5 Avoidable mortality: New Zealand, 1997-2001

5.1 Total avoidable and unavoidable mortality

Three quarters (74.4%) of all deaths at ages 0 to 74 years over the period 1997 to 2001 are considered to be from avoidable causes. Of these avoidable deaths, 43.2% (or 32.1% of total deaths at these ages) are considered to be amenable to health care (Table 5.1).

The age-standardised death rate (ASR) from avoidable mortality was 219.3 deaths per 100,000 population. Within this overall rate, 94.2 deaths per 100,000 population were estimated to be amenable mortality: this sub-set is shown in brackets in Table 5.1.

The death rate from the remaining, or 'unavoidable' deaths, was 75.4 per 100,000 population; and the rate for all deaths was 294.6 deaths per 100,000 population.

The proportion of male (74.8%) and female (73.7%) deaths considered to be avoidable were similar. The 27,089 male deaths accounted for almost two thirds (61.2%) of avoidable mortality.

There were just over three quarters of a million (approximately 757,000) years of life lost (YLL)[1] for total avoidable mortality over the observation period, considerably more for males (approximately 466,000) than for females (291,000).
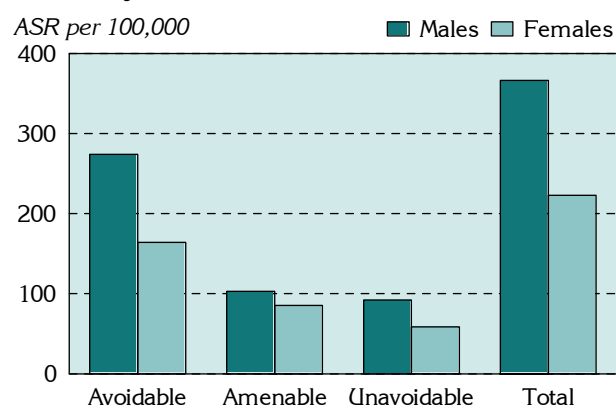
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[1] See Chapter 2, *Methods*

Table 5.1: Avoidable mortality (0 to 74 years) by sex, New Zealand, 1997-2001

Mortality category	Number			Per cent of total	ASR per 100,000			Rate ratio M:F
	Males	Females	Total		Males	Females	Total	
Avoidable mortality	27,089	17,183	44,272	74.4	274.2	164.4	219.3	1.67**
(Amenable mortality)	(10,300)	(8,830)	(19,130)	(32.1)	(103.1)	(85.4)	(94.2)	(1.21**)
Unavoidable mortality	9,132	6,117	15,249	25.6	92.2	58.5	75.4	1.58**
Total mortality	**36,221**	**23,300**	**59,520**	**100.0**	**366.4**	**222.9**	**294.6**	**1.64****
Avoidable mortality - as % of Total	**74.8**	**73.7**	**74.4**	..	..	..	..	..
- Years of life lost (YLL)	465,699	291,049	756,747	..	..	..	..	..

Death rates in all mortality categories were higher for males than for females (Table 5.1, Figure 5.1). For avoidable mortality, the male rate was 274.2 deaths per 100,000 males and 164.4 for females, with the male rate more than one and a half times (1.67**) the female rate.

For amenable mortality, the male rate was 103.1 deaths per 100,000 males, 21% higher than the female rate of 85.4. Unavoidable death rates for males (92.2 deaths per 100,000 males) were almost 60% higher than for females (58.5, a rate ratio of 1.58**).

Figure 5.1: Avoidable mortality (0 to 74 years) by sex, New Zealand, 1997-2001

5.2 Avoidable mortality by age and sex

Almost half (46.1%) of avoidable mortality at ages 0 to 74 years occurred in the 65 to 74 year age group (Table 5.2). The 45 to 64 and 25 to 44 year age groups accounted for 35.0% and 11.1% of avoidable mortality, respectively, with the age groups below 25 years contributing 7.9%.

Death rates varied from 1,640.4 deaths per 100,000 population in the 65 to 74 year age group to 16.5 at ages 1 to 14 years. Other high rates were for infants under one year of age (405.8) and in the 45 to 64 year age group (401.5).

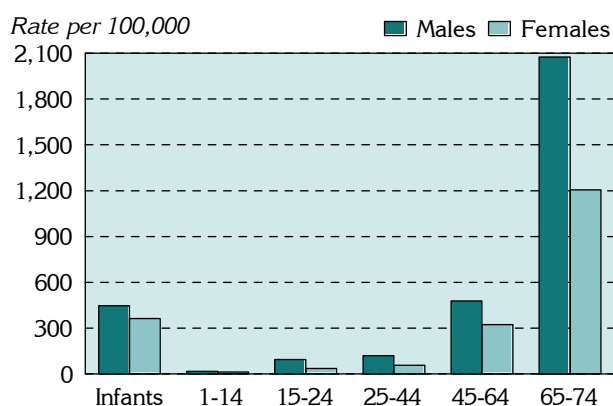**Table 5.2: Avoidable mortality by age and sex, New Zealand, 1997-2001**

Age (years)	Number			Per cent of total	Rate per 100,000 population[1]			Rate ratio M:F
	Males	Females	Total		Males	Females	Total	
Infants (<1)	628	482	1,109	2.5	448.0	363.5	405.8	1.23**
1-14	369	276	644	1.5	18.4	14.5	16.5	1.27**
15-24	1,239	473	1,712	3.9	95.9	36.8	66.4	2.61**
25-44	3,211	1,688	4,900	11.1	119.5	57.4	88.4	2.08**
45-64	9,181	6,330	15,511	35.0	479.6	323.5	401.5	1.48**
65-74	12,461	7,935	20,396	46.1	2,075.1	1,205.6	1,640.4	1.72**
Total	27,089	17,183	44,272	100.0	274.2	164.4	219.3	1.67**

[1] **Rates are age standardised within age categories, except under 1 year**

Male death rates from avoidable mortality were higher than female death rates in each age group in the analysis (Table 5.2, Figure 5.2). The highest avoidable mortality rates for both males and females were in the 65 to 74 year age group, where the male rate of 2,075.1 deaths per 100,000 population was 72% higher than the female rate of 1,205.6 (a rate ratio of 1.72**).

However, the greatest differentials between the male and female rates were in the 15 to 24 year and 25 to 44 year age groups. For the 15 to 24 year age group, the rate for males (95.9 deaths per 100,000 males) was 2.61** times the female rate (36.8); and for the 25 to 44 year age group, the rate for males (119.5 deaths per 100,000 males) was more than twice (2.08**) the female rate (57.4).

From 1997 to 2001, avoidable mortality accounted for approximately 760,000 years of life lost (YLL) for the 0 to 74 year age groups. The number of YLL from avoidable mortality were highest in the 45 to 64 year age group (approximately 284,000 years), followed by the 65 to 74 year age group (approximately 248,000 years) (Table 5.3). These two age groups accounted for 70% of total YLL from avoidable mortality.

Table 5.3: YLL from avoidable mortality by age and sex, New Zealand, 1997-2001

Age (years)	Number		
	Males	Females	Total
Infants (<1)	19,160	14,696	33,856
1-14	11,020	8,238	19,258
15-24	34,978	13,390	48,368
25-44	80,752	41,924	122,677
45-64	168,000	116,258	284,257
65-74	151,788	96,543	248,331
Total	465,699	291,049	756,747

YLL were higher for males than females in all age groups. The largest differentials in YLL between males and females were in the 15 to 24 year age group (YLL for males was 2.6 times females) and the 25 to 44 year age group (males 1.9 times females).

Figure 5.2: Avoidable mortality by age and sex, New Zealand, 1997-2001

5.3 Avoidable mortality by cause

Table 5.4 shows the number, age-standardised death rate, proportion of avoidable mortality and YLL, for the major condition groups and individual causes included in the avoidable mortality classification.

The highest rates of avoidable mortality at the major condition group level were for cardiovascular diseases, with a rate of 73.1 deaths per 100,000 population (35.0% of total avoidable mortality) and

cancer (67.7 deaths per 100,000 population, 31.8% of avoidable mortality). These two major condition groups were responsible for over two-thirds (66.8%) of mortality from avoidable causes at ages 0 to 74 years.

Similarly, the numbers of YLL from avoidable mortality were highest for cardiovascular diseases and cancer, accounting for approximately 233,000 and 224,000 YLL, respectively.

Table 5.4: Avoidable mortality (0 to 74 years) by major condition group and cause, New Zealand, 1997-2001

Major condition group/ cause	Number	ASR	Per cent of total	YLL
Infections	**729**	**3.8**	**1.6**	**14,682**
Tuberculosis	51	0.2	0.1	750
Selected invasive bacterial and protozoal infections	454	2.4	1.0	9,044
Hepatitis	94	0.5	0.2	1,822
HIV/AIDS	100	0.5	0.2	2,328
Viral pneumonia and influenza	30	0.2	0.1	738
Cancers (malignant neoplasms)	**14,100**	**67.7**	**31.8**	**224,066**
Lip, oral cavity and pharynx	349	1.7	0.8	5,580
Oesophagus	486	2.3	1.1	7,237
Stomach	841	4.0	1.9	13,312
Colorectal	3,193	15.2	7.2	48,248
Liver	434	2.2	1.0	7,297
Lung	4,543	21.6	10.3	67,898
Melanoma of skin	776	3.9	1.8	13,600
Non-melanotic skin	115	0.5	0.3	1,670
Breast (female)	2,147	10.4	4.8	38,422
Cervix	267	1.3	0.6	5,101
Uterus	227	1.1	0.5	3,542
Bladder	300	1.4	0.7	4,252
Thyroid	46	0.2	0.1	766
Hodgkin's disease	51	0.3	0.1	991
Lymphoid leukaemia – acute/chronic	235	1.2	0.5	4,551
Benign	91	0.5	0.2	1,599
Nutritional, endocrine and metabolic conditions	**1,837**	**8.8**	**4.1**	**28,353**
Thyroid disorders	16	0.1	–[1]	255
Diabetes	1,821	8.7	4.1	28,097
Drug use disorders	**714**	**3.7**	**1.6**	**13,795**
Alcohol related disease	579	2.9	1.3	10,303
Illicit drug use disorders	134	0.8	0.3	3,492
Neurological disorders	**266**	**1.5**	**0.6**	**6,145**
Epilepsy	266	1.5	0.6	6,145
Cardiovascular diseases	**15,512**	**73.1**	**35.0**	**232,667**
Rheumatic and other valvular heart disease	381	1.9	0.9	6,852
Hypertensive heart disease	221	1.0	0.5	3,455
Ischaemic heart disease	11,030	52.1	24.9	165,188
Cerebrovascular diseases	3,073	14.3	6.9	46,061
Aortic aneurysm	806	3.7	1.8	11,112
Genitourinary disorders	**446**	**2.1**	**1.0**	**6,843**
Nephritis and nephrosis	399	1.9	0.9	6,090
Obstructive uropathy and prostatic hyperplasia	46	0.2	0.1	753

… continued

Table 5.4: Avoidable mortality (0 to 74 years) by major condition group and cause, New Zealand, 1997-2001 … *continued*

Major condition group/ cause	Number	ASR	Per cent of total	YLL
Respiratory diseases	**2,925**	**13.4**	**6.6**	**40,757**
DVT with pulmonary embolism	106	0.5	0.2	1,844
COPD (45-74 years)	2,734	12.4	6.2	36,693
Asthma (0-44 years)	85	0.5	0.2	2,219
Digestive disorders	**436**	**2.0**	**1.0**	**6,497**
Peptic ulcer disease	137	0.6	0.3	2,001
Acute abdomen, appendicitis, intestinal obstruction, cholecystitis/ lithiasis, pancreatitis, hernia	209	1.0	0.5	3,142
Chronic liver disease	90	0.4	0.2	1,355
Maternal and infant causes	**1,454**	**9.4**	**3.3**	**40,997**
Birth defects	843	5.2	1.9	22,353
Complications of perinatal period	611	4.2	1.4	18,644
Unintentional injuries	**2,993**	**17.3**	**6.8**	**72,351**
Road traffic injuries	2,198	12.9	5.0	54,027
Falls	295	1.5	0.7	5,701
Fires, burns	98	0.6	0.2	2,554
Accidental poisonings	103	0.6	0.2	2,485
Drownings	298	1.8	0.7	7,584
Intentional injuries	**2,860**	**16.5**	**6.5**	**69,596**
Suicide and self inflicted injuries	2,588	14.9	5.8	62,699
Violence	272	1.6	0.6	6,897
Total avoidable mortality	**44,272**	**219.3**	**100.0**	**756,747**

[1] **Not shown: proportion of avoidable mortality less than 0.1%, rounded to 1 decimal place**

Of the top ten causes of avoidable mortality, ischaemic heart disease ranked the highest, with a rate of 52.1 deaths per 100,000 population, followed by lung cancer, with a rate of 21.6 (Table 5.5). Together, ischaemic heart disease and lung cancer accounted for over one third (35.2%) of mortality from avoidable causes. Rates for the other eight causes ranged from 5.2 deaths per 100,000 population for birth defects to 15.2 for colorectal cancer.

Ischaemic heart disease also ranked highest for YLL from avoidable deaths, accounting for approximately 165,200 YLL from 1997 to 2001. YLL from lung cancer (approximately 67,900 years) was ranked second, followed by suicide and self inflicted injuries (approximately 62,700 years) and road traffic injuries (approximately 54,000 years).

Table 5.5: Top ten causes of avoidable mortality (0 to 74 years), New Zealand, 1997-2001

Cause	Number	ASR	Per cent of total	YLL
Ischaemic heart disease	11,030	52.1	24.9	165,188
Lung cancer	4,543	21.6	10.3	67,898
Colorectal cancer	3,193	15.2	7.2	48,248
Suicide and self inflicted injuries	2,588	14.9	5.9	62,699
Cerebrovascular diseases	3,073	14.3	6.9	46,061
Road traffic injuries	2,198	12.9	5.0	54,027
COPD (45-74 years)	2,734	12.4	6.2	36,693
Breast cancer (female)	2,147	10.4	4.8	38,422
Diabetes	1,821	8.7	4.1	28,097
Birth defects	843	5.2	1.9	22,353
All causes	**44,272**	**219.3**	**100.0**	**756,747**

By age

Table 5.6 shows the variation in avoidable mortality by cause and age. Complications of the perinatal period accounted for over half (54.3%) of avoidable mortality for infants, a rate of 220.5 deaths per 100,000 population. Birth defects were responsible for a further 35.5% of avoidable mortality, a rate of 144.2. Selected invasive bacterial and protozoal infections contributed 5.2% of avoidable infant deaths, and violence accounted for 1.4%.

In the 1 to 14 year age group, deaths from road traffic injuries accounted for 29.0% of avoidable mortality, a rate of 4.7 deaths per 100,000 population. Birth defects (16.3%), drowning (10.9%) and selected invasive bacterial and protozoal infections (7.5%) resulted in approximately 35% of deaths in this age group.

For young people aged 15 to 24 years, deaths from road traffic injuries and suicides were the major causes of avoidable mortality. Road traffic injuries accounted for 37.6% of avoidable mortality, a rate of 24.9 deaths per 100,000 population. Suicide and self inflicted injuries were responsible for a further 36.9% of avoidable mortality in this age group, a rate of 24.5. Approximately 9% of avoidable deaths in the 15 to 24 year age group were from deaths resulting from birth defects (3.3%), drownings (3.1%) and violence (2.9%).

In the 25 to 44 year age group, the top two causes of death are the same as for the 15 to 24 year age group, but in the reverse order of rankings. Suicide and self inflicted injuries resulted in 25.1% of avoidable mortality (a rate of 23.1 deaths per 100,000 population) and road traffic injuries contributed 16.1% (a rate of 14.9). Ischaemic heart disease (10.7%) and breast cancer (females only, 6.9%) accounted for a further 17.6% of avoidable mortality in this age group.

At ages 45 to 64 years, over one quarter (26.6%) of avoidable deaths were from ischaemic heart disease, a rate of 107.1 deaths per 100,000 population. Lung cancer ranked second, accounting for 12% of avoidable deaths, with a rate of 48.4. Over 16% of avoidable deaths in the 45 to 64 year age group resulted from colorectal cancer (8.6%) and breast cancer (females only, 7.6%).

Ischaemic heart disease and lung cancer were also major causes of death in the 65 to 74 year age group. Ischaemic heart disease accounted for almost one third (31.3%) of avoidable deaths (a rate of 515.4 deaths per 100,000 population) and lung cancer was the cause of 12.5% of avoidable deaths (206.7 deaths per 100,000 population). Almost 20% of avoidable deaths in this age group were from COPD (10.0%) and cerebrovascular diseases (9.1%).

Table 5.6: Avoidable mortality by major cause and age, New Zealand, 1997-2001

Age (years)	Cause	Number	Rate per 100,000[1]	% of total in age group	YLL
Infants (<1)	Complications of perinatal period	602	220.5	54.3	18,377
	Birth defects	394	144.2	35.5	12,019
	Selected invasive bacterial and protozoal infections	58	20.9	5.2	1,761
	Violence	15	5.6	1.4	472
1-14	Road traffic injuries	187	4.7	29.0	5,564
	Birth defects	105	2.7	16.3	3,148
	Drownings	70	1.8	10.9	2,102
	Selected invasive bacterial and protozoal infections	48	1.3	7.5	1,462
15-24	Road traffic injuries	643	24.9	37.6	18,218
	Suicide and self inflicted injuries	631	24.5	36.9	17,816
	Birth defects	57	2.2	3.3	1,597
	Drownings	53	2.0	3.1	1,486
	Violence	50	2.0	2.9	1,411
25-44	Suicide and self inflicted injuries	1,229	23.1	25.1	31,361
	Road traffic injuries	788	14.9	16.1	20,155
	Ischaemic heart disease	523	9.0	10.7	12,622
	Breast (female)	336	5.6	6.9	8,209
45-64	Ischaemic heart disease	4,120	107.1	26.6	74,900
	Lung cancer	1,865	48.4	12.0	33,543
	Colorectal cancer	1,337	34.7	8.6	24,008
	Breast cancer (female)	1,182	30.2	7.6	22,425
65-74	Ischaemic heart disease	6,382	515.4	31.3	77,516
	Lung cancer	2,548	206.7	12.5	31,237
	COPD (45-74 years)	2,033	161.5	10.0	24,499
	Cerebrovascular diseases	1,859	147.4	9.1	22,432

[1] **Rates are age standardised within age categories, except under 1 year**

As noted previously, death rates from avoidable mortality are highest at older ages; however, there are also substantial numbers of deaths at younger ages. The impact of these deaths is illustrated in Table 5.6, with the measure of years of life lost (YLL).

For infants, over 18,000 YLL were due to avoidable mortality from complications of the perinatal period, with deaths from birth defects accounting for approximately 12,000 YLL. In the 1 to 14 year age group, deaths from road traffic injuries were responsible for over 5,500 YLL.

In the 15 to 24 year age group, deaths from road traffic injuries and suicide and self inflicted injuries accounted for approximately 18,000 YLL each. In the 25 to 44 year age group, deaths from suicide and self inflicted injuries were responsible for approximately 31,500 YLL; with a further 20,000 YLL from road traffic injuries.

For the 45 to 64 year and 65 to 74 year age groups, ischaemic heart disease accounted for the largest number of YLL from avoidable mortality (approximately 75,000 and 77,500 YLL, respectively). Avoidable mortality from lung cancer ranked second, with more than 30,000 YLL in both the 45 to 64 and 65 to 74 year age groups.

By age and sex

The main causes impacting avoidable mortality in the various age groups show interesting variations when further analysed by sex (Table 5.7).

Apart from for infants, there were differences in all age groups in the ranking of the main causes of avoidable death for males and females. At older ages this difference is in part due to the impact of breast cancer for females.

For infants, complications of the perinatal period were responsible for over half of all infant avoidable deaths (52.2% of infant male deaths and 56.8% of infant female deaths). Birth defects accounted for over one third of avoidable deaths (34.6% of infant male deaths and 36.7% of infant female deaths). Selected invasive bacterial and protozoal infections resulted in 7.0% of infant male deaths and 2.9% of infant female deaths. (Note: only the top three causes of infant death are shown in Table 5.7, due to the low numbers for the next ranked causes.)

Road traffic injuries were the largest cause of death in the 1 to 14 year age group, responsible for 29.8% of avoidable male deaths and 27.5% of female deaths. Birth defects accounted for 13.8% of avoidable male deaths and 19.6% of female deaths. Drownings resulted in 13.0% of male deaths and 8.0% of female deaths. Selected invasive bacterial and protozoal infections and suicide and self inflicted injuries also accounted for 8.0% each of avoidable female deaths.

In the 15 to 24 year age group, the top two causes of avoidable mortality for males were suicide and self inflicted injuries, and road traffic injuries, the same two causes top the rankings for females but in reverse order. These two causes were responsible for over three-quarters (76.9%) of avoidable deaths for males and over two-thirds (67.8%) for females. The male rate of deaths from road traffic injuries (38.0 deaths per 100,000 males) was almost three and a half times (3.45[**]) the female rate (11.0). For suicide and self inflicted injuries, the rates were 35.8 deaths per 100,000 males and 14.0 for females, a differential of over two and a half times (2.56[**]).

In the 25 to 44 year age group, deaths from breast cancer ranked highest for females (11.1 deaths per 100,000 females), accounting for almost one fifth (19.9%) of avoidable female deaths. For males, suicide and self inflicted injuries were the major causes, responsible for 29.9% of avoidable male deaths (a rate of 36.8), compared to 15.9% (a rate of 9.4) for females (a rate ratio of 3.91[**]). The next highest cause of avoidable deaths in this age group was road traffic injuries, contributing 18.3% of male deaths (a rate of 22.7) and 12.0% of female deaths (a rate of 7.1), a differential of more than three (3.20[**]). For males, ischaemic heart disease ranked third in this age group, with 13.2% of avoidable deaths (a rate of 14.8).

Deaths from breast cancer accounted for 18.7% of avoidable female deaths at ages 45 to 64 years (60.3 deaths per 100,000 females). The other major causes of avoidable mortality for females in this age group were ranked in the same order as for males, although with lower rates. Ischaemic heart disease resulted in 34.7% of avoidable deaths for males (166.3 deaths per 100,000 males) and 14.8% for females (a rate of 48.0), a differential in rates of 3.46[**]. The proportions of deaths from lung cancer were similar for males (11.4%) and females (12.9%), but the rates were one third (1.32[**]) higher for males (a rate of 55.0 deaths per 100,000 males) compared to females (41.7).

In the 65 to 74 year age group, the top three causes of avoidable mortality were ranked the same for males and females. Ischaemic heart disease resulted in 35.3% of avoidable male deaths (a rate of 731.8 deaths per 100,000 males) and 25.1% of avoidable female deaths (a rate of 299.0), a differential in rates of almost two and a half (2.45[**]). The second highest cause of avoidable deaths was lung cancer, which contributed 13.0% of avoidable male deaths (271.4 deaths per 100,000 males) and 11.7% of avoidable female deaths (a rate of 142.0), a differential in rates of 1.91[**].

Table 5.7: Avoidable mortality by major cause, age and sex, New Zealand, 1997-2001

Age (years)	Cause	Males Number	Males Rate[1]	Males Per cent[2]	Males Rank[3]	Females Number	Females Rate[1]	Females Per cent[2]	Females Rank[3]
Infants (<1)	Complications of perinatal period	328	234.3	52.2	1	274	206.7	56.8	1
	Birth defects	217	155.0	34.6	2	177	133.3	36.7	2
	Selected invasive bacterial and protozoal infections	44	31.1	7.0	3	14	10.7	2.9	3
1-14	Road traffic injuries	110	5.5	29.8	1	76	4.0	27.5	1
	Birth defects	51	2.5	13.8	2	54	2.9	19.6	2
	Drownings	48	2.4	13.0	3	22	1.2	8.0	3
	Fire, burns	28	1.4	7.6	4	12	0.6	4.3	7
	Selected invasive bacterial and protozoal infections	26	1.3	7.0	5	22	1.2	8.0	3
	Suicide and self inflicted injuries	22	1.1	6.0	6	22	1.1	8.0	4
15-24	Suicide and self inflicted injuries	490	38.0	39.5	1	142	11.0	30.0	2
	Road traffic injuries	464	35.8	37.4	2	179	14.0	37.8	1
	Drownings	49	3.8	4.0	3	#	..	..	..
	Falls	33	2.6	2.7	4	#	..	..	..
	Birth defects	33	2.5	2.7	5	24	1.8	5.1	3
	Violence	29	2.2	2.3	6	21	1.7	4.4	4
25-44	Suicide and self inflicted injuries	961	36.8	29.9	1	268	9.4	15.9	2
	Road traffic injuries	587	22.7	18.3	2	202	7.1	12.0	3
	Ischaemic heart disease	425	14.8	13.2	3	98	3.2	5.8	5
	Drownings	98	3.8	3.1	4	#	..	..	..
	Cerebrovascular diseases	96	3.5	3.0	5	105	3.6	6.2	4
	Breast cancer	–	..	..	..	336	11.1	19.9	1
45-64	Ischaemic heart disease	3,184	166.3	34.7	1	937	48.0	14.8	2
	Lung cancer	1,049	55.0	11.4	2	816	41.7	12.9	3
	Colorectal cancer	724	37.9	7.9	3	613	31.4	9.7	4
	Cerebrovascular diseases	517	26.9	5.6	4	479	24.5	7.6	5
	Breast cancer	–	..	..	..	1,182	60.3	18.7	1
65-74	Ischaemic heart disease	4,393	731.8	35.3	1	1,989	299.0	25.1	1
	Lung cancer	1,622	271.4	13.0	2	926	142.0	11.7	2
	COPD	1,169	192.8	9.4	3	863	130.2	10.9	3
	Colorectal cancer	1,037	173.7	8.3	4	701	107.8	8.8	5
	Cerebrovascular diseases	1,011	167.0	8.1	5	848	127.8	10.7	4

Not shown or not calculated, as there are fewer than 5 deaths over the period shown
[1] Rates are age standardised within age categories, except under 1 year
[2] Per cent is the proportion of total avoidable deaths within the relevant age-sex group
[3] Rank is the rank order of rates for the top four causes of death for males and females: more than four causes are listed where the rank order differs between males and females

5.4 Avoidable mortality by area

Introduction to map and text pages

This section examines avoidable mortality, based on the area of usual residence of the deceased. The analysis includes text and maps showing total avoidable mortality, avoidable mortality for three major condition groups and avoidable mortality for the seven causes with the highest age-standardised death rates.

The maps and associated text showing avoidable mortality for the major condition groups/ causes by area have been ordered alpha-numerically, according to ICD-10, as follows:

- **All causes**

- **Major condition group** – Cancer
- Selected cause – Colorectal cancer
- Selected cause – Lung cancer

- **Major condition group** – Cardiovascular diseases
- Selected cause – Ischaemic heart disease
- Selected cause – Cerebrovascular diseases

- **Major condition group** – Respiratory diseases
- Selected cause – Chronic obstructive pulmonary disease

- Selected cause – Road traffic injuries

- Selected cause – Suicide and self inflicted injuries

For total avoidable mortality, and for each selected major condition group/ cause, a map and associated text page is included with:

- a discussion of the mapped rates by District Health Board, which are also included in a table;
- a figure showing the rates by quintile of deprivation of area[2], by sex; and
- a table showing the rates by ethnicity (Mäori, Pacific peoples and European/ others) and sex.

A key to the areas mapped is included in *Appendix 1.4*.

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[2] See Chapter 2, *Methods*

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All causes: avoidable mortality (0 to 74 years), New Zealand

By District Health Board

Total avoidable mortality varied considerably by District Health Board, with the highest rate (an age-standardised death rate of 319.1 deaths per 100,000 population) almost one and a half times (1.46[**]) the average New Zealand rate (219.3 deaths per 100,000 population) and the lowest rate (177.4) 19% below the national average (a rate ratio of 0.81[**]) (Table 5.8).

Overall, age-standardised rates of avoidable mortality at the District Health Board level were highest in the North Island (Map 5.1). The highest rates were in Tairawhiti (319.1 deaths per 100,000 population), Lakes (283.5), Northland (274.9), West Coast (267.0) and Whanganui (261.9) District Health Boards.

The lowest rates were in Waitemata (177.4 deaths per 100,000 population), Canterbury (185.2), Nelson-Marlborough (192.4) and Capital and Coast (201.0).

Table 5.8: Avoidable mortality from all causes by area, New Zealand, 1997-2001

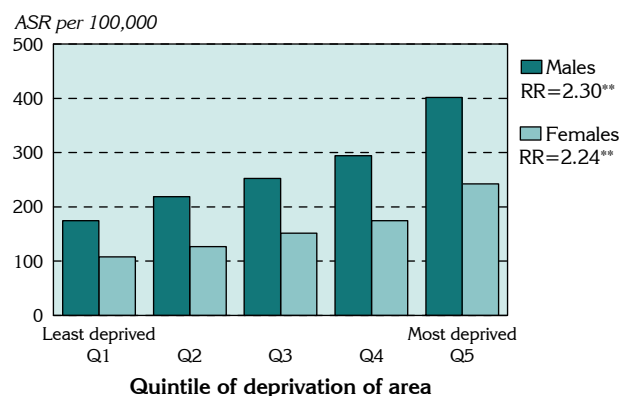| District Health Board	Number	ASR
Auckland	3,624	207.8
Bay of Plenty	2,458	229.0
Canterbury	4,489	185.2
Capital and Coast	2,459	201.0
Counties Manukau	3,904	227.2
Hawke's Bay	1,999	243.0
Hutt	1,594	231.9
Lakes	1,439	283.5
MidCentral	2,101	237.5
Nelson-Marlborough	1,398	192.4
Northland	2,318	274.9
Otago	2,171	211.6
South Canterbury	779	217.2
Southland	1,458	245.4
Tairawhiti	755	319.1
Taranaki	1,277	210.6
Waikato	4,117	239.8
Wairarapa	556	230.7
Waitemata	3,885	177.4
West Coast	492	267.0
Whanganui	999	261.9
Total	**44,272**	**219.3**

By deprivation

For both males and females, there was a marked deprivation gradient in the rates of death from avoidable conditions (Figure 5.3).

Rates for males were higher than females, ranging from 174.7 deaths per 100,000 population in the least deprived areas (Quintile 1) to 401.3 in the most deprived areas (Quintile 5).

Age-standardised death rates for females ranged from 108.2 in the least deprived areas to 242.3 in the most deprived areas.

The differentials in rates between Quintile 5 and Quintile 1 were both large, being 2.30[**] for males and 2.24[**] for females.

Figure 5.3: Avoidable mortality from all causes by deprivation and sex, New Zealand, 1997-2001

By ethnicity

Avoidable mortality varied substantially by ethnicity. For the total population, and for both males and females, rates were highest for Mäori, followed by Pacific peoples and the remaining population (Table 5.9). The avoidable death rate for Mäori (509.4 deaths per 100,000 population) was almost three (2.73[**]) times the rate for European/ others (186.9): the rate for Pacific peoples (379.0 deaths per 100,000 population) was double the European/ others rate (a rate ratio of 2.03[**]).

Within all ethnic groups, the male rate of avoidable mortality was higher than the female rate.

The differential in rates between the Mäori and European/ others was greater for females (a rate ratio of 3.02[**]) than for males (2.54[**]). For Pacific peoples, the differentials between the European/ others rates were approximately double, for both males and females.
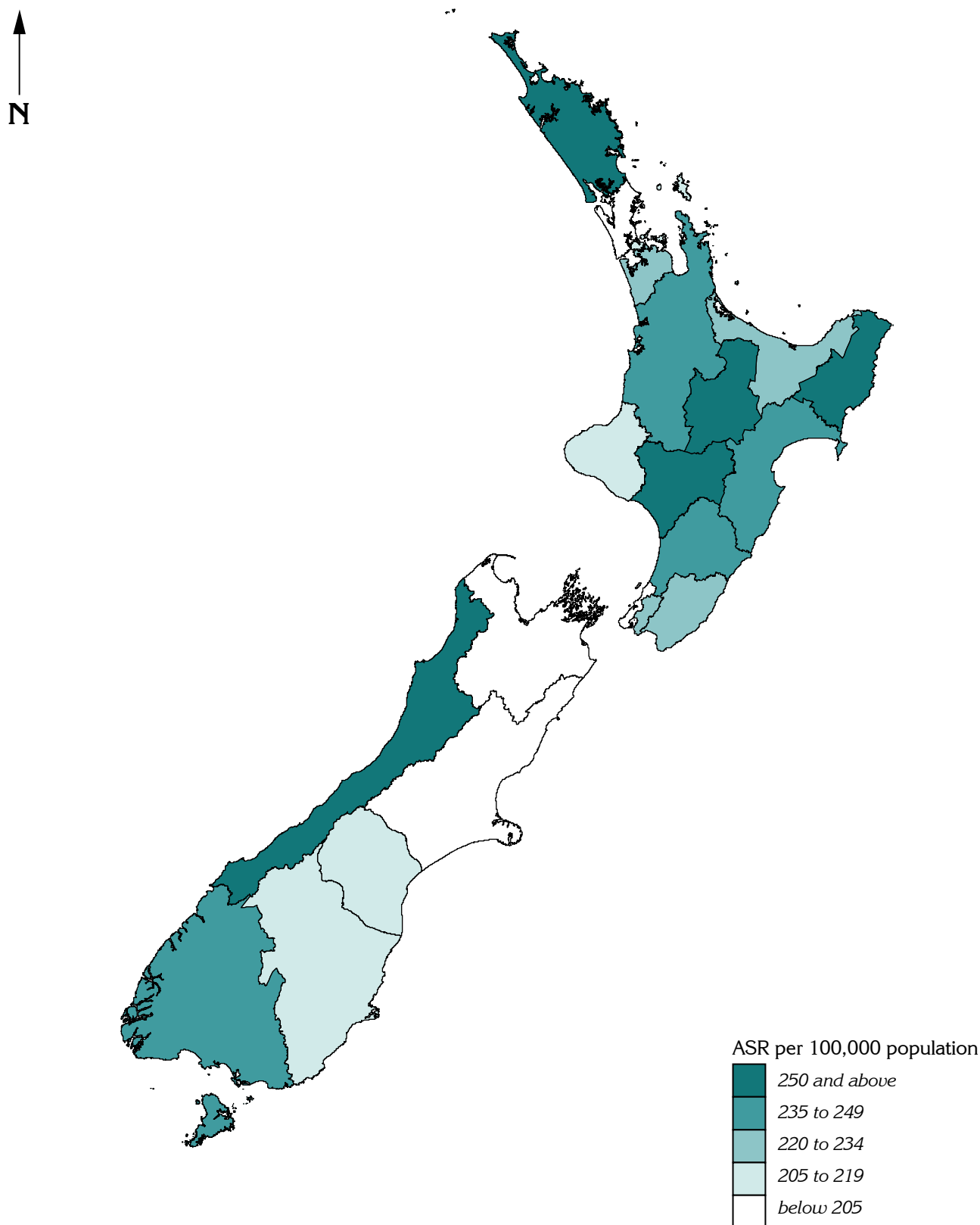
Table 5.9: Avoidable mortality from all causes by ethnicity and sex, New Zealand, 1997-2001

ASR per 100,000 population

Ethnic group	Males	Females	Total	RR M:F
Mäori	603.2	413.3	509.4	1.46[**]
Pacific peoples	476.0	282.3	379.0	1.69[**]
Euro/ others	237.1	137.0	186.9	1.73[**]
Total	**274.2**	**164.4**	**219.3**	**1.67[**]**
RR–Mäori:Euro	**2.54[**]**	**3.02[**]**	**2.73[**]**	..
RR–Pacific:Euro	**2.01[**]**	**2.06[**]**	**2.03[**]**	..

Map 5.1
All causes: avoidable mortality (0 to 74 years), New Zealand, 1997-2001

age standardised deaths per 100,000 population by District Health Board

N

ASR per 100,000 population

- 250 and above
- 235 to 249
- 220 to 234
- 205 to 219
- below 205

Details of map boundaries are in Appendix 1.4

Australian and New Zealand Atlas of Avoidable Mortality

Major condition group – Cancer: avoidable mortality (0 to 74 years), New Zealand

By District Health Board

Avoidable mortality from cancer varied considerably by District Health Board, with the highest rate (89.1 deaths per 100,000 population) 32% above the average New Zealand rate of 67.7 deaths per 100,000 population (a rate ratio of 1.32**); and the lowest rate (59.7) 12% below the national average (a rate ratio of 0.88**) (Table 5.10).

The highest rates of avoidable mortality from cancer were in Tairawhiti (89.1 deaths per 100,000 population), Lakes (84.4), Northland (81.1), Whanganui (77.0) and Southland (74.3) (Map 5.2).

Rates were lowest in Waitemata (59.7 deaths per 100,000 population), Canterbury (60.1), Nelson-Marlborough (61.8), Capital and Coast (62.4) and Auckland (64.1).

Table 5.10: Avoidable mortality from cancer by area, New Zealand, 1997-2001

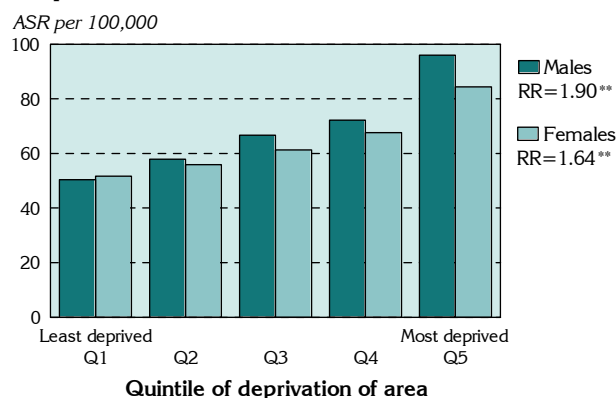| District Health Board	Number	ASR
Auckland	1,121	64.1
Bay of Plenty	768	67.9
Canterbury	1,511	60.1
Capital and Coast	773	62.4
Counties Manukau	1,261	72.9
Hawke's Bay	580	67.6
Hutt	483	68.7
Lakes	439	84.4
MidCentral	647	70.8
Nelson-Marlborough	473	61.8
Northland	721	81.1
Otago	748	70.1
South Canterbury	269	70.5
Southland	456	74.3
Tairawhiti	215	89.1
Taranaki	416	65.8
Waikato	1,259	71.4
Wairarapa	168	65.8
Waitemata	1,346	59.7
West Coast	139	72.1
Whanganui	306	77.0
Total	**14,100**	**67.7**

By deprivation

For both males and females, there was a marked deprivation gradient in the rates of avoidable mortality from cancer (Figure 5.4).

Rates for males were generally higher than for females, ranging from 50.4 deaths per 100,000 population in the least deprived areas (Quintile 1) to 96.0 in the most deprived areas (Quintile 5). The female rates ranged from 51.6 in Quintile 1 to 84.4 in Quintile 5.

Despite the relatively low rate in Quintile 1, the differential in rates between the most deprived areas and least deprived areas was larger for males (1.90**) than for females (1.64**).

Figure 5.4: Avoidable mortality from cancer by deprivation and sex, New Zealand, 1997-2001

By ethnicity

Avoidable mortality from cancer varied by ethnicity (Table 5.11). The rate for Māori (141.9 deaths per 100,000 population) was more than twice (2.33** times) that for European/ others (60.9): the rate for Pacific peoples was lower (106.3 deaths per 100,000 population), but still a substantial 1.75** times.

For Pacific peoples and European/ others, the male rate of avoidable mortality from cancer was higher than the female rate: for the Māori population, the female rate was marginally lower than the male rate (a rate ratio of 0.98).

The differential in death rates between the Māori and European/ others was greater for females (2.45**) than for males (2.21**): for Pacific peoples, the differential was greater for males (1.86**) than for females (1.65**).

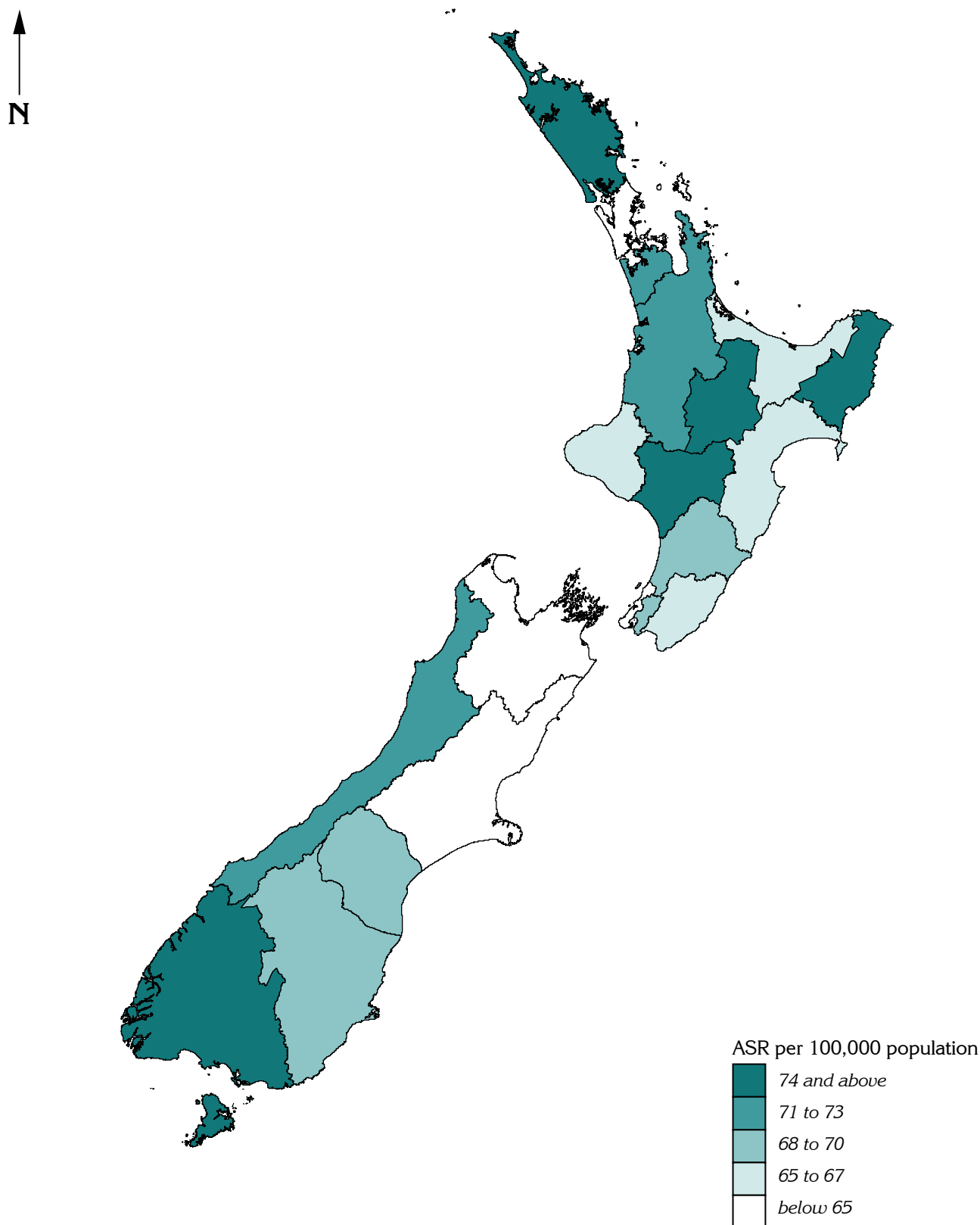**Table 5.11: Avoidable mortality from cancer by ethnicity and sex, New Zealand, 1997-2001**

ASR per 100,000 population

Ethnic group	Males	Females	Total	RR M:F
Māori	140.0	143.0	141.9	0.98
Pacific peoples	118.0	96.2	106.3	1.23**
Euro/ others	63.4	58.4	60.9	1.09**
Total	**69.7**	**65.8**	**67.7**	**1.06****
RR–Māori:Euro	**2.21****	**2.45****	**2.33****	..
RR–Pacific:Euro	**1.86****	**1.65****	**1.75****	..

Map 5.2

Major condition group – Cancer: avoidable mortality (0 to 74 years), New Zealand, 1997-2001

age standardised deaths per 100,000 population by District Health Board

N

ASR per 100,000 population

- 74 and above
- 71 to 73
- 68 to 70
- 65 to 67
- below 65

Selected cause – Colorectal cancer: avoidable mortality (0 to 74 years), New Zealand

By District Health Board

The overall rate of mortality from colorectal cancer for New Zealand was 15.2 deaths per 100,000 population (Table 5.12). The highest rate at the District Health Board level (22.7 deaths per 100,000 population) was almost one and a half times (1.49**) the New Zealand average of 15.2; and the lowest rate (12.6) was 17% below the national average (a rate ratio of 0.83**).

Rates for colorectal cancer were highest in West Coast (22.7 deaths per 100,000 population), Southland (22.0), South Canterbury (20.7), Whanganui (20.1) and Otago (19.1) (Map 5.3).

The lowest rates were in Waitemata (12.6 deaths per 100,000 population), Hawke's Bay and Hutt (both 12.7), and Bay of Plenty (12.9).

Table 5.12: Avoidable mortality from colorectal cancer by area, New Zealand, 1997-2001

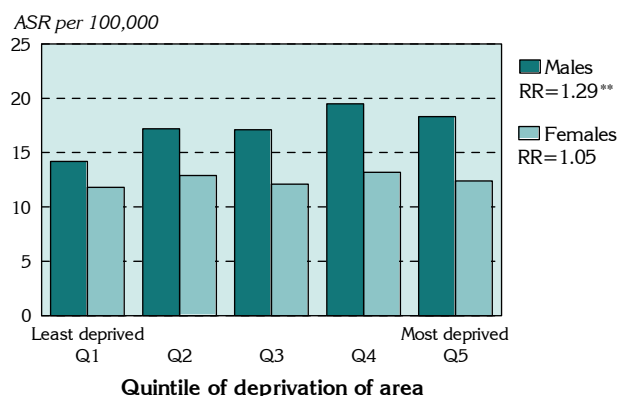| District Health Board	Number	ASR
Auckland	247	14.2
Bay of Plenty	150	12.9
Canterbury	382	15.0
Capital and Coast	182	14.7
Counties Manukau	237	13.9
Hawke's Bay	111	12.7
Hutt	90	12.7
Lakes	82	15.6
MidCentral	149	16.0
Nelson-Marlborough	117	15.1
Northland	146	16.1
Otago	208	19.1
South Canterbury	82	20.7
Southland	137	22.0
Tairawhiti	42	17.2
Taranaki	102	15.9
Waikato	279	15.6
Wairarapa	42	16.0
Waitemata	283	12.6
West Coast	45	22.7
Whanganui	82	20.1
Total	**3,193**	**15.2**

By deprivation

For males, there was a largely continuous gradient in the rates of male deaths from colorectal cancer, when examined by quintile of NZDep score; for females, there was no relationship evident (Figure 5.5).

Rates for males were higher than females in each quintile, ranging from 14.2 deaths per 100,000 population in the least deprived areas (Quintile 1) to 19.5 in Quintile 4. The female rates ranged from 11.8 in Quintile 1 to 13.2 in Quintile 4.

The differentials in rates between Quintile 1 and Quintile 5 were 1.29** for males and 1.05 for females.

Figure 5.5: Avoidable mortality from colorectal cancer by deprivation and sex, New Zealand, 1997-2001

By ethnicity

Avoidable mortality from colorectal cancer varied by ethnicity, and showed a reversal of the trend for the causes described previously, with the highest rates for European/ others (Table 5.13). The differential in rates for Mäori and Pacific peoples were 0.89** and 0.80**, respectively (or 89% and 80% of the European/ others rate).

For all ethnic groups, the male rate of colorectal cancer mortality was higher than the female rate

For both males and females, the rates for Mäori and Pacific peoples were between 74% and 90% of the European/ others rates.

Table 5.13: Avoidable mortality from colorectal cancer by ethnicity and sex, New Zealand, 1997-2001
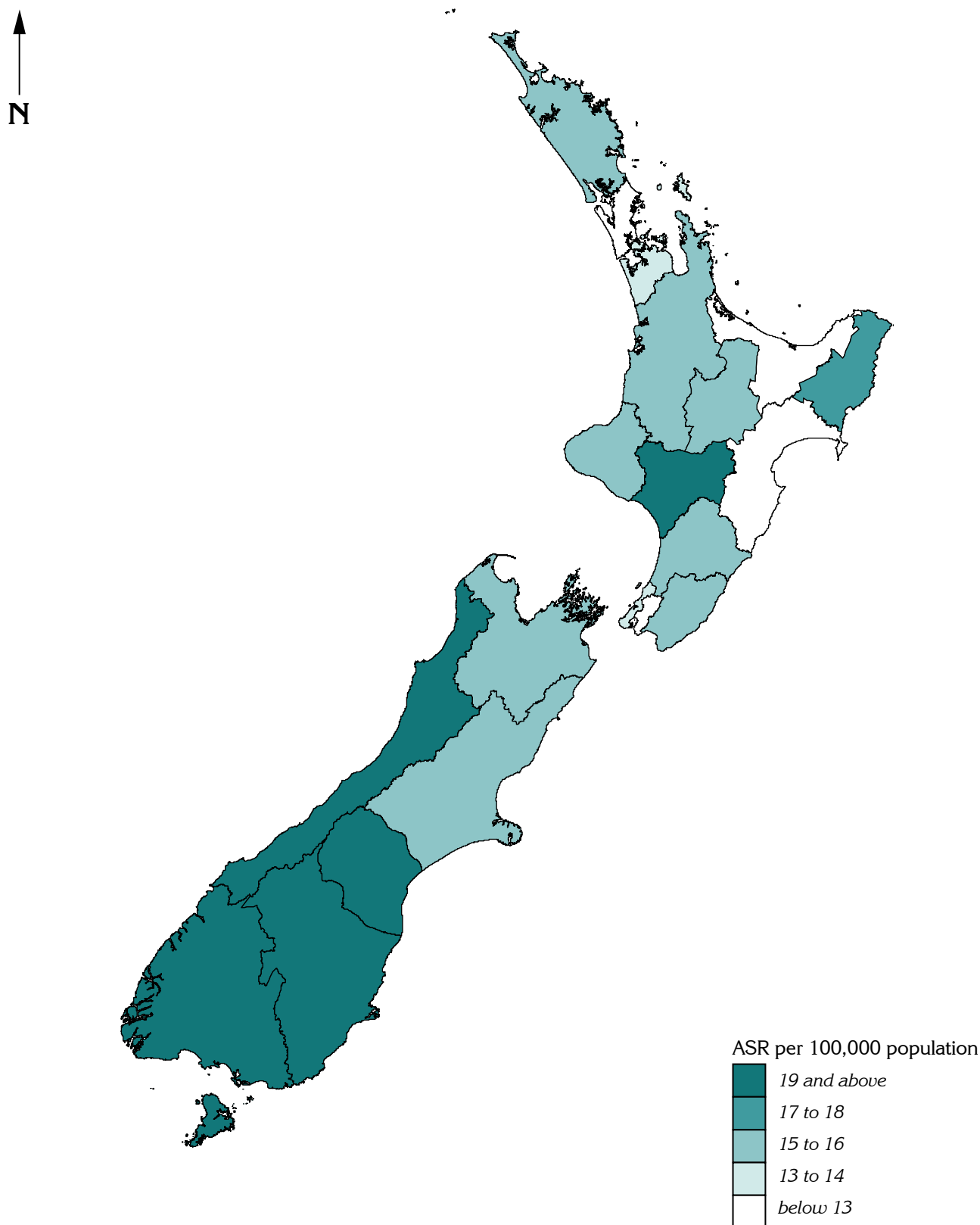
ASR per 100,000 population

Ethnic group	Males	Females	Total	RR M:F
Mäori	16.1	11.4	13.7	1.41*
Pacific peoples	15.2	9.6	12.3	1.58
Euro/ others	17.8	12.9	15.4	1.38**
Total	**17.7**	**12.7**	**15.2**	**1.39****
RR–Mäori:Euro	**0.90**	**0.88**	**0.89**	**..**
RR–Pacific:Euro	**0.85**	**0.74**	**0.80**	**..**

Map 5.3
Selected cause – Colorectal cancer: avoidable mortality
(0 to 74 years), New Zealand, 1997-2001
age standardised deaths per 100,000 population by District Health Board

N

ASR per 100,000 population

- *19 and above*
- *17 to 18*
- *15 to 16*
- *13 to 14*
- *below 13*

Details of map boundaries are in Appendix 1.4

Australian and New Zealand Atlas of Avoidable Mortality

Selected cause – Lung cancer: avoidable mortality (0 to 74 years), New Zealand

By District Health Board

The overall rate of avoidable mortality from lung cancer for New Zealand was 21.6 deaths per 100,000 population (Table 5.14). The highest rate by District Health Board (31.5 deaths per 100,000 population) was almost one and a half times (1.46**) the New Zealand average and the lowest rate (16.9) was 22% below the national average (a rate ratio of 0.78**).

The highest rates of lung cancer were in the District Health Boards of Lakes (31.5 deaths per 100,000 population), Northland (31.1), and Tairawhiti (30.6) (Map 5.4).

Rates were lowest in Nelson-Marlborough (16.9), Canterbury (17.4), Auckland (17.9), and Capital and Coast and Wairarapa (both 18.7).

Table 5.14: Avoidable mortality from lung cancer by area, New Zealand, 1997-2001

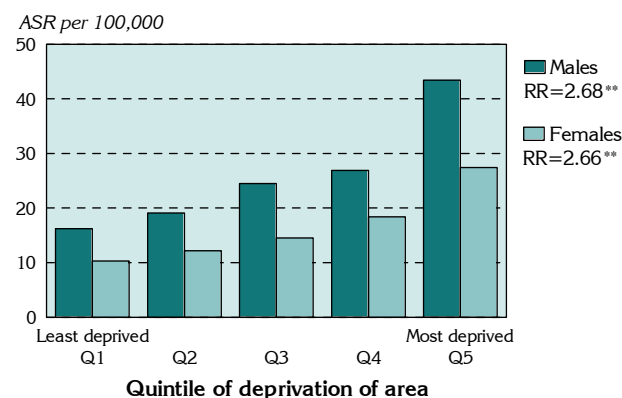| District Health Board	Number	ASR
Auckland	309	17.9
Bay of Plenty	250	21.4
Canterbury	444	17.4
Capital and Coast	230	18.7
Counties Manukau	408	23.8
Hawke's Bay	184	21.0
Hutt	155	21.9
Lakes	166	31.5
MidCentral	217	23.2
Nelson-Marlborough	133	16.9
Northland	285	31.1
Otago	261	23.8
South Canterbury	83	20.8
Southland	146	23.4
Tairawhiti	75	30.6
Taranaki	135	20.8
Waikato	445	24.8
Wairarapa	49	18.7
Waitemata	431	19.1
West Coast	43	21.5
Whanganui	96	23.4
Total	**4,543**	**21.6**

By deprivation

For both males and females, there was a marked deprivation gradient in the rates of death from lung cancer (Figure 5.6).

Age-standardised death rates for males were higher than females, ranging from 16.2 deaths per 100,000 population in the least deprived areas (Quintile 1) to 43.4 in the most deprived areas (Quintile 5). The female rates ranged from 10.3 in the least deprived areas to 27.4 in the most deprived areas.

The differentials in rates between Quintile 5 and Quintile 1 were both large, being 2.68** for males and 2.66** for females.

Figure 5.6: Avoidable mortality from lung cancer by deprivation and sex, New Zealand, 1997-2001

By ethnicity

Avoidable mortality from lung cancer varied substantially by ethnicity (Table 5.15). The age-standardised death rate for Māori (72.1 deaths per 100,000 population) was more than four times (4.10**) the European/ others rate (17.6 deaths per 100,000 population): the rate for Pacific peoples (36.6) was just over double (a rate ratio of 2.08**).

For all ethnic groups, the male rate of lung cancer mortality was higher than the female rate, with a substantially larger differential for Pacific peoples (3.02**).
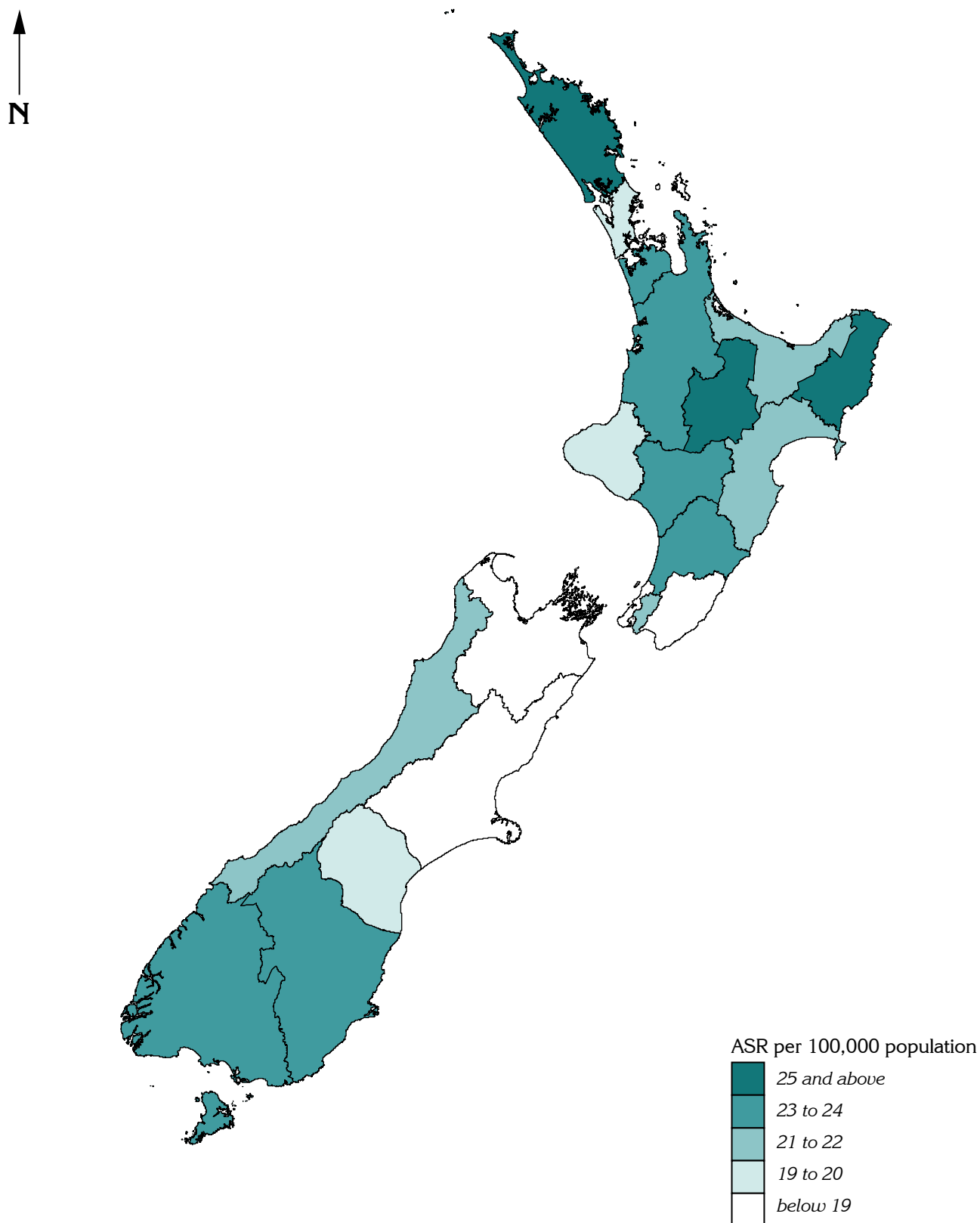
The differential in rates between the Māori and European/ others was greater for females (5.07**) than for males (3.44**): for Pacific peoples, the differential was greater for males (2.55**) than for females (1.43**).

Table 5.15: Avoidable mortality from lung cancer by ethnicity and sex, New Zealand, 1997-2001

ASR per 100,000 population

Ethnic group	Males	Females	Total	RR M:F
Māori	76.3	66.4	72.1	1.15*
Pacific peoples	56.5	18.7	36.6	3.02**
Euro/ others	22.2	13.1	17.6	1.69**
Total	**26.3**	**16.8**	**21.6**	**1.57****
RR–Māori:Euro	**3.44****	**5.07****	**4.10****	..
RR–Pacific:Euro	**2.55****	**1.43***	**2.08****	..

Map 5.4
Selected cause – Lung cancer: avoidable mortality (0 to 74 years), New Zealand, 1997-2001
age standardised deaths per 100,000 population by District Health Board

N

ASR per 100,000 population

- 25 and above
- 23 to 24
- 21 to 22
- 19 to 20
- below 19

Details of map boundaries are in Appendix 1.4

Australian and New Zealand Atlas of Avoidable Mortality

Major condition group – Cardiovascular diseases: avoidable mortality (0 to 74 years), New Zealand

By District Health Board

The average rate of avoidable mortality from cardiovascular diseases for New Zealand was 73.1 deaths per 100,000 population (Table 5.16). The highest rate by District Health Board (107.8 deaths per 100,000 population) was almost one and a half times (1.47**) the New Zealand average, and the lowest rate (56.0) was 23% below the national average (a rate ratio of 0.77**).

The highest rates were in Tairawhiti (107.8 deaths per 100,000 population), West Coast (98.2), Southland (90.6) and Lakes (88.6) (Map 5.5).

The lowest rates were in Waitemata (56.0), Nelson-Marlborough (61.7) and Canterbury (63.3).

Table 5.16: Avoidable mortality from cardiovascular diseases by area, New Zealand, 1997-2001

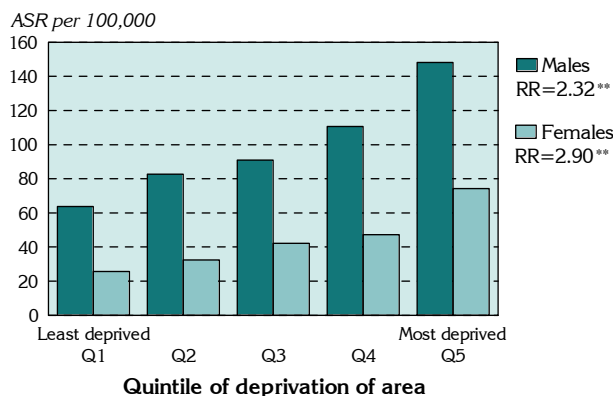| District Health Board	Number	ASR
Auckland	1,201	68.4
Bay of Plenty	805	68.5
Canterbury	1,635	63.3
Capital and Coast	892	71.6
Counties Manukau	1,247	72.7
Hawke's Bay	728	82.8
Hutt	582	81.9
Lakes	470	88.6
MidCentral	832	88.3
Nelson-Marlborough	487	61.7
Northland	810	88.3
Otago	799	72.3
South Canterbury	267	66.6
Southland	573	90.6
Tairawhiti	267	107.8
Taranaki	435	66.7
Waikato	1456	80.7
Wairarapa	213	80.3
Waitemata	1272	56.0
West Coast	197	98.2
Whanganui	344	83.9
Total	**15,512**	**73.1**

By deprivation

For both males and females, there was a marked deprivation gradient in rates of avoidable mortality from cardiovascular diseases (Figure 5.7).

Rates for males were higher than females, ranging from 63.7 deaths per 100,000 population in the least deprived areas (Quintile 1) to 148.1 in the most deprived areas (Quintile 5). The female rates ranged from 25.6 in the least deprived areas to 74.2 in the most deprived areas.

The differentials in rates between Quintile 5 and Quintile 1 were 2.32** for males and 2.90** for females.

Figure 5.7: Avoidable mortality from cardiovascular diseases by deprivation and sex, New Zealand, 1997-2001

By ethnicity

Avoidable mortality from cardiovascular diseases varied markedly by ethnicity (Table 5.17). The Mäori rate (73.1 deaths per 100,000 population) was 3.30** times the rate for European/ others (61.7): the rate for Pacific peoples (157.5 deaths per 100,000 population) was 2.55** times the rate for European/ others.

For all ethnic groups, the rate of avoidable mortality from cardiovascular diseases was markedly higher for males than for females; the largest differential was for European/ others (2.43**).

The differential in rates between the Mäori and European/ others was larger for females (4.21**) than for males (2.90**); and, similarly, for Pacific peoples, with the differential 2.86** times for females and 2.41** times for males.

Table 5.17: Avoidable mortality from cardiovascular diseases by ethnicity and sex, New Zealand, 1997-2001

ASR per 100,000 population

Ethnic group	Males	Females	Total	RR M:F
Mäori	253.7	151.7	203.8	1.67**
Pacific peoples	211.2	103.1	157.5	2.05**
Euro/ others	87.5	36.0	61.7	2.43**
Total	**101.0**	**45.1**	**73.1**	**2.24****
RR–Mäori:Euro	**2.90****	**4.21****	**3.30****	..
RR–Pacific:Euro	**2.41****	**2.86****	**2.55****	..

Map 5.5
Major condition group – Cardiovascular diseases: avoidable mortality (0 to 74 years), New Zealand, 1997-2001
age standardised deaths per 100,000 population by District Health Board

N

ASR per 100,000 population

- 88.5 and above
- 80.5 to less than 88.5
- 72.5 to less than 80.5
- 64.5 to less than 72.5
- below 64.5

Details of map boundaries are in Appendix 1.4

Australian and New Zealand Atlas of Avoidable Mortality

Selected cause – Ischaemic heart disease: avoidable mortality (0 to 74 years), New Zealand

By District Health Board

The overall rate of avoidable mortality from ischaemic heart disease for New Zealand was 52.1 deaths per 100,000 population (Table 5.18). The highest rate (74.9 deaths per 100,000 population) was almost one and a half times (1.44**) the New Zealand average and the lowest rate (40.4) was 22% below the national average (a rate ratio of 0.78**).

The highest rates were in Tairawhiti (74.9 deaths per 100,000 population), West Coast (73.2) and Southland (65.4) (Map 5.6).

The lowest rates were in Waitemata (40.4), Nelson-Marlborough (45.8), Canterbury (46.3) and Auckland (46.4).

Table 5.18: Avoidable mortality from ischaemic heart disease by area, New Zealand, 1997-2001

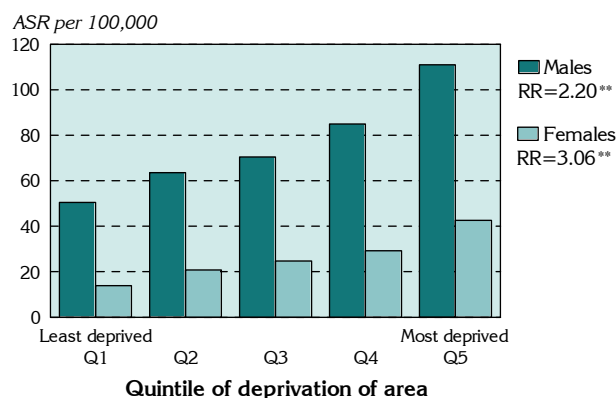| District Health Board	Number	ASR
Auckland	809	46.4
Bay of Plenty	564	48.1
Canterbury	1,189	46.3
Capital and Coast	636	51.4
Counties Manukau	816	47.7
Hawke's Bay	521	59.5
Hutt	423	59.7
Lakes	335	63.1
MidCentral	589	62.8
Nelson-Marlborough	361	45.8
Northland	580	63.2
Otago	576	52.3
South Canterbury	202	50.6
Southland	413	65.4
Tairawhiti	185	74.9
Taranaki	322	49.6
Waikato	1,032	57.3
Wairarapa	156	58.9
Waitemata	913	40.4
West Coast	147	73.2
Whanganui	262	64.0
Total	**11,030**	**52.1**

By deprivation

For both males and females, there was a marked deprivation gradient in the rates of death from ischaemic heart disease (Figure 5.8).

Death rates for males were higher than females, ranging from 50.4 deaths per 100,000 population in the least deprived areas (Quintile 1) to 111.0 in the most deprived areas (Quintile 5). The female rates ranged from 13.9 in the least deprived areas to 42.5 in the most deprived areas.

The differentials in rates between Quintile 5 and Quintile 1 were 2.20** for males and 3.06** for females.

Figure 5.8: Avoidable mortality from ischaemic heart disease by deprivation and sex, New Zealand, 1997-2001

By ethnicity

Avoidable mortality from ischaemic heart disease varied by ethnicity (Table 5.19). The Māori rate (144.5 deaths per 100,000 population) was over three times (3.24**) the rate for European/ others (44.6): the rate for Pacific peoples (97.1) was 2.18** times.

For all ethnic groups, the male rate of mortality from ischaemic heart disease was substantially higher than the female rate; the largest differentials in rates were for Pacific peoples (3.31**) and European/ others (3.05**).

The differential between the Māori and the European/ others rates was notably higher for females (4.11**) than for males (2.94**): for Pacific peoples, the differential was slightly larger for males (2.22**) than for females (2.05**).

Table 5.19: Avoidable mortality from ischaemic heart disease by ethnicity and sex, New Zealand, 1997-2001

ASR per 100,000 population

Ethnic group	Males	Females	Total	RR M:F
Māori	197.7	90.4	144.5	2.19**
Pacific peoples	149.5	45.2	97.1	3.31**
Euro/ others	67.2	22.0	44.6	3.05**
Total	**77.5**	**26.8**	**52.1**	**2.89****
RR–Māori:Euro	**2.94****	**4.11****	**3.24****	..
RR–Pacific:Euro	**2.22****	**2.05****	**2.18****	..

Map 5.6
Selected cause – Ischaemic heart disease: avoidable mortality
(0 to 74 years), New Zealand, 1997-2001
age standardised deaths per 100,000 population by District Health Board

N

ASR per 100,000 population

- 65 and above
- 59 to 64
- 53 to 58
- 47 to 52
- below 47

Details of map boundaries are in Appendix 1.4

Australian and New Zealand Atlas of Avoidable Mortality

Selected cause – Cerebrovascular diseases: avoidable mortality (0 to 74 years), New Zealand

By District Health Board

The overall rate of avoidable mortality from cerebrovascular diseases for New Zealand was 14.3 deaths per 100,000 population (Table 5.20). The highest rate by District Health Board (20.2 deaths per 100,000 population) was 41% above the New Zealand average (a rate ratio of 1.41*) and the lowest rate (9.8) was 31% below the national average (a rate ratio of 0.69*).

Rates at the District Health Board level were relatively uniform across both islands (Map 5.7), being highest in Tairawhiti (20.2 deaths per 100,000 population), Northland and Southland (both 17.0).

The lowest rates were in South Canterbury (9.8), Waitemata (11.0), Canterbury (11.6), Nelson-Marlborough (11.8) and Taranaki (12.1).

Table 5.20: Avoidable mortality from cerebrovascular diseases by area, New Zealand, 1997-2001

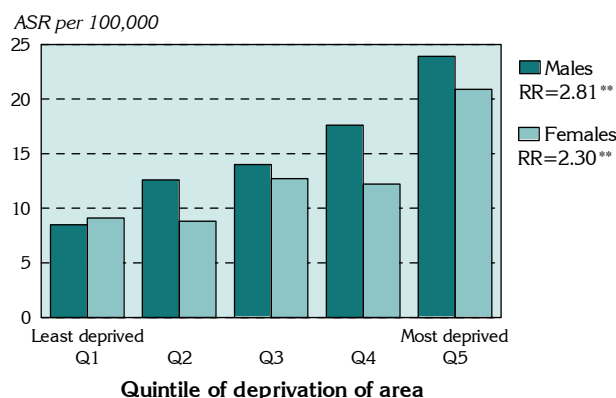| District Health Board	Number	ASR
Auckland	272	15.2
Bay of Plenty	160	13.4
Canterbury	305	11.6
Capital and Coast	194	15.3
Counties Manukau	283	16.3
Hawke's Bay	143	16.1
Hutt	121	16.8
Lakes	78	14.7
MidCentral	149	15.6
Nelson-Marlborough	94	11.8
Northland	156	17.0
Otago	160	14.3
South Canterbury	40	9.8
Southland	108	17.0
Tairawhiti	50	20.2
Taranaki	80	12.1
Waikato	299	16.4
Wairarapa	44	16.4
Waitemata	254	11.0
West Coast	34	16.9
Whanganui	52	12.5
Total	**3,073**	**14.3**

By deprivation

For both males and females, there was a marked deprivation gradient in the rates of mortality from cerebrovascular diseases (Figure 5.9).

Rates for males were higher than females, ranging from 8.5 deaths per 100,000 population in the least deprived areas (Quintile 1) to 23.9 in the most deprived areas (Quintile 5). The female rates

ranged from 9.1 in the least deprived areas to 20.9 in the most deprived areas.

The differentials in rates between Quintile 5 to Quintile 1 were 2.81** for males and 2.30** for females.

Figure 5.9: Avoidable mortality from cerebrovascular diseases by deprivation and sex, New Zealand, 1997-2001

By ethnicity

Pacific peoples had the highest rates of avoidable mortality from cerebrovascular diseases, followed by Mäori and European/ others (Table 5.21). The rate for Pacific peoples (37.8 deaths per 100,000 population) was 3.05** times the European/ others rate (12.4): the rate for Mäori (32.0) was similar high (2.58**).

The male rate of avoidable mortality from cerebrovascular diseases was higher for Pacific peoples (1.12) and European/ others (1.32**), and 18% lower (a rate ratio of 0.82*) for Mäori.

The differential in rates between Pacific peoples and European/ others was greater for females (3.33**) than for males (2.82**): and, similarly, between Mäori and European/ others, with differentials of 3.24** for females and 2.03** for males.

Table 5.21: Avoidable mortality from cerebrovascular diseases by ethnicity and sex, New Zealand, 1997-2001

ASR per 100,000 population

Ethnic group	Males	Females	Total	RR M:F
Mäori	28.6	34.7	32.0	0.82*
Pacific peoples	39.8	35.6	37.8	1.12
Euro/ others	14.1	10.7	12.4	1.32**
Total	**15.6**	**13.0**	**14.3**	**1.20****
RR–Mäori:Euro	**2.03****	**3.24****	**2.58****	..
RR–Pacific:Euro	**2.82****	**3.33****	**3.05****	..

Map 5.7
Selected cause – Cerebrovascular diseases: avoidable mortality (0 to 74 years), New Zealand, 1997-2001
age standardised deaths per 100,000 population by District Health Board

N

ASR per 100,000 population

- 17.0 and above
- 15.5 to less than 17.0
- 14.0 to less than 15.5
- 12.5 to less than 14.0
- below 12.5

Details of map boundaries are in Appendix 1.4

Australian and New Zealand Atlas of Avoidable Mortality

Major condition group – Respiratory diseases: avoidable mortality (0 to 74 years), New Zealand

By District Health Board

The rate of avoidable mortality from respiratory diseases for New Zealand was 13.4 deaths per 100,000 population (Table 5.22). The highest rate by District Health Board (20.9 deaths per 100,000 population) was one and a half times (1.56**) the New Zealand average and the lowest rate (10.0) was 25% below the national average (a rate ratio of 0.75**).

Rates were highest in West Coast (20.9 deaths per 100,000 population), Lakes (17.9) and Tairawhiti (17.5) (Map 5.8).

The lowest rates were in Waitemata (10.0), Canterbury (11.0), Capital and Coast (11.5) and South Canterbury (11.7).

Table 5.22: Avoidable mortality from respiratory diseases by area, New Zealand, 1997-2001

District Health Board	Number	ASR
Auckland	242	13.6
Bay of Plenty	169	13.6
Canterbury	297	11.0
Capital and Coast	146	11.5
Counties Manukau	243	14.1
Hawke's Bay	117	12.8
Hutt	112	15.4
Lakes	98	17.9
MidCentral	147	14.8
Nelson-Marlborough	102	12.5
Northland	119	12.5
Otago	179	15.4
South Canterbury	50	11.7
Southland	107	16.4
Tairawhiti	45	17.5
Taranaki	83	12.1
Waikato	293	15.7
Wairarapa	34	12.2
Waitemata	231	10.0
West Coast	43	20.9
Whanganui	71	16.4
Total	**2,925**	**13.4**

By deprivation

For both males and females, there was marked deprivation gradient in the rates of avoidable mortality from respiratory diseases (Figure 5.10).

Rates for males were higher than females, ranging from 8.7 deaths per 100,000 population in the least deprived areas (Quintile 1) to 24.5 in the most deprived areas (Quintile 5). The female rates ranged from 6.1 in the least deprived areas to 18.1 in the most deprived areas.

The differentials in rates between Quintile 5 and Quintile 1 were 2.82** for males and 2.97** for females.

Figure 5.10: Avoidable mortality from respiratory diseases by deprivation and sex, New Zealand, 1997-2001

By ethnicity

Avoidable mortality from respiratory diseases varied by ethnicity (Table 5.23). The rate for Mäori (36.1 deaths per 100,000 population) was over three times (3.09**) the European/ others rate (11.7): the rate for Pacific peoples (19.1 deaths per 100,000 population) was 1.63** times.

For Pacific peoples, the rate of avoidable mortality from respiratory diseases for males was more than three times (3.40**) the female rate, and also one third higher (1.35**) than the European/ others population. Conversely, for Mäori, the male rate was 14% lower than the female rate (a rate ratio of 0.86).

The differential in rates between the Mäori and European/ other females was just less than four times (3.83**), and for males was approximately two and one half times (2.44**). For Pacific peoples, the differential was 2.22** for males; however, females had a relatively low rate, being 91% of the female European/ others rate.
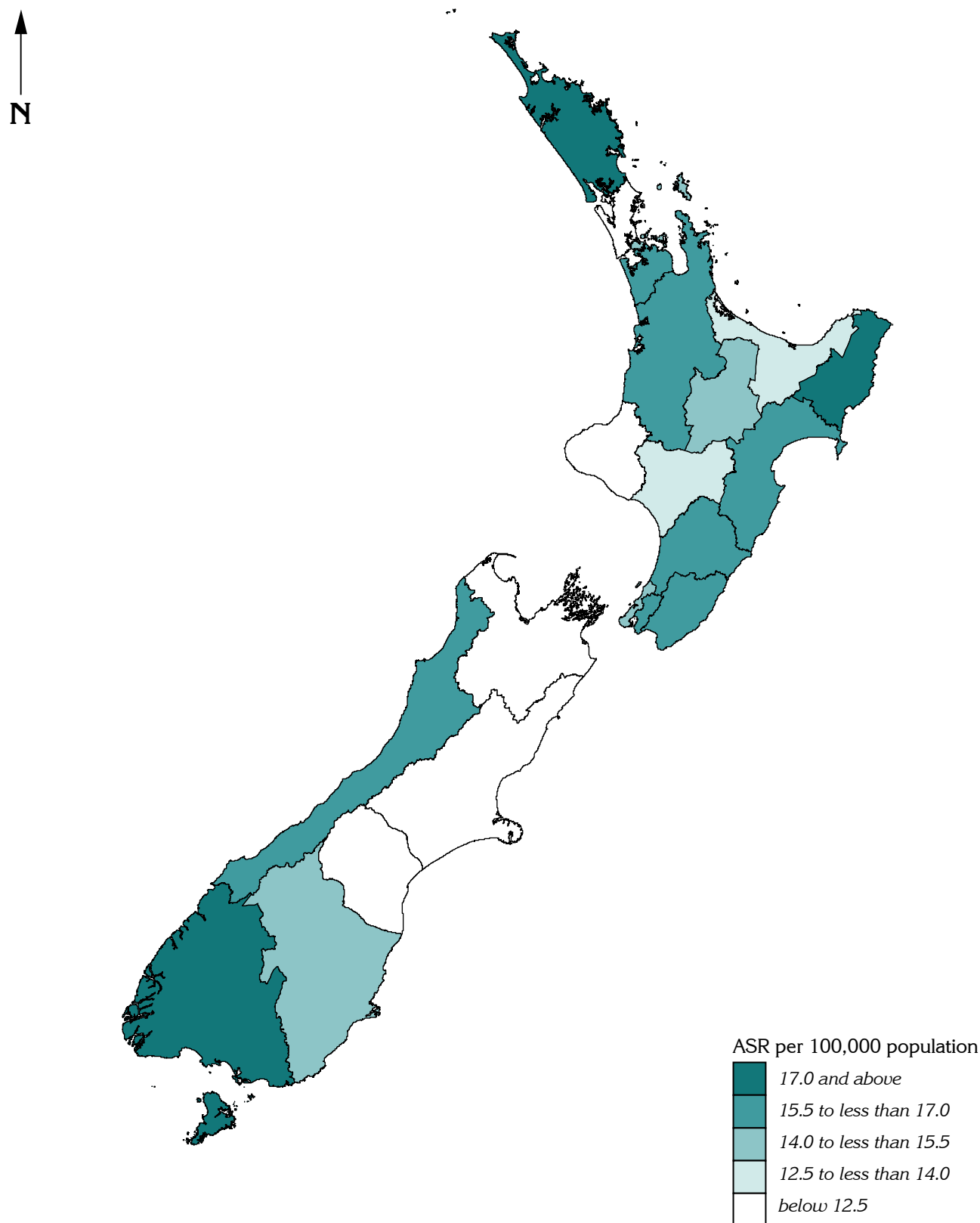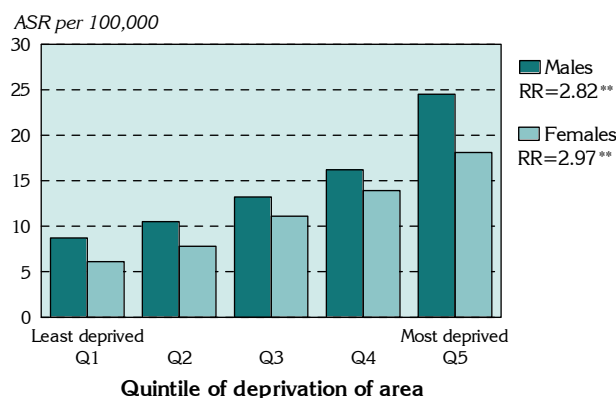
Table 5.23: Avoidable mortality from respiratory diseases by ethnicity and sex, New Zealand, 1997-2001

ASR per 100,000 population

Ethnic group	Males	Females	Total	RR M:F
Mäori	32.9	38.3	36.1	0.86
Pacific peoples	30.9	9.1	19.1	3.40**
Euro/ others	13.5	10.0	11.7	1.35**
Total	**15.0**	**11.7**	**13.4**	**1.28****
RR–Mäori:Euro	**2.44****	**3.83****	**3.09****	**..**
RR–Pacific:Euro	**2.29****	**0.91**	**1.63****	**..**

Map 5.8
Major condition group – Respiratory diseases: avoidable mortality (0 to 74 years), New Zealand, 1997-2001
age standardised deaths per 100,000 population by District Health Board

N

ASR per 100,000 population

- 16.5 and above
- 15.0 to less than 16.5
- 13.5 to less than 15.0
- 12.0 to less than 13.5
- below 12.0

Details of map boundaries are in Appendix 1.4

Australian and New Zealand Atlas of Avoidable Mortality

Selected cause – Chronic obstructive pulmonary disease: avoidable mortality (45 to 74 years), New Zealand

By District Health Board

The average rate of mortality from Chronic Obstructive Pulmonary Disease (COPD) for New Zealand was 12.4 deaths per 100,000 population (Table 5.24). The highest rate by District Health Board (20.1 deaths per 100,000 population) was over 62% above the New Zealand average (a rate ratio of 1.62**) and the lowest rate (9.3) was 25% below the national average (a rate ratio of 0.75**).

The highest rates were in West Coast (20.1 deaths per 100,000 population), Lakes (17.2), Tairawhiti (16.6), Whanganui (15.4) and Southland (15.0) (Map 5.9).

Rates were lowest in Waitemata (9.3 deaths per 100,000 population), Wairarapa (10.2), Tarankai (10.3) and Canterbury (10.4).

Table 5.24: Avoidable mortality from COPD by area, New Zealand, 1997-2001

District Health Board	Number	ASR
Auckland	223	12.5
Bay of Plenty	160	12.6
Canterbury	285	10.4
Capital and Coast	134	10.6
Counties Manukau	218	12.7
Hawke's Bay	110	11.9
Hutt	102	14.0
Lakes	94	17.2
MidCentral	132	13.1
Nelson-Marlborough	94	11.3
Northland	116	12.0
Otago	175	14.8
South Canterbury	50	11.4
Southland	99	15.0
Tairawhiti	43	16.6
Taranaki	72	10.3
Waikato	275	14.6
Wairarapa	29	10.2
Waitemata	216	9.3
West Coast	42	20.1
Whanganui	68	15.4
Total	**2,734**	**12.4**

By deprivation

For both males and females, there was a marked deprivation gradient in the rates of death from chronic obstructive pulmonary disease (Figure 5.11).

Rates for males were higher than females, ranging from 7.7 deaths per 100,000 population in the least deprived areas (Quintile 1) to 23.2 in the most deprived areas (Quintile 5). The female rates ranged from 5.7 in the least deprived areas to 16.3 in the most deprived areas.

The differentials in rates between Quintile 5 and Quintile 1 were a high 3.01** for males and 2.86** for females.

Figure 5.11: Avoidable mortality from COPD by deprivation and sex, New Zealand, 1997-2001

By ethnicity

Avoidable mortality from COPD varied by ethnicity (Table 5.25). The rate for Mäori (34.4 deaths per 100,000 population) was 3.16** times the European/ others rate (10.9): the rate for Pacific peoples (17.4 deaths per 100,000 population) was 1.60** times.

As seen for all respiratory diseases (above), the male rate of mortality from COPD for Pacific peoples was four times (4.10**) the female rate, and was also higher for European/ others (1.40**). Conversely, for Mäori, the male rate was 15% lower than the female rate (a rate ratio of 0.85).

The differential between the Mäori and European/ others rate was higher for females (4.02**) than for males (2.46**). For Pacific peoples, males had a relatively high rate (a differential of 2.32**); however, females had a relatively low rate, being 79% of the female European/ others rate.
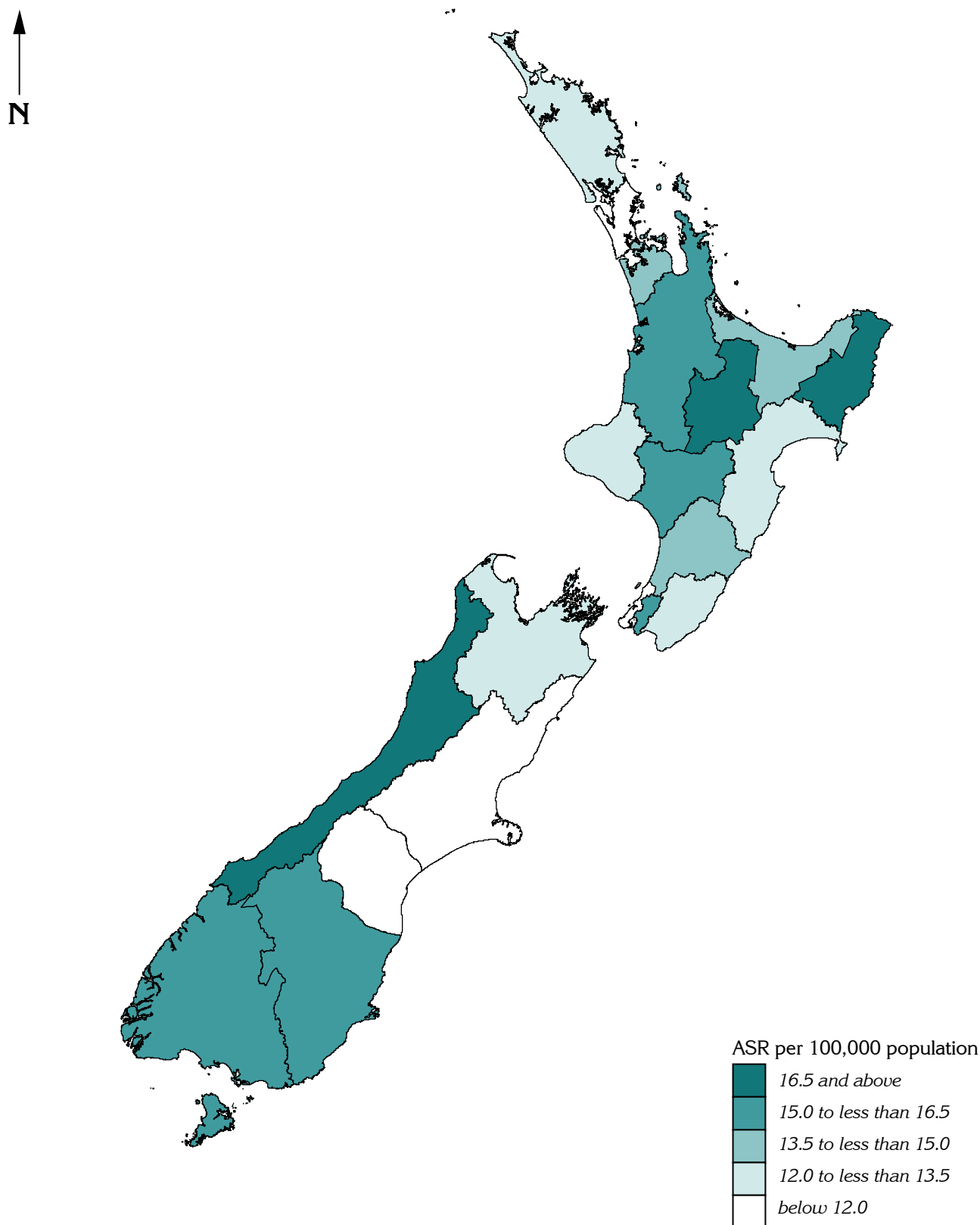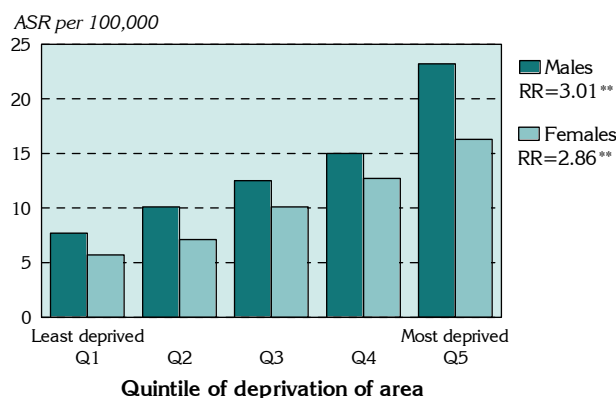
Table 5.25: Avoidable mortality from COPD by ethnicity and sex, New Zealand, 1997-2001

ASR per 100,000 population

Ethnic group	Males	Females	Total	RR M:F
Mäori	31.2	36.6	34.4	0.85
Pacific peoples	29.5	7.2	17.4	4.10**
Euro/ others	12.7	9.1	10.9	1.40**
Total	**14.0**	**10.7**	**12.4**	**1.31****
RR–Mäori:Euro	**2.46****	**4.02****	**3.16****	..
RR–Pacific:Euro	**2.32****	**0.79**	**1.60****	..

Map 5.9
Selected cause – Chronic obstructive pulmonary disease: avoidable
mortality (45 to 74 years), New Zealand, 1997-2001
age standardised deaths per 100,000 population by District Health Board

ASR per 100,000 population

15.0 and above
13.5 to less than 15.0
12.0 to less than 13.5
10.5 to less than 12.0
below 10.5

Details of map boundaries are in Appendix 1.4

Australian and New Zealand Atlas of Avoidable Mortality

Selected cause – Road traffic injuries: avoidable mortality (0 to 74 years), New Zealand

By District Health Board

Avoidable mortality from road traffic injuries varied substantially, at the District Health Board level, around the New Zealand rate of 12.9 deaths per 100,000 population (Table 5.26). The highest rate (23.5 deaths per 100,000 population) was 82% above the average (a rate ratio of 1.82[**]), and the lowest rate (6.4) was 50% below the national average (0.50[**]).

The highest rates were in Bay of Plenty (23.5 deaths per 100,000 population), Northland and Whanganui (both 21.6), and Lakes (20.4) (Map 5.10).

The lowest rates were in Capital and Coast (6.4), Auckland (7.4), Hutt (7.7), Otago (8.1) and Canterbury (8.6).

Table 5.26: Avoidable mortality from road traffic injuries by area, New Zealand, 1997-2001

District Health Board	Number	ASR
Auckland	127	7.4
Bay of Plenty	178	23.5
Canterbury	171	8.6
Capital and Coast	75	6.4
Counties Manukau	199	11.9
Hawke's Bay	118	18.3
Hutt	47	7.7
Lakes	88	20.4
MidCentral	129	17.6
Nelson-Marlborough	69	12.7
Northland	132	21.6
Otago	67	8.1
South Canterbury	39	16.6
Southland	75	15.4
Tairawhiti	38	19.4
Taranaki	89	19.0
Waikato	253	17.2
Wairarapa	33	19.5
Waitemata	185	9.6
West Coast	23	16.9
Whanganui	63	21.6
Total	**2,198**	**12.9**

By deprivation

For both males and females, there was a marked deprivation gradient in the rates of death from road traffic injuries (Figure 5.12).

Rates for males were higher than females, ranging from 11.9 deaths per 100,000 population in the least deprived areas (Quintile 1) to 26.0 in the most deprived areas (Quintile 5). The female rates ranged from 4.5 in the least deprived areas to 10.6 in the most deprived areas.

The differentials in rates between Quintile 5 and Quintile 1 were 2.18[**] for males and 2.36[**] for females.

Figure 5.12: Avoidable mortality from road traffic injuries by deprivation and sex, New Zealand, 1997-2001

By ethnicity

Avoidable mortality from road traffic injuries also varied markedly by ethnicity (Table 5.27). The rate for Māori (25.3 deaths per 100,000 population) was 2.34[**] times the European/ others rate (10.8). The rate for Pacific peoples (10.5 deaths per 100,000 population) was only marginally lower than the European/ others rate (three per cent lower, a rate ratio of 0.97).

For all ethnic groups, the male rates of avoidable mortality from road traffic injuries were more than twice the female rates.
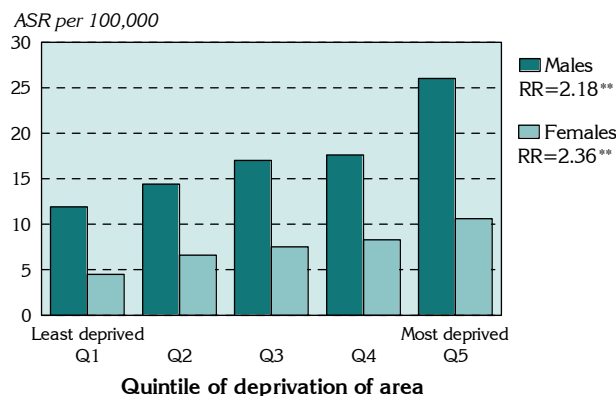
The differential in rates between the Māori and European/ others was greater for females (2.56[**]) than for males (2.25[**]). For Pacific peoples, rates were lower than for the European/ others population, at 92% (of the European/ others rate) for females and 99% for males.

Table 5.27: Avoidable mortality from road traffic injuries by ethnicity and sex, New Zealand, 1997-2001

ASR per 100,000 population

Ethnic group	Males	Females	Total	RR M:F
Māori	34.4	16.1	25.3	2.14[**]
Pacific peoples	15.2	5.8	10.5	2.62[**]
Euro/ others	15.3	6.3	10.8	2.43[**]
Total	**18.0**	**7.7**	**12.9**	**2.34[**]**
RR–Māori:Euro	**2.25[**]**	**2.56[**]**	**2.34[**]**	..
RR–Pacific:Euro	**0.99**	**0.92**	**0.97**	..

Map 5.10
Selected cause – Road traffic injuries: avoidable mortality (0 to 74 years), New Zealand, 1997-2001
age standardised deaths per 100,000 population by District Health Board

N

ASR per 100,000 population

- 21 and above
- 17 to 20
- 13 to 16
- 9 to 12
- below 9

Details of map boundaries are in Appendix 1.4

Australian and New Zealand Atlas of Avoidable Mortality

Selected cause – Suicide and self inflicted injuries: avoidable mortality (0 to 74 years), New Zealand

By District Health Board

The rate of avoidable mortality from suicide and self inflicted injuries for New Zealand is 14.9 deaths per 100,000 population (Table 5.28). The highest rate (24.2 deaths per 100,000 population) was 62% (a rate ratio of 1.62**) higher than the average, and the lowest (10.7) approximately 30% below the national average (0.72).

The highest rates of avoidable mortality from suicide were in West Coast (24.2 deaths per 100,000 population), Lakes (20.9), Hawke's Bay (18.6), Nelson-Marlborough (18.4) and Bay of Plenty (18.1) (Map 5.11).

The lowest rates were in Wairarapa (10.7; 18 deaths), Capital and Coast (12.2) and Auckland (13.2).

Table 5.28: Avoidable mortality from suicide and self inflicted injuries by area, New Zealand, 1997-2001

District Health Board	Number	ASR
Auckland	238	13.2
Bay of Plenty	136	18.1
Canterbury	305	15.0
Capital and Coast	147	12.2
Counties Manukau	227	13.5
Hawke's Bay	119	18.6
Hutt	100	16.1
Lakes	91	20.9
MidCentral	103	14.2
Nelson-Marlborough	102	18.4
Northland	99	16.4
Otago	114	13.7
South Canterbury	41	17.1
Southland	79	15.9
Tairawhiti	32	16.5
Taranaki	68	14.5
Waikato	214	14.6
Wairarapa	18	10.7
Waitemata	268	13.6
West Coast	34	24.2
Whanganui	51	17.6
Total	**2,588**	**14.9**

By deprivation

For both males and females, there was a deprivation gradient in the rates of death from suicide and self inflicted injuries (Figure 5.13).

Rates for males were higher than females, ranging from 16.7 deaths per 100,000 population in the least deprived areas (Quintile 1) to 27.2 in the most deprived areas (Quintile 5). The female rates ranged from 5.3 in the least deprived areas to 7.3 in the most deprived areas.

The differentials in rates between Quintile 5 and Quintile 1 were 1.63** for males and 1.38* for females.

Figure 5.13: Avoidable mortality from suicide and self inflicted injuries by deprivation and sex, New Zealand, 1997-2001

By ethnicity

Avoidable mortality from suicide and self inflicted injuries varied by ethnicity (Table 5.29). The rate for Māori (22.4 deaths per 100,000 population) was 1.6 times the European/ others rate (14.0). However, the rate for Pacific peoples (11.0 deaths per 100,000 population) was 21% lower than the European/ others rate.

For all ethnic groups, the male rate of avoidable mortality from suicide and self inflicted injuries was substantially higher than the female rate.

The differential in rates between the Māori and European/ others was greater for males (1.62**) than for females (1.55**). For Pacific peoples, the rates were below the European/ others rate, being 19% lower for males and 26% lower for females.
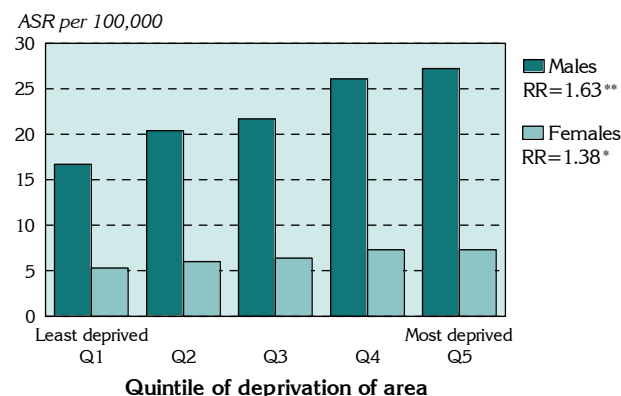
Table 5.29: Avoidable mortality from suicide and self inflicted injuries by ethnicity and sex, New Zealand, 1997-2001

ASR per 100,000 population

Ethnic group	Males	Females	Total	RR M:F
Māori	35.1	9.6	22.4	3.66**
Pacific peoples	17.5	4.6	11.0	3.80**
Euro/ others	21.7	6.2	14.0	3.50**
Total	**23.2**	**6.6**	**14.9**	**3.52****
RR–Māori:Euro	**1.62****	**1.55****	**1.60****	..
RR–Pacific:Euro	**0.81**	**0.74**	**0.79***	..

Map 5.11

Selected cause – Suicide and self inflicted injuries: avoidable mortality (0 to 74 years), New Zealand, 1997-2001

age standardised deaths per 100,000 population by District Health Board

ASR per 100,000 population

- 18.0 and above
- 16.5 to less than 18.0
- 15.0 to less than 16.5
- 13.5 to less than 15.0
- below 13.5

Details of map boundaries are in Appendix 1.4

Australian and New Zealand Atlas of Avoidable Mortality

5.5 Avoidable mortality by deprivation

This section examines avoidable mortality by deprivation (measured using the NZDep96 index). The calculation of age-standardised death rates by quintile and the NZDep96 index are described in Chapter 2, *Methods*.

By sex

Figure 5.14 (also shown on page 106) and Table 5.30 show clear gradients in rates of avoidable mortality across the quintiles of deprivation of area for the total population and for both males and females. Age-standardised death rates varied from 141.5 deaths in the least deprived areas (Quintile 1) to 321.9 in the most deprived areas (Quintile 5), a differential in rates between the most deprived areas and least deprived areas of 2.27[**].

Within each quintile, the male rate was some 60% to 70% higher than the female rate. Male rates ranged from 174.7 deaths per 100,000 population in Quintile 1 to 401.3 in Quintile 5. For females, the variation in rates of avoidable mortality was

from 108.2 in the least deprived areas to 242.3 in the most deprived areas.

The differentials in rates between Quintile 5 and Quintile 1 were both large, being 2.30[**] for males and 2.24[**] for females.

Figure 5.14: Avoidable mortality (0 to 74 years) by deprivation and sex, New Zealand, 1997-2001
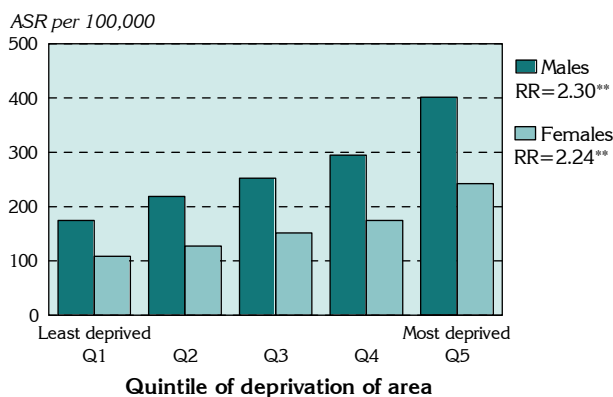

Table 5.30: Avoidable mortality (0 to 74 years) by deprivation and sex, New Zealand, 1997-2001

Quintile	Number			ASR per 100,000 population			
	Males	Females	Total	Males	Females	Total	Rate ratio M:F
1: Least deprived	3,132	2,001	5,133	174.7	108.2	141.5	1.61[**]
2	4,116	2,510	6,626	218.8	127.1	172.9	1.72[**]
3	4,921	3,142	8,063	252.2	151.7	202.0	1.66[**]
4	6,275	4,033	10,309	294.6	174.6	234.6	1.69[**]
5: Most deprived	7,176	4,610	11,785	401.3	242.3	321.9	1.66[**]
Total	**27,089**	**17,183**	**44,272**	**274.2**	**164.4**	**219.3**	**1.67[**]**
RR–Quintile 5:Quintile 1	..	..	..	**2.30[**]**	**2.24[**]**	**2.27[**]**	..

By excess deaths[3]

For the total population, and for both males and females, the number of excess deaths increased with increasing deprivation, with the fewest excess deaths in Quintile 2 and the largest number in Quintile 5 (most deprived) (Table 5.31).

The size of the impact of inequality is noteworthy: if mortality in all quintiles equalled that of the least deprived group (Quintile 1), total avoidable deaths

would be reduced from 44,272 (see Table 5.30 above) to 30,257. The 14,015 excess deaths that occurred over the observation period accounted for almost one third (31.7%) of total avoidable mortality.

For males, there were estimated to be 8,730 excess deaths (62.3%), and 5,285 for females (37.7%). The number of male excess deaths was between one and a half (Quintile 5) and just over twice (Quintile 2) the level for females.

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[3] See Chapter 2, *Methods*

Table 5.31: Excess deaths[1] from avoidable mortality (0 to 74 years) by quintile of deprivation and sex, New Zealand, 1997-2001

Sex	Number					Total (Q1:Q5)	Per cent of total
	Q1	Q2	Q3	Q4	Q5		
Males	(0)	794	1,461	2,473	4,002	**8,730**	62.3
Females	(0)	360	881	1,503	2,541	**5,285**	37.7
Total	**(0)**	**1,154**	**2,342**	**3,976**	**6,543**	**14,015**	**100.0**
Ratio–M:F	..	2.21	1.66	1.65	1.57	1.65	..

[1] Excess deaths is the difference between the observed and expected number of deaths, calculated between Quintile 1 (least deprived) and the quintile under analysis

By excess deaths and age

The number of excess deaths increased by age, with marginally fewer deaths in the 65 to 74 year age group (Table 5.32). Over 80.0% of excess deaths (11,150) were in the 45 to 64 year and 65 to 74 year age groups.

In the age group under one year, there were 376 excess deaths, 2.7% of the total for all age groups in the analysis, with twice this number in the 1 to 24 year age group (761 deaths, 5.4%).

One in eight (12.3%) of the total excess deaths were recorded in the 25 to 44 year age group. The largest number of excess deaths, 5,835 (41.6%) was in the 45 to 64 year age group, while the 65 to 74 year age group, with 5,315 (37.9%), had marginally fewer.

The pattern of excess deaths within each quintile of deprivation of area was similar to that for New Zealand as a whole, with the largest numbers (between 36% and 43% of excess deaths in each Quintile) in the two oldest age groups, and the smallest (less than 3%) in the youngest. Excess deaths in the 45 to 64 year and 65 to 74 year age groups in Quintile 2 accounted for a total of 935 deaths, 81.0% of excess deaths in this group.

The smallest number of excess deaths in Quintile 2 was among infants with 33 deaths (2.9%). There were 49 excess deaths in the 1 to 24 year age group and 137 in those aged 25 to 44 years.

In Quintile 3, the 65 to 74 year age group had 953 excess deaths, two fifths (40.7%) of all excess deaths in these areas, and marginally more than the 932 excess deaths (39.8%) in those aged 45 to 64 years. There were 48 excess deaths of infants under one year of age, and the 1 to 24 year and 25 to 44 year age groups recorded 124 and 285 excess deaths, respectively.

In Quintiles 4 and 5, excess deaths in the 65 to 74 year (1,578 and 2,330) and 45 to 64 year (1,613 and 2,808) age groups comprised 80.3% and 78.5% of excess deaths in these quintiles, respectively.

While the number of excess deaths in the 1 to 24 year age group was lower in Quintile 4 (221) than in Quintile 5 (368), the proportions were the same (5.6%). Similarly, in the 25 to 44 year age group, there was marginal variation in the proportions of excess deaths between Quintile 4 (11.5%, 459 deaths) and Quintile 5 (12.9%, 847 deaths).

Table 5.32: Excess deaths from avoidable mortality (0 to 74 years) by quintile of deprivation and age, New Zealand, 1997-2001

| Age (years) | Number | | | | | Total | Per cent |
	Q1	Q2	Q3	Q4	Q5	(Q2:Q5)	of total
Infants (<1)	(0)	33	48	105	190	**376**	2.7
1-24	(0)	49	124	221	368	**761**	5.4
25-44	(0)	137	285	459	847	**1,728**	12.3
45-64	(0)	481	932	1,613	2,808	**5,835**	41.6
65-74	(0)	454	953	1,578	2,330	**5,315**	37.9
Total	(0)	1,154	2,342	3,976	6,543	14,015	100.0

By excess deaths, age and sex

Total excess deaths for males were above those for females in each age group of the analysis, except for infants, where there was little difference by sex, although there were notable variations by age (Table 5.33).

The pattern of excess deaths by age for both sexes is similar to that for the total population, with the highest number of excess deaths for both males (3,686, 42.2% of male excess deaths) and females 2,149, 40.7% of female excess deaths) in the 45 to 64 year age group. The 45 to 64 and 65 to 74 year age groups accounted for more than three quarters of excess deaths in both males (79.4%, 6,936 deaths) and females (79.8%, 4,214).

The greatest differentials between male and female excess deaths were in the 1 to 24 year and 25 to 44 year age groups, where deaths in males (492,

5.6% and 1,115, 12.8%, respectively) were just under twice those for females in these age groups (270, 5.1%, and 612, 11.6%, respectively).

The greatest variation between male and female excess deaths was in Quintile 2, with almost four times the number of male deaths in the 1 to 24 year age group (39) than female deaths (10). The differential of 2.3 times for infants was notably larger than for this age group in the other deprivation groups. There were also differentials of greater than two in the 25 to 44 year age group and the 65 to 74 year age group.

In Quintile 3, male excess deaths in the 45 to 64 year age group (628) were more than twice those for females (305) in this age group. Differentials for the other age groups in this deprivation group ranged from less than one (in infants) to just under two (in the 1 to 24 year age group).

The number of excess deaths for males in the 1 to 24 year age group in Quintile 4 was just less than twice those for females, with slightly smaller differentials in each subsequent age group. For infants, female excess deaths were higher than those for males.

In Quintile 5, the most deprived areas, male excess deaths were 83% higher than for females in the 25 to 44 year age group. Apart from infants (where there was little difference in numbers of deaths) differentials between males and females in the other age groups in Quintile 5 were just over one and one half times.

Table 5.33: Excess deaths from avoidable mortality by quintile of deprivation, age and sex, New Zealand, 1997-2001

| Age (years) and sex | Number | | | | | Total (Q2:Q5) | Per cent of total |
	Q1	Q2	Q3	Q4	Q5		
Males							
Infants (<1)	(0)	23	23	43	98	**187**	2.1
1-24	(0)	39	82	146	225	**492**	5.6
25-44	(0)	94	177	297	548	**1,115**	12.8
45-64	(0)	317	628	1,014	1,728	**3,686**	42.2
65-74	(0)	321	551	973	1,404	**3,250**	37.2
Total	(0)	794	1,461	2,473	4,002	8,730	100.0
Females							
Infants (<1)	(0)	10	25	62	92	**189**	3.6
1-24	(0)	10	42	75	143	**270**	5.1
25-44	(0)	43	108	163	299	**612**	11.6
45-64	(0)	164	305	600	1,080	**2,149**	40.7
65-74	(0)	133	402	604	926	**2,065**	39.1
Total	(0)	360	881	1,503	2,541	5,285	100.0
Ratio–M:F							
Infants (<1)	..	2.30	0.92	0.69	1.07	**0.99**	..
1-24	..	3.90	1.95	1.95	1.57	**1.82**	..
25-44	..	2.19	1.64	1.82	1.83	**1.82**	..
45-64	..	1.93	2.06	1.69	1.60	**1.72**	..
65-74	..	2.41	1.37	1.61	1.52	**1.57**	..
Total	..	1.66	1.65	1.57	1.65	..	..

5.6 Avoidable mortality by ethnicity

This section examines avoidable mortality by ethnicity, with comparisons of Mäori, Pacific peoples, and the remaining population (referred to as 'European/ others').

Overall impact by ethnicity

The proportion of deaths at ages 0 to 74 years from avoidable causes is 77.4% for Mäori, 76.1% for Pacific peoples and 73.5% for the European/ others population (Table 5.34).

The differences between the three ethnic groups are relatively small when compared with the differences in rates.

The Mäori rate is 2.73** times that for European/ others, and the rate for Pacific peoples is more than twice (2.03**) the European/ others rate.

The proportion of deaths from amenable causes for Mäori is 30.6%, lower than the proportions of 36.3% for Pacific peoples and 32.2% for the ` population.

Table 5.34: Avoidable mortality (0 to 74 years) by ethnicity, New Zealand, 1997-2001

Mortality category	Number			ASR per 100,000 population			Rate ratio	
	Mäori	Pacific peoples	Euro/ others	Mäori	Pacific peoples	Euro/ others	Mäori: Euro/ others	Pacific: Euro/ others
Avoidable	8,449	2,332	33,491	509.4	379.0	186.9	2.73**	2.03**
(Amenable)	(3,337)	(1,112)	(14,681)	(198.2)	(179.4)	(81.6)	(2.43**)	(2.20**)
Unavoidable	2,466	732	12,051	146.5	117.7	67.2	2.18**	1.75**
Total	10,915	3,064	45,542	655.5	496.7	254.2	2.58**	1.95**

By sex

Avoidable mortality varied substantially by ethnicity (Figure 5.15, Table 5.35 – note rates also shown in Table 5.9, page 106). Mäori rates were the highest for the total population and for both males and females, followed by rates for Pacific peoples and the remaining population. The Mäori rate for deaths from avoidable causes (509.4 deaths per 100,000 population) was 2.73** times the European/ others rate (186.9): the rate for Pacific peoples (379.0) was 2.01** times.

For all ethnic groups, the male rate of avoidable mortality was higher (1.46** to 1.73**) than the female rate. The differential between the Mäori and the European/ others rate was larger for females (3.02**) than for males (2.54**).

For Pacific peoples, the rates were approximately double the European/ others rate for both males (2.01**) and females (2.03**).

Figure 5.15: Avoidable mortality (0 to 74 years) by ethnicity and sex, New Zealand, 1997-2001

Table 5.35: Avoidable mortality (0 to 74 years) by ethnicity and sex, New Zealand, 1997-2001

Ethnic group	Number			ASR per 100,000 population			Rate ratio M:F
	Males	Females	Total	Males	Females	Total	
Mäori	4,870	3,579	8,449	603.2	413.3	509.4	1.46**
Pacific peoples	1,412	919	2,332	476.0	282.3	379.0	1.69**
Euro/ others	20,806	12,685	33,491	237.1	137.0	186.9	1.73**
Total	27,089	17,183	44,272	274.2	164.4	219.3	1.67**
RR–Mäori:Euro	..	..	..	2.54**	3.02**	2.73**	..
RR–Pacific:Euro	..	..	..	2.01**	2.06**	2.03**	..

By age

Apart from the infant death rate, which was higher for Pacific peoples, Mäori rates for avoidable mortality were the highest in each age group; next highest were the rates for Pacific peoples and then the remaining population (Table 5.36, Figure 5.16).

The highest rates were in the 65 to 74 year age group, with a rate of 3,969.3 per 100,000 population for Mäori, 3,143.4 for Pacific peoples, and 1,489.5 for European/ others.

The next highest rates were in the 45 to 64 year age group.

The rates of avoidable mortality for infants were 602.9 for Pacific peoples, 510.8 for Mäori and 335.6 for European/ others. The largest differential in the Mäori and European/ others rates was in the 45 to 64 year age group, with a rate ratio of 3.55**. For Pacific peoples, the largest differential was also in the 45 to 64 year age group, with a rate ratio of 2.48**.
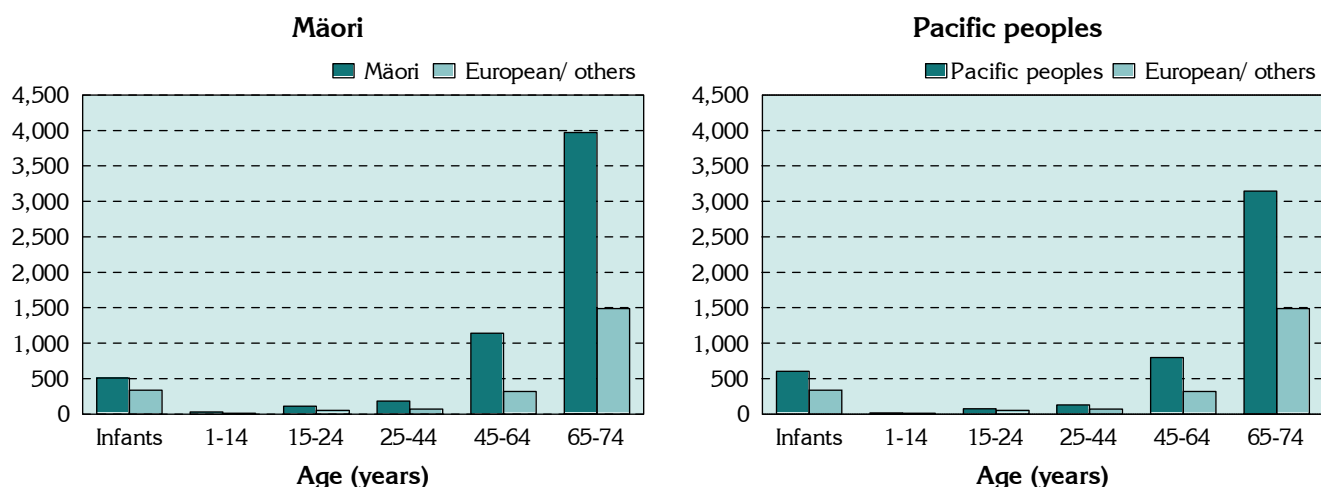
Table 5.36: Avoidable mortality by ethnicity and age, New Zealand, 1997-2001

Age (years)	Number			Rate per 100,000[1]			Rate ratio Mäori: Euro/ others	Rate ratio Pacific: Euro/ others
	Mäori	Pacific peoples	Euro/ others	Mäori	Pacific peoples	Euro/ others		
Infants (<1)	366	149	594	510.8	602.9	335.6	1.52**	1.80**
1-14	266	54	325	29.0	17.4	12.1	2.40**	1.44*
15-24	513	127	1,071	110.2	75.3	55.1	2.00**	1.37**
25-44	1,347	357	3,196	185.3	129.4	70.4	2.63**	1.84**
45-64	3,563	922	11,026	1,140.9	797.1	321.0	3.55**	2.48**
65-74	2,394	723	17,279	3,969.3	3,143.4	1,489.5	2.66**	2.11**
Total	**8,449**	**2,332**	**33,491**	**509.4**	**379.0**	**186.9**	**2.73****	**2.03****

[1] Rates are age standardised within age categories, except under 1 year

Figure 5.16: Avoidable mortality by ethnicity and age, New Zealand, 1997-2001

Rate per 100,000 population

The impact of avoidable mortality on each of the ethnic populations is most evident at younger ages in the Mäori and Pacific peoples populations, and at older ages in the European/ others population (Table 5.37). The proportions of years of life lost (YLL) from avoidable causes at ages 0 to 24 years were similar for the Mäori population (20.7%) and Pacific peoples (21.7%), and were more than twice the proportion for the European/ others (10.6%). At the same time, the proportions of YLL at ages 45 to 74 years for Mäori (58.6%) and Pacific peoples (58.3%) were notably lower than the proportion for the European/ others at these ages (74.9%).

Table 5.37: YLL from avoidable mortality by ethnicity and age, New Zealand, 1997-2001

Age (years)	Number			Per cent			Ratio Mäori: Euro/ others	Ratio Pacific: Euro/ others
	Mäori	Pacific peoples	Euro/ others	Mäori	Pacific peoples	Euro/ others		
Infants (<1)	11,185	4,548	18,123	6.9	10.1	3.3	2.08**	3.07**
1-14	7,949	1,614	9,695	4.9	3.6	1.8	2.76**	2.04**
15-24	14,518	3,586	30,263	8.9	8.0	5.5	1.61**	1.45**
25-44	33,817	8,916	79,944	20.7	19.9	14.6	1.42**	1.37**
45-64	65,819	17,216	201,222	40.3	38.4	36.7	1.10**	1.05**
65-74	29,884	8,934	209,512	18.3	19.9	38.2	0.48**	0.52**
Total	163,173	44,815	548,759	100.0	100.0	100.0	..	..

By deprivation

There are clear socioeconomic gradients in the rates of avoidable mortality for Mäori and European/ others, but no clear pattern for Pacific peoples (Table 5.38). The gradient is more pronounced for Mäori compared to the European/ others, with a differential in rates of 2.10** between the most deprived areas (Quintile 5) and the least deprived areas (Quintile 1) for Mäori, compared to 1.77** for European/ others.

The greatest differential in rates between the Mäori and European/ others was in the most deprived areas, where the Mäori rate (509.4 deaths per 100,000 population) was more than two and half times (2.73**) the rate for European/ others (186.9). The highest differential in rates between Pacific peoples and European/ others was in Quintile 1 where the Pacific peoples rate (368.8 deaths per 100,000 population) was also 2.73** times the European/ others rate (135.3).

Table 5.38: Avoidable mortality (0 to 74 years) by ethnicity and deprivation, New Zealand, 1997-2001

Quintile	Number			ASR per 100,000 population			Rate ratio Mäori: Euro/ others	Rate ratio Pacific: Euro/ others
	Mäori	Pacific peoples	Euro/ others	Mäori	Pacific peoples	Euro/ others		
1: Least deprived	307	95	4,730	286.7	368.8	135.3	2.12**	2.73**
2	604	151	5,871	379.4	354.3	161.7	2.35**	2.19**
3	1,109	281	6,673	411.9	335.3	183.3	2.25**	1.83**
4	1,836	470	8,003	483.7	367.8	205.9	2.35**	1.79**
5: Most deprived	4,205	1,260	6,321	600.8	396.7	239.1	2.51**	1.66**
Total	8,449	2,332	33,491	509.4	379.0	186.9	2.73**	2.03**
RR–Q5:Q1	..	..	..	2.10**	1.08**	1.77**	..	..

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6 Amenable mortality: Australia, 1997-2001

6.1 Amenable mortality by age and sex

As noted in Chapter 4, 40.2% of avoidable deaths (or 28.7% of total deaths) at ages 0 to 74 years over the period 1997 to 2001 are considered to be amenable to health care.

Almost half (49.5%) of these deaths occurred in the 65 to 74 year age group, with more than one third (36.0%) at ages 45 to 64 years (Table 6.1). The 25 to 44 year age group comprised 7.8% of deaths

from amenable causes, with the age groups below 25 years accounting for 6.6%.

Death rates for amenable mortality ranged from 567.6 deaths per 100,000 population in the 65 to 74 year age group to 3.8 in the 1 to 14 year age group. Other high rates were for infants under one year of age (304.5 per 100,000 population) and in the 45 to 64 year age group (132.6).

Table 6.1: Amenable mortality by age and sex, Australia, 1997-2001
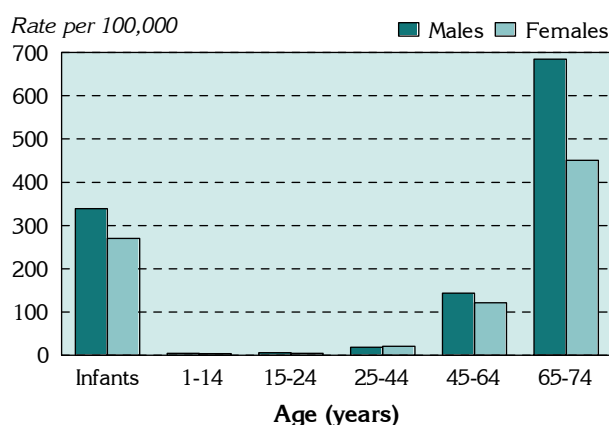
| Age (years) | Number | | | Per cent of total | Rate per 100,000 population[1] | | | Rate ratio M:F |
	Males	Females	Total		Males	Females	Total	
Infants (<1)	2,083	1,577	3,661	4.8	338.7	270.4	304.5	1.25**
1-14	399	302	701	0.9	4.2	3.4	3.8	1.24
15-24	428	294	722	0.9	6.3	4.5	5.4	1.40**
25-44	2,804	3,141	5,946	7.8	18.8	20.8	19.8	0.90**
45-64	14,934	12,531	27,464	36.0	143.4	121.7	132.6	1.18**
65-74	21,920	15,837	37,756	49.5	684.8	450.4	567.6	1.52**
Total	**42,568**	**33,682**	**76,250**	**100.0**	**79.4**	**61.4**	**70.4**	**1.29****

[1] **Rates are age standardised within age categories, except under 1 year**

Male death rates from amenable mortality were higher than female death rates in all but the 25 to 44 year age group, where the male rate was 10% lower than the females rate (a differential of 0.90**) (Table 6.1, Figure 6.1).

The highest rates of amenable mortality for both males and females were in the 65 to 74 year age group, with the male rate (684.8 deaths per 100,000 males) 1.52** times the female rate (450.4). The next highest differential was in the 15 to 25 year age group, with the male rate (6.3 deaths per 100,000 males) 1.40** times the female rate (4.5).

Figure 6.1: Amenable mortality by age and sex, Australia, 1997-2001

From 1997 to 2001, amenable mortality accounted for a total of 1.3 million years of life lost (YLL) for the 0 to 74 year age groups (Table 6.2). The largest numbers of YLL from amenable mortality were in the 45 to 64 year age group (517,600 years) and the 65 to 74 year age group (480,100). Together, these two age groups accounted for over three quarters (76.8%) of all YLL from deaths from amenable causes.

Table 6.2: YLL from amenable mortality by age and sex, Australia, 1997-2001

| Age (years) | Number ('000) | | |
	Males	Females	Total
Infants (<1)	63.6	48.2	111.8
1-14	11.9	9.0	21.0
15-24	12.1	8.3	20.4
25-44	69.8	77.8	147.6
45-64	279.1	238.5	517.6
65-74	279.3	200.8	480.1
Total	**715.8**	**582.6**	**1,298.4**

The numbers of YLL were higher for males than for females in all age groups except the 25 to 44 year age group, where YLL were 10% higher for females than for males. The largest differentials in YLL between males and females were in the 15 to 24 year age group (males 46% higher) and 65 to 74 year age group (males 39% higher).

6.2 Amenable mortality by cause

Note: for three causes – diabetes, ischaemic heart disease and cerebrovascular diseases – only 50% of the total avoidable deaths were attributed as 'amenable' to health care intervention. Refer to Chapter 2, *Methods*, for further information.

Table 6.3 shows the number, number, age-standardised death rate, proportion of amenable deaths and YLL, for the major condition groups and individual causes included in the amenable mortality classification.

The highest rates of amenable mortality by major condition groups were for cancer, with a rate of 27.9 deaths per 100,000 population (40.2% of amenable deaths), with a similar rate for cardiovascular diseases (25.7, 38.5% of amenable deaths). These two major condition groups were responsible for over three quarters of amenable mortality at ages 0 to 74 years.

Similarly, the numbers of YLL for deaths from amenable causes were highest for these two major condition groups – cancer and cardiovascular diseases – accounting for 517,000 and 448,600 YLL, respectively.

Table 6.3: Amenable mortality (0 to 74 years) by major condition group and cause, Australia, 1997-2001

Major condition group/ cause	Number	ASR	Per cent of total	YLL ('000)
Infections	**3,120**	**2.9**	**4.1**	**54.3**
Tuberculosis	127	0.1	0.2	2.0
Selected invasive bacterial and protozoal infections	2,993	2.8	3.9	52.3
Cancer (malignant neoplasms)	**30,652**	**27.9**	**40.2**	**517.0**
Colorectal	13,008	11.7	17.1	206.3
Melanoma of skin	3,284	3.0	4.3	58.6
Nonmelanotic skin	686	0.6	0.9	10.5
Breast (female)	8,550	7.9	11.2	154.7
Cervix	908	0.8	1.2	17.1
Uterus	724	0.6	0.9	11.3
Bladder	1,635	1.4	2.1	23.7
Thyroid	225	0.2	0.3	3.7
Hodgkin's disease	208	0.2	0.3	4.0
Lymphoid leukaemia – acute/chronic	1,108	1.1	1.5	21.5
Benign	316	0.3	0.4	5.7
Nutritional, endocrine and metabolic conditions	**3,168**	**2.8**	**4.2**	**49.2**
Thyroid disorders	84	0.1	0.1	1.3
Diabetes	3,084	2.7	4.0	47.9
Neurological disorders	**1,000**	**1.0**	**1.3**	**23.2**
Epilepsy	1,000	1.0	1.3	23.2
Cardiovascular diseases	**29,368**	**25.7**	**38.5**	**448.6**
Rheumatic and other valvular heart disease	614	0.6	0.8	10.5
Hypertensive heart disease	619	0.5	0.8	9.9
Ischaemic heart disease	21,856	19.2	28.7	333.7
Cerebrovascular diseases	6,279	5.4	8.2	94.5
Genitourinary disorders	**2,072**	**1.8**	**2.7**	**31.2**
Nephritis and nephrosis	1,910	1.6	2.5	28.7
Obstructive uropathy and prostatic hyperplasia	162	0.1	0.2	2.5
Respiratory diseases	**390**	**0.4**	**0.5**	**10.4**
Asthma (0-44 years)	390	0.4	0.5	10.4
Digestive disorders	**1,676**	**1.5**	**2.2**	**26.7**
Peptic ulcer disease	664	0.6	0.9	10.1
Acute abdomen, appendicitis, intestinal obstruction, cholecystitis/ lithiasis, pancreatitis, hernia	1,012	0.9	1.3	16.5
Maternal and infant causes	**4,803**	**6.4**	**6.3**	**137.9**
Birth defects	3,278	4.2	4.3	91.4
Complications of perinatal period	1,525	2.1	2.0	46.5
Total amenable mortality	**76,249**	**70.4**	**100.0**	**1,298.4**

Of the top ten causes of amenable mortality, ischaemic heart disease ranked the highest, with a rate of 19.2 deaths per 100,000 population; colorectal cancer, with a rate of 11.7 deaths per 100,000 population, was ranked next (Table 6.4). Together, ischaemic heart disease and colorectal cancer accounted for almost half (45.8%) of deaths from amenable causes. The rates for the other eight causes ranged from 1.6 deaths per

100,000 population for nephritis and nephrosis to 7.9 deaths per 100,000 female population for breast cancer.

Ischaemic heart disease was also ranked highest for the number of YLL from these deaths, accounting for 333,710 YLL. Colorectal cancer and breast cancer were the next ranked causes, responsible for around 206,300 and 154,700 YLL, respectively.

Table 6.4: Top ten causes of amenable mortality (0 to 74 years), Australia, 1997-2001

Cause	Number	ASR	Per cent of total	YLL
Ischaemic heart disease	21,856	19.2	28.7	333,710
Colorectal cancer	13,008	11.7	17.1	206,296
Breast cancer (female)	8,550	7.9	11.2	154,683
Cerebrovascular diseases	6,279	5.4	8.2	94,496
Birth defects	3,278	4.2	4.3	91,362
Skin cancer	3,284	3.0	4.3	58,590
Selected invasive bacterial and protozoal infections	2,993	2.8	3.9	52,276
Diabetes	3,084	2.7	4.0	47,929
Complications of perinatal period	1,525	2.1	2.0	46,494
Nephritis and nephrosis	1,910	1.6	2.5	28,671
All causes	**76,249**	**70.4**	**100.0**	**1,298,430**

By age

Table 6.5 shows variations in amenable mortality by the major causes in selected age groups.

For infants, birth defects accounted for over half (54.5%) of the deaths from amenable causes, a rate of 166.2 deaths per 100,000 population. Complications of the perinatal period were responsible for a further 40.9% of these deaths n this age group, a rate of 124.3, followed by selected invasive bacterial and protozoal infections, which contributed 3.6% of deaths from amenable causes.

In the 1 to 14 year age group, deaths from birth defects accounted for 39.9% of amenable mortality, a rate of 1.5 deaths per 100,000 population. Acute/ chronic lymphoid leukaemia (18.4%) and selected invasive bacterial and protozoal infections (16.8%) were responsible for over one third of deaths from amenable causes in this age group, with approximately 8.0% from each of epilepsy and asthma.

For the 15 to 24 year age group, amenable mortality from birth defects accounted for 22.7% of all deaths, a rate of 1.2 deaths per 100,000 population. The next four highest causes of death each accounted for between 11% and 16% of amenable mortality in this age group, with rates ranging from 0.6 deaths per 100,000 population for both asthma and selected invasive bacterial and protozoal infections to 0.9 deaths per 100,000 population for epilepsy.

In the 25 to 44 year age group, the top two causes of death were responsible for over one third of amenable mortality (35.7%). Breast cancer (females only) accounted for 19.2% of amenable mortality, a rate of 3.7 deaths per 100,000 population, and ischaemic heart disease resulted in 16.5%, a rate of 3.2. Skin cancer (9.1%), colorectal cancer (9.2%) and epilepsy (7.1%) comprised a further one quarter (25.4%) of deaths from amenable causes in this age group.

At ages 45 to 64 years, over one quarter (27.5%) of deaths from amenable causes were from ischaemic heart disease, a rate of 36.4 deaths per 100,000 population. Colorectal cancer ranked second, with 20.6% of deaths in this age group, a rate of 27.4, followed by breast cancer (females only), comprising 17.3% of deaths, a rate of 22.9. One in eight deaths from amenable causes in the 45 to 64 age group were due to cerebrovascular diseases (6.5%) and skin cancer (5.3%).

Ischaemic heart disease and colorectal cancer were also the major causes of amenable mortality in the 65 to 74 year age group. Ischaemic heart disease accounted for 35.2% of amenable deaths (a rate of 201.1 deaths per 100,000 population) and colorectal cancer was responsible for 18.0% of amenable deaths (103.1 deaths per 100,000 population). Just less than one quarter of deaths from amenable causes in this age group were from cerebrovascular diseases (10.9%), breast cancer (females only, 7.0%) and diabetes (4.8%).

Table 6.5: Amenable mortality by major cause and age, Australia, 1997-2001

Age (years)	Cause	Number	Rate per 100,000[1]	% of total in age group	YLL
Infants (<1)	Birth defects	1,995	166.2	54.5	60,907
	Complications of perinatal period	1,497	124.3	40.9	45,703
	Selected invasive bacterial and protozoal infections	131	10.9	3.6	3,999
1-14	Birth defects	280	1.5	39.9	8,417
	Lymphoid leukaemia – acute/chronic	129	0.7	18.4	3,843
	Selected invasive bacterial and protozoal infections	118	0.6	16.8	3,555
	Asthma	57	0.3	8.1	1,693
	Epilepsy	56	0.3	8.0	1,672
15-24	Birth defects	164	1.2	22.7	4,657
	Epilepsy	115	0.9	15.9	3,253
	Lymphoid leukaemia – acute/chronic	99	0.7	13.7	2,817
	Asthma	81	0.6	11.2	2,288
	Selected invasive bacterial and protozoal infections	78	0.6	10.8	2,215
25-44	Breast cancer (female)	1,143	3.7	19.2	27,900
	Ischaemic heart disease	980	3.2	16.5	24,024
	Colorectal cancer	548	1.8	9.2	13,450
	Skin cancer	542	1.8	9.1	13,520
	Epilepsy	425	1.5	7.1	10,774
45-64	Ischaemic heart disease	7,559	36.4	27.5	140,706
	Colorectal cancer	5,658	27.4	20.6	105,023
	Breast cancer (female)	4,742	22.9	17.3	92,198
	Cerebrovascular diseases	1,783	8.6	6.5	33,282
	Skin cancer	1,451	7.0	5.3	27,870
65-74	Ischaemic heart disease	13,297	201.1	35.2	168,412
	Colorectal cancer	6,781	103.1	18.0	87,231
	Cerebrovascular diseases	4,103	60.8	10.9	51,340
	Breast cancer (female)	2,658	38.6	7.0	34,389
	Diabetes	1,809	27.3	4.8	23,044

[1] Rates are age standardised within age categories, except under 1 year

As noted previously, death rates from amenable mortality are highest at older ages; however, there are also substantial numbers of deaths at younger ages. The impact of these deaths is illustrated in Table 6.5 by the measure of years of life lost (YLL).

For infants, approximately 60,900 YLL were a result of amenable mortality from birth defects, with deaths from complications of the perinatal period accounting for 45,700 YLL. For the 1 to 14 and 15 to 24 year age groups, YLL from birth defects ranked highest, with over 8,400 YLL and 3,800 YLL, respectively.

Deaths from breast cancer in the 25 to 44 year age group were responsible for 27,900 YLL among females, followed by ischaemic heart disease, with over 24,000 YLL.

For the 45 to 64 and 65 to 74 year age groups, ischaemic heart disease accounted for the largest number of YLL from deaths from amenable causes (approximately 140,700 and 168,400 YLL, respectively).

Although the rate of mortality from colorectal cancer in the 65 to 74 year age group was almost four times (3.76[**]) the rate in the 45 to 64 year age group, the number of YLL in the 45 to 64 year age group was larger (approximately 105,000 YLL, compared to 87,200).

Similarly, in the 45 to 64 year age group, YLL from breast cancer in females were approximately 92,200 compared to 34,400 in the 65 to 74 year age group (but with rates of 22.9 deaths per 100,000 population and 38.6 deaths per 100,000 population, respectively).

By age and sex

The main causes impacting amenable mortality at different ages show interesting variations when further analysed by sex (Table 6.6).

Apart from for infants and the 15 to 24 year age group (and a marginal difference in the 1 to 14 year age group), the ranking of the main causes of death for amenable mortality differed for males and females. At older ages this difference is in part due to the impact of breast cancer for females.

For infants, birth defects were responsible for over half the deaths from amenable causes (57.7% of female infant deaths and 52.1% of male infant deaths). Complications of the perinatal period accounted for the majority of the remaining amenable infant deaths (43.2% for infant males and 37.7% for infant females). (Note: only the top three causes of infant death are shown in Table 6.6, due to the lower numbers for the next ranked causes.)

For the 1 to 14 year age group, birth defects were responsible for 39.3% of deaths from amenable causes for males and 41.4% for females. Acute/ chronic lymphoid leukaemia was responsible for a further 20.5% of male deaths and 15.5% of female deaths. Selected invasive bacterial and protozoal infections accounted for 15.8% of these deaths for males and 15.5% for females. Asthma and epilepsy were the next ranked causes.

In the 15 to 24 year age group, the major causes of mortality were similarly ranked for both males and females. Birth defects were responsible for almost one quarter of deaths from amenable causes – 22.7% of male deaths and 23.1% of female deaths. Epilepsy and acute/ chronic lymphoid leukaemia were responsible for approximately equal proportions of these deaths for males and females.

For the 25 to 44 year age group, the rank order of amenable mortality for males and females varied. Ischaemic heart disease was responsible for 28.6% of male deaths from amenable causes (ranked first)

but just 5.6% of female deaths (ranked fifth). The rates for ischaemic heart disease were 5.3 for males and 1.2 for females, a differential of 4.42[**]. For males, the next highest causes of death were skin cancer, epilepsy and colorectal cancer, each contributing to between 9% and 11% of male deaths from amenable causes. For females, deaths from breast cancer ranked highest, accounting for over one third (36.3%) of female deaths from amenable causes in this age group, with a rate of 7.4 deaths per 100,000 females. The next highest rates of deaths from amenable causes for females were colorectal cancer, accounting for 8.6% of these female deaths, and skin cancer, accounting for 7.5%.

Ischaemic heart disease accounted for 40.2% of male deaths from amenable causes at ages 45 to 64 years, with colorectal cancer ranked second, accounting for 22.6% of these male deaths. Deaths from breast cancer ranked highest for females in this age group, and were responsible for 37.8% of deaths from amenable causes for females, a rate of 45.8 deaths per 100,000 females. Colorectal cancer ranked second, contributing to 18.2% of these female deaths, followed by ischaemic heart disease (12.4%). The male rate of deaths from ischaemic heart disease (57.7 deaths per 100,000 males) was almost four times (3.80[**]) the female rate (15.2 deaths per 100,000 females).

Causes of amenable mortality were ranked the same for males and females in the 65 to 74 year age group, with the exception of breast cancer for females (ranked second). Ischaemic heart disease was responsible for 41.6% of deaths of males from amenable causes 26.4% of females; the male rate (285.0 deaths per 100,000 population) was almost two and a half times (2.41[**]) the female rate (117.2). Colorectal cancer was responsible for a further 18.9% of amenable male deaths and 16.6% of amenable female deaths. Breast cancer was responsible for 16.8% of deaths from amenable causes for females.

Table 6.6: Amenable mortality by major cause, age and sex, Australia, 1997-2001

Age (years)	Cause	Males				Females			
		Number	Rate[1]	Per cent[2]	Rank[3]	Number	Rate[1]	Per cent[2]	Rank[3]
<1	Birth defects	1,085	176.4	52.1	1	910	156.0	57.7	1
	Complications of perinatal period	901	146.5	43.3	2	596	102.1	37.8	2
	Selected invasive bacterial and protozoal infections	75	12.2	3.6	3	56	9.6	3.5	3
1-14	Birth defects	156	1.7	39.1	1	124	1.4	41.1	1
	Lymphoid leukaemia – acute/chronic	82	0.9	20.6	2	47	0.5	15.6	3
	Selected invasive bacterial and protozoal infections	63	0.7	15.8	3	55	0.6	18.2	2
	Asthma	31	0.3	7.8	4	26	0.3	8.6	4
	Epilepsy	31	0.3	7.8	4	25	0.3	8.3	4
15-24	Birth defects	97	1.4	22.7	1	67	1.0	22.8	1
	Epilepsy	78	1.1	18.2	2	37	0.6	12.6	2
	Lymphoid leukaemia – acute/chronic	69	1.0	16.1	3	30	0.5	10.2	3
	Asthma	47	0.7	11.0	4	34	0.5	11.6	3
	Selected invasive bacterial and protozoal infections	43	0.6	10.0	5	35	0.5	11.9	3
25-44	Ischaemic heart disease	804	5.3	28.7	1	176	1.2	5.6	5
	Skin cancer	306	2.0	10.9	2	236	1.6	7.5	3
	Epilepsy	281	1.9	10.0	3	144	1.0	4.6	7
	Colorectal cancer	277	1.8	9.9	4	271	1.8	8.6	2
	Breast cancer	–	..	..	..	1,143	7.4	36.4	1
	Cervical cancer	–	..	..	..	207	1.4	6.6	4
45-64	Ischaemic heart disease	6,006	57.7	40.2	1	1,553	15.2	12.4	3
	Colorectal cancer	3,381	32.6	22.6	2	2,277	22.2	18.2	2
	Cerebrovascular diseases	1,066	10.3	7.1	3	717	7.0	5.7	4
	Skin cancer	965	9.2	6.5	4	486	4.7	3.9	5
	Breast cancer	–	..	..	..	4,742	45.8	37.8	1
65-74	Ischaemic heart disease	9,118	285.0	41.6	1	4,178	117.2	26.4	1
	Colorectal cancer	4,153	130.7	18.9	2	2,628	75.6	16.6	3
	Cerebrovascular diseases	2,333	72.3	10.6	3	1,770	49.4	11.2	4
	Diabetes	1,073	33.6	4.9	4	736	20.9	4.6	5
	Breast cancer	–	..	..	..	2,658	77.2	16.8	2

[1] Rates are age standardised within age categories, except under 1 year
[2] Per cent is the proportion of total amenable deaths within the relevant age-sex group
[3] Rank is the rank order of rates for the top four causes of death for males and females: more than four causes are listed where the rank order differs for males and females

6.3 Amenable mortality by area

By state/ territory and area

There is minimal variation in the rates of amenable mortality for all causes for ages 0 to 74 by state/ territory and area within the jurisdiction, apart from the Northern Territory (Table 6.7). The rates of mortality from causes amenable mortality were highest in the Northern Territory (a rate of 148.4), with the remaining state/ territory rates ranging from 63.5 in the Australian Capital Territory to 75.5 in Tasmania.

The differential in the rates between the rest of state/ territory areas and the capital cities was highest in Northern Territory (a rate ratio of 2.36[**]) and lowest in Tasmania (0.94). For the remaining jurisdictions, the differentials in rates between the rest of state areas and the capital cities ranged from 1.10[**] in New South Wales to 1.18[**] in Western Australia.

Table 6.7: Amenable mortality (0 to 74 years) by area, Australia, 1997-2001

State/ Territory	Capital city (CC) and other major urban centres (MUC)		Rest of state/ territory areas (ROS)		Rate ratio ROS: CC/MUC	Whole of state/ territory[1]	
	Number	ASR	Number	ASR		Number	ASR
New South Wales[2]	18,227	68.3	8,118	75.1	1.10[**]	26,374	70.3
Victoria	13,097	65.3	5,305	73.0	1.12[**]	18,406	67.4
Queensland	8,930	70.4	5,645	79.8	1.13[**]	14,323	73.9
South Australia	4,563	68.6	1,987	77.3	1.13[**]	6,556	71.1
Western Australia	4,574	62.8	1,934	73.8	1.18[**]	6,517	65.8
Tasmania	894	78.1	1,238	73.3	0.94	2,140	75.5
Northern Territory	353	91.8	620	216.2	2.36[**]	996	148.4
Australian Capital Territory[3]	1,079	68.3	#	..	..	932	63.5
Total	**51,717**	**67.5**	**24,589**	**77.0**	**1.14[**]**	**76,249**	**70.4**

Not shown or not calculated, as there are fewer than 5 deaths over the period shown
[1] Total for *Whole of State/ Territory* includes 'Other Territories' (Jervis Bay, Christmas Island and Cocos Islands)
[2] NSW *Rest of state* areas include Tweed Heads
[3] ACT *Capital city and other major urban centres* comprises Canberra, Queanbeyan and Yarrowlumla A (Pt A)

Introduction to map and text pages

The following pages examine amenable mortality, based on area of usual residence of the deceased.

The analysis includes text and maps showing total amenable mortality: the individual causes have not been mapped as those with larger numbers (ischaemic heart disease, colorectal, breast cancer and cerebrovascular diseases) have the same patterns (albeit some with lower rates) in terms of mortality, as mapped in *Section 4.4*; and the remaining causes had insufficient numbers to be mapped.

For further information related to the map pages, refer to the 'Introduction to map and text pages' in *Section 4.4*.

Keys to the areas mapped are included in *Appendix 1.4*.

The numbers and rates by SSD are available at www.publichealth.gov.au.

All causes: amenable mortality (0 to 74 years), capital cities, Australia, 1997-2001

Capital cities

Over the period 1997 to 2001, deaths from amenable mortality ranged from a rate of 63.0 deaths per 100,000 population in Perth to a rate of 88.3 in Darwin (Table 6.8). The rate for all capitals combined was 66.9 deaths per 100,000 population.

Table 6.8: Amenable mortality from all causes, capital cities, Australia, 1997-2001

ASR per 100,000 population

Sydney	Melbourne	Brisbane	Adelaide	Perth	Hobart	Darwin	Canberra	All capitals
66.7	64.9	71.5	68.6	62.8	78.1	91.8	63.4	66.8

Other major urban centres

Rates in the other major urban centres ranged from 62.3 deaths per 100,000 population in the Sunshine Coast to 90.3 in Townsville-Thuringowa (details in Table A4, Appendix 1.3).

By Statistical Subdivision (SSD)

For **Sydney**, the rates varied substantially, with over one third of areas in both the highest and lowest ranges (Map 6.1). The highest rates were in Inner Sydney (79.7 deaths per 100,000 population), Blacktown (79.2), and Outer South Western Sydney (77.9) SSDs, and the lowest were in Central Northern Sydney (50.8), Northern Beaches (52.6) and Lower Northern Sydney (56.6).

Rates were lower in **Melbourne**, with the highest rates in Inner Melbourne (76.5 deaths per 100,000 population), Greater Dandenong City (73.6) and Melton-Wyndham (73.4). Lowest rates were in Eastern Middle Melbourne (54.4), Boroondara City (56.3) and Northern Outer Melbourne (59.3).

In **Brisbane**, the highest rates were in Redcliffe City (85.5 deaths per 100,000 population), Ipswich City (84.6) and Gold Coast City Part A (77.4). Rates were lowest in Redland Shire (59.3) and Beaudesert Shire Part A (60.3).

The rates of amenable mortality in **Adelaide** were within a smaller range, varying from 73.5 deaths in Northern Adelaide to 63.4 in Southern Adelaide.

The rates were comparatively low in **Perth**, ranging from 57.0 deaths per 100,000 population in North Metropolitan to 67.3 in East Metropolitan.

Residents of **Hobart** had the second highest rate of amenable mortality (78.1 deaths per 100,000 population) of all the capital cities (after Darwin).

The rates in **Darwin** were comparatively high, with the two highest rates of all capital cities in Palmerston-East Arm (94.8) Darwin City (94.3).

In **Canberra**, rates were comparatively low, varying from 76.2 in South Canberra to 52.4 in Gunghalin-Hall (the lowest rate of all capital city SSDs).

By socioeconomic status

For all capital cities and other major urban centres combined, there was an almost uninterrupted socioeconomic gradient in death rates from amenable causes for both males and females (Figure 6.2).

Rates for males were higher than for females in each decile, ranging from 55.3 male deaths per 100,000 population in the least disadvantaged areas to 91.5 in the most disadvantaged areas. The rates for females ranged from 49.6 in the least disadvantaged areas to 68.3 in the most disadvantaged areas.

The differential in the rates between the most disadvantaged areas and least disadvantaged areas was greater for males (1.65**) than for females (1.38**).

Figure 6.2: Amenable mortality from all causes by socioeconomic status and sex, capital cities and other major urban centres, Australia, 1997-2001

Decile of socioeconomic disadvantage of area

Map 6.1
All causes: amenable mortality (0 to 74 years), capital cities, Australia, 1997-2001
age standardised deaths per 100,000 population by Statistical Subdivision

N

Sydney
N = 14,736

Perth
N = 4,573

Melbourne
N = 12,406

Adelaide
N = 4,563

Hobart
N = 894

Darwin
N = 353

Canberra
N = 930

Brisbane
N = 5,940

ASR per 100,000 population

78 and above

72 to 77

66 to 71

60 to 65

below 60

Details of map boundaries are in Appendix 1.4

Australian and New Zealand Atlas of Avoidable Mortality

All causes: amenable mortality (0 to 74 years), Australia, 1997-2001

States/ Territories

Death rates from amenable mortality were higher in the rest of state/ territory areas than in the capital cities in all jurisdictions except Tasmania, where the rate was five per cent lower (Table 6.9). The rate in the rest of territory area was substantially higher in the Northern Territory, with 216.2 deaths per 100,000 population, compared with 91.8 in Darwin, a differential of 2.34**.

Table 6.9: Amenable mortality from all causes by area, Australia, 1997-2001

ASR per 100,000 population

Area	NSW	Vic	Qld	SA	WA	Tas	NT	ACT	All
Capital city	66.7	64.9	71.5	68.6	62.8	78.1	91.8	63.4	66.8
Other major urban centres	75.9	72.9	68.2	..	..	..	..	..	72.2
Rest of state/ territory areas	75.4	73.0	79.8	77.3	73.8	73.3	216.2	#	77.0
Whole of state/ territory	**70.3**	**67.4**	**73.9**	**71.7**	**65.8**	**75.5**	**148.4**	**63.5**	**70.4**

By Statistical Subdivision (SSD)

For **New South Wales**, rates were highest in Upper Darling (118.3 deaths per 100,000 population), Macquarie-Barwon (112.1) and North Central Plain (99.6) (Map 6.2). Rates were lowest in Tweed Heads (67.0), Lower Murrumbidgee (67.1), Illawarra Balance (67.2) and Port Macquarie (67.3).

Rates were lower in **Victoria**, with the highest rates in Glenelg (86.1 deaths per 100,000 population) and Mildura Rural City Part A (85.3), and the lowest in East Ovens-Murray (58.4), East Barwon (58.7) and South Loddon (59.0).

In **Queensland**, rates were highest in North West (124.2 deaths per 100,000 population), Rockhampton (98.1) and South West (95.8). The lowest rates were in Sunshine Coast (62.3), Moreton Balance (65.4) and Gold Coast City Part B (65.7).

Rates of amenable mortality in **South Australia** were highest in Far North (126.2 deaths per 100,000 population), West Coast (101.6) and Flinders Ranges (95.5). Rates were lowest in Barossa (57.8) and Mt Lofty Ranges (58.1)

Rates in **Perth** varied substantially, with the two highest rates across Australia, apart from in the Northern Territory, in Fitzroy (172. deaths per 100,000 population) and Ord (156.3). The lowest rate of all the rest of Australia areas was in Lakes (52.4), followed by Campion (59.7).

Rates in **Tasmania** were highest in North Eastern (86.6 deaths per 100,000 population) and Burnie-Devonport (76.1), and lowest in Central North (63.5) and North Western Rural (65.6).

In the **Northern Territory**, the rates for all SSDs were over two and a half times the Australian rate (70.4), and the highest across Australia, apart from in Finniss (63.9, 6 deaths). The highest rates were in Bathurst-Melville (332.1 deaths per 100,000 population) and Alligator (326.9).

By remoteness

The graph of death rates by remoteness shows (opposite page) the lowest rate, of 69.4, in the Inner Regional areas, increasing to 84.4 in the Remote areas, followed by a sharp increase to 135.0 in the Very Remote areas. The numbers of deaths from amenable mortality decline rapidly across the remoteness classes.

By socioeconomic status

For males, there was a socioeconomic gradient in the rates of all rest of state/ territory areas combined: for females, the pattern was less clear (Figure 6.3), although the female rate was lowest in Decile 1 and highest in Decile 10.

Rates for males were higher than females, ranging from 66.6 in the least disadvantaged areas to 117.1 in the most disadvantaged areas. The female rates ranged from 57.4 in the least disadvantaged areas to 91.5 in the most disadvantaged areas. The differential in the rates between the most disadvantaged areas and least disadvantaged areas was 1.76** for males and 1.59** for females.
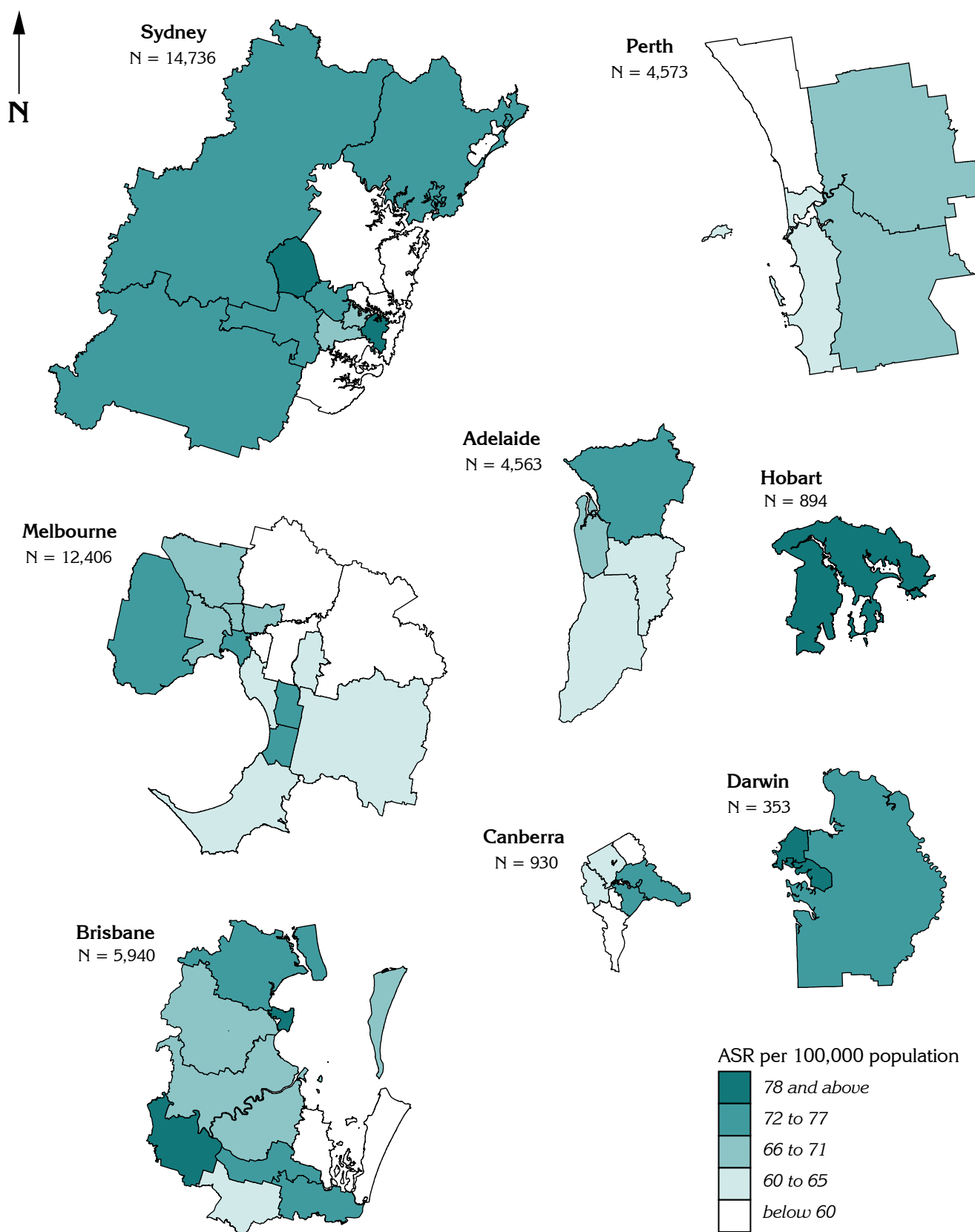
Figure 6.3: Amenable mortality from all causes by socioeconomic status and sex, rest of states/ territories, Australia, 1997-2001

Decile of socioeconomic disadvantage of area

Map 6.2
All causes: amenable mortality (0 to 74 years), Australia, 1997-2001
age standardised deaths per 100,000 population by Statistical Subdivision

Map legend for SSDs not distinguishable
- Coffs Harbour
- Port Macquarie
- Hervey Bay City Part A
- Mackay City Part A
- Townsville City Part A
- Bunbury
- Geraldton
- Kalgoorlie/Boulder City Part A

N

Darwin

Perth

Adelaide

Melbourne

Hobart

Brisbane

Sydney

Canberra

ASR per 100,000 population
- *88 and above*
- *80 to 87*
- *72 to 79*
- *64 to 71*
- *below 64*
- *data not mapped (<5 deaths)*

ASGC Remoteness classification

	Deaths
Major Cities: 1	46,979
Inner Regional: 2	17,218
Outer Regional: 3	9,365
Remote: 4	1,479
Very Remote: 5	1,119

0 20 40 60 80 100 120 140
Amenable mortality (ASR)

Details of map boundaries are in Appendix 1.4

Australian and New Zealand Atlas of Avoidable Mortality

6.4 Amenable mortality by socioeconomic status

This section examines amenable mortality by socioeconomic status. The calculation of rates by decile, and the particular measure of socioeconomic disadvantage used (the IRSD), are described in Chapter 2, *Methods*.

By area

Figure 6.4 and Table 6.10 show amenable mortality for the capital cities and other major urban centres, and the rest of state/ territory areas. For each decile, there was a differential in the rates between the rest of state/ territory areas and the capital cities and other major urban centres of around 10% to 20%, apart from Decile 9, where there was no effective difference in the rates, and Decile 10, where the differential was a notable 31%.

For both the capital cities and other major urban centres areas, and the rest of state/ territory areas, there is a socioeconomic gradient in the rates of amenable mortality, with the highest rate in the most disadvantaged areas in the rest of state/ territory areas.

The differentials in rates between the most disadvantaged areas and least disadvantaged areas, were 1.52** for the capital cities and other major urban centres, and 1.68** for the rest of state/ territory areas.

Figure 6.4: Amenable mortality (0 to 74 years) by socioeconomic status and area, Australia, 1997-2001
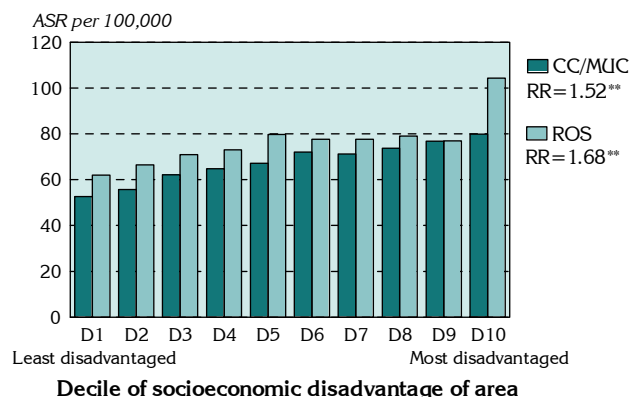

Table 6.10: Amenable mortality (0 to 74 years) by socioeconomic status and area, Australia, 1997-2001

Decile	Capital cities (CC) and other major urban centres (MUC)		Rest of states/ territories (ROS)		Rate ratio ROS: CC/MUC	Australia	
	Number	ASR	Number	ASR		Number	ASR
1: Least disadvantaged	4,076	52.6	1,891	62.0	1.18**	5,617	53.7
2	4,159	55.7	2,051	66.4	1.19**	6,335	58.8
3	4,887	62.2	2,096	71.0	1.14**	6,560	64.0
4	4,701	64.8	2,312	73.1	1.13**	7,000	66.7
5	4,990	67.2	2,491	79.7	1.19**	7,626	71.2
6	5,442	72.1	2,618	77.7	1.08**	7,944	72.4
7	5,559	71.3	2,550	77.6	1.09**	8,383	75.1
8	5,873	73.7	2,587	79.1	1.07**	8,560	74.6
9	6,002	76.8	2,585	76.9	1.00	8,767	78.1
10: Most disadvantaged	6,276	79.9	3,010	104.3	1.31**	9,365	86.9
Total	**51,717**	**67.5**	**24,589**	**77.0**	**1.14****	**76,250**	**70.4**
RR–Decile 10:Decile 1	..	**1.52****	..	**1.68****	..	..	**1.62****

By state/ territory and sex

The charts in Figure 6.5 show death rates for amenable mortality by decile of socioeconomic status by state/ territory and by sex. For all jurisdictions, there is a pattern of the least disadvantaged areas with the lowest rates and the most disadvantaged areas with the highest rates. Apart from a variable pattern in Tasmania and the Australian Capital Territory, there was a gradient in rates in all states and territories, which was generally clearer for males than for females.

The differentials in rates were larger for males than for females in all jurisdictions apart from the Northern Territory, where rates for females in the most disadvantaged areas were over six times (6.17**) those in the least disadvantaged areas. For males, the differential was over three and a half (3.74**).

Figure 6.5: Amenable mortality (0 to 74 years) by socioeconomic status, state/ territory and sex, Australia, 1997-2001

ASR per 100,000 population

New South Wales

Victoria

Queensland

South Australia

Western Australia

Tasmania

Northern Territory: *note the different scale*

Australian Capital Territory

Note: Rate ratio (RR) is the ratio of the rate in Decile 10 areas compared to the rate in Decile 1
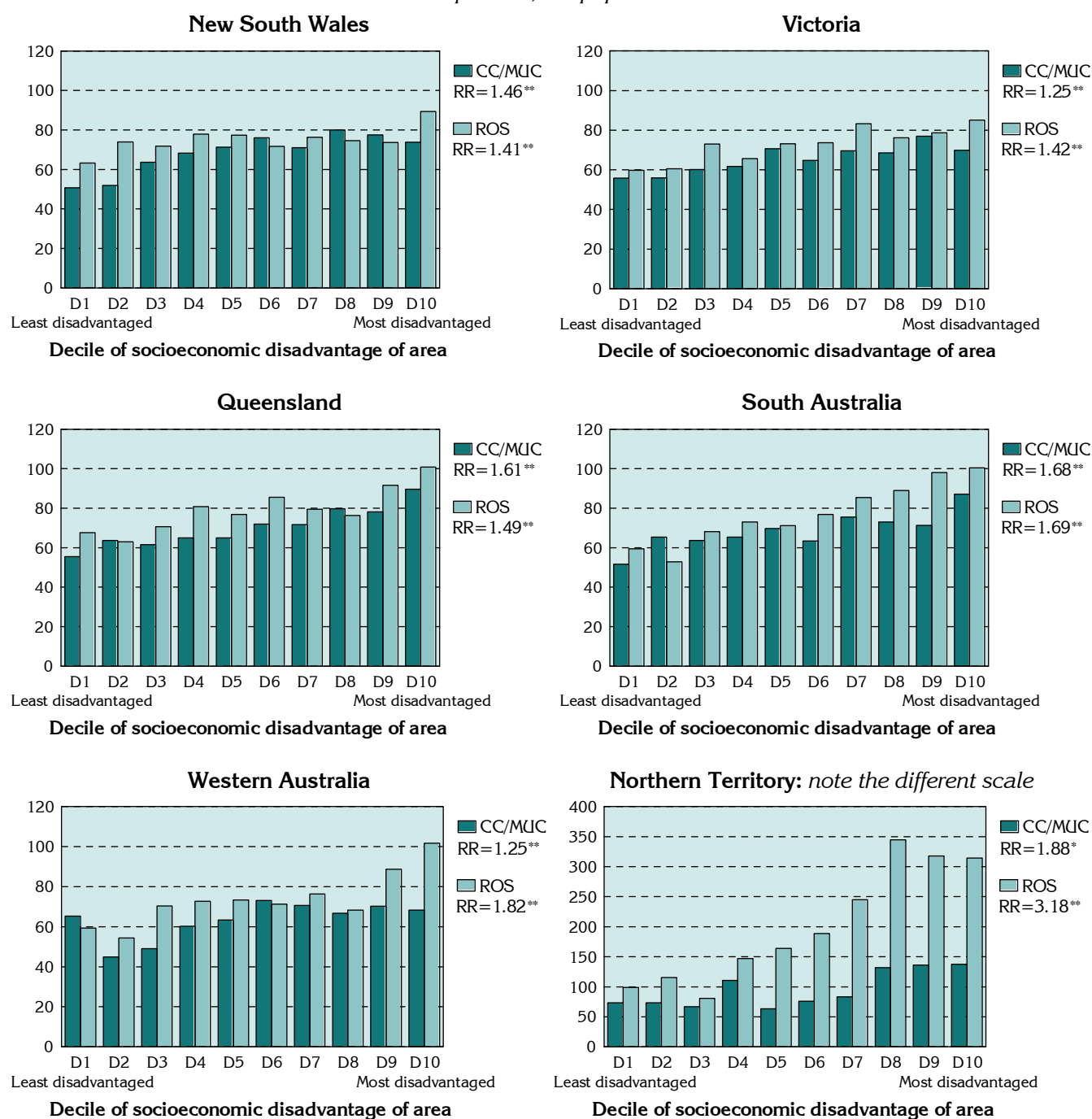
By state/ territory and area

Figure 6.6 shows death rates for amenable mortality by decile of socioeconomic status in the capital city/ other major urban centre and rest of state/ territory areas by jurisdiction. For all areas the least disadvantaged areas had the lowest rates and the most disadvantaged areas had the highest rates. There was also a socioeconomic gradient evident in the rates of amenable mortality, although this was less clear in Western Australia or in Darwin (the capital city area of the Northern Territory).

The differentials in rates were larger in the rest of state areas than in the capital city/ other major urban centre areas in all but New South Wales and Queensland. The largest differentials were in the rest of territory areas in Northern Territory, with rates in the most disadvantaged areas more than three times (a rate ratio of 3.18**) those in the least disadvantaged areas.

In South Australia, the differentials in rates were around 70%. In the rest of state areas in Western Australia, the rates in the most disadvantaged areas were more than 80% higher (a rate ratio of 1.82**) than those in the least disadvantaged areas.

Figure 6.6: Amenable mortality (0 to 74 years) by socioeconomic status, state/ territory and area, Australia, 1997-2001

ASR per 100,000 population

Note: Rate ratio (RR) is the ratio of the rate in Decile 10 areas compared to the rate in Decile 1

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By excess deaths[1]

For the total population, and for both males and females, there was a gradient by socioeconomic disadvantage of area in the number of excess deaths, with the fewest excess deaths in Quintile 2 (less disadvantaged) and the most excess deaths in Quintile 5 (most disadvantaged) (Table 6.11).

If mortality in all of the socioeconomic groups equalled that of the least disadvantaged group (Quintile 1), total amenable deaths would be reduced from 76,250 (see Table 6.10, page 146) to 61,108. The 15,142 excess deaths that occurred over the observation period accounted for almost twenty per cent (19.9%) of total amenable mortality.

[1] See Chapter 2, *Methods*

For males, these excess deaths totalled 9,711 deaths (64% of total excess deaths), almost 80% more than the 5,430 for females.

Male excess deaths were also between 60% and 80% above those for females in each quintile. In Quintiles 2 and 3, there were 1,212 (64.3% of excess deaths in these areas) and 2,171 (64.7%) male excess deaths, respectively, compared to 672 (35.7%) and 1,184 (35.3%) for females.

Excess deaths for males in Quintile 4 represented 2,780 deaths (66.4%), compared to 1,409 deaths (33.6%) for females. In the most disadvantaged areas (Quintile 5), male excess deaths represented 3,548 deaths (62.1%) compared to 2,166 for females (37.9%).

Table 6.11: Excess deaths[1] from amenable mortality (0 to 74 years) by quintile of socioeconomic status and sex, Australia, 1997-2001

| Sex | Number | | | | | Total | Per cent |
	Q1	Q2	Q3	Q4	Q5	(Q1:Q5)	of total
Males	(0)	1,212	2,171	2,780	3,548	**9,711**	64.1
Females	(0)	672	1,184	1,409	2,166	**5,430**	35.9
Total	**(0)**	**1,884**	**3,355**	**4,189**	**5,714**	**15,142**	**100.0**
Ratio–M:F	..	**1.80**	**1.83**	**1.97**	**1.64**	**1.79**	..

[1] **Excess deaths is the difference between the observed and expected number of deaths, calculated between Quintile 1 (least disadvantaged) and the quintile under analysis**

By excess deaths and age

The number of excess deaths increased with age, apart from in the 15 to 24 year age group (Table 6.12). Almost 85.0% of excess deaths (12,832 deaths) occurred in the 45 to 64 year and 65 to 74 year age groups.

Among those aged 65 to 74 years, there were 6,804 excess deaths (44.9% of excess deaths), marginally more than the 6,028 (39.8%) in the 45 to 64 year age group. The smallest number of excess deaths, 167 (1.1%), occurred in the 15 to 24 year age group. In the 0 to 14 year age group, there were 712 (4.7%) excess deaths, half of the 1,430 (9.4%) in the 25 to 44 year age group.

The pattern of excess deaths within each socioeconomic status grouping was similar to that for the Australia as a whole, with the largest numbers (between 40% and 50% of excess deaths in each Quintile) in the 45 to 64 year and 65 to 74 year age groups, and the smallest (less than 1.5%) in the 15 to 24 year age group.

In Quintile 2, there were 855 excess deaths in the 65 to 74 year age group (45.4% of the excess deaths in these areas), marginally more than the 778 in those aged 45 to 64 years (41.3%). The 15 to 24 year age group had 14 excess deaths (0.7%).

There were 1,596 excess deaths in the 65 to 74 year age group, just under half (47.6%) of all excess deaths in Quintile 3, compared to 1,361 (40.6%) among those aged 45 to 64 years. The smallest number of excess deaths in Quintile 3 (38) was in the 15 to 24 year age group (1.1%).

The 65 to 74 year age group in Quintile 4 had 1,876 excess deaths, 44.8% of deaths in these areas, compared to 1,641 in those aged 45 to 64 years (39.2%). There were 52 excess deaths in the 15 to 24 year age group, 1.2% of total excess deaths in these areas.

In Quintile 5, the 65 to 74 year age group had 2,478 excess deaths (43.4%), marginally more than the 2,248 (39.3%) in those aged 45 to 64 years. The 15 to 24 year age group had 63 excess deaths (1.1%).

Table 6.12: Excess deaths from amenable mortality (0 to 74 years) by quintile of socioeconomic status and age, Australia, 1997-2001

Age (years)	Number					Total (Q2:Q5)	Per cent of total
	Q1	Q2	Q3	Q4	Q5		
0-14	(0)	47	103	221	341	**712**	4.7
15-24	(0)	14	38	52	63	**167**	1.1
25-44	(0)	191	258	398	584	**1,430**	9.4
45-64	(0)	778	1,361	1,641	2,248	**6,028**	39.8
65-74	(0)	855	1,596	1,876	2,478	**6,804**	44.9
Total	**(0)**	**1,884**	**3,355**	**4,189**	**5,714**	**15,142**	**100.0**

By excess deaths, age and sex

Excess deaths of males represented between one and a half and three times those for females in each age group of the analysis, apart from in the 0 to 24 year age group, where numbers differed little (Table 6.13). The pattern varied between the sexes, with the smallest number for males in the 0 to 24 year age group (459 deaths) and, for females, in the 25 to 44 year age group (375).

In the 0 to 24 year age group, the number of excess deaths of males (459 deaths; 52.2% of excess deaths in the age group) was only marginally higher than for females (420; 47.8%). In the 25 to 44 year age group, however, there were 1,055 excess deaths of males (73.8% of excess deaths), almost three times the 375 excess deaths of females (26.2%). There were almost twice as many excess deaths in males aged 45 to 64 years (4,012, 66.6% of excess deaths in the age group) compared to females (2,016, 33.4%). In the 65 to 74 year age group male excess deaths totalled 4,185 (61.5% of excess deaths), compared to 2,619 for females (38.5%).

In Quintile 2, the largest number of male excess deaths was in the 45 to 64 year age group (524 deaths, 43.2% of male excess deaths in these areas); while for females, the largest number was in the 65 to 74 year age group (366 deaths, 54.5%). In the 0 to 24 year age group, both the number and proportion of female excess deaths (41 deaths, 6.1%) were higher than for males (19, 1.6%). Conversely, in the 25 to 44 year age group, the number and proportion for males (180 deaths, 14.9%) were higher than for females (11, 1.6%).

In Quintile 3, the largest number of excess deaths for both males and females were in the 65 to 74 year (1,009 deaths, 43.0% for males; 586, 49.5% for females) and the 45 to 64 year age groups (914, 42.1% and 446, 37.7%, respectively). The smallest number of excess deaths was in the 0 to 24 year age group for males (53 deaths, 2.4%) and the 25 to 44 year age group for females (63, 5.3%).

In Quintile 4, the largest numbers of excess deaths were again in the 65 to 74 year age group, with 1,195 deaths (43.0%) for males and 681 (48.3%) for females; and in the 45 to 64 year age group, with 1,138 (40.9%) and 503 (35.7%) deaths, respectively.

The largest numbers of excess deaths in Quintile 5 were in the 65 to 74 and 45 to 64 year age groups, together accounting for 2,927 deaths (82.5%) for males and 1,799 (93.1%) for females. The smallest numbers were in the 0 to 24 year age group, with 228 deaths (6.4%) for males and 175 (8.1%) for females.

Table 6.13: Excess deaths from amenable mortality (0 to 74 years) by quintile of socioeconomic status, age and sex, Australia, 1997-2001

Age (years) and sex	Number					Total (Q2:Q5)	Per cent of total
	Q1	Q2	Q3	Q4	Q5		
Males							
0-24	(0)	19	53	158	228	**459**	4.7
25-44	(0)	180	194	289	393	**1,055**	10.9
45-64	(0)	524	914	1,138	1,436	**4,012**	41.3
65-74	(0)	489	1,009	1,195	1,491	**4,185**	43.1
Total	**(0)**	**1,212**	**2,171**	**2,780**	**3,548**	**9,711**	**100.0**
Females							
0-24	(0)	41	88	115	175	**420**	7.7
25-44	(0)	11	63	110	191	**375**	6.9
45-64	(0)	254	446	503	812	**2,016**	37.1
65-74	(0)	366	586	681	987	**2,619**	48.2
Total	**(0)**	**672**	**1,184**	**1,409**	**2,166**	**5,430**	**100.0**
Ratio–M:F							
0-24	..	0.46	0.60	1.37	1.30	**1.09**	..
25-44	..	16.36	3.08	2.63	2.06	**2.81**	..
45-64	..	2.06	2.05	2.26	1.77	**1.99**	..
65-74	..	1.34	1.72	1.75	1.51	**1.60**	..
Total	**..**	**1.80**	**1.83**	**1.97**	**1.64**	**1.79**	**..**

6.5 Amenable mortality by Indigenous status

This analysis has been limited to data from the jurisdictions considered by the Australian Bureau of Statistics to have the most complete coverage of Indigenous deaths: that is, they are considered to have the highest proportions of Indigenous deaths that are registered as such (refer to *Section 4.6*).

By sex

As noted in *Section 4.6*, 40% of avoidable mortality (for both Indigenous and non-Indigenous Australians) is considered to be from amenable causes.

However, there are notable differences in death rates from amenable causes when examined by Indigenous status.

The overall amenable mortality rate for the Indigenous population (264.7 deaths per 100,000 Indigenous population) was almost four (3.85[**]) times the rate for the non-Indigenous population (68.8 deaths per 100,000 population) (Table 6.14).

The rate for Indigenous males (298.8 deaths per 100,000 males) was 1.30[**] times that for Indigenous females (230.7), and 3.81[**] times the rate for non-Indigenous males (78.4). The differential in death rates for Indigenous and non-Indigenous females was marginally higher than for males, at 3.90[**] (230.7 deaths per 100,000 females and 59.1 for non-Indigenous females).

Table 6.14: Amenable mortality (0 to 74 years) by Indigenous status and sex, Queensland, South Australia, Western Australia and Northern Territory, 1997-2001

Sex	Number			ASR per 100,000 population			Rate ratio
	Indigenous	Non-Indigenous	Total	Indigenous	Non-Indigenous	Total	I:Non-I
Males	1,032	15,016	16,048	298.8	78.4	82.3	3.81[**]
Females	942	11,402	12,344	230.7	59.1	62.7	3.90[**]
Total	1,974	26,419	28,392	264.7	68.8	72.5	3.85[**]
RR–M:F	..	..	..	1.30[**]	1.33[**]	1.31[**]	..

By age

Amenable mortality rates were much higher for the Indigenous population than for the non-Indigenous population for all of the age groups in the analysis (Figure 6.7, Table 6.15). Whilst the highest amenable mortality rate for both the Indigenous and non-Indigenous populations was in the 65 to 74 year age group, the highest rate differentials were in the 25 to 44 year and 45 to 64 year age groups.

In the 25 to 44 year age group, Indigenous mortality from amenable causes (123.6 deaths per 100,000 population) was 6.65[**] times the non-Indigenous rate (18.6). The rate for the Indigenous population aged 45 to 64 years (597.2 deaths per 100,000 population) was 4.67[**] times that for the non-Indigenous population (128.0).

Figure 6.7: Amenable mortality by Indigenous status and age, Qld, SA, WA and NT,1997-2001

Table 6.15: Amenable mortality by Indigenous status and age, Queensland, South Australia, Western Australia and Northern Territory, 1997-2001

Age (years)	Number		Rate per 100,000 population[1]		Rate ratio
	Indigenous	Non-Indigenous	Indigenous	Non-Indigenous	Indig:Non-Indig
Infants (<1)	258	1,172	861.6	276.7	3.11[**]
1-14	43	238	8.5	3.7	2.30[**]
15-24	44	251	17.2	5.2	3.31[**]
25-44	455	2,008	123.6	18.6	6.65[**]
45-64	771	9,617	597.2	128.0	4.67[**]
65-74	404	13,134	1,559.7	566.4	2.75[**]
Total	1,974	26,419	264.7	68.8	3.85[**]

[1] Rates are age standardised within age categories, except under 1 year

As was the case for avoidable mortality, the impact of amenable mortality on the Indigenous population is most evident at ages below 45 years than for the non-Indigenous population, for whom the impact is more noticeable at older ages.

For example, the proportion of years of life lost (YLL) from amenable causes for Indigenous infants under one year of age (18.6%) was over twice that of non-Indigenous infants (8.0%) (Table 6.16). Similarly, the proportions of YLL for Indigenous children aged 1 to 14 years (3.0%) and young people aged from 15 to 24 years (3.0%) were almost twice (1.9** times) those in the non-Indigenous population.

For the 25 to 44 year age group, the proportion of YLL from amenable mortality in the Indigenous population (26.9% of YLL) was almost two and a half times that of the non-Indigenous population (11.1%).

In the remaining age groups analysed, the differentials in YLL are reversed, with proportions of YLL in the Indigenous population less than those for the non-Indigenous population. The proportion of YLL for the Indigenous population aged 45 to 64 years (35.8%) was 12% less that of the non-Indigenous population (40.5%) and in the 65 to 74 year age group, the proportion in the Indigenous population (12.7%) was approximately one third that of the non-Indigenous population (37.3%).
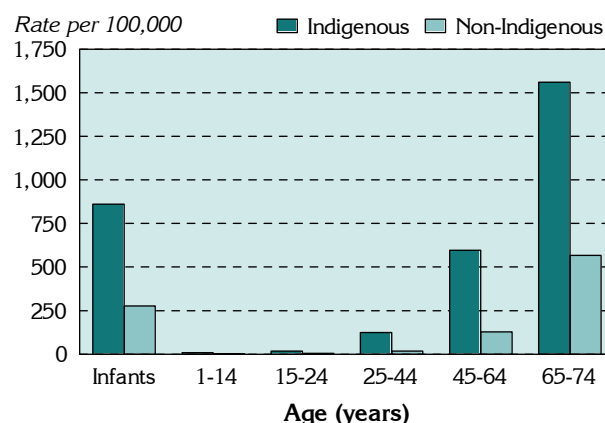
Table 6.16: YLL from amenable mortality by Indigenous status and age, Queensland, South Australia, Western Australia and Northern Territory, 1997-2001

| Age (years) | Number | | Per cent | | Ratio: |
	Indigenous	Non-Indigenous	Indigenous	Non-Indigenous	Indig:Non-Indig
Infants (<1)	7,861	35,781	18.6	8.0	2.34**
1-14	1,274	7,125	3.0	1.6	1.90**
15-24	1,246	7,096	3.0	1.6	1.87**
25-44	11,361	49,803	26.9	11.1	2.42**
45-64	15,082	181,421	35.8	40.5	0.88**
65-74	5,350	167,113	12.7	37.3	0.34**
Total	**42,175**	**448,338**	**100.0**	**100.0**	..

Indigenous deaths by age and sex

Rates of death from amenable causes were higher for Indigenous males than for Indigenous females in all age groups (Figure 6.8, Table 6.17). While the highest rates for both males (1,569.5 deaths per 100,000 Indigenous males) and females (1,477.4) were in the 65 to 74 year age group, the largest differential in rates was in the 15 to 24 year age group, where the rate for males (22.7 deaths per 100,000 males) was almost twice (1.94*) that for females (11.7). Indigenous males aged 25 to 44 years (143.5 deaths per 100,000 males) were one third (1.37**) more likely to die from amenable causes than Indigenous females at these ages (104.8).

Figure 6.8: Amenable mortality by age and sex, Indigenous population, Qld, SA, WA and NT, 1997-2001

Table 6.17: Amenable mortality by age and sex, Indigenous population, Queensland, South Australia, Western Australia and Northern Territory, 1997-2001

| Age (years) | Number | | | % of total amenable mortality | Rate per 100,000 population[1] | | | Rate ratio Males:Females |
	Males	Females	Total		Males	Females	Total	
Infants (<1)	144	114	258	13.1	951.3	772.1	861.6	1.23
1-14	25	18	43	2.2	9.6	7.4	8.5	1.30
15-24	29	15	44	2.2	22.7	11.7	17.2	1.94*
25-44	257	197	455	23.0	143.5	104.8	123.6	1.37**
45-64	396	375	771	39.0	660.4	536.0	597.2	1.23**
65-74	181	222	404	20.5	1,569.5	1,477.4	1,559.7	1.06
Total	**1,032**	**941**	**1,975**	**100.0**	**298.8**	**230.7**	**264.7**	**1.30**

[1] Rates are age standardised within age categories, except under 1 year

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By cause

Ischaemic heart disease was the highest ranking cause of amenable mortality for both the Indigenous (an ASR of 91.8 deaths per 100,000 population) and non-Indigenous (an ASR of 18.9) populations, resulting in over one quarter of deaths in both population groups (25.8% and 28.9%, respectively) (Table 6.18). The next highest death rate for the Indigenous population was from diabetes, with an ASR of 43.9 deaths per 100,000 population (13.1% of deaths from amenable causes), seventeen times the non-Indigenous rate, of 2.5 deaths per 100,000 population (3.7%).

Selective invasive bacterial and protozoal infections resulted in 27.7 deaths per 100,000 population in the Indigenous population (11.6%), more than ten times the rate in the non-Indigenous population (2.6 deaths per 100,000 population; 3.7%). The Indigenous death rate for nephritis and nephrosis (26.4 deaths per 100,000 population; 7.8%) was more than twenty times the rate for the non-Indigenous population (1.3; 2%).

Deaths from rheumatic and other valvular heart diseases (11.7 deaths per 100,000 Indigenous population, 4.4% of deaths) were ranked sixth, much higher than in the non-Indigenous population (nineteenth).

Table 6.18: Amenable mortality (0 to 74 years) by Indigenous status and major cause, Queensland, South Australia, Western Australia and Northern Territory, 1997-2001

Cause	Indigenous				Non-Indigenous			
	Number	ASR	Per cent[1]	Rank[2]	Number	ASR	Per cent[1]	Rank[2]
Ischaemic heart disease	510	91.8	25.8	1	7,632	18.9	28.9	1
Diabetes	258	43.9	13.1	2	986	2.5	3.7	8
Selected invasive bacterial and protozoal infections	228	27.7	11.6	3	986	2.6	3.7	7
Nephritis and nephrosis	154	26.4	7.8	4	518	1.3	2.0	11
Cerebrovascular diseases	132	22.8	6.7	5	2,082	8.1	7.9	4
Rheumatic and other valvular heart diseases	86	11.7	4.4	6	183	0.5	0.6	19
Birth defects	155	8.9	7.9	7	1,143	4.2	4.3	5
Colorectal cancer	42	7.2	2.1	8	4,733	12.0	17.9	2
Breast cancer (female)	52	7	2.6	9	2,963	7.7	11.2	3
Digestive disorders	43	6.7	2.2	10	348	0.9	1.3	14
Skin cancer	#	0.7	0.2	22	1,285	3.3	4.9	6
Complications of the perinatal period	117	6	5.9	11	455	1.8	1.7	9
Bladder cancer	8	1.6	0.4	17	625	1.5	2.4	10

Not shown or not calculated, as there are fewer than 5 deaths over the period shown
[1] Per cent is the proportion of total amenable deaths within the Indigenous and non-Indigenous population groups
[2] Rank is the rank order of ASRs for the top ten causes of death for Indigenous and non-Indigenous populations

By socioeconomic status

There is a clear socioeconomic gradient in the rates of amenable mortality for both the Indigenous and non-Indigenous populations, with the lowest rates in the least disadvantaged areas (Quintile 1) and the highest in the most disadvantaged areas (Quintile 5) (Table 6.19, Figure 6.9).

The gradient in ASR is much more pronounced for the Indigenous population than for the non-Indigenous, with the differential in Indigenous/ non-Indigenous rates increasing from double (2.04**) in the least disadvantaged areas to more than four times (4.39**) in the most disadvantaged areas.

The highest ASR for the Indigenous population was 367.2 deaths per 100,000 population in Quintile 5 and the lowest was 114.8 in Quintile 1, a differential in rates of 3.20** between the most disadvantaged areas and the least disadvantaged areas.

For the non-Indigenous population, the differential in ASRs between the most and least disadvantaged areas was 1.49**, ranging from 83.7 deaths per 100,000 population in the most disadvantaged areas to 56.3 in the least disadvantaged areas.

Figure 6.9: Amenable mortality (0 to 74 years) by Indigenous status and socioeconomic status, Qld, SA, WA and NT, 1997-2001

Decile of socioeconomic disadvantage of area

The greatest differential in rates between the Indigenous and non-Indigenous populations was in the most disadvantaged areas (Quintile 5), where the Indigenous rate (367.2 deaths per 100,000 population) was more than four times (4.39[**]) that of the non-Indigenous population (83.7). In the least disadvantaged areas, the Indigenous rate (114.8 deaths per 100,000 population) was twice (2.04[**]) that of the non-Indigenous population (56.3).

Table 6.19: Amenable mortality (0 to 74 years) by Indigenous status and socioeconomic status, Queensland, South Australia, Western Australia and Northern Territory, 1997-2001

Quintile	Number		ASR per 100,000 population		Rate ratio
	Indigenous	Non-Indigenous	Indigenous	Non-Indigenous	Indig:Non-Indig
1: Least disadvantaged	38	3,117	114.8	56.3	2.04[**]
2	167	5,147	155.7	62.9	2.48[**]
3	256	4,521	214.9	65.7	3.27[**]
4	322	6,112	189.6	69.1	2.74[**]
5: Most disadvantaged	1,164	7,504	367.2	83.7	4.39[**]
Total	**1,974**	**26,419**	**264.7**	**68.8**	**3.85[**]**
RR–Quintile 5:Quintile 1	**..**	**..**	**3.20[**]**	**1.49[**]**	**..**

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7   Amenable mortality: New Zealand, 1997-2001

7.1 Amenable mortality by age and sex

As noted in Chapter 5, 43.2% of avoidable deaths (or 32.1% of total deaths) at ages 0 to 74 years over the period 1997 to 2001 are considered to be amenable to health care.

Almost half (46.1%) of these deaths occurred in the 65 to 74 year age group, with a further 38.0% in the 45 to 64 year age group (Table 7.1).

The 25 to 44 year age groups and infants under one year of age accounted for 8.1% and 5.5% of amenable mortality, respectively.

Death rates from amenable mortality varied from 707.7 deaths per 100,000 population in the 65 to 74 year age group to 6.2 deaths per 100,000 population at ages 1 to 14 years. Infants had the second highest rate (387.9 per 100,000 population) of amenable mortality.
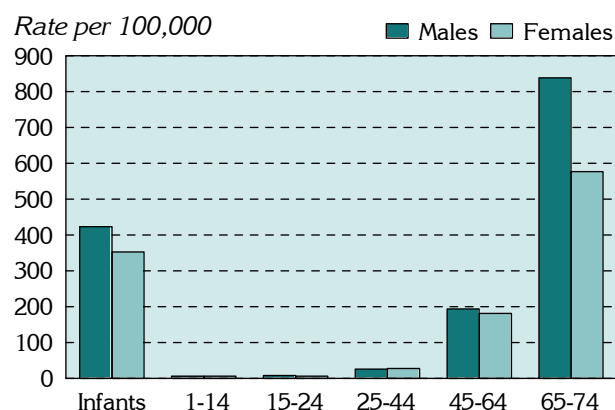
Table 7.1: Amenable mortality by age and sex, New Zealand, 1997-2001

| Age (years) | Number | | | Per cent of total | Rate per 100,000 population[1] | | | Rate ratio M:F |
	Males	Females	Total		Males	Females	Total	
Infants (<1)	593	467	1,060	5.5	423.1	352.8	387.9	1.20**
1-14	125	116	241	1.3	6.3	6.1	6.2	1.03
15-24	110	82	192	1.0	8.5	6.4	7.4	1.33
25-44	724	833	1,557	8.1	25.9	27.9	26.9	0.93
45-64	3,712	3,549	7,261	38.0	194.0	181.4	187.7	1.07**
65-74	5,036	3,783	8,819	46.1	838.5	576.9	707.7	1.45**
Total	**10,300**	**8,830**	**19,130**	**100.0**	**103.1**	**85.4**	**94.2**	**1.21****

[1] **Rates are age standardised within age categories, except under 1 year**

Male death rates from amenable causes were notably higher than female death rates for infants, and in the 15 to 24 and 65 to 74 year age groups, with marginally higher rates in the 1 to 14 and 45 to 64 year age groups (Table 7.1, Figure 7.1). The male rate was 7% lower in the 25 to 44 year age group. The highest rates of amenable mortality for both males and females were in the 65 to 74 year age group, which also had the largest differential in male and female rates, with the male rate almost 50.0% higher than the female rate (a rate ratio of 1.45**). The next highest differential was for infants, with the male rate 20% higher than the female rate (a rate ratio of 1.20**).

From 1997 to 2001, amenable mortality accounted for a total of 324,100 years of life lost (YLL)[1] from deaths before 75 years of age. The largest numbers of YLL were in the 45 to 64 year age group (133,300), and the 65 to 74 year age group (107,500) (Table 7.2). These two age groups accounted for almost three quarters (74.3%) of the YLL from deaths from amenable causes.

Table 7.2: YLL from amenable mortality by age and sex, New Zealand, 1997-2001

| Age (years) | Number | | |
	Males	Females	Total
Infants (<1)	18,095	14,261	32,357
1-14	3,749	3,460	7,209
15-24	3,099	2,317	5,416
25-44	17,849	20,488	38,337
45-64	67,665	65,637	133,302
65-74	61,327	46,169	107,496
Total	**171,784**	**152,333**	**324,116**

The numbers of YLL were higher for males than for females in all age groups, apart from the 25 to 44 year age group where YLL were 13% higher for females than for males. The largest differentials in YLL between males and females were in the 15 to 24 year age group (males 34% higher) and the 65 to 74 year age group (males 33% higher).

Figure 7.1: Amenable mortality by age and sex, New Zealand, 1997-2001

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[1] See Chapter 2, *Methods*

7.2 Amenable mortality by cause

Note: for three causes – diabetes, ischaemic heart disease and cerebrovascular diseases – only 50% of the total avoidable deaths were attributed as 'amenable' to health care intervention. Refer to Chapter 2, *Methods*, for further information.

Table 7.3 shows the number, age-standardised death rate, proportion of amenable deaths and YLL, for the major condition groups and individual causes included in the amenable mortality classification.

The highest rates of amenable mortality by major condition groups were for cardiovascular diseases,

with a rate of 36.2 deaths per 100,000 population (40.0% of amenable deaths), with a similar rate and proportion for cancer (36.0 deaths per 100,000 population, 38.9% of amenable deaths). These two major condition groups were responsible for almost 80% of amenable mortality at ages 0 to 74 years.

Similarly, the numbers of YLL from deaths from amenable causes were highest for these two major condition groups – cancer and cardiovascular diseases – accounting for 122,700 and 115,900 YLL, respectively.

Table 7.3: Amenable mortality (0 to 74 years) by major condition group and cause, New Zealand, 1997-2001

Major condition group/ cause	Number	ASR	Per cent of total	YLL
Infections	**505**	**2.6**	**2.6**	**9,794**
Tuberculosis	51	0.2	0.3	750
Selected invasive bacterial and protozoal infections	454	2.4	2.4	9,044
Cancers (malignant neoplasms)	**7,448**	**36.0**	**38.9**	**122,742**
Colorectal	3,193	15.2	16.7	48,248
Melanoma of skin	776	3.9	4.1	13,600
Nonmelanotic skin	115	0.5	0.6	1,670
Breast (female)	2,147	10.4	11.2	38,422
Cervix	267	1.3	1.4	5,101
Uterus	227	1.1	1.2	3,542
Bladder	300	1.4	1.6	4,252
Thyroid	46	0.2	0.2	766
Hodgkin's disease	51	0.3	0.3	991
Lymphoid leukaemia – acute/chronic	235	1.2	1.2	4,551
Benign	91	0.5	0.5	1,599
Nutritional, endocrine and metabolic conditions	**927**	**4.4**	**4.8**	**14,304**
Thyroid disorders	16	0.1	0.1	255
Diabetes	911	4.4	4.8	14,049
Neurological disorders	**266**	**1.5**	**1.4**	**6,145**
Epilepsy	266	1.5	1.4	6,145
Cardiovascular diseases	**7,654**	**36.2**	**40.0**	**115,931**
Rheumatic and other valvular heart disease	381	1.9	2.0	6,852
Hypertensive heart disease	221	1.0	1.2	3,455
Ischaemic heart disease	5,515	26.1	28.8	82,594
Cerebrovascular diseases	1,537	7.1	8.0	23,031
Genitourinary disorders	**446**	**2.1**	**2.3**	**6,843**
Nephritis and nephrosis	399	1.9	2.1	6,090
Obstructive uropathy and prostatic hyperplasia	46	0.2	0.2	753
Respiratory diseases	**85**	**0.5**	**0.4**	**2,219**
Asthma (0-44 years)	85	0.5	0.4	2,219
Digestive disorders	**346**	**1.6**	**1.8**	**5,142**
Peptic ulcer disease	137	0.6	0.7	2,001
Acute abdomen, appendicitis, intestinal obstruction, cholecystitis/ lithiasis, pancreatitis, hernia	209	1.0	1.1	3,142
Maternal and infant causes	**1,454**	**9.4**	**7.6**	**40,997**
Birth defects	843	5.2	4.4	22,353
Complications of perinatal period	611	4.2	3.2	18,644
Total amenable mortality	**19,130**	**94.2**	**100.0**	**324,116**

Of the top ten causes of amenable mortality, ischaemic heart disease ranked the highest, with a rate of 26.1 deaths per 100,000 population; colorectal cancer, with a rate of 15.2, was ranked next (Table 7.4). Together, ischaemic heart disease and colorectal cancer accounted for almost half (45.5%) of deaths from amenable causes. The rates for the other eight causes ranged from 1.9 deaths per 100,000 population for both rheumatic and other valvular heart diseases and nephritis and nephrosis, to 10.4 for breast cancer.

Ischaemic heart disease was also ranked highest for the number of YLL from deaths amenable mortality, accounting for approximately 82,600 YLL. Colorectal cancer and breast cancer were the next ranked causes, responsible for approximately 48,200 and 38,400 YLL, respectively. Deaths from cerebrovascular diseases resulted in approximately 23,000 YLL, followed by birth defects, which were responsible for approximately 22,300 YLL.

Table 7.4: Top ten causes of amenable mortality (0 to 74 years), New Zealand, 1997-2001

Cause	Number	ASR	Per cent of total	YLL
Ischaemic heart disease	5,515	26.1	28.8	82,594
Colorectal cancer	3,193	15.2	16.7	48,248
Breast cancer (female)	2,147	10.4	11.2	38,422
Cerebrovascular diseases	1,537	7.1	8.0	23,031
Birth defects	843	5.2	4.4	22,353
Diabetes	911	4.4	4.8	14,049
Complications of perinatal period	611	4.2	3.2	18,644
Skin cancer	776	3.9	4.1	13,600
Selected invasive bacterial and protozoal infections	454	2.4	2.4	9,044
Rheumatic and other valvular heart diseases	381	1.9	2.0	6,852
Nephritis and nephrosis	399	1.9	2.1	6,090
All causes	**19,130**	**94.2**	**100.0**	**324,116**

By age

Table 7.5 shows variations in amenable mortality by the major causes in selected age groups.

For infants, complications of the perinatal period accounted for over half (56.8%) the deaths from amenable causes, a rate of 220.5 deaths per 100,000 population. Birth defects were responsible for a further 37.2% of these deaths, a rate of 144.2, followed by selected invasive bacterial and protozoal infections, which contributed 5.5%.

In the 1 to 14 year age group, deaths from birth defects accounted for 43.6% of amenable mortality, a rate of 2.7 deaths per 100,000 population. Selected invasive bacterial and protozoal infections (19.9%) and acute/ chronic lymphoid leukaemia (15.4%) were responsible for over one third of deaths from amenable causes in this age group, with 7.9% from epilepsy.

For the 15 to 24 year age group, amenable mortality from birth defects accounted for 29.7% of all deaths, a rate of 2.2 per 100,000 population. The next four highest causes of death each accounted for between 9% and 14% of deaths from amenable causes in this age group, with rates ranging from 0.7 deaths per 100,000 population for asthma to 1.0 death per 100,000 population for both epilepsy and selected invasive bacterial and protozoal infections.

The top two causes of death in the 25 to 44 year age group were responsible for over one third (38.4%) of amenable mortality: breast cancer (females only) accounted for 21.6% of amenable mortality, a rate of 5.6 deaths per 100,000 female population, and ischaemic heart disease contributed 16.8%, a rate of 4.5. Epilepsy (8.0%), skin cancer (7.6%) and colorectal cancer (7.0%) were responsible for a further 22.6% of deaths from amenable causes in this age group.

At ages 45 to 64, over one quarter (28.4%) of deaths from amenable causes were from ischaemic heart disease, a rate of 53.6 deaths per 100,000 population. Colorectal cancer ranked second, accounting for 18.4% of deaths, a rate of 34.7 deaths per 100,000 population, followed by breast cancer (females only), with 16.3%, a rate of 30.2. Over 12% of deaths from amenable causes in the 45 to 64 age group resulted from cerebrovascular diseases (6.9%) and diabetes (5.5%).

Ischaemic heart disease and colorectal cancer were also major causes of amenable mortality in the 65 to 74 year age group. Ischaemic heart disease resulted in 36.2% of deaths from amenable causes (a rate of 257.7 deaths per 100,000 population) with colorectal cancer responsible for 19.7% of these deaths (140.8 deaths per 100,000 population). Almost one quarter (22.9%) of deaths from amenable causes in this age group were from cerebrovascular diseases (10.5%), breast cancer (females only, 7.1%) and diabetes (5.3%).

Table 7.5: Amenable mortality by major cause and age, New Zealand, 1997-2001

Age (years)	Cause	Number	Rate per 100,000[1]	% of total in age group	YLL
Infants (<1)	Complications of perinatal period	602	220.5	56.8	18,377
	Birth defects	394	144.2	37.2	12,019
	Selected invasive bacterial and protozoal infections	58	20.9	5.5	1,761
1-14	Birth defects	105	2.7	43.6	3,148
	Selected invasive bacterial and protozoal infections	48	1.3	19.9	1,462
	Lymphoid leukaemia – acute/chronic	37	0.9	15.4	1,096
	Epilepsy	19	0.5	7.9	565
15-24	Birth defects	57	2.2	29.7	1,597
	Selected invasive bacterial and protozoal infections	26	1.0	13.5	741
	Epilepsy	26	1.0	13.5	723
	Lymphoid leukaemia – acute/chronic	21	0.8	10.9	583
	Asthma	18	0.7	9.4	522
25-44	Breast cancer (female)	336	5.6	21.6	8,209
	Ischaemic heart disease	262	4.5	16.8	6,311
	Epilepsy	124	2.3	8.0	3,125
	Skin cancer	119	2.1	7.6	2,943
	Colorectal cancer	109	1.9	7.0	2,663
45-64	Ischaemic heart disease	2,060	53.6	28.4	37,450
	Colorectal cancer	1,337	34.7	18.4	24,008
	Breast cancer (female)	1,182	30.2	16.3	22,425
	Cerebrovascular diseases	498	12.9	6.9	9,074
	Diabetes	401	10.4	5.5	7,269
65-74	Ischaemic heart disease	3,191	257.7	36.2	38,758
	Colorectal cancer	1,739	140.8	19.7	21,349
	Cerebrovascular diseases	930	73.7	10.5	11,216
	Breast cancer (female)	625	48.2	7.1	7,701
	Diabetes	466	37.5	5.3	5,702

[1] Rates are age standardised within age categories, except under 1 year

As noted previously, death rates from amenable mortality are highest at older ages; however, there are also substantial numbers of deaths at younger ages. The impact of these deaths is illustrated in Table 7.5 by the measure of years of life lost (YLL).

For infants, 18,400 YLL were due to deaths from the complications of the perinatal period, with mortality from birth defects accounting for 12,000 YLL. For the 1 to 14 and 15 to 24 year age groups, YLL from birth defects ranked highest, with 3,100 YLL and 1,600 YLL, respectively.

In the 25 to 44 year age group, deaths from breast cancer were responsible for 8,200 YLL among females, followed by ischaemic heart disease, with 6,300 YLL.

For the 45 to 64 and 65 to 74 year age groups, ischaemic heart disease accounted for the highest YLL from amenable mortality (37,500 and 38,800 YLL, respectively). Amenable mortality from colorectal cancer ranked second, with approximately 24,000 YLL in the 45 to 64 year age group and 21,300 in the 65 to 74 year age group.

By age and sex

The main causes impacting amenable mortality in the various age groups show interesting variations when further analysed by sex (Table 7.6).

Apart from for infants and the 1 to 14 year age group, the ranking of the main causes of death from amenable causes differed for males and females. At older ages this difference is in part due to the impact of breast cancer for females.

For infants, complications of the perinatal period were responsible for over half the deaths from amenable causes (55.3% of infant male deaths, a rate of 234.3 deaths per 100,000 population; and 58.7% of infant female deaths, a rate of 206.7). Birth defects accounted for 36.6% of infant male deaths and 37.9% of infant female deaths. (Note: only the top three causes of infant death are shown in Table 7.6, due to the lower numbers for the next ranked causes).

For the 1 to 14 year age group, birth defects were responsible for 40.8% of deaths from amenable causes for males and almost half (46.6%) of these deaths for females. Selected invasive bacterial and protozoal infections, ranked second, resulted in

20.8% of male and 19.0% of female deaths from amenable causes.

In the 15 to 24 year age group, birth defects were responsible for 30.0% of deaths from amenable causes for males and 29.3% for females. For males, acute/ chronic lymphoid leukaemia and epilepsy ranked next, jointly accounting for over 30% of these deaths for males. For females, selected invasive bacterial and protozoal infections ranked second, with almost 15% of female deaths.

For the 25 to 44 year age group, the rank order of amenable mortality for males and females varied. Ischaemic heart disease was the cause of 29.4% of male deaths from amenable causes (ranked first) and 5.9% of female deaths (ranked sixth). The rates for ischaemic heart disease were 7.4 deaths per 100,000 population for males and 1.6 for females, a differential of 4.7[**]. The next highest causes of death for males were epilepsy, skin cancer, colorectal cancer and birth defects, each contributing approximately 7% to 12% of amenable male deaths. For females, deaths from breast cancer ranked highest, accounting for 40.3% of female deaths from amenable causes, a rate of 11.1 deaths per 100,000 population. The next highest causes of amenable mortality for females were cervical cancer, skin cancer, cerebrovascular diseases and colorectal cancer, each accounting for approximately 6% to 7% of female deaths.

Ischaemic heart disease accounted for 42.9% of male deaths from amenable causes at ages 45 to 64 years (the highest ranked cause for males) and 13.2% for females (ranked third). The male rate of deaths from ischaemic heart disease (83.2 deaths per 100,000 males) was almost three and a half times (3.47[**]) the female rate (24.0). Deaths from breast cancer ranked highest for females in this age group, and were responsible for one third (33.3%) of female deaths from amenable causes, a rate of 60.3 deaths per 100,000 female. Colorectal cancer was the second highest cause of death for males and the third for females, accounting for 19.5% of male deaths (a rate of 37.9 per 100,000 males) and 17.3% of female amenable deaths (a rate of 31.4).

Causes of deaths from amenable mortality were ranked the same for males and females in the 65 to 74 year age group, with the exception of breast cancer for females (ranked third). Ischaemic heart disease was responsible for 43.6% of male deaths and 26.3% of female deaths; the male rate (365.9 deaths per 100,000 males) was almost two and a half times (2.45[**]) the female rate (149.5 deaths per 100,000 females). Colorectal cancer resulted in 20.6% of amenable deaths for males (a rate of 173.7 deaths per 100,000 males) and 18.5% for females (a rate of 107.8).

Table 7.6: Amenable mortality by major cause, age and sex, New Zealand, 1997-2001

Age (years)	Cause	Males				Females			
		Number	Rate[1]	Per cent[2]	Rank[3]	Number	Rate[1]	Per cent[2]	Rank[3]
<1	Complications of perinatal period	328	234.3	55.3	1	274	206.7	58.7	1
	Birth defects	217	155.0	36.6	2	177	133.3	37.9	2
	Selected invasive bacterial and protozoal infections	44	31.1	7.4	3	14	10.7	3.0	3
1-14	Birth defects	51	2.5	40.8	1	54	2.9	46.6	1
	Selected invasive bacterial and protozoal infections	26	1.3	20.8	2	22	1.2	19.0	2
	Lymphoid leukaemia – acute/ chronic	21	1.0	16.8	3	16	0.8	13.8	3
	Epilepsy	10	0.5	8.0	4	9	0.5	7.8	4
15-24	Birth defects	33	2.5	30.0	1	24	1.8	29.3	1
	Lymphoid leukaemia – acute/ chronic	18	1.4	16.4	2	#	..	..	..
	Epilepsy	17	1.3	15.5	3	9	0.7	11.0	3
	Selected invasive bacterial and protozoal infections	14	1.1	12.7	4	12	0.9	14.6	2
	Asthma	10	0.8	9.1	5	8	0.6	9.8	4
25-44	Ischaemic heart disease	213	7.4	29.4	1	49	1.6	5.9	5
	Epilepsy	88	3.2	12.2	2	36	1.3	4.3	6
	Skin cancer	64	2.3	8.8	3	55	1.8	6.6	3
	Colorectal cancer	56	2.0	7.7	4	53	1.7	6.4	4
	Birth defect	53	2.0	7.3	5	35	1.2	4.2	7
	Breast cancer	–	..	..	..	336	11.1	40.3	1
	Cervical cancer	–	..	..	..	60	2.0	7.2	2
	Cerebrovascular diseases	48	1.7	6.6	6	53	1.8	6.4	3
45-64	Ischaemic heart disease	1,592	83.2	42.9	1	468	24.0	13.2	3
	Colorectal cancer	724	37.9	19.5	2	613	31.4	17.3	2
	Cerebrovascular diseases	258	13.5	7.0	3	239	12.2	6.7	4
	Diabetes	248	13.0	6.7	4	152	7.8	4.3	5
	Breast cancer	–	..	..	..	1,182	60.3	33.3	1
65-74	Ischaemic heart disease	2,196	365.9	43.6	1	995	149.5	26.3	1
	Colorectal cancer	1,037	173.7	20.6	2	701	107.8	18.5	2
	Cerebrovascular diseases	506	83.5	10.0	3	424	63.9	11.2	4
	Diabetes	265	44.3	5.3	4	201	30.8	5.3	5
	Breast cancer	–	..	..	..	625	96.4	16.5	3

[1] Rates are age standardised within age categories, except under 1 year
[2] Per cent is the proportion of total amenable deaths within the relevant age-sex group
[3] Rank is the rank order of rates for the top four causes of death for males and females: more than four causes are listed where the rank order differs for males and females

7.3 Amenable mortality by area

Introduction to map and text pages

The following pages examine amenable mortality, based on area of usual residence of the deceased.

The analysis includes text and maps showing total amenable mortality: the individual causes have not been mapped as those with larger numbers (ischaemic heart disease, colorectal, breast cancer and cerebrovascular diseases) have the same patterns (albeit some with lower rates) in terms of mortality, as mapped in *Section 5.4*; and the remaining causes had insufficient numbers to be mapped.

For further information related to the map pages, refer to the 'Introduction to map and text pages' in *Section 5.4*.

A key to the areas mapped is included in *Appendix 1.4*.

All causes: amenable mortality (0 to 74 years), New Zealand, 1997-2001

By District Health Board (DHB)

Total amenable mortality varied considerably by District Health Board (Table 7.7), with the highest rate (133.1 deaths per 100,000 population) 40% above the average New Zealand rate (94.2), and the lowest rate (76.8 deaths per 100,000 population) 20% below the national average.

The highest rates of amenable mortality were in Tairawhiti (133.1 deaths per 100,000 population), Lakes (114.5), Northland (113.1), West Coast (110.4) and Whanganui (109.6) (Map 7.1).

The lowest rates were in Waitemata (76.8), Canterbury (80.7), Nelson-Marlborough (83.7), Capital and Coast (88.2) and Taranaki (89.6).

Table 7.7: Amenable mortality from all causes by area, New Zealand, 1997-2001

District Health Board	Number	ASR
Auckland	1,596	92.1
Bay of Plenty	1,033	94.7
Canterbury	1,961	80.7
Capital and Coast	1,076	88.2
Counties Manukau	1,757	101.2
Hawke's Bay	878	105.2
Hutt	704	101.9
Lakes	586	114.5
MidCentral	897	101.1
Nelson-Marlborough	614	83.7
Northland	969	113.1
Otago	947	92.4
South Canterbury	348	95.8
Southland	623	104.5
Tairawhiti	320	133.1
Taranaki	549	89.6
Waikato	1,713	99.2
Wairarapa	241	98.4
Waitemata	1,691	76.8
West Coast	205	110.4
Whanganui	423	109.6
Total	**19,130**	**94.2**

Map 7.1
All causes: amenable mortality (0 to 74 years), New Zealand, 1997-2001

age standardised deaths per 100,000 population by District Health Board

N

ASR per 100,000 population

	108 and above
	102 to 107
	96 to 101
	90 to 95
	below 90

Details of map boundaries are in Appendix 1.4

Australian and New Zealand Atlas of Avoidable Mortality

7.4 Amenable mortality by deprivation

This section examines amenable mortality by deprivation (measured using the NZDep96 index). The calculation of age-standardised death rates by quintile and the NZDep96 index are described in Chapter 2, *Methods*.

By sex

There is a clear gradient in the rates of amenable mortality for the total population, and for both males and females, from the least deprived areas to the most deprived areas (Table 7.1, Figure 7.2). Age-standardised death rates varied from 64.4 deaths per 100,000 population in Quintile 1 to 131.1 in Quintile 5, a differential in rates between the most deprived and least deprived areas of 2.04[**].

Within each quintile, the male rate was higher than the female rate. Male rates ranged from 67.7 deaths per 100,000 males in the least deprived areas (Quintile 1) to 143.5 in the most deprived areas (Quintile 5). Rates for females ranged from

61.0 deaths per 100,000 females in Quintile 1 to 118.6 in Quintile 5.

The differential in rates between the most deprived 20% of small areas and least deprived areas was 2.12[**] for males and 1.94[**] for females.

Figure 7.2: Amenable mortality (0 to 74 years) by deprivation and sex, New Zealand, 1997-2001
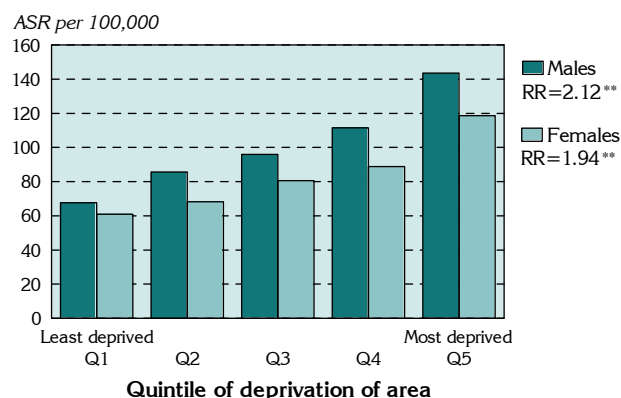

Table 7.8: Amenable mortality (0 to 74 years) by deprivation and sex, New Zealand, 1997-2001

Quintile	Males		Females		Rate ratio	Total	
	Number	ASR	Number	ASR	M:F	Number	ASR
1: Least deprived	1,225	67.7	1,125	61.0	1.11[*]	2,350	64.4
2	1,632	85.7	1,335	68.2	1.26[**]	2,967	76.9
3	1,893	95.9	1,650	80.6	1.19[**]	3,543	88.3
4	2,407	111.5	2,017	88.8	1.26[**]	4,424	100.1
5: Most deprived	2,592	143.5	2,232	118.6	1.21[**]	4,825	131.1
Total	**10,300**	**103.1**	**8,830**	**85.4**	**1.21**[**]	**19,130**	**94.2**
RR–Quintile 5:Quintile 1	..	**2.12**[**]	..	**1.94**[**]	..	..	**2.04**[**]

By excess deaths[2]

For the total population, and both males and females, there was a gradient in the number of excess deaths, with the fewest excess deaths in Quintile 2 and the greatest number in Quintile 5 (Table 7.9).

If mortality in all deprivation groups equalled that of the least deprived group (those in Quintile 1), total amenable deaths would be reduced from 19,130

(see Table 7.8 above) to 13,733. The 5,397 excess deaths that occurred over the observation period accounted for almost thirty per cent (28.2%) of total amenable mortality.

For males, there were 3,158 excess deaths (58.5% of all excess deaths) and for females, 2,239 (41.5%). The largest differential was in Quintile 2, where there were 334 male excess deaths and 137 for females, a differential of almost two and a half times. In the most deprived areas (Quintile 5), there were 1,359 male excess deaths and 1,085 female excess deaths, a differential of 1.25.

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[2] See Chapter 2, *Methods*

Table 7.9: Excess deaths[1] from amenable mortality (0 to 74 years) by quintile of deprivation and sex, New Zealand, 1997-2001

Sex	Number					Total (Q1:Q5)	Per cent of total
	Q1	Q2	Q3	Q4	Q5		
Males	(0)	334	543	923	1,359	**3,158**	58.5
Females	(0)	137	395	622	1,085	**2,239**	41.5
Total	**(0)**	**471**	**938**	**1,545**	**2,443**	**5,397**	**100.0**
Ratio-M:F	..	**2.44**	**1.37**	**1.48**	**1.25**	**1.41**	..

[1] Excess deaths is the difference between the observed and expected number of deaths, calculated between Quintile 1 (least deprived) and the quintile under analysis

The number of excess deaths increased with age, with over 80.0% of excess deaths (4,363) in the two oldest age groups (Table 7.10). The one to 24 year age group had 135 excess deaths (2.5% of total excess deaths) and infants under one year of age had 360 excess deaths (6.7%).

In Quintile 2, it was estimated that had the rates in Quintile 1 applied, there would have been four fewer excess deaths in the one to 24 year age group (giving a figure of -4). The 65 to 74 year age group recorded the highest number of excess deaths, with 220 deaths (46.7%).

While the numbers of excess deaths increased in each age group across Quintiles 3, 4 and 5, the proportions of total excess deaths in each deprivation group were consistent. For infants, the numbers of excess deaths in these quintiles were 48, 99 and 177.

The one to 24 year age group recorded the smallest number of excess deaths in Quintile 3 (26), with just less than 3% of deaths.

In Quintile 4, the 45 to 64 year age group had the highest number of excess deaths (646), and together with the 65 to 74 year age group (603 deaths), accounted for just over 80% of excess deaths. The smallest number of excess deaths in Quintile 4 was in the one to 24 year age group (42), with less than 3% of deaths.

The highest number of excess deaths in Quintile 5, as with Quintile 4, was in the 45 to 64 year age group (1,038), with 42.3% of deaths in these areas. The one to 24 year age group recorded the smallest number of deaths in Quintile 5 (71), contributing just less than 3% of excess deaths.

Table 7.10: Excess deaths from amenable mortality (0 to 74 years) by quintile of deprivation and age, New Zealand, 1997-2001

| Age (years) | Number | | | | | Total | Per cent |
	Q1	Q2	Q3	Q4	Q5	(Q2:Q5)	of total
Infants (<1)	(0)	35	48	99	177	**360**	6.7
1-24	(0)	-4	26	42	71	**135**	2.5
25-44	(0)	16	90	155	278	**540**	10.0
45-64	(0)	203	352	646	1,038	**2,239**	41.5
65-74	(0)	220	423	603	879	**2,124**	39.3
Total	**(0)**	**471**	**938**	**1,545**	**2,443**	**5,397**	**100.0**

7.5 Amenable mortality by ethnicity

This section examines amenable mortality by ethnicity, with comparisons of Māori, Pacific peoples, and the remaining population (referred to as 'European/ others').

By sex

Mortality from amenable causes varied substantially by ethnicity (Table 7.12, Figure 7.3). For the total population and for both males and females, rates for Māori were highest, followed by those for Pacific peoples and the remaining population. The Māori rate (198.2 deaths per 100,000 population) for amenable mortality was 2.43** times the European/ others rate (81.6 deaths per 100,000 population): the rate for Pacific peoples (179.4) was substantially higher than the European/ others rate, with a rate ratio of 2.20**.

For each ethnic group, the male rate for deaths from amenable causes was higher than the female rate. The differential between the Māori and European/ others rate was higher for females (2.54**) than for males (2.34**). For Pacific peoples, the rate ratios were also higher for females (2.27**) than for males (a rate ratio of 2.14**).

Figure 7.3: Amenable mortality (0 to 74 years) by ethnicity and sex, New Zealand, 1997-2001
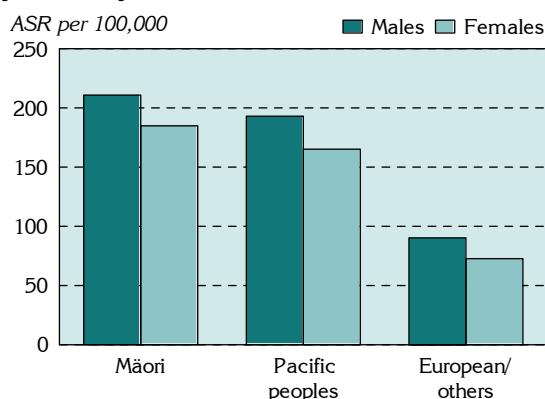

Table 7.11: Amenable mortality (0 to 74 years) by ethnicity and sex, New Zealand, 1997-2001

Ethnic group	Number			ASR per 100,000 population			Rate ratio M:F
	Males	Females	Total	Males	Females	Total	
Māori	1,698	1,639	3,337	211.0	184.9	198.2	1.14**
Pacific peoples	564	548	1,112	193.1	165.2	179.4	1.17**
European/ others	8,038	6.643	14,681	90.3	72.8	81.6	1.24**
Total	10,300	8,830	19,130	103.1	85.4	94.2	1.21**
RR–Māori:European/ others	..	..	..	2.34**	2.54**	2.43**	..
RR–Pacific:European/ others	..	..	..	2.14**	2.27**	2.20**	..

By age

Mortality from amenable causes in the younger and middle age groups (0 to 44 years) was highest for Pacific peoples, while for older (45 to 64 year and 65 to 74 year) age groups rates were highest for Māori (Table 7.12, Figure 7.4).

The highest rates for all ethnic groups were in the 65 to 74 year age group, with rates of 1,591.3 deaths per 100,000 population for Māori, 1,334.4 for Pacific peoples and 649.0 for European/ others. Infants recorded the next highest rates, with 580.9 for Pacific peoples, 480.5 for Māori and 323.5 for European/ others. The 45 to 64 year age group

also had high rates, with 475.0 deaths per 100,000 population for Māori, 374.6 for Pacific peoples and 155.1 for European/ others.

The largest differentials between the Māori and European/ others rates were in the 45 to 64 year age group (a rate ratio of 3.06**), and the 25 to 44 year age group (a rate ratio of 2.83**).

For Pacific peoples, the largest differentials were in the 15 to 24 year (a rate ratio of 3.02**), and the 25 to 44 year age groups (with a rate ratio of 2.89**).

Table 7.12: Amenable mortality by ethnicity and age, New Zealand, 1997-2001

Age (years)	Number			Rate per 100,000 population[1]			Rate ratio Māori: Euro/ others	Rate ratio Pacific: Euro/ others
	Māori	Pacific peoples	European/ others	Māori	Pacific peoples	European others		
Infants (<1)	345	144	572	480.5	580.9	323.5	1.49**	1.80**
1-14	65	31	145	7.1	10.0	5.4	1.31	1.85*
15-24	47	30	114	10.0	17.8	5.9	1.69**	3.02**
25-44	423	162	972	57.7	59.0	20.4	2.83**	2.89**
45-64	1,491	435	5,335	475.0	374.6	155.1	3.06**	2.42**
65-74	966	310	7,544	1,591.3	1,334.4	649.0	2.45**	2.06**
Total	3,337	1,112	14,681	198.2	179.4	81.6	2.43**	2.20**

[1] Rates are age standardised within age categories, except under 1 year

As with avoidable mortality, the impact of amenable mortality on each of the ethnic populations is most evident at younger ages in the Mäori and Pacific peoples populations, and at older ages in the European/ others population (Table 7.13). The proportions of years of life lost (YLL) from amenable causes at ages 0 to 24 years for Mäori (19.6%) and Pacific peoples (24.0%) were

more than twice the proportion for European/ others (9.1 %).

At the same time, the proportions of YLL from amenable mortality at ages 65 to 74 years for Mäori (18.9%) and Pacific peoples (17.3%) were less than half the proportion for the European/ others at these ages (38.5%).

Table 7.13: YLL from amenable mortality by ethnicity and age, New Zealand, 1997-2001

Age (years)	Number			Per cent			Ratio Mäori: Euro/ others	Ratio Pacific: Euro/ others
	Mäori	Pacific peoples	Euro/ others	Mäori	Pacific peoples	Euro/ others		
Infants (<1)	10,516	4,380	17,460	16.5	19.8	7.3	2.24**	2.69**
1-14	1,959	930	4,320	3.1	4.2	1.8	1.69**	2.31**
15-24	1,330	859	3,227	2.1	3.9	1.4	1.54**	2.86**
25-44	10,394	4,016	23,927	16.3	18.1	10.1	1.62**	1.80**
45-64	27,635	8,149	97,519	43.3	36.7	41.0	1.06**	0.90**
65-74	12,052	3,841	91,603	18.9	17.3	38.5	0.49**	0.45**
Total	63,886	22,175	238,055	100.0	100.0	100.0	..	..

By deprivation

There are clear socioeconomic gradients in the rates of amenable mortality for the Mäori and European/ others populations: for Pacific peoples, there is a gradient from Quintile 2 to Quintile 5 (Table 7.14). The gradient is more pronounced for Mäori compared to the European/ others, with a differential in rates of 2.10** between the most deprived areas and the least deprived areas for Mäori, compared to 1.58** for European/ others.

The greatest differential in rates between the Mäori and European/ others was in the most deprived areas (Quintile 5), where the Mäori rate (228.7 deaths per 100,000 population) was more than twice (2.33**) that of the European/ others population (a rate of 98.1).

In the least deprived areas (Quintile 1), the Mäori rate (109.1 deaths per 100,000 population) was one and three quarters times (1.76**) the European/ others (a rate of 61.9).

The pattern was different for Pacific peoples: the highest differential in rates compared with the European/ others was in the least deprived areas (Quintile 1), where Pacific peoples rate (216.3 deaths per 100,000 population) was three and a half times (3.49**) the European/ others (61.9 deaths per 100,000 population). In the most deprived areas (Quintile 5), the rate for Pacific peoples (183.8 deaths per 100,000 population) was just less than twice (1.87**) the European/ others (98.1).

Table 7.14: Amenable mortality (0 to 74 years) by ethnicity and deprivation, New Zealand, 1997-2001

Quintile	Number			ASR per 100,000 population			Rate ratio Māori: Euro/ others	Rate ratio Pacific: Euro/ others
	Māori	Pacific peoples	Euro/ others	Māori	Pacific peoples	Euro/ others		
1: Least deprived	116	55	2,180	109.1	216.3	61.9	1.76**	3.49**
2	228	58	2,681	142.7	135.5	73.4	1.94**	1.85**
3	440	139	2,964	162.3	166.6	81.0	2.00**	2.06**
4	753	229	3,442	195.4	178.2	88.1	2.22**	2.02**
5: Most deprived	1,641	591	2,592	228.7	183.8	98.1	2.33**	1.87**
Total	3,337	1,112	14,681	198.2	179.4	81.6	2.43**	2.20**
RR–Q5:Q1	..	..	..	2.10**	0.85	1.58**	..	..

8 Trends in avoidable and amenable mortality: Australia, 1987-2001

8.1 Change in total avoidable and unavoidable mortality

Of all deaths at ages 0 to 74 years in 2001, 70.6% were considered to have been avoidable, a smaller proportion than in 1987 (77.4%). Over one quarter (28.7%) of the total deaths at ages 0 to 74 in 2001 are considered to have been amenable to health care, compared to one third (33.3%) in 1987 (Table 8.1, Figure 8.1). This sub-set of amenable mortality is shown in brackets in Table 8.1.
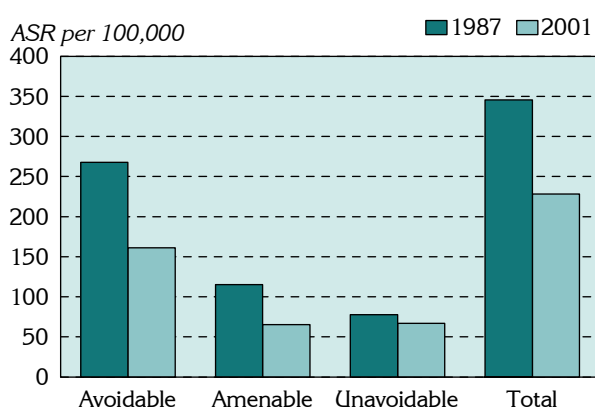
The age-standardised death rate (ASR) from avoidable mortality in 2001 was 161.3 deaths per 100,000 population, 40% lower than the 1987 rate of 267.6. Within the overall rate of avoidable mortality in 2001, 65.3 deaths per 100,000 population were estimated to have been amenable to health care, again notably lower (43.4%) than the rate of 115.3 in 1987. Death rates from the remaining, or 'unavoidable' deaths, were 67.0 per 100,000 population in 2001, compared to 77.9 in 1987 (a decline of 14% over the period). The rates for all deaths at these ages were 228.3 deaths per 100,000 population in 2001, and 345.5 in 1987.

Table 8.1: Change in avoidable mortality (0 to 74 years), Australia, 1987 and 2001

Mortality category	Number		Per cent of total		ASR per 100,000		Per cent change
	1987	2001	1987	2001	1987	2001	
Avoidable mortality	47,087	35,893	77.4	70.6	267.6	161.3	-39.7
(Amenable mortality)	(20,257)	(14,582)	(33.3)	(28.7)	(115.3)	(65.3)	(-43.4)
Unavoidable mortality	13,718	14,931	22.6	29.4	77.9	67.0	-14.0
Total mortality	**60,805**	**50,824**	**100.0**	**100.0**	**345.5**	**228.3**	**-33.9**

Figure 8.1: Change in avoidable mortality (0 to 74 years), Australia, 1987 and 2001

There were approximately 629,200 years of life lost (YLL) due to deaths from avoidable causes in 2001, a decrease of almost one quarter (23.4%) on the 821,000 years of YLL in 1987 (Table 8.2). YLL from amenable mortality showed a higher relative decline (28.6%), falling from approximately 350,000 in 1987 to 249,800 in 2001. At the same time, there was an increase in YLL from unavoidable causes of death of 6.1% over the period, from 242,500 YLL in 1987 to 257,300 in 2001. Total mortality at ages 0 to 74 years accounted for approximately 1.06 million YLL in 1987 and 886,500 years in 2001, a decline of 16.6%.

However, given the growth in population over the 14 year period also impacting on the number of deaths, it is useful to examine the change in proportion of YLL in each category of mortality. In 1987, YLL from avoidable mortality accounted for 77.2% of total YLL, declining to 71.0% in 2001 (a ratio of 0.92[**]). Similarly, YLL from amenable mortality fell from 32.9% of total YLL in 1987 to 28.2% in 2001 (a ratio of 0.86[**]). At the same time there was an increase in the proportion of YLL for unavoidable mortality, from 22.8% in 1981 to 29.0% in 2001.

Table 8.2: Change in years of life lost (0 to 74 years), Australia, 1987 and 2001

Mortality category	Number		Per cent change	Per cent of total YLL		Ratio 2001:1987
	1987	2001		1987	2001	
Avoidable mortality	820,970	629,168	-23.4	77.2	71.0	0.92[**]
(Amenable mortality)	(350,008)	(249,808)	(-28.6)	(32.9)	(28.2)	(0.86)[**]
Unavoidable mortality	242,537	257,333	6.1	22.8	29.0	1.27[**]
Total mortality	**1,063,508**	**886,501**	**-16.6**	**100.0**	**100.0**	**..**

8.2 Change in avoidable and amenable mortality by age and sex

By sex

Rates in all categories of mortality were higher for males than for females over the 14 year period (Table 8.3, Figure 8.2). For avoidable mortality, the 1987 rate for males was 357.6 deaths per 100,000 males, twice the female rate of 177.8 (a rate ratio of 2.01[**]). ASRs in 2001 were 210.1 deaths per 100,000 for males and 112.4 for females, a slightly lower differential of 1.87[**].

For amenable mortality, the 1987 rate for males was 133.4 deaths per 100,000 males, 37% higher than the female rate of 97.3 (a rate ratio of 1.37[**]).

In 2001, the differential was marginally lower, with the rate of male deaths (73.5 deaths per 100,000 males) being 1.29[**] times the female rate (57.1).
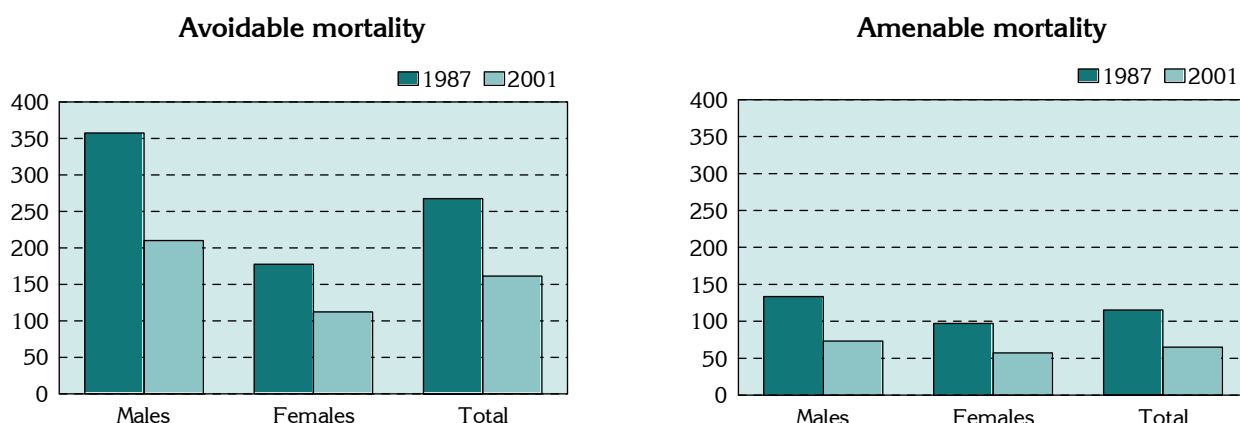
For unavoidable mortality, the rate for males in 1987 was 96.6 deaths per 100,000 population, almost two thirds (63%) higher than the female rate of 59.3 deaths per 100,000 population. In 2001, the rate for males was 81.2 deaths per 100,000 population, just over one and a half times the female rate of 52.7 deaths per 100,000 population (a rate ratio of 1.54[**]).

Table 8.3: Change in avoidable mortality (0 to 74 years) by sex, Australia, 1987 and 2001

Mortality category	Males			Females			Rate ratio Males:Females	
	ASR per 100,000		Per cent change	ASR per 100,000		Per cent change		
	1987	2001		1987	2001		1987	2001
Avoidable mortality	357.6	210.1	-41.2	177.8	112.4	-36.8	2.01[**]	1.87[**]
(Amenable mortality)	(133.4)	(73.5)	(-44.9)	(97.3)	(57.1)	(-41.3)	(1.37)[**]	(1.29)[**]
Unavoidable mortality	96.6	81.2	-15.9	59.3	52.7	-11.1	1.63[**]	1.54[**]
Total mortality	**454.3**	**291.3**	**-35.9**	**237.1**	**165.1**	**-30.4**	**1.92**[**]	**1.76**[**]

Figure 8.2: Change in avoidable and amenable mortality by sex, Australia, 1987 and 2001

ASR per 100,000 population

By age

Rates of death from avoidable causes declined in all of the age groups under study (Table 8.4). The largest decline (51.5%) was in the 0 to 14 year age group, with rates decreasing from 56.1 deaths per 100,000 population in 1987 to 27.2 in 2001. The decline in rates in this age group for deaths from amenable causes was similar (51.7%), falling from 44.9 deaths per 100,000 population in 1987 to 21.7 in 2001.

Rates in the oldest age groups fell by more than 40% over the period for both avoidable and amenable causes of death. In the 45 to 64 year age group, the rate for avoidable causes fell from 503.1 deaths per 100,000 population in 1987 to 288.8 in 2001, and from amenable causes from 219.3 deaths in 1987 to 121.9 in 2001. In the 65

to 74 year age group, the rate for avoidable causes declined from 2,074.9 deaths per 100,000 population in 1987 to 1,210.2 in 2001, and for amenable mortality, from 913.5 deaths per 100,000 population in 1987 to 516.9 in 2001.

In the 15 to 24 year age group, the decline in rates of death from avoidable causes (35.9%; from 70.2 deaths per 100,000 population in 1987 to 45.0 in 2001) was slightly lower than for amenable mortality (37.8%: from 8.2 deaths per 100,000 population to 5.1). The smallest decreases in death rates between 1987 and 2001 from avoidable causes (15.3%; from 89.5 deaths per 100,000 population to 75.8) and amenable causes (29.2%; from 27.7 deaths per 100,000 population to 19.6) were in the 25 to 44 year age group.

Table 8.4: Change in avoidable and amenable mortality by age, Australia, 1987 and 2001

Age (years)	Number		Per cent	Rate per 100,000[1]		Per cent
	1987	2001	change	1987	2001	change
Avoidable mortality						
0-14	2,045	1,050	-48.7	56.1	27.2	-51.5
15-24	1,921	1,204	-37.3	70.2	45.0	-35.9
25-44	4,509	4,490	-0.4	89.5	75.8	-15.3
45-64	16,692	12,864	-22.9	503.1	288.8	-42.6
65-74	21,920	16,285	-25.7	2,074.9	1,210.2	-41.7
Total (0 to 74)	**47,087**	**35,893**	**-23.8**	**267.6**	**161.3**	**-39.7**
Amenable mortality						
0-14	1,631	834	-48.9	44.9	21.7	-51.7
15-24	223	136	-39.0	8.2	5.1	-37.8
25-44	1,384	1,196	-13.6	27.7	19.6	-29.2
45-64	7,262	5,423	-25.3	219.3	121.9	-44.4
65-74	9,758	6,994	-28.3	913.5	516.9	-43.4
Total (0 to 74)	**20,257**	**14,582**	**-28.0**	**115.3**	**65.3**	**-43.4**

[1] **Rates are age standardised within age categories**

By age and sex

Rates of death from avoidable causes declined for both males and females in all age groups (Table 8.5, Figure 8.3). Overall, the percentage change for males was similar (41% to 46%) across the age groups studied, with the exception of the lower relative change (13.1%) in the 25 to 44 year age group. For females, the percentage reduction was most marked at ages 0 to 24 years (just below 50%), and, as with males, lowest in the 25 to 44 year age group.

Between 1987 and 2001, the rate of deaths from avoidable causes for males aged 0 to 24 years declined by 41.5% (from 78.8 deaths per 100,000 males to 46.1) and by 47.3% for deaths from amenable mortality (from 33.8 deaths per 100,000 males to 17.8).

Over the same period, the rate of deaths from avoidable causes for females aged 0 to 24 years decreased by half (49.4%; from 44.1 deaths per 100,000 females to 22.3) and by just over half for amenable mortality (from 27.3 deaths per 100,000 females to 12.7).

For males aged 25 to 44 years, the relative decline in death rates from avoidable causes was substantially lower, at 13.1% (from 120.8 deaths per 100,000 males to 105.0), and 27.6% for deaths from amenable causes (from 26.1 deaths per 100,000 males to 18.9). The decrease in death rates from avoidable causes for females was also substantially lower, with a decline of 20.2% (from 58.3 deaths per 100,000 females to 46.5), and 31.3% for deaths from amenable causes (from 29.4 deaths per 100,000 females to 20.2).

Table 8.5: Change in avoidable and amenable mortality by age and sex, Australia, 1987 and 2001

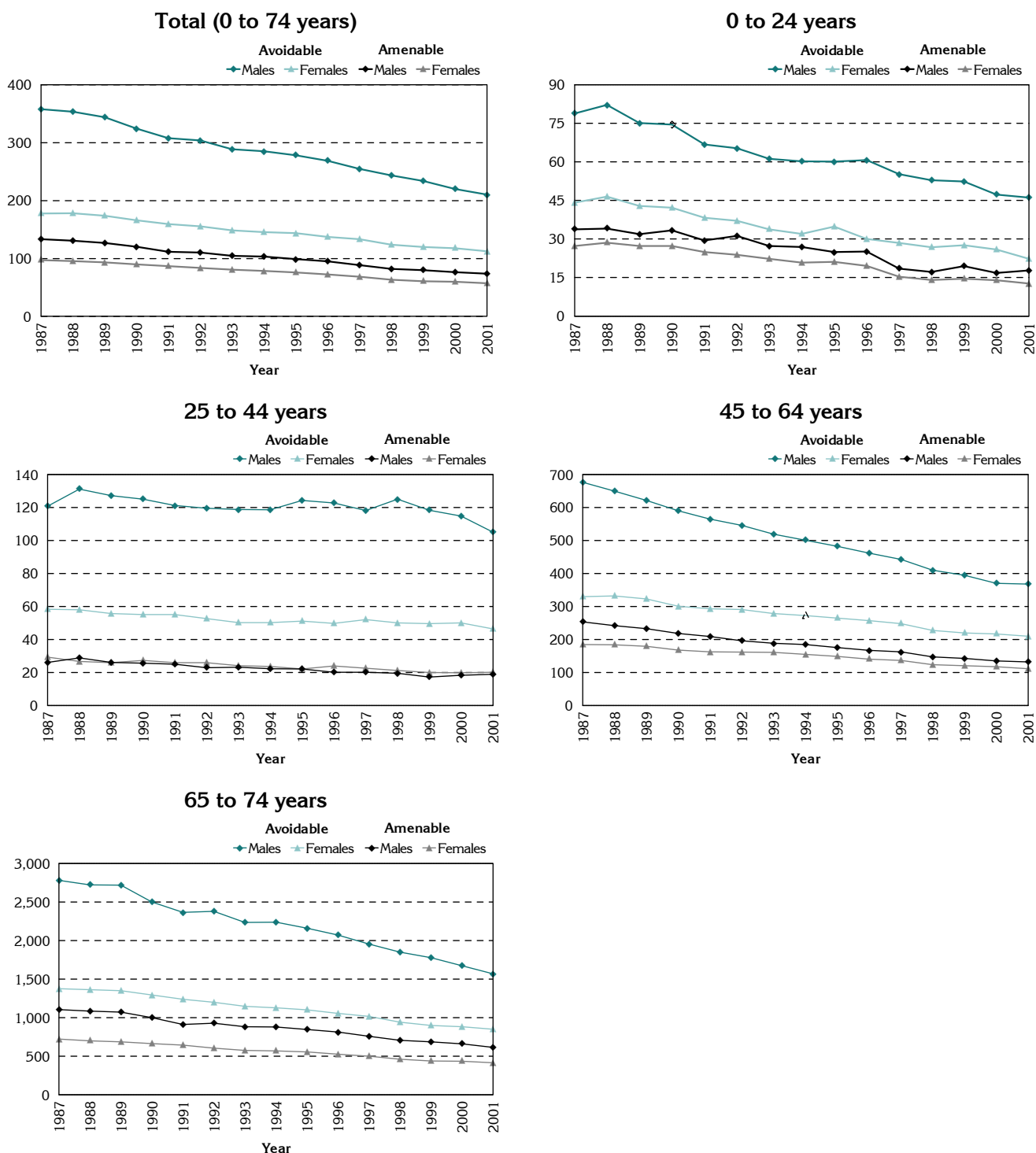| Age (years)	Males			Females		
	Rate per 100,000[1]		Per cent	Rate per 100,000[1]		Per cent
	1987	2001	change[1]	1987	2001	change
Avoidable mortality						
0-24	78.8	46.1	-41.5	44.1	22.3	-49.4
25-44	120.8	105.0	-13.1	58.3	46.5	-20.2
45-64	676.1	367.7	-45.6	329.6	209.9	-36.3
65-74	2,780.5	1,568.4	-43.6	1,376.0	849.7	-38.2
Total (0 to 74)	**357.6**	**210.1**	**-41.3**	**177.8**	**112.4**	**-36.8**
Amenable mortality						
0-24	33.8	17.8	-47.3	27.3	12.7	-53.5
25-44	26.1	18.9	-27.6	29.4	20.2	-31.3
45-64	253.5	132.1	-47.9	184.6	111.7	-39.5
65-74	1,105.4	616.6	-44.2	722.5	416.8	-42.3
Total (0 to 74)	**133.4**	**73.5**	**-44.9**	**97.3**	**57.1**	**-41.3**

[1] **Rates are age standardised within age categories**

Rates of death from avoidable causes for males aged 45 to 64 years fell by 45.6% between 1987 and 2001 (from 676.1 deaths per 100,000 males to 367.7) and by 47.9% for amenable causes of death (from 253.5 deaths per 100,000 males to 132.1). The decrease in rates over this period for females was lower, with falls of 36.3% for deaths from avoidable causes (from 329.6 deaths per 100,000 females in 1987 to 209.9 in 2001) and 39.5% for deaths from amenable causes (from 184.6 deaths per 100,000 females to 111.7).

Males in the 65 to 74 year age group experienced 43.6% fewer deaths from avoidable causes over this 14 year period (from 2,780.5 deaths per 100,000 males to 1,568.4) and a similar decrease (44.2%) in deaths from amenable causes (from 1,105 deaths per 100,000 males to 616.6). The decline in death rates for females between 1987 and 2001 was slightly lower, at 38.2%, for deaths from avoidable causes (from 1,376.0 deaths per 100,000 females to 849.7) and 42.3% for deaths from amenable causes (from 722.5 deaths per 100,000 females to 416.8).

Figure 8.3: Trends in avoidable and amenable mortality by age and sex, Australia, 1987 to 2001

Rate per 100,000 population: note the different scales

8.3 Change in avoidable mortality by cause

By major condition group

Rates of death from avoidable causes declined for 10 of the 12 major condition groups between 1987 and 2001, remained unchanged for one group (neurological disorders) and increased for another (infection) (Table 8.6, Figure 8.4). There were falls of more than 50% for cardiovascular diseases (58.3%), digestive disorders (58.0%) and maternal and infant causes (50.4%) over the period. ASRs for cardiovascular diseases (the highest rate of all the condition groups) fell from 108.2 deaths per 100,000 population in 1987 to 45.1 in 2001; for digestive disorders the decline was from 5.0 deaths per 100,000 population to 2.1; and for maternal and infant causes, from 11.9 deaths per 100,000 population to 5.9.

There were also substantial declines in ASRs for genitourinary disorders of 46.4% (from 2.8 deaths per 100,000 population to 1.5) and drug use disorders of 40.3% (from 7.7 deaths per 100,000 population to 4.6) between 1987 and 2001.

There was a smaller relative decrease in the ASR from respiratory diseases of 37.5%, from 14.4 deaths per 100,000 population in 1987 to 9.0 in 2001. Death rates from unintentional injuries fell by just under one third (29.8%) over the 14 year period, from 20.8 deaths per 100,000 population in 1987 to 14.6 in 2001. ASRs for deaths from cancer declined from 71.5 deaths per 100,000 population in 1987 (the second highest ASR after cardiovascular diseases) to 54.2 in 2001, a fall of just less than one quarter (24.2%). Intentional injuries resulted in proportionately fewer (11.6%) deaths over the period, falling from an ASR of 15.5 deaths per 100,000 population in 1987 to 13.7 in 2001.

Rates of death from neurological disorders (1.1 deaths per 100,000 population) remained unchanged between 1987 and 2001. Infection was the only major condition group to record an increase in ASR, rising from 3.9 deaths per 100,000 population in 1987 to 4.1 in 2001.

Table 8.6: Change in avoidable mortality (0 to 74 years) by major condition group, Australia, 1987 and 2001

Major condition group	Number		Per cent change	ASR per 100,000		Per cent change
	1987	2001		1987	2001	
Infection	663	891	34.4	3.9	4.1	5.1
Cancers (malignant neoplasms)	12,607	12,569	-0.3	71.5	54.2	-24.2
Nutritional, endocrine and metabolic conditions	989	1,230	24.4	5.4	5.2	-3.7
Drug use disorders	1,275	997	-21.8	7.7	4.6	-40.3
Neurological disorders	171	210	22.8	1.1	1.1	–
Cardiovascular diseases	19,821	10,685	-46.1	108.2	45.1	-58.3
Genitourinary disorders	512	365	-28.7	2.8	1.5	-46.4
Respiratory diseases	2,659	2,160	-18.8	14.4	9.0	-37.5
Digestive disorders	890	486	-45.4	5.0	2.1	-58.0
Maternal and infant causes	1,629	894	-45.1	11.9	5.9	-50.4
Unintentional injuries	3,354	2,739	-18.3	20.8	14.6	-29.8
Intentional injuries	2,517	2,667	6.0	15.5	13.7	-11.6
Total avoidable mortality	**47,107**	**35,893**	**-23.8**	**267.6**	**161.3**	**-39.7**

Note: the avoidable mortality causes which comprise each major condition group are detailed in Appendix 1.1

Figure 8.4: Trends in avoidable mortality (0 to 74 years) by selected major condition group, Australia, 1987 to 2001

ASR per 100,000 population: note the different scales

Cardiovascular diseases

Cancer

Unintentional injuries

Intentional injuries

Respiratory diseases

Maternal and infant causes

By cause

Of the major avoidable mortality conditions, ischaemic heart disease had the highest age-standardised death rate in each year of period from 1987 to 2001. The ASR decreased from 81.9 deaths per 100,000 population in 1987 to 32.8 in 2001, a decline of 60.0%: the number of deaths also showed a substantial fall of 48.2% (Table 8.7, Figure 8.5).

Deaths from lung cancer, which was the second ranked condition each year over the 14 year period, fell by 21.5%, from an ASR of 23.3 deaths per 100,000 population in 1987 to 18.3 in 2001.

There was little change in the number of deaths of lung cancer.

Cerebrovascular diseases had a decline of more than half (53.5%) in ASR between 1987 and 2001, falling from 20.2 deaths per 100,000 population in 1987 to 9.4 in 2001, and a notable decrease of 40% in the number of deaths.

There was also a substantial decline (45.0%) in the rate of avoidable mortality as a result of road traffic injuries, from an ASR of 16.0 in 1987 (the fourth ranked cause of deaths) to 8.8 in 2001 (ranked sixth), with a fall in number of deaths of 38.2%.

Colorectal cancer, the fifth rated cause of deaths in 1987 with an ASR of 14.2, was rated fourth in 2001 with an ASR of 10.9, a decrease of 23.2% in the rate of deaths over the period, although with no change in the number of deaths.

Although the rate of deaths from suicide and self inflicted injuries declined by one tenth (9.6%) over the period, from an ASR of 13.5 deaths per 100,000 population in 1987 to 12.2 in 2001, the rank increased from sixth to third, and the number of deaths increased by 7.4%.

Both the ASR and number of deaths from COPD declined over this period (by 37.1% and 19.5%, respectively), from an ASR of 12.4 deaths per 100,000 population in 1987 to 7.8 in 2001.

While breast cancer (which was ranked eighth in each year of the period) resulted in a similar number of deaths in both 1987 and 2001, the ASR declined by one fifth (20.2%), from 9.4 deaths per 100,000 population to 7.5.

While deaths from alcohol related disease fell by 38.1% between 1987 and 2001 (from 6.3 deaths per 100,000 to 3.9), the rank changed only marginally, from ninth to tenth. The number of deaths fell by 17.5% over the period.

Complications of the perinatal period resulted in 6.1 deaths per 100,000 in 1987 (a rank of tenth), and declined to 2.1 in 2001 (ranked nineteenth), a fall of two thirds (65.6%). There was a similar decrease in the number of deaths (63.2%).

The rate of deaths from diabetes declined marginally (3.8%) over this 14 year period, with the number of deaths increased by one quarter (25.4%). There was a corresponding rise in rank from twelfth in 1987 to ninth in 2001.

Table 8.7: Change in major causes of avoidable mortality (0 to 74 years), Australia, 1987 and 2001

Cause	Number		Per cent change	ASR per 100,000		Per cent change	Rank	
	1987	2001		1987	2001		1987	2001
Ischaemic heart disease	15,004	7,778	-48.2	81.9	32.8	-60.0	1	1
Lung cancer	4,185	4,271	2.1	23.3	18.3	-21.5	2	2
Cerebrovascular diseases	3,774	2,263	-40.0	20.2	9.4	-53.5	3	5
Road traffic injuries	2,581	1,596	-38.2	16.0	8.8	-45.0	4	6
Colorectal cancer	2,546	2,543	-0.1	14.2	10.9	-23.2	5	4
Suicide and self inflicted injuries	2,208	2,371	7.4	13.5	12.2	-9.6	6	3
COPD (45-74 years)	2,349	1,891	-19.5	12.4	7.8	-37.1	7	7
Breast cancer	1,633	1,698	4.0	9.4	7.5	-20.2	8	8
Alcohol related disease	1,058	873	-17.5	6.3	3.9	-38.1	9	10
Complications of the perinatal period	816	300	-63.2	6.1	2.1	-65.6	10	19
Diabetes	966	1,211	25.4	5.3	5.1	-3.8	12	9
All causes	**47,107**	**35,893**	**-23.8**	**267.6**	**161.3**	**-39.7**	**..**	**..**

Figure 8.5: Trends in major causes of avoidable mortality (0 to 74 years), Australia, 1987 to 2001

ASR per 100,000 population: note the different scales

Ischaemic heart disease

Lung cancer

Cerebrovascular diseases

Road traffic injuries

Colorectal cancer

Suicide and self inflicted injuries

COPD (45 to 74 years)

Breast cancer

... continued

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Figure 8.5: Trends in major causes of avoidable mortality (0 to 74 years), Australia, 1987 to 2001
… continued

ASR per 100,000 population: note the different scales

Alcohol related disease

Complications of perinatal period

Diabetes

8.4 Change in avoidable and amenable mortality by State/ Territory

The overall decline in rates for deaths from avoidable causes between 1987 and 2001 in all states and territories was around 40.0% (Table 8.8). Victoria recorded the highest decrease in ASRs (41.9%), falling from 264.4 deaths per 100,000 population in 1987 to 153.5 in 2001. Northern Territory (with the highest rates) recorded the lowest decline in ASR, 20.1%, from 410.6 deaths per 100,000 population in 1987 to 328.2 in 2001.

New South Wales experienced a similar rate of decline in avoidable mortality (41.5%) to Victoria over the period, falling from 272.5 deaths per 100,000 population to 159.5.

Deaths from avoidable causes in Western Australia fell by just under the average for all areas (39.4%), from a rate of 248.1 deaths per 100,000 population in 1987 to 150.4 in 2001. Rates in Tasmania declined by 38.1%, from 300.8 deaths per 100,000 population in 1987 to 186.3 deaths in 2001. The fall in ASR in the Australian Capital Territory was 37.7%, declining from 230.9 deaths per 100,000 population in 1987 to 143.9 in 2001.

In South Australia, the ASR for deaths from avoidable causes fell by 36.6% between 1987 and 2001, from 255.0 deaths per 100,000 population to 161.6. The decline in Queensland (36.4%) was similar to that for South Australia, falling from 271.0 deaths per 100,000 population to 172.4.

The change in rates of death from amenable mortality over the 14 year period showed a different pattern to the fall in ASRs from avoidable causes, declining an average of 43.4%, with the largest decrease in Western Australia (46.2%) and the smallest in the Northern Territory (23.8%) (Table 8.8). In Western Australia the ASR fell from 111.5 deaths per 100,000 population in 1987 to 60.0 in 2001, while in the Northern Territory (which had the highest rates) the rate declined from 162.7 deaths per 100,000 population to 124.0.

New South Wales and Tasmania both recorded a decline of 45.5% in ASRs from amenable causes, from 117.4 and 128.9 deaths per 100,000 population, respectively, in 1987 to 64.0 and 70.2 in 2001. The relative decline in ASRs in Victoria (43.7%) and the Australian Capital Territory (42.7%) were similar, reflecting falls from 111.9 and 104.6 deaths per 100,000 population in 1987 to 63.0 and 59.9, respectively, in 2001.

South Australia's ASR for deaths from amenable causes declined by 39.7% over the period, falling from 110.2 deaths per 100,000 population in 1987 to 66.5 in 2001. In the Northern Territory the ASR decreased by 23.8%, falling from 162.7 deaths per 100,000 population in 1987 to 124.0 in 2001.

Table 8.8: Change in avoidable and amenable mortality (0 to 74 years) by state/ territory and sex, Australia, 1987 and 2001

State/ Territory	Males			Females			Total		
	ASR		Per cent	ASR		Per cent	ASR		Per cent
	1987	2001	change	1987	2001	change	1987	2001	change
Avoidable mortality									
New South Wales	364.9	209.8	-42.5	180.5	109.1	-39.6	272.5	159.5	-41.5
Victoria	354.6	198.1	-44.1	174.6	108.6	-37.8	264.4	153.5	-41.9
Queensland	360.6	223.4	-38.0	181.6	121.4	-33.1	271.0	172.4	-36.4
South Australia	340.7	209.9	-38.4	169.6	113.1	-33.3	255.0	161.6	-36.6
Western Australia	330.4	198.1	-40.0	165.9	102.7	-38.1	248.1	150.4	-39.4
Tasmania[1]	..	..	..	..	..	..	300.8	186.3	-38.1
Northern Territory[1]	..	..	..	..	..	..	410.6	328.2	-20.1
ACT[1]	..	..	..	..	..	..	230.9	143.9	-37.7
All areas	**357.6**	**210.1**	**-41.2**	**177.8**	**112.4**	**-36.8**	**267.6**	**161.3**	**-39.7**
Amenable mortality									
New South Wales	135.9	72.6	-46.6	99.0	55.3	-44.1	117.4	64.0	-45.5
Victoria	129.3	70.3	-45.6	94.7	55.7	-41.2	111.9	63.0	-43.7
Queensland	135.6	80.3	-40.8	100.2	61.4	-38.7	117.9	70.8	-39.7
South Australia	128.3	73.8	-42.5	92.3	59.1	-36.0	110.2	66.5	-39.7
Western Australia	130.8	66.8	-48.9	92.4	53.2	-42.4	111.5	60.0	-46.2
Tasmania[1]	..	..	..	..	..	..	128.9	70.2	-45.5
Northern Territory[1]	..	..	..	..	..	..	162.7	124.0	-23.8
ACT[1]	..	..	..	..	..	..	104.6	59.9	-42.7
All areas	**133.4**	**73.5**	**-44.9**	**97.3**	**57.1**	**-41.3**	**115.3**	**65.3**	**-43.4**

[1] Not shown by sex for Tasmania, Northern Territory and Australian Capital Territory due to the small numbers of death

By sex[1]

The largest proportional decline in ASR for avoidable causes between 1987 and 2001 for males was in Victoria (44.1%) and for females in New South Wales (39.6%) (Table 8.8, Figure 8.6). The decline in ASR for females in Victoria was 37.8% and for males in New South Wales was 42.5%.

In Western Australia, the ASRs for avoidable causes fell 40.0% for males over the 14 year period, and 38.1% for females. Queensland recorded a decline in deaths from avoidable causes of 38.0% for males and 33.1% for females.

The decline in ASRs for deaths from avoidable causes in South Australia between 1987 and 2001 was 38.4% for males and 33.3% for females. Queensland's reduction in ASRs over the 14 year period was 38.0% for males and slightly lower at 33.1% for females.

For deaths from amenable mortality, the decrease in ASR for males (an average of 44.9%) was higher than that for females (an average of 41.3%) in each of the states over the period. Western Australia recorded the highest relative decrease in ASR for males (48.9%), while the highest fall in rate for females (44.1%) was in New South Wales. The decrease in ASR over the period for females in Western Australia was 42.4%, and for males in New South Wales was 42.5%.

In Victoria, the decline in deaths from amenable causes between 1987 and 2001 was 45.6% for males and 41.2% for females. The decline in ASR for males in South Australia over the period was 42.5%, compared to a 36.0% fall in ASR for females. Queensland recorded declines in rates of death from amenable causes of 40.8% for males and 38.7% for females.

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[1] Not shown by sex for Tasmania, Northern Territory and Australian Capital Territory due to the small numbers of death

Figure 8.6: Trends in avoidable and amenable mortality (0 to 74 years) by state/ territory and sex[1], Australia, 1987 to 2001

ASR per 100,000 population: note the different scales

9 Trends in avoidable and amenable mortality: New Zealand, 1981-2001

9.1 Change in total avoidable and unavoidable mortality

Almost three quarters (74.3%) of all deaths at ages 0 to 74 years in 2001 are considered to be from avoidable causes, slightly less than in 1981 (79.2%). Of all deaths at these ages in 2001, almost one third (31.9%) are considered to be amenable to health care, again lower than in 1981 (36.0%) (Table 9.1, Figure 9.1). The sub-set of amenable mortality is shown in brackets in Table 9.1.
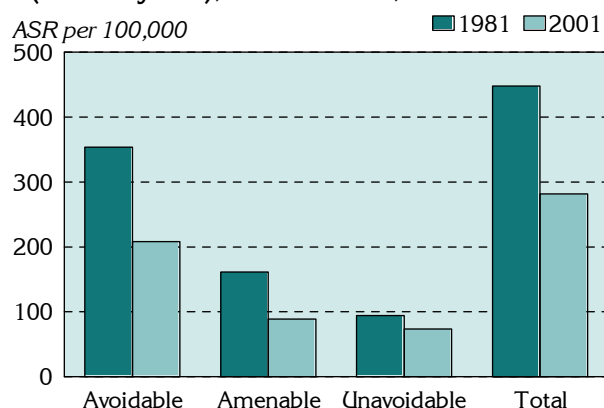
However, despite these consistent proportions, the ASR from avoidable mortality in 2001 (208.3 deaths per 100,000 population) was notably

(41.1%) lower than in 1981 (353.6 deaths per 100,000). Of the overall rate of avoidable mortality in 2001, 88.7 deaths per 100,000 population were estimated to have been amenable to health care, also substantially (45.1%) lower than the rate of 161.5 in 1981. Deaths from the remaining, or 'unavoidable' causes of mortality, comprised 73.4 deaths per 100,000 population in 2001, a decline of 22.2% compared to the ASR of 94.3 in 1981. The ASRs for all deaths at these ages were 281.6 deaths per 100,000 population in 2001, and 448.0 in 1981, a fall of 37.1% over the period.

Table 9.1: Change in avoidable mortality (0 to 74 years), New Zealand, 1981 and 2001

Mortality category	Number		Per cent of total		ASR		Per cent change
	1981	2001	1981	2001	1981	2001	
Avoidable mortality	11,450	8,614	79.2	74.3	353.6	208.3	-41.1
(Amenable mortality)	(5,214)	(3,703)	(36.0)	(31.9)	(161.5)	(88.7)	(-45.1)
Unavoidable mortality	3,015	2,987	20.8	25.7	94.3	73.4	-22.2
Total mortality	**14,465**	**11,601**	**100.0**	**100.0**	**448.0**	**281.6**	**-37.1**

Figure 9.1: Change in avoidable mortality (0 to 74 years), New Zealand, 1981 and 2001

ASR per 100,000

In 2001 there were approximately 145,900 years of life lost (YLL) to deaths from avoidable causes, a decrease of one quarter (25.0%) from the 194,500 YLL in 1981 (Table 9.2).

The YLL from causes amenable to health care showed a greater relative decline (29.6%), from 88,700 years in 1981 to 62,400 in 2001.

Unavoidable mortality declined by 8.4% over the period, falling from 56,100 YLL in 1981 to 51,500 in 2001. Total mortality at ages 0 to 74 years accounted for approximately 250,700 YLL in 1981 and 197,400 years in 2001, a decrease of 21.3%.

However, with the growth in population over the period also impacting on the number of deaths, it is useful to examine the change in proportion of YLL in each category of mortality. In 1981, YLL from avoidable mortality accounted for 77.6% of total YLL, declining to 73.9% in 2001 (a ratio of 0.95[**]). YLL from amenable mortality fell to a similar extent, from 35.4% of total YLL in 1981 to 31.6% in 2001 (a ratio of 0.89[**]).

Table 9.2: Change in years of life lost (0 to 74 years), New Zealand, 1981 and 2001

Mortality category	Number		Per cent change	Per cent of total YLL		Ratio 2001:1981
	1981	2001		1981	2001	
Avoidable mortality	194,509	145,908	-25.0	77.6	73.9	0.95[**]
(Amenable mortality)	(88,709)	(62,407)	(-29.6)	(35.4)	(31.6)	(0.89)[**]
Unavoidable mortality	56,149	51,450	-8.4	22.4	26.1	1.16[**]
Total mortality	**250,658**	**197,358**	**-21.3**	**100.0**	**100.0**	**..**

9.2 Change in avoidable and amenable mortality by age and sex

By sex

Death rates for avoidable and amenable mortality for both males and females were notably lower in 2001 than in 1981 (Table 9.3, Figure 9.2).

In 1981 the avoidable mortality rate for males was 459.9 deaths per 100,000 population, 1.85** times the female rate of 248.2. By 2001, the rates of death from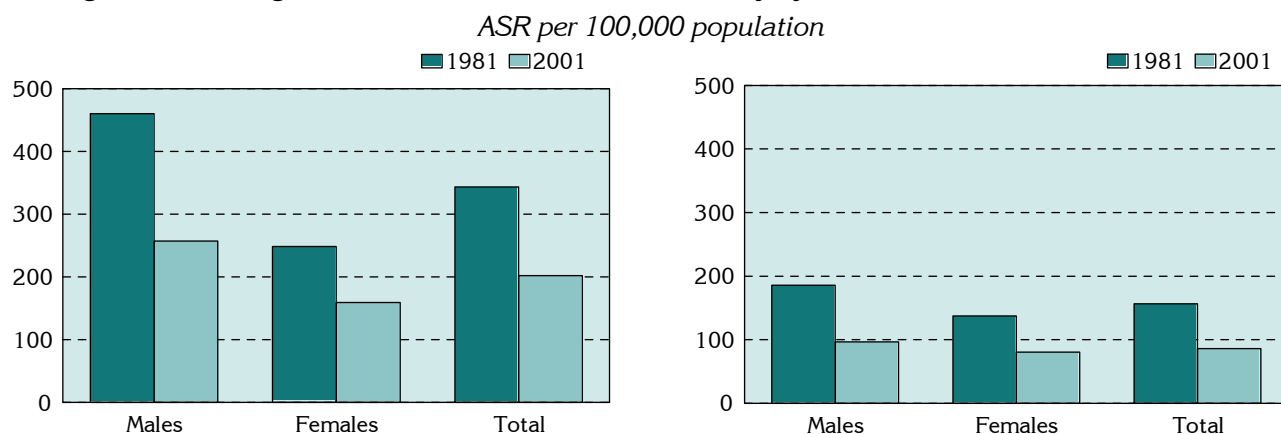 avoidable causes had declined to 257.3 deaths per 100,000 population for males and 158.9 for females, a smaller differential, of 1.62**.

For deaths from amenable mortality, the male ASR of 185.8 in 1981 was 35% higher than the female rate of 137.6. By 2001, the ASR for male deaths from amenable causes had declined by 48.0%, to 96.6 deaths per 100,000 population, 20% higher than the ASR of 80.7 for females.

Table 9.3: Change in avoidable mortality (0 to 74 years) by sex, New Zealand, 1981 and 2001

Mortality category	Males			Females			Rate ratio Males:Females	
	ASR		Per cent	ASR		Per cent		
	1981	2001	change	1981	2001	change	1981	2001
Avoidable mortality	459.9	257.3	-44.1	248.2	158.9	-36.0	1.85**	1.62**
(Amenable mortality)	(185.8)	(96.6)	(-48.0)	(137.6)	(80.7)	(-41.4)	(1.35)**	(1.20)**
Unavoidable mortality	114.6	91.4	-20.2	73.9	55.5	-24.9	1.55**	1.65**
Total mortality	**574.7**	**348.6**	**-39.3**	**322.2**	**214.4**	**-33.5**	**1.78****	**1.63****

Figure 9.2: Change in avoidable and amenable mortality by sex, New Zealand, 1981 and 2001

ASR per 100,000 population

By age

Rates of avoidable mortality declined notably between 1981 and 2001 for all age groups (Table 9.4). The declines in the rate of death from causes amenable to health care were similarly high, and more uniform across the age groups.

Numbers also fell notably in all age groups for both avoidable and amenable mortality, apart from the 25 to 44 year age group, where there was a small increase (5.4%) in the number of deaths from avoidable causes over the period.

Infants under one year of age recorded the largest decrease in the rate of deaths avoidable causes (47.0%), declining from 701.9 deaths per 100,000 population in 1981 to 372.3 deaths in 2001. The death rate from causes amenable to health care in this age group declined by a similar proportion (46.1%), from 674.1 deaths per 100,000 population in 1981 to 363.1 in 2001.

In the 1 to 24 year age group, the decline in the death rate from avoidable causes was just over one third (35.8%), from 53.7 deaths per 100,000 population to 34.5. The rate of amenable mortality in this age group fell by a 39.7%, from 12.6 deaths per 100,000 population in 1981 to 7.6 in 2001. The proportional decreases in number of deaths differed little for avoidable (41.9%) and amenable (42.9%) mortality.

The 25 to 44 year age group recorded the smallest proportional decrease in avoidable mortality (22.7%), with the rate falling from 105.1 deaths per 100,000 population in 1981 to 81.2 in 2001. The decline in the rate of deaths from amenable causes (46.4%) was more than double that from avoidable mortality, with the rate falling from 44.4 deaths per 100,000 population in 1981 to 23.8 in 2001.

As noted previously, there was an increase of 5.4% in the number of deaths from avoidable causes in this age group, while deaths amenable mortality decreased by 21.1%.

In the 45 to 64 year age group, the decline in the rates of avoidable mortality (44.5%; from 679.1 deaths per 100,000 population in 1981 to 376.7 in 2001) and amenable mortality (45.0%; 312.9 deaths per 100,000 population to 172.2 deaths per 100,000 population) was similar. The fall in the number of deaths over the period was also similar for both avoidable (25.7%) and amenable (26.1%) causes.

The decrease in the rate of death from avoidable causes in the 65 to 74 year age group (41.8%) was marginally lower that for amenable mortality (44.9%). Avoidable mortality in this age group declined from 2,749.3 deaths per 100,000 population in 1981 to 1,600.0 in 2001, compared to a fall from 1,243.2 deaths per 100,000 population in 1981 to 685.3 in 2001 in mortality from amenable mortality. There was a smaller relative decline in the number of deaths from avoidable causes (25.3%) compared to amenable causes (29.6%) in this age group.

Table 9.4: Change in avoidable and amenable mortality by age, New Zealand, 1981 and 2001

Age (years)	Number		Per cent change	Rate per 100,000[1]		Per cent change
	1981	2001		1981	2001	
Avoidable mortality						
Infants (<1)	355	203	-42.8	701.9	372.3	-47.0
1-24	747	434	-41.9	53.7	34.5	-35.8
25-44	863	910	5.4	105.1	81.2	-22.7
45-64	4,132	3,069	-25.7	679.1	376.7	-44.5
65-74	5,354	3,998	-25.3	2,749.3	1,600.0	-41.8
Total (0 to 74)	**11,450**	**8,614**	**-24.8**	**353.6**	**208.3**	**-41.1**
Amenable mortality						
Infants (<1)	341	198	-41.9	674.1	363.1	-46.1
1-24	170	97	-42.9	12.6	7.6	-39.7
25-44	356	281	-21.1	44.4	23.8	-46.4
45-64	1,903	1,407	-26.1	312.9	172.2	-45.0
65-74	2,444	1,720	-29.6	1,243.2	685.3	-44.9
Total (0 to 74)	**5,214**	**3,703**	**-29.0**	**161.5**	**88.7**	**-45.1**

[1] **Rates are age standardised within age categories, except under 1 year**

By age and sex

Between 1981 and 2001 rates of death for avoidable causes of mortality fell by an average of 44.1% for males (from 459.9 deaths per 100,000 males in 1981 to 257.3 in 2001) and 36.0% for females (from 248.2 deaths per 100,000 females to 158.9) (Table 9.5, Figure 9.3).

The rate of deaths from avoidable causes for infants declined by 44.2% for males (from 747.6 deaths per 100,000 infant males to 417.2), and 50.3% for females (from 657.3 deaths per 100,000 infant females to 326.9) over the period. The declines in the rate of deaths from amenable causes were similar for both sexes, falling by 45.6% for infant males and 46.8% for infant females.

For the 1 to 24 year age group, there was a decline in the rate of deaths over the twenty year period of 34.9% for males (from 71.6 deaths per 100,000 males in 1981 to 46.6 in 2001), lower than the decrease of 37.6% for females (from 35.9 deaths per 100,000 females in 1981 to 22.4 in 2001). The decline in the rate of deaths from amenable causes was smaller for males (36.4%) than for females (42.7%).

In the 25 to 44 year age group, the decline in the rate of deaths from avoidable causes for males (15.8%) was less than half that for females (34.0%). The rate for males fell from 132.9 deaths per 100,000 males in 1981 to 111.9 in 2001, compared to a decline for females from 77.4 to 51.1 over the period. Conversely, the decrease in the rate of deaths from amenable mortality was higher for males (47.4%) than for females (44.9%).

The decline in the rate of deaths for avoidable causes in the 45 to 64 year age group was notably higher for males (50.9%; from 896.3 deaths per 100,000 males in 1981 to 440 in 2001) than for females (32.5%; from 463.3 to 312.6) over the same period. The rate for amenable mortality showed similar declines, with the rate for males falling from 367.4 deaths per 100,000 males in 1981 to 177.4 in 2001 (a decrease of 51.7%), and from 258.9 to 166.7 for females (a decrease of 35.6%).

In the 65 to 74 year age group, the decline in the death rate from avoidable mortality was higher for males (44.5%) than for females (37.3%). The ASR for males fell from 3,601.2 deaths per 100,000 males in 1981 to 1,998.6 in 2001, compared to a

decline from 1,909.6 to 1,197.1 over the same period for females. The declines in the death rates from amenable mortality were similar for both males (45.8%) and females (43.7%) in this age group.

Table 9.5: Change in avoidable and amenable mortality by age and sex, New Zealand, 1981 and 2001

Age (years)	Males			Females		
	Rate per 100,000[1]		Per cent	Rate per 100,000[1]		Per cent
	1981	2001	change	1981	2001	change
Avoidable mortality						
Infants (<1)	747.6	417.2	-44.2	657.3	326.9	-50.3
1-24	71.6	46.6	-34.9	35.9	22.4	-37.6
25-44	132.9	111.9	-15.8	77.4	51.1	-34.0
45-64	896.3	440.0	-50.9	463.3	312.6	-32.5
65-74	3,601.2	1,998.6	-44.5	1,909.6	1,197.1	-37.3
Total (0 to 74)	**459.9**	**257.3**	**-44.1**	**248.2**	**158.9**	**-36.0**
Amenable mortality						
Infants (<1)	733.3	399.2	-45.6	614.8	326.9	-46.8
1-24	12.1	7.7	-36.4	13.1	7.5	-42.7
25-44	44.3	23.3	-47.4	44.5	24.5	-44.9
45-64	367.4	177.4	-51.7	258.9	166.7	-35.6
65-74	1,480.9	803.0	-45.8	1,006.7	566.9	-43.7
Total (0 to 74)	**185.8**	**96.6**	**-48.0**	**137.6**	**80.7**	**-41.4**

[1] Rates are age standardised within age categories, except under 1 year

Figure 9.3: Trends in avoidable and amenable mortality by age and sex, New Zealand, 1981 to 2001

Rate per 100,000 population: note the different scales

9.3 Change in avoidable mortality by cause

By major condition group

Between 1981 and 2001 ASRs declined (by between 20% and 60%) for 10 of the 12 major condition groups and increased marginally for one group (nutritional, endocrine and metabolic conditions). In contrast, the rate for intentional injuries increased substantially, rising by 34.5% (Table 9.6).

There were declines in ASRs of over 50.0% over the 20 year period for cardiovascular diseases (59.6%), digestive disorders (58.3%), infection (51.8%) and drug use disorders (51.6%) (Figure 9.4).

Declines of more than 40% over the 20 year period were recorded in the ASRs for genitourinary disorders (42.9%) and unintentional injuries (41.1%).

The ASRs for mortality from maternal and infant causes fell by 33.8% over the 20 year period, and by 26.7% from neurological disorders. The relative decline in rates of death from respiratory diseases over the period was just under one quarter (22.9%); and around one fifth (19.4%) from cancer.

Contrary to the notable declines in ASRs for most of the major condition groups over the 20 year period, there was a marginal increase (3.5%) in the ASR for nutritional, endocrine and metabolic conditions. This reflects the increase in the prevalence of type 2 diabetes over the study period.

As noted, the ASR for deaths from intentional injuries increased by one third (34.5%) over the period (from 11.6 deaths per 100,000 population in 1981 to 15.6 in 2001). This increase was due entirely to deaths from suicide.

Table 9.6: Change in avoidable mortality (0 to 74 years) by major condition group, New Zealand, 1981 and 2001

Major condition group	Number		Per cent change	ASR		Per cent change
	1981	2001		1981	2001	
Infections	271	164	-39.5	8.5	4.1	-51.8
Cancers (malignant neoplasms)	2,651	2,808	5.9	81.8	65.9	-19.4
Nutritional, endocrine and metabolic conditions	280	378	35.0	8.5	8.8	3.5
Drug use disorders	189	119	-37.0	6.2	3.0	-51.6
Neurological disorders	44	39	-11.4	1.5	1.1	-26.7
Cardiovascular diseases	5,517	2,923	-47.0	166.1	67.1	-59.6
Genitourinary disorders	116	88	-24.1	3.5	2.0	-42.9
Respiratory diseases	639	634	-0.8	18.8	14.5	-22.9
Digestive disorders	160	85	-46.9	4.8	2.0	-58.3
Maternal and infant causes	379	277	-26.9	13.6	9.0	-33.8
Unintentional injuries	856	552	-35.5	27.5	16.2	-41.1
Intentional injuries	349	547	56.7	11.6	15.6	34.5
Total avoidable mortality	**11,450**	**8,614**	**-24.8**	**353.6**	**208.3**	**-41.1**

Note: the avoidable mortality causes which comprise each major condition group are detailed in Appendix 1.1

ASR per 100,000 population: note the different scales

Cardiovascular diseases

Cancers

Unintentional injuries

Respiratory diseases

Maternal and infant causes

Intentional injuries

By cause

Ischaemic heart disease had the highest age-standardised death rate (ASR) from avoidable causes in each year from 1981 to 2001. The ASR fell from 122.4 deaths per 100,000 population in 1981 to 46.7 in 2001, a decline of 61.8%. The number of deaths also showed a notable decrease (49.9%) (Table 9.7, Figure 9.5).

Mortality from cerebrovascular diseases fell from an ASR of 33 deaths per 100,000 population in 1981 to 14 in 2001, a decrease of 57.6%: the number of deaths fell by 44.5%. The rate of lung cancer deaths declined by almost one quarter (23.1%), falling from an ASR of 27.3 deaths per 100,000

population in 1981 to 21 in 2001: the number of deaths varied little over the period. There was notable decline (41.7%) in the rate of deaths from road traffic injuries, from an ASR of 20.6 in 1981 to 12.0 in 2001, with a 37.3% fall in the number of deaths.

While the rate of deaths from colorectal cancer declined by 14.7% over the 20 year period, falling from an ASR of 17.7 deaths per 100,000 population in 1981 to 15.1 in 2001, the number of deaths increased by 11.9%. Similarly, the rate of deaths from COPD declined by 10% between 1981 and 2001, from an ASR of 15 deaths per 100,000 population to 13.5, but the number of deaths increased by 17.1% over the same period.

While the ASR for deaths from breast cancer declined by 15.7% over the period, from 11.5 deaths per 100,000 population in 1981 to 9.7 in 2001, the number of deaths increased by 13.7%.

The rate and number of deaths from suicide and other self inflicted injuries increased between 1981 and 2001, with the ASR rising by 41%, from 10 deaths per 100,000 population to 14.1: the number

of deaths increased by two thirds (65.4%). Similarly, the ASR from diabetes increased 8.6%, from 8.1 deaths per 100,000 population in 1981 to 8.8 in 2001, with the number of deaths increasing by 41.7%.

The rate and number of deaths resulting from birth defects fell (by 31.0% and 23.9%, respectively) over the period, from 7.1 deaths per 100,000 population in 1981 (201 deaths) to 4.9 in 2001 (153) .

Table 9.7: Change in major causes of avoidable mortality (0 to 74 years), New Zealand, 1981 and 2001

Cause	Number		Per cent change	ASR		Per cent change	Rank	
	1981	2001		1981	2001		1981	2001
Ischaemic heart disease	4,047	2,026	-49.9	122.4	46.7	-61.8	1	1
Cerebrovascular diseases	1,117	620	-44.5	33.0	14.0	-57.6	2	5
Lung cancer	896	899	0.3	27.3	21.0	-23.1	3	2
Road traffic injuries	641	402	-37.3	20.6	12.0	-41.7	4	7
Colorectal cancer	579	648	11.9	17.7	15.1	-14.7	5	3
COPD (45 to 74 years)	515	603	17.1	15.0	13.5	-10.0	6	6
Breast cancer	365	415	13.7	11.5	9.7	-15.7	7	8
Suicide and self inflicted injuries	301	498	65.4	10.0	14.1	41.0	8	4
Diabetes	266	377	41.7	8.1	8.8	8.6	9	9
Birth defects	201	153	-23.9	7.1	4.9	-31.0	10	10

Figure 9.5: Trends in major causes of avoidable mortality (0 to 74 years), New Zealand, 1981 to 2001

ASR per 100,000 population: note the different scales

Ischaemic heart disease

Cerebrovascular diseases

Lung cancer

Road traffic injuries

… continued

Figure 9.5: Trends in major causes of avoidable mortality (0 to 74 years), New Zealand, 1981 to 2001
... *continued*

ASR per 100,000 population: note the different scales

Colorectal cancer

COPD (45 to 74 years)

Breast cancer

Suicide and self inflicted injuries

Diabetes

Birth defects

9.4 Change in avoidable and amenable mortality by area

Avoidable mortality

Between 1982-1986 and 1997-2001 the average decline in ASRs from avoidable causes across District Health Boards was 35.3%, ranging from 43% (West Coast) to 21.1% (Whanganui) (Table 9.8, Map 9.1). The proportional decrease in the total number of deaths from avoidable causes between the two periods was 22%, with a range from 43.1% (West Coast) to 2.4% (Northland).

The highest falls in ASRs between the two five year periods were in West Coast (43.0%; from 468.6 deaths per 100,000 population to 267.0), Auckland (41.7%; from 356.7 deaths per 100,000 population to 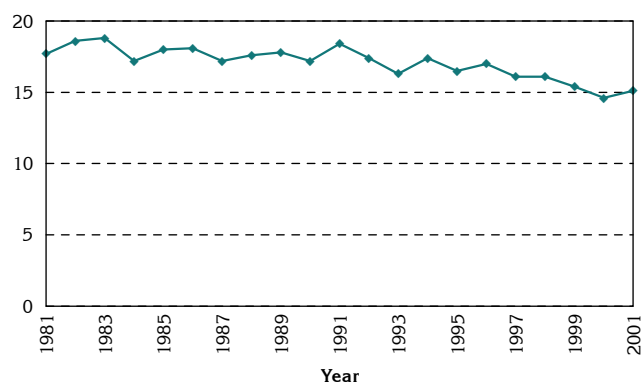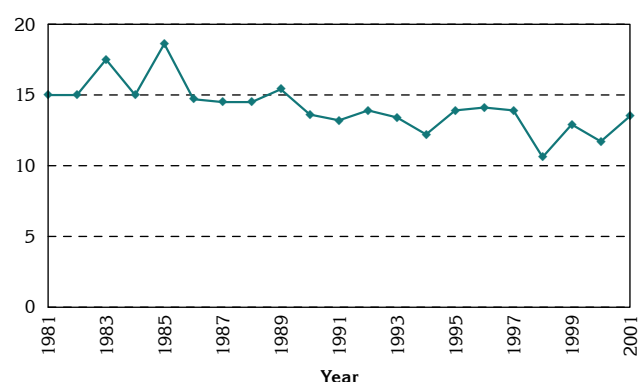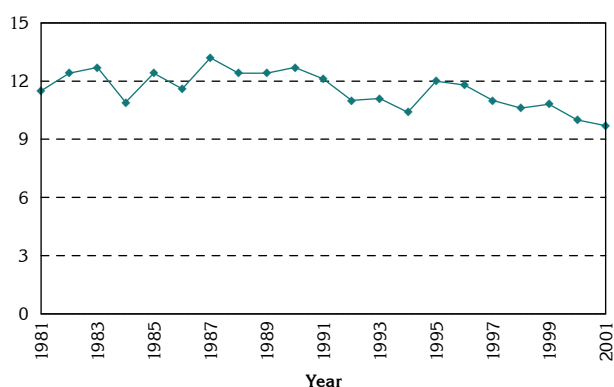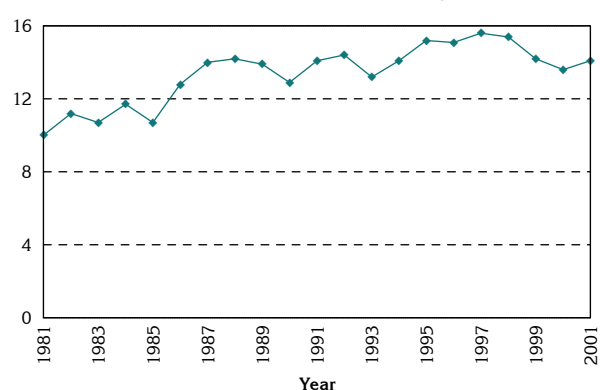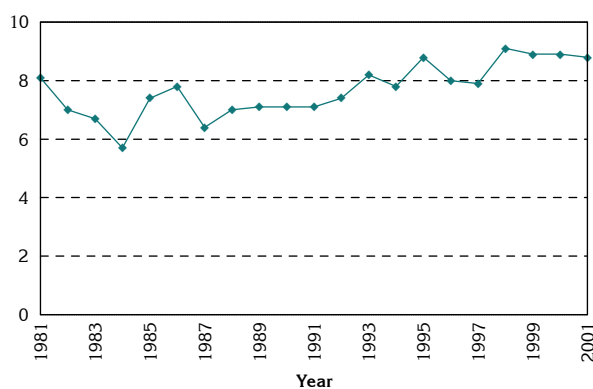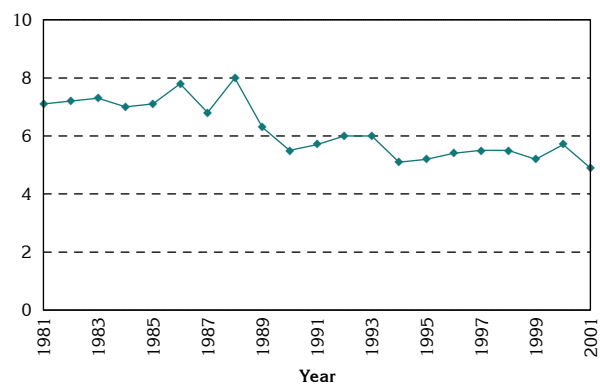207.8), Taranaki (41.5%; from 359.8 deaths per 100,000 population to 210.6) and Canterbury (38.3%; from 300.1 deaths per 100,000 population to 185.2). Although West Coast recorded the highest per cent change in ASR between 1982-86 and 1997-01 showed little improvement in rank from the highest ASR in 1982-86 (468.6 deaths per 100,000 population) to fourth highest in 1997-01 (267.0)

The lowest declines in ASRs were recorded in the District Health Boards of Whanganui (21.1%; from 332.0 deaths per 100,000 population to 261.9), Tairawhiti (25.9%; from 430.5 deaths per 100,000 population to 319.1), Southland (29%; from 345.4 deaths per 100,000 population to 245.4) and Northland (29.9%; from 392.3 deaths per 100,000 population to 274.9).

The number of deaths from avoidable causes declined by more than 30% between 1982-1986 and 1997-2001 in the District Health Boards of West Coast (43.1%; from 865 deaths to 492), Auckland (41.5%; from 6,196 deaths to 3,624), Taranaki (35.9%; from 1,992 deaths to 1,277) and Otago (32%; from 3,194 deaths to 2,171).

The smallest proportional decreases in the number of deaths from avoidable causes (less than 10%) were in Northland (2.4%; from 2,375 deaths to 2,318), Counties Manukau (3.8%; from 4,057 deaths to 3,904), Bay of Plenty (5.8%; from 2,610 deaths to 2,458) and Waitemata (6.0%; from 4,131 deaths to 3,885).

Table 9.8: Change in avoidable mortality (0 to 74 years) by area, New Zealand, 1982-1986 and 1997-2001

District Health Board	Number		Per cent change	ASR		Per cent change	Rank	
	1982-86	1997-01		1982-86	1997-01		82-86	97-01
Auckland	6,196	3,624	-41.5	356.7	207.8	-41.7	9	17
Bay of Plenty	2,610	2,458	-5.8	360.6	229.0	-36.5	7	12
Canterbury	6,228	4,489	-27.9	300.1	185.2	-38.3	19	20
Capital and Coast	3,365	2,459	-26.9	316.4	201.0	-36.5	18	18
Counties Manukau	4,057	3,904	-3.8	354.1	227.2	-35.8	10	13
Hawke's Bay	2,692	1,999	-25.7	372.6	243.0	-34.8	5	7
Hutt	2,214	1,594	-28.0	339.1	231.9	-31.6	13	10
Lakes	1,680	1,439	-14.3	436.7	283.5	-35.1	2	2
MidCentral	2,808	2,101	-25.2	364.7	237.5	-34.9	6	9
Nelson-Marlborough	1,692	1,398	-17.4	297.2	192.4	-35.3	20	19
Northland	2,375	2,318	-2.4	392.3	274.9	-29.9	4	3
Otago	3,194	2,171	-32.0	327.6	211.6	-35.4	16	15
South Canterbury	1,070	779	-27.2	318.6	217.2	-31.8	17	14
Southland	1,871	1,458	-22.1	345.4	245.4	-29.0	12	6
Tairawhiti	978	755	-22.8	430.5	319.1	-25.9	3	1
Taranaki	1,992	1,277	-35.9	359.8	210.6	-41.5	8	16
Waikato	4,857	4,117	-15.2	350.2	239.8	-31.5	11	8
Wairarapa	666	556	-16.5	336.6	230.7	-31.5	14	11
Waitemata	4,131	3,885	-6.0	268.7	177.4	-34.0	21	21
West Coast	865	492	-43.1	468.6	267.0	-43.0	1	4
Whanganui	1,217	999	-17.9	332.0	261.9	-21.1	15	5
Total	**56,758**	**44,272**	**-22.0**	**338.7**	**219.3**	**-35.3**	..	..

Map 9.1
Change in avoidable mortality (0 to 74 years), New Zealand, 1982-1986 and 1997-2001
per cent change in age standardised death rates from 1982-1986 to 1997-2001 by District Health Board

Per cent change in death rates from 1982-86 to 1997-01

- *39% or more lower*
- *36 to 38% lower*
- *33 to 35% lower*
- *30 to 32% lower*
- *less than 30% lower*

Amenable mortality

Between 1982-1986 and 1997-2001, the average decline in ASRs from causes amenable to health care across District Health Boards was 39.3%, ranging from 47.4% (Taranaki) to 33% (Tairawhiti) (Table 9.9, Map 9.2). The overall proportional decrease in the number of deaths from causes amenable to health care was 26.2%, with variation across District Health Boards ranging from 46.3% (West Coast) to 5.6% (Northland).

The highest declines in ASRs (of more than 40%) between the two five year periods were in Taranaki (47.4%; from 170.3 deaths per 100,000 population to 89.6), West Coast (46.9%; from 208.0 deaths per 100,000 population to 110.4), Canterbury (43.6%; from 143.2 deaths per 100,000 population to 80.7), Lakes (42.6%; from 199.4 deaths per 100,000 population to 114.5), and Auckland (42.1%; from 159.1 deaths per 100,000 population to 92.1).

The largest proportional decrease in rates (47.4%) was in Taranaki, with a corresponding change in rank from fourth highest in 1982-86 to seventeenth in 1997-01. However, while West Coast recorded the second largest decline in rates (46.9%) there

was little improvement in rank from the highest ASR in 1982-86 (208.0 deaths per 100,000 population) to fourth highest in 1997-01 (110.4).

The lowest declines in ASRs were recorded in the District Health Boards of Tairawhiti (33%; from 198.8 deaths per 100,000 population to 133.1), Hutt (33.1%; from 152.4 deaths per 100,000 population to 101.9), Northland (33.4%; from 169.8 deaths per 100,000 population to 113.1), Whanganui, from 165.6 deaths per 100,000 population to 109.6) and Southland (34.9%; from 160.4 deaths per 100,000 population to 104.5).

The number of deaths from causes amenable to health care declined by more than 40% between 1982-1986 and 1997-2001 in the District Health Boards of West Coast (46.3%; from 382 deaths to 205), Auckland (42.2%; from 2,762 deaths to 1,596) and Taranaki (41.7%; from 942 deaths to 549).

The smallest proportional decreases in the number of deaths from causes amenable to health care (less than 10%) were in Northland (5.6%; from 1,027 deaths to 969), Counties Manukau (7.2%; from 1,894 deaths to 1,757), Waitemata (8.6%; from 1,851 deaths to 1,691) and Bay of Plenty (9.3%; from 1,139 deaths to 1,033).
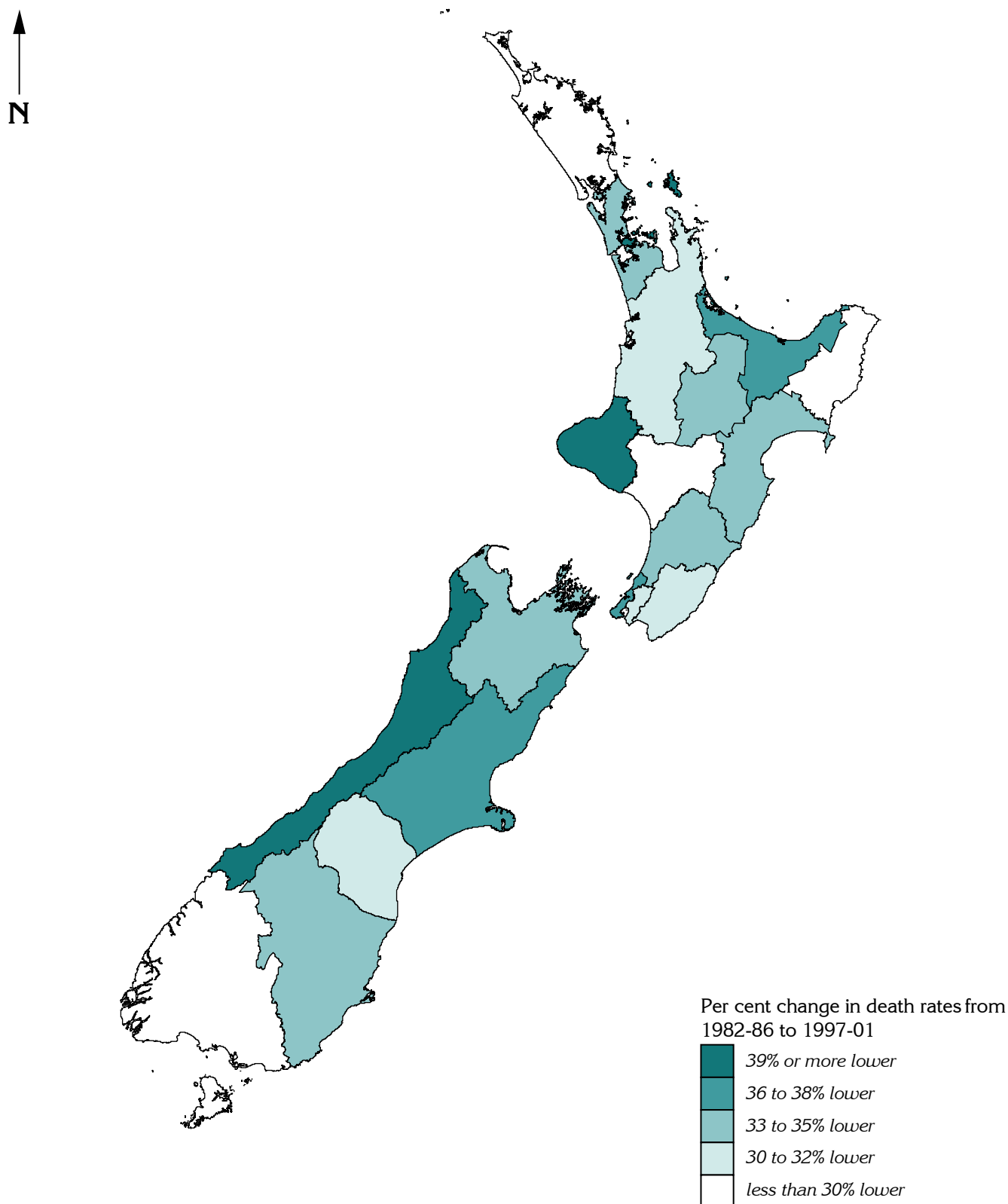
Table 9.9: Change in amenable mortality (0 to 74 years) by area, New Zealand, 1982-1986 and 1997-2001

District Health Board	Number		Per cent change	ASR		Per cent change	Rank	
	1982-86	1997-01		1982-86	1997-01		82-86	97-01
Auckland	2,762	1,596	-42.2	159.1	92.1	-42.1	12	16
Bay of Plenty	1,139	1,033	-9.3	156.9	94.7	-39.6	14	14
Canterbury	2,960	1,961	-33.8	143.2	80.7	-43.6	19	20
Capital and Coast	1,516	1,076	-29.0	144.3	88.2	-38.9	18	18
Counties Manukau	1,894	1,757	-7.2	166.6	101.2	-39.3	7	9
Hawke's Bay	1,208	878	-27.3	166.5	105.2	-36.8	8	6
Hutt	991	704	-29.0	152.4	101.9	-33.1	16	8
Lakes	762	586	-23.1	199.4	114.5	-42.6	2	2
MidCentral	1,300	897	-31.0	169.8	101.1	-40.5	5	10
Nelson-Marlborough	798	614	-23.1	140.3	83.7	-40.3	20	19
Northland	1,027	969	-5.6	169.8	113.1	-33.4	6	3
Otago	1,446	947	-34.5	148.8	92.4	-37.9	17	15
South Canterbury	516	348	-32.6	153.4	95.8	-37.5	15	13
Southland	864	623	-27.9	160.4	104.5	-34.9	10	7
Tairawhiti	453	320	-29.4	198.8	133.1	-33.0	3	1
Taranaki	942	549	-41.7	170.3	89.6	-47.4	4	17
Waikato	2,181	1,713	-21.5	158.2	99.2	-37.3	13	11
Wairarapa	318	241	-24.2	160.3	98.4	-38.6	11	12
Waitemata	1,851	1,691	-8.6	120.8	76.8	-36.4	21	21
West Coast	382	205	-46.3	208.0	110.4	-46.9	1	4
Whanganui	608	423	-30.4	165.6	109.6	-33.8	9	5
Total	**25,919**	**19,130**	**-26.2**	**155.2**	**94.2**	**-39.3**	**..**	**..**

Map 9.2
Change in amenable mortality (0 to 74 years), New Zealand, 1982-1986 and 1997-2001
per cent change in age standardised rates from 1982-1986 to 1997-2001 by District Health Board

N

Per cent change in death rates from 1982-86 to 1997-01

- *43% or more lower*
- *40 to 42% lower*
- *37 to 39% lower*
- *34 to 36% lower*
- *less than 34% lower*

Details of map boundaries are in Appendix 1.4

Australian and New Zealand Atlas of Avoidable Mortality

9.5 Change in avoidable and amenable mortality by ethnicity

Between 1986 and 2001, ASRs for avoidable mortality for the three ethnic populations in the analysis aged 0 to 74 years decreased by an average of 37.4%, ranging from a decline of 42.5% for European/ others to 12.5% for Pacific peoples (Table 9.10, Figure 9.6). The number of deaths from avoidable causes fell by an average of 24.5% over the same period, ranging from an increase of 94.8% for Pacific peoples to a decline of 33.1% for the European/ others population.

The decrease in ASR over the period for European/ others of 42.5% (from 308.4 deaths per 100,000 population in 1986 to 177.4 in 2001) was much greater than for the other ethnic groups. For Mäori, there was a fall of 27.0%, from 663.7 deaths per 100,000 population in 1986 to 484.3 in 2001. Pacific peoples recorded the smallest decline in ASR from avoidable causes, of 12.5%, over the

period, falling from 420.6 deaths per 100,000 population in 1986 to 368.1 in 2001.

The average decline in ASRs between 1986 and 2001 from causes amenable to health care was 41.3%, slightly higher than the decrease in avoidable mortality. The total number of deaths fell by an average of 28.3% over the period, ranging from an increase of 77.1% for Pacific peoples to a fall of 36.1% for European/ others.

The European/ others had the largest decline in ASR for amenable mortality, 45.7%, falling from 140.3 deaths per 100,000 population in 1986 to 76.2 in 2001. The ASR for Mäori declined by 33.9% (from 289.3 deaths per 100,000 population to 191.2), and the decline for Pacific peoples was 23.4% (from 226.3 deaths per 100,000 population to 173.3).

Table 9.10: Change in avoidable and amenable mortality (0 to 74 years) by ethnicity, New Zealand, 1986 and 2001

Age (years)	Number		Per cent change	ASR		Per cent change
	1986	2001		1986	2001	
Avoidable mortality						
Mäori	1,438	1,622	12.8	663.7	484.3	-27.0
Pacific peoples	249	485	94.8	420.6	368.1	-12.5
European/ others	9,720	6,507	-33.1	308.4	177.4	-42.5
Total	11,408	8,614	-24.5	332.9	208.3	-37.4
RR–Mäori:European/ others	..	..	..	2.15**	2.73**	..
RR–Pacific:European/ others	..	..	..	1.36**	2.07**	..
Amenable mortality						
Mäori	623	653	4.8	289.3	191.2	-33.9
Pacific peoples	131	232	77.1	226.3	173.3	-23.4
European/ others	4,408	2,818	-36.1	140.3	76.2	-45.7
Total	5,162	3,703	-28.3	151.1	88.7	-41.3
RR–Mäori:European/ others	..	..	..	2.06**	2.51**	..
RR–Pacific:European/ others	..	..	..	1.61**	2.27**	..

Figure 9.6: Change in avoidable and amenable mortality (0 to 74 years) by ethnicity, New Zealand, 1986 and 2001

ASR per 100,000 population

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References: Chapters 3 to 6

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Appendix

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Appendix 1.1: ICD codes

Table A1 details the ICD-9, and ICD-10 (for Australia)/ ICD-10-AM (for New Zealand) codes for the avoidable mortality causes and the mortality amenable to health care groupings. For this analysis, there were no differences in the relevant codes in the ICD-10 and ICD-10-AM versions.

Table A1: Avoidable mortality and amenable mortality conditions and ICD codes

Age limit: 0 to 74 years, unless otherwise specified

Major condition group/ condition	ICD-9	ICD-10 [Aust Codes] / ICD-10-AM [NZ Codes]	Limits (age, sex)	Amenable to health care[1]
Infections				
Tuberculosis	010-018,137	A15-A19, B90		✔
Selected invasive bacterial and protozoal infections	034-036, 038, 084, 320, 481, 482, 485, 681, 682	A38-A41, A46, A48.1 B50-B54, G00, G03, J02.0, J13-J15, J18, L03		✔
Hepatitis	070	B15-B19		
HIV/AIDS	042	B20-B24		
Viral pneumonia and influenza	480, 487	J10, J12, J17.1, J21		
Neoplasms				
Lip, oral cavity and pharynx	140-149	C00-C14		
Oesophagus	150	C15		
Stomach	151	C16		
Colorectal	153, 154	C18-C21		✔
Liver	155	C22		
Lung	162	C33, C34		
Melanoma of skin	172	C43		✔
Nonmelanotic skin	173	C44		✔
Breast	174	C50	Female	✔
Cervix	180	C53		✔
Uterus	179, 182	C54, C55		✔
Bladder	188	C67		✔
Thyroid	193	C73		✔
Hodgkin's disease	201	C81		✔
Lymphoid leukaemia – acute/chronic	204.0, 204.1	C91.0, C91.1		✔
Benign	210-229	D10-D36		✔
Nutritional, endocrine and metabolic conditions				
Thyroid disorders	240-246	E00-E07		✔
Diabetes	250	E10-E14		✔ (0.5)
Drug use disorders				
Alcohol related disease	291, 303, 305.0, 425.5, 535.3, 571.0-571.3	F10, I42.6, K29.2, K70		
Illicit drug use disorders	292, 304, 305.2-305.9	F11-F16, F18, F19		

… continued

Table A1: Avoidable mortality and amenable mortality conditions and ICD codes ... *continued*

Age limit: 0 to 74 years, unless otherwise specified

Major condition group/ condition	ICD-9	ICD-10 [Aust Codes] / ICD-10-AM [NZ Codes]	Limits (age, sex)	Amenable to health care[1]
Neurological disorders				
Epilepsy	345	G40, G41		✔
Cardiovascular diseases				
Rheumatic and other valvular heart disease	390-398	I01-I09		✔
Hypertensive heart disease	402	I11		✔
Ischaemic heart disease	410-414	I20-I25		✔ (0.5)
Cerebrovascular diseases	430-438	I60-I69		✔ (0.5)
Aortic aneurysm	441	I71		
Genitourinary disorders				
Nephritis and nephrosis	403, 580-589, 591	I12, I13, N00-N09, N17-N19		✔
Obstructive uropathy & prostatic hyperplasia	592, 593.7, 594, 598, 599.6, 600	N13, N20, N21, N35, N40, N99.1		✔
Respiratory diseases				
DVT with pulmonary embolism	415.1, 451.1	I26, I80.2		
COPD	490-492, 496	J40-J44	45-74 years	
Asthma	493	J45, J46	0-44 years	✔
Digestive disorders				
Peptic ulcer disease	531-534	K25-K28		✔
Acute abdomen, appendicitis, intestinal obstruction, cholecystitis/ lithiasis, pancreatitis, hernia	540-543, 550-553, 574-577	K35-K38, K40-K46, K80-K83, K85, K86, K91.5		✔
Chronic liver disease (excluding alcohol related disease)	571.4-571.9	K73, K74		
Maternal & infant causes				
Birth defects	237.70, 740-760	H31.1, P00, P04, Q00-Q99		✔
Complications of perinatal period	764-779	P03, P05-P95		✔
Unintentional injuries				
Road traffic injuries	E810-E819	V01-V04, V06, V09-V80, V87, V89, V99		
Falls	E880-E886, E888	W00-W19		
Fires, burns	E890-E899	X00-X09		
Accidental poisonings	E850-E869	X40-X49		
Drownings	E910	W65-W74		
Intentional injuries				
Suicide and self inflicted injuries	E950-E959, E980-E989	X60-X84, Y87.0, Y10-Y34		
Violence	E960-E969	X85-Y09, Y87.1		

[1] Subset list of conditions amenable to health care, denoted as ✔; or ✔ (0.5) to represent 50% of total deaths in the category

Table A2 shows the conditions excluded on the basis that they represented less than 0.1% (rounded at one decimal place) of all deaths, based on an analysis of deaths over a recent three (Australia) or four (New Zealand) year period. Note that when one country met the 0.1 per cent requirement, the condition was retained.

Table A2: Avoidable mortality conditions excluded from analysis[1]

Condition	ICD-9	ICD-10 (Australia); ICD-10-AM (New Zealand)	Percentage of all deaths (%)	
			Aust[2]	NZ[2]
Diarrhoeal disease	001-009	A00-A09	0.03	0.05
Childhood vaccine-preventable diseases	032-033, 036.0, 037, 041.2, 041.5, 045, 070.2-070.3, 052, 055-056	A35-A37, A39.0, A49.1, A49.2, A80, B01, B05-B06, B16, J11	Child only	Child only
Sexually transmitted diseases except HIV/AIDS	090-099, 614.0-614.5, 614.7-616.9, 633	A50-A64, M02.3, N34.1, N70-N73, N75.0, N75.1, N76.4, N76.6, O00	0.01	0.01
Testis cancer	186	C62	0.02	0.02
Eye cancer	190	C69	0.03	0.02
Nutritional deficiency anemia	280-281	D50-D53	0.03	0.04
Adrenal disorders	255.0, 255.4	E24, E27	0.01	0.01
Newborn screening disorders	255.2, 270.1, 271.1	E25, E70.0, E74.2	0.00	0.00
Ear infections – Otitis media and mastoiditis	381-383	H65-H70	0.00	0.00
Upper respiratory tract infection	382-383, 460-465	J00-J06, H66, H70	0.02	0.04
Osteomyelitis and other osteopathies of bone	730	M86, M89-M90	0.02	0.03
Complication of pregnancy, labor or the puerperium	630-632, 634-676	O01-O99	0.01	0.01
Sports injuries	E884.0, E886.0, E917.0, E927	any external cause code V00-Y99 with an activity code of 0	0.01	0.02
War	E990-E999	Y36	0.00	0.00
Total of all deaths	..	..	**0.26**	**0.39**

[1] Condition categories were excluded where they represented less than 0.1 per cent of all deaths in both countries
[2] Percentages were calculated from total deaths over a three or four year period: for Australia: 1997-99; for NZ: 1996-99

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Appendix 1.2: Rationale for including conditions

Table A3: Rationale for including conditions in avoidable mortality and amenable mortality classifications

Age limit: 0 to 74 years, unless otherwise specified

No.	Group	Condition: Cause	Limits: Age, sex	Amenable to health care	Rationale for including in: avoidable mortality	Rationale for including in: amenable mortality
01	Infections	Tuberculosis		✓	Exposure to Mycobacterium tuberculosis is preventable through reducing poverty and overcrowding, and through contact tracing (with immunisation or prophylactic antibiotic treatment being given to contacts). Infection can also be prevented with reasonable effectiveness through BCG immunisation.	Should infection or disease occur, it is readily treatable with antibiotics, although resistant strains may be a problem. *(so considered amenable)*
02	Infections	Selected invasive bacterial and protozoal infections		✓	Immunisation can prevent a proportion of these serious infections (eg meningococcal, Hib, pneumococcal).	Although not always successful, early detection and effective intensive support coupled with appropriate antibiotic therapy can massively reduce case fatality rates, eg for meningococcal disease, case fatality rate should not exceed 5%. *(so considered amenable)*
03	Infections	Hepatitis			Substantially preventable through safe injection practice in the case of the blood borne hepatitis B virus and (with more difficulty) hepatitis C virus. Sexually transmitted HBV preventable through condom use. Waterborne HAV and related viruses controllable through sanitary measures (safe sewage disposal and drinking water supplies, standard food safety measures). In addition, HBV and HAV preventable through immunisation. Vertical transmission of HBV from mother to child similarly preventable in most cases.	
04	Infections	HIV/AIDS			Most infections are potentially preventable through condom use, use of clean needles, appropriate management of pregnancy and postnatal care to prevent vertical transmission.	Should infection occur, early detection coupled with appropriate combination antiviral therapy can slow progression to AIDS and yield reasonable long-term survival. *(but the contribution of health care insufficient for this cause to be defined as 'mostly' amenable – see Chapter 2, Methods)*

Table A3: Rationale for including conditions in avoidable mortality and amenable mortality classifications … *continued*

Age limit: 0 to 74 years, unless otherwise specified

No.	Group	Cause	Limits: Age, sex	Amenable to health care	Rationale for including in: avoidable mortality	amenable mortality
05	Infections	Viral pneumonia and influenza			Major cause is influenza, which is generally preventable (disease, not infection) through immunisation. Antiviral agents also now available that may prevent (and also treat) serious clinical complications. Non-smoking may decrease susceptibility.	
06	Neoplasms	Lip, oral cavity and pharynx			Most are related to tobacco or alcohol consumption, and are therefore theoretically preventable. HPV infection may also play a role in some cases.	Treatment (surgery, with adjunctive radio and chemotherapy) also yields reasonable five-year relative survival if detected at early stage. *(but the contribution of health care insufficient for this cause to be defined as 'mostly' amenable – see Chapter 2, Methods)*
07	Neoplasms	Oesophagus			Squamous carcinomas are largely related to tobacco and alcohol consumption and are thus potentially preventable. Adenocarcinomas of the lower third appear to be related to reflux (Barrett's disease) and so are preventable (through weight control or medical treatment of reflux).	
08	Neoplasms	Stomach			Most cases appear to be related to infection with Helicobacter pylori, and so are preventable (eg through control of overcrowding, poverty or antibiotic therapy). Some cases appear to be related to tobacco, alcohol, salt preservative, or lack of vegetables & fruit and so are again preventable. Adenocarcinomas of the gastro-oesophageal junction appear to be related to reflux (see above).	
09	Neoplasms	Colorectal		✓	Known, modifiable risk factors account for a substantial proportion of cases – including physical inactivity, elevated BMI, dietary factors ranging from intake of meat and dairy products to nitrosamines produced by cooking, and inadequate fruits & vegetables. Genetic factors account for about 10% of cases, and are detectable through screening and resection of polyps before they become malignant.	General population screening for faecal occult blood, followed by endoscopy and resection can reduce mortality by up to 20%. Treatment (surgery, chemo, radiotherapy) of established disease is moderately effective, with good 5 year relative survival for early stage lesions. *(so considered amenable, including both screening and treatment)*

Table A3: Rationale for including conditions in avoidable mortality and amenable mortality classifications ... *continued*

Age limit: 0 to 74 years, unless otherwise specified

No.	Group	Cause	Limits: Age, sex	Amenable to health care	Rationale for including in: avoidable mortality	Rationale for including in: amenable mortality
10	Neoplasms	Liver			Primary liver cancer is caused predominantly by HBV and HCV infection, and so is theoretically largely preventable through immunisation against HBV. Behavioural measures to reduce exposure to HBV (see above) also important.	Screening HBV carriers for alpha foeto-protein, followed by surgical resection of early stage tumours, also contributes (five year relative survival good provided early stage). *(but the contribution of health care insufficient for this cause to be defined as 'mostly' amenable – see Chapter 2, Methods)*
11	Neoplasms	Lung			At least 80% of cases result from tobacco smoke exposure, and so are readily preventable (in principle). Adequate fruit & vegetable intake, and control of radon exposure in homes (if geologically relevant) also contribute. Asbestos exposure interacts synergistically with tobacco.	
12	Neoplasms	Melanoma of skin		✓	Most (although not all) cases reflect excessive intermittent exposure to UV radiation (typically from sun bathing) leading to sunburn in childhood or adolescence. As such these cases are theoretically preventable through sun safe behaviour.	Early stage lesions can often be detected in primary care (aided by regular self assessment) and are then curable by simple resection. Five year relative survival is good even for thicker lesions, given access to modern chemo- and other (radio, immuno) therapy, unless metastasis has occurred. *(so considered amenable)*
13	Neoplasms	Nonmelanotic skin		✓	Shares similar association with UV exposure as for melanoma, so again largely preventable.	Again, lesions often detectable by patient or primary care provider at early stage when they are easily curable by resection. Even more advanced (but not very late stage) lesions are associated with reasonable five years survival, given access to appropriate treatment modalities. *(so considered amenable)*
14	Neoplasms	Breast	Female	✓	Increasing evidence that a proportion of cases may be preventable through control of BMI, physical activity level, diet, and alcohol consumption, and through breast-feeding. In addition, 30% or greater reduction in mortality possible through mammographic screening of general population (ages 50-69 years or possibly 40-69 years) and more frequent screening of high-risk women.	Surgery together with radio and chemotherapy, and hormone therapy when indicated (oestrogen receptor positive status), yields reasonable five-year relative survival except in late stage disease. (so considered amenable, taking both screening and treatment of non-screen detected disease into account)

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Table A3: Rationale for including conditions in avoidable mortality and amenable mortality classifications ... *continued*

Age limit: 0 to 74 years, unless otherwise specified

No.	Condition		Limits: Age, sex	Amenable to health care	Rationale for including in:	
	Group	Cause			avoidable mortality	amenable mortality
16	Neoplasms	Cervix		✓	HPV has been identified as the cause, so all cases in theory preventable through condom use. HPV vaccine currently undergoing phase 3 clinical trials with early results highly favourable. Tobacco smoking also contributes to a minority of cases (perhaps 10%). Regular screening with LBC or Pap smear, followed by colposcopy and therapeutic biopsy if positive for precancer, can theoretically prevent up to 90% of cases (screening test is not highly sensitive for adenocarcinomas, which make up about 10% of cases; also some interval squamous cancers cannot realistically be prevented).	Even for invasive cancer, surgical treatment along with radio and chemotherapy as required yields reasonable five-year relative survival rates except for late stage (metastatic) disease. *(so considered amenable, taking both screening and treatment into account)*
15	Neoplasms	Uterus		✓	Control of BMI, reduction in oestrogen exposure, and addition of progestin in HRT (or avoidance of excessive duration of HRT) will prevent a substantial proportion of cases. Hysterectomy for benign disease (eg fibroids) obviously also prevents endometrial cancer. Use of tamoxifen is another modifiable risk factor.	Surgery, radio and chemotherapy yield reasonable five-year relative survival, depending on stage at presentation and age. *(so considered amenable)*
17	Neoplasms	Bladder		✓	A high proportion of cases are associated with tobacco smoking. Occupational chemical exposure in the rubber, organic dye, metal refining, paint and petrochemical industries is another avoidable exposure. Other avoidable exposures are certain drugs (phenacetin, chlornaphazin, and chronic cyclophosphamide exposure), diets rich in meat and fat, and external beam radiation.	Treatment is moderately effective, with good five-year relative survival for early stage disease. *(so considered amenable)*

... continued

Table A3: Rationale for including conditions in avoidable mortality and amenable mortality classifications ... *continued*

Age limit: 0 to 74 years, unless otherwise specified

		Condition		Limits: Age, sex	Amenable to health care	Rationale for including in:	
No.	Group	Cause				avoidable mortality	amenable mortality
18	Neoplasms	Thyroid			✓	The only known environmental cause is radiation. Many cases seen today reflect therapeutic radiation exposure in the past, given the long latent period. There are some which are genetic/familial (approx. 5% of papillary carcinomas, and others are inherited as a component of familial adenomatous polyposis).	If detected at an early stage (ie as a solitary thyroid nodule), surgical resection followed by adjunctive radioiodine to ablate any remaining thyroid tissue (and lifelong maintenance on replacement thyroid hormone) is almost always curative. Treatment is less successful, but far from useless, at later stages. (*so considered amenable, since most cases present at early stage*)
19	Neoplasms	Hodgkin's disease			✓	Cause(s) unknown, so prevention not possible.	Highly responsive to chemotherapy with a very high cure rate. (*so considered amenable*)
20	Neoplasms	Lymphoid leukaemia – acute/ chronic			✓	Limiting exposure to radiation is a proven preventive measure. (Exposure to human or animal viruses suspected but not proven).	Childhood leukaemia is mainly ALL, which responds well to chemotherapy with good cure rates being achievable. Other types are less responsive to treatment, but also less common at younger ages. CLL usually affects adults, and generally has longer survival rates. (*so considered amenable*)
21	Neoplasms	Benign			✓	Tuberous sclerosis screening.	These cause mortality mainly by acting as space occupying lesions (especially intra-cranially). Almost all are treatable through surgical resection. (*so considered amenable*)
22	Nutritional, endocrine and metabolic conditions	Thyroid disorders			✓	Iodine deficiency is readily preventable eg through iodisation of table salt or injection of iodised oil depot.	Both hyper- and hypothyroidism are treatable with thyroid hormone replacement or appropriate medical or surgical treatment. (*so considered amenable*)

... continued

Table A3: Rationale for including conditions in avoidable mortality and amenable mortality classifications … *continued*

Age limit: 0 to 74 years, unless otherwise specified

No.	Condition Group	Cause	Limits: Age, sex	Amenable to health care	Rationale for including in: avoidable mortality	amenable mortality
23	Nutritional, endocrine and metabolic conditions	Diabetes mellitus		✓ (0.5)	Type 2 diabetes is largely preventable through control of body weight, healthy diet and physically active lifestyle. Type 1 is as yet unpreventable (many cases believed related to infection, but unproven), but symptoms can be controlled with insulin.	Tight control of blood glucose with insulin or oral hypoglycaemic drugs, and careful management of blood pressure and blood lipids has been proven to reduce micro and (to a lesser extent) macrovascular complications in both type 1 and type 2 disease. Gestational diabetes can be detected and managed, so avoiding poor reproductive outcomes. *(considered to reach 50%, rather than 80% threshold for amenability, so random half of cases considered amenable)*
24	Drug use disorders	Alcohol related disease			Preventable in theory by moderating alcohol use.	Dual diagnoses and complications eg nutritional deficiencies can be treated. *(but the contribution of health care insufficient for this cause to be defined as 'mostly' amenable – see Chapter 2, Methods)*
25	Drug use disorders	Illicit drug use disorders			As for alcohol.	Injecting drug use can be made safer through use of clean needles. *(but the contribution of health care insufficient for this cause to be defined as 'mostly' amenable – see Chapter 2, Methods)*
26	Neurological disorders	Epilepsy		✓	Causes of epilepsy can sometimes be prevented eg meningitis, birth trauma / hypoxia, head injury, alcohol use, drug and toxin exposure, stroke, some space occupying lesions.	Most cases relatively well controlled using appropriate medical therapy. *(so considered amenable)*
27	Cardiovascular diseases	Rheumatic and other valvular heart disease		✓	Prophylaxis with penicillin generally effective in preventing progression of rheumatic fever (itself largely preventable through effective antibiotic treatment of group A strep infections) to rheumatic heart disease. Poor standards of living especially overcrowding – high prevalence still in remote Aboriginal communities in northern Australia.	Mortality from valvular heart disease (rheumatic, congenital, other) largely preventable through timely and appropiate surgery. *(so considered amenable)*

… continued

Table A3: Rationale for including conditions in avoidable mortality and amenable mortality classifications … *continued*

Age limit: 0 to 74 years, unless otherwise specified

No.	Condition Group	Cause	Limits: Age, sex	Amenable to health care	Rationale for including in: avoidable mortality	Rationale for including in: amenable mortality
28	Cardiovascular diseases	Hypertensive heart disease		✓	Hypertension can often be prevented through salt restriction, healthy diet including adequate fruit & vegetables, control of body weight, sufficient physical activity, and moderation of alcohol use and environmental stress.	If not, and if no specific cause can be found (eg renal disease), most cases are controllable with antihypertensive drugs (if severity of hypertension or absolute five or ten year cardiovascular risk warrants their use). *(so considered amenable)*
29	Cardiovascular diseases	Ischaemic heart disease		✓ (0.5)	Atherosclerosis is largely preventable through diet (especially fatty acid intake, consumption of fruit & veg, fish, nuts), physical activity, control of body weight and control of diabetes and hypertension. Smoking, high blood pressure and stress are other major modifiable risk factors. It is estimated that at least 80% of cases are preventable. There is good evidence that moderate alcohol use is protective.	Medical treatment of established disease, including thrombolysis for acute myocardial infarction, can reduce mortality substantially. *(by about 50%, so random half of cases considered to be amenable)*
30	Cardiovascular diseases	Cerebrovascular diseases		✓ (0.5)	Major risk factor for haemorrhagic stroke is high blood pressure. Ischaemic stroke is a manifestation of atherosclerosis, so shares the same risk factors as ischaemic heart disease. Atrial fibrillation is another major modifiable risk factor.	At least 70% of strokes are preventable through primary prevention. Screening for risk factors such as hypertension and atrial fibrillation (with appropriate medical management), preventive carotid endarterectomy when indicated, appropriate use of thrombolysis, and effective management such as provided by dedicated stroke units, can reduce mortality significantly. *(by about 50%, so random half of cases considered to be amenable)*
31	Cardiovascular diseases	Aortic aneurysm			Abdominal aortic aneurysm is generally a manifestation of atherosclerosis and so shares the same risk and protective factors as ischaemic heart disease.	Recently, screening by ultrasound (followed by surgery) has been shown to be cost effective for middle aged males in European / North American populations. Once leakage or rupture occurs, surgery and intensive care still has some success if rapid transport to an appropriate hospital is possible *(but the contribution of health care insufficient for this cause to be defined as 'mostly' amenable – see Chapter 2, Methods)*

… continued

Table A3: Rationale for including conditions in avoidable mortality and amenable mortality classifications … *continued*

Age limit: 0 to 74 years, unless otherwise specified

No.	Group	Condition Cause	Limits: Age, sex	Amenable to health care	Rationale for including in: avoidable mortality	Rationale for including in: amenable mortality
32	Genitourinary disorders	Nephritis and nephrosis		✓	Some cases can be prevented eg glomerulonephritis resulting from group A streptococcus infection.	Effective medical management is available for most types. If renal failure supervenes, dialysis and transplantation are options. *(so considered amenable)*
33	Genitourinary disorders	Obstructive uropathy & prostatic hyperplasia		✓		Medical or (more generally) surgical removal of the obstruction is generally curative (eg benign prostatic hypertrophy, urinary calculus), assuming the underlying cause is benign. *(so considered amenable)*
34	Respiratory diseases	DVT with pulmonary embolism			If the cause of the embolus is DVT, this is theoretically partly preventable eg through avoidance of prolonged periods of immobility, exercise, use of elasticised stockings, and anticoagulation agents.	Treatment of pulmonary embolism can reduce case fatality substantially *(but the contribution of health care insufficient for this cause to be defined as 'mostly' amenable – see Chapter 2, Methods)*
35	Respiratory diseases	COPD	45-74 years		Almost all cases are related to tobacco smoking, so are theoretically preventable. Air pollution (sulphur dioxide (SO_2) and particulate matter) also plays a role and is likewise theoretically preventable. COPD is also more prevalent in workers who engage in occupations exposing them to either inorganic or organic dusts or to noxious gases. Also some evidence that repeated acute respiratory illnesses in smokers, and severe viral pneumonia early in life may lead to chronic obstruction, predominantly in small airways.	Effective treatment can partly control symptoms and prolong survival, especially if detected early. Stopping smoking does not reverse the damage, but slows the rate of further deterioration in lung function. *(but the contribution of health care insufficient for this cause to be defined as 'mostly' amenable – see Chapter 2, Methods)*
36	Respiratory diseases	Asthma	0-44 years	✓	Asthma can often be controlled by avoiding allergens and other triggers.	Attacks can also be prevented using prophylactic drugs, or medically treated with generally good results. Mortality from asthma should be a rare event. *(so considered amenable)*
37	Digestive disorders	Peptic ulcer disease		✓	Cases related to infection with Helicobacter pylori are preventable (eg through control of overcrowding, poverty or antibiotic therapy).	Treatment of H. pylori and pharmacological control of gastric acid secretion (or sensitivity to acid) can effectively cure or control a high proportion of cases. *(so considered amenable)*

… continued

Table A3: Rationale for including conditions in avoidable mortality and amenable mortality classifications … *continued*

Age limit: 0 to 74 years, unless otherwise specified

No.	Condition Group	Cause	Limits: Age, sex	Amenable to health care	Rationale for including in: avoidable mortality	Rationale for including in: amenable mortality
38	Digestive disorders	Acute abdomen, appendicitis, intestinal obstruction, cholecystitis/ lithiasis, pancreatitis, hernia		✓		Medical or surgical management should be effective in a high proportion of cases, depending on the underlying cause, and factors such as age, timeliness of intervention, quality of care. *(so considered amenable)*
40	Digestive disorders	Chronic liver disease (excluding alcohol related disease)			A substantial proportion can be prevented by HBV immunisation and management of alcohol use.	Progression of several types of chronic liver disease can be halted or at least slowed by appropriate medical management. *(but the contribution of health care insufficient for this cause to be defined as 'mostly' amenable – see Chapter 2, Methods)*
41	Maternal & infant causes	Birth defects		✓	At least one third of neural tube defects can be prevented through folic acid supplementation and fortification. Other preventable strategies are immunisation against infections such as rubella, and pre-birth genetic screening.	Many life threatening birth defects can be surgically treated with good outcomes. *(so considered amenable)*
42	Maternal & infant causes	Complications of perinatal period		✓	Most are related to low birth weight resulting from premature delivery. Others reflect birth trauma / hypoxia. The birth weight distribution can be shifted by improving diet in pregnancy and avoiding exposure to tobacco smoke, alcohol, certain drugs and other toxins. Good obstetric care should minimise the risk of birth trauma / hypoxia.	Given the birth of a very low birth weight infant, neonatal intensive care can make a substantial difference to survival chances. *(taking both neonatal intensive care and obstetric care into account, and excluding very low birthweight infants, considered to be amenable)*
43	Unintentional injuries	Road traffic injuries			The major risk factors are speed (in excess of what the network will safely allow), drink driving and non-use of safety belts. All are theoretically responsive to engineering, enforcement and educational interventions (preferably in combination). In fact, by definition all injury deaths are potentially avoidable, although this may be unachievable in practice.	Significant advances in emergency retrieval and transport services, trauma and emergency medicine and surgical management have improved survival rates. *(but the contribution of health care insufficient for this cause to be defined as 'mostly' amenable – see Chapter 2, Methods)*

… continued

Table A3: Rationale for including conditions in avoidable mortality and amenable mortality classifications ... *continued*

Age limit: 0 to 74 years, unless otherwise specified

No.	Condition Group	Cause	Limits: Age, sex	Amenable to health care	Rationale for including in: avoidable mortality	amenable mortality
44	Unintentional injuries	Falls			Most fatal falls involve toddlers, and frail elderly people. In the former case, child proofing home, childcare and other environments in which young children spend time, is highly effective (coupled with close parental or adult supervision, especially in the playground). For older people, the risk of falling can be reduced by checking medications, resistance training, wearing hip protector pads and environmental modification of the home.	Significant advances in emergency retrieval and transport services, trauma and emergency medicine and surgical management have improved survival rates. *(but the contribution of health care insufficient for this cause to be defined as 'mostly' amenable – see Chapter 2, Methods)*
45	Unintentional injuries	Fires, burns			Thermal injuries are in theory preventable by environmental modification eg domestic hot water temperature, domestic smoke alarms, short kettle cords, building design and many others. Smoking is a preventable risk factor.	If thermal injury occurs, specialist treatment is effective albeit often prolonged and painful unless the burns are very extensive. *(but the contribution of health care insufficient for this cause to be defined as 'mostly' amenable – see Chapter 2, Methods)*
46	Unintentional injuries	Accidental poisonings			Occupational legislation should prevent this in the workplace. In the home, most cases involve toddlers and environmental modifications like child safe closures for medicine and household chemical containers, use of safe storage (eg locked, high medicine cabinet) are highly effective.	If poisoning does occur, prompt advice from a poisons centre and appropriate medical care ensures a very low case fatality rate. *(but the contribution of health care insufficient for this cause to be defined as 'mostly' amenable – see Chapter 2, Methods)*
47	Unintentional injuries	Drownings			Recreational drownings account for about half of all immersion injury deaths, and are in theory preventable through environmental or behaviour modification eg swimming between the flags, wearing life jackets when boating. Non-recreational drowning (ie when the contact with the water body was unintentional) is also partly susceptible to environmental modification eg swimming pool fencing laws. Other drownings relate to transport safety and share similar risk factors discussed above for road safety – including having alcohol as an important risk factor.	Significant advances in resuscitation techniques, emergency retrieval and transport services, and emergency medical management have contributed to improved survival rates. *(but the contribution of health care insufficient for this cause to be defined as 'mostly' amenable – see Chapter 2, Methods)*

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Table A3: Rationale for including conditions in avoidable mortality and amenable mortality classifications … *continued*

Age limit: 0 to 74 years, unless otherwise specified

No.	Condition Group	Cause	Limits: Age, sex	Amenable to health care	Rationale for including in: avoidable mortality	amenable mortality
48	Intentional injuries	Suicide and self inflicted injuries			At the individual level, many suicides (especially among youth and young adults) are associated with treatable factors such as an alcohol or drug problem, or with clinical depression and other serious mental illnesses. These can be effectively treated if youth health services and other community mental health services can overcome access barriers and provide effective counselling, support and other forms of social and medical assistance. At the population level, risk factors for youth suicide include youth unemployment, poverty, stress relating to romantic relationships or other aspects of socialisation (including social isolation, bullying) and concern about academic performance (perhaps related to job prospects). The evidence for effectiveness of services or policies in addressing these social determinants of suicide is less clear.	
49	Intentional injuries	Violence			Again, interpersonal violence is theoretically fully preventable by definition. In practice, however, a range of criminal justice, social and health care interventions may have some effectiveness. Alcohol & drug related interventions are very important. At a population level, however, some societies are clearly much more prone to violence than others. Policies that build social cohesion, promote employment, provide a safety net for those in most need (including access to adequate income and decent housing), foster gender and race equality, minimise harms from alcohol and drug use, and restrict access to handguns, are likely to experience lower levels of violence.	Significant advances in emergency retrieval and transport services, trauma and emergency medicine and surgical management have improved survival rates. *(but the contribution of health care insufficient for this cause to be defined as 'mostly' amenable – see Chapter 2, Methods)*

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Appendix 1.3: Additional data

Table A4 includes the avoidable mortality rates for the 'other major urban centres' referred to in the map text pages in Chapter 4, *Section 4.4* and Chapter 6, *Section 6.3*.

Table A4: Avoidable mortality (0 to 74 years) by major condition group and cause, other major urban centres, Australia, 1997-2001

ASR per 100,000 population

Major condition group/ cause	NSW: Newcastle	NSW: Wollongong	Victoria: Geelong	Queensland: Gold Coast-Tweed Heads	Queensland: Sunshine Coast	Queensland: Townsville-Thuringowa
Avoidable mortality						
All causes	195.1	182.8	184.3	166.8	160.7	209.7
Cancer						
Colorectal cancer	13.2	11.6	13.9	11.8	10.4	13.7
Lung cancer	21.1	21.9	21.5	19.5	16.6	26.1
Cardiovascular diseases						
Ischaemic heart disease	45.5	47.3	39.1	38.8	35.8	50.9
Cerebrovascular diseases	11.5	11.3	11.1	9.5	8.6	12.0
Respiratory diseases						
Chronic obstructive pulmonary disease	10.1	7.8	8.9	6.6	8.4	11.5
Road traffic injuries	9.1	6.4	7.0	7.1	9.0	6.6
Suicide and self-inflicted injuries	14.0	12.9	11.8	15.6	17.4	14.0
Amenable mortality						
All causes	78.3	71.5	72.9	65.9	62.3	90.3

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Map A1
Key to Statistical Subdivisions mapped for the capital cities, Australia

Alphabetical Key to Statistical Subdivisions in the capital cities, Australia, 2001

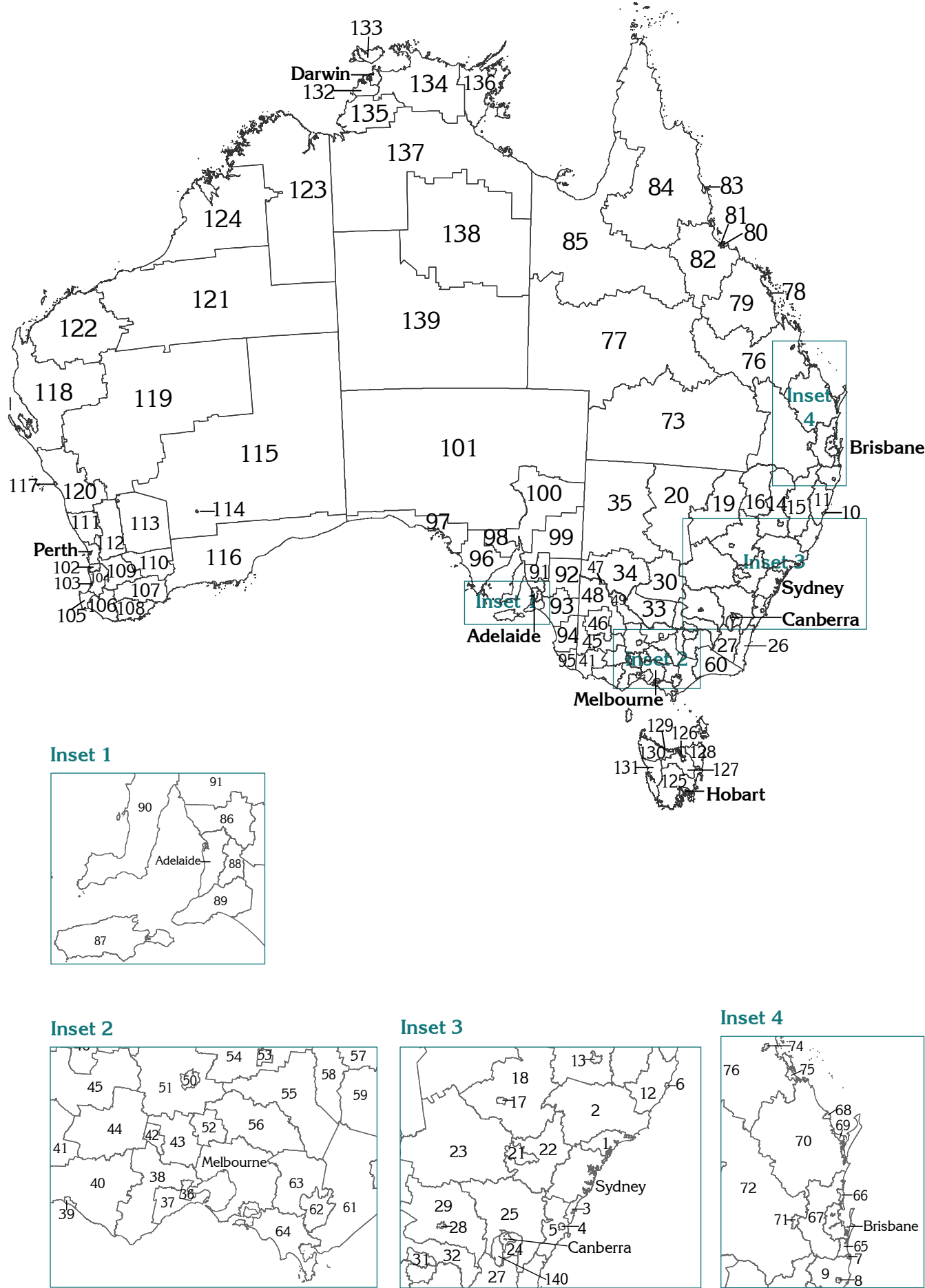| Statistical Subdivision name	Map Ref.	Statistical Subdivision name	Map Ref.
Sydney		**Brisbane…**_continued_	
Blacktown	5	Gold Coast City Part A	38
Canterbury-Bankstown	10	Ipswich City	35
Central Northern Sydney	6	Logan City	37
Central Western Sydney	9	Pine Rivers Shire	32
Eastern Suburbs	14	Redcliffe City	33
Fairfield-Liverpool	4	Redland Shire	39
Gosford-Wyong	1		
Inner Sydney	12	**Adelaide**	
Inner Western Sydney	11	Eastern Adelaide	42
Lower Northern Sydney	8	Northern Adelaide	40
Northern Beaches	7	Southern Adelaide	43
Outer South Western Sydney	3	Western Adelaide	41
Outer Western Sydney	2		
St George-Sutherland	13	**Perth**	
		Central Metropolitan	45
Melbourne		East Metropolitan	46
Boroondara City	22	North Metropolitan	44
Eastern Middle Melbourne	23	South East Metropolitan	47
Eastern Outer Melbourne	24	South West Metropolitan	48
Frankston City	29		
Greater Dandenong City	27	**Hobart**	
Hume City	16	Greater Hobart	49
Inner Melbourne	18		
Melton-Wyndham	15	**Darwin**	
Moreland City	19	Darwin City	50
Mornington Peninsula Shire	30	Litchfield Shire	52
Northern Middle Melbourne	21	Palmerston-East Arm	51
Northern Outer Melbourne	20		
South Eastern Outer Melbourne	26	**Canberra**	
Southern Melbourne	28	Belconnen	54
Western Melbourne	17	Gungahlin-Hall	53
Yarra Ranges Shire Part A	25	North Canberra	59
		South Canberra	58
Brisbane		Tuggeranong	57
Beaudesert Shire Part A	36	Weston Creek-Stromlo	55
Brisbane City	34	Woden Valley	56
Caboolture Shire Part A	31		

Map A1

Key to Statistical Subdivisions mapped for the capital cities, Australia ... *continued*

Numerical Key to Statistical Subdivisions in the capital cities, Australia, 2001			
Statistical Subdivision name	Map Ref.	Statistical Subdivision name	Map Ref.
Sydney		**Brisbane...***continued*	
Gosford-Wyong	1	Brisbane City	34
Outer Western Sydney	2	Ipswich City	35
Outer South Western Sydney	3	Beaudesert Shire Part A	36
Fairfield-Liverpool	4	Logan City	37
Blacktown	5	Gold Coast City Part A	38
Central Northern Sydney	6	Redland Shire	39
Northern Beaches	7		
Lower Northern Sydney	8	**Adelaide**	
Central Western Sydney	9	Northern Adelaide	40
Canterbury-Bankstown	10	Western Adelaide	41
Inner Western Sydney	11	Eastern Adelaide	42
Inner Sydney	12	Southern Adelaide	43
St George-Sutherland	13		
Eastern Suburbs	14	**Perth**	
		North Metropolitan	44
Melbourne		Central Metropolitan	45
Melton-Wyndham	15	East Metropolitan	46
Hume City	16	South East Metropolitan	47
Western Melbourne	17	South West Metropolitan	48
Inner Melbourne	18		
Moreland City	19	**Hobart**	
Northern Outer Melbourne	20	Greater Hobart	49
Northern Middle Melbourne	21		
Boroondara City	22	**Darwin**	
Eastern Middle Melbourne	23	Darwin City	50
Eastern Outer Melbourne	24	Palmerston-East Arm	51
Yarra Ranges Shire Part A	25	Litchfield Shire	52
South Eastern Outer Melbourne	26		
Greater Dandenong City	27	**Canberra**	
Southern Melbourne	28	Gungahlin-Hall	53
Frankston City	29	Belconnen	54
Mornington Peninsula Shire	30	Weston Creek-Stromlo	55
		Woden Valley	56
Brisbane		Tuggeranong	57
Caboolture Shire Part A	31	South Canberra	58
Pine Rivers Shire	32	North Canberra	59
Redcliffe City	33		

Alphabetical Key to Statistical Subdivisions in the rest of state/territory areas, Australia, 2001

Statistical Subdivision name	Map Ref.	Statistical Subdivision name	Map Ref.	Statistical Subdivision name	Map Ref.
New South Wales		**Victoria…**continued		**South Australia…**continued	
Albury	31	North Wimmera	46	West Coast	97
Bathurst-Orange	21	South Gippsland	64	Whyalla	98
Central Macquarie	18	South Goulburn	55	Yorke	90
Central Murray	33	South Loddon	52		
Central Murrumbidgee	29	South West Goulburn	56	**Western Australia**	
Central Tablelands	22	South Wimmera	45	Avon	112
Clarence	11	Warrnambool City	39	Blackwood	106
Coffs Harbour	10	Wellington Shire	61	Bunbury	103
Dubbo	17	West Barwon	38	Campion	113
Far West	35	West Central Highlands	44	Carnegie	119
Hastings	12	West Gippsland	63	De Grey	121
Hunter SD Balance	2	West Mallee	48	Fitzroy	124
Illawarra SD Balance	5	West Ovens-Murray	58	Fortescue	122
Lachlan	23	Wodonga	57	Gascoyne	118
Lismore	8			Geraldton	117
Lower Murrumbidgee	30	**Queensland**		Greenough River	120
Lower South Coast	26	Bundaberg	68	Hotham	109
Macquarie-Barwon	19	Cairns City Part A	83	Johnston	116
Murray-Darling	34	Central West	77	Kalgoorlie/Boulder City Part A	114
Newcastle	1	Darling Downs SD Balance	72	King	108
North Central Plain	16	Far North SD Balance	84	Lakes	110
Northern Slopes	14	Fitzroy SD Balance	76	Lefroy	115
Northern Tablelands	15	Gladstone	75	Mandurah	102
Nowra-Bomaderry	4	Gold Coast City Part B	65	Moore	111
Port Macquarie	6	Hervey Bay City Part A	69	Ord	123
Queanbeyan	24	Mackay City Part A	78	Pallinup	107
Richmond-Tweed SD Bal.	9	Mackay SD Balance	79	Preston	104
Snowy	27	Moreton SD Balance	67	Vasse	105
Southern Tablelands	25	North West	85		
Tamworth	13	Northern SD Balance	82	**Tasmania**	
Tweed Heads	7	Rockhampton	74	Burnie-Devonport	129
Upper Darling	20	South West	73	Central North	127
Upper Murray	32	Sunshine Coast	66	Greater Launceston	126
Wagga Wagga	28	Thuringowa City Part A	81	Lyell	131
Wollongong	3	Toowoomba	71	North Eastern	128
		Townsville City Part A	80	North Western Rural	130
Victoria		Wide Bay-Burnett SD Bal	70	Southern	125
Ballarat City	42				
East Barwon	37	**South Australia**		**Northern Territory**	
East Central Highlands	43	Barossa	86	Alligator	134
East Gippsland Shire	60	Far North	101	Barkly	138
East Mallee	49	Fleurieu	89	Bathurst-Melville	133
East Ovens-Murray	59	Flinders Ranges	100	Central	139
Glenelg	41	Kangaroo Island	87	Daly	135
Greater Bendigo City Part A	50	Lincoln	96	East Arnhem	136
Greater Geelong City Part A	36	Lower North	91	Finniss	132
Greater Shepparton City Part A	53	Lower South East	95	Lower Top End	137
Hopkins	40	Mt Lofty Ranges	88		
La Trobe Valley	62	Murray Mallee	93	**Australian Capital Territory**	
Mildura Rural City Part A	47	Pirie	99	Australian Capital Territory Balance	140
North Goulburn	54	Riverland	92		
North Loddon	51	Upper South East	94		

Map A2
Key to Statistical Subdivisions mapped for Australia

Inset 1

Inset 2

Inset 3

Inset 4

Key to Statistical Subdivisions mapped for Australia ... *continued*

Numerical Key to Statistical Subdivisions in the rest of state/territory areas, Australia, 2001

Statistical Subdivision name	Map Ref.	Statistical Subdivision name	Map Ref.	Statistical Subdivision name	Map Ref.
New South Wales		**Victoria**...*continued*		**South Australia**...*continued*	
Newcastle	1	North Loddon	51	Pirie	99
Hunter SD Balance	2	South Loddon	52	Flinders Ranges	100
Wollongong	3	Greater Shepparton City Part A	53	Far North	101
Nowra-Bomaderry	4	North Goulburn	54		
Illawarra SD Balance	5	South Goulburn	55	**Western Australia**	
Port Macquarie	6	South West Goulburn	56	Mandurah	102
Tweed Heads	7	Wodonga	57	Bunbury	103
Lismore	8	West Ovens-Murray	58	Preston	104
Richmond-Tweed SD Bal.	9	East Ovens-Murray	59	Vasse	105
Coffs Harbour	10	East Gippsland Shire	60	Blackwood	106
Clarence	11	Wellington Shire	61	Pallinup	107
Hastings	12	La Trobe Valley	62	King	108
Tamworth	13	West Gippsland	63	Hotham	109
Northern Slopes	14	South Gippsland	64	Lakes	110
Northern Tablelands	15			Moore	111
North Central Plain	16	**Queensland**		Avon	112
Dubbo	17	Gold Coast City Part B	65	Campion	113
Central Macquarie	18	Sunshine Coast	66	Kalgoorlie/Boulder City Part A	114
Macquarie-Barwon	19	Moreton SD Balance	67	Lefroy	115
Upper Darling	20	Bundaberg	68	Johnston	116
Bathurst-Orange	21	Hervey Bay City Part A	69	Geraldton	117
Central Tablelands	22	Wide Bay-Burnett SD Bal	70	Gascoyne	118
Lachlan	23	Toowoomba	71	Carnegie	119
Queanbeyan	24	Darling Downs SD Balance	72	Greenough River	120
Southern Tablelands	25	South West	73	De Grey	121
Lower South Coast	26	Rockhampton	74	Fortescue	122
Snowy	27	Gladstone	75	Ord	123
Wagga Wagga	28	Fitzroy SD Balance	76	Fitzroy	124
Central Murrumbidgee	29	Central West	77		
Lower Murrumbidgee	30	Mackay City Part A	78	**Tasmania**	
Albury	31	Mackay SD Balance	79	Southern	125
Upper Murray	32	Townsville City Part A	80	Greater Launceston	126
Central Murray	33	Thuringowa City Part A	81	Central North	127
Murray-Darling	34	Northern SD Balance	82	North Eastern	128
Far West	35	Cairns City Part A	83	Burnie-Devonport	129
		Far North SD Balance	84	North Western Rural	130
Victoria		North West	85	Lyell	131
Greater Geelong City Part A	36				
East Barwon	37	**South Australia**		**Northern Territory**	
West Barwon	38	Barossa	86	Finniss	132
Warrnambool City	39	Kangaroo Island	87	Bathurst-Melville	133
Hopkins	40	Mt Lofty Ranges	88	Alligator	134
Glenelg	41	Fleurieu	89	Daly	135
Ballarat City	42	Yorke	90	East Arnhem	136
East Central Highlands	43	Lower North	91	Lower Top End	137
West Central Highlands	44	Riverland	92	Barkly	138
South Wimmera	45	Murray Mallee	93	Central	139
North Wimmera	46	Upper South East	94		
Mildura Rural City Part A	47	Lower South East	95	**Australian Capital Territory**	
West Mallee	48	Lincoln	96	Australian Capital Territory Balance	140
East Mallee	49	West Coast	97		
Greater Bendigo City Part A	50	Whyalla	98		

Map A3
Key to District Health Boards mapped for New Zealand

Northland

Auckland

Waitemata

Counties
Manukau

Waikato

Bay of
Plenty

Tairawhiti

Lakes

Taranaki

Whanganui

Hawke's
Bay

Capital
and
Coast

MidCentral

Wairarapa

Nelson-
Marlborough

Hutt

West Coast

Canterbury

South
Canterbury

Otago

Southland