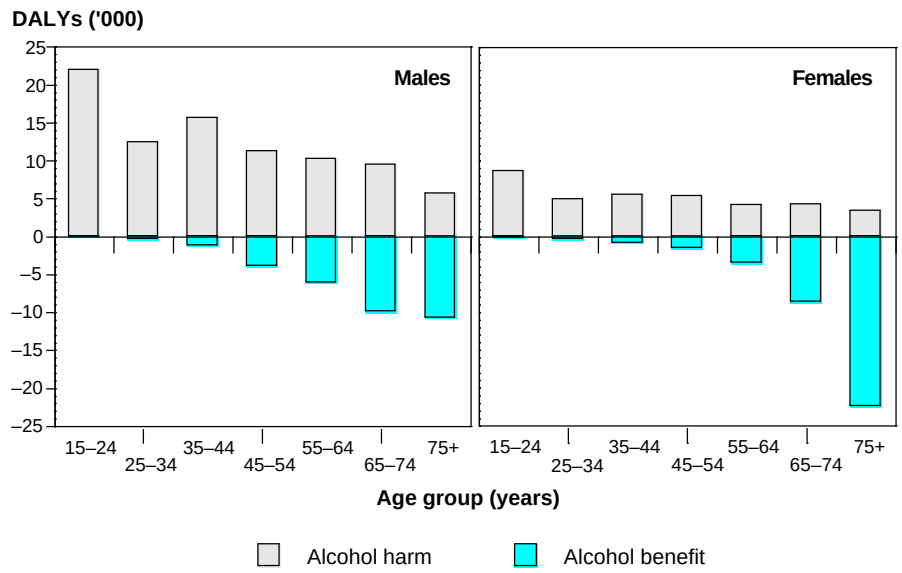


Figure 16: The burden of disease and injury attributable to the harmful and beneficial effects of alcohol, by age and sex, Australia, 1996

Illicit drugs are responsible for a level of harm similar 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%).

Occupational exposures to toxic chemicals and injury risks were responsible for an estimated 2,005 deaths in Australia in 1996, or 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%).

9 Conclusions

This study provides the first comprehensive assessment of the health status of the Australian population. 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. Inclusion of fatal and non-fatal health outcomes in a single summary measure produces a picture substantially different from that provided by traditional mortality statistics:

- Premature mortality (YLL) is responsible for 57% of the total burden of disease in Australian males and 51% in females. The male mortality burden is 26% higher than that for females.
- Non-fatal outcomes (YLD) are responsible for 43% of the male burden and 49% of the female burden. The leading causes of the disability burden in Australia are mental disorders (responsible for nearly 30% of YLD in 1996).
- 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.
- The leading causes of total disease burden (DALYs) are ischaemic heart disease and stroke, 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 causes 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 3.7% of the total burden. If the attributable burden of suicide and self-inflicted injury is included, then depression rises to third place, accounting for an overall 5% of the total burden of disease and injury in Australia.
- Diabetes is the seventh leading cause of disease burden. If the burden of cardiovascular diseases attributable to diabetes is included with diabetes, its total attributable burden rises to 4.9%, making it with depression the equal third cause of disease burden.

This report has identified substantial inequalities in the burden of disease according to a measure of socioeconomic disadvantage based on area of residence. The most disadvantaged 20% of Australians have a mortality burden that is 35% higher than that for the least disadvantaged 20%. The differential in total burden (DALYs) between these groups is estimated to be around 32%.

Risk factors such as smoking, alcohol consumption, physical inactivity, hypertension, high blood cholesterol, obesity and inadequate fruit and vegetable consumption are responsible for large proportions of the overall burden of disease in Australia.

- The leading risk factor is tobacco smoking, responsible for about 12% of the total burden of disease in males and 7% in females. Physical inactivity is responsible for

about 8% of the total burden of disease and obesity a somewhat lower proportion, at around 4.4%.

- The increase in tobacco-related mortality in Australian women over the last 15 years is a reason for concern, as is the continuing trend in increasing levels of overweight and obesity in the Australian population.

If the types of information provided by burden of disease analysis are seen to be useful in Australia, there will need to be further work to refine and develop the data and methods, and to assess the disability associated with health conditions in the Australian context.

There are major gaps in our knowledge about the effectiveness of interventions and the associated costs. Linking of burden of disease analyses to studies of the cost-effectiveness of interventions for major health problems will allow these interventions to be judged in terms of both cost-effectiveness and their relative impacts in reducing the burden of disease and ill-health.

Until these analyses can be done, however, the results reported here provide a valuable insight into the scope for further health gain in Australia. This information will assist in addressing the future challenges posed by the ageing of the population, changes in disease and risk factor patterns, and the increasing costs of health services.

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