

## 5 Mortality differences by socioeconomic disadvantage

A large and growing international literature has documented the association between socioeconomic position (SEP) and mortality (House & Williams 2000; Lynch & Kaplan 2000; Feinstein 1993; Krieger & Fee 1994; Ostrove & Adler 1998; Williams & Collins 1995; Davey Smith et al. 1998; Kaplan et al. 1996), with disadvantaged groups experiencing higher death rates for most major causes of death. These socioeconomic differences in mortality are evident for both males and females at every stage of the lifecourse (House et al. 1994; Mustard et al. 1997) and they have been found in different historic periods (Krieger & Fee 1996) and in all countries where socioeconomic data are collected (Ancona et al. 2000; Mackenbach 1994; Song & Byeen 2000). There is also growing evidence that mortality inequalities have widened over time in some countries (Marmot & McDowall 1986; Marang-van de Mheen et al. 1998; McCarron et al. 1994; Pappas et al. 1993; Feldman et al. 1989; Dunleep 1989; Borrell et al. 1997; Regidor et al. 1995). These increasing disparities appear to be due to faster declines in mortality among those in higher socioeconomic positions, although in a number of countries there is evidence of an actual increase in mortality rates for some conditions among the most disadvantaged.

Socioeconomic inequalities in mortality have also been repeatedly observed within the Australian population (McMichael 1985; Siskind et al. 1992; Mathers 1994a, 1994b, 1995, 1996; Bennett 1996; Burnley 1998; Turrell et al. 1999; Glover et al. 1999; Turrell & Mengersen 2000; Turrell & Mathers 2001). These studies have shown that Australia has substantial socioeconomic mortality inequalities, with death rates typically being highest among the disadvantaged.

This chapter examines area-based socioeconomic mortality inequalities among infants and children (0–14 years), young adults (15–24 years), working-aged adults (25–64 years), and older persons (65 years and older) for the period 1998–2000. We also examine trends in mortality inequalities over the period 1985–1987 to 1998–2000, plus estimate the proportion of total mortality in the Australian population that was attributable to socioeconomic disadvantage in the latter period.

We use a geographic measure of SEP known as the Index of Relative Socioeconomic Disadvantage (IRSD), developed by the Australian Bureau of Statistics (ABS) using 1996 Census data to categorise areas on the basis of their social and economic characteristics (ABS 1998b). The IRSD is derived from the following area-attributes:

- Persons aged 15 and over with no qualifications (%)
- Families with income less than \$15,600 (%)
- Families with offspring having parental income less than \$15,000 (%)
- Females (in labour force) unemployed (%)
- Males (in labour force) unemployed (%)
- Employed females classified as 'Labourer and Related Workers' (%)
- Employed males classified as 'Labourer and Related Workers' (%)
- Employed males classified as 'Intermediate Production and Transport Workers' (%)
- Employed females classified as 'Intermediate Production and Transport Workers' (%)
- Employed females classified as 'Elementary Clerical, Sales and Service Workers' (%)
- Employed males classified as 'Tradespersons' (%)

- One-parent families with dependent offspring only (%)
- Households renting (government authority) (%)
- Persons aged 15 and over separated or divorced (%)
- Dwellings with no motor cars at dwelling (%)
- Persons aged 15 and over who did not go to school (%)
- Aboriginals or Torres Strait Islanders (%)
- Occupied private dwellings with two or more families (%)
- Lacking fluency in English (%)

The IRSD is compiled initially at the Collector's District (CD) level, a census collection unit broadly equivalent in urban areas to a small group of suburban blocks, comprising approximately 250 dwellings (CDs in rural regions usually contain fewer dwellings). This study uses IRSD scores for Statistical Local Areas (SLAs), which in most cases correspond to council boundaries defined by Local Government Areas. IRSD scores for each SLA are constructed by computing weighted average scores (using population census counts) across all CDs comprising the SLA. In aggregate, SLAs cover the whole of Australia without gaps or overlaps. For the years 1985–87 and 1998–2000, deceased persons were classified into quintiles of socioeconomic disadvantage according to the value of the IRSD for their SLA of usual residence, with Quintile 1 corresponding to the highest socioeconomic area and Quintile 5 the lowest. SLAs were grouped into quintiles so that each contained approximately 20% of the total Australian population.

## 5.1 Persons aged 0–14 years

In 1998–2000, life expectancy at birth for boys born in the least disadvantaged areas of Australia was around 2.4 years higher than the national average, and 3.9 years higher than for boys born in the most disadvantaged areas (Table 5.1.1). Life expectancy for girls born in the most advantaged areas was 83.6 years: this was approximately 1.2 years higher than for all new-born girls, and 2.0 years greater than for girls born in the most disadvantaged areas.

**Table 5.1.1: Life expectancy by IRSD quintile and sex, children born 1998–2000**

<b>IRSD quintile</b>	<b>Boys</b>	<b>Girls</b>
Quintile 1 (Least disadvantaged)	79.2	83.6
Quintile 2	77.6	83.0
Quintile 3	76.4	82.2
Quintile 4	76.1	82.1
Quintile 5 (Most disadvantaged)	75.3	81.6
<b>Total persons</b>	<b>76.8</b>	<b>82.4</b>

Source: ABS mortality data.

### Infants aged less than 1 year

In 1998–2000, infants from the most disadvantaged areas experienced significantly higher all-cause mortality rates than infants from the least disadvantaged areas: for boys, the difference was 80% (337 more deaths per 100,000) and for girls, 57% (214 more deaths per 100,000)(Table 5.1.2). Significant differences between the least and most disadvantaged areas were also found for certain conditions originating in the perinatal period, congenital malformations, deformations and chromosomal abnormalities, and SIDS: for each of these conditions, death rates were highest in the most disadvantaged areas.

**Table 5.1.2: Selected causes of death, children aged less than 1 year by IRSD quintile and sex, 1998–2000**

Cause of death and ICD-10 codes	Boys		Girls	
	Rate <sup>(a)</sup>	Rate ratio	Rate <sup>(a)</sup>	Rate ratio
<i>All causes</i>				
Quintile 1	419.6	1.00	372.3	1.00
Quintile 2	516.1	1.23**	408.6	1.10
Quintile 3	555.2	1.32***	424.2	1.14
Quintile 4	634.0	1.51***	519.8	1.40***
Quintile 5	756.7	1.80***	586.0	1.57***
<i>Certain conditions originating in the perinatal period (P00–P96)</i>				
Quintile 1	220.5	1.00	187.0	1.00
Quintile 2	252.6	1.15	219.9	1.18
Quintile 3	257.7	1.17	210.2	1.12
Quintile 4	279.7	1.27	226.5	1.21
Quintile 5	351.4	1.59***	238.6	1.28*
<i>Congenital malformations, deformations and chromosomal abnormalities (Q00–Q99)</i>				
Quintile 1	116.4	1.00	103.2	1.00
Quintile 2	141.9	1.22	106.4	1.03
Quintile 3	133.7	1.15	130.1	1.26
Quintile 4	179.0	1.54**	151.9	1.47*
Quintile 5	187.0	1.61***	153.8	1.49**
<i>Sudden Infant Death Syndrome (R95)</i>				
Quintile 1	32.2	1.00	29.0	1.00
Quintile 2	48.6	1.51	29.8	1.03
Quintile 3	74.7	2.32***	26.3	0.91
Quintile 4	74.6	2.32***	62.9	2.97**
Quintile 5	97.9	3.04***	71.6	2.47***

(a) Deaths per 100,000 persons.

Note: Quintile 1 = least disadvantaged; quintile 5 = most disadvantaged.

Source: ABS mortality data.

\*p<0.05, \*\*p<0.01, \*\*\*p<0.001

If infant death rates across the IRSD quintiles were equivalent to the most advantaged areas, approximately 1,197 deaths could have been avoided in 1998–2000 (Table 5.1.3). Substantial numbers of deaths could also have been avoided for a range of specific conditions.

**Table 5.1.3: Excess mortality by IRSD quintile and sex, children aged less than 1 year, 1998–2000**

Cause of death and ICD-10 codes	Boys		Girls	
	Number <sup>(a)</sup>	Per cent <sup>(b)</sup>	Number <sup>(a)</sup>	Per cent <sup>(b)</sup>
All causes	794	29.0	403	19.4
Certain conditions originating in the perinatal period (P00–P96)	198	18.7	101	12.7
Congenital malformations, deformations and chromosomal abnormalities (Q00–Q99)	156	24.3	112	21.8
Accidents and injury (V01–Y98)	199	63.9	78	38.4

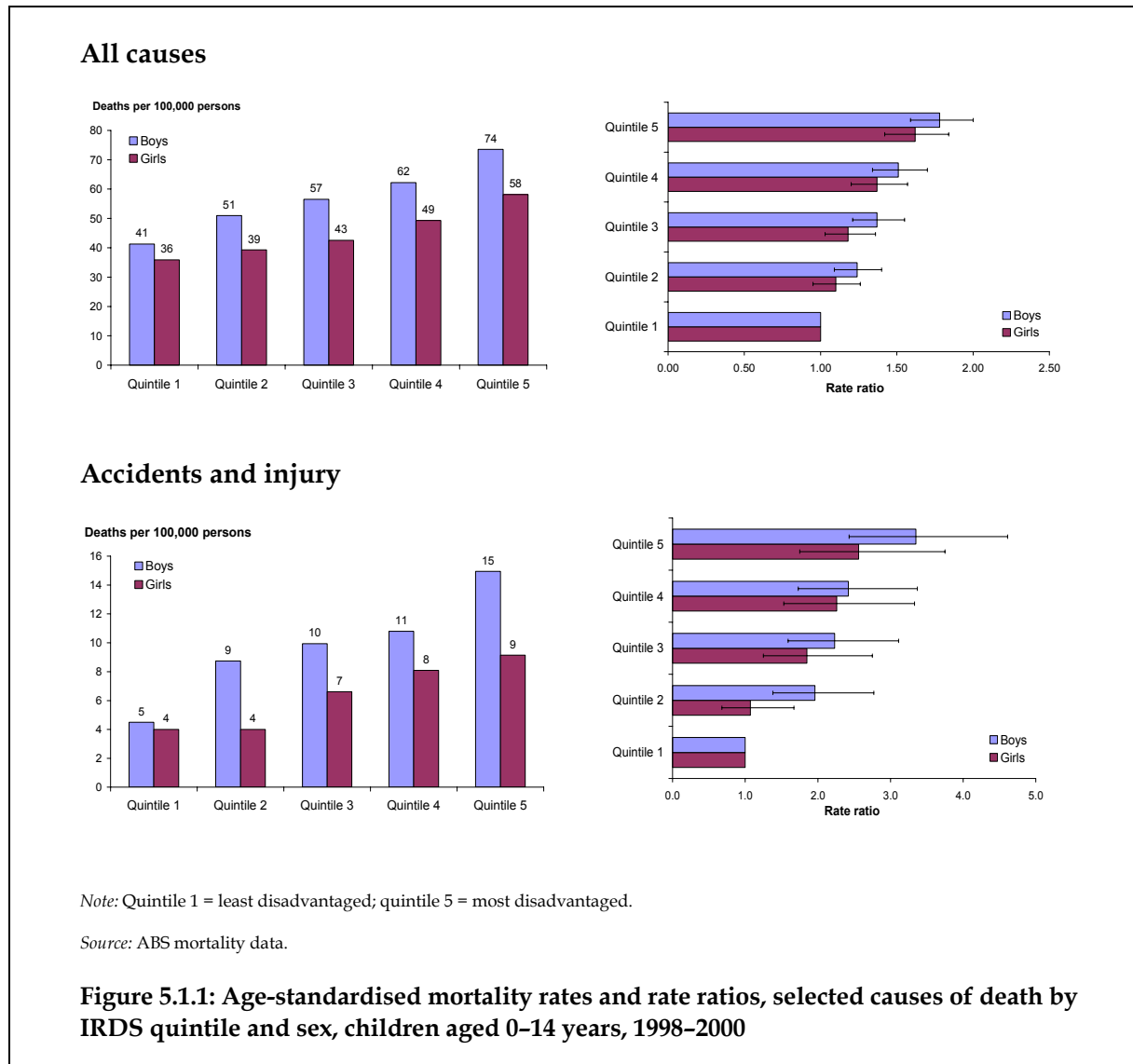
(a) Total number of deaths that would have been avoided if all IRSD quintiles had the same mortality rate as the least disadvantaged area.

(b) Percentage of deaths that would have been avoided if all IRSD quintiles had the same mortality rate as the least disadvantaged area.

Source: ABS mortality data.

## Children aged 0–14 years

In 1998–2000, young children from the most disadvantaged areas of Australia experienced significantly higher death rates for all causes: for male children, the difference between the most and least disadvantaged areas was 78% (32 more deaths per 100,000), and for female children, 62% (22 more deaths per 100,000)(Figure 5.1.1, Table 5.1.4). Children from disadvantaged areas also experienced a greater loss of potential years of life, higher mortality for potentially avoidable deaths, and substantially higher death rates for accidents and injury.



**Table 5.1.4: Age-standardised mortality rates and rate ratios, children aged 0–14 years by IRSD quintile and sex, 1998–2000**

Cause of death and ICD-10 codes	Boys		Girls	
	Rate <sup>(a)</sup>	Rate ratio	Rate <sup>(a)</sup>	Rate ratio
<i>All causes</i>				
Quintile 1	41.3	1.00	35.9	1.00
Quintile 2	51.0	1.24***	39.3	1.10
Quintile 3	56.5	1.37***	42.5	1.18*
Quintile 4	62.2	1.51***	49.3	1.37***
Quintile 5	73.5	1.78***	58.2	1.62***
<i>PYLL<sup>(b)</sup></i>				
Quintile 1	28.1	1.00	24.3	1.00
Quintile 2	35.5	1.26***	27.3	1.13
Quintile 3	39.7	1.41***	29.9	1.23**
Quintile 4	43.9	1.56***	34.7	1.43***
Quintile 5	52.0	1.87***	41.1	1.70***
<i>Potentially avoidable deaths</i>				
Quintile 1	21.0	1.00	16.3	1.00
Quintile 2	26.0	1.23*	19.8	1.21
Quintile 3	26.3	1.25**	19.5	1.20
Quintile 4	31.9	1.52***	24.7	1.52***
Quintile 5	38.2	1.82***	28.7	1.76***
<i>Accidents and injury (V01–Y98)</i>				
Quintile 1	4.5	1.00	3.6	1.00
Quintile 2	8.7	1.96***	3.8	1.07
Quintile 3	9.9	2.23***	6.6	1.85**
Quintile 4	10.8	2.42***	8.1	2.26***
Quintile 5	15.0	3.35***	9.2	2.56***

(a) Deaths per 100,000 persons.

(b) PYLL per 1,000 persons.

Note: Quintile 1 = least disadvantaged; quintile 5 = most disadvantaged.

Source: ABS mortality data.

\*p<0.05, \*\*p<0.01, \*\*\*p<0.001

Approximately 1,491 deaths among 0–14 year olds (males n=958, females n=533) could have been avoided in 1998–2000 if the mortality rates for each of the IRSD quintiles were equivalent to that observed in the most advantaged quintile (Table 5.1.5). Large numbers of deaths could also have been avoided for accidents and injury.

**Table 5.1.5: Excess mortality by IRSD quintile and sex, children aged 0–14 years, 1998–2000**

Cause of death and ICD-10 codes	Boys		Girls	
	Number <sup>(a)</sup>	Per cent <sup>(b)</sup>	Number <sup>(a)</sup>	Per cent <sup>(b)</sup>
All causes	958	28.3	533	21.1
Accidents and injury (V01–Y98)	327	55.0	158	44.0

(a) Total number of deaths that would have been avoided if all IRSD quintiles had the same mortality rate as the least disadvantaged area.

(b) Percentage of deaths that would have been avoided if all IRSD quintiles had the same mortality rate as the least disadvantaged area.

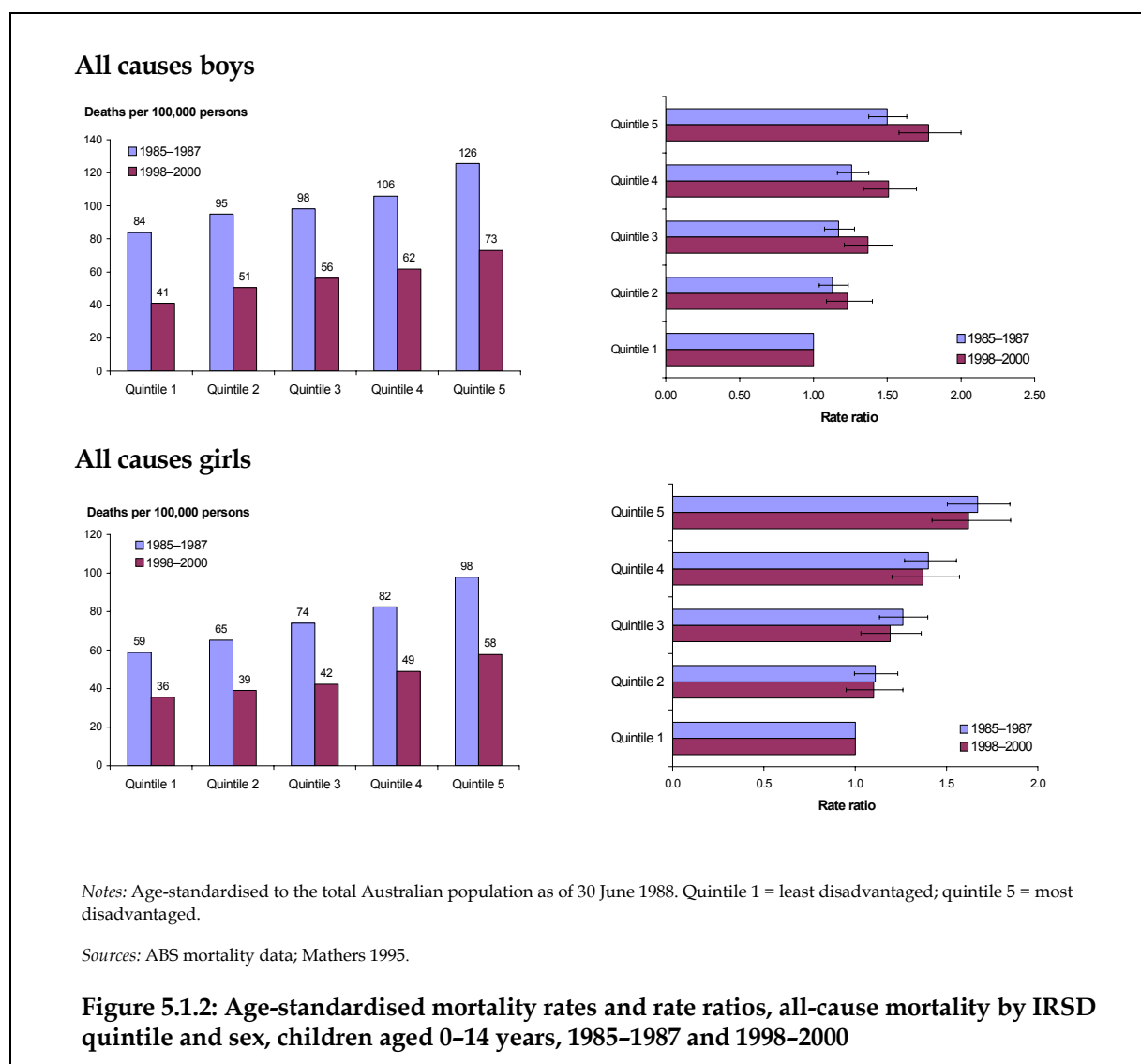
Source: ABS mortality data.

## Trends in mortality rates and mortality inequality

Between 1985–1987 and 1998–2000, all-cause mortality rates for children aged 0–14 years decreased markedly for all socioeconomic quintiles (Figure 5.1.2).

For boys, relative mortality inequalities for all causes widened over the period: in 1985–1987 death rates in the most disadvantaged areas were approximately 50% higher than in the least disadvantaged, and in 1998–2000 the corresponding difference was 78%. In terms of absolute death rates however, the difference between the most and least disadvantaged quintiles narrowed: from 42 deaths per 100,000 in 1985–1987 to 32 deaths per 100,000 in 1998–2000.

For girls, relative mortality inequality for all causes between the most and least disadvantaged areas declined slightly over the two periods from 66% in 1985–1987 to 61% in 1998–2000. Declines were also observed in terms of absolute death rates: in the earlier period, there was a difference of 39 deaths per 100,000 between the most and least disadvantaged areas, and in the later period, this difference was 22 deaths per 100,000.



## 5.2 Persons aged 15–24 years

In 1998–2000, males aged 15 years and living in the most disadvantaged areas of Australia had a life expectancy of 61.2 years: this was 3.5 years fewer than their counterparts from the most advantaged areas, who had a life expectancy of 64.7 years (Table 5.2.1). For females, the corresponding difference in life expectancy between the most and least disadvantaged areas was 1.7 years, with girls aged 15 years residing in the former areas living an estimated 67.3 years, and the latter, 69.0 years.

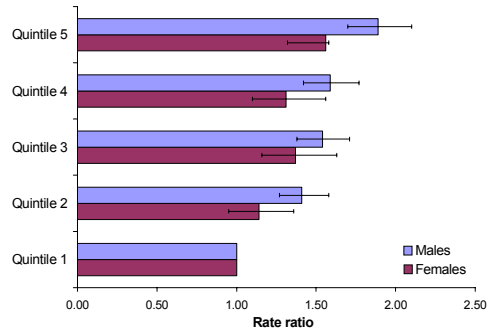
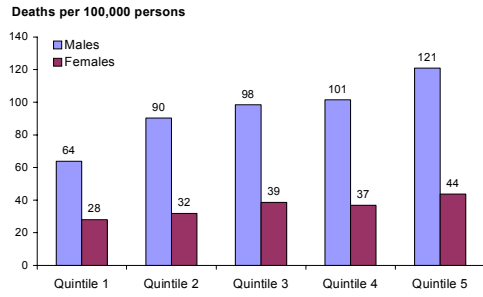
**Table 5.2.1: Life expectancy, persons at 15 years by IRSD quintile and sex, 1998–2000**

<b>IRSD quintile</b>	<b>Males</b>	<b>Females</b>
Quintile 1 (Least disadvantaged)	64.7	69.0
Quintile 2	63.2	68.5
Quintile 3	62.0	67.7
Quintile 4	61.8	67.7
Quintile 5 (Most disadvantaged)	61.2	67.3
<b>Total persons</b>	<b>62.5</b>	<b>68.0</b>

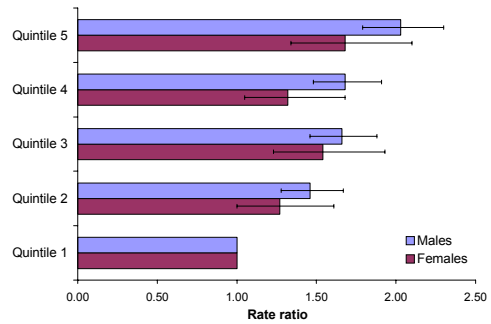
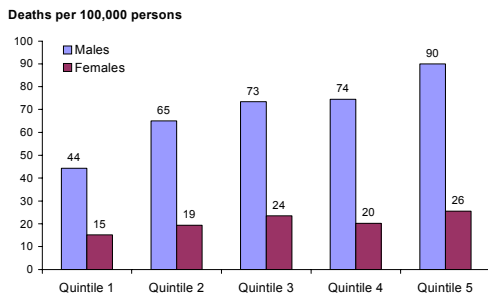
Source: ABS mortality data.

Males and females aged 15–24 from socioeconomically disadvantaged areas experienced significantly higher death rates for all causes, and for a number of specific causes (Figure 5.2.1; Table 5.2.2). Young adults from disadvantaged areas also experienced a greater loss of potential years of life, and higher mortality for potentially avoidable deaths.

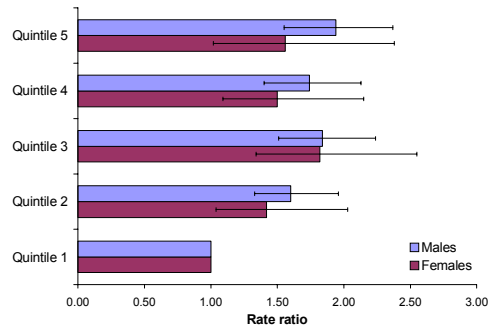
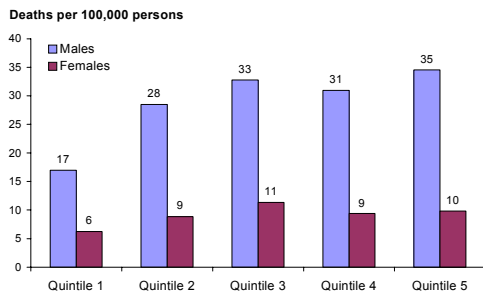
## All causes



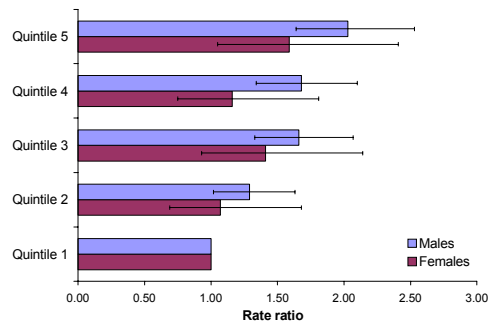
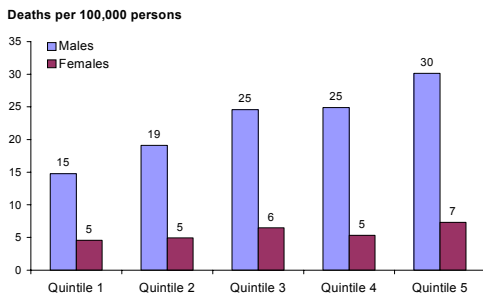
## Accidents and injury



## Transport accidents



## Suicide



Note: Quintile 1 = least disadvantaged; quintile 5 = most disadvantaged.

Source: ABS mortality data.

**Figure 5.2.1: Age-standardised mortality rates and rate ratios, selected causes of death by IRSD quintile and sex, persons aged 15–24 years, 1998–2000**

**Table 5.2.2: Age-standardised mortality rates and rate ratios, persons aged 15–24 years by IRSD quintile and sex, 1998–2000**

Cause of death and ICD-10 codes	Males		Females	
	Rate <sup>(a)</sup>	Rate ratio	Rate <sup>(a)</sup>	Rate ratio
<i>All causes</i>				
Quintile 1	63.9	1.00	28.0	1.00
Quintile 2	90.3	1.41***	31.9	1.14
Quintile 3	98.4	1.54***	38.5	1.37***
Quintile 4	101.4	1.59***	36.8	1.31**
Quintile 5	120.9	1.89***	43.7	1.56***
<i>PYLL<sup>(b)</sup></i>				
Quintile 1	35.2	1.00	15.5	1.00
Quintile 2	49.8	1.41***	17.7	1.14
Quintile 3	54.1	1.53***	21.3	1.38***
Quintile 4	55.4	1.53***	20.3	1.31**
Quintile 5	66.0	1.87***	24.2	1.56***
<i>Potentially avoidable deaths</i>				
Quintile 1	39.0	1.00	14.4	1.00
Quintile 2	54.1	1.39***	16.7	1.16
Quintile 3	63.7	1.63***	24.8	1.71***
Quintile 4	61.5	1.58***	20.4	1.41**
Quintile 5	72.2	1.85***	23.9	1.66***
<i>Accidents and injury (V01–Y98)</i>				
Quintile 1	44.4	1.00	15.3	1.00
Quintile 2	65.0	1.46***	19.4	1.27*
Quintile 3	73.5	1.66***	23.5	1.54***
Quintile 4	74.5	1.68***	20.2	1.32*
Quintile 5	89.9	2.03***	25.6	1.68***
<i>Transport accidents (V01–V99)</i>				
Quintile 1	17.0	1.00	6.3	1.00
Quintile 2	28.5	1.60***	8.9	1.42
Quintile 3	32.8	1.84***	11.4	1.82***
Quintile 4	31.0	1.74***	9.4	1.50*
Quintile 5	34.5	1.94***	9.8	1.56*
<i>Suicide (X60–X84)</i>				
Quintile 1	14.8	1.00	4.6	1.00
Quintile 2	19.1	1.29*	4.9	1.07
Quintile 3	24.6	1.66***	6.5	1.41
Quintile 4	24.9	1.68***	5.3	1.16
Quintile 5	30.1	2.03***	7.3	1.59*

Note: Quintile 1 = least disadvantaged; quintile 5 = most disadvantaged.

(a) Deaths per 100,000 persons.

(b) PYLL per 1,000 persons.

Source: ABS mortality data.

\*p<0.05, \*\*p<0.01, \*\*\*p<0.001

In 1998–2000, approximately 1,550 deaths could have been avoided among persons aged 15–24 years if death rates in Quintiles 2–5 were equivalent to those experienced by young adults in the least disadvantaged areas (Quintile 1) (Table 5.2.3). Substantial numbers of deaths could also have been avoided for accidents and injury (n=1,226) and suicide (n=359), particularly among males.

**Table 5.2.3: Excess mortality, selected causes of death by IRSD quintile and sex, persons aged 15–24 years, 1998–2000**

Cause of death and ICD-10 codes	Males		Females	
	Number <sup>(a)</sup>	Per cent <sup>(b)</sup>	Number <sup>(a)</sup>	Per cent <sup>(b)</sup>
All causes	1,251	32.3	299	21.4
Accidents and injury (V01–Y98)	1,011	35.7	215	26.4
Transport accidents (V01–V99)	452	38.2	112	31.4
Suicide (X60–X84)	315	34.2	44	19.7

(a) Total number of deaths that would have been avoided if all IRSD quintiles had the same mortality rate as the least disadvantaged group.

(b) Percentage of deaths that would have been avoided if all IRSD quintiles had the same mortality rate as the least disadvantaged group.

Source: ABS mortality data.

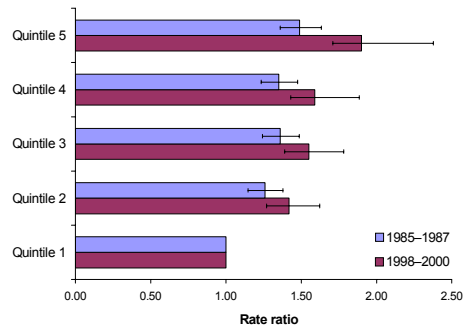
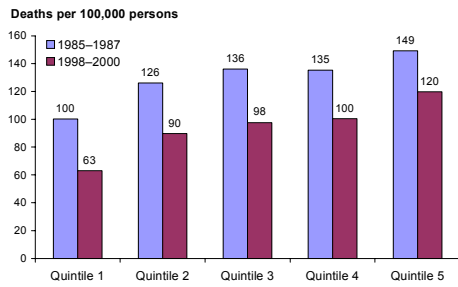
### Trends in mortality rates and mortality inequality

Between 1985–1987 and 1998–2000, all-cause mortality rates for persons aged 15–24 years decreased for all socioeconomic quintiles (Figure 5.2.2).

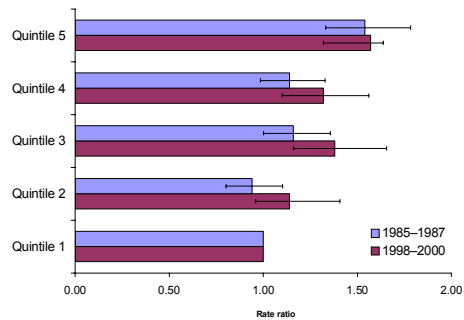
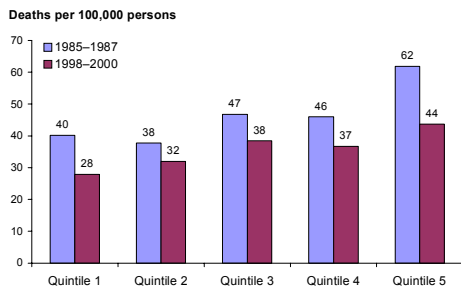
For males, relative mortality inequalities for all causes widened over the period: in 1985–1987 death rates in the most disadvantaged areas were approximately 49% higher than in the least disadvantaged, and in 1998–2000 the corresponding difference was 90%. In terms of absolute death rates, the difference between the most and least disadvantaged quintiles also increased: from 49 deaths per 100,000 in 1985–1987 to 57 deaths per 100,000 in 1998–2000.

For females, relative mortality inequality for all causes between the most and least disadvantaged areas increased slightly over the two periods from 55% in 1985–1987 to 57% in 1998–2000. In terms of absolute death rates however, declines were observed: in the earlier period, there was a difference of 22 deaths per 100,000 between the most and least disadvantaged areas, and in the later period, this difference was 16 deaths per 100,000.

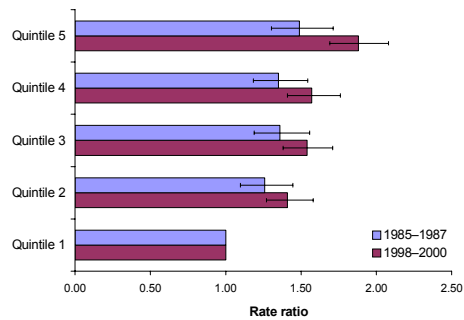
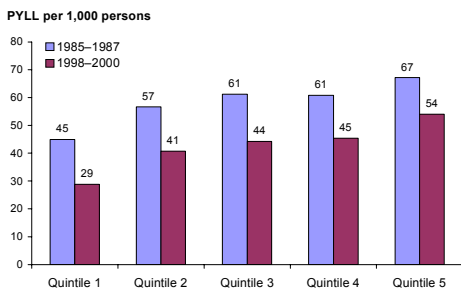
### All causes males



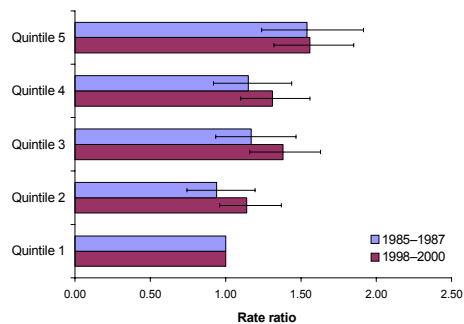
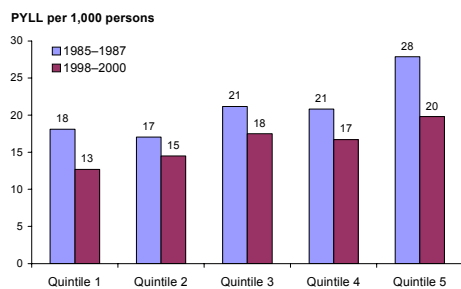
### All causes females



### PYLL males



### PYLL females



Notes: Ages standardised to the total Australian population as of 30 June 1988. Quintile 1 = least disadvantaged; quintile 5 = most disadvantaged.

Sources: ABS mortality data; Mathers 1995.

**Figure 5.2.2: Age-standardised mortality rates and rate ratios, all causes and PYLL by IRSD quintile and sex, persons aged 15-24 years, 1985-1987 and 1998-2000**

### 5.3 Persons aged 25–64 years

In 1998–2000, males aged 25 years who were resident in the most disadvantaged areas had a life expectancy of 51.8 years, which was 3.3 years less than for 25 year old males living in the least disadvantaged areas (Table 5.3.1). Among females aged 25, differences in life expectancy between the least and most disadvantaged areas were somewhat smaller at 1.7 years.

**Table 5.3.1: Life expectancy by IRSD quintile and sex, persons aged 25 years, 1998–2000**

<b>IRSD quintile</b>	<b>Males</b>	<b>Females</b>
Quintile 1 (Least disadvantaged)	55.1	59.2
Quintile 2	53.8	58.7
Quintile 3	52.6	57.9
Quintile 4	52.4	57.9
Quintile 5 (Most disadvantaged)	51.8	57.5
<b>Total population</b>	<b>53.1</b>	<b>58.2</b>

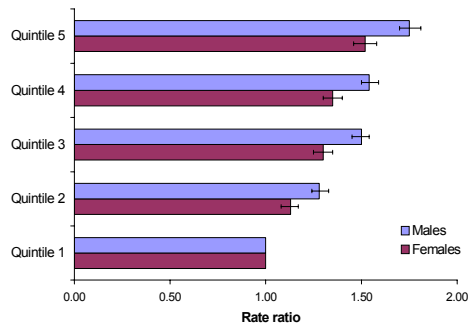
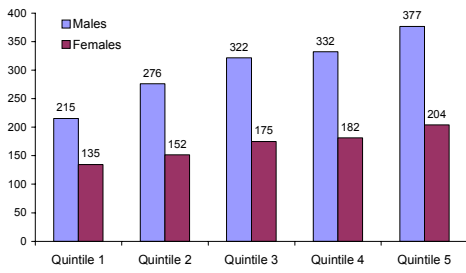
Source: ABS mortality data.

The all-cause mortality rate for males living in the most disadvantaged areas was 75% higher than for males from the least disadvantaged areas (Figure 5.3.1; Table 5.3.2). The corresponding difference in all-cause mortality among females was 52%. Significant differences in death rates were also found for many specific conditions. Compared with persons from the least disadvantaged areas of Australia, those from the most disadvantaged had higher mortality rates for:

- potentially avoidable deaths: 84% higher for males (113 more deaths per 100,000), 58% for females (48 more deaths per 100,000);
- lung cancer: 102% higher for males (15 more deaths per 100,000), 73% for females (6 more deaths per 100,000);
- diseases of the circulatory system: 112% higher for males (53 more deaths per 100,000), 127% for females (23 more deaths per 100,000);
- diseases of the respiratory system: 181% higher for males (10 more deaths per 100,000), 143% for females (7 more deaths per 100,000);
- diseases of the digestive system: 130% higher for males (10 more deaths per 100,000), 118% for females (4 more deaths per 100,000); and
- accidents and injury: 75% higher for males (36 more deaths per 100,000), 67% for females (20 more deaths per 100,000)

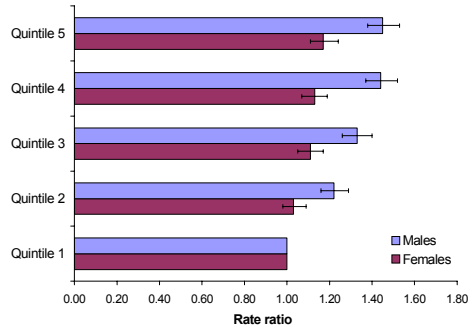
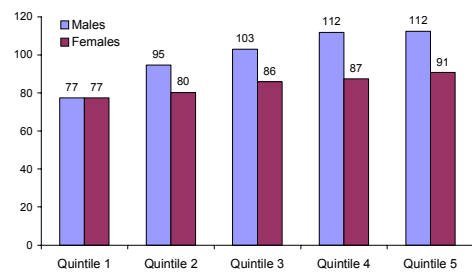
### All causes

Deaths per 100,000 persons



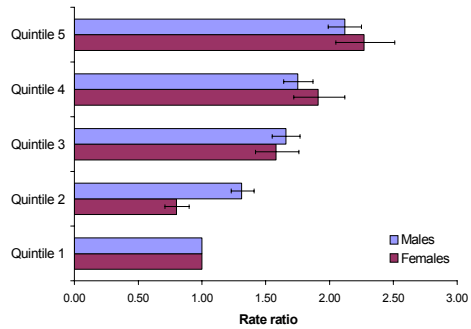
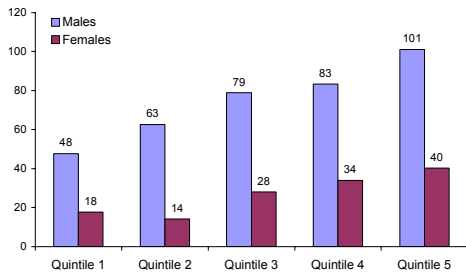
### Cancers

Deaths per 100,000 persons



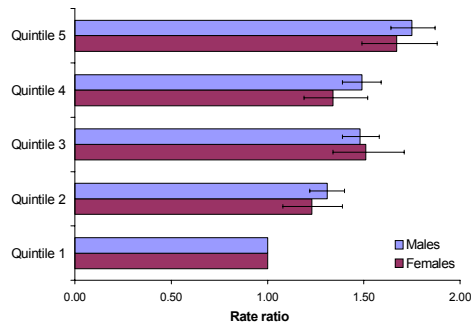
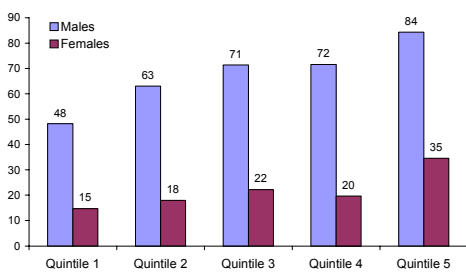
### Diseases of the circulatory system

Deaths per 100,000 persons



### Accidents and injury

Deaths per 100,000 persons



Note: Quintile 1 = least disadvantaged; quintile 5 = most disadvantaged.

Source: ABS mortality data.

**Figure 5.3.1: Age-standardised mortality rates and rate ratios, selected causes of death by IRSD quintile and sex, persons aged 25–64 years, 1998–2000**

**Table 5.3.2: Age-standardised mortality rates and rate ratios, persons aged 25–64 years by IRSD quintile and sex, 1998–2000**

Cause of death and ICD-10 codes	Males		Females	
	Rate <sup>(a)</sup>	Rate ratio	Rate <sup>(a)</sup>	Rate ratio
<i>All causes</i>				
Quintile 1	215.1	1.00	134.7	1.00
Quintile 2	276.3	1.28***	151.6	1.13***
Quintile 3	321.7	1.50***	174.8	1.30***
Quintile 4	332.1	1.54***	181.6	1.35***
Quintile 5	376.8	1.75***	204.2	1.52***
<i>PYLL<sup>(b)</sup></i>				
Quintile 1	53.5	1.00	32.7	1.00
Quintile 2	68.4	1.28***	35.6	1.09***
Quintile 3	79.1	1.48***	41.5	1.27***
Quintile 4	83.2	1.55***	43.7	1.34***
Quintile 5	95.6	1.79***	50.5	1.55***
<i>Potentially avoidable deaths</i>				
Quintile 1	134.8	1.00	82.7	1.00
Quintile 2	176.7	1.31***	95.2	1.15***
Quintile 3	209.0	1.55***	108.2	1.31***
Quintile 4	217.2	1.61***	113.0	1.37***
Quintile 5	248.3	1.84***	130.8	1.58***
<i>Cancers (C00–C97)</i>				
Quintile 1	77.5	1.00	77.5	1.00
Quintile 2	94.7	1.22***	80.1	1.03
Quintile 3	103.1	1.33***	85.9	1.11***
Quintile 4	111.7	1.44***	87.4	1.13***
Quintile 5	112.3	1.45***	90.7	1.17***
<i>Cancer of the digestive organs (C15–C26)</i>				
Quintile 1	24.1	1.00	16.3	1.00
Quintile 2	30.6	1.27***	18.0	1.11
Quintile 3	31.8	1.32***	18.5	1.14*
Quintile 4	34.7	1.44***	18.6	1.15*
Quintile 5	33.3	1.38***	18.2	1.12
<i>Colon cancer (C18)</i>				
Quintile 1	7.9	1.00	6.4	1.00
Quintile 2	9.3	1.17	7.5	1.16
Quintile 3	10.0	1.26**	7.3	1.13
Quintile 4	10.4	1.31***	7.1	1.10
Quintile 5	9.8	1.23*	7.0	1.09
<i>Melanoma of skin (C43)</i>				
Quintile 1	4.4	1.00	2.8	1.00
Quintile 2	5.3	1.22	2.6	0.93
Quintile 3	4.2	0.97	2.7	0.94
Quintile 4	4.8	1.10	3.0	1.07
Quintile 5	5.4	1.24	3.0	1.05
<i>Lung cancer (C33, C34)</i>				
Quintile 1	14.1	1.00	8.5	1.00
Quintile 2	19.4	1.37***	9.9	1.18
Quintile 3	25.7	1.82***	12.4	1.47***
Quintile 4	27.1	1.92***	12.2	1.44***
Quintile 5	28.6	2.02***	14.6	1.73***

(continued)

**Table 5.3.2 (continued): Age-standardised mortality rates and rate ratios, persons aged 25–64 years by IRSD quintile and sex, 1998–2000**

Cause of death and ICD-10 codes	Males		Females	
	Rate <sup>(a)</sup>	Rate ratio	Rate <sup>(a)</sup>	Rate ratio
<i>Breast cancer (C50)</i>				
Quintile 1	0.2	1.00	23.0	1.00
Quintile 2	0.1	0.61	21.6	0.94
Quintile 3	0.1	0.25	22.2	0.96
Quintile 4	0.2	0.93	22.5	0.98
Quintile 5	0.2	0.67	23.3	1.02
<i>Cancer of the female genital organs (C51–C58)</i>				
Quintile 1	—	—	8.5	1.00
Quintile 2	—	—	7.9	0.93
Quintile 3	—	—	9.0	1.06
Quintile 4	—	—	8.7	1.03
Quintile 5	—	—	9.0	1.06
<i>Brain cancer (C71)</i>				
Quintile 1	6.1	1.00	3.5	1.00
Quintile 2	5.6	0.92	3.7	1.08
Quintile 3	5.7	0.93	3.5	1.00
Quintile 4	5.5	0.89	4.0	1.15
Quintile 5	6.5	1.06	3.3	0.96
<i>Cancer in the lymphoid, haematopoietic and related tissue (C81–C96)</i>				
Quintile 1	9.6	1.00	7.4	1.00
Quintile 2	10.7	1.12	6.5	0.88
Quintile 3	10.2	1.06	7.7	1.03
Quintile 4	12.1	1.26**	7.7	1.03
Quintile 5	10.2	1.07	7.7	1.03
<i>Mental and behavioural disorders due to psychoactive substance use (F10–F19)</i>				
Quintile 1	6.2	1.00	1.9	1.00
Quintile 2	7.5	1.21	1.9	1.00
Quintile 3	10.0	1.60***	2.8	1.53*
Quintile 4	9.6	1.54***	2.2	1.17
Quintile 5	9.8	1.58***	2.5	1.37
<i>Diseases of the circulatory system (I00–I99)</i>				
Quintile 1	47.7	1.00	17.7	1.00
Quintile 2	62.6	1.31***	14.2	0.80***
Quintile 3	79.0	1.66***	28.0	1.58***
Quintile 4	83.4	1.75***	33.9	1.91***
Quintile 5	101.0	2.12***	40.3	2.27***
<i>Ischaemic heart disease (I20–I25)</i>				
Quintile 1	33.2	1.00	7.4	1.00
Quintile 2	42.6	1.28***	10.5	1.43***
Quintile 3	54.5	1.64***	13.3	1.78***
Quintile 4	58.8	1.77***	16.1	2.16***
Quintile 5	68.9	2.07***	20.1	2.70***
<i>Acute myocardial infarction (I21)</i>				
Quintile 1	15.0	1.00	3.6	1.00
Quintile 2	20.1	1.34***	5.5	1.55***
Quintile 3	27.1	1.80***	7.0	1.96***
Quintile 4	30.5	2.03***	9.1	2.55***
Quintile 5	36.7	2.44***	11.4	3.20***

(continued)

**Table 5.3.2 (continued): Age-standardised mortality rates and rate ratios, persons aged 25–64 years by IRSD quintile and sex, 1998–2000**

Cause of death and ICD-10 codes	Males		Females	
	Rate <sup>(a)</sup>	Rate ratio	Rate <sup>(a)</sup>	Rate ratio
<i>Stroke (I60–I69)</i>				
Quintile 1	6.6	1.00	4.9	1.00
Quintile 2	7.9	1.19	6.2	1.25*
Quintile 3	10.5	1.58***	7.3	1.50***
Quintile 4	9.8	1.48***	7.9	1.61***
Quintile 5	12.8	1.93***	9.1	1.84***
<i>Diseases of the respiratory system (J00–J99)</i>				
Quintile 1	5.7	1.00	5.2	1.00
Quintile 2	9.1	1.60***	6.6	1.29*
Quintile 3	12.5	2.18***	9.1	1.76***
Quintile 4	12.3	2.16***	9.5	1.84***
Quintile 5	16.0	2.81***	12.5	2.43***
<i>Chronic lower respiratory disease (J40–J47)</i>				
Quintile 1	3.1	1.00	3.4	1.00
Quintile 2	5.8	1.89***	4.8	1.41**
Quintile 3	8.7	2.82***	6.4	1.87***
Quintile 4	8.7	2.83***	7.1	2.08***
Quintile 5	11.0	3.57***	9.5	2.78***
<i>Diseases of the digestive system (K00–K93)</i>				
Quintile 1	7.2	1.00	3.7	1.00
Quintile 2	11.5	1.59***	4.4	1.18
Quintile 3	12.6	1.74***	5.9	1.59***
Quintile 4	14.9	2.07***	6.4	1.73***
Quintile 5	16.7	2.30***	8.1	2.18***
<i>Diseases of the liver (K70–K77)</i>				
Quintile 1	5.1	1.00	2.4	1.00
Quintile 2	8.3	1.63***	2.7	1.12
Quintile 3	9.4	1.84***	3.2	1.34*
Quintile 4	11.2	2.21***	3.8	1.57*
Quintile 5	12.6	2.48***	4.9	2.05***
<i>Accidents and injury (V01–Y98)</i>				
Quintile 1	48.2	1.00	14.7	1.00
Quintile 2	63.0	1.31***	18.0	1.23***
Quintile 3	71.3	1.48***	22.2	1.51***
Quintile 4	71.5	1.49***	19.7	1.34***
Quintile 5	84.3	1.75***	34.6	1.67***
<i>Transport accidents (V01–V99)</i>				
Quintile 1	8.5	1.00	3.0	1.00
Quintile 2	13.8	1.63***	4.4	1.45**
Quintile 3	17.5	2.07***	6.0	2.00***
Quintile 4	17.0	2.00***	4.9	1.61***
Quintile 5	18.9	2.24***	6.1	2.03***

(continued)

**Table 5.3.2 (continued): Age-standardised mortality rates and rate ratios, persons aged 25–64 years by IRSD quintile and sex, 1998–2000**

Cause of death and ICD-10 codes	Males		Females	
	Rate <sup>(a)</sup>	Rate ratio	Rate <sup>(a)</sup>	Rate ratio
<i>Suicide (X60–X84)</i>				
Quintile 1	22.4	1.00	6.6	1.00
Quintile 2	26.6	1.19***	7.1	1.08
Quintile 3	29.3	1.30***	7.9	1.20
Quintile 4	30.7	1.37***	6.6	1.01
Quintile 5	36.1	1.61***	8.3	1.27*

Note: Quintile 1 = least disadvantaged; quintile 5 = most disadvantaged.

(a) Deaths per 100,000 persons.

(b) PYLL per 1,000 persons.

Source: ABS mortality data.

\*p<0.05, \*\*p<0.01, \*\*\*p<0.001

Table 5.3.3 presents excess mortality estimates for persons aged 25–64 years associated with differences in mortality between IRSD quintiles. In 1998–2000, approximately 29.6% of male deaths, and 20.3% of female deaths, could have been avoided if all areas in Australia had experienced an all-cause mortality rate equivalent to that of the least disadvantaged. Put differently, among persons aged 25–64, socioeconomic disadvantage resulted in an unnecessary excess of 13,749 deaths among males, and 5,250 deaths among females. Substantial numbers of deaths could also have been avoided for cancers, diseases of the circulatory system, and accidents and injury.

**Table 5.3.3: Excess mortality, selected causes by IRSD quintile and sex, persons aged 25–64 years, 1998–2000**

Cause of death and ICD-10 codes	Males		Females	
	Number <sup>(a)</sup>	Per cent <sup>(b)</sup>	Number <sup>(a)</sup>	Per cent <sup>(b)</sup>
All causes	13,749	29.6	5,250	20.3
Cancers (C00–C97)	3,502	22.7	1,054	8.1
Lung cancer (C33, C34)	1,378	39.0	471	26.5
Diseases of the circulatory system (I00–I99)	4,237	36.7	1,432	34.9
Stroke (I60–I69)	449	30.7	328	30.5
Diseases of the digestive system (K00–K93)	842	42.9	297	33.9
Accidents and injury (V01–Y98)	2,872	28.9	768	26.2

(a) Total number of deaths that would have been avoided if all IRSD quintiles had the same mortality rate as the least disadvantaged quintile.

(b) Percentage of deaths that would have been avoided if all IRSD quintiles had the same mortality rate as the least disadvantaged quintile.

Source: ABS mortality data.

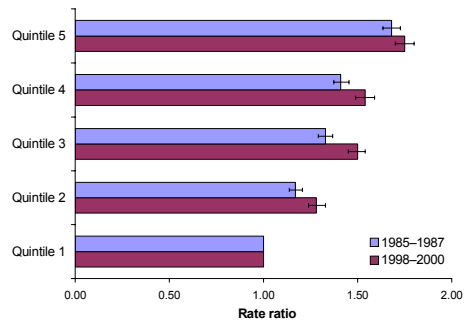
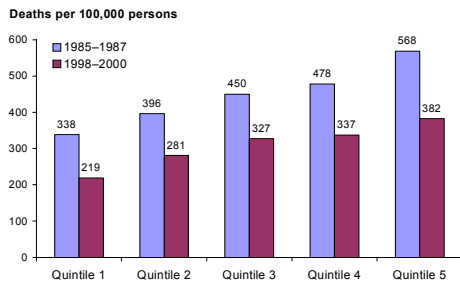
### **Trends in mortality rates and mortality inequality**

Between 1985–1987 and 1998–2000, all-cause mortality rates for persons aged 25–64 years decreased for all socioeconomic quintiles (Figure 5.3.2).

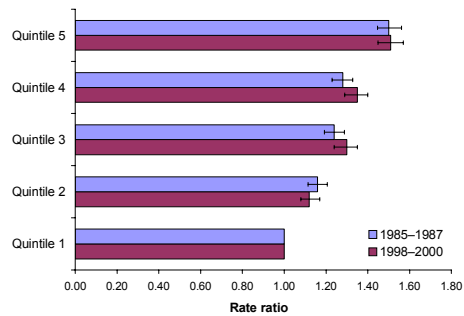
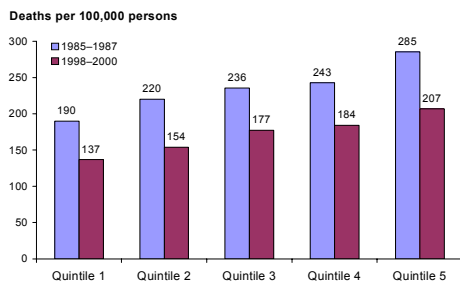
For males, relative mortality inequalities for all causes widened over the period: in 1985–1987 death rates in the most disadvantaged areas were approximately 68% higher than in the least disadvantaged, and in 1998–2000 the corresponding difference was 75% (Table 5.3.4). In terms of absolute death rates however, the difference between the most and least disadvantaged quintiles narrowed: from 230 deaths per 100,000 in 1985–1987 to 163 deaths per 100,000 in 1998–2000.

For females, relative mortality inequality for all causes between the most and least disadvantaged areas remained stable over the two periods at approximately 50%. In terms of absolute death rates however, declines were observed: in 1985–1987, there was a difference of 95 deaths per 100,000 between the most and least disadvantaged areas, and in 1998–2000, this difference was 70 deaths per 100,000.

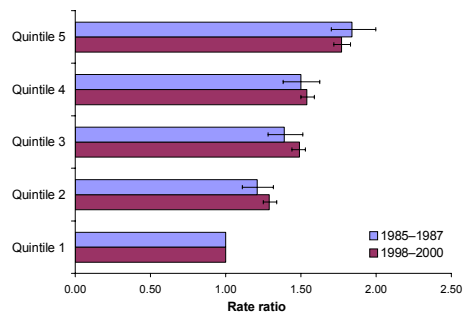
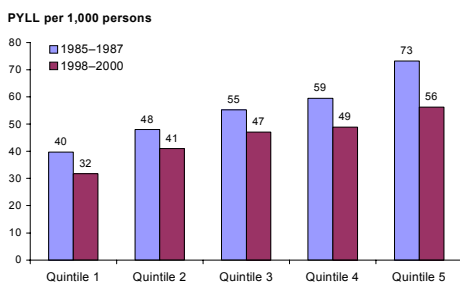
### All causes males



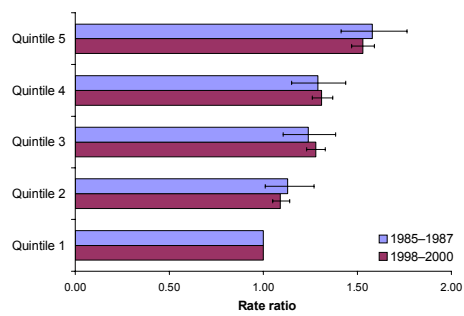
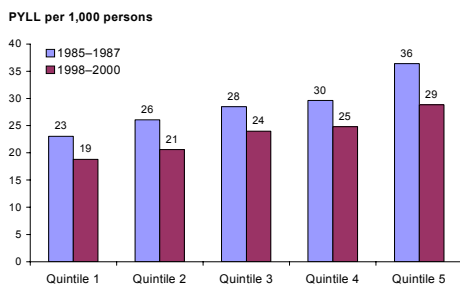
### All causes females



### PYLL males



### PYLL females



Notes: Age-standardised to the total Australian population as of 30 June 1988. Quintile 1 = least disadvantaged; quintile 5 = most disadvantaged.

Source: ABS mortality data; Mathers 1994a.

**Figure 5.3.2: Age-standardised mortality rates and rate ratios, all causes and PYLL by IRSD quintile and sex, persons aged 25-64, 1985-1987 and 1998-2000**

**Table 5.3.4: Age-standardised mortality rate ratios, persons aged 25–64 years by IRSD quintile and sex, 1985–1987 and 1998–2000**

Cause of death and ICD-10 codes	1985–1987				1998–2000			
	Males		Females		Males		Females	
	Rate <sup>(a)</sup>	Rate Ratio	Rate	Rate ratio	Rate	Rate ratio	Rate	Rate ratio
<i>All causes</i>								
Quintile 1	338.4	1.00	189.9	1.00	218.8	1.00	136.8	1.00
Quintile 2	396.3	1.17***	220.2	1.16***	281.1	1.28***	153.8	1.12***
Quintile 3	449.6	1.33***	235.5	1.24***	327.2	1.50***	177.2	1.30***
Quintile 4	478.1	1.41***	242.6	1.28***	337.3	1.54***	184.3	1.35***
Quintile 5	568.5	1.68***	285.5	1.50***	382.4	1.75***	206.7	1.51***
<i>Cancers (C00–C97)</i>								
Quintile 1	118.0	1.00	102.7	1.00	79.2	1.00	78.6	1.00
Quintile 2	122.6	1.04	108.8	1.06*	96.9	1.22***	81.2	1.13***
Quintile 3	138.9	1.18***	106.4	1.04	105.8	1.34***	87.2	1.22***
Quintile 4	139.2	1.18***	106.7	1.04	114.4	1.44***	88.6	1.29***
Quintile 5	150.6	1.28***	112.9	1.10***	115.1	1.45***	91.8	1.31***
<i>Diseases of the circulatory system (I00–I99)</i>								
Quintile 1	125.8	1.00	41.1	1.00	48.9	1.00	18.2	1.00
Quintile 2	150.7	1.20***	52.9	1.29***	63.9	1.31***	14.3	1.32***
Quintile 3	166.6	1.33***	65.5	1.60***	80.6	1.65***	28.6	1.64***
Quintile 4	180.8	1.44***	68.2	1.66***	84.9	1.74***	34.6	1.78***
Quintile 5	207.8	1.65***	80.8	1.97***	102.8	2.10***	41.0	2.15***

Note: Quintile 1 = least disadvantaged; quintile 5 = most disadvantaged.

(a) Deaths per 100,000 persons.

Sources: ABS mortality data; Mathers 1994a.

\*p<0.05, \*\*p<0.01, \*\*\*p<0.001

## 5.4 Persons aged 65 years and over

In this report, deaths among those aged 65 years and over are expressed as rates per 1,000 persons, which is consistent with the earlier benchmark work of Mathers (1994b).

In 1998–2000, life expectancy for persons aged 65 was highest in the least disadvantaged areas (males 18.0 years, females 21.3 years) and lowest in the most disadvantaged areas (males 16.7 years, females 20.6 years). As was observed among the younger age groups, differences in life expectancy between the IRSD quintiles were larger for males than females (Table 5.4.1).

**Table 5.4.1: Life expectancy by IRSD quintile and sex, persons aged 65 years, 1998–2000**

IRSD quintile	Males	Females
Quintile 1 (Least disadvantaged)	18.0	21.3
Quintile 2	17.5	21.0
Quintile 3	16.8	20.5
Quintile 4	16.7	20.7
Quintile 5 (Most disadvantaged)	16.7	20.6
<b>Total population</b>	<b>17.1</b>	<b>20.8</b>

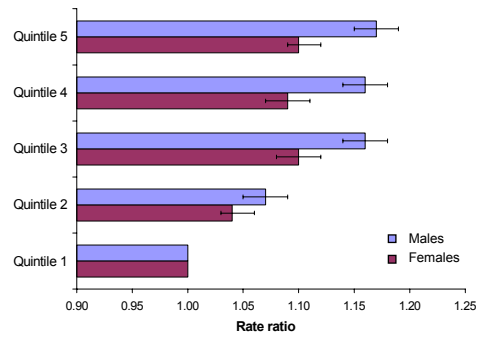
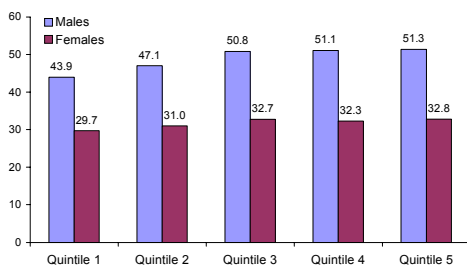
Source: ABS mortality data.

Significant differences in all-cause and specific-cause mortality were observed across the IRSD quintiles for persons aged 65 years and over, although the size of the differences was considerably smaller than that found for the younger age groups (Figure 5.4.1; Table 5.4.2). In addition, death rates among those aged 65 years or more were often not patterned as a continuous linear gradient from the least to the most disadvantaged quintile; by contrast, this was a characteristic feature of the mortality profile of younger persons. Among males, all-cause death rates in the most disadvantaged areas were 17% higher than in the least disadvantaged areas (7 more deaths per 1,000), and for females, the corresponding difference was 10% (3 more deaths per 1,000). Death rates in the most disadvantaged areas were also significantly higher for:

- lung cancer: 37% higher for males (1 more death per 1,000), 13% for females (0.14 more deaths per 1,000);
- diabetes mellitus: 44% higher for males (0.49 more deaths per 1,000), 84% for females (0.45 more deaths per 1,000);
- diseases of the circulatory system: 15% higher for males (3 more deaths per 1,000), 11% higher for females (1 more death per 1,000);
- diseases of the respiratory system: 39% higher for males (2 more deaths per 1,000), 18% higher for females (0.43 more deaths per 1,000);
- diseases of the digestive system: 30% higher for males (0.35 more deaths per 1,000), 27% higher for females (0.25 more deaths per 1,000); and
- renal failure: 24% higher for males (0.16 more deaths per 1,000), 19% for females (0.09 more deaths per 1,000).

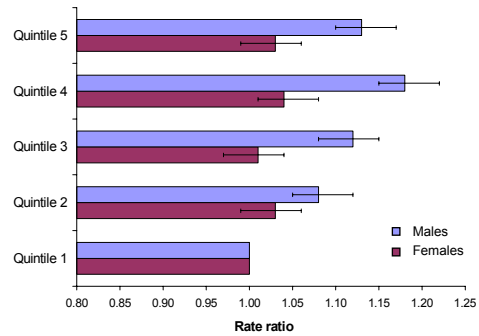
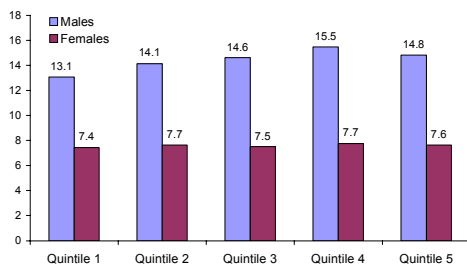
## All causes

Deaths per 1,000 persons



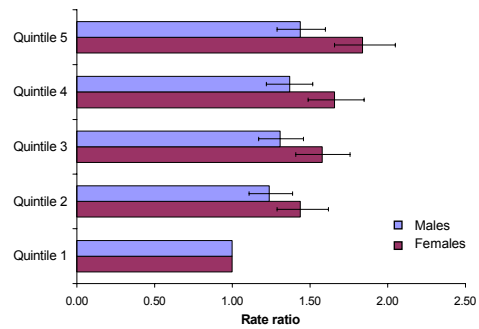
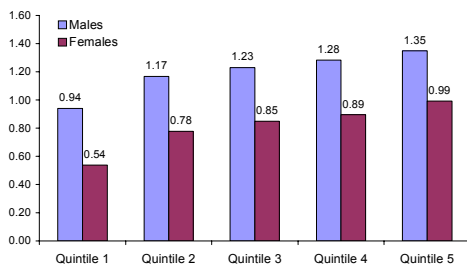
## Cancers

Deaths per 1,000 persons



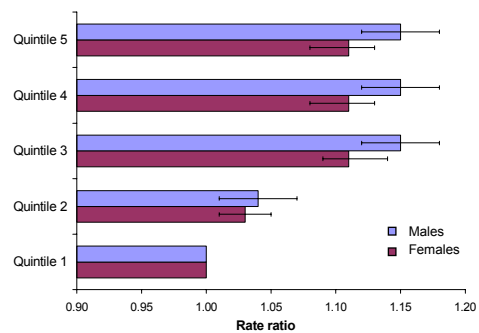
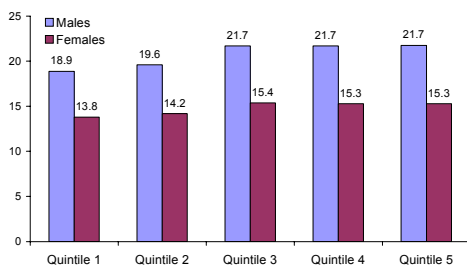
## Diabetes

Deaths per 1,000 persons



## Diseases of the circulatory system

Deaths per 1,000 persons



Note: Quintile 1 = least disadvantaged; quintile 5 = most disadvantaged.

Source: ABS mortality data.

**Figure 5.4.1: Age-standardised mortality rates and rate ratios, selected causes of death by IRSD quintile and sex, persons aged 65 years and over, 1998–2000**

**Table 5.4.2: Age-standardised mortality rates and rate ratios, persons aged 65 years and over by IRSD quintile and sex, 1998–2000**

Cause of death and ICD-10 codes	Males		Females	
	Rate <sup>(a)</sup>	Rate ratio	Rate <sup>(a)</sup>	Rate ratio
<i>All causes</i>				
Quintile 1	43.92	1.00	29.71	1.00
Quintile 2	47.06	1.07***	31.00	1.04***
Quintile 3	50.81	1.16***	32.72	1.10***
Quintile 4	51.07	1.06***	32.32	1.09***
Quintile 5	51.34	1.17***	32.79	1.10***
<i>Cancers (C00–C97)</i>				
Quintile 1	13.06	1.00	7.44	1.00
Quintile 2	14.14	1.08***	7.65	1.03
Quintile 3	14.60	1.12***	7.49	1.01
Quintile 4	15.46	1.18***	7.75	1.04*
Quintile 5	14.81	1.13***	7.64	1.03
<i>Cancer of the digestive organs (C15–C26)</i>				
Quintile 1	3.62	1.00	2.30	1.00
Quintile 2	3.77	1.04	2.33	1.01
Quintile 3	3.97	1.10**	2.37	1.03
Quintile 4	4.09	1.13***	2.38	1.03
Quintile 5	4.06	1.12***	2.38	1.03
<i>Colon cancer (C18)</i>				
Quintile 1	1.24	1.00	0.89	1.00
Quintile 2	1.16	0.94	0.90	1.00
Quintile 3	1.27	1.02	0.89	1.00
Quintile 4	1.33	1.07	0.86	0.96
Quintile 5	1.22	0.98	0.82	0.92
<i>Cancer of the pancreas (C25)</i>				
Quintile 1	0.56	1.00	0.49	1.00
Quintile 2	0.59	1.04	0.46	0.95
Quintile 3	0.59	1.05	0.47	0.97
Quintile 4	0.64	1.14	0.48	0.99
Quintile 5	0.58	1.02	0.50	1.03
<i>Lung cancer (C33, C34)</i>				
Quintile 1	2.69	1.00	1.06	1.00
Quintile 2	3.30	1.23***	1.21	1.15**
Quintile 3	3.43	1.27***	1.15	1.08
Quintile 4	3.78	1.40***	1.22	1.15**
Quintile 5	3.67	1.37***	1.20	1.13**
<i>Breast cancer (C50)</i>				
Quintile 1	—	—	0.97	1.00
Quintile 2	—	—	1.01	1.04
Quintile 3	—	—	0.93	0.96
Quintile 4	—	—	0.91	0.94
Quintile 5	—	—	0.96	0.99
<i>Cancer of the male genital organs (C60–63)</i>				
Quintile 1	2.24	1.00	—	—
Quintile 2	2.43	1.08*	—	—
Quintile 3	2.50	1.12**	—	—
Quintile 4	2.54	1.13***	—	—
Quintile 5	2.33	1.04	—	—

(continued)

**Table 5.4.2 (continued): Age-standardised mortality rates and rate ratios, persons aged 65 years and over by IRSD quintile and sex, 1998–2000**

Cause of death and ICD-10 codes	Males		Females	
	Rate <sup>(a)</sup>	Rate ratio	Rate <sup>(a)</sup>	Rate ratio
<i>Prostate cancer (C61)</i>				
Quintile 1	2.22	1.00	—	—
Quintile 2	2.41	1.09*	—	—
Quintile 3	2.49	1.12**	—	—
Quintile 4	2.53	1.14***	—	—
Quintile 5	2.31	1.04	—	—
<i>Cancer of the lymphoid, haematopoietic and related tissue (C81–C96)</i>				
Quintile 1	1.41	1.00	0.91	1.00
Quintile 2	1.32	0.94	0.81	0.89*
Quintile 3	1.28	0.90*	0.80	0.88*
Quintile 4	1.40	0.99	0.87	0.95
Quintile 5	1.30	0.92	0.79	0.86**
<i>Endocrine, nutritional and metabolic diseases (E00–E90)</i>				
Quintile 1	1.22	1.00	0.81	1.00
Quintile 2	1.50	1.23***	1.08	1.34***
Quintile 3	1.62	1.32***	1.14	1.41***
Quintile 4	1.56	1.28***	1.18	1.47***
Quintile 5	1.69	1.39***	1.32	1.64***
<i>Diabetes mellitus (E10–E14)</i>				
Quintile 1	0.94	1.00	0.54	1.00
Quintile 2	1.17	1.24***	0.78	1.44***
Quintile 3	1.23	1.31***	0.85	1.58***
Quintile 4	1.28	1.37***	0.89	1.66***
Quintile 5	1.35	1.44***	0.99	1.84***
<i>Diseases of the nervous system (G00–G99)</i>				
Quintile 1	1.41	1.00	1.10	1.00
Quintile 2	1.39	0.99	1.06	0.97
Quintile 3	1.43	1.02	1.22	1.11**
Quintile 4	1.25	0.89*	1.03	0.94
Quintile 5	1.29	0.92	0.99	0.90*
<i>Alzheimer's disease (G30)</i>				
Quintile 1	0.43	1.00	0.55	1.00
Quintile 2	0.47	1.08	0.53	0.95
Quintile 3	0.57	1.32***	0.72	1.30***
Quintile 4	0.03	1.03	0.54	0.97
Quintile 5	0.03	1.08	0.55	0.99
<i>Diseases of the circulatory system (I00–I99)</i>				
Quintile 1	18.86	1.00	13.79	1.00
Quintile 2	19.60	1.04**	14.19	1.03*
Quintile 3	21.68	1.15***	15.36	1.11***
Quintile 4	21.66	1.15***	15.28	1.11***
Quintile 5	21.73	1.15***	15.27	1.11***
<i>Ischaemic heart disease (I20–I25)</i>				
Quintile 1	10.75	1.00	6.43	1.00
Quintile 2	11.31	1.05**	6.87	1.07***
Quintile 3	12.56	1.17***	7.58	1.18***
Quintile 4	12.60	1.17***	7.72	1.20***
Quintile 5	12.74	1.18***	7.76	1.21***

(continued)

**Table 5.4.2 (continued): Age-standardised mortality rates and rate ratios, persons aged 65 years and over by IRSD quintile and sex, 1998–2000**

Cause of death and ICD-10 codes	Males		Females	
	Rate <sup>(a)</sup>	Rate ratio	Rate <sup>(a)</sup>	Rate ratio
<i>Acute myocardial infarction (I21)</i>				
Quintile 1	5.97	1.00	3.72	1.00
Quintile 2	6.28	1.05*	3.99	1.07**
Quintile 3	6.87	1.15***	4.21	1.13***
Quintile 4	7.07	1.18***	4.46	1.20***
Quintile 5	7.20	1.21***	4.37	1.17***
<i>Pulmonary heart disease of pulmonary circulation and other forms of heart disease (I26–I52)</i>				
Quintile 1	2.29	1.00	1.93	1.00
Quintile 2	2.24	0.98	1.98	1.03
Quintile 3	2.62	1.14***	2.17	1.12***
Quintile 4	2.65	1.16***	2.15	1.11***
Quintile 5	2.49	1.08*	2.05	1.06*
<i>Heart failure (I50)</i>				
Quintile 1	0.89	1.00	0.81	1.00
Quintile 2	0.96	1.08	0.89	1.10*
Quintile 3	1.06	1.20**	1.07	1.32***
Quintile 4	1.10	1.24***	0.95	1.17***
Quintile 5	1.06	1.19**	0.93	1.14**
<i>Stroke (I60–I69)</i>				
Quintile 1	4.19	1.00	4.17	1.00
Quintile 2	4.35	1.04	4.06	0.97
Quintile 3	4.68	1.12***	4.19	1.00
Quintile 4	4.49	1.07*	4.05	0.97
Quintile 5	4.64	1.11***	4.04	0.97
<i>Diseases of arteries, arterioles and capillaries (I70–I79)</i>				
Quintile 1	1.19	1.00	0.70	1.00
Quintile 2	1.18	1.00	0.69	0.99
Quintile 3	1.28	1.08	0.80	1.13*
Quintile 4	1.35	1.14*	0.75	1.07
Quintile 5	1.33	1.13*	0.82	1.16**
<i>Diseases of the respiratory system (J00–J99)</i>				
Quintile 1	3.98	1.00	2.36	1.00
Quintile 2	4.62	1.16***	2.48	1.05
Quintile 3	5.27	1.32***	2.61	1.11***
Quintile 4	5.10	1.28***	2.51	1.06*
Quintile 5	5.55	1.39***	2.79	1.18***
<i>Influenza and pneumonia (J10–J18)</i>				
Quintile 1	0.89	1.00	0.70	1.00
Quintile 2	0.91	1.02	0.70	0.99
Quintile 3	0.93	1.05	0.68	0.97
Quintile 4	0.81	0.91	0.63	0.90*
Quintile 5	0.99	1.11	0.72	1.02
<i>Chronic lower respiratory disease (J40–J47)</i>				
Quintile 1	2.32	1.00	1.24	1.00
Quintile 2	2.90	1.25***	1.39	1.12**
Quintile 3	3.44	1.48***	1.51	1.21***
Quintile 4	3.48	1.50***	1.49	1.20***
Quintile 5	3.69	1.59***	1.62	1.31***

(continued)

**Table 5.4.2 (continued): Age-standardised mortality rates and rate ratios, persons aged 65 years and over by IRSD quintile and sex, 1998–2000**

Cause of death and ICD-10 codes	Males		Females	
	Rate <sup>(a)</sup>	Rate ratio	Rate <sup>(a)</sup>	Rate ratio
<i>Diseases of the digestive system (K00–K93)</i>				
Quintile 1	1.19	1.00	0.92	1.00
Quintile 2	1.31	1.10	1.06	1.16***
Quintile 3	1.46	1.23***	1.10	1.20***
Quintile 4	1.43	1.21***	1.14	1.24***
Quintile 5	1.54	1.30***	1.17	1.27***
<i>Diseases of the genitourinary system (N00–N99)</i>				
Quintile 1	1.07	1.00	0.76	1.00
Quintile 2	1.14	1.06	0.82	1.08
Quintile 3	1.19	1.11	0.92	1.21***
Quintile 4	1.13	1.05	0.83	1.10
Quintile 5	1.24	1.16**	0.92	1.21***
<i>Renal failure (N17–N19)</i>				
Quintile 1	0.72	1.00	0.46	1.00
Quintile 2	0.79	1.11	0.52	1.12
Quintile 3	0.84	1.17**	0.54	1.17**
Quintile 4	0.77	1.07	0.50	1.09
Quintile 5	0.88	1.24***	0.55	1.19**
<i>Accidents and injury (V01–Y98)</i>				
Quintile 1	1.05	1.00	0.64	1.00
Quintile 2	1.17	1.12*	0.67	1.05
Quintile 3	1.13	1.08	0.73	1.14*
Quintile 4	1.20	1.15*	0.69	1.07
Quintile 5	1.16	1.11	0.70	1.09
<i>Falls (W00–W19)</i>				
Quintile 1	0.22	1.00	0.11	1.00
Quintile 2	0.18	0.83	0.11	1.01
Quintile 3	0.14	0.65**	0.13	1.24
Quintile 4	0.16	0.74*	0.09	0.88
Quintile 5	0.14	0.65**	0.13	1.17

Note: Quintile 1 = least disadvantaged; quintile 5 = most disadvantaged.

(a) Deaths per 1,000 persons.

Source: ABS mortality data.

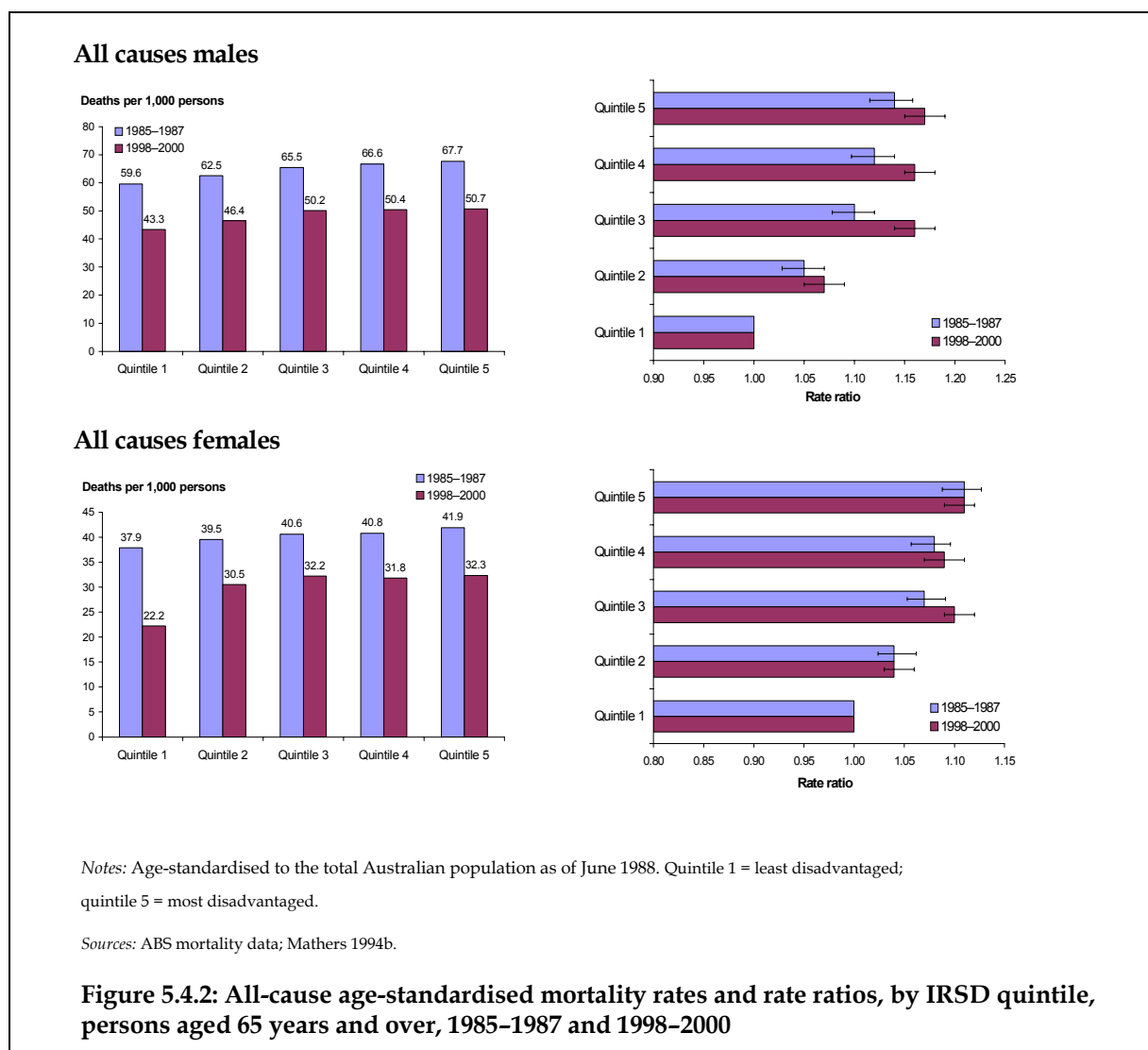
\*p<0.05, \*\*p<0.01, \*\*\*p<0.001

## Trends in mortality rates and mortality inequality

Between 1985–1987 and 1998–2000, all-cause mortality rates for persons aged 65 years and over decreased for all socioeconomic quintiles (Figure 5.4.2; Table 5.4.3).

For males, relative mortality inequalities for all causes widened slightly over the period: in 1985–1987 death rates in the most disadvantaged areas were approximately 14% higher than in the least disadvantaged, and in 1998–2000 the corresponding difference was 17%. In terms of absolute death rates, the difference between the most and least disadvantaged quintiles was similar at each period: 8 deaths per 1,000 in 1985–1987 and 7 deaths per 1,000 in 1998–2000.

For females, relative mortality inequality for all causes between the most and least disadvantaged areas remained stable over the two periods at approximately 11%. In terms of absolute death rates, things also remained relatively stable: in 1985–1987, there was a difference of 4 deaths per 1,000 between the most and least disadvantaged areas, and in 1998–2000, this difference was 3 deaths per 1,000.



**Table 5.4.3: Age-standardised mortality rate ratios, persons aged 65 years and over by IRSD quintile and sex, 1985–1987 and 1998–2000**

Cause of death and ICD-10 codes	1985–1987				1998–2000			
	Males		Females		Males		Females	
	Rate <sup>(a)</sup>	Rate ratio	Rate	Rate ratio	Rate	Rate ratio	Rate	Rate ratio
<i>All causes</i>								
Quintile 1	59.6	1.00	37.9	1.00	43.3	1.00	29.2	1.00
Quintile 2	62.5	1.05***	39.5	1.04***	46.4	1.07***	30.5	1.04***
Quintile 3	65.5	1.10***	40.6	1.07***	50.2	1.16***	32.2	1.10***
Quintile 4	66.6	1.12***	40.8	1.08***	50.4	1.16***	31.8	1.09***
Quintile 5	67.7	1.14***	41.9	1.11***	50.7	1.17***	32.3	1.11***
<i>Cancers (C00–C97)</i>								
Quintile 1	14.5	1.00	7.8	1.00	13.0	1.00	7.4	1.00
Quintile 2	15.4	1.06**	8.0	1.03	14.0	1.08***	7.6	1.03
Quintile 3	15.5	1.07***	7.8	1.00	14.5	1.12***	7.4	1.01
Quintile 4	15.3	1.06**	7.9	1.01	15.4	1.19***	7.7	1.04*
Quintile 5	15.8	1.09***	7.7	0.99	14.7	1.14***	7.6	1.03
<i>Diseases of the circulatory system (I00–I99)</i>								
Quintile 1	31.8	1.00	22.3	1.00	18.5	1.00	13.5	1.00
Quintile 2	32.6	1.03	23.2	1.04**	19.3	1.04**	13.9	1.13*
Quintile 3	34.1	1.07***	23.9	1.07***	21.4	1.15***	15.1	1.12***
Quintile 4	34.9	1.10***	23.8	1.07***	21.3	1.15***	15.0	1.11***
Quintile 5	35.1	1.10***	24.7	1.11***	21.4	1.15***	15.0	1.11***

Note: Quintile 1 = least disadvantaged; quintile 5 = most disadvantaged.

(a) Deaths per 1,000 persons.

Sources: ABS mortality data; Mathers 1994b.

\*p<0.05, \*\*p<0.01, \*\*\*p<0.001

### Persons aged 65–74, and 75 years and over

Among males and females aged 65–74, significant (and often graded) associations were found between area disadvantage and death rates from all causes, and for a number of specific causes including cancers, diabetes mellitus, diseases of the circulatory system, and accidents and injury (Table 5.4.4). In most cases, mortality rates were lowest in the least disadvantaged areas, and highest in the most disadvantaged. Statistically significant differences in mortality rates across the IRSD quintiles were also observed for males and females aged 75 years and older, with the least disadvantaged areas experiencing the lowest rates. The association between area disadvantage and mortality for this older group, however, was weaker (i.e. smaller in magnitude) than that found among those aged 65–74 (with the notable exception of diabetes mellitus), and the association did not follow a graded step-wise pattern.

**Table 5.4.4: Age-standardised mortality rates and rate ratios, persons aged 65–74 years and 75 years and over by IRSD quintile and sex, 1998–2000**

Cause of death and ICD-10 codes	Males				Females			
	65–74 years		75 years and older		65–74 years		75 years and older	
	Rate <sup>(a)</sup>	Rate ratio	Rate <sup>(a)</sup>	Rate ratio	Rate <sup>(a)</sup>	Rate ratio	Rate <sup>(a)</sup>	Rate ratio
<i>All causes</i>								
Quintile 1	19.99	1.00	80.74	1.00	11.32	1.00	58.01	1.00
Quintile 2	23.18	1.16***	83.79	1.04***	12.49	1.10***	59.47	1.03**
Quintile 3	25.87	1.29***	89.16	1.10***	13.99	1.24***	61.52	1.06***
Quintile 4	26.58	1.33***	88.74	1.10***	13.94	1.23***	60.58	1.04***
Quintile 5	27.09	1.36***	88.63	1.10***	14.75	1.30***	60.53	1.04***
<i>Cancers (C00–C97)</i>								
Quintile 1	8.43	1.00	20.19	1.00	5.19	1.00	10.90	1.00
Quintile 2	9.50	1.13***	21.27	1.05*	5.49	1.06	10.97	1.01
Quintile 3	10.16	1.21***	21.42	1.06**	5.44	1.05	10.66	0.98
Quintile 4	11.08	1.31***	22.21	1.10***	5.68	1.09**	10.93	1.00
Quintile 5	10.55	1.25***	21.37	1.06**	5.64	1.09**	10.72	0.98
<i>Diabetes mellitus (E10–E14)</i>								
Quintile 1	0.50	1.00	1.61	1.00	0.25	1.00	0.98	1.00
Quintile 2	0.65	1.30**	1.96	1.22**	0.39	1.56***	1.37	1.40***
Quintile 3	0.70	1.38***	2.05	1.28***	0.45	1.80***	1.46	1.49***
Quintile 4	0.66	1.31**	2.24	1.39***	0.48	1.93***	1.53	1.56***
Quintile 5	0.85	1.68***	2.12	1.32***	0.54	2.16***	1.69	1.72***
<i>Diseases of the circulatory system (I00–I99)</i>								
Quintile 1	5.94	1.00	37.20	1.00	3.33	1.00	29.88	1.00
Quintile 2	8.16	1.18***	37.20	1.00	3.73	1.12**	30.26	1.01
Quintile 3	9.29	1.34***	40.75	1.10***	4.63	1.39***	31.86	1.07***
Quintile 4	9.41	1.36***	40.50	1.09***	4.56	1.37***	31.76	1.06***
Quintile 5	9.63	1.39***	40.35	1.08***	4.84	1.46***	31.32	1.05***
<i>Accidents and injury (V01–Y98)</i>								
Quintile 1	0.55	1.00	1.81	1.00	0.25	1.00	1.24	1.00
Quintile 2	0.64	1.15	2.00	1.10	0.29	1.16	1.25	1.01
Quintile 3	0.68	1.23*	1.83	1.01	0.33	1.31*	1.34	1.09
Quintile 4	0.59	1.07	2.14	1.18*	0.29	1.14	1.30	1.05
Quintile 5	0.70	1.26*	1.87	1.03	0.33	1.30*	1.26	1.02

Note: Quintile 1 = least disadvantaged; quintile 5 = most disadvantaged.

(a) Deaths per 1,000 persons.

Source: ABS mortality data.

\*p<0.05, \*\*p<0.01, \*\*\*p<0.001

## 5.5 Summary and discussion

This chapter examined mortality inequalities by area-level socioeconomic disadvantage for males and females aged 0–14, 15–24, 25–64 and 65 years or more for the period 1998–2000. Where data permitted, we also examined socioeconomic inequalities in mortality for the periods 1985–1987 and 1998–2000.

Australia at the end of the 20th century showed large area-based socioeconomic inequalities in mortality. Life expectancy at birth and at age 15, 25, and 65 was related to area disadvantage, with predicted longevity being greatest in socioeconomically advantaged areas, and lowest in the most disadvantaged areas. With few exceptions, death rates were highest in the most disadvantaged areas for males and females in each age group up to and including 65–74 year olds. Moreover, mortality rates very often fell in a continuous gradient from the most to the least disadvantaged quintile. Thus in Australia, as elsewhere (Adler et al. 1994), mortality inequalities are not confined to differences between the rich and poor but, rather, are observed across the entire socioeconomic spectrum.

As part of our analysis, we estimated the extent to which socioeconomic inequalities in death rates contributed to the total mortality burden in the population. In other words, if it were possible to reduce death rates among the socioeconomic areas to a level equivalent to that of the least disadvantaged quintile, what would be the potential savings in mortality? Our results showed that the mortality burden attributable to area-based socioeconomic inequality was large: during 1998–2000, this was estimated to be 1,197 deaths among infants (children under 1 year); 1,491 deaths among 0–14 year olds; 1,550 deaths among adolescents and young adults (15–24 years); and 18,999 deaths among working-aged adults (25–64 years). The size of the mortality burden attributable to variability among the quintiles of area disadvantage in Australia clearly has far-reaching implications, not only in terms of the unnecessary loss of life, but also in terms of the loss of economically productive members of society, and added costs for the health care system and other public sectors more generally (Woodward & Kawachi 2000).

Between 1985–1987 and 1998–2000, all-cause mortality rates for each socioeconomic quintile decreased for males and females aged 0–14, 15–24, 25–64, and 65 years and over. Differences in the nature and extent of relative and absolute mortality inequalities between the most and least disadvantaged quintiles for the two periods are summarised below.

**Table 5.5.1: Relative and absolute all-cause mortality inequalities between the most and least disadvantaged quintiles, males and females, 1985–1987 and 1998–2000**

Age-group		Relative mortality inequalities between most and least disadvantaged areas <sup>(a)</sup>		Difference in absolute death rates between the most and least disadvantaged areas <sup>(b)</sup>	
		1985–1987	1998–2000	1985–1987	1998–2000
0–14 years	Males	50%	78%	42	32
	Females	66%	61%	39	22
15–24 years	Males	49%	90%	49	57
	Females	55%	57%	22	16
25–64 years	Males	68%	75%	230	163
	Females	50%	51%	95	70
65 years and over	Males	14%	17%	8	7
	Females	11%	11%	4	3

(a) Difference as expressed using the rate ratio.

(b) Difference between the most and least disadvantaged quintiles in absolute death rates per 100,000 persons for each period.

In terms of relative mortality inequalities for all causes of death, increases between the two periods were observed for males in each age group, although the absolute differences in the gaps for each age group have decreased. Similar findings were also reported in an earlier Australian study that examined mortality inequalities for the period 1985–1987 to 1995–1997 (Turrell & Mathers 2001). Widening relative socioeconomic inequalities in mortality have also been reported in Britain (Marmot & McDowall 1986; Marang van de Mheen et al. 1998; Phillimore et al. 1994; Drever & Bunting 1997), the US (Pappas et al. 1993; Feldman et al. 1989), and Europe (Borrell et al. 1997; Regidor et al. 1995; Jozan & Forster 1993; Dahl & Kjaersgaard 1993). Among females however, a somewhat different pattern was observed – relative mortality inequalities for all causes declined between 1985–1987 and 1995–1997 for 0–14 year olds, and remained stable (or increased slightly) for females aged 15–24, 25–64 and 65 years and over. In terms of absolute death rates for all causes, differences between the most and least disadvantaged quintiles declined for males and females in each age group, with one exception – among males aged 15–24, where the death rate difference between the most and least disadvantaged areas increased from 49 deaths per 100,000 persons in 1985–1987 to 57 deaths per 100,000 in 1998–2000.

When considering this report's findings, we need to be mindful of a number of potential sources of bias in the mortality analysis, and in the use of the area-based Index of Relative Socioeconomic Disadvantage (IRSD). First, death rates are calculated using numerator data that are collected as part of the mortality registration process, whereas the denominator data are derived from the population census. Mortality rates will be in error to the extent that deaths for a particular sex-age subgroup attributed to an SLA are not in fact drawn from that SLA. Quantifying the magnitude of bias resulting from these types of errors is difficult; however, our best estimates indicate that misclassification of deaths based on sex and place of residence is small, thus the overall impact on the mortality rate is likely to be minimal. Second, prior to calculating the mortality rate it was necessary to exclude death records where the identifier for the SLA of usual residence was missing, or where it was not possible to assign the SLA an IRSD score (because of small population numbers, IRSD was not calculated for a few SLAs). These problems arose for a very small number of deaths, thus the exclusion of these cases will have had little effect on the estimates of mortality inequality. Third, in assessing the mortality inequalities, it should be remembered that the Australian population has been classified into quintiles using a small area-based index of socioeconomic disadvantage. Different estimates of mortality inequality would have been obtained if we had used any of the following: a different reference group (e.g. top decile rather than top quintile); a smaller, more socioeconomically homogenous unit of analysis (e.g. Collector's District rather than SLA); or an individual-level rather than an area-based indicator of socioeconomic status (because the IRSD relates to the average disadvantage of all people living in the area). We used quintiles of socioeconomic disadvantage to ensure direct comparability with the methodology used by Mathers (1994a, 1994b, 1995, 1996), thus allowing us to assess whether inequalities had widened or narrowed during the ensuing 15 years. Further, Australian death data do not permit area-based analyses of mortality inequality to be conducted using smaller units such as Collector's Districts. Importantly, it should be stressed that the data and measurement limitations that constrained our approach have produced estimates of mortality inequality that almost certainly understate the true extent of the mortality burden by level of socioeconomic disadvantage in Australia. Finally, it should be noted that the IRSD measures used for 1985–1987 and 1998–2000 were calculated using data from the relevant population censuses and hence some SLAs may have changed quintile between 1986 and 1996. Additionally, there are differences between some SLA boundaries for the two time-periods. Thus the corresponding quintiles for the two periods do not consist of exactly the same areas, although for both periods, the bottom and top quintiles contain the 20% most disadvantaged and 20% least disadvantaged areas.

How are we to interpret the strong associations between area disadvantage and mortality that were documented in this chapter? What might be some of the factors that contributed to the much poorer mortality profile of persons from socioeconomically disadvantaged areas? Answering these questions with any certainty is difficult, and a large part of the difficulty stems from the fact that we used a composite area-based index – this measure is adequate for analytic purposes (i.e. examining the nature and extent of association between socioeconomic status and mortality), but it tells us very little about the specific factor(s) that are producing the mortality inequalities. This and other limitations associated with the IRSD (and SEIFA more generally) have been discussed by McCracken (2001). The main contributors to the higher death rates in socioeconomically disadvantaged areas could be due to the lower average educational attainment of people residing in these areas, or their low incomes, or their greater propensity to be unemployed, or a combination of these. Alternatively, higher mortality rates in disadvantaged areas might not exclusively reflect the socioeconomic composition of the resident individuals but, rather, the impact of wider contextual and environmental influences that transcend the characteristics of individuals (e.g. inadequate housing, lack of health care facilities, pollution, poor public transport, or limited access to healthy and nutritious food). In sum, the use of the IRSD permits only a very general non-specific interpretation (i.e. socioeconomic disadvantage is bad for your health) and, by extension, the IRSD is limited in terms of its capacity to inform policies and interventions to reduce socioeconomic health inequalities.