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 chapter describes the burden of premature mortality in Australia in 1996 using years of life lost (YLL). The calculation of YLL is based on numbers of deaths attributed to each cause at each age. The following section describes how numbers of deaths were estimated for each cause and the rest of the chapter presents results for deaths and YLL which identify patterns by age, sex, cause, level of socioeconomic disadvantage, and time trends over the last 15 years.

3.1 Estimating deaths due to each cause

Registration of deaths in Australia is the responsibility of the State and Territory Registrars of Births, Deaths and Marriages. Information on the cause of death is supplied by the medical practitioner certifying the death or by a coroner. Other information about the deceased is supplied by a relative or other person acquainted with the deceased, or by an official of the institution where the death occurred. Registration of death is a legal requirement in Australia, and compliance is virtually complete. The information is provided by the Registrars to the Australian Bureau of Statistics (ABS) for coding of information and compilation into national statistics. Estimates of numbers of deaths and mortality burden in this report were derived from the registration data coded by ABS and provided to the Institute by the State and Territory Registrars.

There were 128,711 deaths registered in Australia during 1996 (53% of these were for males). For each of these deaths, the underlying cause of death is coded using the Ninth Revision of the International Classification of Diseases (ICD-9). This code was used to classify all deaths registered in 1996 to one of the 175 disease and injury categories used in this study. Full details of these categories and their corresponding ICD-9 codes are given in Annex Table A.

There were 327 deaths assigned to ill-defined signs and symptoms (ICD-9 codes 780 to 799 excluding the code for sudden infant death syndrome) for Australia in 1996, of which 13 were aged 0–4. This 0.25% of deaths was redistributed proportionally by age and sex to other causes apart from injuries on the assumption that it is unlikely for injury deaths to be classified as ill-defined. Note that this differs from the GBD which distributed deaths due to ill-defined causes across Group I only for ages 0–4 and Group II only for ages 5 and over.

Prior to 1996, HIV/AIDS deaths were only identifiable through the use of a flag indicating that AIDS was mentioned on the death certificate. In 1996, for the first time, ABS coded most AIDS deaths to codes 042–044 (HIV/AIDS), and there were 491 male and 15 female deaths for these causes. There were an additional 55 male and 7 female deaths for which there was an AIDS flag specified, including 9 male deaths with ICD-9 external cause code 875 (contaminated blood). A total of 479 male and 17 female AIDS deaths which occurred in 1996 were notified by mid-1998 (NCHECR 1998). A total of 500 male and 17 female deaths were classified to HIV/AIDS in this study, including the nine deaths for E-code 875 with an AIDS flag, and two additional female deaths with an AIDS flag.

There were 2320 cancer deaths (6.6% of all malignant neoplasms) coded to ICD-9 codes 195–199 (malignant neoplasm of other and unspecified sites including those whose point of origin cannot be determined, secondary and unspecified neoplasms). On advice from the

National Cancer Statistics Clearinghouse at the AIHW, these have been distributed pro-rata across all malignant neoplasm categories within each age–sex group.

Murray and Lopez (1997b) provided convincing evidence that a significant and varying proportion of ischaemic heart disease deaths are coded in many countries to ill-defined codes such as 428 (heart failure). In Australia in 1996, 5.4% of cardiovascular deaths were coded to heart failure and an additional 1.1% to other so-called 'garbage' codes (see Table 3.1). The GBD used a regression formula to redistribute deaths from garbage codes to ischaemic heart disease. It mentioned also that some of these deaths might belong to the *inflammatory heart disease* group (cardiomyopathy, endocarditis, myocarditis and pericarditis) but did not redistribute deaths to this group.

Table 3.1: Deaths coded to cardiovascular 'garbage' codes, Australia 1996

Garbage code	ICD-9	No. deaths
Heart failure	428	2,909
Ill-defined descriptions of heart disease	429.0–429.2	245
Generalised and unspecified atherosclerosis	440.9	214
Cardiac arrest	427.5	123
Ventricular fibrillation and flutter	427.4	18
Ventricular tachycardia	427.1	6
Heart disease, unspecified	429.9	9
Total garbage codes		**3,524**

Australian cardiovascular disease experts advised that the major cause of heart failure (ICD code 428) in young adults is cardiomyopathy and in older adults is ischaemic heart disease. There was only one heart failure death below age 30 in Australia in 1996 (a male aged 10–14 years). It was decided after expert advice to redistribute the majority of cardiovascular garbage codes to ischaemic heart disease, inflammatory heart disease and hypertensive heart disease in proportions varying by age as shown in Table 3.2. These redistributions result in a 10% increase in deaths attributed to ischaemic heart disease in 1996. This is very similar to the estimate of 10% under-estimation of ischaemic heart disease deaths by Jamrozik et al. (1999).

Deaths coded as gastric haemorrhage (ICD-9 code 578) were redistributed equally across peptic ulcer disease and liver cirrhosis as the most likely underlying aetiologies.

There were 139 injury deaths in Australia in 1996 where it was not determined whether the injury was accidental or intentional (ICD-9 E-codes 980–989). The GBD allocated these deaths pro-rata to intentional and unintentional injury. Because unintentional injuries in Australia are dominated by motor vehicle accidents and falls, this has the effect of reallocating most of the undetermined deaths to accidental deaths.

Table 3.2: Redistribution of deaths coded to cardiovascular 'garbage' codes

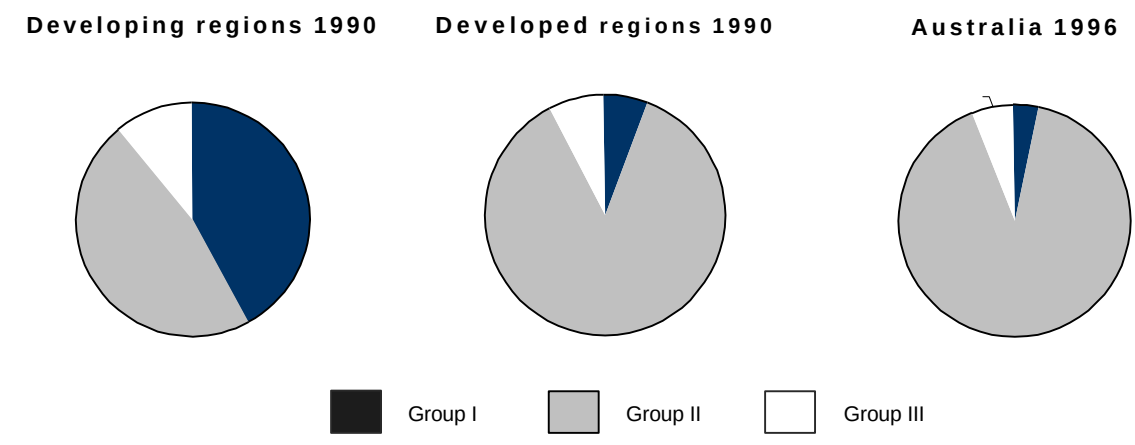
Garbage code	Age group	Ischaemic heart disease	Inflammatory heart disease	Hypertensive heart disease
Heart failure (428)	5–29	—	75%	—
	30 –44	70%	25%	5%
	45 –59	70%	10%	20%
	60+	60%	10%	30%
Other CVD garbage codes (see Table 3.1)	30 –44	75%	—	—
	60+	80%	—	—

However, very few of the undetermined deaths are falls or road traffic accidents: The age–sex distribution and other characteristics of these 'undetermined' injuries are much closer to suicide than to the relevant accidental injuries. Injury researchers advised that it is likely that the great majority of the undetermined deaths are suicide, but that the coroner did not have sufficient evidence to make that finding. Ninety per cent of undetermined poisoning and drowning deaths were allocated to suicide, and the other 10% to accidental poisoning and drowning respectively. Undetermined deaths due to other causes were similarly allocated 90% to intentional causes (suicide for those aged 15 years and over, violence for the three male deaths under age 15 years) and 10% to other accidental causes excluding road traffic and transport accidents.

For certain cause groups, deaths have been redistributed back to other cause groups to ensure consistency with the YLD estimates for sequelae associated with those cause groups. Liver cancer and liver cirrhosis deaths attributable to hepatitis have been redistributed to the hepatitis B and hepatitis C categories in this report. Data on the underlying cause of renal failure from the Australian and New Zealand Register of Dialysis and Transplant Patients (ANZDATA) have been used to redistribute renal failure deaths to nephritis and nephrosis, diabetes mellitus, injuries, congenital conditions, cancers and infectious diseases. Cardiovascular disease mortality attributable to diabetes as a risk factor is included in the cardiovascular category. Diabetes mortality includes deaths directly due to diabetes and its complications and diabetic renal failure deaths. The total attributable mortality burden of diabetes, including the cardiovascular component, is estimated in Section 5.4.

3.2 Deaths in Australia 1996

Due to these various redistributions, the distribution of deaths by age, sex and cause used to estimate the mortality burden in Australia in 1996 differs slightly from cause of death data published elsewhere by AIHW and ABS. Annex Table D tabulates the adjusted numbers of deaths by cause, sex and 20-year age groups for Australia in 1996. These deaths form the basis for the YLL estimates described in the following section. YLL are calculated as described in Section 2.4.



Source: Data for developing and developed regions of the world from Murray and Lopez 1996

Figure 3.1: Deaths by broad cause groups, Australia 1996 compared with developed and developing regions in 1990 (Murray and Lopez 1996).

Deaths by broad cause groups for Australia in 1996 are compared with those for developed and developing regions in 1990 (Murray & Lopez 1996a) in Figure 3.1. Group I conditions (infectious, maternal, perinatal and nutritional conditions) are responsible for fewer deaths in Australia than in other developed countries, as are Group III conditions (injuries). The non-communicable diseases (Group II) thus account for a larger proportion of deaths in Australia than in other developed countries as a whole.

Table 3.3 compares the ten leading causes of death for Australia and developed regions of the world (developed regions include Established Market Economies and Former Socialist Economies).

Table 3.3: 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. Lower respiratory infections[(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 traffic 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) Influenza, acute bronchitis and pneumonia.

Australia ranks around 10th in the world in terms of total life expectancy at birth (AIHW 1998b). Life expectancy at birth in 1996 was 75.6 years for Australian males and 81.3 years for Australian females. Another way to compare the mortality risks of Australians with those in other countries is to calculate the probability of dying between two specific ages if a person experienced the average mortality risk observed at each age in the population.

Table 3.4 compares the probability of dying between ages 15 and 59 for Australia and selected other developed countries in 1998. The Australian estimates are based on the 1995–1997 Australian life tables projected forward to 1998 as described in Section 2.4. Countries are ranked in increasing probability of dying between ages 15 and 59 for males and females combined. Australia ranks fifth in the world, behind Japan, Greece, Sweden and Italy.

3.3 Mortality burden in Australia in 1996

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 (see Section 2.4), then the male excess mortality burden rises to 43%.[33]

Table 3.4: Probability of dying (%) between ages 15 and 59, by sex, Australia and selected developed countries, 1998

Country	Males	Females	Persons
Japan	9.9	5.0	7.5
Greece	11.0	4.9	8.0
Sweden	9.7	6.3	8.0
Italy	10.8	5.4	8.1
Australia	**10.4**	**5.9**	**8.1**
Israel	10.2	6.1	8.2
Norway	10.7	5.9	8.3
Netherlands	10.2	6.5	8.4
Canada	10.8	6.1	8.5
Switzerland	11.4	6.0	8.7
UK	11.0	6.9	9.0
Ireland	11.4	6.6	9.0
Spain	12.9	5.4	9.2
Singapore	11.8	7.8	9.8
Germany	13.2	6.6	9.9
New Zealand	12.5	7.9	10.2
France	14.5	6.3	10.4
USA	15.4	7.9	11.7
Denmark	14.1	9.6	11.9

Source: Data for other countries from WHO (1999a)

Cardiovascular disease, cancers and injury were responsible for 72% of the total mortality burden in both males and females (Figure 3.2). In people aged 75 years and over, cardiovascular diseases account for more than half the years of life lost, whereas cancers are a more important cause than cardiovascular disease for all ages below 75. Injuries are the main cause of lost years of life in young adults and children aged 5–14 years, and neonatal conditions the main cause in children aged under five (Figure 3.3).

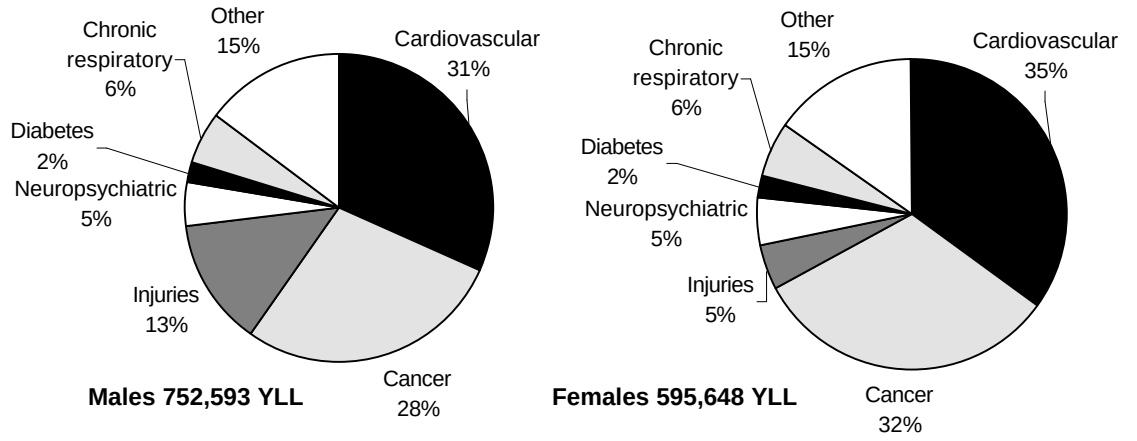


Figure 3.2: Mortality burden (YLL) by sex and broad disease group, Australia, 1996

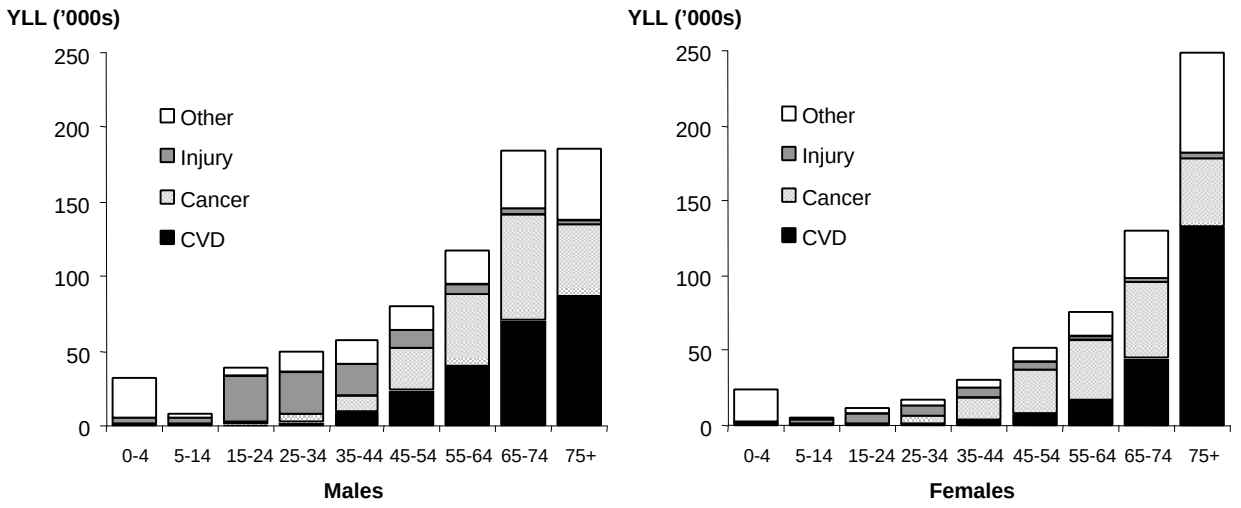


Figure 3.3: Years of life lost by age, sex and broad disease group, Australia, 1996

Table 3.5: Top twenty causes of the mortality burden (YLL), by sex, Australia, 1996

	Males	YLL ('000)		Females	YLL ('000)		Persons	YLL ('000)
1	Ischaemic heart disease	158,378	1	Ischaemic heart disease	117,399	1	Ischaemic heart disease	275,778
2	Lung cancer	55,030	2	Stroke	56,660	2	Stroke	98,523
3	Suicide	44,278	3	Breast cancer	40,684	3	Lung cancer	83,146
4	Stroke	41,863	4	Lung cancer	28,117	4	Suicide	55,458
5	Road traffic accidents	33,685	5	Colorectal cancer	26,149	5	Colorectal cancer	55,372
6	COPD[(a)]	31,429	6	COPD[(a)]	23,065	6	COPD[(a)]	54,494
7	Colorectal cancer	29,223	7	Dementia	15,670	7	Road traffic accidents	45,928
8	Prostate cancer	22,474	8	Diabetes mellitus	15,090	8	Breast cancer	40,684
9	Diabetes mellitus	16,019	9	Road traffic accidents	12,243	9	Diabetes mellitus	31,109
10	Cirrhosis of the liver	13,053	10	Ovary cancer	11,699	10	Dementia	23,887
11	HIV/AIDS	11,594	11	Suicide	11,180	11	Prostate cancer	22,474
12	Leukemia	10,045	12	Lymphoma	9,687	12	Lymphoma	19,535
13	Lymphoma	9,848	13	Pancreas cancer	9,474	13	Cirrhosis of the liver	18,824
14	Hypertensive heart disease	9,686	14	Lower respiratory tract infections[(b)]	8,141	14	Pancreas cancer	18,334
15	Brain cancer	9,636	15	Leukemia	7,256	15	Leukemia	17,056
16	Pancreas cancer	8,861	16	Brain cancer	7,076	16	Brain cancer	16,713
17	Stomach cancer	8,646	17	Inflammatory heart disease	6,684	17	Lower respiratory tract infections[(b)]	15,318
18	Heroin dependence & harmful use	8,556	18	Nephritis and nephrosis	8,681	18	Inflammatory heart disease	15,111
19	Dementia	8,217	19	Cirrhosis of the liver	5,771	19	Stomach cancer	14,400
20	Melanoma	8,164	20	Stomach cancer	5,754	20	Melanoma	13,114
	All causes	**752,591**		**All causes**	**595,642**		**All causes**	**1,348,233**

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

(b) Influenza, acute bronchitis and pneumonia.

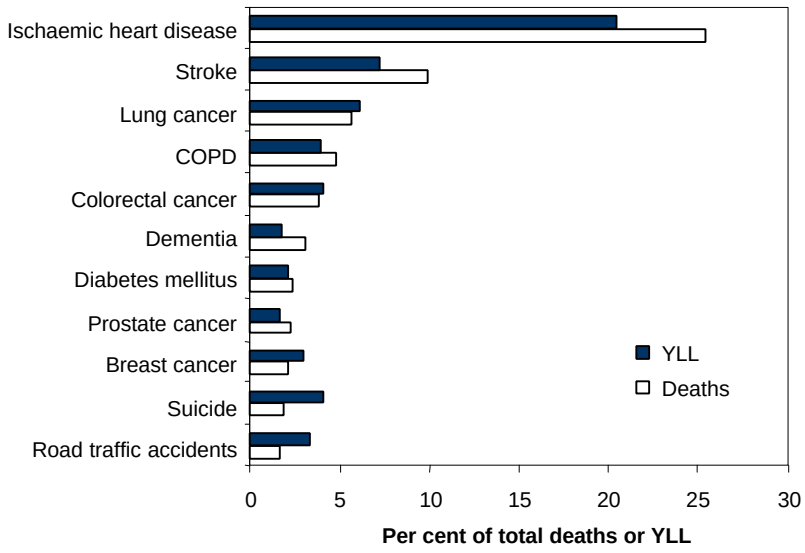


Figure 3.4: Leading causes of mortality burden (YLL), by sex, Australia, 1996

Ischaemic heart disease (IHD) is by far the largest cause of years of life lost in both males and females (Table 3.5 and Figure 3.4). 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. State differences in mortality burden are shown in Figure 3.5. A complete analysis of the mortality burden of disease in Victoria has been carried out by Vos and coworkers (Department of Human Services 1999a).

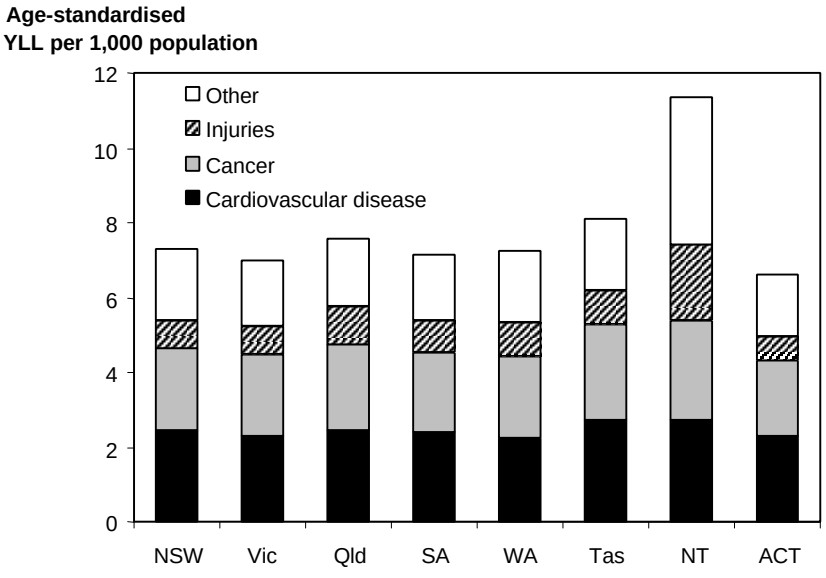


Figure 3.5: Years of life lost per 1,000 population by State and Territory, 1996

Note that YLL estimates of mortality burden produce a quite different ranking of causes than the potential years of life lost to age 75 (PYLL) published by AIHW and other health statistical agencies (see for example, Jelfs et al. 1996). This is because PYLL to age 75 exclude deaths above age 75 and truncate the years of life lost to age 75. In other words, the traditional PYLL indicators apply a strong form of age weighting, which gives zero weight to years of life lost above age 75. Figure 3.6 compares YLL and PYLL estimates for males and females combined for the top 20 causes of mortality burden in Australia. The PYLL give greater weight to those causes with a younger average age at death (because there is no discounting) and lower weight to those causes with relatively high proportion of deaths occurring above age 75.

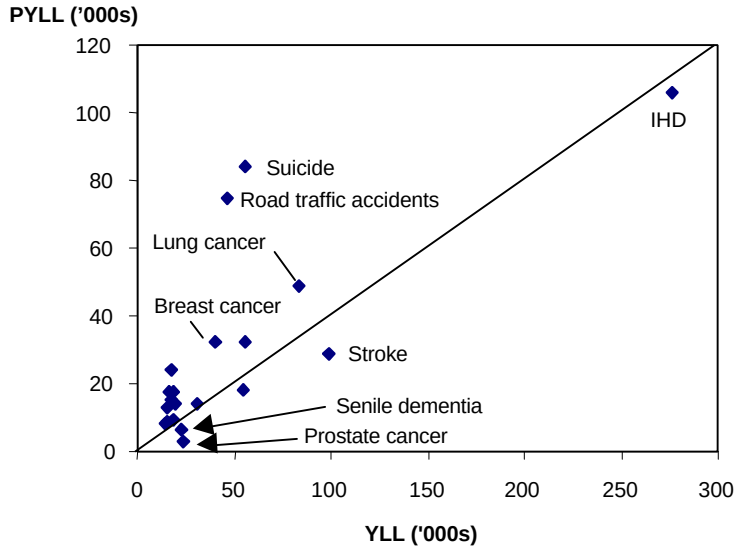


Figure 3.6: Potential years of life lost to age 75 (PYLL) and years of life lost (YLL), top twenty causes of mortality burden, Australia, 1996

3.4 Recent trends in mortality burden

The per capita mortality burden in Australia has declined by 44% in the 15 years between 1981 and 1996 (from 88.1 YLL per 1,000 in 1981 to 73.8 YLL per 1,000 in 1996). Table 3.6 shows the disease and injury groups with the largest changes over 15 years in the mortality burden per 1,000 population (not age-standardised). Overall, the age-adjusted mortality burden in Australia has declined by 44% in the 15 years between 1981 and 1996, from 94.8 YLL per 1,000 in 1981 to 65.8 YLL per 1,000 in 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 massive 30-40% decrease in the burden of ischaemic heart disease and stroke over the last 15 years is thought to reflect the successes of primary prevention (through reductions in levels of tobacco smoking, changes in diet, better control of hypertension and high blood cholesterol, and other risk factors) and of improvements in treatment (AIHW 1998a). The more than 50% reduction in the mortality burden for road traffic accidents reflects Australia's success in improving road safety over recent decades. The 25% to 30% reduction

in the mortality burden for stomach cancer is offset by the increasing burden of colorectal cancer in males and lung cancer, breast cancer and several other cancers in females.

Note that the burden of smoking-related diseases (lung cancer, COPD) has decreased in males but increased substantially in 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 chronic obstructive pulmonary disease in women. The first death from AIDS in Australia was recorded in 1982, so there was no mortality burden due to HIV/AIDS in 1981. HIV/AIDS mortality peaked in 1989 and has dropped dramatically since. The large apparent increase in mortality burden for dementia is likely to be partly due to changes in coding practice that have led to increasing identification of dementia as an underlying cause of death.

Table 3.6: Causes with largest increase or decrease in mortality burden per 1,000 population, Australia, 1981–1996

		Change				Change	
	Males	**YLL/1000**	**%**		**Females**	**YLL/1000**	**%**
Largest decreases in mortality burden per 1,000 population							
1.	Ischaemic heart disease	–12.2	–41	1.	Ischaemic heart disease	–6.0	–32
2.	Road traffic accidents	–4.3	–54	2.	Stroke	–3.3	–35
3.	Stroke	–2.5	–36	3.	Road traffic accidents	–1.4	–50
4.	Lung cancer	–1.1	–15	4.	Sudden infant death syndrome	–0.4	–57
5.	Sudden infant death syndrome	–0.7	–63	5.	Inflammatory heart disease	–0.3	–28
6.	COPD	–0.7	–16	6.	Low birthweight	–0.3	–38
7.	Cirrhosis of the liver	–0.6	–31	7.	Cervix cancer	–0.2	–30
8.	Low birthweight	–0.5	–49	8.	Stomach cancer	–0.2	–25
9.	Pneumonia, influenza	–0.4	–35	9.	Cirrhosis of the liver	–0.2	–25
10.	Stomach cancer	–0.4	–30	10.	Colorectal cancer	–0.2	–7
Largest increases in mortality burden per 1,000 population							
1.	HIV/AIDS	1.3	—	1.	Dementia	1.2	267
2.	Suicide and self-inflicted injuries	1.1	31	2.	Lung cancer	1.2	62
3.	Prostate cancer	0.9	62	3.	COPD	1.0	70
4.	Heroin dependence/harmful use	0.7	323	4.	Breast cancer	0.4	10
5.	Dementia	0.5	145	5.	Pancreas cancer	0.3	41
6.	Type 2 diabetes	0.5	41	6.	Lymphoma	0.2	30
7.	Poisoning	0.4	108	7.	Type 2 diabetes	0.2	18
8.	Colorectal cancer	0.2	8	8.	Heroin dependence/harmful use	0.2	356
9.	Liver cancer	0.2	59	9.	Multiple myeloma	0.2	74
10.	Oesophagus cancer	0.2	29	10.	Septicaemia	0.1	117
	All causes	**–20.4**	**–25**		**All causes**	**–8.4**	**–13**

3.5 Socioeconomic disadvantage and mortality

There is a marked gradient in the 1996 mortality burden with socioeconomic disadvantage as defined by a small area index of socioeconomic disadvantage at SLA (local government) area level (Figure 3.7). The mortality burden in the most disadvantaged (5th) quintile is 41% higher for males and 26% higher for females than the burden for males and females in the least disadvantaged (1st) quintile. Inequalities in burden would be much greater for disadvantaged groups defined in terms of smaller areas (such as census collection districts) or individual circumstances.

The ratio of the age-standardised YLL rate per 1,000 population for bottom and top quintiles is a measure of the differential mortality burden between the most disadvantaged and least disadvantaged groups in Australia, after taking into account differences in the age structure of the population across quintiles of socioeconomic disadvantage. Figure 3.7 illustrates the differentials in mortality burden for all causes and major groups of causes of death. Figure 3.8 illustrates the differentials in mortality burden due to various main causes of death (on the left) and for selected specific causes of death (on the right). The differentials in mortality burden between top and bottom quintiles are smaller for infectious diseases and cancers than for cardiovascular disease, chronic respiratory conditions, digestive system diseases and injuries (see also Table 3.7).

As described in Section 2.8, the Gini coefficient is a summary measure of the degree of inequality in mortality burden across all quintiles of socioeconomic disadvantage. Table 3.7 also gives Gini coefficients for the male and female mortality burden for all main cause of death groups. The overall inequality in mortality burden is 50% larger for males than females in Australia (with Gini coefficients of 0.06 and 0.04). The inequality in mortality burden is greatest for maternal mortality and nutritional deficiencies in women (where there are very small total numbers of deaths), followed by ill-defined conditions (sudden infant death syndrome) in both sexes, followed by digestive system diseases in males, diabetes in females, and injuries in males.

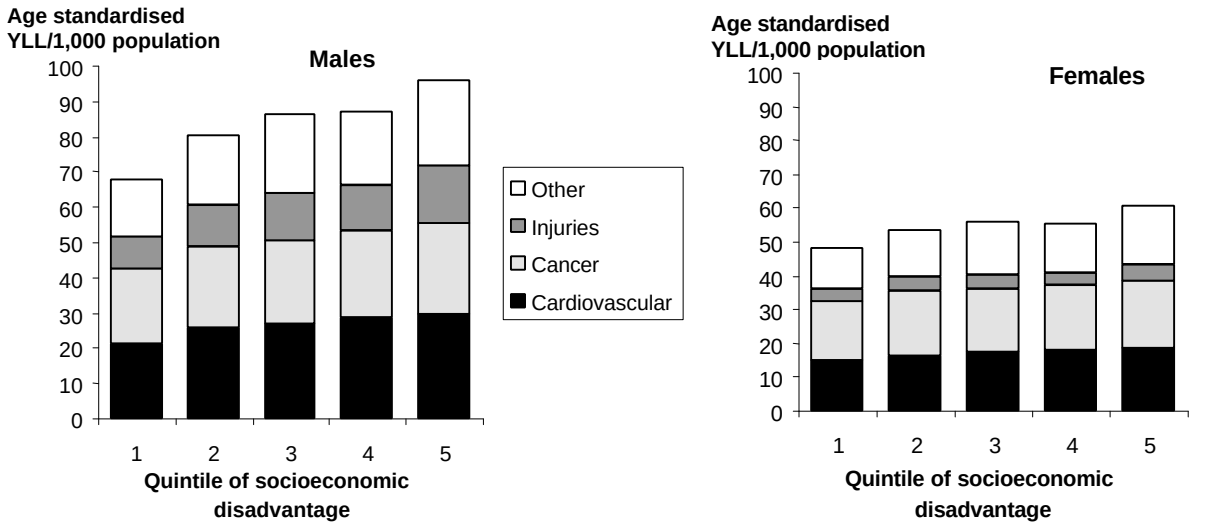
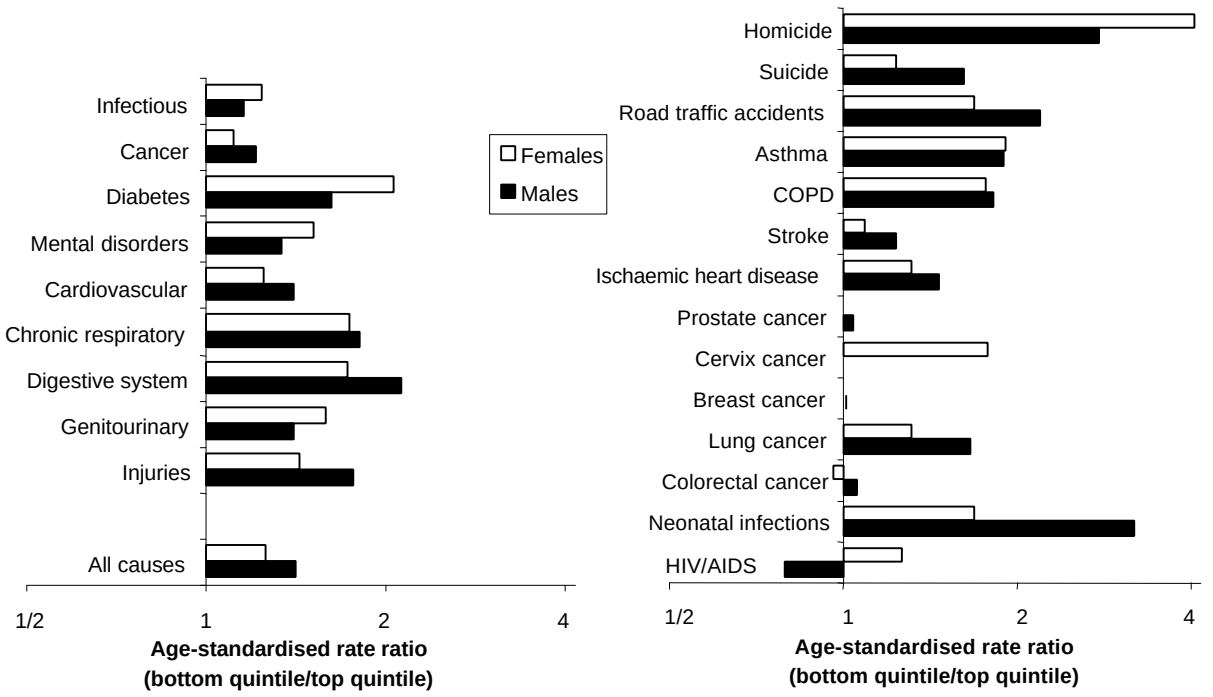


Figure 3.7: Mortality burden (YLL) per 1,000 population by quintile of socioeconomic disadvantage and major causes, 1995–97



Note: The infectious disease category includes acute respiratory infections

Figure 3.8: Differentials in mortality burden top and bottom quintiles of socioeconomic disadvantage, main causes and selected causes, by sex, 1995–97

Table 3.7 also presents estimates of the proportion of the mortality burden that is attributable to variability in YLL rates across the quintiles of socioeconomic disadvantage. Interpretation of these estimates is straightforward. Take for example, diabetes YLL rates for males for the period 1995–97. If the top four quintiles had the same YLL rate as the most disadvantaged SES quintile, the overall mortality burden for diabetes would be lower by approximately one-quarter for males and one-third for females. The excess mortality burden associated with socioeconomic disadvantage is particularly high for diabetes, chronic respiratory diseases, unintentional injuries, intentional injuries and acute respiratory conditions (in males).

Among males, the overall 'excess' mortality burden associated with socioeconomic disadvantage is 19%, considerably higher than the corresponding excess burden of 12% for females. In other words, if it were possible to reduce death rates in all areas to a level equivalent to that of the least disadvantaged quintile, the potential savings in years of life lost due to mortality would range from 12% for females to 19% for males. These are larger than the attributable mortality burden for risk factors such as tobacco smoking, hypertension or physical inactivity estimated in Chapter 7. Of course, some of the effects of socioeconomic disadvantage are mediated by these traditional risk factors (Mathers 1994a) and so there is some overlap in the estimate of excess mortality burden estimated here with the burden attributable to various risk factors.

Table 3.7: Differentials and inequality in mortality burden, by main disease categories and sex, Australia, 1995-97

Disease category	YLL ratio[a] (bottom quintile/top quintile)		Gini coefficient		Excess burden[b]	
	Male	Female	Male	Female	Male	Female
A. Infectious and parasitic diseases	1.06	1.05	–0.015	–0.001	9.6	–3.9
B. Acute respiratory infections	1.47*	1.42*	0.078*	0.051*	21.7*	12.6
C. Maternal conditions	—	2.46	—	0.255	—	18.9
D. Neonatal causes	1.43*	1.40*	0.077*	0.050	14.4	7.7
E. Nutritional deficiencies	0.63	2.79*	–0.074	0.226*	–50.5	48.7*
F. Malignant neoplasms	1.22*	1.12*	0.036*	0.018*	10.9*	6.7*
G. Other neoplasms	0.95	1.20	–0.021	0.033	–0.2	12.2
H. Diabetes mellitus	1.63*	2.07*	0.072*	0.117*	24.9*	33.1*
I. Endocrine and metabolic disorders	1.21	1.52*	0.030	0.071*	14.7	21.5*
J. Mental disorders	1.35*	1.52*	0.061*	0.043	15.7*	19.2
K. Nervous system disorders	1.12	0.78*	0.013	–0.050*	3.3	–10.0*
L. Cardiovascular disease	1.41*	1.25*	0.060*	0.043	19.5*	12.3*
M. Chronic respiratory diseases	1.81*	1.75*	0.098*	0.089*	30.9*	27.5*
N. Diseases of the digestive system	2.13*	1.73*	0.122*	0.098*	38.3*	26.2*
O. Genitourinary diseases	1.41*	1.59*	0.057*	0.078*	16.9*	21.8*
P. Skin diseases	0.83	0.95	0.004	0.013	21.5	11.3
Q. Musculoskeletal diseases	0.90	1.39*	–0.015	0.040	7.9	17.2*
R. Congenital abnormalities	1.34*	1.00	0.036	0.028	12.1	10.5
S. Oral health	—	—	—	—	—	—
V. Ill-defined conditions	1.96*	4.06*	0.122*	0.244*	27.1	58.9*
T. Unintentional injuries	1.84*	1.41*	0.102*	0.056*	31.9*	17.0*
U. Intentional injuries	1.71*	1.49*	0.092*	0.041*	25.0*	19.9*
All causes	**1.41***	**1.26***	**0.059***	**0.039***	**18.7***	**12.0***

(a) Ratio of age-standardised YLL per 1,000 population for bottom quintile of area index of socioeconomic disadvantage to age-standardised YLL per 1,000 population for top (least disadvantaged) quintile.

(b) Per cent of mortality burden (YLL) that would be avoided if all quintiles had the same YLL rate as the least disadvantaged (1st) quintile.

* Asterisk indicates that rate ratio, Gini coefficient and excess burden differ significantly ($p<0.05$) from value for no difference (1, 0.0 and 0% respectively).

These gradients in mortality burden correspond to quite large gradients in the probability of survival at younger ages and mid-adult ages (Table 3.8 and Figure 3.9). For example, men in the bottom quintile have a 40% higher chance of dying between ages 25 and 64 than men in the top quintile. Table 3.9 gives estimates of average life expectancy by quintile of socioeconomic disadvantage. There is a 3.6 year gap in life expectancy at birth for males between the top and bottom quintiles, and a 1.9 year gap for females.

In assessing the mortality inequalities reported here, we should keep in mind that the Australian population has been classified into quintiles using a small area based index of socioeconomic disadvantage. This index relates to the average disadvantage of all people living in the area and so the resultant mortality inequalities will be smaller than if the population were classified using individual socioeconomic status or areas defined at a lower level than SLA (e.g. census districts). In other words, these measures of inequality will almost certainly understate the true inequality in mortality burden by level of socioeconomic disadvantage at the individual level in Australia.

Table 3.8: Probability of dying between various exact ages, by quintile of socioeconomic disadvantage, by sex, Australia, 1995–97

	1st quintile	2nd quintile	3rd quintile	4th quintile	5th quintile
Between ages 0 and 15					
Males	0.8	0.8	1.0	1.0	1.2
Females	0.6	0.7	0.8	0.7	0.9
Between ages 15 and 25					
Males	0.7	0.9	1.2	0.9	1.4
Females	0.3	0.3	0.3	0.3	0.4
Between ages 25 and 65					
Males	11.6	14.7	16.0	16.3	18.1
Females	7.2	8.3	9.1	9.5	10.2
Between ages 65 and 75					
Males	21.8	24.8	25.3	25.6	27.7
Females	12.8	13.8	14.7	14.2	15.3

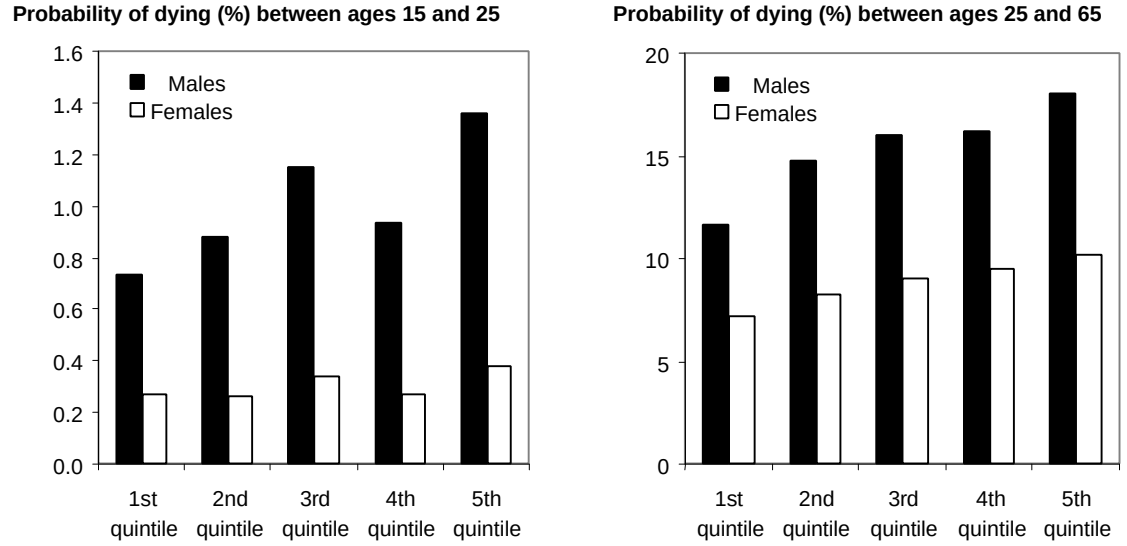


Figure 3.9: Probability of dying between exact ages 15 and 25, and ages 25 and 65, by quintile of socioeconomic disadvantage and sex, Australia, 1995–97

Table 3.9: Life expectancy at birth and at age 65, by quintile of socioeconomic disadvantage, Australia, 1995–97

	1st quintile	2nd quintile	3rd quintile	4th quintile	5th quintile
Life expectancy at birth					
Male	77.76	76.01	75.28	75.20	74.12
Female	82.39	81.45	81.20	81.20	80.48
Life expectancy at age 65 years					
Male	17.08	16.15	16.10	15.95	15.73
Female	20.26	19.70	19.76	19.82	19.52

Table 3.10: Trends in mortality differentials and inequality in mortality rates for selected disease and injury categories, by broad age group and sex, Australia, 1985–87 to 1995–97

	Males			Females		
	Gini coefficient			Gini coefficient		
Disease category	1985–87	1995–97		1985–87	1995–97	
0–14 years						
All causes	0.07	0.09**	⇑	0.10	0.07**	⇓
Perinatal conditions	0.08	0.08		0.13	0.07**	⇓
Sudden infant death syndrome	0.04	0.17**	⇑	0.11	0.19**	⇑
All injuries	0.11	0.13**	⇑	0.11	0.11	
Road traffic accidents	0.07	0.16**	⇑	0.14	0.08**	⇓
15–24 years						
All causes	0.07	0.10**	⇑	0.09	0.07**	⇓
Drug dependence and harmful use	0.13	0.04**	⇓	0.07	0.01**	⇓
All injuries	0.06	0.12**	⇑	0.10	0.07**	⇓
Road traffic accidents	0.05	0.14**	⇑	0.08	0.12**	⇑
Suicide	0.05	0.09**	⇑	0.03	0.03**	
25–64 years						
All causes	0.10	0.09**		0.07	0.07	
Ischaemic heart disease	0.08	0.11**	⇑	0.14	0.16**	⇑
Stroke	0.13	0.12**		0.10	0.09**	
Diabetes mellitus	0.12	0.12		0.18	0.22**	⇑
All cancers	0.05	0.06**		0.01	0.02**	
Lung cancer	0.08	0.12**	⇑	0.07	0.10**	⇑
All injuries	0.12	0.09**	⇓	0.09	0.06**	⇓
Suicide	0.10	0.06**	⇓	0.06	0.01**	⇓
Road traffic accident	0.09	0.15**	⇑	0.08	0.12**	⇑

(a) Age-standardised Gini coefficients for mortality rate per 1,000 population across quintiles of socioeconomic disadvantage defined using a small area index of relative socioeconomic disadvantage according to place of residence at time of death.

(b) Asterisks attached to the 1995-97 estimates indicate level of significance of the difference from the corresponding 1985–87 value: * p <0.01, ** p <0.001. The arrows indicate significant increasing or decreasing trends for Gini coefficients which have changed by more than 0.01 over the ten year period.

Source: Turrell and Mathers 1999.

As shown in Table 3.9, comparison of death rate differentials for 1995–97 with those for 1985–87 published in earlier AIHW reports (Mathers 1994a, 1995, 1996) shows that the differentials have remained similar for females and for adult and older males, but have widened for boys and young men aged 15–24 years (Turrell & Mathers 1999). In the latter group, the differentials between the top and bottom quintiles have widened for motor vehicle accidents and suicide, but narrowed for drug overdose deaths as rates have increased faster in the top quintile than the bottom.