

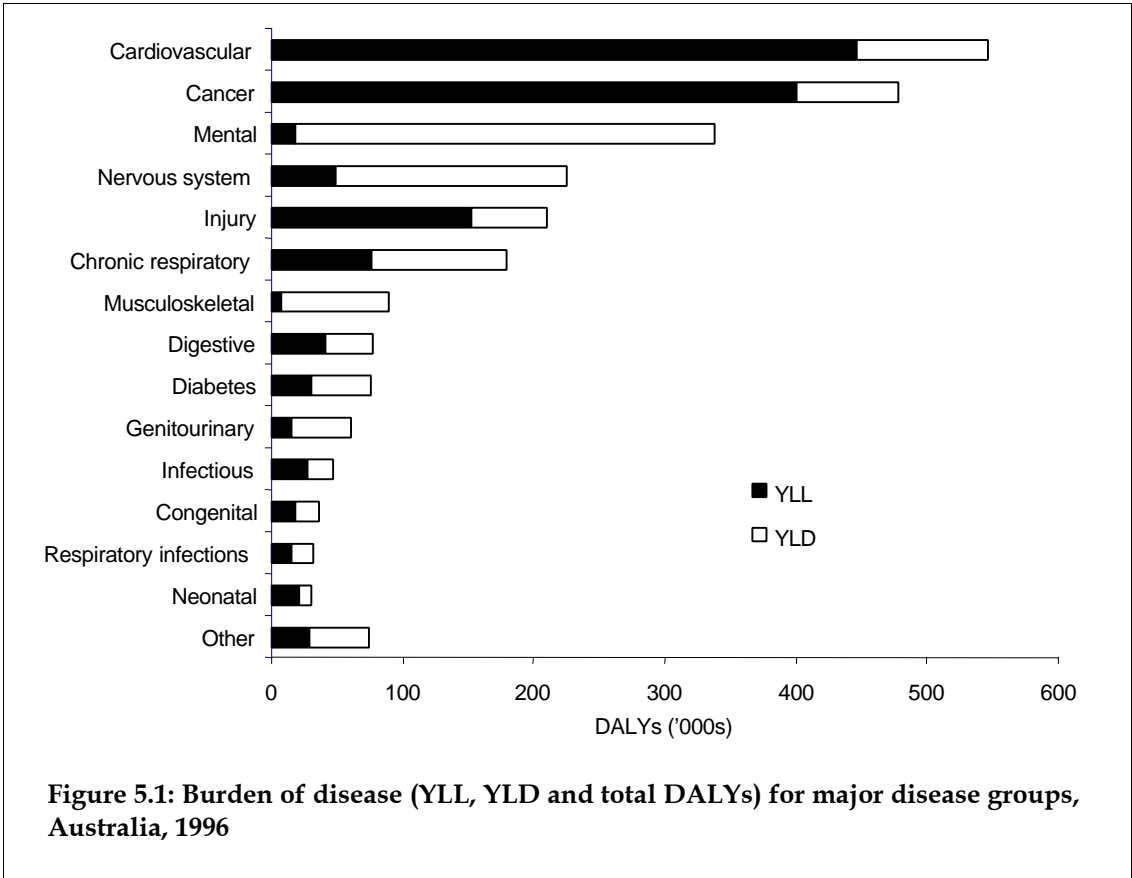
5 Burden of disease and injury

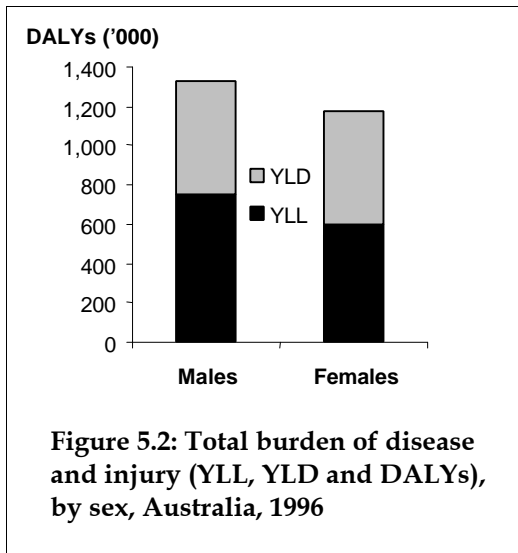
5.1 Overview

In this chapter, we present the results of the Australian Burden of Disease and Injury Study for the total disease burden measured in DALYs by age, sex and cause for 1996. These results quantify the combined burden of fatal and non-fatal health outcomes in a single measure, the disability-adjusted life year or DALY. The DALY adds together: (a) the years of life lost through all deaths in 1996, and (b) the years of healthy life lost through living with disease, impairment and disability for all cases beginning in 1996.

Figure 5.1 shows the YLL and YLD contributions to total DALYs for the major disease groups and injury. 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 burden after cardiovascular diseases and cancers. Central nervous system and chronic respiratory conditions are almost as large a contributor to total burden as injuries.

Note that the burden of diabetes shown here does not include the burden of cardiovascular disease attributable to diabetes as a risk factor. As discussed in Section 5.4, inclusion of the attributable cardiovascular disease burden increases the total burden of diabetes from 3.0% of total DALYs to 4.9%.



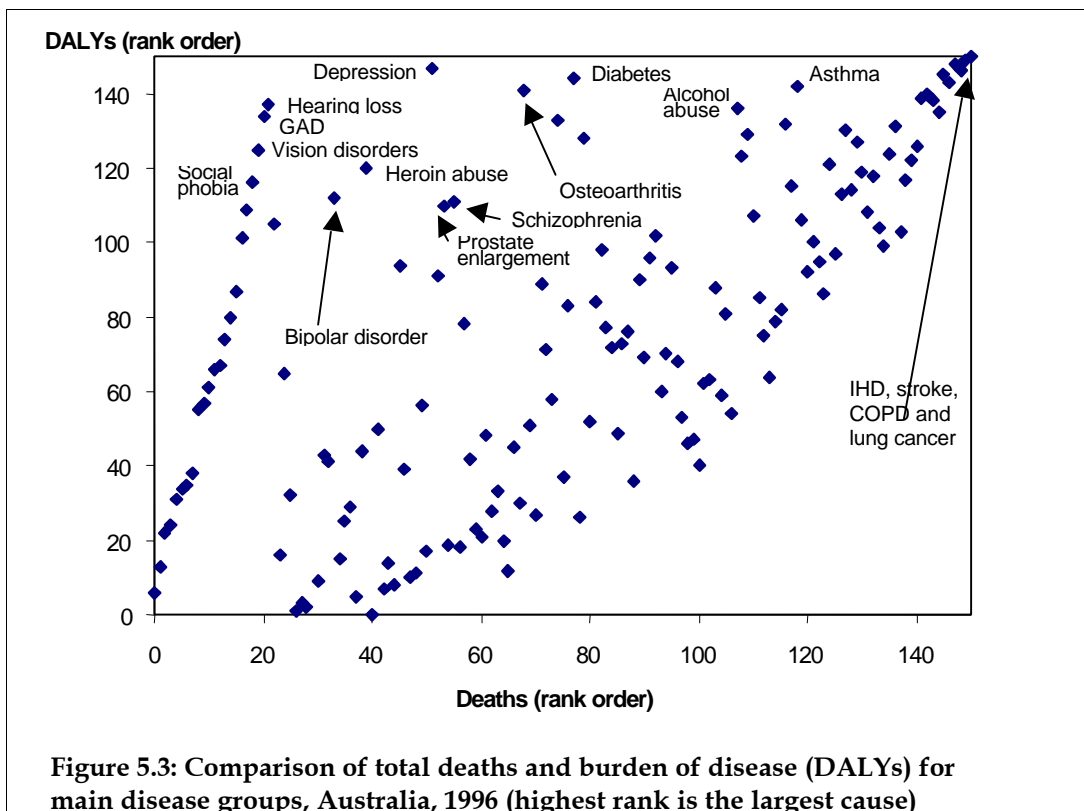


The total burden of disease and injury in Australia in 1996 is estimated to be 2.5 million DALYs or 137 DALYs lost per 1,000 population. In other words, among each 1,000 people in the Australian population, during 1996 the lost years of healthy life represented 13.7% of the total life years lived. The male burden (in total DALYs) is 13% higher than the female burden (Figure 5.2). When differences in the age-structure of the male and female population are taken into account, the male burden is 28% higher than the female burden (Table 5.1). Non-fatal outcomes (YLD) are responsible for 43% of the male burden and 49% of the female burden.

Table 5.1: Total burden of disease for males and females in Australia, 1996

	DALYs		Age-standardised DALYs per 1,000 population
	Number	Per 1,000 population	
Males	1,331,311	146.2	155.0
Females	1,178,963	128.1	121.0
Total	2,510,274	137.1	137.1

(a) Directly age-standardised using the 1996 total Australian population



When causes of deaths are compared, in rank order, with the total disease burden in DALYs, whether at individual condition level or main disease group level, there are substantial differences (Figure 5.3). This reinforces the need to take non-fatal outcomes into account as well as deaths when assessing the health of Australians. While a few leading conditions – such as ischaemic heart disease, stroke, chronic obstructive pulmonary disease, dementia and lung cancer – are at the top of both lists, there are 19 conditions in the top half of the list for disease burden that are in the bottom half of the list for deaths. These include most of the mental disorders, musculoskeletal disorders and sight and hearing loss.

5.2 Leading causes of disease burden

The ten leading causes of disease burden for Australia are shown in Table 5.2. 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.

The leading causes of disease burden in Australia are broadly similar to those for the Established Market Economies (EME) in the Global Burden of Disease Study (Table 5.2). However, asthma appears in the top ten causes for Australia but not the EME, reflecting the almost four times higher prevalence of asthma in Australia compared to the EME. Road traffic accidents appear in the top ten for the EME, but not for Australia, where they rank twelfth and cause 2.2% of the total disease burden (approximately half the proportion for the EME). Alcohol dependence ranks more highly in the EME (4.7% of total burden) than in Australia (1.8% of total burden). This may reflect differences in the methods and data used to estimate the burden of mental disorders in Australia (see Section 4.2).

Table 5.2: The ten leading causes of disease burden (DALYs), Australia 1996 and Established Market Economies 1990

Australia 1996	Per cent of total DALYs	Established Market Economies 1990 ^(a)	Per cent of total DALYs
1 Ischaemic heart disease	12.4	1 Ischaemic heart disease	9.0
2 Stroke	5.4	2 Depression	6.8
3 Chronic obstructive pulmonary disease	3.7	3 Stroke	5.0
4 Depression	3.7	4 Alcohol dependence and abuse	4.7
5 Lung cancer	3.6	5 Road traffic accidents	4.4
6 Dementia	3.5	6 Lung cancer	3.0
7 Diabetes mellitus	3.0	7 Dementia	2.9
8 Colorectal cancer	2.7	8 Osteoarthritis	2.7
9 Asthma	2.6	9 Diabetes mellitus	2.4
10 Osteoarthritis	2.2	10 Chronic obstructive pulmonary disease	2.3

(a) Age-weighted DALYs for Established Market Economies from the Global Burden of Disease Study (Murray & Lopez 1996a). Non-age-weighted DALYs for Australia.

Table 5.3: Leading causes of disease burden: DALYs by sex, Australia, 1996

Males		DALY ('000)	Per cent of total	Females		DALY ('000)	Per cent of total
1	Ischaemic heart disease	180,630	13.6	1	Ischaemic heart disease	130,700	11.1
2	Stroke	64,330	4.8	2	Stroke	72,248	6.1
3	Lung cancer	60,000	4.5	3	Depression	57,109	4.8
4	COPD	55,866	4.2	4	Dementia	55,510	4.7
5	Suicide and self-inflicted injuries	44,531	3.3	5	Breast cancer	54,109	4.6
6	Road traffic accidents	40,305	3.0	6	COPD	37,521	3.2
7	Diabetes mellitus	39,438	3.0	7	Asthma	36,242	3.1
8	Depression	35,907	2.7	8	Diabetes mellitus	35,493	3.0
9	Colorectal cancer	35,511	2.7	9	Osteoarthritis	33,695	2.9
10	Dementia	33,468	2.5	10	Colorectal cancer	31,440	2.7
11	Adult-onset hearing loss	33,012	2.5	11	Lung cancer	30,521	2.6
12	Prostate cancer	32,448	2.4	12	Generalised anxiety disorder	20,488	1.7
13	Alcohol dependence/abuse	31,553	2.4	13	Age-related vision disorders	16,700	1.4
14	Asthma	28,281	2.1	14	Road traffic accidents	15,403	1.3
15	Osteoarthritis	22,610	1.7	15	Adult-onset hearing loss	15,158	1.3
16	Benign prostatic hypertrophy	17,079	1.3	16	Parkinson's disease	14,312	1.2
17	Heroin dependence/abuse	16,319	1.2	17	Alcohol dependence/abuse	13,819	1.2
18	Inflammatory heart disease	14,544	1.1	18	Ovary cancer	12,623	1.1
19	HIV/AIDS	13,885	1.0	19	Lymphoma	11,487	1.0
20	Cirrhosis of the liver	13,500	1.0	20	Suicide and self-inflicted injuries	11,399	1.0
21	Falls	13,186	1.0	21	Lower respiratory tract infections	10,673	0.9
22	Lymphoma	11,964	0.9	22	Eating disorders	10,644	0.9
23	Melanoma	11,860	0.9	23	Falls	10,416	0.9
24	Generalised anxiety disorder	11,342	0.9	24	Social phobia	10,185	0.9
25	Parkinson's disease	11,264	0.8	25	Pancreas cancer	9,809	0.8
26	Leukemia	11,187	0.8	26	Bipolar affective disorder	8,902	0.8
27	Brain cancer	10,299	0.8	27	Schizophrenia	8,728	0.7
28	Borderline personality disorder	10,274	0.8	28	Rheumatoid arthritis	8,343	0.7
29	Mouth and oropharynx cancers	10,180	0.8	29	Leukemia	8,240	0.7
30	Peripheral arterial disease	10,152	0.8	30	Peripheral arterial disease	8,181	0.7
31	Lower respiratory tract infections	9,844	0.7	31	Melanoma	8,150	0.7
32	Stomach cancer	9,753	0.7	32	Hypertensive heart disease	8,042	0.7
33	Attention-deficit hyperactivity disorder	9,369	0.7	33	Inflammatory heart disease	7,855	0.7
34	Pancreas cancer	9,201	0.7	34	Brain cancer	7,474	0.6
35	Schizophrenia	8,960	0.7	35	Heroin dependence/abuse	6,856	0.6
36	Bipolar affective disorder	8,797	0.7	36	Dental caries	6,814	0.6
37	Social phobia	8,428	0.6	37	Nephritis and nephrosis	6,666	0.6
38	Aortic aneurysm	8,371	0.6	38	Skin diseases	6,343	0.5
39	Oesophagus cancer	7,694	0.6	39	Stomach cancer	6,289	0.5
40	Homicide and violence	7,608	0.6	40	Urinary incontinence	6,273	0.5

Table 5.3: (continued): Leading causes of disease burden: DALYs by sex, Australia, 1996

Males		DALY ('000)	Per cent of total	Females		DALY ('000)	Per cent of total
41	Low birthweight	6,892	0.5	41	Cirrhosis of the liver	6,101	0.5
42	Bladder cancer	6,883	0.5	42	Borderline personality disorder	6,097	0.5
43	Epilepsy	6,668	0.5	43	Low birthweight	6,075	0.5
44	Dental caries	6,649	0.5	44	Cervix cancer	6,045	0.5
45	Poisoning	6,505	0.5	45	Iron-deficiency anaemia	5,603	0.5
46	Kidney cancer	6,475	0.5	46	Kidney cancer	4,937	0.4
47	Other transport accidents	6,284	0.5	47	Uterus cancer	4,866	0.4
48	Nephritis and nephrosis	5,837	0.4	48	Epilepsy	4,851	0.4
49	Hypertensive heart disease	4,999	0.4	49	Inflammatory bowel disease	4,834	0.4
50	Congenital heart disease	4,830	0.4	50	Aortic aneurysm	4,716	0.4
51	Autism/Asperger's syndrome	4,749	0.4	51	Panic disorder	4,395	0.4
52	Drowning	4,641	0.3	52	Cataracts	4,341	0.4
53	Birth trauma & asphyxia	4,524	0.3	53	Non-rheumatic valvular disease	4,331	0.4
54	Inflammatory bowel disease	4,473	0.3	54	Peptic ulcer disease	4,313	0.4
55	Age-related vision disorders	4,356	0.3	55	Congenital heart disease	4,257	0.4
56	Non-rheumatic valvular disease	4,355	0.3	56	Mouth and oropharynx cancers	4,124	0.3
57	Other chromosomal anomalies	4,140	0.3	57	Oesophagus cancer	4,030	0.3
58	Multiple myeloma	4,085	0.3	58	Post-traumatic stress disorder	3,976	0.3
59	Machinery accidents	4,061	0.3	59	Periodontal disease	3,755	0.3
60	Sudden infant death syndrome	3,731	0.3	60	Birth trauma & asphyxia	3,635	0.3
61	Post-traumatic stress disorder	3,717	0.3	61	Multiple myeloma	3,598	0.3
62	Rheumatoid arthritis	3,646	0.3	62	Attention-deficit hyperactivity disorder	3,590	0.3
63	Peptic ulcer disease	3,623	0.3	63	Chronic fatigue syndrome	3,505	0.3
64	Periodontal disease	3,495	0.3	64	Other chromosomal anomalies	3,418	0.3
65	Hepatitis	3,398	0.3	65	Agoraphobia	3,376	0.3
66	Liver cancer	3,431	0.3	66	Non-deficiency anaemia	3,351	0.3
67	Fires/burns/scalds	3,311	0.2	67	Occupational overuse syndrome	3,337	0.3
68	Bone/connective tissue cancers	3,279	0.2	68	Multiple sclerosis	3,184	0.3
69	Striking and crushing accidents	3,247	0.2	69	Homicide and violence	3,089	0.3
70	Cannabis dependence/abuse	3,092	0.2	70	Bone/connective tissue cancers	2,948	0.3
71	Non-melanoma skin cancers	3,017	0.2	71	Bladder cancer	2,939	0.2
72	Motor neurone disease	2,794	0.2	72	Gall bladder cancer	2,855	0.2
73	Septicaemia	2,763	0.2	73	Sudden infant death syndrome	2,819	0.2
74	Non-deficiency anaemia	2,706	0.2	74	Septicaemia	2,816	0.2
75	Iron-deficiency anaemia	2,676	0.2	75	Intestinal obstruction	2,776	0.2

Table 5.3 shows the 75 leading causes of burden of disease and injury in Australia for males and females. Ischaemic heart disease, stroke and the smoking-related diseases lung cancer and chronic obstructive lung disease (COPD) are the leading causes of burden for males, followed by suicide and self-inflicted injury. Ischaemic heart disease and stroke are the leading causes for females, followed by depression (including major depressive episodes and dysthymia), breast cancer then dementia. Diabetes is ranked seventh for males and eighth for females (this does not include the cardiovascular disease attributable to diabetes – see Section 5.4).

5.3 Age and sex patterns of disease burden

As noted in Section 5.1, the male disease burden in Australia is 13% higher than the female disease burden. This difference is due to the sex difference in the mortality burden: YLLs for males are 26% higher than those for females. In contrast, total YLD are 1% lower for males than females. The main causes of disease burden for males and females are also contrasted in Figure 5.4. Table 5.4 shows the distribution of total disease burden by age and sex for four broad age groups, for which leading causes of burden are examined in more detail below. Table 5.5 gives the percentage distribution of DALYs among the main disease and injury groups for males and females, and for the four age groups.

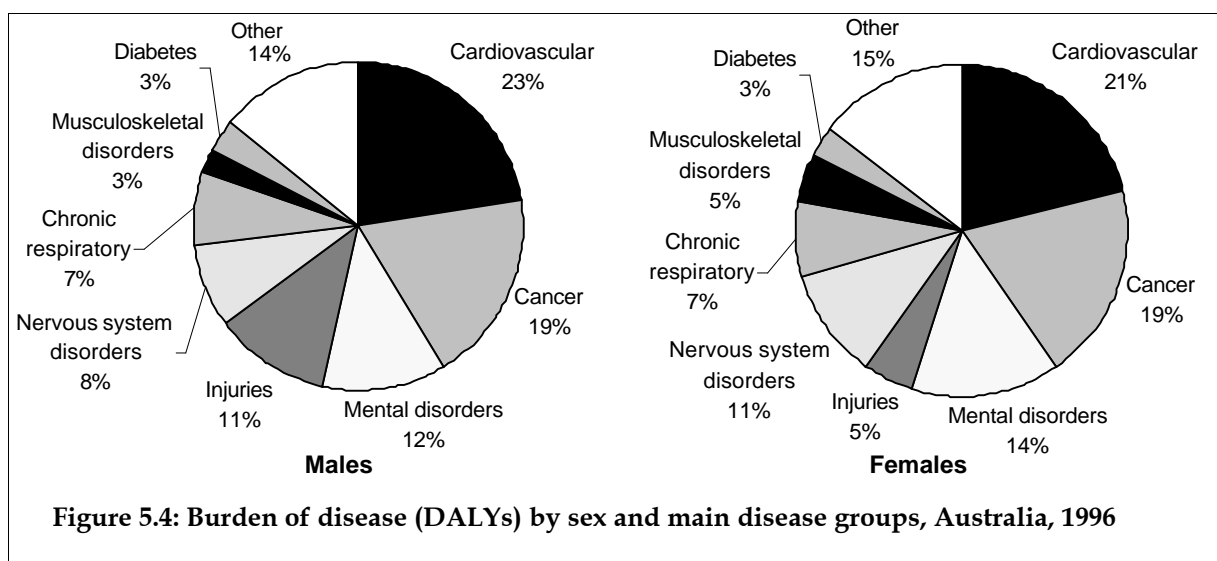


Table 5.4: Distribution of DALYs by life cycle stage and sex, Australia, 1996

Males	DALY ('000)	Per cent of total	Females	DALY ('000)	Per cent of total
0–14 years	120,707	9.1	0–14 years	92,562	7.9
15–24 years	115,861	8.7	15–24 years	98,341	8.3
25–64 years	570,968	42.9	25–64 years	438,832	37.2
65 years and over	523,774	39.3	65 years and over	549,228	46.6
Total	1,331,311	100.0	Total	1,178,963	100.0

Table 5.5: Percentage distribution of DALYs by main disease category, sex and age group, Australia, 1996

Disease category	Per cent of total DALYs							
	Persons	Male	Female	0-14	15-34	35-54	55-74	75+
A. Infectious and parasitic diseases	1.8	2.1	1.4	2.9	3.0	2.8	1.0	0.9
B. Acute respiratory infections	1.2	1.1	1.3	3.5	0.9	0.9	0.8	1.3
C. Maternal conditions	0.1	0.0	0.3	0.0	0.8	0.1	0.0	0.0
D. Neonatal causes	1.2	1.2	1.2	14.3	0.0	0.0	0.0	0.0
E. Nutritional deficiencies	0.4	0.2	0.5	1.7	0.5	0.4	0.1	0.1
F. Malignant neoplasms	19.1	19.0	19.3	2.3	3.9	20.2	30.6	18.8
G. Other neoplasms	0.3	0.2	0.3	0.2	0.2	0.3	0.3	0.4
H. Diabetes mellitus	3.0	3.0	3.0	1.0	1.0	5.1	3.6	2.4
I. Endocrine and metabolic disorders	1.2	1.2	1.2	1.8	0.7	1.2	1.3	1.2
J. Mental disorders	13.2	12.2	14.3	15.9	44.4	19.5	2.8	0.4
K. Nervous system disorders	9.4	8.1	10.9	4.3	2.8	4.0	10.8	18.1
L. Cardiovascular disease	21.9	22.5	21.2	1.1	2.4	13.1	27.7	41.4
M. Chronic respiratory diseases	7.1	7.1	7.1	20.2	4.6	5.1	7.0	6.0
N. Diseases of the digestive system	2.6	2.6	2.6	0.9	2.2	3.4	2.7	2.5
O. Genitourinary diseases	2.5	2.6	2.3	0.2	3.5	2.5	2.5	2.5
P. Skin diseases	0.4	0.3	0.5	0.9	1.1	0.5	0.2	0.2
Q. Musculoskeletal diseases	3.6	2.6	4.7	1.1	2.2	6.3	4.8	1.6
R. Congenital abnormalities	1.3	1.3	1.3	12.9	0.5	0.3	0.1	0.1
S. Oral health	1.0	0.8	1.1	0.5	1.6	1.8	0.8	0.3
V. Ill-defined conditions	0.5	0.4	0.5	3.2	0.4	0.6	0.0	0.0
T. Unintentional injuries	5.7	7.4	3.8	10.5	14.9	6.9	2.2	1.7
U. Intentional injuries	2.7	3.9	1.2	0.7	8.6	4.8	0.8	0.2
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

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 (Table 5.6). Neonatal conditions and congenital anomalies together account for 27% of the total disease burden in children.

Table 5.6: Leading causes of burden of disease and injury in children aged 0–14 years: DALYs by sex, Australia, 1996

Boys		DALYs	Per cent of total	Girls		DALYs	Per cent of total
1	Asthma	21,663	17.9	1	Asthma	17,219	18.6
2	Attention-deficit hyperactivity disorder	9,369	7.8	2	Low birthweight	6,075	6.6
3	Low birthweight	6,892	5.7	3	Attention-deficit hyperactivity disorder	3,590	3.9
4	Autism/Asperger's syndrome	4,749	3.9	4	Birth trauma & asphyxia	3,589	3.9
5	Birth trauma and asphyxia	4,524	3.7	5	Other chromosomal anomalies	3,376	3.6
6	Other chromosomal anomalies	4,140	3.4	6	Depression	3,361	3.6
7	Congenital heart disease	3,911	3.2	7	Congenital heart disease	3,263	3.5
8	Road traffic accidents	3,911	3.2	8	Sudden infant death syndrome	2,819	3.0
9	Sudden infant death syndrome	3,731	3.1	9	Road traffic accidents	2,222	2.4
10	Depression	2,961	2.5	10	Eating disorders	1,861	2.0
Total		120,707	100.0	Total		92,562	100.0

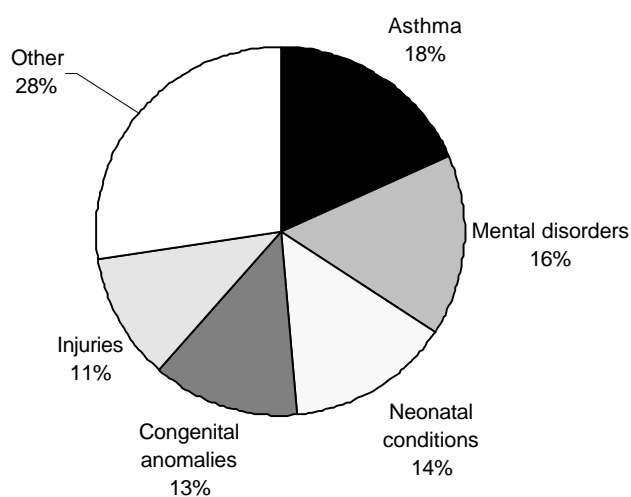


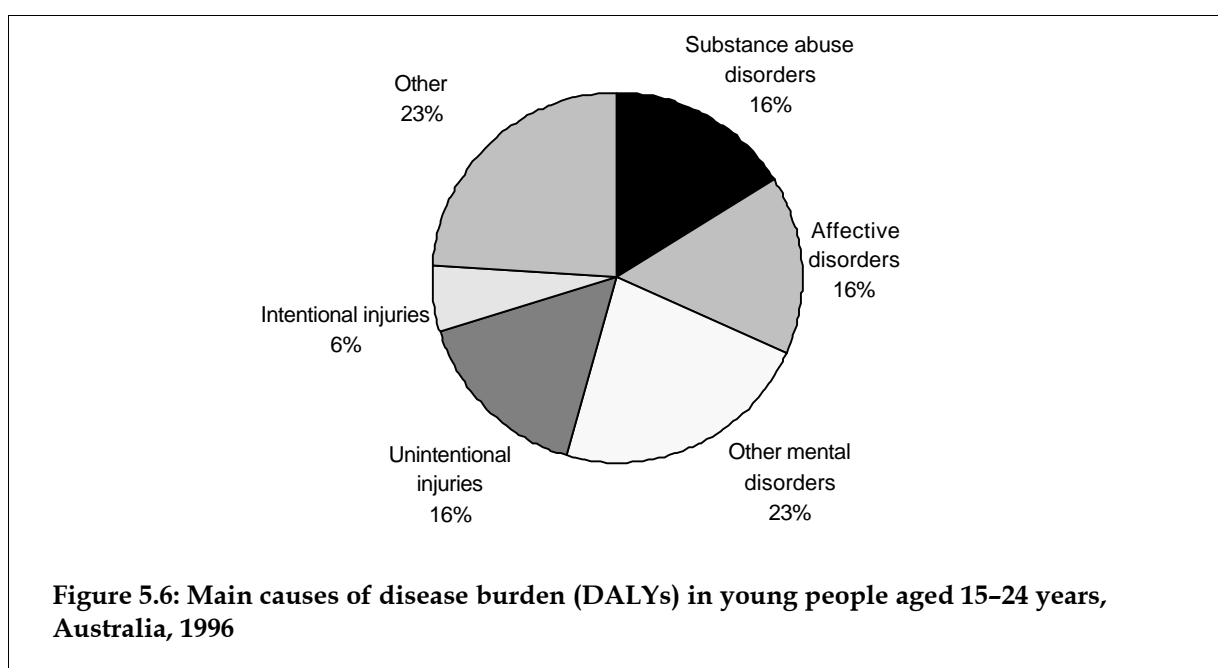
Figure 5.5: Main causes of disease burden (DALYs) in children aged 0–14 years, Australia 1996

Young adults 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 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 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.

Table 5.7: Leading causes of burden of disease and injury in young adults aged 15–24 years: DALYs by sex, Australia, 1996

Males	DALYs	Per cent of total	Females	DALYs	Per cent of total
Road traffic accidents	15,013	13.2	Depression	14,096	14.3
Alcohol dependence & harmful use	12,827	11.3	Bipolar affective disorder	7,054	7.2
Suicide and self-inflicted injuries	10,421	9.1	Alcohol dependence & harmful use	6,703	6.8
Bipolar affective disorder	7,076	6.2	Eating disorders	6,401	6.5
Heroin dependence & harmful use	8,411	7.3	Social phobia	5,886	6.0
Schizophrenia	5,291	4.6	Heroin dependence & harmful use	5,125	5.2
Depression	4,903	4.3	Asthma	5,057	5.1
Social phobia	4,674	4.1	Road traffic accidents	4,463	4.5
Borderline personality disorder	4,227	3.7	Schizophrenia	4,382	4.5
Generalised anxiety disorder	2,767	2.4	Generalised anxiety disorder	2,806	2.9
Total	115,861	100.0	Total	98,341	100.0

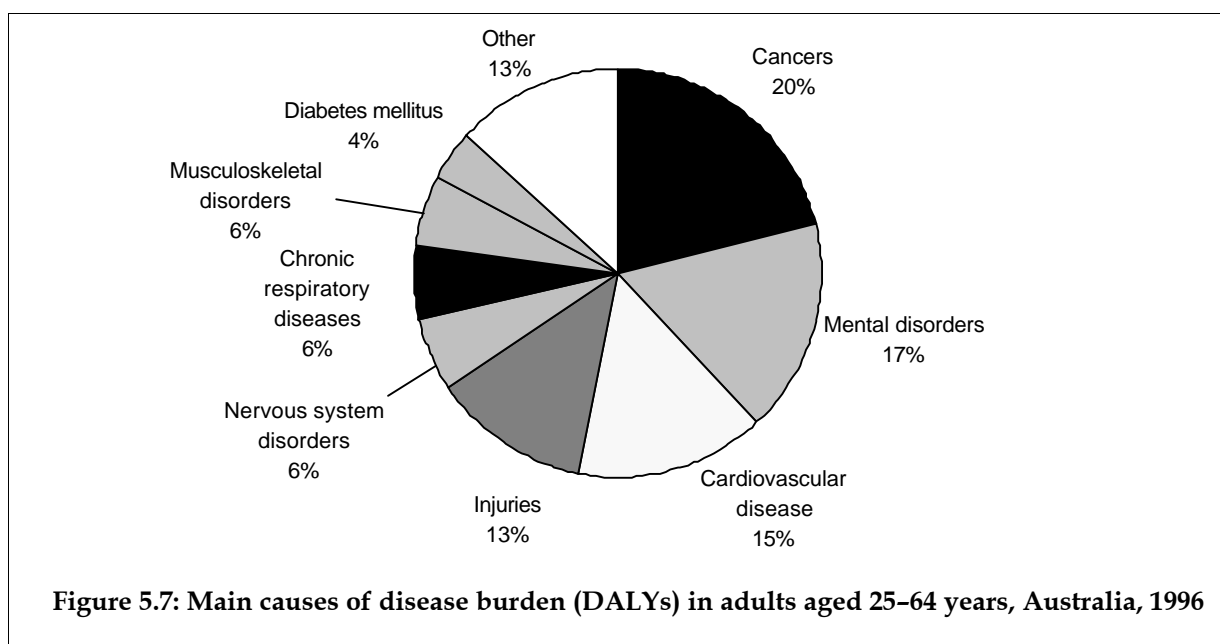


Adults aged 25–64 years

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 (Tables 5.8 and 5.9). Ischaemic heart disease is the leading cause of disease burden in adults aged 25–64 years, accounting for 8.5% of total DALYs (Table 5.8). Depression is the second leading cause, at 6.3% accounting for almost as much of the disease burden as ischaemic heart disease. These are followed by chronic obstructive pulmonary disease (4.0%), suicide and self-inflicted injuries (4.0%), and diabetes mellitus (3.9%). All cancers account for 20% of the total disease burden in adults aged 25–64 years (Figure 5.7).

Table 5.8: Leading causes of burden of disease and injury in adults aged 25–64 years: DALYs by sex, Australia, 1996

Males	DALYs	Per cent of total	Females	DALYs	Per cent of total
Ischaemic heart disease	66,767	11.7	Depression	36,783	8.4
Suicide and self-inflicted injuries	31,630	5.5	Breast cancer	34,476	7.8
Depression	27,169	4.8	Osteoarthritis	21,354	4.9
COPD	25,428	4.5	Ischaemic heart disease	19,340	4.4
Lung cancer	23,792	4.2	Diabetes mellitus	17,993	4.1
Diabetes mellitus	21,612	3.8	Generalised anxiety disorder	16,690	3.8
Road traffic accidents	19,519	3.4	COPD	15,466	3.5
Stroke	18,423	3.2	Lung cancer	13,247	3.0
Alcohol dependence & harmful use	17,650	3.1	Stroke	12,737	2.9
Adult-onset hearing loss	17,300	3.0	Colorectal cancer	12,589	2.9
Total	570,968	100.0		438,832	100.0

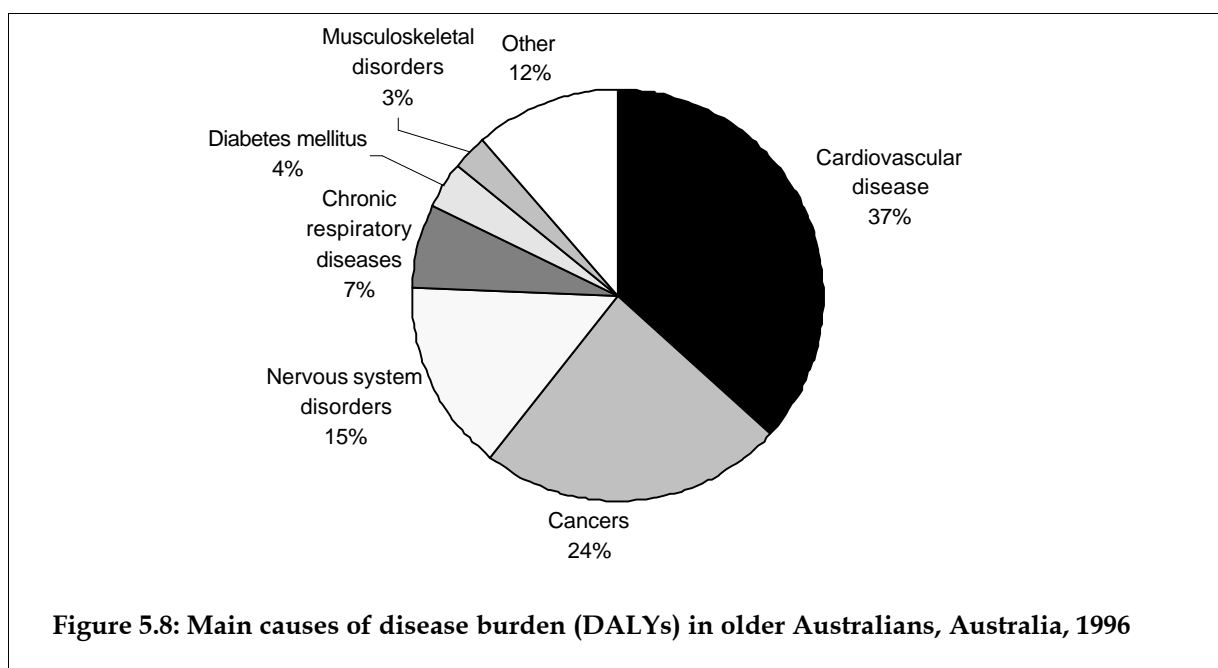


Older Australians

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. Cardiovascular diseases and cancers together account for over 60% of the disease burden in older Australians, followed by disorders of the nervous system (Figure 5.8).

Table 5.9: Leading causes of burden of disease and injury in adults aged 65 years and over, by sex, Australia, 1996

Males	DALYs	Per cent of total	Females	DALYs	Per cent of total
Ischaemic heart disease	113,681	21.7	Ischaemic heart disease	111,267	20.3
Stroke	45,111	8.6	Stroke	58,894	10.7
Lung cancer	36,206	6.9	Dementia	48,946	8.9
COPD	30,348	5.8	COPD	21,838	4.0
Dementia	27,804	5.3	Breast cancer	19,627	3.6
Prostate cancer	26,723	5.1	Colorectal cancer	18,812	3.4
Colorectal cancer	19,976	3.8	Lung cancer	17,273	3.1
Diabetes mellitus	15,958	3.0	Age-related vision disorders	15,591	2.8
Adult-onset hearing loss	15,404	2.9	Diabetes mellitus	15,232	2.8
Benign prostatic hypertrophy	9,902	1.9	Osteoarthritis	12,341	2.2
Total	523,774	100.0	Total	549,228	100.0



5.4 Attributable burden: diabetes, depression, osteoporosis, firearms and sporting injuries

The full contribution of some diseases and external causes of injury to the total disease burden is poorly reflected in the cause groups used in this study. One example is diabetes mellitus which, in addition to its direct sequelae, also contributes to increased risk of ischaemic heart disease, stroke and peripheral vascular disease (DHAC & AIHW 1999c). Attributable fractions methods analogous to those used for risk factors in Chapter 7 (see Section 2.9) have been used to estimate the additional burden associated with diabetes, depression and osteoporosis. Mortality and hospitalisation data have been used to estimate the total burdens associated with firearms and sporting injuries, which are distributed across the external cause of injury categories used in this report.

As well as contributing to the burden of disease in its own right, depression is a risk factor for suicide and self-inflicted harm and for ischaemic heart disease (AIHW 1999c). We have used estimates of the relative risk of suicide and ischaemic heart disease associated with depression to estimate the total attributable burden of depression.

The burden of disease associated with osteoporosis (low bone mineral density) is largely caused by fractures of the hip, vertebrae and wrist (Harris et al. 1998). Hip fracture in older people is associated with long term disability and a decline in health status. Between 6% and 40% will die within one year, while around half of the survivors will have long-term disability. It is estimated that the proportion of women with osteoporosis increases from 15% in those aged 60–64 years up to 71% in those over 80 years of age. The DALYs estimated for osteoporosis in Annex Table H include only the disability associated with low bone mineral density per se. We have estimated the DALYs associated with osteoporotic fractures using attributable fractions by age and sex for six fracture sites from Harris et al. (1998).

Sporting activity is identified by the ICD-9 external cause codes as a cause of injury only for falls and collisions. The sports injury category in this study thus provides only a partial estimate of the burden of sports injuries. We have used information on place of occurrence in the AIHW national hospital inpatient data to estimate the proportion of other external causes of injury which are attributable to sports activity.

ICD-9 external cause codes identify firearm injuries within the ‘other unintentional injury’ category and each of the three intentional injury categories. We have added these components together to estimate the total burden of firearm injuries in Australia. The majority (82%) of this burden falls in the ‘Suicide and self-inflicted injury’ category.

Table 5.10: Attributable disease burden for selected diseases and injuries, by sex, Australia, 1996

	Males		Females		Persons	
	DALYs	Per cent of total DALYs	DALYs	Per cent of total DALYs	DALYs	Per cent of total DALYs
Diabetes mellitus	66,457	5.0	56,078	4.8	122,535	4.9
Depression	57,292	4.3	65,040	5.5	122,332	4.9
Osteoporosis	2,203	0.2	5,095	0.4	7,297	0.3
Firearm injuries	9,715	0.7	1,236	0.1	10,951	0.4
Sporting injuries	5,288	0.4	1,402	0.1	6,690	0.3

Table 5.11: Attributable disease burden for selected diseases and injuries: deaths, YLL, YLD and DALYs, Australia, 1996

Condition	Attributable deaths	Attributable YLL	Attributable YLD	Attributable DALYs
Diabetes mellitus	8,373	69,534	53,001	122,535
Depression	1,365	28,531	93,801	122,332
Osteoporosis	586	4,282	3,016	7,297
Firearm injuries	523	10,881	70	10,951
Sporting injuries	73	1,814	5,639	6,690

Table 5.10 summarises the total attributable DALYs for these disease and injury categories for males and females. Table 5.11 provides estimates of total attributable deaths, YLL, YLD and DALYs for each of these disease and injury categories.

Inclusion of the attributable burden of cardiovascular disease due to diabetes increases the burden of diabetes from 3% to 5% of total DALYs. The attributable burden of diabetes is discussed in more detail in Section 6.5. Inclusion of the attributable burden of suicide and ischaemic heart disease increases the total burden of depression also from 3% to 5% of total DALYs. The inclusion of the attributable burden of sporting injuries increases the estimate of sporting injury DALYs by 172%. The attributable deaths and YLL for sporting injuries should be interpreted with caution as they have been derived using information on injury hospitalisations which end in death.

5.5 The undiscounted burden of disease

As discussed in Sections 1.6 and 2.3, the Australian Burden of Disease Study has used a 3% discount rate in calculating DALYs for each condition. Undiscounted DALYs (i.e. using a zero discount rate) have also been calculated and totals for males and females are given in Annex Table I. This section compares the discounted and undiscounted estimates of the burden of disease in Australia. Table 5.12 shows the leading causes of disease burden in Australia, when undiscounted DALYs are used. The leading causes of disease burden are generally similar to those for discounted DALYs (see Table 5.3). However, depression has

Table 5.12: Leading causes of disease burden: undiscounted DALYs by sex, Australia, 1996

Males		DALY ('000)	Per cent of total	Females		DALY ('000)	Per cent of total
1	Ischaemic heart disease	223,480	12.3	1	Ischaemic heart disease	156,297	10.0
2	Suicide and self-inflicted injuries	81,110	4.5	2	Stroke	86,573	2.6
3	Road traffic accidents	77,969	4.3	3	Breast cancer	74,041	2.2
4	Stroke	77,922	4.3	4	Dementia	63,400	1.9
5	Lung cancer	75,100	4.1	5	Depression	58,395	1.7
6	COPD	71,553	3.9	6	Diabetes mellitus	51,848	1.5
7	Diabetes mellitus	55,442	3.0	7	COPD	49,860	1.5
8	Adult-onset hearing loss	45,429	2.5	8	Asthma	49,549	1.5
9	Colorectal cancer	44,319	2.4	9	Osteoarthritis	43,450	1.3
10	Dementia	38,110	2.1	10	Colorectal cancer	40,574	1.2

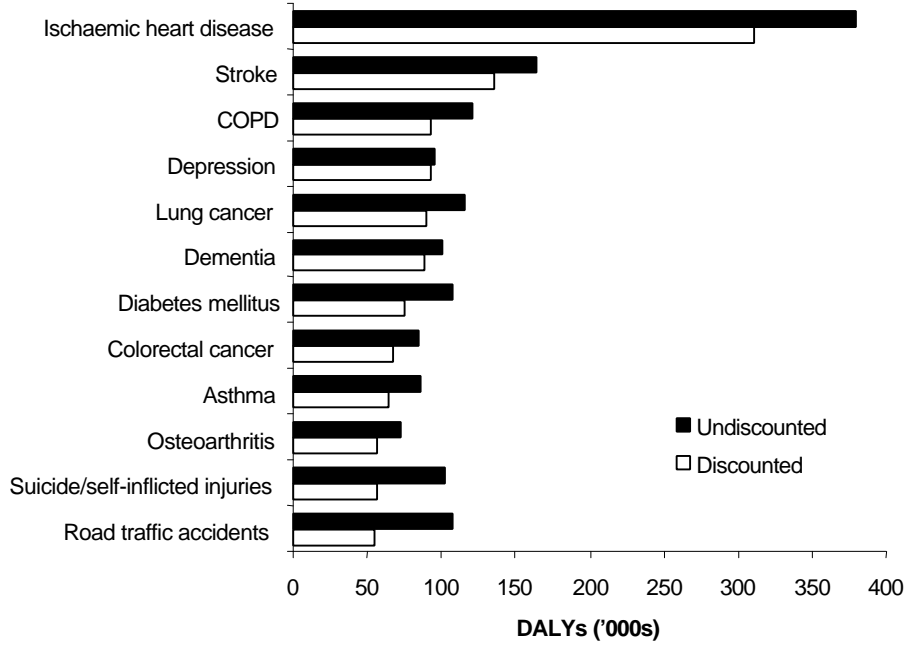


Figure 5.9: Leading causes of disease burden (undiscounted DALYs), by sex, Australia, 1996

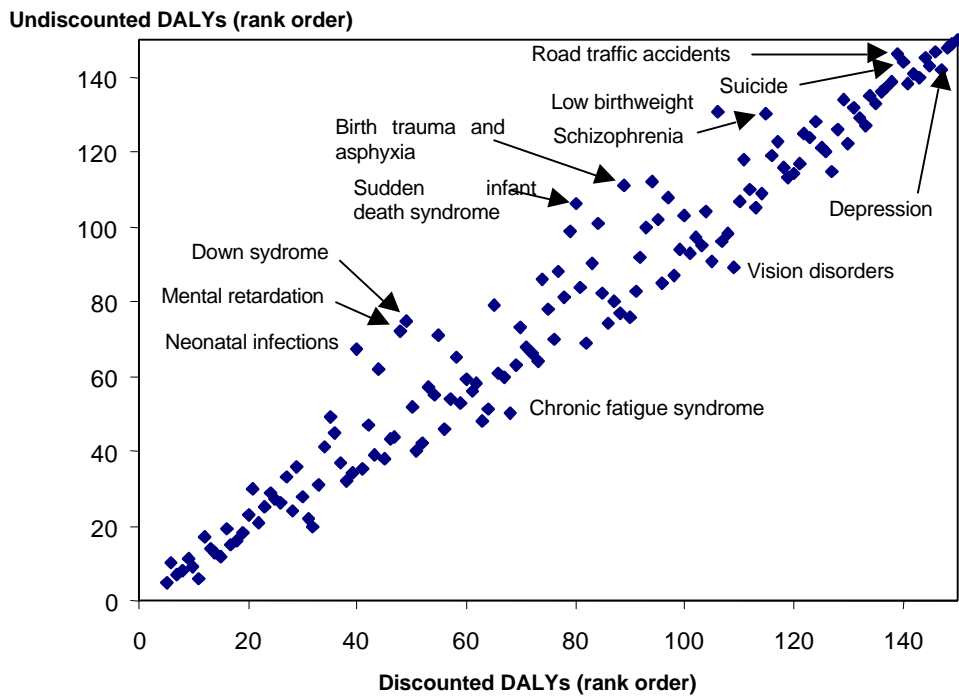


Figure 5.10: Comparison of discounted and undiscounted DALYs for 150 disease and injury categories, Australia, 1996 (highest rank is the largest cause)

moved from 3rd place for females to 5th place, and from 8th place for males to 13th. Road traffic accidents, suicide and hearing loss have moved into the top ten causes for males.

Figure 5.9 compares the discounted and undiscounted DALYs for the top ten causes of disease burden in Australia. Figure 5.10 compares the rank order of causes of disease burden according to discounted and undiscounted DALYs. In general, the undiscounted DALYs give greater relative weight to long-term conditions, particularly to those incident in childhood, and to conditions with high levels of mortality at younger ages (e.g. road traffic accidents and suicide).

Table 5.13 provides a summary of the percentage distribution of undiscounted DALYs for the main disease and injury categories. The discounted DALY percentage distribution is in Table 5.5. Total undiscounted DALYs for individual conditions are listed in Annex Table I. Age-sex-specific undiscounted estimates for individual conditions are available from AIHW.

Table 5.13: Percentage distribution of undiscounted DALYs by main disease category, sex and age group, Australia, 1996

Disease category	Per cent of total undiscounted DALYs							
	Persons	Male	Female	0-14	15-34	35-54	55-74	75+
A. Infectious and parasitic diseases	2.0	2.4	1.5	2.6	3.3	3.1	1.0	0.9
B. Acute respiratory infections	1.1	1.0	1.2	2.6	0.7	0.8	0.8	1.3
C. Maternal conditions	0.1	0.0	0.3	0.0	0.6	0.1	0.0	0.0
D. Neonatal causes	2.3	2.3	2.3	19.4	0.0	0.0	0.0	0.0
E. Nutritional deficiencies	0.3	0.2	0.4	1.0	0.4	0.3	0.1	0.1
F. Malignant neoplasms	18.5	17.7	19.6	2.9	4.8	21.9	30.9	18.6
G. Other neoplasms	0.3	0.2	0.3	0.3	0.2	0.3	0.3	0.4
H. Diabetes mellitus	3.2	3.0	3.3	1.4	1.2	4.7	4.1	3.1
I. Endocrine and metabolic disorders	1.2	1.1	1.2	1.8	0.7	1.2	1.2	1.1
J. Mental disorders	12.0	11.2	12.9	11.6	36.1	15.9	2.5	0.4
K. Nervous system disorders	8.6	7.5	9.9	3.6	2.9	4.2	10.6	18.4
L. Cardiovascular disease	19.8	20.3	19.3	1.1	2.8	13.7	27.7	41.0
M. Chronic respiratory diseases	6.9	6.7	7.1	13.7	4.8	5.4	7.0	5.9
N. Diseases of the digestive system	2.7	2.6	2.7	1.0	2.7	3.7	2.8	2.5
O. Genitourinary diseases	2.3	2.3	2.3	0.3	3.0	2.4	2.4	2.5
P. Skin diseases	0.4	0.3	0.4	0.5	0.7	0.4	0.2	0.2
Q. Musculoskeletal diseases	3.4	2.4	4.5	0.8	1.9	6.1	4.7	1.5
R. Congenital abnormalities	2.2	2.2	2.2	16.6	0.7	0.3	0.2	0.1
S. Oral health	0.8	0.6	0.9	0.2	1.1	1.5	0.7	0.2
V. Ill-defined conditions	0.7	0.6	0.7	4.5	0.3	0.4	0.0	0.0
T. Unintentional injuries	7.7	10.0	5.0	13.1	19.6	7.9	2.2	1.7
U. Intentional injuries	3.6	5.2	1.8	0.9	11.5	5.7	0.8	0.2
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

5.6 Socioeconomic disadvantage and the burden of disease

It has not been possible to complete comprehensive analyses of total burden of disease by quintile of socioeconomic disadvantage for all disease and injury categories for this first report on the burden of disease and injury in Australia. Provisional estimates of differentials in burden of disease measured in DALYs for the main disease and injury groups are presented here. These are based on YLD estimates for mental disorders by quintile of disadvantage (see Section 4.8) and provisional YLD estimates for other main disease groups derived as described in Section 2.8.

There is a marked gradient in the total burden of disease with socioeconomic disadvantage as defined by a small area index of socioeconomic disadvantage at SLA (local government) area level (Table 5.14). The ratio of the age-standardised DALY rate per 1,000 population for the top and bottom quintiles of disadvantage is a measure of the differential mortality burden between the most disadvantaged and least disadvantaged groups in Australia. This takes into account differences in the age structure of the population across quintiles of socioeconomic disadvantage.

The burden per 1,000 population in the bottom quintile (most disadvantaged) is 37% higher for males and 27% higher for females than the burden for males and females in the top quintile (least disadvantaged). The estimated differentials in the non-fatal burden of YLD are somewhat smaller than for the mortality burden for males, and slightly larger for females.

Table 5.14: Differentials in the burden of disease and injury between top and bottom quintiles of socioeconomic disadvantage, age-standardised YLL, YLD and DALYs per 1,000 population, Australia, 1996

	Males	Females	Persons
YLL ratio ^(a)	1.41 (1.38–1.45)	1.26 (1.22–1.29)	1.35 (1.32–1.37)
YLD ratio ^(a)	1.32 (1.13–1.46)	1.29 (1.05–1.53)	1.30 (1.09–1.44)
DALY ratio ^(a)	1.37 (1.28–1.43)	1.27 (1.14–1.41)	1.32 (1.22–1.39)
Excess burden (per cent) ^(b)	18.7 (15.1–21.5)	15.4 (9.3–19.6)	17.1 (13.7–19.4)

(a) Ratio of age-standardised rate per 1,000 population for bottom (5th) quintile of area index of socioeconomic disadvantage to the age-standardised rate per 1,000 population for the top (1st) quintile. Range given in brackets is the estimated 95% confidence or uncertainty interval (see Section 2.8).

(b) Per cent of total burden (DALYs) that would be avoided if all quintiles had the same age-standardised DALY rate as the least disadvantaged (1st) quintile. Range given in brackets is the estimated 95% confidence or uncertainty interval (see Section 2.8).

Table 5.14 also presents estimates of the proportion of the total disease burden that is attributable to variability in DALYs across the quintiles of socioeconomic disadvantage. Interpretation of these estimates is straightforward. The excess disease burden associated with socioeconomic disadvantage 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 17% of the total disease burden. These are larger than the attributable burden for risk factors such as tobacco smoking, hypertension or physical inactivity estimated in Chapter 7, although some of the effects of socioeconomic disadvantage are mediated by these traditional risk factors (Mathers 1994a). Part of the excess burden estimated here is associated with higher levels of smoking and other risk factors in the more disadvantaged quintiles.

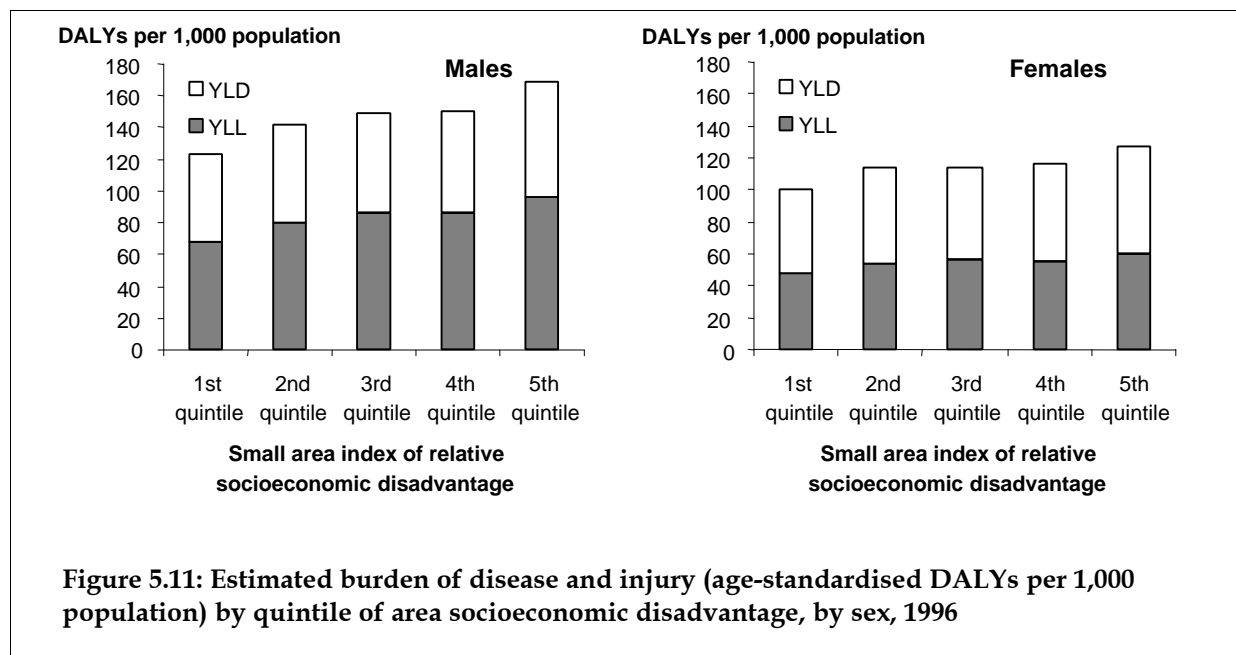


Figure 5.11 illustrates the differentials in disease burden across the five quintiles of socioeconomic disadvantage. There is an increase in the burden of disease with each increasing level of socioeconomic disadvantage for both males and females. As noted previously (see Section 3.5), these differentials relate to quintiles defined using a small area based index of socioeconomic disadvantage. The differentials reported here will thus almost certainly understate the true differentials in mortality burden by level of socioeconomic disadvantage at the individual level in Australia.

Table 5.15 summarises the differentials in disease burden between the top and bottom quintiles for selected main cause groups (those responsible for significant shares of the total burden).

These differentials are largest for intentional injuries and unintentional injuries, diabetes, digestive system disorders (in males) and mental disorders. They are smallest for cancers and for nervous system and sense organ disorders in women (where there is actually a higher burden among the least disadvantaged women). This may reflect higher survival rates in the least disadvantaged women, resulting in higher non-fatal burden due to senile dementias and sense organ disorders. It may also reflect limitations in self-reported prevalence data on sense disorders.

It must be emphasised that the non-fatal contributions to socioeconomic differentials in burden of disease described here are provisional. More detailed analysis of YLD differentials by socioeconomic status for individual conditions using available Australian data are required in order to better estimate the impact of socioeconomic conditions on the burden of disease and injury in Australia.

Table 5.15: Differentials in the burden of disease and injury between top and bottom quintiles of socioeconomic disadvantage, by selected main disease categories and sex, Australia, 1996

Disease category	DALY ratio ^(a) (bottom quintile/top quintile)	
	Male	Female
A. Infectious and parasitic diseases and acute respiratory infections	1.30*	1.43*
D. Neonatal causes	1.34*	1.32*
F. Malignant neoplasms	1.19*	1.11*
H. Diabetes mellitus	1.64*	2.26*
I. Endocrine and metabolic disorders	1.21*	1.37*
J. Mental disorders	1.43*	1.53*
K. Nervous system disorders	1.32	0.84
L. Cardiovascular disease	1.30*	1.22
M. Chronic respiratory diseases	1.48*	1.34*
N. Diseases of the digestive system	2.11*	1.54*
O. Genitourinary diseases	1.16*	1.23*
Q. Musculoskeletal diseases	1.44*	1.44*
T. Unintentional injuries	1.79*	1.39*
U. Intentional injuries	1.76*	1.54*
Other causes	1.17	1.20*
All causes	1.37*	1.27*

(a) Ratio of age-standardised DALYs per 1,000 population for most disadvantaged (5th) quintile of area index of socioeconomic disadvantage to age-standardised DALYs per 1,000 population for least disadvantaged (1st) quintile.

* Asterisk indicates that rate ratio differs significantly ($p < 0.05$) from 1.0 (no differential between top and bottom quintiles).