Australian and New Zealand Atlas of Avoidable Mortality

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Others who contributed to this atlas include:

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Executive summary

Introduction

The *Australian and New Zealand Atlas of Avoidable Mortality* aims to illustrate geographic and social variations in avoidable and amenable mortality rates both within and between Australia and New Zealand.

Avoidable and amenable mortality comprises those causes of death that are potentially avoidable at the present time, given available knowledge about social and economic policy impacts, health behaviours, and health care (the latter relating to the subset of amenable causes). We hope that this atlas will promote the use of 'avoidable mortality' as an indicator to assist in monitoring the quality, effectiveness and productivity of the Australian and New Zealand health systems in the 21st century.

Overall, almost three quarters of all deaths at ages 0 to 74 years in Australia and New Zealand for the period 1997 to 2001 were considered to be avoidable: 71.5% in Australia and 74.4% in New Zealand. In Australia, 40.2% of these avoidable deaths are considered to be amenable to health care. In New Zealand, the proportion is higher, at 43.2%. Total mortality at 0 to 74 years accounted for 41.5% of deaths at all ages in Australia, and 43.7% in New Zealand.

Australia

A higher proportion of male deaths (73.0%) were from conditions considered to be avoidable, compared to female deaths (68.9%): the avoidable male deaths accounted for almost two thirds (64.8%) of total avoidable mortality.

On average, in each year over the period from 1997 to 2001, approximately 665,000 years of life were lost (YLL) from deaths from avoidable conditions. Males aged 0 to 74 years accounted for a larger share (approximately 435,000 YLL per annum), compared with females (approximately 231,000).

Almost half (46.6%) of avoidable mortality at ages 0 to 74 years occurred in the 65 to 74 year age group. The 45 to 64 and 25 to 44 year age groups accounted for 33.9% and 12.8% of avoidable mortality, respectively, with the age groups below 25 years contributing 6.7%.

The highest rates of avoidable mortality in the major condition groups were for cancers, responsible for 32.8% of avoidable mortality and cardiovascular diseases (31.6% of avoidable mortality). Together, these two major condition groups were responsible for over 60% of avoidable mortality at ages 0 to 74 years.

Of the avoidable mortality conditions, ischaemic heart disease ranked the highest (23.0% of avoidable mortality), with lung cancer responsible for 11.2% of avoidable mortality. These were followed by colorectal cancer (6.9%), cerebrovascular diseases (6.6%) and suicide and self inflicted injuries (6.5%).

In the states/ territories, avoidable mortality rates were the highest in Northern Territory, with rates in the states at a notably lower level, and the lowest rate in the Australian Capital Territory. Death rates from avoidable mortality were higher in the rest of state/ territory areas than in the capital cities, except in Tasmania. In the Northern Territory, the rates in the rest of territory areas were twice that for Darwin, with the rates in the rest of state areas in all other states between 10% to 25% higher than in the capital cities, apart from in Tasmania (approximately 9% lower).

Rates of avoidable mortality were approximately 80% higher in the most disadvantaged areas compared to the least disadvantaged areas. There was also a clear socioeconomic gradient in rates for all causes of avoidable mortality and for most conditions examined.

From 1997 to 2001, there were 46,958 excess deaths from avoidable mortality (estimated on the basis that the numbers of avoidable deaths in all socioeconomic groups equalled that of the least disadvantaged group).

The Indigenous rate of deaths from avoidable causes was 3.7 times the rate for the non-Indigenous population. Similarly, the Indigenous rate of death for causes amenable to health care was over 3.8 times the non-Indigenous rate. Ischaemic heart disease was the highest ranked cause of avoidable death for the Indigenous population (21.1%), with diabetes accounting for 10.6% of Indigenous deaths from avoidable causes.

From 1987 to 2001 there was a reduction in the proportion of avoidable deaths for those aged 0 to 74 years, falling from 77.4% of all deaths at these ages in 1987, to 70.6% in 2001. Over one quarter (28.7%) of all deaths at ages 0 to 74 in 2001 were considered to have been amenable to health care, compared to one third (33.3%) in 1987. Of the major avoidable mortality conditions, the rate of ischaemic heart disease fell by 60.0% over the fifteen year period, with the rate of cerebrovascular diseases declining by over 50%.

New Zealand

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

On average, in each year over the period from 1997 to 2001, approximately 151,000 years of life were lost (YLL) from deaths from avoidable conditions. Males aged 0 to 74 years accounted for a larger share (approximately 93,000 YLL per annum), compared with females (approximately 58,000).

Almost half (46.1%) of avoidable mortality at ages 0 to 74 years occurred in the 65 to 74 year age group. 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%.

The highest rates of avoidable mortality at the major condition group level were for cardiovascular diseases, with 35.0% of total avoidable mortality, and for cancers (31.8%). These two major condition groups were responsible for over two thirds (66.8%) of mortality from avoidable causes at ages 0 to 74 years.

Of the avoidable mortality conditions, ischaemic heart disease ranked the highest (24.9% of avoidable mortality), with lung cancer responsible for 10.3% of avoidable mortality. These were followed by colorectal cancer (7.2%), cerebrovascular diseases (6.9%) and suicide and self inflicted injuries (5.9%).

Total avoidable mortality varied considerably by District Health Board, with the highest rate almost one and a half times the average New Zealand rate and the lowest rate 20% below the national average.

The rates of avoidable mortality in the most deprived areas were approximately 2.3 times the rates in the least deprived areas. There were clear gradients in rates of avoidable mortality by deprivation of area for the total population and for both males and females.

From 1997 to 2001, there were 14,015 excess deaths from avoidable mortality (estimated on the basis that the numbers of avoidable deaths in all socioeconomic groups equalled that of the least deprived group).

The Mäori rate of deaths from avoidable causes was approximately two and a half times the rate for the European/ others population, with the rate for Pacific peoples approximately twice the rate for the European/ others. Similarly, the rates of amenable mortality for Mäori and Pacific peoples were over twice the rates for the European/ others.

From 1981 to 2001 there was a reduction in the proportion of avoidable deaths for those aged 0 to 74 years, falling from 79.2% of all deaths at these ages in 1981, to 74.3% in 2001. Of all deaths at these ages in 2001, almost one third (31.9%) were considered to be amenable to health care, again lower than in 1981 (36.0%). Of the major avoidable morality conditions, the rate of ischaemic heart disease fell by 61.8% over the twenty year period, with the rate of cerebrovascular diseases declining by 57.6%. Over this period there were increases in the rates of suicide and self inflicted injuries (41.0%) and diabetes (8.6%).

Glossary/ symbols used

ASR
ASR refers to age standardised rates – the rates in this atlas are per 100,000 population. For further information, refer to Chapter 2, *Methods*.

CC
Capital cities, Australia

ICD-9
International Classification of Diseases, Ninth Revision [WHO]

ICD-10
International Statistical Classification of Diseases and Related Health Problems, Tenth Revision [WHO]

ICD-10-AM
International Statistical Classification of Diseases and Related Health Problems, Tenth Revision, Australian Modification

MUC
'Other' major urban centres, Australia, excluding the capital cities – for further information, refer to Chapter 2, *Methods*

ROS
'Rest of state/ territory' areas, Australia, excluding the capital cities and other major urban centres

RR
Rate ratio – for further information, refer to Chapter 2, *Methods*

Statistical significance

* Statistically significant, at the 5% confidence level
** Statistically significant, at the 1% confidence level

YLL
Years of life lost – for further information, refer to Chapter 2, *Methods*

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1 Introduction

1.1 Background

Over the last thirty years, as health services have greatly expanded their range and scope, interest has grown in attempting to evaluate their performance and to identify areas for improvement. Donabedian (1966) first articulated a model for assessing the quality of health services across three domains: the structure (organisation and inputs) of the service, its process of care, and the outcome for the patient.

While much work has been undertaken since then to develop techniques for evaluating structures and processes of care, methods for assessing health outcomes attributable to the care received have proved more elusive. Yet, there is continuing interest in doing so. This is because there is an ongoing need to ensure that health care investment results in improved health for individuals and populations; to understand the causes of geographic and social variation in practice; and to reduce the frequency of inappropriate, poor quality or unsafe care (Woolf 1990).

One approach to assessing the quality of health care in terms of clinical outcomes has been to identify deaths that should not have occurred, given available health care interventions. This method was initiated in 1976 by Rutstein, who prepared a list of 'amenable' health conditions in consultation with an expert panel. Deaths from these causes represented 'untimely and unnecessary deaths' and their occurrence was 'a warning signal, a sentinel health event, that the quality of care might need to be improved' (Rutstein et al. 1976). The intention was to use the list for the purposes of medical audit.

Further studies followed. In the United Kingdom, Charlton and colleagues chose 14 disease groups from Rutstein's original list for which mortality in a developed country such as the United Kingdom should be wholly avoidable (Charlton et al. 1983). The list included certain conditions such as appendicitis, where prevention of death conferred an all-of-life benefit, and others, such as hypertensive diseases, where intervention might lead only to death being deferred (Jamrozik and Hobbs 2002). The authors calculated standardised mortality ratios to summarise the variations among UK district health authorities in mortality from the selected conditions. As a result of the publication of these indicators, several district health authorities undertook confidential enquiries into implicated services with subsequent improvement in SMRs (Segal and Chen 2001).

'Amenable' mortality as an indicator of the outcome of health care has been widely applied since the pioneering work of Rutstein and Charlton, including studies of time-trends and of geographical and socioeconomic variation in such mortality within and between countries (Westerling and Rosén 2002; Treurniet et al. 2004). A number of atlases of avoidable mortality (see below) for countries of the European Community have been published (Holland 1988, 1991, 1993, 1997). A detailed review, including an annotated bibliography of published studies, has recently been made available by Nolte and McKee (2004).

The concept has also been extended from studies of mortality to studies of morbidity, generally operationalised as avoidable hospitalisations (for example, Weissman et al. 1992; Billings et al. 1996; Jackson and Tobias 2001).

Returning to mortality, there is now a pressing need to monitor not only deaths that indicate the quality of health care, but also those that largely reflect 'upstream' risk factors or determinants of health (eg, deaths attributable to tobacco consumption). The latter causes of death are considered to be responsive to national health policies concerned with prevention rather than to clinical intervention at the individual patient level (Jamrozik and Hobbs 2002). Broadening of the concept from 'amenable' to 'avoidable' mortality through inclusion of 'preventable' mortality has been characteristic of more recent work in this area (for example, Holland 1988; Simonato et al. 1998; Tobias and Jackson 2001). This development has, however, introduced uncertainty regarding causal attribution and has complicated interpretation of the concept as an indicator of the quality of health care.

Jamrozik and Hobbs (2002) have cited the example of smoking and the importance of lag time, where deaths attributable to tobacco may reflect exposure decades earlier (Doll and Peto 1981; Peto et al. 1992). They also highlight the distinction between preventing mortality from acute conditions, so conferring a benefit that persists for the whole of life, versus deferment of death from chronic disease, which also may be associated with an increase in the prevalence of functional limitation. Arguably, it is not only the reduction in mortality that is important; the quality of the years of life gained should (ideally) also be taken into account (Jamrozik and Hobbs 2002).

1.2 Strengths and limitations of the concept

As outcome indicators for monitoring of health system quality, effectiveness and productivity, amenable and avoidable mortality have some advantages. Mortality is the hardest of hard

endpoints, so there can be little questioning of the salience of the outcome or the quality of the data. Furthermore, mortality data are available – at least in developed countries – with relatively little delay, a necessary requirement for meaningful monitoring. Finally, amenable – and especially avoidable – deaths are relatively frequent events that involve all population subgroups and allow most facets of the health system to be assessed, from primary to tertiary care and (in the case of avoidable mortality) public health services and health policy as well.

On the other hand, these indicators also have several weaknesses (Jamrozik and Hobbs 2002). Being confined to mortality, services not associated with significant case fatality (eg orthopaedic services) or the opposite (eg palliative care) cannot be evaluated using these indicators. Furthermore, in the absence of additional information, interpreting a change or difference in a mortality rate is problematic, as the change or difference could reflect variation in disease incidence, survival (case fatality) or both. Even more seriously, such a change or difference could be entirely artefactual, reflecting nothing more than a change in diagnostic criteria or coding rules.

Beyond such technical and interpretational difficulties, the extent of change in avoidable or amenable mortality is influenced by the selection of both the particular causes of death and the age range used (most studies have been restricted to people under the age of 65 years). Some conditions that were previously not preventable or treatable may have become so in the interim (Jamrozik and Hobbs 2002), so the list of avoidable and amenable conditions needs to be regularly updated to reflect preventive and therapeutic advances (Nolte and McKee 2003; Treurniet et al. 2004).

In addition, while categorical attribution of cause may be appropriate for some causes of avoidable mortality (those that are clearly either responsive to health care intervention or not), this approach is simplistic for others, as it takes no account of the counterfactual. That is, for the latter causes of death what should be modelled is the *fraction* of the deaths from each cause that may have been prevented under a specified counterfactual exposure scenario (eg, 85% of lung cancer deaths this year would have been avoided if no-one had smoked in the preceding three to four decades). Use of categorical attribution (rule-based all-or-none classification) provides only a very approximate estimate of avoidable mortality. However, the necessary data on risk exposure and exposure–outcome relationships required for counterfactual modelling may not be available.

Finally, avoidable mortality as a performance indicator has often been criticised in that it does not link clearly to other indicators of health service provision, whether of process or input. So knowing the level or distribution of avoidable mortality does not directly indicate to the politician or health service manager what corrective action needs to be taken to improve the unsatisfactory situation vis a vis health outcomes.

As Nolte and McKee (2004) have pointed out, however, critics of the avoidable / amenable mortality concept have frequently asked it to do more than it is capable of doing. Avoidable mortality cannot provide a definitive indicator of the performance of a health service or of the health system as a whole, and indeed was never intended to be used as such. Rather, it provides an indication that poor performance may exist in one or more services or other health system functions, and points the way to more focussed evaluation research and audit to uncover the precise causes of the problem and identify the necessary corrective action. Even such a limited role is not trivial, however, especially given the ease and low cost with which avoidable and amenable mortality can be monitored.

1.3 Condition lists

Rutstein et al.'s (1976) original list included 90 conditions which could be considered clear-cut causes of 'unnecessary untimely deaths' amenable to medical interventions available at that time. The list was designed for use internationally, rather than only in economically developed countries, and as such encompassed many conditions rarely, if ever, seen in the latter countries.

In 1983, Charlton et al. selected 14 of Rutstein et al.'s (1976) indicators for use in small area studies. The criteria involved selecting conditions thought to be responsive to medical or surgical treatment and which were sufficiently common to allow analysis at small area level in the United Kingdom. Age limits were set for each cause, and a maximum upper age limit of 64 years was defined. Charlton et al.'s list of indicators was not intended to be comprehensive, but rather to highlight where a problem might exist and to stimulate further inquiry. The stated research aim was that "if they proved useful as indicators of inadequacies in health-care provision they would provide an inexpensive, valuable, and readily available tool for health-care planners and managers". Charlton et al.'s (1983) list was the first to be widely adopted by other researchers.

In 1988, a European Community (EC) working group produced the 'European Community Atlas of Avoidable Death' using an alternative list of 17 causes of avoidable mortality (see Holland 1988). The avoidable mortality conditions were described as indicators of health policy for primary prevention

(3 indicators) and medical care indicators (14 indicators). Strict age limits were again imposed. The atlas highlighted differences between the European countries and also showed within-country variations at the small area level. Subsequent revisions of the lists followed in the 2nd and 3rd editions of the EC atlases (see Holland 1991 (vol. I and 1993 (vol. II); 1997).

Most of the subsequent research has used these early lists of Charlton et al. (based on Rustein et al.), or Holland, including monitoring or research studies in Europe, Scandinavia, Japan, the United States, Canada, New Zealand and Greenland. Some recent studies following the EC approach of Holland, with some minor modifications, include Logminiene et al. (2004), who examined avoidable mortality trends in Lithuania from 1970 to 1999, and Treurniet et al. (2004), who compared trends in fifteen European countries from 1980 to 1997.

Other researchers have also based their condition list on that of the EC working group but have incorporated more extensive changes. For example, Andreev et al.'s (2003) research into avoidable mortality in Russia from 1965 to 2000 included accidental alcohol poisoning and tuberculosis, due to their importance as causes of premature death in that country.

While the majority of research and monitoring in this area has maintained a focus on amenable mortality, the thrust of much recent research has been to include a wider set of avoidable conditions (i.e., 'preventable' conditions responsive to prevention at the individual and especially the population level, through lifestyle change, environmental modification, or health policy and regulation more generally) . A study by Simonato et al. (1998) into avoidable mortality trends in Europe from 1955 to 1994 examined causes of death amenable to intervention by primary, secondary and tertiary prevention (the latter corresponding to the classical concept of 'amenable' mortality). Simonato's avoidable mortality condition list included 23 conditions, comprising seven allocated to the subcategory of primary prevention (various cancers, chronic liver disease, and injury and poisonings); four cancer-related conditions in the secondary prevention subcategory; and the remaining twelve allocated to tertiary prevention. A subsequent analysis by Tobias and Jackson (2001) examined avoidable mortality trends in New Zealand from 1981 to 1997 under these same three categories, but expanded the list to include 56 condition groupings, reflecting advances in population-based and individual-based preventive interventions as well as health care technology. In addition, the upper age limit used to examine avoidable mortality was extended from 64 to 74 years.

1.4 Age limits

Most earlier studies used the upper age limit of 64 years for the majority of conditions, following either Charlton et al.'s (1983) or the EC working group lists (Holland 1988; 1991; 1993; 1997). However, as mentioned earlier, strict age groups were specified for some avoidable mortality conditions: for example, in the EC list (2nd edition, vol. I, 1991), the age range for asthma was specified as 5 to 44 years. Research by Albert et al. (1996) included a category of total avoidable mortality up to the age of 75 years, but the main analysis retained the 64 year age limit.

Most recent research, notably by Tobias and Jackson (2001), followed by Andreev et al. (2003) and Nolte and McKee (2003), has adopted an upper age limit of 74 years in order to reflect changes in life expectancy (now about 80 years in developed countries), as well as improvements in coding which have allowed a single cause of death to be coded for most deaths among older people, despite their higher prevalence of multiple co-morbidities.

However, other recent studies continue to follow the age limits set by Holland. For example, Logminiene et al. (2004) and Treurniet et al. (2004) reported that a decision was made to maintain the 64 year age limit (and follow the standard EC condition list) in order to compare findings with earlier research, allowing for assessment of trends in avoidable mortality over time.

Consistency of definitions over time has to be weighed against considerations of validity, however. The latter would favour regular updating of both coverage (i.e., condition list) and age range of the indicator, reflecting advances in prevention practice and health care technology.

1.5 Using avoidable mortality data

To date, most studies using avoidable and amenable mortality indicators have involved examination of the relationships between these causes of mortality (individually or more usually, collectively), socio-economic conditions, and health service factors on a small area basis, in order to evaluate the performance of specific health services from the perspectives of quality, effectiveness, or productivity.

Other studies have involved the analysis of variations in health system performance (using avoidable mortality as the sole or as one among several outcome measures) across different countries, different health administrative areas, or over time. More recent analyses have included variations in avoidable mortality by socioeconomic

position and ethnicity (Westerling and Rosén 2002; Tobias and Jackson 2001). Mackenbach et al. (1988) has used the concept to quantify the contribution of health care to life expectancy gain in The Netherlands over the twentieth century.

However, the key limitation of all these studies, as outlined above, has been their inability – shared with all studies based on aggregate indexes – to identify what corrective action needs to be taken once poor system or service performance has been identified. This requires the capability to drill down into the detail, so highlighting issues of process and input mix. Nolte and McKee (2004) have proposed a solution to this conundrum, "in which analyses of amenable mortality identify areas of potential concern that are then examined in more detail by studying the processes and outcomes of care for tracer conditions, selected on the basis of their ability to assess a wide range of health system components". The use of tracer conditions alongside avoidable or amenable mortality indicators may represent a powerful methodology, one that could illuminate health care performance across the continuum from inputs through processes to outcomes.

1.6 Previous Australian and New Zealand research

Australian research

The first main studies of avoidable mortality are included in the New South Wales Chief Health Officer's reports (NSW Department of Health 2002; 2004) which include an examination of avoidable mortality in New South Wales, following Tobias and Jackson's (2001) methodology. Deaths from potentially avoidable causes accounted for 80 per cent of all premature deaths (before the age of 75 years) in 1983, falling to 70% of all premature deaths in 2002. Over the 20 year period, rates of avoidable death fell by 56%. The reduction in avoidable death rate was higher for males (58%) than for females (55%) (NSW Department of Health 2004).

The earlier analysis of socioeconomic inequalities in the change in rates of avoidable deaths between 1980 and 2000 in New South Wales found that the decrease in rates for those from the highest socioeconomic group (62% in males and 55% in females) was greater than those from the lowest group (53% in males and 48% in females) (NSW Department of Health 2002; see also Hayen et al. 2002).

In the period 1996 to 2000, the death rate from 'avoidable' causes in New South Wales increased with remoteness, and was three times higher in the Very Remote areas than in Highly Accessible areas. Similar gradients were observed when avoidable deaths were divided into primary, secondary and tertiary classifications (NSW Department of Health 2002).

The National Health Performance Committee (2004) examined potentially avoidable deaths in Australia from 1980 to 2001, following methods derived from the NZ Ministry of Health (NZ) (1999) and NSW Department of Health (2002). Between 1980 and 2001, avoidable mortality decreased by 54.6% for males and 48.0% for females. Over the period, the largest decrease for males was for tertiary avoidable mortality (58.7%), followed by secondary avoidable mortality (57.2%) and primary avoidable mortality (51.9%). For females, the largest decrease was for secondary avoidable mortality (53.7%), tertiary avoidable mortality (49.5%) and then primary avoidable mortality (43.3%). The avoidable death rate for males in the most disadvantaged areas was 60.5% higher than males in the least disadvantaged areas. For females, the rates were 47.1% higher in the most disadvantaged areas.

The Victorian DHS (2005) analysed avoidable and unavoidable mortality in Victoria from 1979 to 2001, following the earlier work by Tobias and Jackson (2001). Over the period, mortality rates declined for all categories of avoidable mortality, with primary avoidable mortality showing a greater decline than secondary and tertiary. Ischaemic heart disease was the leading cause of avoidable deaths among males and females during the study period, followed by lung and breast cancers in males and females, respectively.

Recent research by Korda and Butler (2004; 2006) examined the effect of health care on mortality between 1968 and 2001, partitioning avoidable causes into three categories – those amenable to medical care; those mainly responsive to health policy, and ischaemic heart disease. They found that total avoidable death rates fell by 68% in females and 72% in males over the period. Korda and Butler concluded that the Australian trends in avoidable mortality indicated the effectiveness of the Australian healthcare system in improving population health, with Australia's experience comparing favourably with that of the nine European countries studied.

New Zealand research

Variations of Charlton et al.'s (1983) indicator list have been used in previous studies of avoidable mortality in New Zealand (Marshall and Keating 1989; Malcolm and Salmond 1993; Malcolm 1994; Jackson et al. 1998).

As introduced in Section 1.3 above, Tobias and Jackson's (2001) research described avoidable mortality in New Zealand from 1981 to 1997,

including trends and variations between groups by age, gender, ethnicity and degree of deprivation. Avoidable mortality declined 38% from 1981 to 1997; unavoidable mortality declined only 9%. In 1996-97 almost 70% of deaths in the 0 to 74 age range were considered to be potentially avoidable. Almost 80% of avoidable deaths occurred in the 45 to 74 age group. These deaths were dominated by the emergence of chronic diseases, such as ischaemic heart disease, diabetes and smoking-related cancers.

In younger age groups, injury (including suicide) dominated avoidable mortality. Males experienced a greater burden of avoidable mortality than females – a relative excess of 54% (approximately 2,000 deaths) in 1996-97. The gender difference was largely attributed to diseases and injuries amenable to primary prevention, with the largest single contribution coming from ischaemic heart disease. The gap between ethnic groups in avoidable mortality remains wide: rates for Mäori and Pacific peoples were 2 to 2.5 times higher than European rates in 1996-97. Similar gradients were found with deprivation, using a census-based small area index.

1.7 Guide to this report

Purpose and provenance

With these considerations in mind, this volume, *Australian and New Zealand Atlas of Avoidable Mortality,* aims to illustrate the geographic and social variation in avoidable and amenable mortality rates both within and between Australia and New Zealand.

Explanations of the variations, however, are likely to be complex and multi-faceted, and to depend on many factors beyond the control of health care systems. The purpose of this atlas is to highlight the differences and serve as an indicator of areas where additional research may be warranted.

The list of conditions used in this atlas draws on the previous studies undertaken, but updates them to reflect recent advances in preventive and therapeutic technologies (see chapter 2, *Methods*). We believe it contains those causes of death that are potentially avoidable at the present time, given available knowledge about social and economic policy impacts, health behaviours, and health care (the latter relating to the subset of amenable causes). We hope that this atlas will promote the use of 'avoidable mortality' (including within this rubric the subset of 'amenable mortality') as an indicator to assist in monitoring the quality, effectiveness and productivity of the Australian and New Zealand health systems in the 21st century.

1.8 Contents

The atlas has 9 chapters and an appendix. The chapters are:

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Albert X, Bayo A, Alfonso JL, Cortina P, Corella D. The effectiveness of health systems in influencing avoidable mortality: a study in Valencia, Spain, 1975-90. *Journal of Epidemiology and Community Health* 1996; 50(3): 320-325.

Andreev EM, Nolte E, Shkolnikov VM, Varavikova E, McKee M. The evolving pattern of avoidable mortality in Russia. *International Journal of Epidemiology* 2003; 32: 437-446.

Billings J, Anderson GM, Newman LS. Recent findings on preventable hospitalisations. *Health Affairs* 1996; 15: 239-249.

Charlton JR, Hartley RM, Silver R, Holland WW. Geographical variation in mortality from conditions amenable to medical intervention in England and Wales *Lancet* 1983: 1(8326 Pt 1): 691-696.

Doll R, Peto R. The causes of cancer: Quantitative estimates of avoidable risks of cancer in the United States today. *Journal of the National Cancer Institute* 1981; 66: 1191-1308.

Donabedian A. Evaluating the quality of medical care. *Milbank Memorial Fund Quarterly* 1966; 44: 166-203.

Hayen A, Lincoln D, Moore H and Thomas M. Trends in potentially avoidable mortality in NSW. *NSW Public Health Bulletin* 2002; 13(11-12): 226-236.
[Available online: http://www.health.nsw.gov.au/public-health/phb/phb.html; accessed 1 June 2006]

Holland WW, ed. *European Community atlas of 'avoidable death'*. Commission of the European Communities Health Services Research Series No. 3. Oxford: Oxford University Press, 1988.

Holland WW, ed. *European Community atlas of 'avoidable death'*. 2nd edition, Vol I. European Commission of the Communities Health Services Research Series No. 6. Oxford: Oxford University Press, 1991.

Holland WW, ed. *European Community atlas of 'avoidable death'*. 2nd edition, Vol II. European Communities Health Services Research Series No. 9. Oxford: Oxford University Press, 1993.

Holland WW, ed. *European Community Atlas of 'Avoidable Death' 1985-1989.* Oxford: Oxford University Press, 1997.

Jackson G, Kelsall L, Parr A, Papa D. *Socio-economic inequalities in health care: A preliminary analysis of the link between health status and socio-economic status in the North Health Region.* Wellington: Ministry of Health, 1998.

Jackson G and Tobias M. Potentially avoidable hospitalisations in New Zealand, 1989-98. *Australian and New Zealand Journal of Public Health* 2001; 25: 212-221.

Jamrozik and Hobbs. Medical care and public health. In *Oxford Textbook of Public Health.* Edited by: Detels R, McEwen J, Beaglehole R, Tanaka H. Oxford: Oxford University Press, 2002.

Korda RJ, Butler JRG. *The impact of health care on mortality: Time trends in avoidable mortality in Australia 1968-2001.* Working Paper No. 49: National Centre for Epidemiology and Population Health, 2004.
[Available online: http://nceph.anu.edu.au/Staff_Students/Staff_pdf_papers/Korda_WP49_ABSOLUTE_%20FINAL2508.pdf; accessed 1 June 2006]

Korda RJ, Bulter JRG. Effect of healthcare on mortality: Trends in avoidable mortality in Australia and comparisons with Western Europe. *Public Health* 2006; 120: 95-105.

Logminiene Z, Nolte E, McKee M, Valius L, Gaizauskiene A. Avoidable mortality in Lithuania: 1991-1999 compared with 1970-1990. *Public Health* 2004; 118(3): 201-210.

Mackenbach JP, Looman CW, Kunst AE, Habbema JD, van der Maas PJ. Post-1950 mortality trends and medical care: gains in life expectancy due to declines in mortality from conditions amenable to medical intervention in The Netherlands. *Social Science and Medicine* 1988; 27: 889-894.

Malcolm M. Avoidable mortality and life expectancy in New Zealand. *Journal of Epidemiology and Community Health* 1994; 48: 211.

Malcolm MS, Salmond CE. Trends in amenable mortality in New Zealand 1968-1987. *International Journal of Epidemiology* 1993; 22(3): 468-474.

Marshall RJ, Keating GM. Area variation of avoidable causes of death in Auckland, 1977-85. *New Zealand Medical Journal* 1989; 102: 464-465.

National Health Performance Committee (NHPC). *National report on health sector performance indicators 2003.* AIHW cat. no. HW178. Canberra: Australian Institute of Health and Welfare, 2004.

New Zealand (NZ) Ministry of Health. *Our health, our future: The health of New Zealanders 1999.* Wellington: NZ Ministry of Health, 1999.

Nolte E and McKee M. Measuring the health of nations: analysis of mortality amenable to health care. *British Medical Journal* 2003; 327(1129): 1-5.

Nolte E, McKee M. *Does health care save lives? Avoidable mortality revisited.* London: The Nuffield Trust, 2004.

Peto R, Boreham J, Lopez AD, Thun M, Heath C. Mortality from tobacco in developed countries: indirect estimation from national vital statistics. *Lancet* 1992; 339(8804): 1268-1278.

NSW Department of Health. *The health of the people of New South Wales – Report of the Chief Health Officer.* Sydney: NSW Department of Health, 2002.

NSW Department of Health. *The health of the people of New South Wales – Report of the Chief Health Officer.* Sydney: NSW Department of Health, 2004.

Rutstein DD, Berenberg W, Chalmers TC, Child CG, 3rd, Fishman AP, Perrin EB. Measuring the quality of medical care. A clinical method. *New England Journal of Medicine* 1976; 294(11): 582-588.

Segal L, Chen Y. *Priority setting for health: A critique of alternative models.* Research Report 22. Melbourne: Centre for Health Program Evaluation, 2001.

Simonato L, Ballard T, Bellini P, Winkelmann R. Avoidable mortality in Europe 1955-1994: a plea for prevention. *Journal of Epidemiology and Community Health* 1998; 52(10): 624-630.

Tobias M, Jackson G. Avoidable mortality in New Zealand, 1981-97. *Australian and New Zealand Journal of Public Health* 2001; 25(1): 12-20.

Treurniet HF, Boshuizen HC, Harteloh PPM. Avoidable mortality in Europe (1980-1997): a comparison of trends. *Journal of Epidemiology and Community Health* 2004; 58: 290-295.

Victorian Department of Human Services (DHS). *Your health: A report on the health of Victorians 2005.* Melbourne: Victorian Government Department of Human Services, 2005.

Weissman JS, Gatsonis C, Epstein AM. Rates of avoidable hospitalisation by insurance status in Massachusetts and Maryland. *Journal of the American Medical Association* 1992; 268(17): 2388-2394.

Westerling R and Rosen M. 'Avoidable' mortality among immigrants in Sweden. *European Journal of Public Health* 2002; 12: 279-286.

Woolf SH. Preventive services closely linked to quality concerns. QA Review 1990; 2(4): 6.

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2 Methods

2.1 Selection of causes of death

The approach adopted was to critically review and update Tobias and Jackson's 2001 list. This involved:

- Review of the literature to identify conditions that have recently (since 2000) become preventable and/ or treatable as a result of advances in prevention or health care technology
- Review of condition lists used by authors of recently published (post 2000) studies of avoidable or amenable mortality, to identify any conditions previously missed or excluded.
- The resulting draft list of conditions, together with justifications for their inclusion and references for their use, was subjected to peer review by experts in Australia, New Zealand and Europe. A number of revisions were made to the list as a result.
- The revised draft list was then sent to the members of the (Australian) National Public Health Information Working Group for further review, following which several further changes were made to the list.

We are confident that the final list of avoidable conditions accurately represents those conditions whose associated mortality is substantially avoidable today, given existing health and social systems in Australasia, either through incidence reduction (prevention) or case fatality reduction (treatment) or a combination of both.

For computational ease, rare causes of avoidable mortality – those accounting for less than 0.1% of all deaths (assessed over the period 1997-99 for Australia and 1996-99 for New Zealand) – were excluded (note that these rare causes may be considered causes of 'avoided' rather than 'avoidable' mortality). The conditions excluded are shown in Table A2, *Appendix 1.1*.

2.2 Subclassification of avoidable causes of death

The approach used by Simonato (1998) and Tobias and Jackson (2001), of classifying avoidable causes according to level of intervention (primary, secondary and tertiary) was not adopted, as it was considered to be too reliant on expert judgement.

Instead, following Nolte and McKee (2004), the selected avoidable causes were classified into two subgroups:

- Amenable causes
- Preventable causes

Amenable causes were defined as those causes whose case fatality could be substantively reduced by currently available health care technologies. For example, for cancers this was operationalised as a five year relative survival rate greater than 60% (given existing age and stage distribution at diagnosis).

All other causes on the list were classified as 'preventable', in that their associated mortality could be substantially reduced by preventing the condition from occurring in the first place, ie incidence reduction.

This classification system worked well for most conditions on the list, which clearly sorted themselves into 'amenable' or 'preventable' categories. However, there were three important exceptions: ischaemic heart disease (IHD), cerebrovascular diseases (stroke), and diabetes. For these diseases, studies such as the MONICA and ARIC studies indicate that amelioration of their fatal burdens is currently about equally split (in developed countries such as Australia and New Zealand) between incidence reduction and treatment of established disease.

For these conditions only, the decision was made, following Nolte and McKee (2004), to split them randomly on a 50:50 basis between the 'amenable' and 'preventable' categories. This decision contravenes the basic rule of categorical attribution (ie all-or-none classification) and is more akin to a counterfactual modelling approach. However, the alternative – excluding these major causes of death from the amenable category entirely – would seriously undervalue the contribution of health care to survival gain.

2.3 Coding of avoidable causes of death

Assigning ICD codes to conditions deemed 'avoidable' as identified through the process described above, was not a trivial exercise. This involved allocation of ICD-9 codes for Australia to 1997 and New Zealand to 1998, and ICD-10 and ICD-10-AM codes thereafter.

Initial coding assignments were made independently by coding experts in both countries, and differences then resolved internally where possible. The draft sets of codes were then reviewed by the (Australian) National Centre for Classification in Health, and revised accordingly.

2.4 Age restriction

Only deaths in the age range 0 to 74 years (excluding stillbirths) were deemed to be potentially avoidable. Deaths at ages 75 or older were excluded because of the high prevalence of multiple co-morbidities (including but not restricted to chronic diseases) in this age group.[1] Co-morbidity makes assignment of a single cause to a death problematic, so limiting the validity of categorical attribution of deaths as 'avoidable' or not.

Note, however, that extension of the upper age limit from the conventional 64 to 74, following Tobias and Jackson (2001) and Nolte and McKee (2004), still captures improvements in cause of death coding, and in life expectancy, that have characterised mortality among older adults in Australia and New Zealand (and other developed countries) over the past decade.

For two conditions only – asthma and chronic obstructive pulmonary disease (COPD) – different age restrictions were applied. Because of difficulty in distinguishing these diagnoses as causes of death among middle aged and older adults, asthma deaths were included only within the age range of 0 to 44 years, and COPD deaths only from 45 to 74 years of age. This may lead to under-estimation of the fatal burden of asthma in particular, but was considered necessary to avoid the opposite bias.

Readers should note the unconventional method of showing avoidable mortality for infants (under one year of age). In order to be able to calculate rates for the population of all ages on a consistent basis, rates for infants were also calculated per 100,000 population, and not per 1,000 live births, as is usually the case. In addition, maternal and infant conditions (eg birth defects) were not restricted to deaths of infants only, but to death at any age.

2.5 Final condition list

Table 2.1 (page 13, overleaf) records the final list of avoidable conditions and the percentage of all deaths they represent in both countries for the periods 1997-99 for Australia and 1996-99 for New Zealand. Approximately 70% of all deaths in Australia and 73% in New Zealand are considered to have been avoidable over this three or four year period (Table 2.1). The proportions considered amenable were 34% and 37%, respectively. These proportions are higher if only 'premature' deaths (i.e., deaths occurring under 75 years of age) or years of life lost are considered (see *Sections 4.1* for Australia and *5.1* for New Zealand).

Table A1 in *Appendix 1.1* includes the list of avoidable conditions, with the ICD-9 and ICD-10/ ICD-10-AM codes, their subclassifcation as amenable or preventable, and any non-standard age or sex restrictions.

Appendix 1.2 provides details of the justification for inclusion of each listed condition, as well as arguments for their classification as 'amenable' or 'preventable' or both.

2.6 Data sources

Data sources: Australia

Estimated resident population and mortality data for Australia for the years 1987 to 2001 were purchased from the Australian Bureau of Statistics (ABS). The de-identified unit record data for 1997-2001 included underlying cause of death (five digit level) coded to ICD-9 for 1997 and to ICD-10 thereafter; age; sex; Indigenous status; and SLA of usual address.

Measures of remoteness (using the ASGC remoteness classification[2]) and disadvantage (using the ABS Index of Relative Socio-Economic Disadvantage (IRSD)[3]) were added subsequently by matching these measures at the Statistical Local Area (SLA) level to the address of the deceased.

Data sources: New Zealand

Estimated resident population data for New Zealand for the years 1981 to 2001 were supplied by Statistics New Zealand. Mortality data were supplied by the New Zealand Health Information Service.

The de-identified unit record data for 1997-2001 included underlying cause of death (five digit level) coded to ICD-9 for 1997 to 1998 and to ICD-10-AM thereafter; geographic region; prioritised ethnicity; and the NZDep96 index of deprivation[4]. Records prior to 1997 were less detailed.

[1] Note that this does not imply that some deaths in people aged 75 years or older cannot be postponed, whether through preventive or therapeutic interventions.

[2] The ASGC remoteness classification allocates areas (eg. SLAs) to one of five classes, based on road distances to service centres (towns).

[3] The IRSD is an area-based, summary measure of disadvantage and is comprised of variables relating to education, labour force status, occupation, Indigenous status, etc., of individuals and families.

[4] The NZDep is an area based summary measure of deprivation derived from nine census variables, including measures of income, education and labour force status.

2.7 Data methods and analysis

Calculation of rates and mapping

Mortality rates were age standardised, with the WHO World population as the reference, by the direct method for the country comparisons in Chapter 3, and by the indirect method for the analysis presented in the remaining chapters.

The data were set up in HealthWIZ[5] to allow for production of counts, rates, years of life lost and excess deaths by age, sex, condition, condition group, area, population and period.

Data were aggregated into five-year periods for detailed analysis and mapping; a trend analysis was undertaken on a combination of single and five-year groupings of data.

The results were then exported as required from HealthWIZ to HealthMap (a proprietary mapping package developed by PHIDU) for production of maps.

The rates were mapped by Statistical Subdivision for Australia and by District Health Board for New Zealand. For further information, refer to the 'Introduction to map and text pages' in *Section 4.4* (for Australia) and *Section 5.4* (for New Zealand).

Data analysis: general

Excess deaths

Excess deaths are calculated by obtaining the 'observed-indirect expected' which gives the observed number for the data minus the expected number for the local population. The expected number is calculated using the indirect method of age standardisation, based on the first quintile population. It is the number one would expect if the whole population had had the same age-related rates as the rates for the population in the 1st quintile (the 'standard population'), calculated for Australia and New Zealand, respectively.

Rate ratios

'Rate ratios' show the differential between the standardised rate for two groups – for example between males and females; Indigenous and non-Indigenous; and between the most disadvantaged/ deprived areas (Quintile 5/ Decile 10) and the least disadvantaged/ deprived areas (Quintile 1/ Decile 1). The statistical significance of rate ratios is shown with an asterisk(s). A single asterisk indicates that the ratio is statistically significant at the 5% confidence level, that is, that the likelihood of the observed ratio being due to change or random error is less than 5%. A double asterisk indicates that the observed ratio is statistically significant at the 1% confidence level.

Years of life lost (YLL)

Years of life lost (YLL) were calculated using the remaining life expectancy method (this provides an estimate of the average time a person would have lived had he or she not died prematurely). For both Australia and New Zealand, the reference life table was the Coale and Demeny Model Life Table West level 26 female (for both males and females), with the YLL discounted to net present value at a rate of 3 per cent per year.

Data analysis: Australia

ASGC remoteness classification

The ASGC remoteness classification has five remoteness classes to which SLAs can be allocated: Major Cities of Australia, Inner Regional, Outer Regional, Remote and Very Remote.

The Index of Relative Socio-Economic Disadvantage (IRSD)

The Index of Relative Socio-Economic Disadvantage was used to allocate deaths to either five or ten groups (quintiles/ deciles) of similar socioeconomic status (referred to as quintiles/ deciles of socioeconomic disadvantage of area). SLAs (to which deaths data are coded) were ranked by their IRSD score and then allocated to one of five/ ten groups, each with approximately 20%/ 10% of the population aged 0 to 74 years. The IRSD for 2001 was allocated to SLAs for the period 1999-2001; the 1996 index was allocated to SLAs for the period 1997-1998.

Indigenous rates

The analysis of deaths of Australia's Aboriginal and Torres Strait Islander people is restricted to the four jurisdictions for which data are generally accepted as having the most complete coverage of Indigenous deaths. This is discussed in the introduction to *Section 4.6.*

Other major urban centres

The category 'other major urban centres' includes the major urban centres (cities with populations of 100,000 and over) other than the capital cities. The other major urban centre SSDs in this analysis are as follows:

NSW:	Newcastle, Wollongong
Vic:	Geelong
Qld:	Gold Coast-Tweed Heads, Sunshine Coast, Townsville-Thuringowa.

[5] HealthWIZ is a publicly available database for exploring statistical data. It is produced by Prometheus Information Pty Ltd for the Australian Government Department of Health and Ageing. This project, and the data on which it is based, is not available on the public release version.

Data analysis: New Zealand

Ethnic groups

Deaths of Mäori and Pacific peoples were corrected for under-reporting by application of adjustors from the New Zealand Census Mortality Study (NZCMS). The NZCMS is a record linkage study that anonymously and probabilistically links census records to mortality records for the three years following each census, since 1981. This allows ethnicity as recorded on the census (the 'gold standard') to be compared with ethnicity as recorded on the mortality collection. Under-reporting of Mäori and Pacific deaths results from differences in ethnicity definitions and methods of collection of ethnicity data between the census and mortality records.

Index of deprivation

The NZDep96 index was used to stratify deaths by level of deprivation (as a proxy for socioeconomic status). The NZDep96 score is derived from a principal components analysis of nine socioeconomic variables from the 1996 Census, based on small areas with a median of 90 people (mesh blocks). The NZDep96 scores were then grouped into quintiles.

Table 2.1: Avoidable mortality and amenable mortality conditions

Condition group and cause	Per cent of all deaths at all ages[1]	
	Aust	NZ
Infections		
Tuberculosis	0.05	0.11
Selected invasive bacterial and protozoal infections	2.21	2.01
Hepatitis	0.06	0.07
HIV/AIDS	0.13	0.09
Viral pneumonia and influenza	0.01	0.17
Neoplasms		
Lip, oral cavity and pharynx	0.49	0.37
Oesophagus	0.74	0.67
Stomach	0.95	1.09
Colorectal	3.61	4.05
Liver	0.51	0.43
Lung	5.23	5.14
Melanoma of skin	0.74	0.78
Nonmelanotic skin	0.28	0.23
Breast	2.01	2.34
Cervix	0.20	0.28
Uterus	0.20	0.26
Bladder	0.64	0.62
Thyroid	0.06	0.07
Hodgkin's disease	0.05	0.06
Lymphoid leukaemia – acute/ chronic	0.31	0.32
Benign	0.10	0.12
Nutritional, endocrine and metabolic conditions		
Thyroid disorders	0.06	0.06
Diabetes	2.30	2.47
Drug use disorders		
Alcohol related disease	0.83	0.51
Illicit drug use disorders	0.42	0.13
Neurological disorders		
Epilepsy	0.19	0.23
Cardiovascular diseases		
Rheumatic and other valvular heart disease	0.21	0.51
Hypertensive heart disease	0.38	0.58
Ischaemic heart disease	22.19	23.30
Cerebrovascular diseases	9.60	9.53
Aortic aneurysm	1.13	1.55
Genitourinary disorders		
Nephritis and nephrosis	1.73	1.08
Obstructive uropathy & prostatic hyperplasia	0.08	0.09
Respiratory diseases		
DVT with pulmonary embolism	0.41	0.17
COPD	4.39	5.44
Asthma	0.37	0.61
Digestive disorders		
Peptic ulcer disease	0.36	0.43
Acute abdomen, appendicitis, intestinal obstruction, cholecystitis/ lithiasis, pancreatitis, hernia	0.23	0.40
Chronic liver disease (excluding alcohol related disease)	0.23	0.14
Maternal & infant causes		
Birth defects	0.58	0.65
Complications of perinatal period	0.24	0.44
Unintentional injuries		
Road traffic injuries	1.43	1.84
Falls	0.37	0.83
Fires, burns	0.08	0.10
Accidental poisonings	0.55	0.07
Drownings	0.21	0.24
Intentional injuries		
Suicide and self inflicted injuries	2.14	2.05
Violence	0.24	0.22

[1] **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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3 Avoidable mortality overview: Australia and New Zealand, 1997-2001

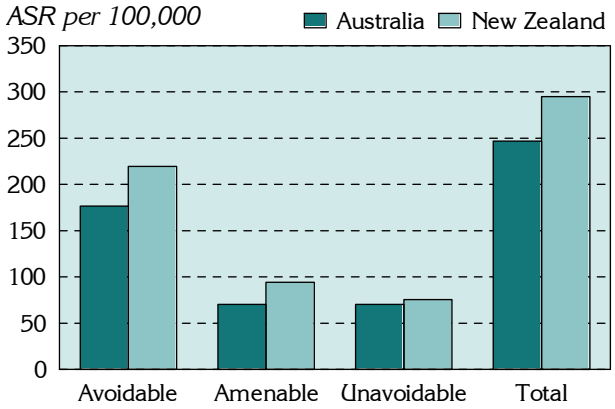
3.1 Total avoidable and unavoidable mortality

Almost three quarters (74.4%) of all deaths in New Zealand at ages 0 to 74 years over the period 1997 to 2001 are considered to be avoidable, marginally higher than the proportion for Australia (71.5%) (Figure 3.1, Table 3.1). Total mortality at 0 to 74 years accounted for 41.5% of deaths at all ages in Australia, and 43.7% in New Zealand.

The age-standardised death rate (ASR)[1] from avoidable mortality for New Zealand was 219.3 deaths per 100,000 population, approximately 24% higher than the rate of 176.6 for Australia. The New Zealand death rate for the remaining, or 'unavoidable' deaths, was 75.4 deaths per 100,000 population, approximately 7.4% higher than the rate for Australia of 70.2.

Deaths amenable to health care (amenable mortality, a subset of avoidable mortality) accounted for 28.7% of all deaths at ages 0 to 74 years in Australia and 32.1% in New Zealand. The ASR was 94.2 for New Zealand, one third higher than the rate for Australia of 70.4.

Figure 3.1: Avoidable mortality (0 to 74 years), Australia and New Zealand, 1997-2001



[1] Directly standardised to the WHO population

Table 3.1: Avoidable mortality (0 to 74 years), Australia and New Zealand, 1997-2001

Mortality category	Number		Per cent of total		ASR per 100,000		Rate ratio
	Aust	NZ	Aust	NZ	Aust	NZ	Aust:NZ
Avoidable mortality	189,845	44,272	71.5	74.4	176.6	219.3	0.81**
(Amenable mortality)	(76,249)	(19,130)	(28.7)	(32.1)	(70.4)	(94.2)	(0.75)**
Unavoidable mortality	75,582	15,249	28.5	25.6	70.2	75.4	0.93**
Total mortality	**265,427**	**59,521**	**100.0**	**100.0**	**246.8**	**294.7**	**0.84****

Another way of measuring premature mortality is to calculate the number of years of life lost (YLL),[2] which takes into account the years a person could have expected to live at each age of death based on the average life expectancy at that age.

The numbers of YLL for Australia and New Zealand over the observation period are shown in Table 3.2 by mortality category. However, given the significant variance in the Australian and New Zealand population sizes, a comparison of the proportion of YLL for each country is also shown.

YLL from avoidable mortality accounted for 71.9% of total YLL (0 to 74 years) for Australia, less than the 74.4% for New Zealand (a ratio of 0.97**). Similarly, the proportion of YLL from amenable mortality of 28.0% for Australia was lower than the 31.9% for New Zealand (a ratio of 0.88**). At the same time, the proportion of YLL from unavoidable mortality in Australia (28.1%) was higher when compared to New Zealand (25.6%; a ratio of 1.10**).

[2] See Chapter 2, *Methods*

Table 3.2: Years of life lost (0 to 74 years), Australia and New Zealand, 1997-2001

Mortality category	Number ('000)		Per cent of total YLL		Ratio
	Aust	NZ	Aust	NZ	Aust:NZ
Avoidable mortality	3,327.4	756.7	71.9	74.4	0.97**
(Amenable mortality)	(1,298.4)	(324.1)	(28.0)	(31.9)	(0.88**)
Unavoidable mortality	1,303.3	260.7	28.1	25.6	1.10**
Total mortality	**4,630.7**	**1,107.4**	**100.0**	**100.0**	**..**

3.2 Avoidable mortality by age and sex

By sex

ASRs for avoidable mortality were higher for males than for females in both Australia and New Zealand (Figure 3.2, Table 3.3). The ASR for Australian males was 232.1 deaths per 100,000 males, almost twice the rate for females of 121.1 (a rate ratio of 1.92**). In New Zealand, the rate differential was smaller, with 274.2 deaths per 100,000 males and a rate of 164.4 for females (a rate ratio of 1.67**). The Australian rates were lower than those in New Zealand for both males (0.85**) and females (0.74**).

The proportion of male deaths from avoidable causes in Australia was 64.8%, notably higher than the 35.2% for females. Similarly, the proportion of male deaths in New Zealand was higher than that for females, at 61.2% and 38.8%, respectively.

Figure 3.2: Avoidable mortality (0 to 74 years) by sex, Australia and New Zealand, 1997-2001

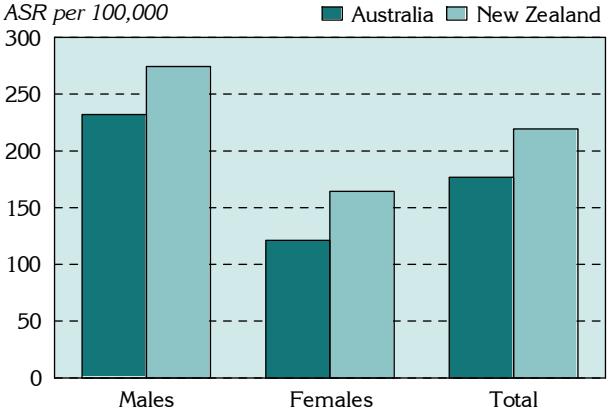


Table 3.3: Avoidable mortality (0 to 74 years) by sex, Australia and New Zealand, 1997-2001

Sex	Number		Per cent of total		ASR per 100,000		Rate ratio
	Aust	NZ	Aust	NZ	Aust	NZ	Aust: NZ
Males	123,026	27,089	64.8	61.2	232.1	274.2	0.85**
Females	66,819	17,183	35.2	38.8	121.1	164.4	0.74**
Total	**189,845**	**44,272**	**100.0**	**100.0**	**176.6**	**219.3**	**0.81****
Rate ratio–M:F	..	..	..	..	**1.92****	**1.67****	..

By age

In both Australia and New Zealand, almost half of avoidable mortality at ages 0 to 74 years occurred in the 65 to 74 year age group (46.6% and 46.1%, respectively) (Table 3.4, Figure 3.3). The 45 to 64 year age group accounted for around one third of avoidable deaths (33.9% and 35.0%, respectively) in both countries, while the 25 to 44 year age group contributed just over one tenth (12.8% and 11.1%). The age groups below 25 years comprised 6.7% of avoidable mortality in Australia and 7.9% in New Zealand.

Death rates varied from 1,338.8 deaths per 100,000 population (Australia) and 1,640.4 (New Zealand) in the 65 to 74 year age group to 10.2 (Australia) and 16.5 (New Zealand) in the 1 to 14 year age groups.

The death rates from avoidable mortality in New Zealand were higher than the rates for Australia in each age group in the analysis. The highest rates for both Australia and New Zealand were in the 65 to 74 age group, where the Australian rate of 1,338.8 deaths per 100,000 population was 18.0% lower than the New Zealand rate of 1,640.4 (a rate ratio of 0.82**).

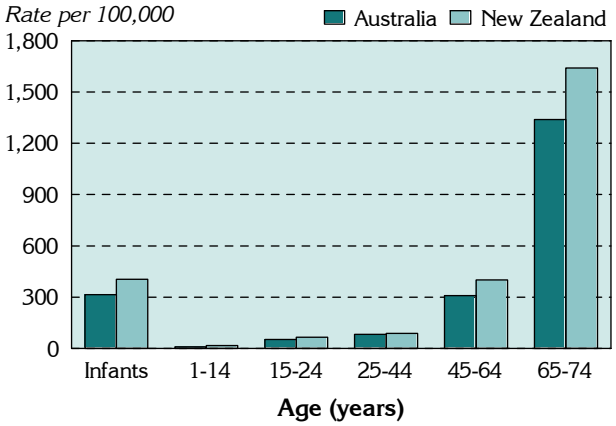
However, the greatest differential in the Australian and New Zealand rates was in the 1 to 14 year age group, where the Australian rate of 10.2 deaths per 100,000 population was 38% lower than the rate for New Zealand of 16.5 (a rate ratio of 0.62**).

Table 3.4: Avoidable mortality by age, Australia and New Zealand, 1997-2001

Age (years)	Number		Per cent of total		Rate per 100,000[1]		Rate ratio
	Aust	NZ	Aust	NZ	Aust	NZ	Aust: NZ
Infants (<1)	3,791	1,109	2.0	2.5	315.4	405.8	0.78**
1-14	1,878	644	1.0	1.5	10.2	16.5	0.62**
15-24	7,045	1,712	3.7	3.9	52.0	66.4	0.78**
25-44	24,356	4,900	12.8	11.1	83.1	88.4	0.94**
45-64	64,282	15,511	33.9	35.0	309.6	401.5	0.77**
65-74	88,493	20,396	46.6	46.1	1,338.8	1,640.4	0.82**
Total	**189,845**	**44,272**	**100.0**	**100.0**	**176.6**	**219.3**	**0.81****

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

Figure 3.3: Avoidable mortality by age, Australia and New Zealand, 1997-2001



By age and sex

In each age group in the analysis, death rates from avoidable causes for both males and females were higher for New Zealand than for Australia (Table 3.5, Figure 3.4). The rates for males were higher than for females in each age group in both countries. The highest rates for both sexes were in the 65 to 74 year and 45 to 64 year age groups, and in infants under one year of age.

In Australia, the highest death rates for both sexes were in the 65 to 74 year age group, with the male rate of 1,760.4 per 100,000 males compared to 917.3 for females. The next highest rate for Australian males was in the 45 to 64 year age group, with an rate of 395.4 deaths per 100,000 males, compared to 223.8 (the third highest rate) for females. Infants also had high rates, with 349.7 deaths per 100,000 infant males and 281.1 for infant females.

Lower rates for avoidable mortality in Australia were in the 25 to 44 year age group, with 116.4 deaths per 100,000 males and 49.7 for females. In the 15 to 24 year age group, the rate for Australian males was 77.2 deaths per 100,000 males compared to 26.8 for females. The lowest rates were in the 1 to 14 year age group, with males having a rate of 12.0 deaths per 100,000 males, and females 8.3.

In New Zealand, the pattern of rates for both males and females was similar to that for Australia, with the highest rates for both sexes in the oldest and youngest age groups, and lower rates in the 1 to 44 year age groups.

The highest rates in New Zealand were in the 65 to 74 year age group, with rates of 2,075.1 deaths per 100,000 males and 1,205.6 for females. The next highest rate for New Zealand males was in the 45 to 64 year age group, with a rate of 479.6 deaths per 100,000 males. For females in this age group, the rate was 323.5 deaths per 100,000 females. Infants had rates of 448.0 deaths per 100,000 males and 363.5 for females.

Lower rates for avoidable mortality in New Zealand were in the 25 to 44 year age group, with 119.5 deaths per 100,000 males and 57.4 for females. In the 15 to 24 year age group, the rates for New Zealand were 95.9 deaths per 100,000 males and 36.8 for females. The lowest rates in New Zealand were in the 1 to 14 year age group, with 18.4 deaths per 100,000 males and 14.5 for females.

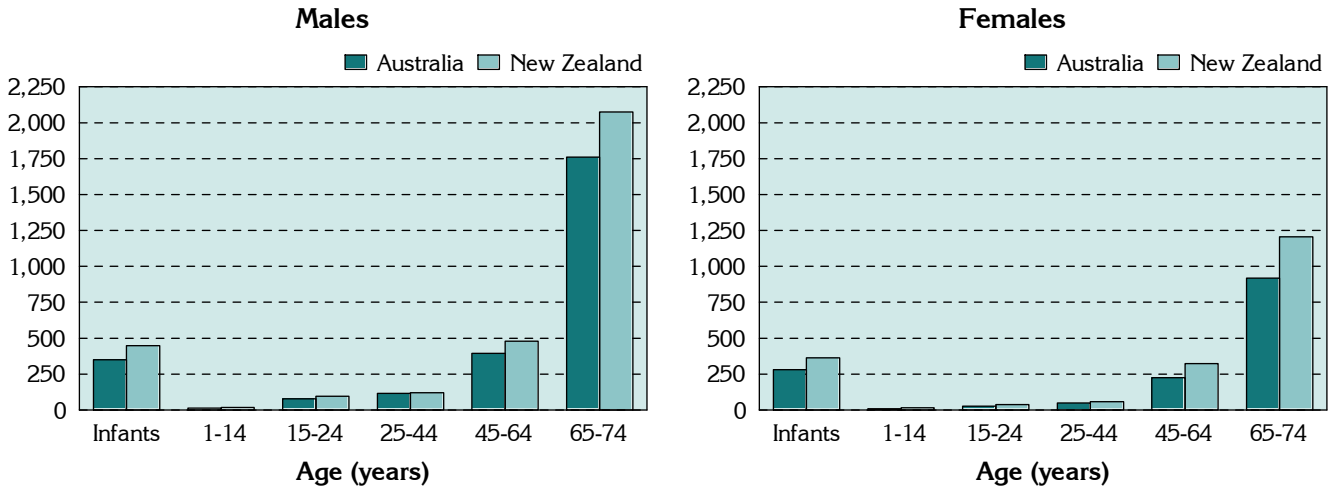
Table 3.5: Avoidable mortality by age and sex, Australia and New Zealand, 1997-2001

Age (years)	Number				Rate per 100,000 population[1]			
	Australia		New Zealand		Australia		New Zealand	
	Males	Females	Males	Females	Males	Females	Males	Females
<1	2,151	1,640	628	482	349.7	281.1	448.0	363.5
1-14	1,132	746	369	276	12.0	8.3	18.4	14.5
15-24	5,289	1,756	1,239	473	77.2	26.8	95.9	36.8
25-44	16,967	7,389	3,211	1,688	116.4	49.7	119.5	57.4
45-64	41,251	23,031	9,181	6,330	395.4	223.8	479.6	323.5
65-74	56,236	32,257	12,461	7,935	1,760.4	917.3	2,075.1	1,205.6
Total	**123,026**	**66,819**	**27,089**	**17,183**	**232.1**	**121.1**	**274.2**	**164.4**

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

Figure 3.4: Avoidable mortality by age and sex, Australia and New Zealand, 1997-2001

Rate per 100,000 population



3.3 Avoidable mortality by cause

The ten top causes of avoidable mortality over the period from 1997 to 2001 were similar in both countries. Ischaemic heart disease, which accounted for almost one quarter of deaths in Australia (23.0%) and New Zealand (24.9%) was the major cause of death from avoidable mortality (Table 3.6). However, the rate of deaths per 100,000 population from ischaemic heart disease was notably higher (52.1) in New Zealand than in Australia (38.4), with the difference in IHD rates accounting for almost one third (32.1%) of the overall difference in avoidable mortality rates between Australia and New Zealand (of 42.7 deaths per 100,000 population). Lung cancer was the next major cause, responsible for just over one tenth of deaths in both Australia (11.2%, a rate of 18.9 deaths per 100,000 population) and New Zealand (10.3%, 21.6).

The proportion of deaths from suicide and self inflicted injuries was slightly higher in Australia (6.5%, a rate of 13.0 deaths per 100,000 population) than in New Zealand (5.8%, 14.9), while for colorectal cancer the reverse was the case (6.9%, a rate of 11.7 and 7.2%, 15.2, respectively).

Cerebrovascular diseases were the fifth rated cause of avoidable mortality in both Australia and New Zealand, resulting in similar proportions of death: 6.6% (a rate of 10.8 deaths per 100,000 population) for Australia, and 6.9% (a rate of 14.3) for New Zealand.

The rate of deaths from road traffic injuries in Australia (9.0 deaths per 100,000 population, 4.3%) was two thirds that for New Zealand (12.9, 5.0%). Similarly, the rate of deaths from COPD for Australia (8.9, 5.5%) was just over two thirds the rate for New Zealand (12.4, 6.2%).

The proportion of deaths from breast cancer was similar for both countries (4.5% and 4.8%), however the rate of deaths in Australia was lower than the rate for New Zealand (7.9, compared to 10.4 deaths per 100,000 females). The ninth rated cause of avoidable deaths was diabetes, which resulted in 3.2% of deaths in Australia (a rate of 5.4) and 4.1% in New Zealand (8.7).

Deaths from alcohol related disease show a different pattern from the top nine rated causes, with Australia having a higher proportion (2.4%) and a higher rate (4.4 deaths per 100,000 population) of mortality compared to New Zealand (1.3% of deaths and a rate of 2.9).

The proportion of deaths from birth defects was similar in both countries (1.7% and 1.9%), with the Australian rate (4.2 deaths per 100,000 population) lower than that for New Zealand (5.2).

Table 3.6: Major causes of avoidable mortality (0 to 74 years), Australia and New Zealand, 1997-2001

Cause	Number		Per cent of total		ASR		Rank[1]	
	Aust	NZ	Aust	NZ	Aust	NZ	Aust	NZ
Ischaemic heart disease	43,712	11,030	23.0	24.9	38.4	52.1	1	1
Lung cancer	21,208	4,543	11.2	10.3	18.9	21.6	2	2
Suicide and self inflicted injuries	12,393	2,588	6.5	5.8	13.0	14.9	3	4
Colorectal cancer	13,008	3,193	6.9	7.2	11.7	15.2	4	3
Cerebrovascular diseases	12,558	3,073	6.6	6.9	10.8	14.3	5	5
Road traffic injuries	8,138	2,198	4.3	5.0	9.0	12.9	6	6
COPD (45-74 years)	10,395	2,734	5.5	6.2	8.9	12.4	7	7
Breast cancer	8,550	2,147	4.5	4.8	7.9	10.4	8	8
Diabetes	6,169	1,821	3.2	4.1	5.4	8.7	9	9
Alcohol related disease	4,621	579	2.4	1.3	4.4	2.9	10	15
Birth defects	3,278	843	1.7	1.9	4.2	5.2	11	10
All causes	**189,845**	**44,272**	**100.0**	**100.0**	**176.6**	**219.3**	**..**	**..**

[1] **Rank is the rank order of the ASRs for the top ten causes of death for each country**

By sex

The major causes of avoidable deaths (apart from breast cancer in women) were similar for males and females in both Australia and New Zealand (Table 3.7). Ischaemic heart disease was the leading cause of avoidable mortality for males (25.9% and 29.6% of total avoidable deaths) and females (17.7% and 17.6%) in both countries.

Death rates in New Zealand were higher than the rates in Australia (with the exception of lung cancer in males, for which there was little variation). The differentials between the Australian and New Zealand rates were higher for females, ranging from 0.60** for COPD to 0.82** for suicide and self inflicted injuries. Road traffic injuries ranked higher for males in New Zealand (fourth) compared to males in Australia (seventh).

Table 3.7: Major causes of avoidable mortality (0 to 74 years) by sex, Australia and New Zealand, 1997-2001

Cause and sex	Number		Per cent of total in sex group		ASR		Rank[1]	
	Aust	NZ	Aust	NZ	Aust	NZ	Aust	NZ
Males								
Ischaemic heart disease	31,881	8,006	25.9	29.6	57.2	77.5	1	1
Lung cancer	14,563	2,725	11.8	10.1	26.2	26.3	2	2
Suicide and self inflicted injuries	9,808	1,995	8.0	7.4	20.6	23.2	3	3
Colorectal cancer	7,823	1,821	6.4	6.7	14.2	17.7	4	5
Cerebrovascular diseases	7,213	1,633	5.9	6.0	12.8	15.6	5	6
COPD (45 to 74 years)	6,513	1,517	5.3	5.6	11.3	14.0	6	7
Road traffic injuries	5,893	1,522	4.8	5.6	13.1	18.0	7	4
Diabetes	3,752	1,083	3.0	4.0	6.8	10.6	8	8
Alcohol related disease	3,658	446	3.0	1.6	6.9	4.5	9	13
Accidental poisonings	2,433	71	2.0	0.3	5.2	0.8	10	33
Stomach cancer	2,232	568	1.8	2.1	4.0	5.5	11	9
Birth defects	1,803	446	1.5	1.6	4.6	5.5	19	10
Females								
Ischaemic heart disease	11,831	3,025	17.7	17.6	19.5	26.8	1	1
Breast cancer	8,550	2,147	12.8	12.5	15.7	20.8	2	2
Lung cancer	6,645	1,818	9.9	10.6	11.6	16.8	3	3
Cerebrovascular diseases	5,345	1,440	8.0	8.4	8.9	13.0	4	4
Colorectal cancer	5,185	1,372	7.8	8.0	9.1	12.7	5	5
COPD (45 to 74 years)	3,882	1,217	5.8	7.1	6.4	10.7	6	6
Suicide and self inflicted injuries	2,585	593	3.9	3.5	5.4	6.6	7	9
Diabetes	2,417	738	3.6	4.3	4.1	6.8	8	8
Road traffic injuries	2,245	676	3.4	3.9	5.0	7.7	9	7
Birth defects	1,475	397	2.2	2.3	3.9	4.9	10	10

[1] **Rank is the rank order of ASRs for the top ten causes of death for each country within the relevant sex group**

By age

Table 3.8 shows the variation in avoidable mortality by the top three causes in selected age groups.

The top three causes of death for infants under one year of age were the same for both countries, although the top two rankings differed.

Birth defects were the top ranked cause of infant death in Australia, responsible for 52.6% of avoidable deaths (a rate of 166.2 deaths per 100,000 population) and the second highest in New Zealand (35.5% of deaths, a rate of 144.2). Complications of the perinatal period were the highest cause of infant mortality in New Zealand, resulting in more than half (54.3%) of infant deaths (a rate of 220.5), and more than one third (39.5%) of deaths (second to birth defects) in Australia, (a rate of 124.3).

In the 1 to 14 year age group, deaths from road traffic injuries were the major cause of mortality in both countries, resulting in 29.4% of deaths in Australia (a rate of 3.0), with a similar proportion in New Zealand (29.0%, a rate of 4.7). The proportion of deaths from drownings was higher in Australia for this age group (15.5%) compared to New Zealand (10.9%), but the death rates were similar (1.6 and 1.8, respectively).

Birth defects were a principal cause of mortality for children (as with infants), resulting in 14.9% of deaths in Australia (a rate of 1.5), and 16.3% in New Zealand (a rate of 2.7).

Deaths from road traffic injuries resulted in more than one third of deaths of young people in the 15 to 24 year age group in both Australia (35.0%, a rate of 18.3 deaths per 100,000 population) and New Zealand (37.6%, a rate of 24.9). The proportion and rate of deaths from suicide and self inflicted injuries were lower in Australia (29.5%, a rate of 15.2) compared to New Zealand (36.9%, 24.5). Accidental poisonings were responsible for a notably higher proportion of deaths in Australia (8.5%, a rate of 4.4) than New Zealand (1.4%, 0.9).

Suicide and self inflicted injuries, and road traffic injuries, were again the top causes of avoidable mortality in the 25 to 44 year age group in both countries. One quarter of deaths in Australia (25.6%) and New Zealand (25.1%) resulted from suicide and self inflicted injuries, with similar death rates (21.6 and 23.1, respectively). The proportion and rate of deaths from road traffic injuries was higher in New Zealand (16.1%, a rate of 14.9) than in Australia (11.8%, 10.0). Deaths from accidental poisonings were again much more prevalent in Australia (8.6%, a rate of 7.3) than New Zealand (0.9%, 0.8).

In the 45 to 64 year age group, the top three ranked causes of avoidable mortality – ischaemic heart disease, lung cancer and colorectal cancer – were the same for both countries. Ischaemic heart disease resulted in a slightly higher proportion of deaths in New Zealand (26.6%) than Australia (23.5%), but the rate was substantially higher in New Zealand (107.1 deaths per 100,000 population) compared to Australia (72.9). Deaths from lung cancer contributed similar proportions for both countries (13.2% and 12.0%, respectively), but the rate was notably higher in New Zealand (48.4) than Australia (41.1). The proportion of deaths resulting from colorectal cancer in this age group was similar for both Australia (8.8%, a rate of 27.4) and New Zealand (8.6%, 34.7).

Ischaemic heart disease and lung cancer were again the top two causes of death in the 65 to 74 year age group in both Australia and New Zealand. Ischaemic heart disease resulted in just under one third of deaths in each country (30.1% and 31.3%, respectively), but the rate was notably higher in New Zealand (515.4, compared to 402.1 in Australia).

Lung cancer was responsible for 13.8% of deaths (a rate of 187.8) in Australia, and 12.5% (a rate of 206.7) in New Zealand in this age group. Both cerebrovascular diseases and COPD accounted for around one tenth of deaths in both countries (9.3% and 8.9%, respectively, in Australia, and 9.1% and 10.0% in New Zealand).

Table 3.8: Major causes of avoidable mortality by age, Australia and New Zealand, 1997-2001

Cause and age	Number		Per cent of total in age group		Rate[1]		Rank[2]	
	Aust	NZ	Aust	NZ	Aust	NZ	Aust	NZ
Infants (<1 year)								
Birth defects	1,995	394	52.6	35.5	166.2	144.2	1	2
Complications of perinatal period	1,497	602	39.5	54.3	124.3	220.5	2	1
Selected invasive bacterial and protozoal infections	131	58	3.5	5.2	10.9	20.9	3	3
1-14 years								
Road traffic injuries	552	187	29.4	29.0	3.0	4.7	1	1
Drownings	292	70	15.5	10.9	1.6	1.8	2	3
Birth defects	280	105	14.9	16.3	1.5	2.7	3	2
15-24 years								
Road traffic injuries	2,468	643	35.0	37.6	18.3	24.9	1	1
Suicide and self inflicted injuries	2,075	631	29.5	36.9	15.2	24.5	2	2
Accidental poisonings	600	24	8.5	1.4	4.4	0.9	3	10
Birth defects	164	57	2.3	3.3	1.2	2.2	6	3
25-44 years								
Suicide and self inflicted injuries	6,245	1,229	25.6	25.1	21.6	23.1	1	1
Road traffic injuries	2,863	788	11.8	16.1	10.0	14.9	2	2
Accidental poisonings	2,095	43	8.6	0.9	7.3	0.8	3	22
Ischaemic heart disease	1,960	523	8.0	10.7	6.4	9.0	4	3
45-64 years								
Ischaemic heart disease	15,118	4,120	23.5	26.6	72.9	107.1	1	1
Lung cancer	8,468	1,865	13.2	12.0	41.1	48.4	2	2
Colorectal cancer	5,658	1,337	8.8	8.6	27.4	34.7	3	3
65-74 years								
Ischaemic heart disease	26,594	6,382	30.1	31.3	402.1	515.4	1	1
Lung cancer	12,235	2,548	13.8	12.5	187.8	206.7	2	2
Cerebrovascular diseases	8,207	1,859	9.3	9.1	121.7	147.4	3	4
COPD	7,864	2,033	8.9	10.0	118.4	161.5	4	3

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

[2] **Rank is the rank order of ASRs for the top three causes of death for each country within the relevant age group: more than three causes are listed where the rank order differs between countries**

3.4 Avoidable mortality by geographic area

An overview of the rates of avoidable mortality in Australia, by Statistical Subdivision, and in New Zealand, by District Health Board, are shown in Map 3.1.

In Australia, ASRs of avoidable mortality were substantially highest in the Northern Territory (a rate of 361.3 deaths per 100,000 population), with the remaining state/ territory rates ranging from 150.2 in the Australia Capital Territory to 192.0 in Tasmania (see Table 4.8, *Section 4.4*).

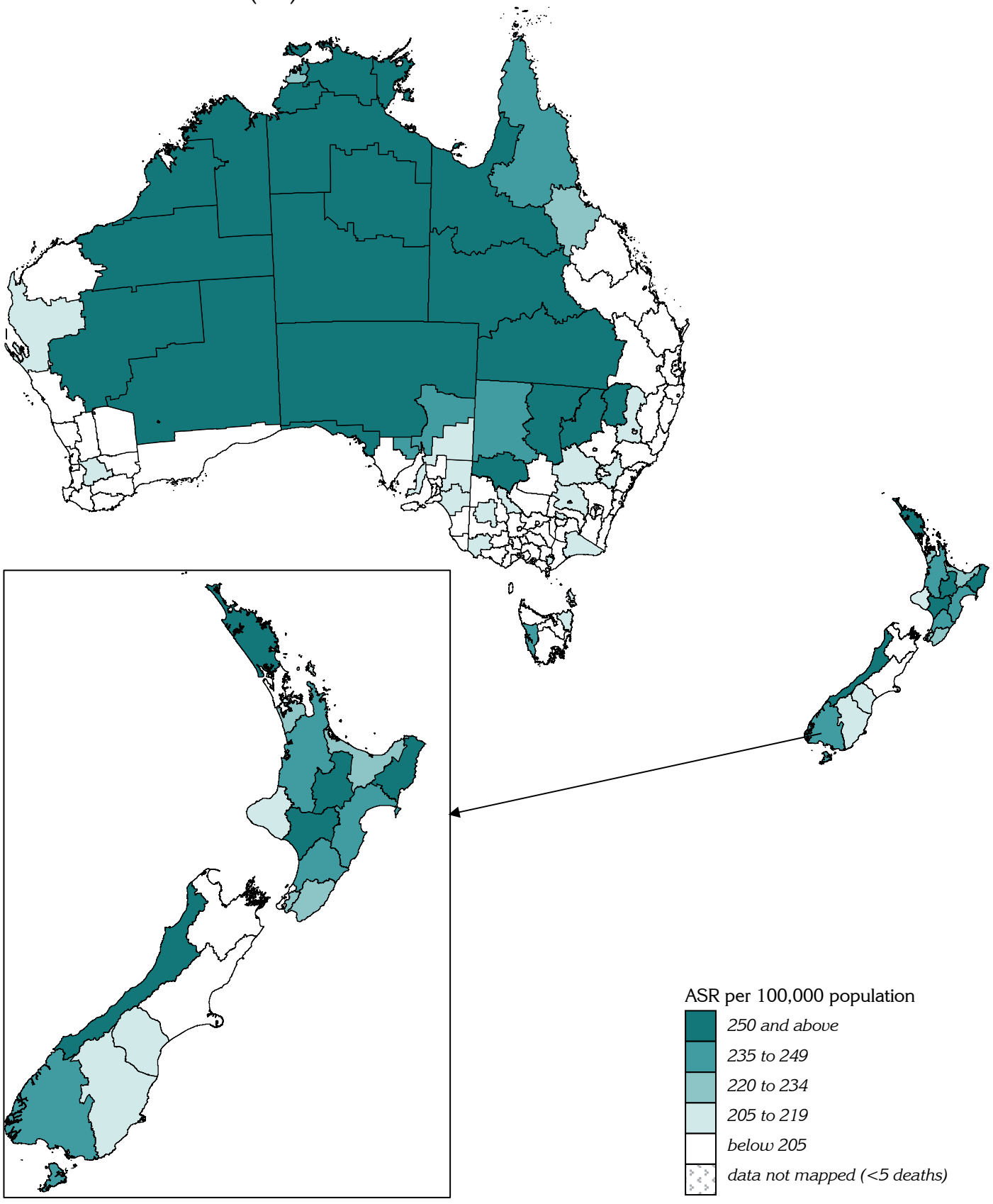
The differential in rates between the rest of the state/ territory areas and the capital cities and other major urban centres was also largest in the Northern Territory, with the rest of territory areas being more than twice the rate in Darwin (a rate ratio of 1.99**). Tasmania was the only area with fewer avoidable deaths in the rest of the state than in Hobart (7.0% fewer, a rate ratio of 0.93*).

In New Zealand the highest rates of death from avoidable causes were in the North Island, with the Tairawhiti District Health Board having the highest rate (319.1 deaths per 100,000 population), and the remaining District Health Board rates varying from 177.4 deaths per 100,000 population in Waitemata to 283.5 in Lakes (see Table 5.8, *Section 5.4*.

Map 3.1 is included as a summary map only – detailed maps of avoidable mortality and descriptions are provided in *Sections 4.4* (Australia) and *5.4* (New Zealand). Maps of amenable mortality are included in *Sections 6.3* (Australia) and *7.3* (New Zealand).

Map 3.1
All causes: avoidable mortality (0 to 74 years), Australia and New Zealand, 1997-2001

age standardised deaths per 100,000 population by Statistical Subdivision (Aust); District Health Board (NZ)



Details of map boundaries are in Appendix 1.4

3.5 Avoidable mortality by socioeconomic status/ deprivation

This section examines avoidable mortality by socioeconomic disadvantage for Australia (measured using the IRSD) and deprivation for New Zealand (measured using the NZDep96 index). The calculation of age-standardised death rates by quintile and the relevant indexes are described in Chapter 2, *Methods*.

By sex

There is a clear socioeconomic gradient in the rates of avoidable mortality for the total populations in Australia and New Zealand and for both males and females in each country (Table 3.9, Figure 3.5). The highest ASR for the Australian population was 213.9 deaths per 100,000 population in Quintile 5 and the lowest was 131.8 in Quintile 1, a differential in rates of 1.62** between the most disadvantaged areas and the least disadvantaged areas. For New Zealand, the differential in ASRs between quintiles was 2.30**, varying from 325.4 deaths per 100,000 population in the most deprived areas (Quintile 5) to 141.5 in the least deprived areas (Quintile 1).

For Australian males, the highest ASR was 281.2 deaths per 100,000 males in Quintile 5, and the lowest was 168.2 in Quintile 1, a differential of 1.67**. The range in ASRs for females was from 146.6 deaths per 100,000 females in the most disadvantaged areas to 95.4 in the least disadvantaged areas, a differential of 1.54**.

The ASRs for males in New Zealand varied from 405.6 deaths per 100,000 males in Quintile 5 to 175.4 in Quintile 1, a differential of 2.31**. The differential of 2.28** for ASRs for females in New Zealand was similar to that for males, with rates varying from 245.2 deaths per 100,000 females in the most deprived areas to 107.6 in the least deprived areas.

In both countries there were marked increases in the number of excess deaths[3] by disadvantage/ deprivation, for the total population as well as for males and females.

For the Australian population, if mortality in all socioeconomic groups equalled that of the least disadvantaged group (those in Quintile 1), there would have been 46,958 fewer avoidable deaths over the five year observation period (accounting for 24.7% of total avoidable mortality). Under this measure, there would have been 14,015 fewer avoidable deaths (31.7% of total avoidable mortality) in New Zealand.

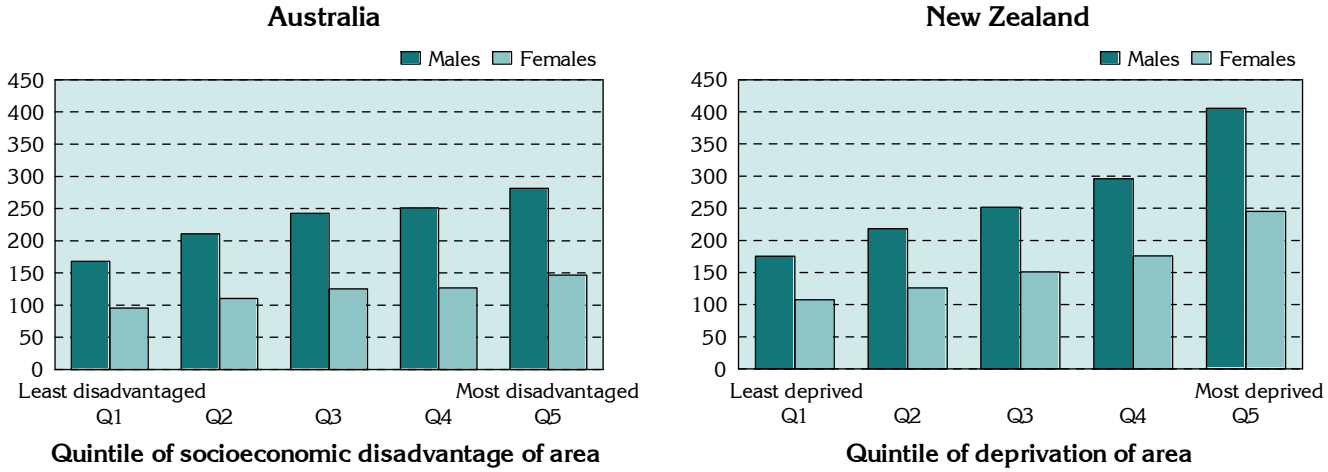
[3] See Chapter 2, *Methods*

Table 3.9: Avoidable mortality (0 to 74 years) by socioeconomic status/ deprivation and sex, Australia and New Zealand, 1997-2001

Quintile and sex	Number		ASR per 100,000		Excess deaths	
	Aust	NZ	Aust	NZ	Aust	NZ
Males						
1: Least disadvantaged/ deprived	17,381	3,132	168.2	175.4	(0)	(0)
2	21,546	4,116	210.6	218.1	4,309	794
3	25,903	4,921	242.8	251.7	7,861	1,461
4	27,567	6,275	251.0	296.0	8,894	2,473
5: Most disadvantaged/ deprived	30,203	7,176	281.2	405.6	11,949	4,002
Total	**123,026**	**27,089**	**232.1**	**274.2**	**33,013**	**8,730**
Rate ratio–Quintile 5:Quintile 1	..	..	**1.67****	**2.31****	..	..
Females						
1: Least disadvantaged/ deprived	10,606	2,001	95.4	107.6	(0)	(0)
2	11,783	2,510	110.5	126.3	1,630	360
3	13,668	3,142	125.1	150.8	3,193	881
4	14,467	4,033	126.9	175.8	3,543	1,503
5: Most disadvantaged/ deprived	16,202	4,610	146.6	245.2	5,579	2,541
Total	**66,819**	**17,183**	**121.1**	**164.4**	**13,945**	**5,285**
Rate ratio–Quintile 5:Quintile 1	..	..	**1.54****	**2.28****	..	..
Total persons						
1: Least disadvantaged/ deprived	27,987	5,133	131.8	141.5	(0)	(0)
2	33,329	6,626	160.5	172.2	5,939	1,154
3	39,571	8,064	184.0	201.2	11,054	2,342
4	42,034	10,309	188.9	325.9	12,437	3,976
5: Most disadvantaged/ deprived	46,405	11,785	213.9	325.4	17,528	6,543
Total	**189,845**	**44,272**	**176.6**	**219.3**	**46,958**	**14,015**
Rate ratio–Quintile 5:Quintile 1	..	..	**1.62****	**2.30****	..	..

Figure 3.5: Avoidable mortality (0 to 74 years) by socioeconomic status/ deprivation and sex, Australia and New Zealand, 1997-2001

ASR per 100,000 population



3.6 Avoidable mortality by Indigenous status and ethnicity

Indigenous people comprise 2.4% of the Australian population (ABS 2002), and 14.7% of the New Zealand population. Results are also included for the Pacific population, who are an important ethnic minority group, comprising a further 6.5% of the New Zealand population (Statistics New Zealand 2002).

In Australia, the ASR for deaths from avoidable causes for the Indigenous population (616.7 deaths per 100,000 population) is more than triple that for the non-Indigenous population (171.9), a rate ratio of 3.59** (Figure 3.6, Table 3.10). Both the Indigenous rate and the differential with the non-Indigenous population are above those for the comparable groups in New Zealand.

The differential in rates of avoidable deaths in New Zealand for Māori compared to European/ others is 2.88** (533.3 deaths per 100,000 population compared to 184.9). For Pacific peoples the rate is 2.15** times the rate for European/ others (398.1 deaths per 100,000 population compared to 184.9).

In both Australia and New Zealand, years of life lost (YLL) from avoidable mortality accounted for over seventy per cent of total YLL at ages 0 to 74. In Australia, the per cent of YLL from avoidable mortality was higher for the Indigenous population (75.5%) than the non-Indigenous (72.1%). In New Zealand, the proportion of YLL from avoidable mortality was highest for Māori (76.5%), followed by Pacific peoples (75.2%) and European/ others (73.7%).

Figure 3.6: Avoidable mortality (0 to 74 years) by Indigenous status/ ethnicity, Australia and New Zealand, 1997-2001

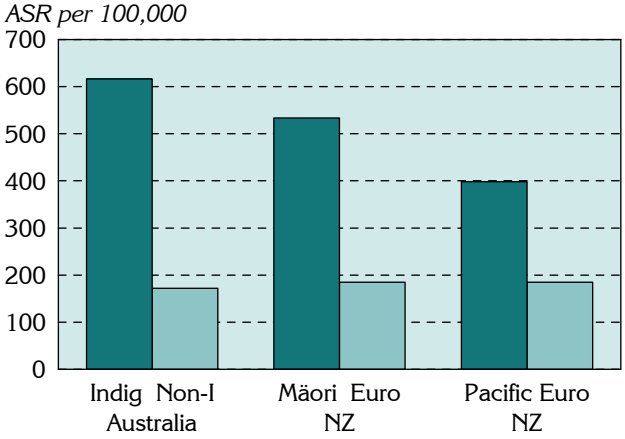


Table 3.10: Avoidable mortality (0 to 74 years) by Indigenous status/ ethnicity, Australia (Qld, SA, WA, NT)[1] and New Zealand, 1997-2001

Country and Indigenous status/ ethnicity	Number	Per cent of total deaths[2]	ASR	YLL ('000)	Per cent of total YLL[3]
Australia					
Indigenous	4,838	76.2	616.7	104.6	75.5
Non-Indigenous	65,793	71.9	171.9	1,152.5	72.1
Rate ratio–Indigenous:Non-Indigenous	..	..	**3.59****	..	..
New Zealand					
Māori	8,449	77.4	533.3	163.2	76.5
Pacific peoples	2,332	76.1	398.1	44.8	75.2
European/ others	33,491	73.5	184.9	548.8	73.7
Rate ratio–Māori:European/ others	..	..	**2.88****	..	..
Rate ratio–Pacific:European/ others	..	..	**2.15****	..	..

[1] **This analysis has been limited to data from the jurisdictions considered by the ABS to have the most complete coverage of Indigenous deaths (refer to *Section 4.6*)**
[2] **Avoidable mortality as a percentage of total deaths at ages 0 to 74 for the relevant ethnic group**
[3] **YLL from avoidable mortality as a per cent of total YLL at ages 0 to 74 for the relevant ethnic group**

By sex

Indigenous males in Australia had a markedly higher ASR for deaths from avoidable causes than both Indigenous females and non-Indigenous males (Table 3.11, Figure 3.7). However, because of the relatively high rate of deaths of Indigenous females, the ratio of male to female rates was lower for the Indigenous than for the non-Indigenous population.

The ASR for Indigenous males in Australia (754.7 deaths per 100,000 males) was more than three times (3.31**) that for non-Indigenous Australian males (227.8 deaths per 100,000 males). For Indigenous females, the ASR (478.8 deaths per 100,000 females) was more than four times (4.13**) that for non-Indigenous Australian females (115.9 deaths per 100,000 females).

Māori males had an ASR of 625.8 deaths per 100,000 population (17.8% of avoidable male deaths) compared to 440.8 for Māori females (a rate ratio of 1.42**), and 234.4 for European/ other New Zealand males (a rate ratio of 2.67**). The ASR for Māori females (440.8 deaths per 100,000 population) was more than three times (3.26**) the rate for European/ other females of 135.4.

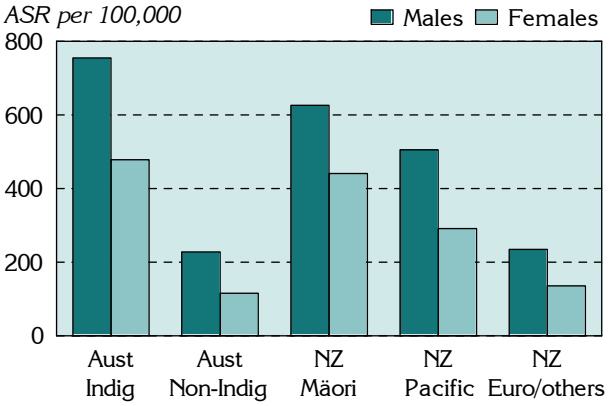
The male Pacific peoples ASR of 505.1 deaths per 100,000 males was notably higher than those for female Pacific peoples (291.0 deaths per 100,000 females, a rate ratio of 1.74**) and European/ other males (234.4, a rate ratio of 2.15**).

Table 3.11: Avoidable mortality (0 to 74 years) by Indigenous status/ ethnicity and sex, Australia (Qld, WA, SA, NT)[1] and New Zealand, 1997-2001

Country and Indigenous status/ ethnicity	Number		ASR		Rate ratio
	Males	Females	Males	Females	M:F
Australia					
Indigenous	2,888	1,950	754.7	478.8	**1.58****
Non-Indigenous	43,282	22,511	227.8	115.9	**1.97****
Rate ratio–Indigenous:Non-Indigenous	**..**	**..**	**3.31****	**4.13****	**..**
New Zealand					
Māori	4,870	3,579	625.8	440.8	**1.42****
Pacific peoples	1,412	919	505.1	291.0	**1.74****
European/ others	20,806	12,685	234.4	135.4	**1.73****
Rate ratio–Māori:European/ others	..	..	**2.67****	**3.26****	**..**
Rate ratio–Pacific:European/ others	..	..	**2.15****	**2.15****	**..**

[1] **This analysis has been limited to data from the jurisdictions considered by the ABS to have the most complete coverage of Indigenous deaths (refer to *Section 4.6*)**

Figure 3.7: Avoidable mortality (0 to 74 years) by Indigenous status/ ethnicity and sex, Australia and New Zealand, 1997-2001



3.7 Amenable mortality

By sex

ASRs for amenable mortality were higher for males than for females in both Australia and New Zealand (Table 3.12, Figure 3.8).

The ASR for Australian males was 79.4 deaths per 100,000 males, 30.0% higher than the rate for females of 61.4 deaths per 100,000 females (a rate ratio of 1.29**).

In New Zealand, the differential in rates between the sexes was smaller (1.21**), with 103.1 deaths per 100,000 males and 85.4 for females. The Australian rates were around 25% lower than in New Zealand for both males (0.77**) and females (0.72**).

Over half (55.8%) of male deaths in Australia were from amenable causes, compared to 44.2% for females.

In New Zealand, the gap was slightly smaller, with amenable mortality accounting for 53.8% of male deaths and 46.2% of female deaths.

Figure 3.8: Amenable mortality (0 to 74 years) by sex, Australia and New Zealand, 1997-2001

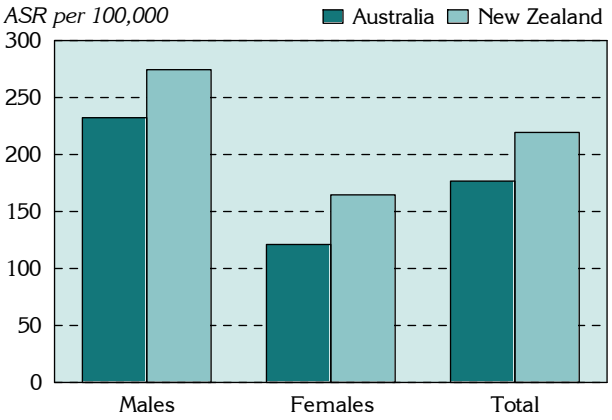


Table 3.12: Amenable mortality (0 to 74 years) by sex, Australia and New Zealand, 1997-2001

Sex	Number		Per cent of total		ASR		Rate ratio
	Aust	NZ	Aust	NZ	Aust	NZ	Aust:NZ
Males	45,568	10,300	55.8	53.8	79.4	103.1	0.77**
Females	33,682	8,830	44.2	46.2	61.4	85.4	0.72**
Total	**76,249**	**19,130**	**100.0**	**100.0**	**70.4**	**94.2**	**0.75****
Rate ratio–M:F	**..**	**..**	**..**	**..**	**1.29****	**1.21****	**..**

By age

In Australia and New Zealand, almost half of amenable deaths at ages 0 to 74 years occurred in the 65 to 74 year age group (49.5% and 46.1%, respectively) (Table 3.13, Figure 3.9). The 45 to 64 year age group accounted for just over one third of amenable mortality in both countries (36.0% and 38.0%, respectively), and the 25 to 44 year age group contributed one in twelve amenable deaths (7.8% and 8.1%, respectively). The age groups below 25 years comprised 6.7% of amenable mortality in Australia and 7.8% in New Zealand.

Death rates from amenable mortality in New Zealand were higher than the rates for Australia in each age group in the analysis. The highest rates for both Australia and New Zealand were in the 65 to 74 age group, where the Australian rate of 567.6 deaths per 100,000 population was 20.0% lower than the New Zealand rate of 707.7 (a rate ratio of 0.80**).

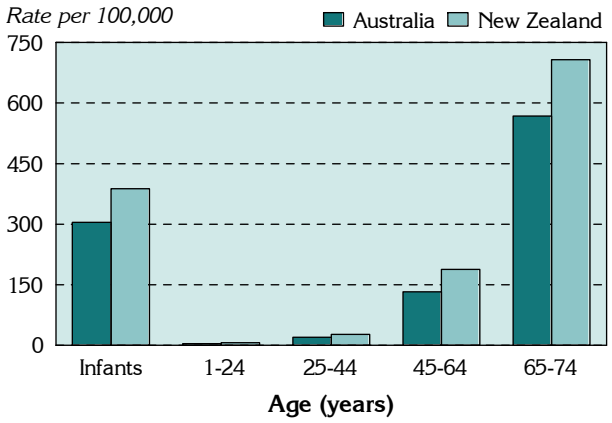
The largest differential in the Australian and New Zealand rates was in the one to 24 year age group, where the Australian rate of 4.4 deaths per 100,000 population was 34.3% lower than the rate for New Zealand of 6.7 (a rate ratio of 0.66**).

Table 3.13: Amenable mortality by age, Australia and New Zealand, 1997-2001

Age (years)	Number		Per cent of total		Rate per 100,000[1]		Rate ratio
	Aust	NZ	Aust	NZ	Aust	NZ	Aust:NZ
Infants (<1)	3,661	1,060	4.8	5.5	304.5	387.9	0.78**
1-24	1,422	433	1.9	2.3	4.4	6.7	0.66**
25-44	2,946	1,557	7.8	8.1	19.8	26.9	0.74**
45-64	27,464	7,261	36.0	38.0	132.6	187.7	0.71**
65-74	37,756	8,819	49.5	46.1	567.6	707.7	0.80**
Total	**76,249**	**19,130**	**100.0**	**100.0**	**70.4**	**94.2**	**0.75****

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

Figure 3.9: Amenable mortality by age, Australia and New Zealand, 1997-2001



By age and sex

In each age group in the analysis, rates of death for both males and females for amenable mortality were higher for New Zealand than for Australia (Table 3.14, Figure 3.10). With the exception of the 25 to 44 year age group (where rates for females were marginally higher), the rates for males were higher than for females in each age group in both countries. The highest rates for both sexes were at the oldest and youngest ages.

In Australia, the highest death rates for males and females from amenable mortality were in the 65 to 74 year age group. The rate for males in this age group was 684.8 deaths per 100,000 males, compared to a rate of 450.4 for females. The next highest rates were for infants, with rates of 338.7 deaths per 100,000 infant males and 270.4 for infant females. Males in the 45 to 64 year age group had rates of 143.4 deaths per 100,000 males, compared to 121.7 for females.

There were notably lower rates in Australia for amenable mortality in the 24 to 44 year age group, with 20.8 deaths per 100,000 females and 18.8 for males. The lowest rates were in the 1 to 24 year age group, with males having a rate of 5.1 deaths per 100,000 males, and females a rate of 3.8.

In New Zealand, the pattern of rates for amenable mortality for males and females was similar to that for Australia, with the highest rates in the two oldest age groups, and for infants.

The highest rates for both males and females in New Zealand were in the 65 to 74 year age group, with a rate for males of 838.5 deaths per 100,000 males and for females of 576.9. The next highest rates were for infants, with rates of 423.1 deaths per 100,000 infant males and 352.8 for infant females in this age group. In the 45 to 64 year age group, the rate for males was 194.0 deaths per 100,000 males, compared to 181.4 for females.

There were much lower rates for amenable mortality in the 25 to 44 year age group, with 27.9 deaths per 100,000 females and 25.9 for males. The lowest rates in New Zealand were in the 1 to 24 year age group, with males having a rate of 7.2 deaths per 100,000 males, and females a rate of 6.2.

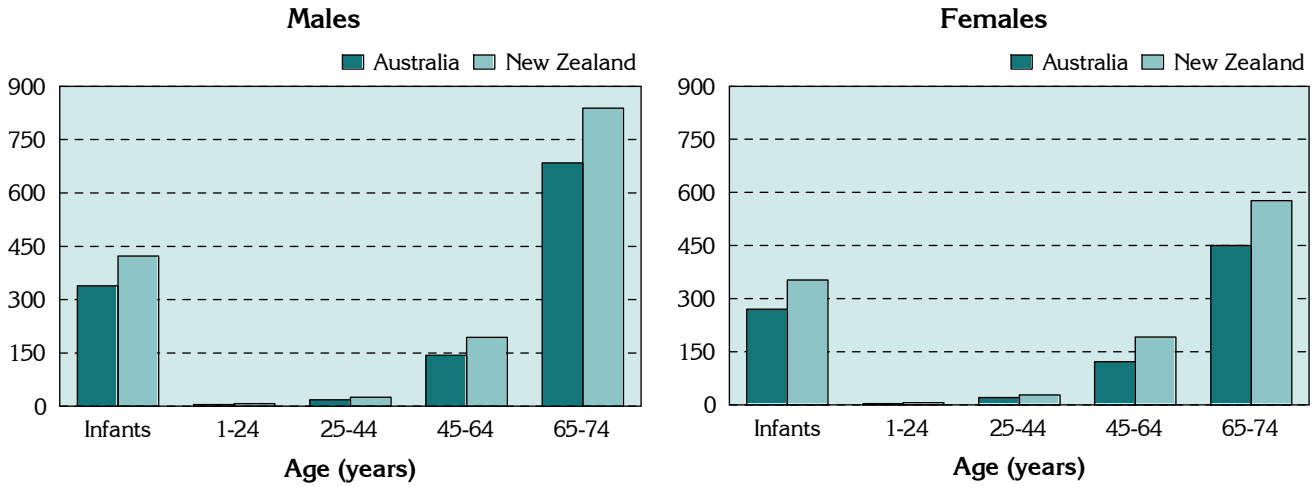
Table 3.14: Amenable mortality by age and sex, Australia and New Zealand, 1997-2001

Age (years)	Number				Rate per 100,000 population[1]			
	Australia		New Zealand		Australia		New Zealand	
	Males	Females	Males	Females	Males	Females	Males	Females
<1	2,083	1,577	593	467	338.7	270.4	423.1	352.8
1-24	827	596	235	198	5.1	3.8	7.2	6.2
25-44	2,804	3,142	724	833	18.8	20.8	25.9	27.9
45-64	14,934	12,531	3,712	3,549	143.4	121.7	194.0	181.4
65-74	21,920	15,837	5,036	3,783	684.8	450.4	838.5	576.9
Total	**42,568**	**33,683**	**10,300**	**8,830**	**79.4**	**61.4**	103.1	**85.4**

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

Figure 3.10: Amenable mortality by age and sex, Australia and New Zealand, 1997-2001

Rate per 100,000 population



4 Avoidable mortality: Australia, 1997-2001

4.1 Total avoidable and unavoidable mortality

Almost three quarters (71.5%) of all deaths at ages 0 to 74 years over the period 1997 to 2001 are considered to be avoidable. Of these avoidable deaths, 40.2% (or 28.7% of total deaths at these ages) are considered to be amenable to health care (Table 4.1).

The age-standardised death rate (ASR) for avoidable mortality over the period was176.6 deaths per 100,000 population. Within this overall rate, 70.4 deaths per 100,000 population were estimated to be amenable to health care. This sub-set is shown in brackets in Table 4.1.

The death rate from the remaining, or 'unavoidable' deaths, was 70.2 per 100,000 population, and the rate for all deaths at these ages was 246.8 deaths per 100,000 population.

A higher proportion of male deaths (73.0%) were from conditions considered to be avoidable, compared to female deaths (68.9%): the 123,026 male deaths accounted for almost two thirds (64.8%) of avoidable mortality.

The years of life lost (YLL)[1] from avoidable mortality over the observation period were 3.3 million, and were higher for males (2.2 million years) than for females (1.2 million years).

[1] See Chapter 2, *Methods*

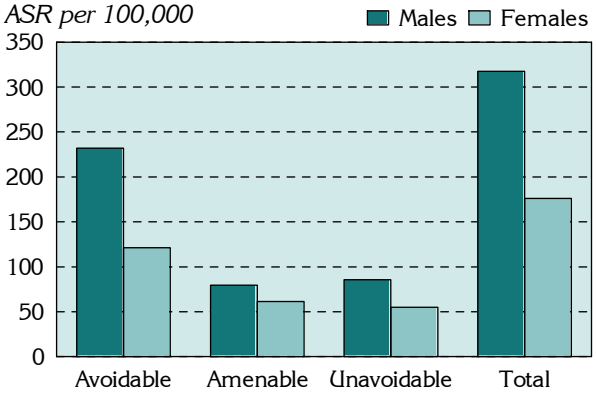
Table 4.1: Avoidable mortality (0 to 74 years) by sex, Australia, 1997-2001

Mortality category	Number			Per cent	ASR per 100,000			Rate ratio
	Males	Females	Total	of total	Males	Females	Total	M:F
Avoidable mortality	123,026	66,819	189,845	71.5	232.1	121.1	176.6	1.92**
(Amenable mortality)	(42,568)	(33,682)	(76,249)	(28.7)	(79.4)	(61.4)	(70.4)	(1.29**)
Unavoidable mortality	45,463	30,119	75,582	28.5	85.5	55.0	70.2	1.55**
Total mortality	**168,489**	**96,938**	**265,427**	**100.0**	**317.6**	**176.1**	**246.8**	**1.80***
Avoidable mortality								
- as % of Total	**73.0**	**68.9**	**71.5**	**..**	**..**	**..**	**..**	**..**
- YLL ('000)	**2,174.4**	**1,153.0**	**3,327.4**	**..**	**..**	**..**	**..**	**..**

Death rates in all categories of mortality were higher for males than for females (Table 4.1, Figure 4.1). For avoidable mortality, the rate for males was 232.1 deaths per 100,000 males, and the rate for females was 121.1, with the male rate 92% higher than the female rate (a rate ratio of 1.92**).

For amenable mortality, the male rate was 79.4 deaths per 100,000 males, 29% higher than the female rate of 61.4 (a rate ratio of 1.29**). The death rate for unavoidable mortality for males (85.5 deaths per 100,000 males) was over half as high again as the rate for females (55.0: a rate ratio of 1.55**).

Figure 4.1: Avoidable mortality (0 to 74 years) by sex, Australia, 1997-2001



4.2 Avoidable mortality by age and sex

Almost half (46.6%) of avoidable mortality at ages 0 to 74 years occurred in the 65 to 74 year age group (Table 4.2). The 45 to 64 and 25 to 44 year age groups accounted for 33.9% and 12.8% of avoidable mortality, respectively, with the age groups below 25 years contributing 6.7%.

Age-standardised death rates varied from 1,338.8 deaths per 100,000 population in the 65 to 74 year age group to 10.2 at ages 1 to 14 years. Other highest rates were for infants under one year of age (315.4) and in the 45 to 64 year age group (309.6).

Table 4.2: Avoidable mortality by age and sex, Australia, 1997-2001

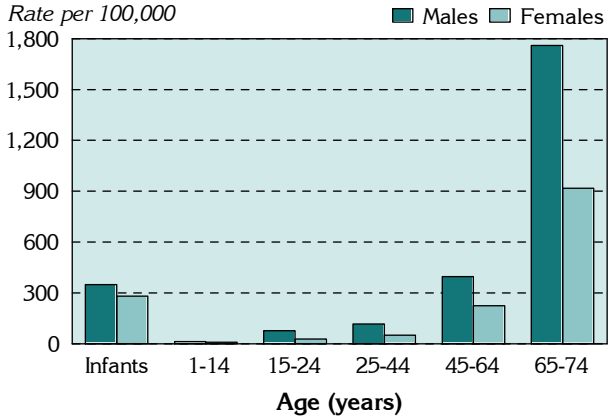
Age (years)	Number			Per cent	Rate per 100,000 population[1]			Rate ratio
	Males	Females	Total	of total	Males	Females	Total	M:F
Infants (<1)	2,151	1,640	3,791	2.0	349.7	281.1	315.4	1.24**
1-14	1,132	746	1,878	1.0	12.0	8.3	10.2	1.45**
15-24	5,289	1,756	7,045	3.7	77.2	26.8	52.0	2.88**
25-44	16,967	7,389	24,356	12.8	116.4	49.7	83.1	2.34**
45-64	41,251	23,031	64,282	33.9	395.4	223.8	309.6	1.77**
65-74	56,236	32,257	88,493	46.6	1,760.4	917.3	1,338.8	1.92**
Total	**123,026**	**66,819**	**189,845**	**100.0**	**232.1**	**121.1**	**176.6**	**1.92****

[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 4.2, Figure 4.2). Whilst the highest rates for both males and females were in the 65 to 74 year age group, the largest differentials between the male and female rates were in the 15 to 24 and 25 to 44 year age groups.

For the 15 to 24 year age group, the male rate (77.2 deaths per 100,000 population) was 2.88** times the female rate (26.8); and for the 25 to 44 year age group, the male rate (116.4) was 2.34** times the female rate (49.7). For the 65 to 74 year age group, the male rate (1,760.4) was almost twice (1.92**) the female rate (917.3).

Figure 4.2: Avoidable mortality by age and sex, Australia, 1997-2001



From 1997 to 2001, avoidable mortality for the population aged 0 to 74 years accounted for a total of 3.3 million years of life lost (YLL) (Table 4.3). YLL from avoidable mortality were highest in the 45 to 64 year age group (1.2 million), followed by the 65 to 74 year age group (1.1 million). Together, these two age groups accounted for 70% of total YLL from avoidable mortality.

Table 4.3: YLL from avoidable mortality by age and sex, Australia, 1997-2001

Age (years)	Number ('000)		
	Males	Females	Total
Infants (<1)	65.7	50.1	115.7
1-14	33.9	22.4	56.2
15-24	149.4	49.7	199.1
25-44	430.8	185.3	616.0
45-64	776.4	436.8	1,213.1
65-74	718.2	408.9	1,127.1
Total	**2,174.4**	**1,153.0**	**3,327.4**

YLL were higher for males than females in all age groups. The largest differentials in the number of YLL between males and females were in the 15 to 24 (YLL for males was 3.0 times females) and the 25 to 44 year (males 2.3 times females) age group; the smallest (males 1.3 times females) was recorded for infants.

4.3 Avoidable mortality by cause

Table 4.4 shows the number, age-standardised death rate (ASR), 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 for the major condition groups were for cancers, with a rate of 56.2 deaths per 100,000 population (32.8% of avoidable mortality), and cardiovascular diseases (52.4, 31.6% of avoidable mortality).

Together, these two major condition groups were responsible for over 60% of avoidable mortality at ages 0 to 74 years.

Similarly, the numbers of YLL from avoidable mortality were highest for these two major condition groups – cancers and cardiovascular diseases – accounting for 1.0 million and 900,000 YLL, respectively.

Table 4.4: Avoidable 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	**4,135**	**3.9**	**2.2**	**77.3**
Tuberculosis	127	0.1	0.1	2.0
Selected invasive bacterial and protozoal infections	2,993	2.8	1.6	52.3
Hepatitis	211	0.2	0.1	4.2
HIV/AIDS	754	0.8	0.4	17.6
Viral pneumonia and influenza	50	0.1	–[1]	1.2
Cancers (malignant neoplasms)	**62,338**	**56.2**	**32.8**	**1,013.0**
Lip, oral cavity and pharynx	2,287	2.1	1.2	38.5
Oesophagus	2,735	2.4	1.4	43.1
Stomach	3,246	2.9	1.7	52.1
Colorectal	13,008	11.7	6.9	206.3
Liver	2,210	2.0	1.2	35.8
Lung	21,208	18.9	11.2	325.5
Melanoma of skin	3,284	3.0	1.7	58.6
Non-melanotic skin	686	0.6	0.4	10.5
Breast (female)	8,550	7.9	4.5	155.7
Cervix	908	0.8	0.5	17.1
Uterus	724	0.6	0.4	11.3
Bladder	1,635	1.4	0.9	23.7
Thyroid	225	0.2	0.1	3.7
Hodgkin's disease	208	0.2	0.1	4.0
Lymphoid leukaemia – acute/chronic	1,108	1.1	0.6	21.5
Benign	316	0.3	0.2	5.7
Nutritional, endocrine and metabolic conditions	**6,253**	**5.5**	**3.3**	**97.2**
Thyroid disorders	84	0.1	–[1]	1.3
Diabetes	6,169	5.4	3.2	95.9
Drug use disorders	**6,877**	**6.8**	**3.6**	**145.8**
Alcohol related disease	4,621	4.4	2.4	87.2
Illicit drug use disorders	2,256	2.5	1.2	58.6
Neurological disorders	**1,000**	**1.0**	**0.5**	**23.2**
Epilepsy	1,000	1.0	0.5	23.2
Cardiovascular diseases	**59,945**	**52.4**	**31.6**	**912.2**
Rheumatic and other valvular heart disease	614	0.6	0.3	10.5
Hypertensive heart disease	619	0.5	0.3	9.9
Ischaemic heart disease	43,712	38.4	23.0	667.4
Cerebrovascular diseases	12,558	10.8	6.6	189.0
Aortic aneurysm	2,442	2.1	1.3	35.4
Genitourinary disorders	**2,072**	**1.8**	**1.1**	**31.2**
Nephritis and nephrosis	1,910	1.6	1.0	28.7
Obstructive uropathy and prostatic hyperplasia	162	0.1	0.1	2.5

... continued

Table 4.4: Avoidable mortality (0 to 74 years) by major condition group and cause, Australia, 1997-2001 … *continued*

Major condition group/ cause	Number	ASR	Per cent of total	YLL ('000)
Respiratory diseases	**11,612**	**10.1**	**6.1**	**186.5**
DVT with pulmonary embolism	827	0.7	0.4	13.9
COPD (45-74 years)	10,395	8.9	5.5	147.1
Asthma (0-44 years)	390	0.4	0.2	25.5
Digestive disorders	**2,695**	**2.4**	**1.4**	**44.0**
Peptic ulcer disease	664	0.6	0.3	10.1
Acute abdomen, appendicitis, intestinal obstruction, cholecystitis/ lithiasis, pancreatitis, hernia	1,012	0.9	0.5	16.5
Chronic liver disease	1,019	0.9	0.5	17.3
Maternal and infant causes	**4,803**	**6.4**	**2.5**	**137.9**
Birth defects	3,278	4.2	1.7	91.4
Complications of perinatal period	1,525	2.1	0.8	46.5
Unintentional injuries	**14,224**	**15.5**	**7.5**	**345.5**
Road traffic injuries	8,138	9.0	4.3	200.8
Falls	1,160	1.1	0.6	22.4
Fires, burns	364	0.4	0.2	8.4
Accidental poisonings	3,425	3.7	1.8	85.2
Drownings	1,137	1.3	0.6	28.7
Intentional injuries	**13,891**	**14.6**	**7.3**	**332.3**
Suicide and self inflicted injuries	12,393	13.0	6.5	295.4
Violence	1,498	1.6	0.8	37.0
Total avoidable mortality	**189,845**	**176.6**	**100.0**	**3,327.4**

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

Of the top ten avoidable mortality conditions, ischaemic heart disease ranked the highest, with a rate of 38.4 deaths per 100,000 population, followed by lung cancer, with a rate of 18.9 deaths per 100,000 population (Table 4.5). Together, they accounted for over one third (34.2%) of avoidable mortality. The rates for the remaining top ten causes ranged from 4.4 deaths per 100,000 population for alcohol related disease to 13.0 for suicide and self inflicted injuries.

Ischaemic heart disease also ranked the highest for YLL from avoidable deaths, accounting for more than 667,000 YLL. YLL from lung cancer was ranked second, resulting in around 325,000 YLL. Suicide and self inflicted injuries (around 295,000 YLL) had the next highest YLL, followed by colorectal cancer (over 206,000 YLL) and road traffic injuries (around 201,000 YLL).

Table 4.5: Top ten causes of avoidable mortality (0 to 74 years), Australia, 1997-2001

Cause	Number	ASR	Per cent of total	YLL
Ischaemic heart disease	43,712	38.4	23.0	667,419
Lung cancer	21,208	18.9	11.2	325,493
Suicide and self inflicted injuries	12,393	13.0	6.5	295,389
Colorectal cancer	13,008	11.7	6.9	206,296
Cerebrovascular diseases	12,558	10.8	6.6	188,991
Road traffic injuries	8,138	9.0	4.3	200,761
COPD (45-74 years)	10,395	8.9	5.5	147,095
Breast cancer (female)	8,550	7.9	4.5	155,729
Diabetes	6,169	5.4	3.2	95,858
Alcohol related disease	4,621	4.4	2.4	87,193
All causes	**189,845**	**176.6**	**100.0**	**3,327,375**

By age

Table 4.6 shows the variation in avoidable mortality by the top four causes in selected age groups.

For infants under one year of age, birth defects accounted for just over half (52.6%) of avoidable mortality, a rate of 166.2 deaths per 100,000 population. Complications of the perinatal period were responsible for a further 39.5% of avoidable mortality, a rate of 124.3, followed by selected invasive bacterial and protozoal infections, which contributed 3.5%. Avoidable mortality from violence accounted for 0.9% of infant deaths.

In the 1 to 14 year age group, deaths from road traffic injuries accounted for 29.4% of avoidable mortality, a rate of 3.0 deaths per 100,000 population. Drownings (15.5%) and birth defects (14.9%) were responsible for approximately 30% of deaths in this age group, followed by lymphoid leukaemia (6.9%).

For the 15 to 24 year age group, deaths from road traffic injuries accounted for over one third (35.0%) of avoidable mortality, a rate of 18.3 deaths per 100,000 population. Suicide and self inflicted injuries were responsible for a further 29.5% of avoidable mortality in this age group, a rate of 15.2. Approximately 16.0% of avoidable deaths in the 15 to 24 year age group were from deaths resulting from accidental poisonings (8.5%) and illicit drug use disorders (7.4%).

In the 25 to 44 year age group, the ranking of the top two causes of death is the reverse of that in the 15 to 24 year age group. Suicide and self inflicted injuries were responsible for 25.6% of avoidable mortality (21.6 deaths per 100,000 population), followed by road traffic injuries, which contributed 11.8% (10.0 deaths per 100,000 population). Accidental poisonings (8.6% of avoidable deaths) and ischaemic heart disease (8.0%) accounted for a further 16.6% of avoidable mortality in this age group.

At ages 45 to 64 years, almost one quarter (23.5%) of avoidable deaths were from ischaemic heart disease, a rate of 72.9 deaths per 100,000 population. Lung cancer ranked second, accounting for13.2% of avoidable deaths, a rate of 41.1. Over 16% of avoidable deaths in the 45 to 64 age group resulted from colorectal cancer (8.8%) and breast cancer (females only, 7.4%).

Ischaemic heart disease and lung cancer were also important causes of death in the 65 to 74 year age group. Ischaemic heart disease accounted for 30.1% of avoidable deaths (a rate of 402.1 deaths per 100,000 population) and lung cancer was responsible for 13.8% of avoidable deaths (187.8 deaths per 100,000 population). Over 18% of avoidable deaths in this age group were from cerebrovascular diseases (9.3%) and COPD (Chronic Obstructive Pulmonary Disease, 8.9%).

Table 4.6: Avoidable mortality by major cause and age, Australia, 1997-2001

Age (years)	Cause	Number	Rate[1]	% of total in age group	YLL
Infants (<1)	Birth defects	1,995	166.2	52.6	60,907
	Complications of perinatal period	1,497	124.3	39.5	45,703
	Selected invasive bacterial and protozoal infections	131	10.9	3.5	3,999
	Violence	35	2.9	0.9	1,069
1-14	Road traffic injuries	552	3.0	29.4	16,473
	Drownings	292	1.6	15.5	8,830
	Birth defects	280	1.5	14.9	8,417
	Lymphoid leukaemia - acute/chronic	129	0.7	6.9	3,843
15-24	Road traffic injuries	2,468	18.3	35.0	69,946
	Suicide and self inflicted injuries	2,075	15.2	29.5	58,533
	Accidental poisonings	600	4.4	8.5	16,897
	Illicit drug use disorders	522	3.8	7.4	14,686
25-44	Suicide and self inflicted injuries	6,245	21.6	25.6	160,083
	Road traffic injuries	2,863	10.0	11.8	73,901
	Accidental poisonings	2,095	7.3	8.6	53,854
	Ischaemic heart disease	1,960	6.4	8.0	48,048
45-64	Ischaemic heart disease	15,118	72.9	23.5	281,411
	Lung cancer	8,468	41.1	13.2	155,941
	Colorectal cancer	5,658	27.4	8.8	105,023
	Breast cancer (female)	4,742	22.9	7.4	92,198
65-74	Ischaemic heart disease	26,594	402.1	30.1	336,824
	Lung cancer	12,235	187.8	13.8	157,332
	Cerebrovascular diseases	8,207	121.7	9.3	102,680
	COPD (45-74 years)	7,864	118.4	8.9	99,469

[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 4.6, with the measure of years of life lost (YLL).

For infants, approximately 60,900 YLL were a result of avoidable mortality from birth defects, with deaths from complications of the perinatal period accounting for approximately 45,700 YLL. In the 1 to 14 year age group, deaths from road traffic injuries were responsible for almost 16,500 YLL.

In the 15 to 24 year age group, deaths from road traffic injuries, and suicide and self inflicted injuries, accounted for approximately 69,900 and 58,500 YLL, respectively. In the 25 to 44 year age group, deaths from suicide and self inflicted injuries resulted in approximately 160,100 YLL, with a further 73,900 years lost to road traffic injuries.

For the 45 to 64 and 65 to 74 year age groups, ischaemic heart disease accounted for the highest number of YLL from avoidable mortality (approximately 281,400 and 336,800 YLL, respectively). Although the rate of deaths from lung cancer in the 65 to 74 year age group was 4.6 times the rate in the 45 to 64 year age group, the numbers of YLL for each age group were similar, at approximately 157,300 YLL and 155,900 YLL, respectively.

By age and sex

The main causes impacting avoidable mortality at different ages show interesting variations when further analysed by sex (Table 4.7).

Apart from for infants and the 15 to 24 year age group, there were differences in the ranking of the main causes of death 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 of all infant avoidable deaths (55.5% of infant female deaths and 50.4% of infant male deaths). Complications of the perinatal period accounted for the majority of the remaining avoidable infant deaths (41.9% for males and 36.3% for females). (Note: only the top three causes of infant death are shown in Table 4.7, due to the lower numbers for the next ranked causes.)

Road traffic injuries were the main cause of avoidable death for both males (29.2% of avoidable male deaths) and females (29.8% of avoidable female deaths) at ages 1 to 14 years. Drownings were the next largest cause of avoidable mortality for males (17.8% of male deaths), with birth defects the third largest (13.8%). The order was reversed for females, with birth defects causing 16.6% and drownings 12.2% of avoidable female deaths.

The top four causes of avoidable mortality in the 15 to 24 year age group were ranked the same for both males and females. Road traffic injuries and suicide and self inflicted injuries were jointly responsible for over two thirds (67.4%) of avoidable deaths for males and more than half (55.7%) for females. The male rate of deaths from road traffic injuries (27.7 deaths per 100,000 males) was over three times (3.11**) the female rate (8.9). For suicide and self inflicted injuries, the rate for males (24.4 deaths per 100,000 males) was four (4.00**) times that for females (6.1).

Suicide and self inflicted injuries were the main causes of avoidable mortality in the 25 to 44 year age group, being responsible for 29.5% of avoidable deaths for males and 16.7% for females. The age-standardised death rates emphasise the difference in the impact of these causes on male and female avoidable deaths, with the male rate (34.8 deaths per 100,000 males) over four times that for females (8.5, a rate ratio of 4.09**). For females, deaths from breast cancer ranked second, accounting for 15.5% of avoidable female deaths in the age group (a rate of 7.4 deaths per 100,000 females). For males, the second ranked cause of avoidable death was road traffic injuries, comprising 13.0% of avoidable deaths (a rate of 15.4 deaths per 100,000 males) in this age group.

Ischaemic heart disease accounted for 29.1% of avoidable male deaths at ages 45 to 64 years, compared to 13.5% for female. The male rate of 115.3 deaths per 100,000 males was more than three and a half times (3.79**) the female rate of 30.4. Deaths from breast cancer ranked highest for females in this age group, with 20.6% of avoidable female deaths, and a high rate of 45.8 deaths per 100,000 females. Lung cancer was ranked second for males, resulting in 13.7% of avoidable male deaths, a rate of 54.6 deaths per 100,000 males, twice (1.99**) the rate for females of 27.5.

In the 65 to 74 year age group, the two top ranked causes of avoidable mortality were the same for males and females. Ischaemic heart disease was responsible for 32.4% of avoidable male deaths and 25.9% of avoidable female deaths. The male rate (570.0 deaths per 100,000 males) was almost two and a half times (2.43**) the female rate (234.3). Lung cancer resulted in 15.4% of avoidable male deaths (271.6 deaths per 100,000 males) and 11.2% of avoidable female deaths (104.0), a rate differential of more than two and a half (2.61**).

Table 4.7: Avoidable 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]
Infants (<1)	Birth defects	1,085	176.4	50.4	1	910	156.0	55.5	1
	Complications of perinatal period	901	146.5	41.9	2	596	102.1	36.3	2
	Selected invasive bacterial and protozoal infections	75	12.2	3.5	3	56	9.6	3.4	3
1-14	Road traffic injuries	330	3.5	29.2	1	222	2.5	29.8	1
	Drownings	201	2.2	17.8	2	91	1.0	12.2	3
	Birth defects	156	1.7	13.8	3	124	1.4	16.6	2
	Lymphoid leukaemia – acute/chronic	82	0.9	7.2	4	47	0.5	6.3	5
	Selected invasive bacterial and protozoal infections	63	0.7	5.6	5	55	0.6	7.4	4
15-24	Road traffic injuries	1,890	27.7	35.7	1	578	8.9	32.9	1
	Suicide and self inflicted injuries	1,674	24.4	31.7	2	401	6.1	22.8	2
	Accidental poisonings	440	6.4	8.3	3	160	2.4	9.1	3
	Illicit drug use disorders	392	5.7	7.4	4	130	2.0	7.4	4
25-44	Suicide and self inflicted injuries	5,009	34.8	29.5	1	1,236	8.5	16.7	1
	Road traffic injuries	2,204	15.4	13.0	2	659	4.6	8.9	3
	Accidental poisonings	1,595	11.2	9.4	3	500	3.4	6.8	4
	Ischaemic heart disease	1,608	10.6	9.5	4	352	2.3	4.8	5
	Breast cancer	–	..	..	..	1,143	7.4	15.5	2
45-64	Ischaemic heart disease	12,012	115.3	29.1	1	3,106	30.4	13.5	2
	Lung cancer	5,650	54.6	13.7	2	2,818	27.5	12.2	3
	Colorectal cancer	3,381	32.6	8.2	3	2,277	22.2	9.9	4
	Suicide and self inflicted injuries	2,404	22.5	5.8	4	725	6.9	3.1	8
	Breast cancer	–	..	..	..	4,742	45.8	20.6	1
65-74	Ischaemic heart disease	18,237	570.0	32.4	1	8,357	234.3	25.9	1
	Lung cancer	8,636	271.6	15.4	2	3,599	104.0	11.2	2
	COPD	5,046	156.8	9.0	3	2,818	80.0	8.7	4
	Cerebrovascular diseases	4,667	144.5	8.3	4	3,540	98.8	11.0	3

[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 for males and females**

4.4 Avoidable mortality by area

There is considerable variation in avoidable mortality for all causes at ages 0 to 74 years when examined by area of usual residence of the deceased. The areas in this analysis are the states and territories, capital cities and other major urban centres, rest of states/ territories areas, Statistical Subdivisions, ASGC remoteness areas and deciles of socioeconomic disadvantage of area.

By state/ territory and area

Rates of avoidable mortality were highest in the Northern Territory (a rate of 361.3 deaths per 100,000 population), with the remaining state/ territory rates ranging from 150.2 in the Australian Capital Territory to 192.0 in Tasmania (Table 4.8).

The differential in rates between the rest of state/ territory areas and the capital cities and other major urban centres was also highest in Northern Territory, where the rate in the rest of Territory areas (492.3 deaths per 100,000 population) was more than twice the rate in Darwin (246.9, a rate ratio of 1.99**).

Tasmania was the only jurisdiction with fewer avoidable deaths in the rest of the state (185.7 deaths per 100,000 population) than in the capital city (200.0, a rate ratio of 0.93*). The differentials for the remaining jurisdictions ranged from 1.13** in Victoria and South Australia to 1.24** in Western Australia.

Table 4.8: Avoidable mortality (0 to 74 years) by state/ territory and 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]	45,343	170.5	19,535	195.8	1.15**	66,151	178.2
Victoria	32,374	162.1	13,049	183.7	1.13**	45,466	167.9
Queensland	22,043	174.4	14,053	199.8	1.15**	35,515	184.0
South Australia	11,086	169.1	4,818	190.7	1.13**	15,938	175.5
Western Australia	11,480	157.7	5,091	193.8	1.23**	16,602	167.6
Tasmania	2,254	200.0	3,080	185.7	0.93*	5,349	192.0
Northern Territory	1,008	246.9	1,500	492.3	1.99**	2,576	361.3
Australian Capital Territory[3]	2,610	155.2	#	210.8	..	2,236	150.2
Total	**128,198**	**168.1**	**61,130**	**195.7**	**1.16****	**189,845**	**176.6**

 # 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 (Part A)

Introduction to map and text pages

The emphasis in the remainder of this section is on describing the pattern of avoidable mortality by Statistical Subdivision, through maps of the capital cities and Australia. 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, two map pages and associated text pages are included, showing the rates within the capital cities and the rest of state/ territory areas (Australian map).

The 'Capital cities' text and map pages for all causes and by major condition group/ cause includes:

- a table showing age-standardised death rates for the capital cities;
- text detailing the rates for the 'other major urban centres
- a discussion of the rates in the capital cities by Statistical Subdivision (SSD), with the maps shown opposite; and
- a figure showing the age-standardised death rates for the capital cities and other major urban centres by decile of socioeconomic disadvantage of area[2], by sex.

Similarly, the Australia text and map pages highlighting the 'Rest of state/ territory areas' for all causes and by major condition group/ cause includes:

- a table comparing the age-standardised death rates for each state/ territory jurisdiction, including rates for the capital cities, other major urban centres, and the rest of state/ territory areas;
- a discussion of the rates in the rest of state/ territory areas (including the other major urban centres) by SSD, with the map shown opposite;
- a figure showing the rates for the rest of states/ territories (excluding the other major urban centres) by decile of socioeconomic disadvantage of area, by sex; and
- a figure (included on the 'Australia' map page), showing the ASGC remoteness classification[2].

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

Additional notes regarding the map and text pages

The text discussing the rates by SSD generally focuses on the highest and lowest rates mapped within each capital city or rest of state area for each state/ territory. (Note: for the Australian Capital Territory, only the capital city (Canberra) rate is mapped: the rate for the ACT Balance is excluded from the rest of state/ territory areas map due to insufficient numbers).

Rates were not mapped if there were fewer than five deaths. Where the discussion includes rates based on fewer than 20 reported deaths, the number of deaths is shown in brackets after the rate.

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

[2] See Chapter 2, *Methods*

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

Capital cities

Over the period 1997 to 2001, deaths from avoidable mortality ranged from a rate of 150.1 deaths per 100,000 population in Canberra to a rate of 246.9 in Darwin (Table 4.9), with the rate for Hobart also high (200.0). The rate for all capitals combined was 166.1 deaths per 100,000 population.

Table 4.9: Avoidable mortality from all causes, capital cities, Australia, 1997-2001

ASR per 100,000 population

Sydney	Melbourne	Brisbane	Adelaide	Perth	Hobart	Darwin	Canberra	All capitals
166.4	161.0	176.1	169.1	157.7	200.0	246.9	150.1	166.1

Other major urban centres

Rates in the other major urban centres were all higher than the 'All capitals' average, ranging from 160.7 in the Sunshine Coast SSD to 209.7 in Townsville-Thuringowa (details in Table A4, Appendix 1.3).

By Statistical Subdivision (SSD)

For **Sydney**, the highest rate was in Inner City (234.0 deaths per 100,000 population), followed by Blacktown (201.1) (Map 4.1). The lowest rates were in the inner northern SSDs of Central Northern Sydney (111.8 – the lowest of the capital city SSDs), Northern Beaches (129.0) and Lower Northern Sydney (133.5).

Rates at the SSD level in **Melbourne** were relatively low, with the highest rates in Inner Melbourne (205.6 deaths per 100,000 population), Greater Dandenong (191.1) and Frankston City (188.9). The lowest rates were in Boroondara City (128.1) and Eastern Middle Melbourne (128.5).

The highest rates in **Brisbane** were in Redcliffe City (223.6 deaths per 100,000 population) and Gold Coast City Part A (211.2). The lowest rates were in Redland Shire (147.6), Pine Rivers Shire (149.8) and Beaudesert Shire Part A (163.9).

Avoidable mortality rates in **Adelaide** varied from a rate of 188.1 deaths per 100,000 population in Western Adelaide to 150.5 in Southern Adelaide.

The rates in **Perth** at the SSD level were relatively evenly spread, with the highest rates in South East Metropolitan (169.4) and East Metropolitan (168.2), and the lowest rate in North Metropolitan (142.6).

Residents of **Hobart** had the second highest rate (200.0 deaths per 100,000 population) of all the capital cities (after Darwin).

The rates in **Darwin** were high, with 254.5 deaths per 100,000 population in Palmerston–East Arm (the highest of the capital city SSDs), 246.8 in Darwin City, and 239.5 in Litchfield Shire.

Canberra had the lowest overall rate, and generally low rates, apart from South Canberra (178.9 deaths per 100,000 population), and North Canberra (175.2). Gungahlin-Hall (122.9) had the lowest rate in Canberra.

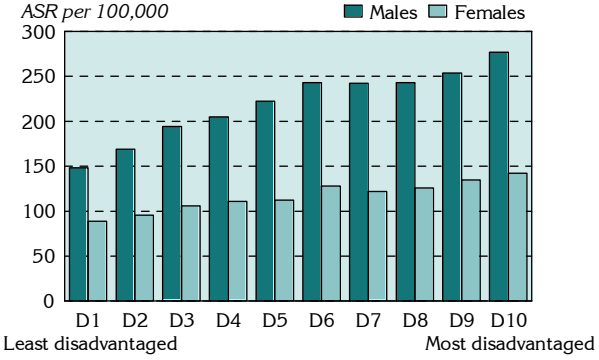
By socioeconomic status

For all capital cities and other major urban centres combined, there was a socioeconomic gradient in rates of death from avoidable mortality, for both males and females (Figure 4.3). The gradients were continuous, with the exception of higher rates in Decile 6.

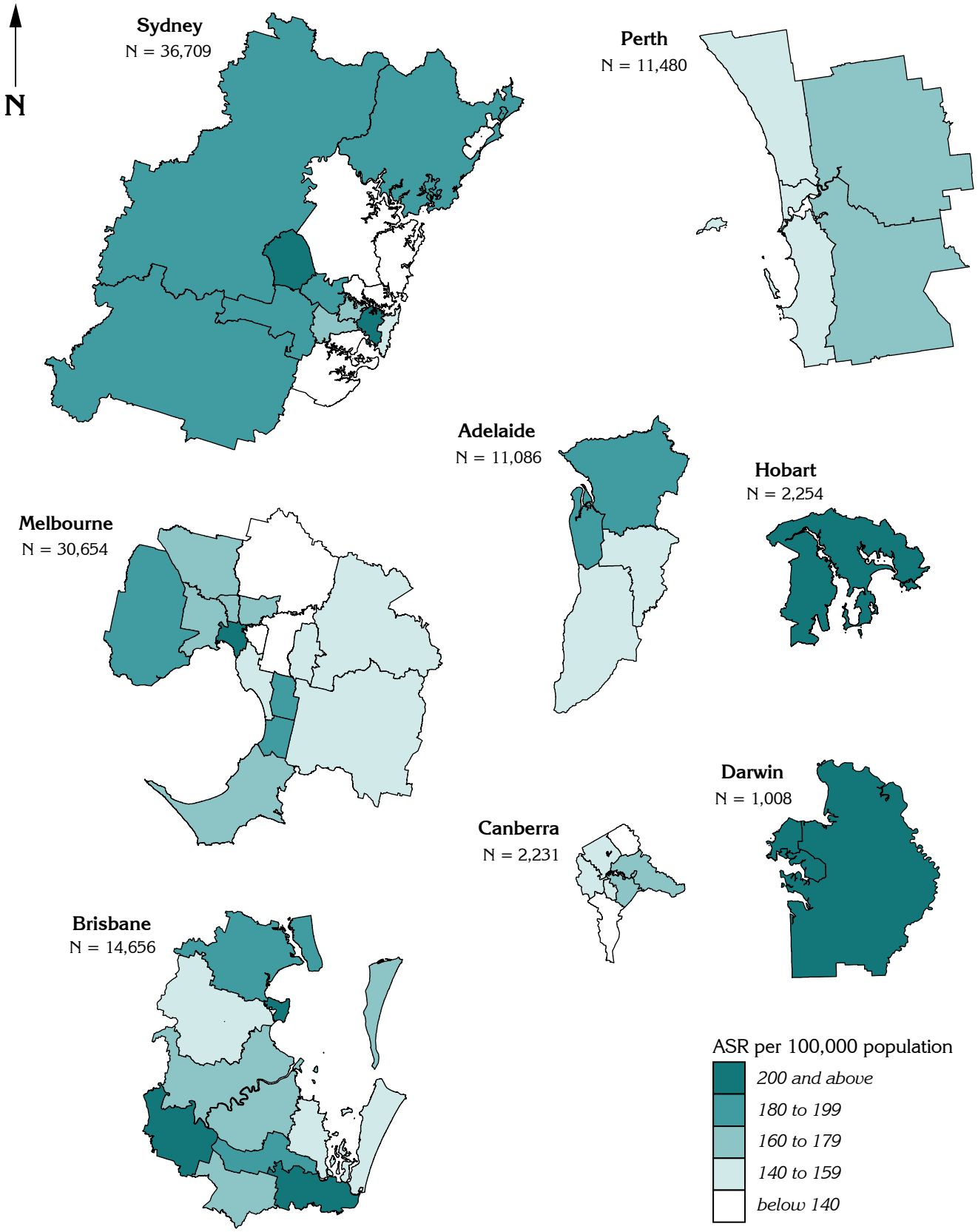
Rates for males were over one and a half times those for females in each decile, ranging from 148.4 deaths per 100,000 population in the least disadvantaged areas to 277.0 in the most disadvantaged areas. For females the range was from 88.7 in the least disadvantaged areas to 142.4 in the most disadvantaged areas.

The differential in rates of death from avoidable mortality between the most disadvantaged areas and least disadvantaged areas was 1.87** for males and 1.61** for females.

Figure 4.3: Avoidable mortality from all causes by socioeconomic status and sex, capital cities and other major urban centres, Australia, 1997-2001



Map 4.1
All causes: avoidable mortality (0 to 74 years), capital cities, Australia, 1997-2001
age standardised deaths per 100,000 population by Statistical Subdivision



Details of map boundaries are in Appendix 1.4

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

States/ Territories

Death rates from avoidable mortality were higher in the rest of state/ territory areas than in the capital cities except in Tasmania (Table 4.10), and higher than in the other major urban centres in New South Wales and Queensland. The influence on these rates of deaths of Aboriginal and Torres Strait Islander people is discussed in Section 4.6. The rate for the rest of the territory areas in the Northern Territory was twice (a rate ratio of 1.99**) that for Darwin (492.3 deaths per 100,000 population, compared to 246.9 in Darwin). The differentials in rates between the rest of state areas and capital cities were 1.23** in Western Australia, 1.17** in New South Wales, 1.14** in Victoria, and 1.13** in Queensland and South Australia. In Tasmania, the rate for the rest of the state was 0.93** (9%) lower than that in Hobart.

Table 4.10: Avoidable 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	166.4	161.0	176.1	169.1	157.7	200.0	246.9	150.1	166.1
Other major urban centres	190.8	184.3	171.1	..	..	..	..	..	181.5
Rest of state/ territory areas	195.2	183.7	199.8	190.7	193.8	185.7	492.3	#	195.7
Whole of state/ territory	**178.2**	**167.9**	**184.0**	**175.5**	**167.6**	**192.0**	**361.3**	**150.2**	**176.6**

By Statistical Subdivision (SSD)

High rates of avoidable mortality covered much of inland **New South Wales**, with the highest in Upper Darling (331.3 deaths per 100,000 population) and Macquarie-Barwon (286.7) (Map 4.2). The lowest rates were in Port Macquarie (168.4) and Illawarra (175.0) SSDs.

For **Victoria**, rates were highest in North Wimmera (213.5) and La Trobe (212.0), and lowest in East Barwon (150.2) and South Loddon (151.0).

The highest rates in **Queensland** were in North West (346.1 deaths per 100,000 population) and Central West (254.3). The lowest rates were in Sunshine Coast (160.7), Moreton SD Balance (164.4), and Gold Coast City Part B (164.8).

The rates in **South Australia** were highest in the Far North (279.6), West Coast (273.0), and Flinders Ranges (248.9) SSDs. Rates were lowest in Mt Lofty Ranges (141.9 - the lowest rate of all the rest of state/ territory areas) and Fleurieu (151.8).

Several of the SSD rates in **Western Australia** were substantially higher, with the highest rates in Ord (469.2), Fitzroy (405.9) and Lefroy (303.6). The lowest rates were in Lakes (148.3) and Greenough River (153.6) SSDs.

In **Tasmania**, rates varied from 242.4 deaths per 100,000 population in Lyell to 157.3 in North Western Rural.

The majority of the rates of avoidable mortality at the SSD level in the **Northern Territory** were extremely high, with the highest in Bathurst-Melville (797.4), Alligator (688.7), Daly (614.7), Barkly (543.0) and Lower Top End (534.9) (the five highest SSD rates across Australia). Finniss (221.5 deaths per 100,000 population) had the lowest rate.

By remoteness

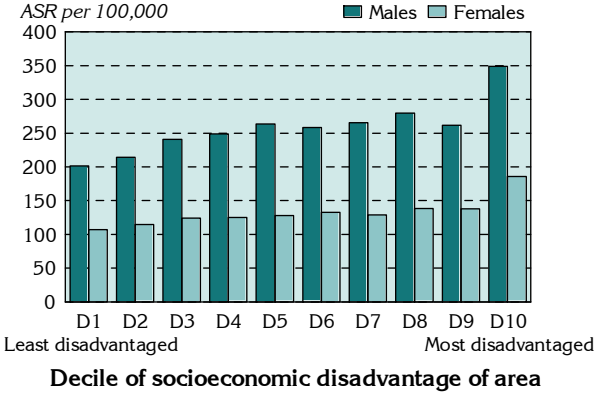
The graph of rates of avoidable mortality by remoteness shows (opposite page) a marginal increase between the Major Cities and the Inner Regional areas, followed by a steady increase to the Remote areas and a much larger increase to the Very Remote areas. The number of deaths decline rapidly across the remoteness classes.

By socioeconomic status

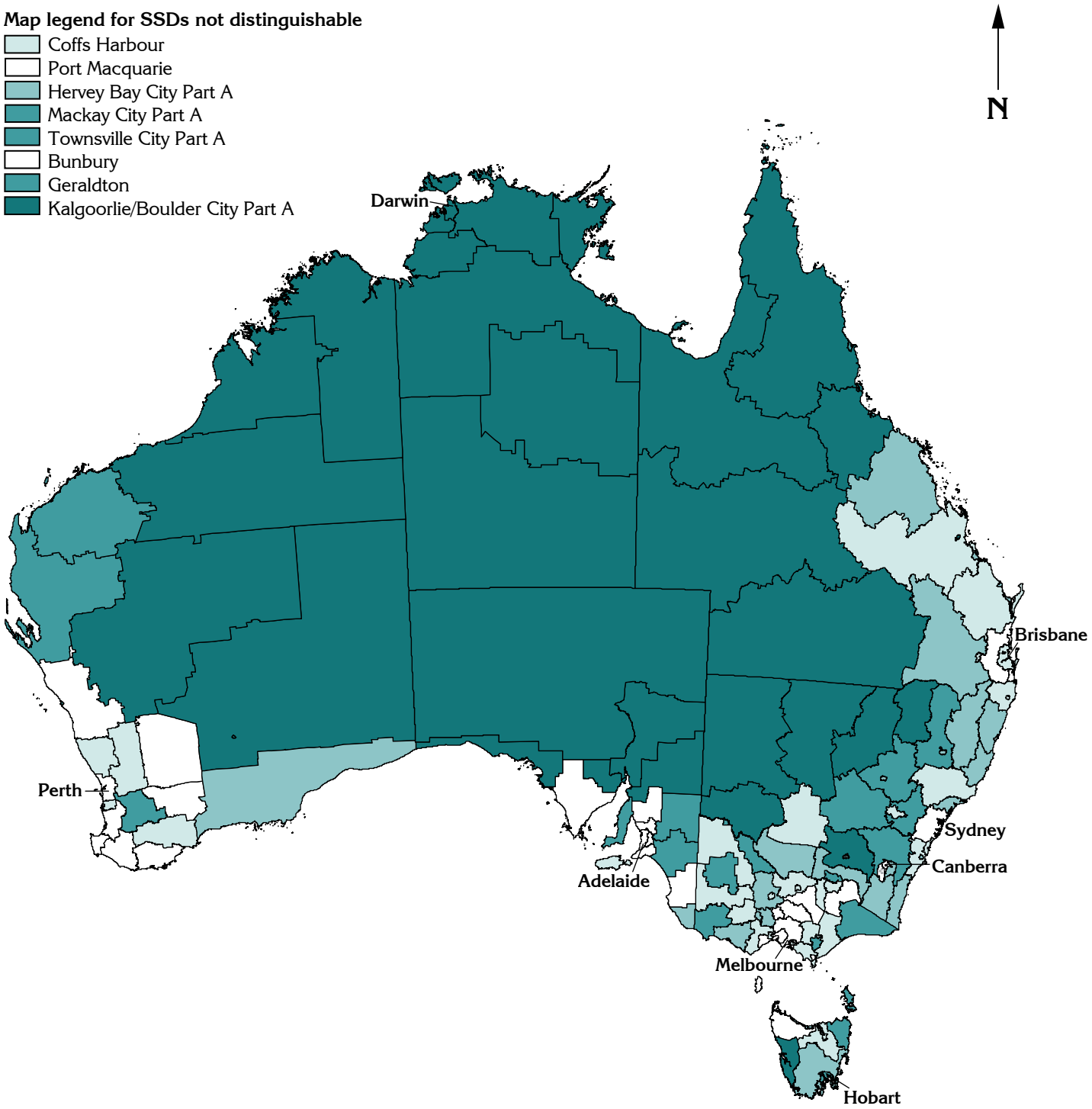
For all rest of state/ territory areas combined, there was a largely uninterrupted socioeconomic gradient in death rates from avoidable mortality, for both males and females (Figure 4.4).

Rates for males were higher than females, ranging from 201.5 in the least disadvantaged areas to 348.8 in the most disadvantaged areas. The female rates ranged from 107.3 in the least disadvantaged areas to 185.9 in the most disadvantaged areas. The differential in rates of avoidable mortality between the most disadvantaged and least disadvantaged areas was 1.73** for both males and females.

Figure 4.4: Avoidable mortality from all causes by socioeconomic status and sex, rest of states/ territories, Australia, 1997-2001

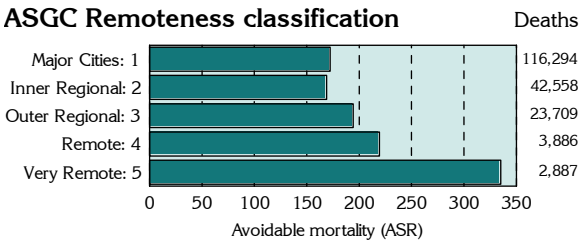


Map 4.2
All causes: avoidable mortality (0 to 74 years), Australia, 1997-2001
age standardised deaths per 100,000 population by Statistical Subdivision



ASR per 100,000 population

- *215 and above*
- *200 to 214*
- *185 to 199*
- *170 to 184*
- *below 170*
- *data not mapped (<5 deaths)*



Details of map boundaries are in Appendix 1.4

Major condition group – Cancer: avoidable mortality (0 to 74 years), capital cities, Australia, 1997-2001

Capital cities

Over the period 1997 to 2001, the death rate from cancers considered to be avoidable (see *Methods*) ranged from 50.5 deaths per 100,000 population in Canberra to a rate of 66.4 in Hobart (Table 4.11). The rate for all capitals combined was 56.2 deaths per 100,000 population.

Table 4.11: Avoidable mortality from cancer, capital cities, Australia, 1997-2001

ASR per 100,000 population

Sydney	Melbourne	Brisbane	Adelaide	Perth	Hobart	Darwin	Canberra	All capitals
52.9	54.9	58.4	54.3	54.3	66.4	64.0	50.5	56.2

Other major urban centres

Rates in the other major urban centres ranged from 51.5 deaths per 100,000 population in Sunshine Coast to 67.2 in Townsville-Thuringowa (details in Table A4, Appendix 1.3).

By Statistical Subdivision (SSD)

People in **Sydney** had relatively low rates of avoidable mortality from cancers, with the highest rates in Gosford-Wyong (62.1 deaths per 100,000 population), Blacktown (61.6) and Inner Sydney (61.5) (Map 4.3). The lowest rates were in Central Northern Sydney (42.6 - the lowest capital city SSD rate), Northern Beaches (44.8) and Lower Northern Sydney (45.4).

Within a generally low overall rate, rates at the SSD level in **Melbourne** were highest in Inner Melbourne (64.9), Melton-Wyndham (63.9) and Greater Dandenong City (63.0), and lowest in Boroondara City (47.3), Eastern Middle Melbourne (48.4) and Yarra Ranges Shire Part A (49.1).

In **Brisbane**, rates were somewhat higher, with the highest in Redcliffe City (76.2 deaths per 100,000 population - the highest rate of all capital city SSDs), Gold Coast City Part A (68.8) and Ipswich City (Part in Brisbane SD) (67.2). The lowest rate was in Redland Shire (51.3).

The lower overall rates in **Adelaide** ranged from 57.9 deaths per 100,000 population in Northern Adelaide to a low of 48.2 in Eastern Adelaide.

The rates in **Perth** were evenly spread at the SSD level, with the highest in South East Metropolitan (56.4) and South West Metropolitan (56.1), and the lowest rate in Central Metropolitan (51.4).

Residents of **Hobart** had the highest rate of the capital cities, 66.4 deaths per 100,000 population.

In **Darwin,** the highest rate was in Litchfield Shire (69.5 deaths per 100,000 population) and the lowest was in Palmerston-East Arm (56.2).

For **Canberra**, with the lowest national death rates, the range was from 55.1 in North Canberra and 54.6 in South Canberra, to a low of 43.5 in Tuggeranong.

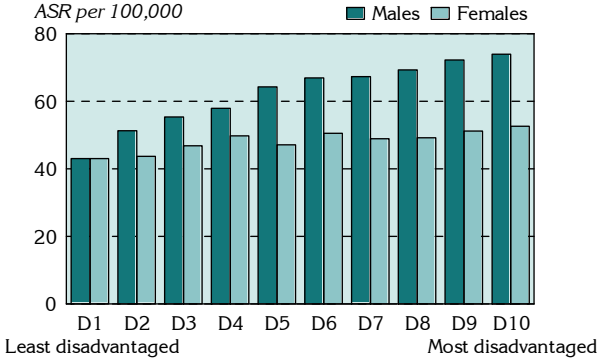
By socioeconomic status

For males, there was a socioeconomic gradient in rates of death from avoidable mortality from cancers for all capital cities and other major urban centres combined: for females, the pattern was less clear, although rates were highest in the most disadvantaged areas (Deciles 9 and 10) (Figure 4.5).

Rates for males ranged from 43.0 deaths per 100,000 population in the least disadvantaged areas to 73.9 in the most disadvantaged areas. The female rates ranged from 43.0 (the same as the male rate) in Decile 1 (advantaged) to 52.6 in Decile 10 (disadvantaged).

The differential in rates of avoidable mortality from cancers between the most disadvantaged areas and least disadvantaged areas was 1.72** for males and 1.22** for females.

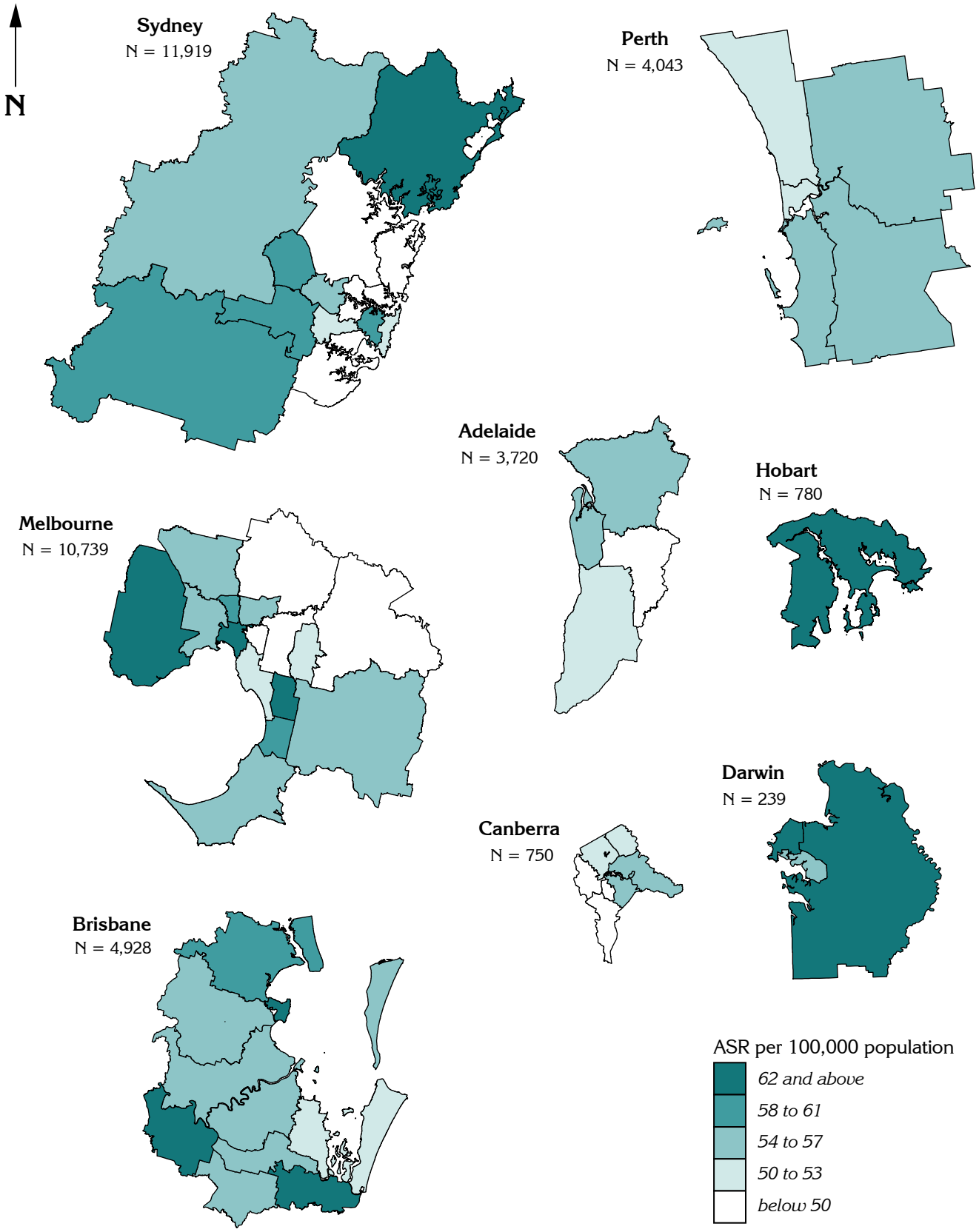
Figure 4.5: Avoidable mortality from cancer by socioeconomic status and sex, capital cities and other major urban centres, Australia, 1997-2001



Map 4.3

Major condition group – Cancer: avoidable mortality (0 to 74 years), capital cities, Australia, 1997-2001

age standardised deaths per 100,000 population by Statistical Subdivision



Details of map boundaries are in Appendix 1.4

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

State/ Territory comparison

Over the period 1997 to 2001, death rates from avoidable cancers (see *Methods*) were higher in the rest of state/ territory areas than in the capital cities in all jurisdictions except Tasmania (Table 4.12). The rate for the rest of territory areas in the Northern Territory was almost one third higher (1.31**) than in Darwin. In New South Wales and Victoria, rates in the rest of state areas were approximately 10% higher (1.08**, 1.09**, respectively) than in the capital cities, with the reverse in Tasmania, (13% lower, a rate ratio of 0.87**).

Table 4.12: Avoidable mortality from cancer by area, Australia, 1997-2001

ASR per 100,000 population

Area	NSW	Vic	Qld	SA	WA	Tas	NT	ACT	All
Capital city	52.9	54.9	58.4	54.3	54.3	66.4	64.0	50.5	54.7
Other major urban centres	59.9	62.7	55.5	..	..	..	..	..	58.2
Rest of state/ territory areas	57.2	59.6	60.8	56.1	56.1	57.8	83.9	#	58.6
Whole of state/ territory	55.1	56.4	58.6	54.8	54.8	61.3	73.3	50.5	56.2

By Statistical Subdivision (SSD)

In **New South Wales**, the highest rates of avoidable mortality from cancers were in the northern SSDs of Upper Darling (103.0 deaths per 100,000 population) and Macquarie-Barwon (73.3) SSDs; and in the south-west in Murray-Darling (77.9) (Map 4.4). Northern Tablelands (45.6), Bathurst-Orange (49.7) and Snowy (51.0) had the lowest rates.

The highest rates in **Victoria** were in SSDs located across the State, in North Wimmera (73.2), La Trobe Valley (69.7) and Mildura Rural City Part A (67.9); the lowest were in East Ovens-Murray (46.4) and South Loddon (49.9).

In **Queensland**, rates were highest across the northern and western SSDs of North West (72.7 deaths per 100,000 population), Mackay City Part A (71.0), Rockhampton (69.6), Thuringowa City Part A (69.5) and Far North (69.2). Sunshine Coast (51.5) and Wide Bay-Burnett SD Balance (52.9) had the lowest rates.

Death rates in **South Australia** were highest in Whyalla (78.6 deaths per 100,000 population) and West Coast (69.3). The lowest rates were in Far North (35.8; 16 deaths), Barossa (41.4) and Mt Lofty Ranges (43.3).

The rates in **Western Australia** were highest in Kalgoorlie/Boulder City Part A (89.1) and Geraldton (77.2), and lowest in Lakes (29.5; 8 deaths), Pallinup (39.2) and Blackwood (45.4).

In **Tasmania**, rates were highest in Lyell (68.9) and North Eastern (60.8), and lowest in Southern (52.7) and Central North (54.0).

The **Northern Territory** rates were comparatively high, the highest being in Bathurst-Melville (126.7 deaths per 100,000 population and 7 deaths) and East Arnhem (123.0) (the two highest rates of all SSDs). Barkly (54.0) and Central (56.9) SSDs had the lowest rates.

By remoteness

The graph of death rates shows (opposite) a weak relationship with remoteness, with the lowest rate (53.2) in the Inner Regional areas and the highest rate (61.7) in the Very Remote areas. The number of deaths decline rapidly across the remoteness classes.

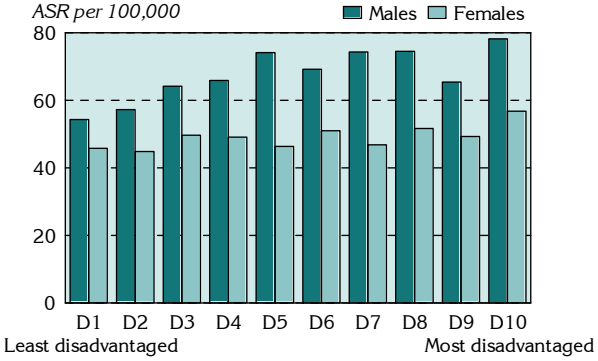
By socioeconomic status

For both males and females, the rates of death from cancers considered to be avoidable for all rest of state/ territory areas combined vary by socioeconomic status (Figure 4.6).

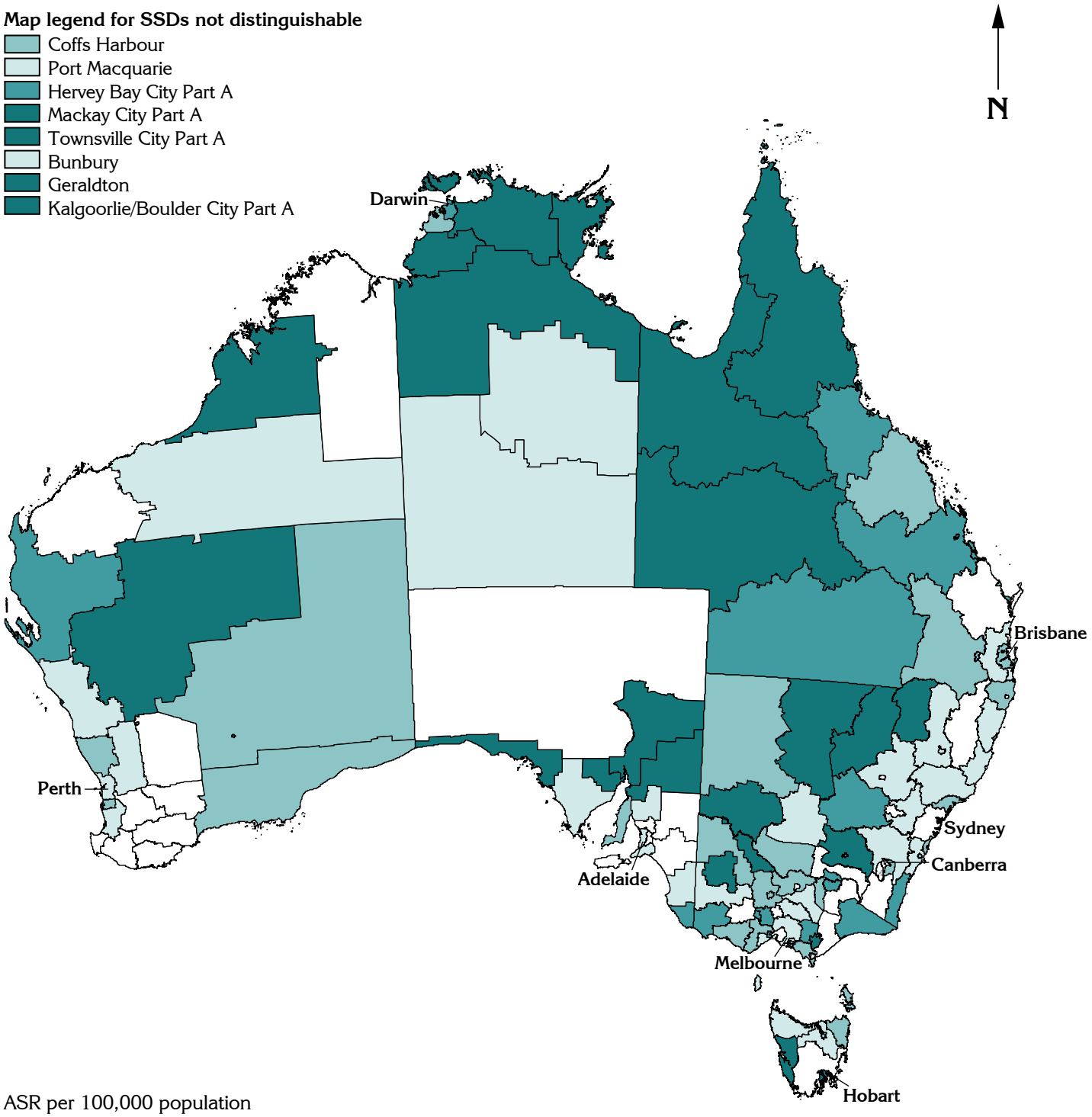
Rates for males were higher than for females, ranging from 54.3 in the least disadvantaged areas to 78.2 in the most disadvantaged areas. The female rates ranged from 44.8 in Decile 2 to 56.8 in the most disadvantaged areas (Decile 10).

The differential between the most disadvantaged areas and least disadvantaged areas in rates of cancers considered to be avoidable was 1.44** for males and 1.24** for females.

Figure 4.6: Avoidable mortality from cancer by socioeconomic status and sex, rest of states/ territories, Australia, 1997-2001



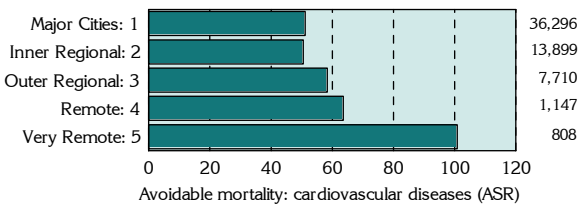
Map 4.4
Major condition group – Cancer: avoidable mortality (0 to 74 years), Australia, 1997-2001
age standardised deaths per 100,000 population by Statistical Subdivision



ASR per 100,000 population

- *65 and above*
- *61 to 64*
- *57 to 60*
- *53 to 56*
- *below 53*
- *data not mapped (<5 deaths)*

ASGC Remoteness classification



Details of map boundaries are in Appendix 1.4

Selected cause – Colorectal cancer: avoidable mortality (0 to 74 years), capital cities, Australia, 1997-2001

Capital cities

Over the period 1997 to 2001, deaths from colorectal cancer ranged from a rate of 8.5 per 100,000 population in Darwin to a rate of 15.1 in Hobart (Table 4.13). The rate for all capitals combined was 11.2.

Table 4.13: Avoidable mortality from colorectal cancer, capital cities, Australia, 1997-2001

ASR per 100,000 population

Sydney	Melbourne	Brisbane	Adelaide	Perth	Hobart	Darwin	Canberra	All capitals
10.6	11.3	11.5	11.6	11.5	15.1	8.5	11.0	11.2

Other major urban centres

Rates in the other major urban centres ranged from 10.4 deaths per 100,000 population from colorectal cancer in the Sunshine Coast to 13.9 in Geelong (details in Table A4, Appendix 1.3).

By Statistical Subdivision (SSD)

Death rates from colorectal cancer were generally average or below average in **Sydney** (Map 4.5), with Gosford-Wyong (12.6 deaths per 100,000 population) the only area with a rate in the highest range mapped. The lowest rates were in Lower Northern Sydney (9.2), Inner Western Sydney and Canterbury-Bankstown (both 9.8).

In **Melbourne**, rates were highest in the inner city and southern coastal SSDs, with the highest rates in Northern Middle Melbourne (13.2) and Moreland City (13.0). Rates were lowest in the Yarra Ranges Shire Part A (8.4) and Hume City (9.1).

Rates in **Brisbane** were highest in the SSDs of Redcliffe City (14.8 deaths per 100,000 population), Gold Coast City Part A (12.9) and Caboolture Shire Part A (12.6). The lowest rates were in Logan City (8.3) and Pine Rivers Shire (9.0).

Death rates in the **Adelaide** SSDs were relatively high, ranging from 12.0 deaths per 100,000 population in Western Adelaide to 11.0 in Eastern Adelaide.

For **Perth**, the highest rate was in the South West Metropolitan SSD (13.8), with North Metropolitan (10.0) having the lowest rate.

The rate of deaths from colorectal cancer for residents in **Hobart** was high, at 15.1 deaths per 100,000 population.

The death rate for colorectal cancer in the SSD of **Darwin City** (the only SSD rate mapped) was 9.2 deaths per 100,000 population.

In **Canberra**, death rates varied the most, with the highest death rate of all the capital city SSDs mapped in North Canberra (16.3), and 12.9 deaths per 100,000 population in South Canberra. The two lowest capital city rates mapped were also in Canberra, in Weston Creek-Stromlo (5.5; 8 deaths) and Tuggeranong (8.6).

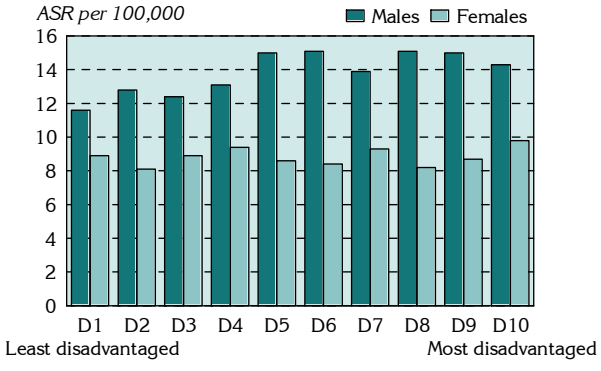
By socioeconomic status

For males, there was a socioeconomic pattern in rates of death from colorectal cancer for all capital cities and other major urban centres combined, although the pattern was variable: for females, there was no relationship evident (Figure 4.7).

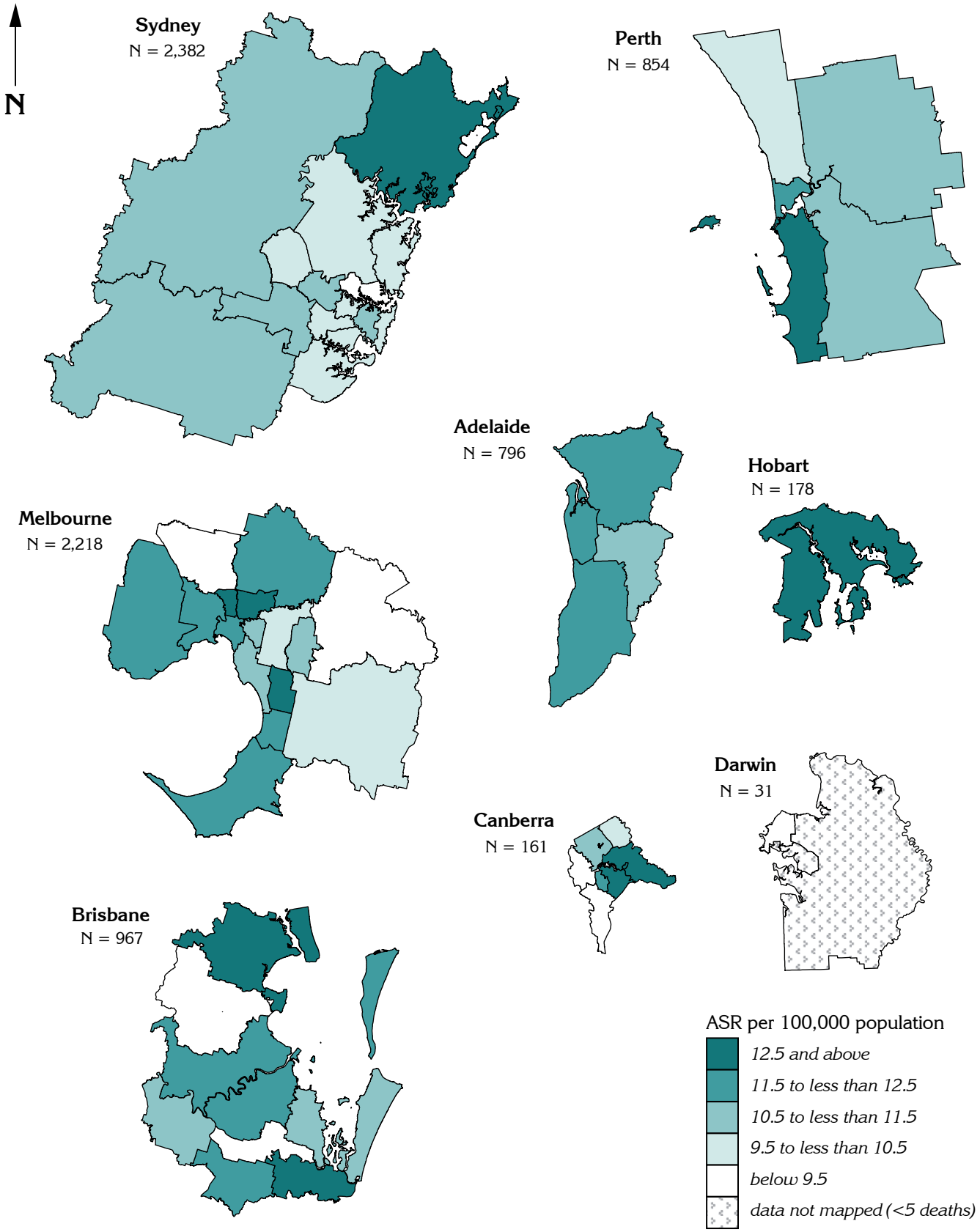
Rates for males were higher than females in each decile, with male rates ranging from 11.6 deaths per 100,000 population in the least disadvantaged areas to 14.3 in the disadvantaged areas in Decile 9. The female rates ranged from 8.1 in Decile 2 to 9.8 in Decile 10.

The differential in the death rates from colorectal cancer between the most disadvantaged areas and least disadvantaged areas was 1.23** for males and 1.10 for females.

Figure 4.7: Avoidable mortality from colorectal cancer by socioeconomic status and sex, capital cities and other major urban centres, Australia, 1997-2001



Map 4.5
Selected cause – Colorectal cancer: avoidable mortality (0 to 74 years), capital cities, Australia, 1997-2001
age standardised deaths per 100,000 population by Statistical Subdivision



Details of map boundaries are in Appendix 1.4

Selected cause – Colorectal cancer: avoidable mortality (0 to 74 years), Australia, 1997-2001

States/ Territories

Death rates from colorectal cancer were higher in the other major urban centres and rest of state/ territory areas than in the capital cities, except in Northern Territory (where the rates differed only slightly) and Tasmania (Table 4.14). Rates in the rest of state/ territory areas were highest in Victoria, with 13.2 deaths per 100,000 population, compared to 11.3 in Melbourne (a rate ratio of 1.17**). The differentials in rates for New South Wales (1.11**), Queensland (1.11*), South Australia (1.11) and Western Australia (1.10) were all around 10%, while the rates in Tasmania were 15% lower outside of the capital city (0.85). Both rates in the Northern Territory were substantially lower than in the states and the ACT.

Table 4.14: Avoidable mortality from colorectal cancer by area, Australia, 1997-2001

ASR per 100,000 population

Area	NSW	Vic	Qld	SA	WA	Tas	NT	ACT	All
Capital city	10.6	11.3	11.5	11.6	11.5	15.1	8.5[1]	11.0	11.2
Other major urban centres	12.6	13.9	11.7	..	..	..	..	..	12.3
Rest of state/ territory areas	11.8	13.2	12.8	12.9	12.6	12.8	8.2[1]	#	12.5
Whole of state/ territory	**11.2**	**11.9**	**12.0**	**11.9**	**11.8**	**13.7**	**8.4**	**11.0**	**11.7**

[1]**Note: rates are based on 21 deaths in Darwin and 31 in the rest of the Northern Territory**

By Statistical Subdivision (SSD)

For **New South Wales**, death rates from colorectal cancer were highest in a strip of SSDs running north-south (Map 4.6). These included Lachlan (17.2 deaths per 100,000 population), Wagga Wagga (16.2) and Central Murrumbidgee (16.0). Central Macquarie (7.2) had the lowest rate.

The highest rates of death in **Victoria** were spread across the state, with the highest in the SSDs of Glenelg (17.0 deaths per 100,000 population) and East Gippsland Shire (16.2). Rates were lowest in East Ovens-Murray (7.9; 10 deaths) and Greater Shepparton City Part A (8.5).

In **Queensland**, rates were highest in Gladstone (19.2), Mackay City Part A (16.3) and Mackay SD Balance (15.9) and lowest in Wide Bay - Burnett SD Balance (9.5) and Sunshine Coast (10.4).

Deaths from colorectal cancer in **South Australia** were highest in Kangaroo Island (17.9 deaths per 100,000 population), Port Pirie and Whyalla (both 17.7), and lowest in Mt Lofty Ranges (9.0; 18 deaths) and Lincoln (9.5; 17 deaths).

The rates in **Western Australia** were highest in Kalgoorlie/ Boulder City Part A (23.2) and Johnston (17.4; 15 deaths). The lowest rates were in Hotham (8.4; 7 deaths) and Fitzroy (8.5; 5 deaths).

For **Tasmania**, the highest rates were in the North Eastern (14.2; 15 deaths), Burnie-Devonport (13.6) and Greater Launceston (13.5) SSDs. Central North (9.9; 13 deaths) and North Western Rural (10.4; 14 deaths) had the lowest rates.

Of the two **Northern Territory** SSDs with sufficient deaths to be mapped, the higher rate was18.9 per 100,000 population (9 deaths) in Lower Top End and the lower rate was 4.3 (5 deaths) in Central.

By remoteness

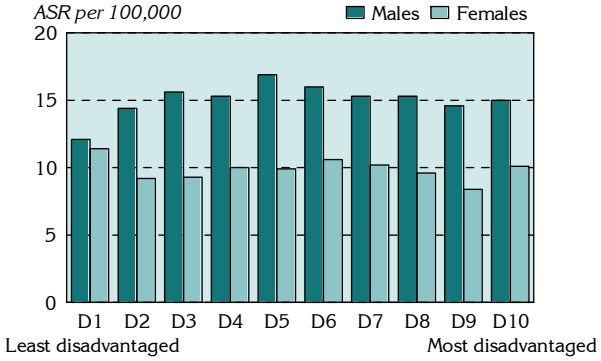
The graph of death rates from colorectal cancer shows (opposite page) an inverse relationship with remoteness, with rates of 11.7 in the Major Cities, 11.5 in the Inner Regional areas, increasing to 12.3 in the Outer Regional areas, before decreasing to 7.7 in the Very Remote areas. The number of deaths decline rapidly across the remoteness classes.

By socioeconomic status

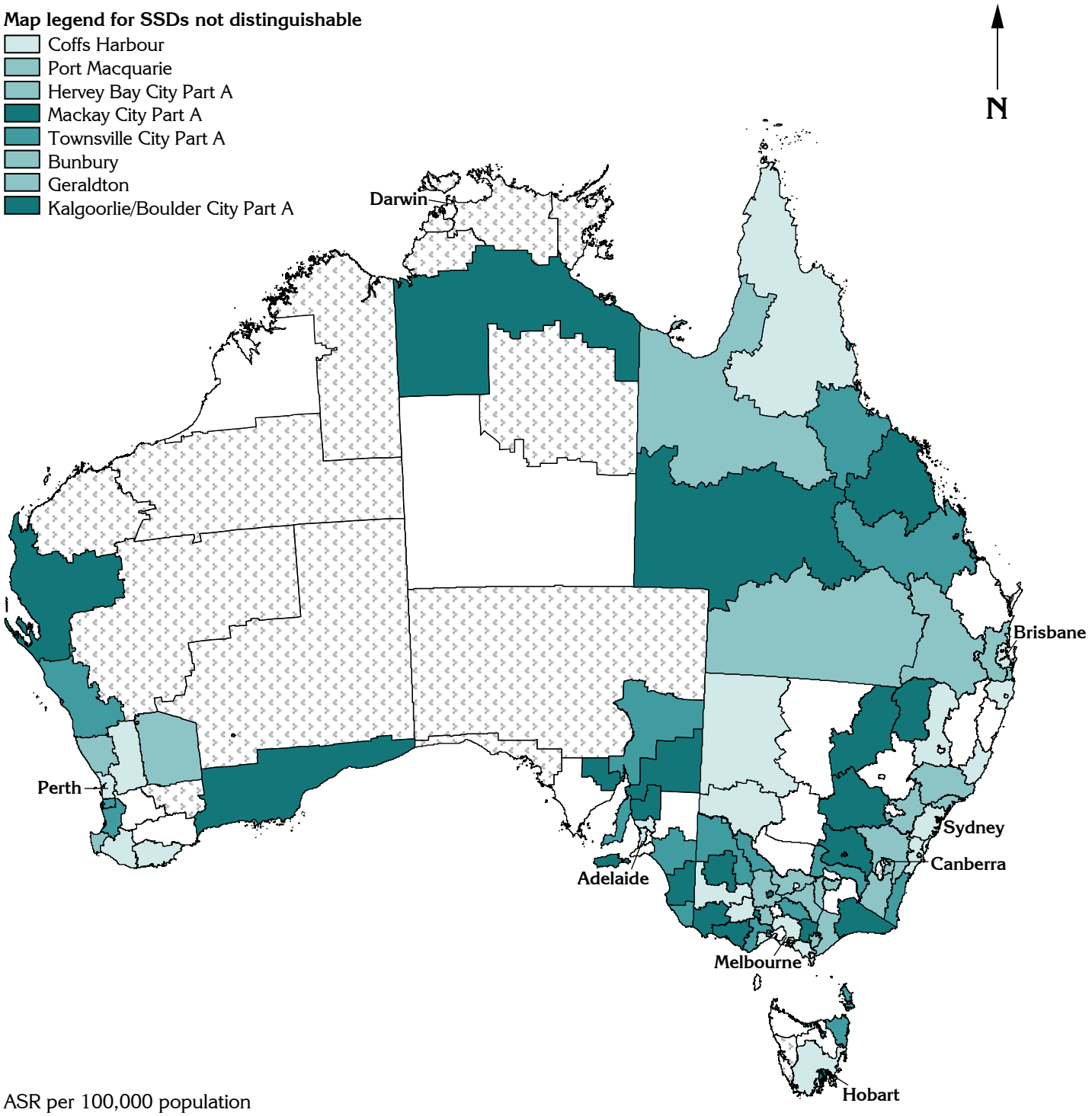
There is no clear socioeconomic pattern in the rates for either males or females for all rest of state/ territory areas combined (Figure 4.8).

Rates for males were higher than for females, ranging from 12.1 in the least disadvantaged areas to 16.9 in Decile 5. The female rates ranged from 8.4 in Decile 9 to 10.6 in Decile 6. The differential in death rates between the most disadvantaged areas and least disadvantaged areas was 1.24** for males and 0.89 for females, with variable rates in the intervening deciles, in particular for males.

Figure 4.8: Avoidable mortality from colorectal cancer by socioeconomic status and sex, rest of states/ territories, Australia, 1997-2001



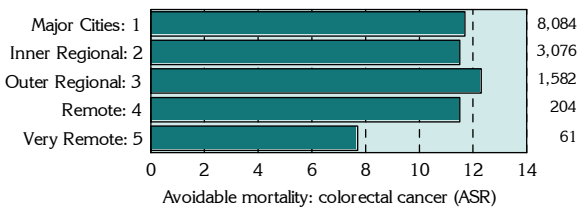
Map 4.6
Selected cause – Colorectal cancer: avoidable mortality (0 to 74 years), Australia, 1997-2001
age standardised deaths per 100,000 population by Statistical Subdivision



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*
- *data not mapped (<5 deaths)*

ASGC Remoteness classification



Details of map boundaries are in Appendix 1.4

Selected cause – Lung cancer: avoidable mortality (0 to 74 years), capital cities, Australia, 1997-2001

Capital cities

Over the period 1997 to 2001, deaths from lung cancer ranged from a rate of 14.9 per 100,000 population in Canberra to a rate of 23.6 in Hobart (Table 4.15). The rate for all capitals combined was 18.2.

Table 4.15: Avoidable mortality from lung cancer, capital cities, Australia, 1997-2001

ASR per 100,000 population

Sydney	Melbourne	Brisbane	Adelaide	Perth	Hobart	Darwin	Canberra	All capitals
17.6	17.8	20.7	18.0	17.9	23.6	24.6	14.9	18.2

Other major urban centres

Rates in the other major urban centres ranged from 16.6 deaths per 100,000 population from lung cancer in the Sunshine Coast to 26.1 in Townsville-Thuringowa (details in Table A4, Appendix 1.3).

By Statistical Subdivision (SSD)

Death rates from lung cancer were highest in the **Sydney** SSDs of Blacktown (24.8 deaths per 100,000 population), Gosford-Wyong (23.1) and Inner Sydney (23.0) (Map 4.7). In contrast to these high rates, over one third of SSDs had rates in the lowest range mapped, with the lowest rate in Central Northern Sydney (10.8 - the lowest rate of all capital cities).

For **Melbourne**, the highest rates were in Melton-Wyndham (25.6), Inner Melbourne (22.9) and Greater Dandenong City (22.4), with the lowest rate in Boroondara City (11.0).

In **Brisbane**, death rates from lung cancer were generally higher, with no SSD rates below the middle range mapped. The highest rates (and the second and third highest of all the capital city SSDs) were in Gold Coast City Part A (29.1) and Redcliffe City (28.8). Redland Shire (18.5) and Brisbane City (19.3) had the lowest rates.

The rates in **Adelaide** for lung cancer ranged from a high of 20.8 deaths per 100,000 population in Northern Adelaide to 13.3 in Eastern Adelaide.

In **Perth**, death rates were fairly evenly spread, ranging from 19.6 deaths per 100,000 population in South East Metropolitan to 15.2 in Central Metropolitan.

The rate of deaths from lung cancer for residents in **Hobart**, at 23.6 deaths per 100,000 population, was in the highest range mapped.

Darwin also had high rates**,** with the highest rate of all the capital cities in Litchfield Shire (38.7 deaths per 100,000 population). The lowest rate was in Darwin City (21.6).

In **Canberra**, death rates from lung cancer were low at the SSD level, reflecting the city's overall low rate: the highest rate was in Weston Creek-Stromlo (19.4 per 100,000 population) and the lowest were in South Canberra (11.4) and Tuggeranong (12.1).

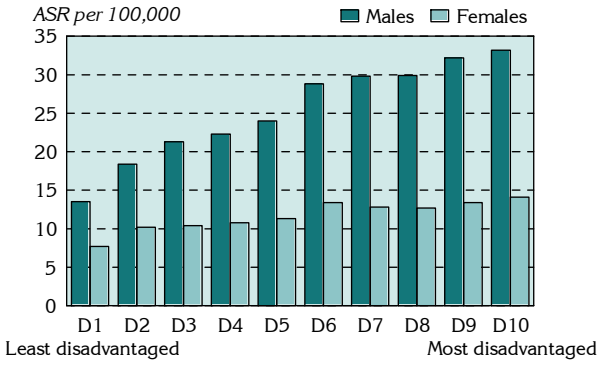
By socioeconomic status

For all capital cities and other major urban centres combined there were largely uninterrupted socioeconomic gradients in the rates of death from lung cancer for both males and females (Figure 4.9).

Rates for males were more than one and a half times those for females in each decile, ranging from 13.5 deaths per 100,000 population in the least disadvantaged areas to 33.2 in the most disadvantaged areas. The female rates ranged from 7.7 in the least disadvantaged areas to 14.1 in Decile 10 (disadvantaged).

The differential in the rates of death from lung cancer between the most disadvantaged areas and least disadvantaged areas was greater for males (2.46**), than for females (1.83**).

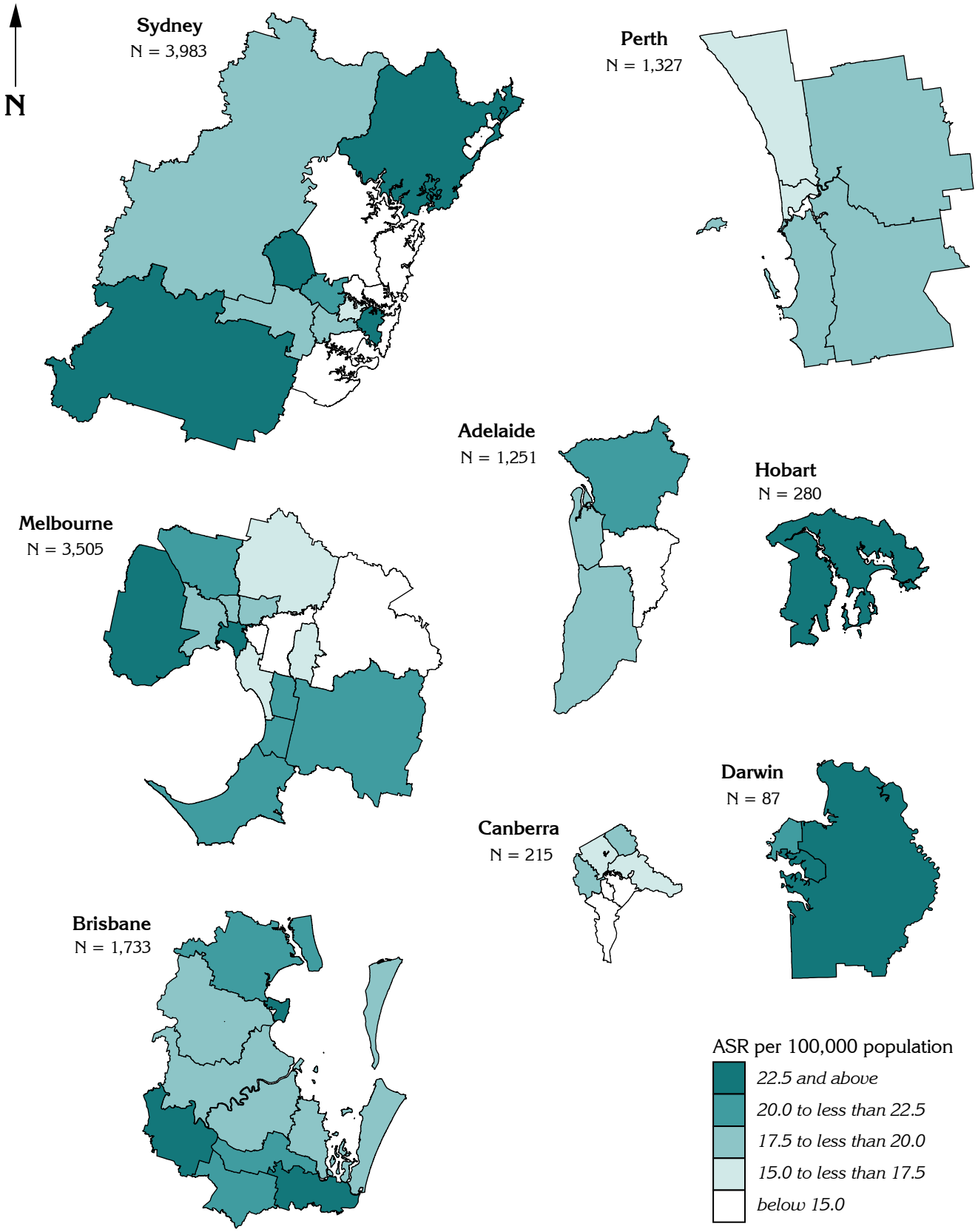
Figure 4.9: Avoidable mortality from lung cancer by socioeconomic status and sex, capital cities and other major urban centres, Australia, 1997-2001



Map 4.7

Selected cause – Lung cancer: avoidable mortality (0 to 74 years), capital cities, Australia, 1997-2001

age standardised deaths per 100,000 population by Statistical Subdivision



Details of map boundaries are in Appendix 1.4

Selected cause – Lung cancer: avoidable mortality (0 to 74 years), Australia, 1997-2001

States/ Territories

In New South Wales and Victoria, death rates from lung cancer were highest in the other major urban centres, followed by the rest of state/ territory areas and the capital cities (Table 4.16). Rates in the rest of state/ territory areas were also higher in Western Australia, and substantially higher in the Northern Territory, with 34.9 deaths per 100,000 population, compared to 24.6 in Darwin, a rate ratio of 1.42*. The rates in the rest of state areas were above those in the capital cities in New South Wales and Victoria (both 1.11**), and Western Australia (1.07), and lower in Queensland (0.99), South Australia (0.97) and Tasmania (0.86*).

Table 4.16: Avoidable mortality from lung cancer by area, Australia, 1997-2001

ASR per 100,000 population

Area	NSW	Vic	Qld	SA	WA	Tas	NT	ACT	All
Capital city	17.6	17.8	20.7	18.0	17.9	23.6	24.6	14.9	18.2
Other major urban centres	21.4	21.5	19.5	..	..	..	..	..	20.6
Rest of state/ territory areas	19.6	19.8	20.5	17.4	19.1	20.2	34.9	#	19.8
Whole of state/ territory	**18.7**	**18.5**	**20.3**	**17.8**	**18.2**	**21.6**	**29.5**	**14.9**	**18.9**

By Statistical Subdivision (SSD)

Relatively high death rates covered much of inland **New South Wales**, with the highest rates in Upper Darling (45.4 deaths per 100,000 population) and Murray-Darling (33.7) (Map 4.8), which, with the exception of the Northern Territory, were the two highest in the rest of state/ territory areas. The lowest rates were in Snowy (11.8; 15 deaths) and Northern Tablelands (14.5).

The highest death rates from lung cancer in **Victoria** were in North Wimmera (27.6 deaths per 100,000 population) and La Trobe Valley (25.3), with the lowest rates in East Ovens-Murray (13.0; 17 deaths) and Wellington Shire (14.3).

In **Queensland,** the highest rates were in the SSDs of Thuringowa City Part A (30.8) and North West (30.5). Moreton SD Balance (16.3) and Sunshine Coast (16.6) had the lowest rates.

Death rates in **South Australia** were highest in West Coast (31.3; 10 deaths) and Whyalla (30.1). Over half of the SSD rates were in the lowest range mapped, with the lowest in Mt Lofty Ranges (9.5; 19 deaths - the lowest rate of all areas), Upper South East (12.3; 15 deaths) and Barossa (12.8).

The rates in **Western Australia** were highest in Kalgoorlie/Boulder City Part A (33.4 deaths per 100,000 population), Fortescue (29.9; 13 deaths), Carnegie (28.7; 5 deaths) and Geraldton (27.0), and lowest in Pallinup (12.4; 8 deaths) and Campion (13.6; 9 deaths).

In **Tasmania,** death rates were highest in Lyell (30.5; 9 deaths), and lowest in North Eastern (18.4) and Burnie-Devonport (18.8).

In the **Northern Territory**, rates in the SSDs were high, ranging from 78.5 deaths per 100,000 population in East Arnhem and 68.5 (10 deaths) in Alligator to 22.3 in Central SSD.

By remoteness

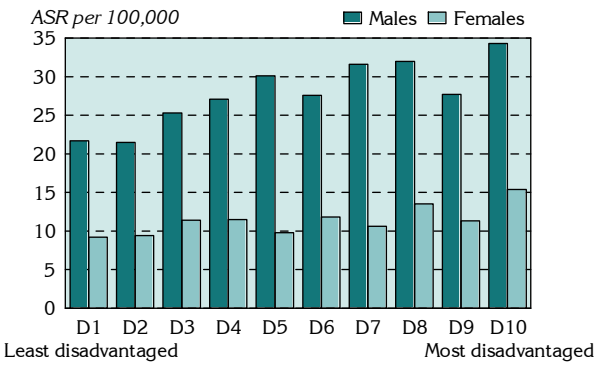
The graph of death rates from lung cancer by remoteness shows (opposite page) the lowest rate in the Inner Regional areas, with a rate of 17.7, increasing to 25.2 in the Very Remote areas. The number of deaths from lung cancer decline rapidly across the remoteness classes.

By socioeconomic status

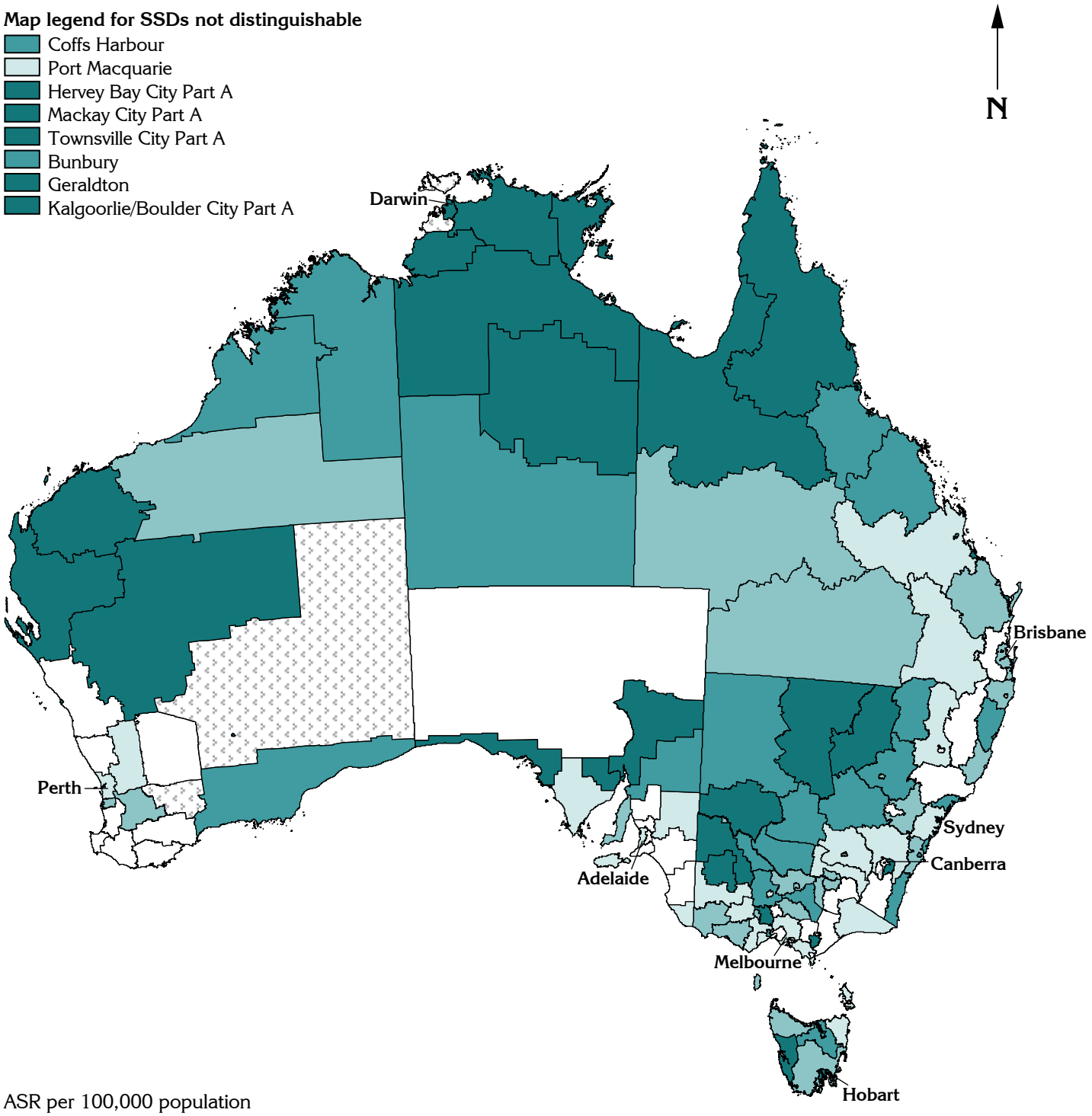
For all rest of state/ territory areas combined there is a largely uninterrupted socioeconomic gradient in death rates for lung cancer for both males: the pattern for females is less clear (Figure 4.10).

Rates for males were more than 80% higher than those for females in each decile, ranging from 21.5 in Decile 2 (less disadvantaged) to 34.3 in the most disadvantaged areas. The female rates ranged from 9.2 in the least disadvantaged areas to 15.4 in the most disadvantaged areas. The differential in rates between the most disadvantaged areas and least disadvantaged areas was 1.58** for males and 1.67** for females.

Figure 4.10: Avoidable mortality from lung cancer by socioeconomic status and sex, rest of states/ territories, Australia, 1997-2001



Map 4.8
Selected cause – Lung cancer: avoidable mortality (0 to 74 years), Australia, 1997-2001
age standardised deaths per 100,000 population by Statistical Subdivision



Details of map boundaries are in Appendix 1.4

Major condition group – Cardiovascular diseases: avoidable mortality (0 to 74 years), capital cities, Australia, 1997-2001

Capital cities

Over the period 1997 to 2001, the death rate from cardiovascular diseases considered to be avoidable (see *Methods*) ranged from 42. 8 per 100,000 population in Canberra to a rate of 70.1 in Darwin (Table 4.17). The rate for all capitals combined was 49.6 deaths per 100,000 population.

Table 4.17: Avoidable mortality from cardiovascular diseases, capital cities, Australia, 1997-2001

ASR per 100,000 population

Sydney	Melbourne	Brisbane	Adelaide	Perth	Hobart	Darwin	Canberra	All capitals
51.2	44.6	54.3	51.2	43.6	57.9	73.3	42.9	48.9

Other major urban centres

Rates in the other major urban centres ranged from 47.0 deaths per 100,000 population in Sunshine Coast to 66.5 in Townsville-Thuringowa (details in Table A4, Appendix 1.3).

By Statistical Subdivision (SSD)

In **Sydney**, death rates from avoidable cardiovascular diseases varied substantially, with the majority of the SSD rates in the two highest ranges (Map 4.9). The highest rates were in Inner Sydney (69.4 deaths per 100,000 population) and Blacktown (69.3) and the lowest rates were in Central Northern Sydney (32.8) and Northern Beaches (34.4).

The rates in **Melbourne** at the SSD level were relatively low, with the highest rates in Melton-Wyndham (55.9) and Inner Melbourne (55.8). The lowest rates were in Boroondara City (33.8) and Eastern Middle Melbourne (35.6).

The rates in **Brisbane** were highest in Logan City (64.8 deaths per 100,000 population) and Gold Coast City Part A (64.6) and lowest in Beaudesert Shire Part A (45.7) and Redland Shire (46.8).

The rates in **Adelaide** varied little at the SSD level, from a rate of 57.1 deaths per 100,000 population in Western Adelaide to 45.8 in Southern Adelaide.

In **Perth**, death rates at the SSD level were all relatively low, with the highest rate in East Metropolitan (49.3) and the lowest in North Metropolitan (39.0).

For **Hobart** residents**,** the death rate was 57.9 deaths per 100,000 population.

The rates were high in the three SSDs in **Darwin**, ranging from 81.9 deaths per 100,000 population in Palmerston-East Arm (the highest rate of all capital city SSDs) to a low of 64.8 in Litchfield Shire.

Rates in **Canberra** were comparatively low, with the highest rate in South Canberra (49.9). The lowest rates were in Gungahlin-Hall (27.5; 13 deaths - the lowest rate of all capital city SSDs) and Tuggeranong (37.7).

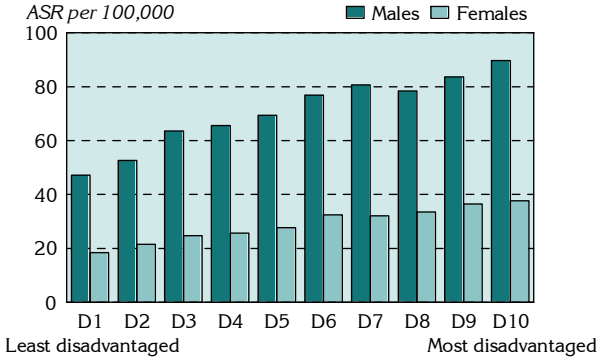
By socioeconomic status

For all capital cities and other major urban centres combined, there was a largely uninterrupted socioeconomic gradient in rates of death from cardiovascular diseases considered avoidable, for both males and females (Figure 4.11).

Rates for males were more than twice those for females in each decile, ranging from 47.2 deaths per 100,000 population in the least disadvantaged areas to 89.7 in the most disadvantaged areas. The female rates ranged from 18.4 in the least disadvantaged areas to 37.7 in the disadvantaged areas.

The differential in avoidable death rates from cardiovascular diseases between the most disadvantaged areas and least disadvantaged areas was greater for females (2.05**) than for males (1.90**).

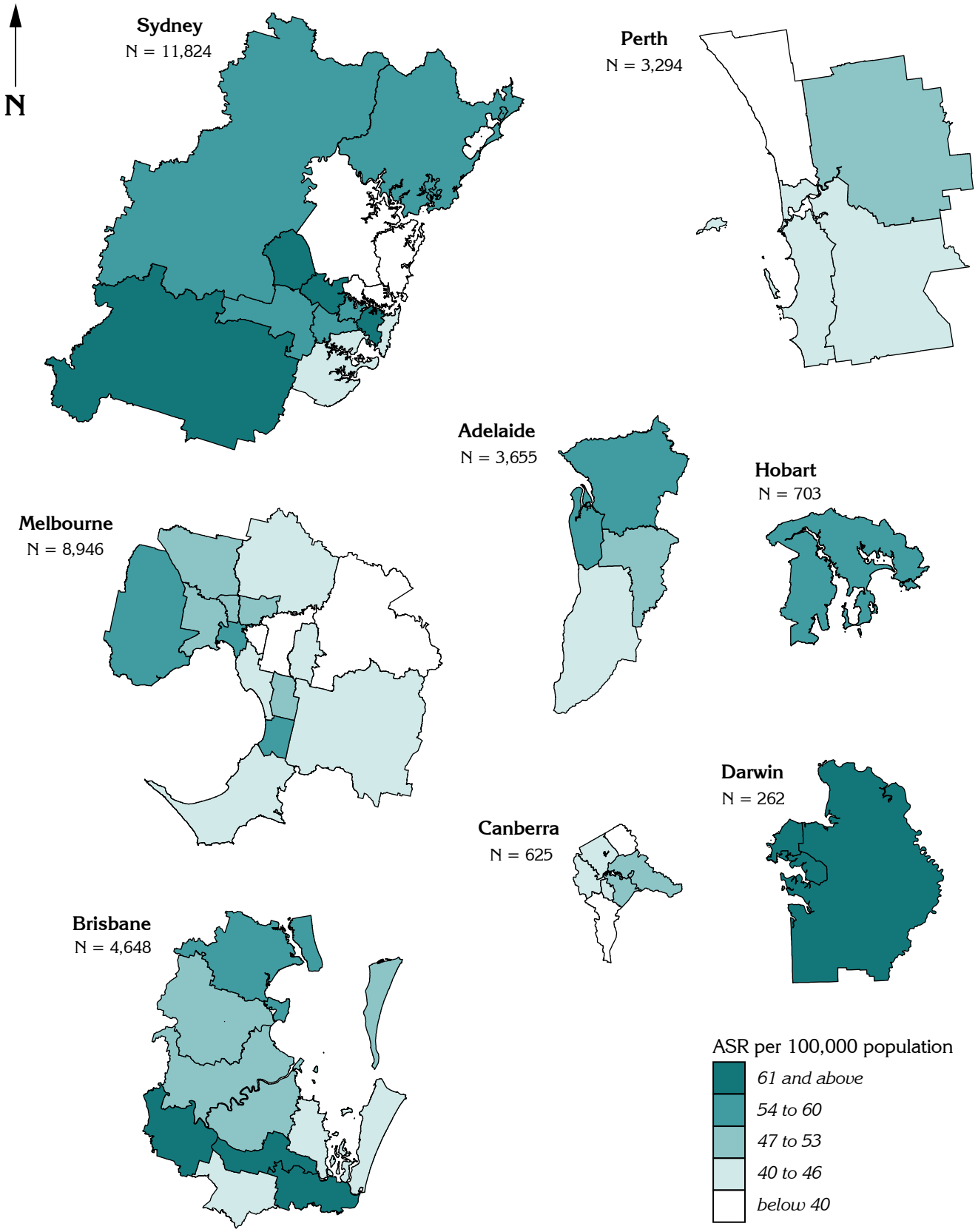
Figure 4.11: Avoidable mortality from cardiovascular diseases by socioeconomic status and sex, capital cities and other major urban centres, Australia, 1997-2001



Map 4.9

Major condition group – Cardiovascular diseases: avoidable mortality (0 to 74 years), capital cities, Australia, 1997-2001

age standardised deaths per 100,000 population by Statistical Subdivision



Details of map boundaries are in Appendix 1.4

Major condition group – Cardiovascular diseases: avoidable mortality (0 to 74 years), Australia, 1997-2001

State/ Territory comparison

Death rates from potentially avoidable cardiovascular diseases (see *Methods*) in the rest of state/ territory areas were approximately 10% to 20% (all significant at the 0.01 level) above those in the capital cities, other than in the Northern Territory (where they were substantially higher) and Tasmania (2% lower, a rate ratio of 0.98) (Table 4.18). In the Northern Territory, the death rate outside of Darwin was more than twice (2.17**) that in Darwin (149.9 deaths per 100,000 population and 70.1 per 100,000 population, respectively).

Table 4.18: Avoidable mortality from cardiovascular diseases by area, Australia, 1997-2001

ASR per 100,000 population

Area	NSW	Vic	Qld	SA	WA	Tas	NT	ACT	All
Capital city	51.2	44.6	54.3	51.2	43.6	57.9	73.3	42.9	48.9
Other major urban centres	61.0	54.4	51.8	..	..	..	..	..	56.3
Rest of state/ territory areas	59.8	52.3	59.2	59.8	53.1	56.8	159.2	#	58.1
Whole of state/ territory	**55.1**	**47.0**	**55.6**	**53.7**	**46.2**	**57.4**	**110.8**	**43.0**	**52.4**

By Statistical Subdivision (SSD)

Death rates from potentially avoidable cardiovascular diseases were comparatively high in **New South Wales** (Map 4.10), with the highest rates in Upper Darling (102.1 deaths per 100,000 population) and North Central Plain (90.0). Rates were lowest in Coffs Harbour (47.0), Port Macquarie (49.5) and Central Murray (49.6).

The rates in **Victoria** were generally lower, with the highest rates in North Wimmera (65.9) and La Trobe Valley (63.9), and the lowest in South Goulburn (33.0) and East Barwon (38.4) (the two lowest SSD rates across Australia, outside of the capital cities).

In **Queensland**, rates were substantially higher in the North West (101.1 deaths per 100,000 population), South West (94.4) and Central West (89.5) SSDs. The lowest rates were in Hervey Bay City Part A (45.6), Sunshine Coast (47.0) and Moreton SD Balance (47.1).

Death rates in **South Australia** were highest in the West Coast (92.8 deaths per 100,000 population), Flinders Ranges (79.6) and Whyalla (79.3) SSDs. The lowest rates were in Lower North (43.0) and Fleurieu (43.3).

In **Western Australia**, rates were substantially higher in Ord (118.4), Fitzroy (116.2) and De Grey (91.5). The lowest rates were in the SSDs of Avon (40.2), Moore (43.3) and King (45.6).

The rates in **Tasmania** were within a smaller range, with the highest rates in Lyell (78.3) and North Eastern (64.0), and the lowest in North Western Rural (45.5) and Greater Launceston (55.2).

The rates in the **Northern Territory** SSDs were all notably higher than in the other states, with the highest rates in Bathurst-Melville (325.2; 16 deaths) and Alligator (302.9), and the lowest in Central (126.7).

By remoteness

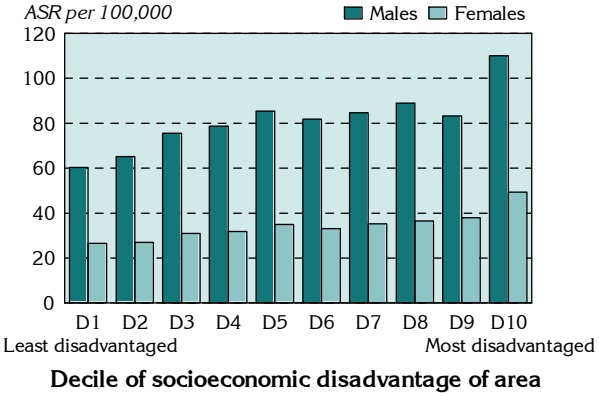
The graph of death rates by remoteness shows (opposite page) the lowest rates in the Major Cities and Inner Regional, with rates of 51.1 and 50.5, respectively, increasing to 63.6 in the Remote areas, followed by a sharp increase to 100.8 in the Very Remote areas. The number of deaths decline rapidly across the remoteness classes.

By socioeconomic status

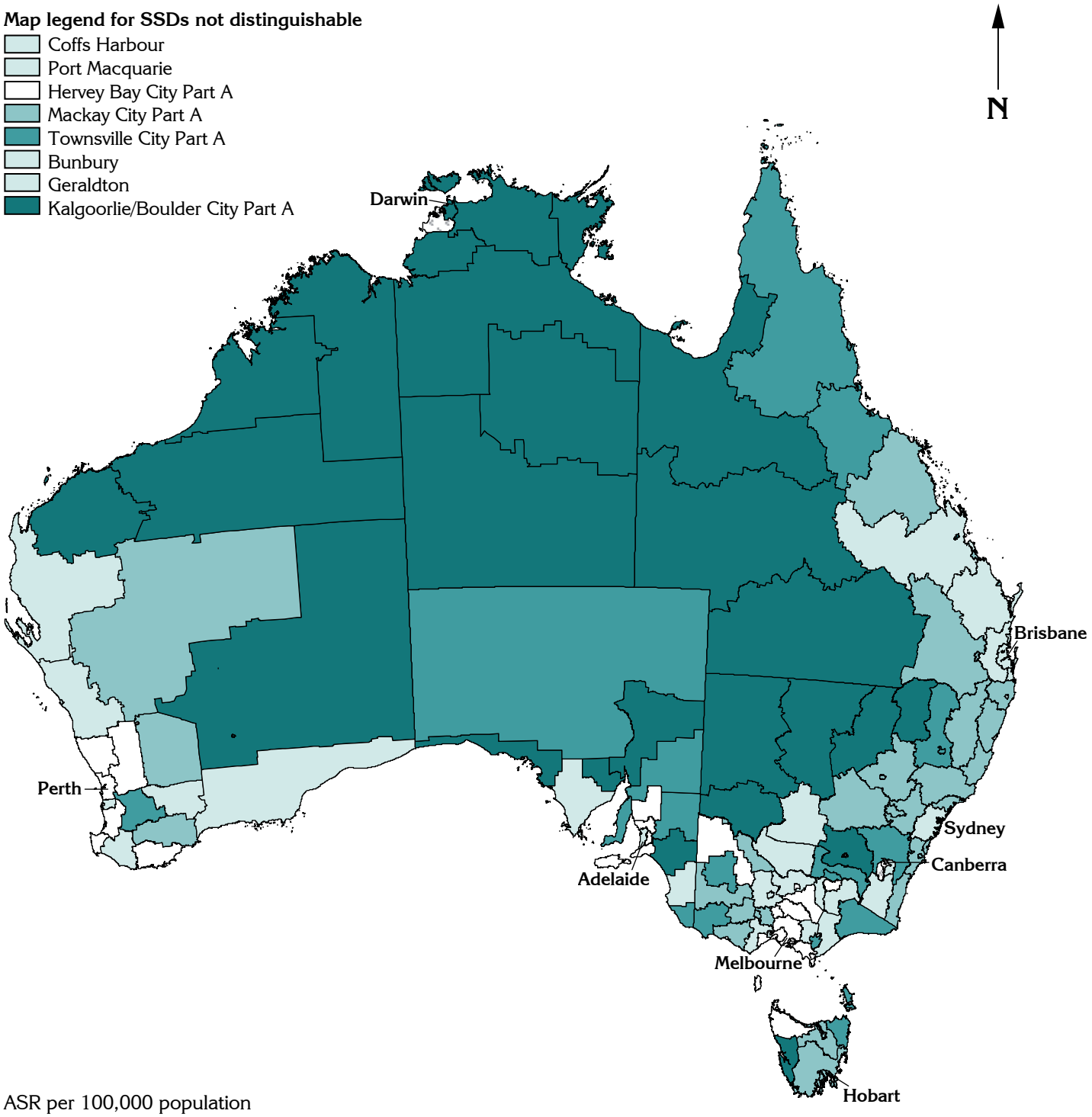
For all rest of state/ territory areas combined, there were largely uninterrupted socioeconomic gradients in the rates for both males and females (Figure 4.12).

Rates for males were more than twice those for females in each decile, ranging from 60.3 in the least disadvantaged areas to 110.1 in the most disadvantaged areas. The female rates ranged from 26.5 in the least disadvantaged areas to 49.4 in the most disadvantaged areas. The differential in rates between the most disadvantaged areas and least disadvantaged areas was 1.83** for males and 1.86** for females.

Figure 4.12: Avoidable mortality from cardiovascular diseases by socioeconomic status and sex, rest of states/ territories, Australia, 1997-2001



Map 4.10
Major condition group – Cardiovascular diseases: avoidable mortality (0 to 74 years), Australia, 1997-2001
age standardised deaths per 100,000 population by Statistical Subdivision



Details of map boundaries are in Appendix 1.4

Selected cause – Ischaemic heart disease: avoidable mortality (0 to 74 years), capital cities, Australia, 1997-2001

Capital cities

Over the period 1997 to 2001, deaths from ischaemic heart disease ranged from a rate of 30.1 per 100,000 population in Canberra to a rate of 48.8 in Darwin (Table 4.19). The rate for all capitals combined was 35.5.

Table 4.19: Avoidable mortality from ischaemic heart disease, capital cities, Australia, 1997-2001

ASR per 100,000 population

Sydney	Melbourne	Brisbane	Adelaide	Perth	Hobart	Darwin	Canberra	All capitals
36.8	31.9	40.2	37.5	31.8	41.1	50.0	30.2	35.3

Other major urban centres

Rates in the other major urban centres were all higher than the 'All capitals' average, ranging from 35.8 deaths per 100,000 population from ischaemic heart disease in the Sunshine Coast to 50.9 in Townsville-Thuringowa (details in Table A4, Appendix 1.3).

By Statistical Subdivision (SSD)

Over one third of the SSDs in **Sydney** had death rates from ischaemic heart disease in the highest range mapped (Map 4.11), with the highest rates in Inner Sydney (51.9 deaths per 100,000 population) and Blacktown (50.0), and the lowest rate in Central Northern Sydney (23.2).

For **Melbourne**, the SSD-level rates were all lower, with the highest rates in Melton-Wyndham (43.0) and Inner Melbourne (40.2), and the lowest rates in Boroondara City (22.3) and Eastern Middle Melbourne (25.9).

The highest death rates from ischaemic heart disease in **Brisbane** were in the north and the south, with rates of 49.7 in Logan City and 48.7 in Caboolture Shire Part A. The lowest rates were in Beaudesert Shire Part A (33.0) and Redland Shire (33.1).

In **Adelaide**, rates varied from a high of 41.2 deaths per 100,000 population in Northern Adelaide to a low of 33.2 in Southern Adelaide.

Within the low overall rate for **Perth**, rates at the SSD level were also low, ranging from 35.8 deaths per 100,000 population in East Metropolitan to 29.1 and 29.7 in North Metropolitan and Central Metropolitan, respectively.

The rate in **Hobart** was relatively high, at 41.1 deaths per 100,000 population.

The rates at the SSD level were also relatively high in **Darwin**, with the highest SSD rate of all the capital cities in Palmerston-East Arm (57.2 deaths from ischaemic heart disease per 100,000 population). The lowest rate was in Litchfield Shire (42.9).

Death rates in **Canberra** from ischaemic heart disease were comparatively low, with the highest rate in North Canberra (33.3). The lowest rate was in Gungahlin-Hall (21.2), which had the lowest rate of the capital city SSDs.

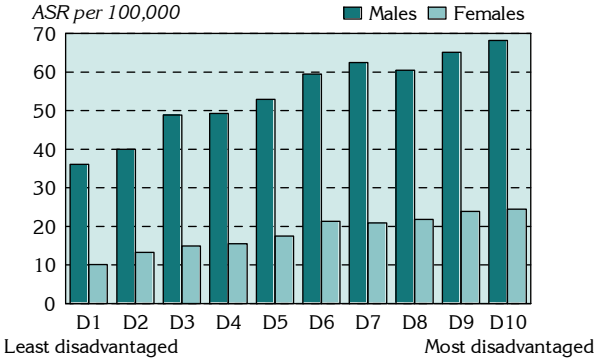
By socioeconomic status

For all capital cities and other major urban centres combined, there was a largely uninterrupted socioeconomic gradient in rates of death from ischaemic heart disease for both males and females (Figure 4.13).

Rates for males were more than twice those for females in each decile, ranging from 36.1 deaths per 100,000 population in the least disadvantaged areas to 68.2 in the most disadvantaged areas. The female rates ranged from 10.1 in the least disadvantaged areas to 24.5 in the most disadvantaged areas (Decile 10).

The differential in rates of death from ischaemic heart disease between the most disadvantaged areas and least disadvantaged areas was greater for females (2.43**) than for males (1.89**).

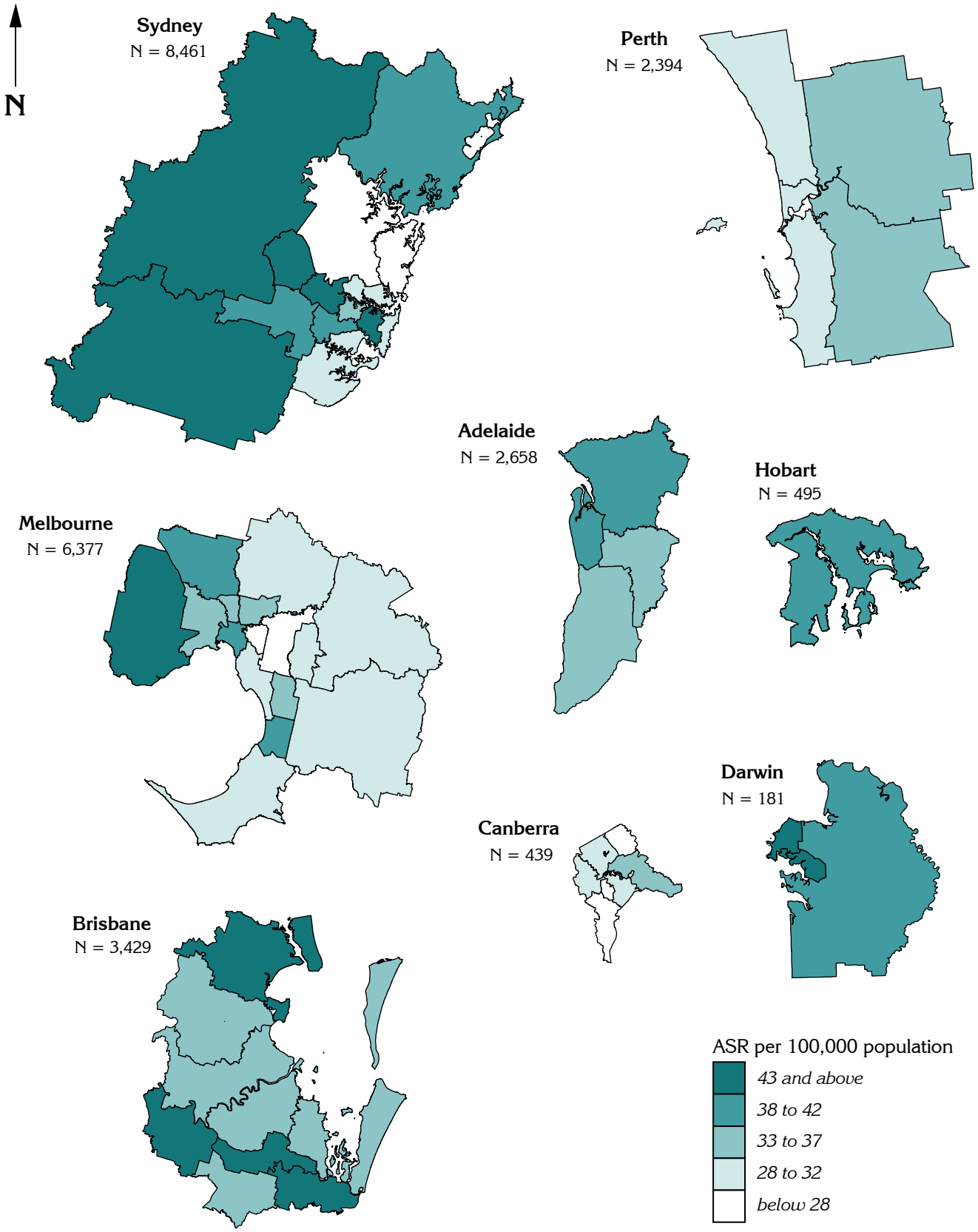
Figure 4.13: Avoidable mortality from ischaemic heart disease by socioeconomic status and sex, capital cities and other major urban centres, Australia, 1997-2001



Map 4.11

Selected cause – Ischaemic heart disease: avoidable mortality (0 to 74 years), capital cities, Australia, 1997-2001

age standardised deaths per 100,000 population by Statistical Subdivision



Details of map boundaries are in Appendix 1.4

Selected cause – Ischaemic heart disease: avoidable mortality (0 to 74 years), Australia, 1997-2001

States/ Territories

Over the period 1997 to 2001, death rates from ischaemic heart disease were higher in the rest of state/ territory areas than in the capital cities in all jurisdictions, except Tasmania (Table 4.20). In the Northern Territory, the rate for the rest of territory areas was substantially higher than the rate in Darwin, with 109.9 deaths per 100,000 population, compared with 50.0 deaths per 100,000 population, respectively, a rate ratio of 2.20**. The differentials in rates between the rest of state areas and capital cities in the other states were all around 1.2**, other than in Queensland (1.1**) and Tasmania (where there was very little difference in the rates).

Table 4.20: Avoidable mortality from ischaemic heart disease by area, Australia, 1997-2001

ASR per 100,000 population

Area	NSW	Vic	Qld	SA	WA	Tas	NT	ACT	All
Capital city	36.8	31.9	40.2	37.5	31.8	41.1	50.0	30.2	35.3
Other major urban centres	46.1	39.1	39.5	..	..	..	..	..	42.5
Rest of state/ territory areas	44.1	38.7	44.4	45.2	39.1	41.0	109.9	#	43.0
Whole of state/ territory	**40.2**	**34.0**	**41.6**	**39.7**	**33.8**	**41.1**	**75.6**	**30.2**	**38.4**

By Statistical Subdivision (SSD)

For **New South Wales**, the pattern is of higher rates throughout the north and north-west (Map 4.12), with the highest rates in Upper Darling (71.3) and North Central Plain (65.0). The lowest rates were in Coffs Harbour (34.7) and Snowy (36.4) SSDs.

In **Victoria,** the rates at the SSD level were lower, with the highest rates in Mildura Rural City Part A (50.6), La Trobe Valley (48.3) and Glenelg (48.2). The lowest rate (and the lowest in any rest of state/ territory area) was in South Goulburn (22.2).

The highest rates in **Queensland** were in the far west of the State, in the Central West (76.0), South West (68.8) and North West (68.7) SSDs. Hervey Bay City Part A (34.7) and Moreton Balance (35.7) had the lowest rates.

In **South Australia,** the highest rates were largely in SSDs in the north and north-west, with the highest rate in West Coast (77.0). The lowest rate was in Kangaroo Island (27.6; 8 deaths), followed by Fleurieu (32.4) and Mount Lofty Ranges (32.7).

The rates in **Western Australia** were highest in Ord (73.3) and Fitzroy (68.6) in the far north of the state. The lowest rates were in Avon (30.1) and Vasse (31.4).

For **Tasmania**, the highest rate was in Lyell (63.9 deaths per 100,000 population and 19 deaths), with the lowest rate in North Western Rural (30.6).

In the **Northern Territory**, the rates were all relatively high, with the highest rates in Bathurst-Melville (265.4; 13 deaths - the highest rate in Australia) and Alligator (236.3). All of the SSD rates mapped in the Northern Territory were higher than the other rest of state/ territory rates.

By remoteness

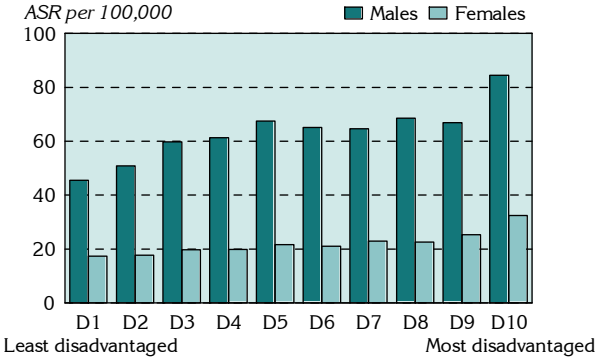
The graph of death rates from ischaemic heart disease by remoteness shows (opposite page) a marginal increase between the Major Cities, with a rate of 37.1, and the Inner Regional areas (37.5), followed by a steady increase to 43.1 in the Remote areas and a larger increase to 72.9 in the Very Remote areas. The number of deaths decline rapidly across the remoteness classes.

By socioeconomic status

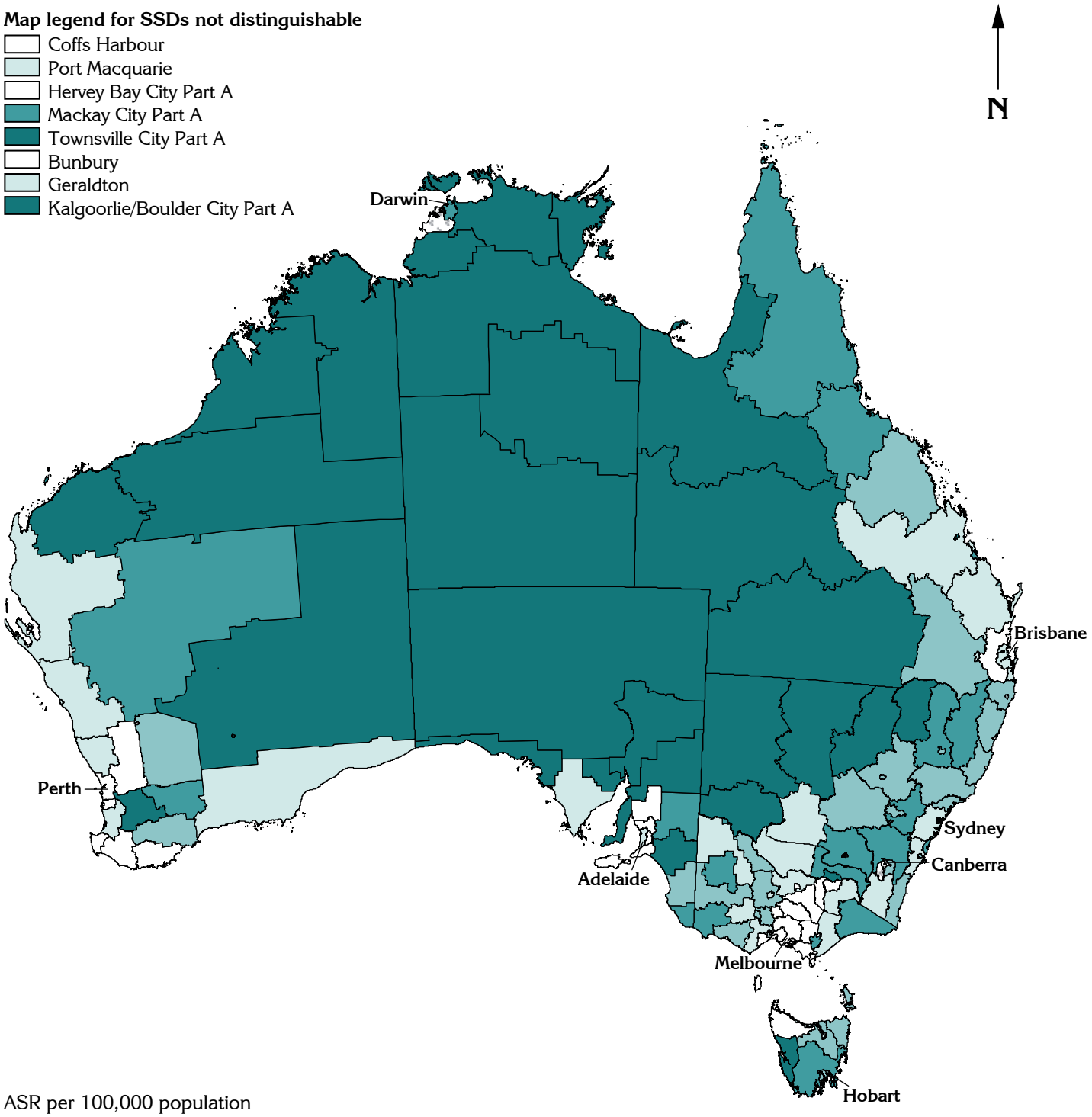
For all rest of state/ territory areas combined, there was a gradient in the rates by decile of socioeconomic disadvantage of area, for both males and females (Figure 4.14)

Rates for males were higher, ranging from 45.5 in the least disadvantaged areas to 84.4 in the most disadvantaged areas. The female rates ranged from 17.4 in the least disadvantaged areas to 32.5 in the most disadvantaged areas. The differential in rates between the most disadvantaged areas and least disadvantaged areas was marginally larger for females (1.87**) than for males (1.85**).

Figure 4.14: Avoidable mortality from ischaemic heart disease by socioeconomic status and sex, rest of states/ territories, Australia, 1997-2001



Map 4.12
Selected cause – Ischaemic heart disease: avoidable mortality (0 to 74 years), Australia, 1997-2001
age standardised deaths per 100,000 population by Statistical Subdivision



Details of map boundaries are in Appendix 1.4

Selected cause – Cerebrovascular diseases: avoidable mortality (0 to 74 years), capital cities, Australia, 1997-2001

Capital cities

Over the period 1997 to 2001, deaths from cerebrovascular diseases ranged from a rate of 9.6 per 100,000 population in Perth to a rate of 15.6 in Darwin (Table 4.21). The rate for all capitals combined was 11.0.

Table 4.21: Avoidable mortality from cerebrovascular diseases, capital cities, Australia, 1997-2001

ASR per 100,000 population

Sydney	Melbourne	Brisbane	Adelaide	Perth	Hobart	Darwin	Canberra	All capitals
11.3	9.9	10.9	10.5	9.3	12.5	16.9	9.8	10.5

Other major urban centres

Rates in the other major urban centres ranged from 8.6 deaths per 100,000 population from cerebrovascular diseases in the Sunshine Coast to 12.0 in Townsville-Thuringowa (details in Table A4, Appendix 1.3).

By Statistical Subdivision (SSD)

Death rates from cerebrovascular diseases in **Sydney** were highest in the inner and south-western SSDs (Map 4.13), in Blacktown and Fairfield-Liverpool (both 15.3 deaths per 100,000 population) and Inner Western Sydney (14.2). Northern Beaches (6.8 - the lowest rate of all the capital city areas) and Central Northern Sydney (7.1) had the lowest rates.

In **Melbourne**, the rates were comparatively low, with the highest rates in Inner Melbourne (12.0 deaths per 100,000 population), Frankston City (11.7) and Hume City (11.5). Almost half of the SSDs had rates in the lowest two ranges mapped, with the lowest rates in Yarra Ranges Shire Part A and Eastern Middle Melbourne (both 7.6).

The rates of death in **Brisbane** were highest in Gold Coast City Part A (13.6 deaths per 100,000 population) and Redcliffe City (12.9), with the lowest rate in Pine Rivers Shire (7.8).

The pattern for **Adelaide** showed the highest rate to be in Western Adelaide (12.5) and the lowest rate in Northern Adelaide (9.5).

Death rates from cerebrovascular diseases in **Perth** were relatively evenly spread at the SSD level, with the highest rate in East Metropolitan (10.9 deaths per 100,000 population) and the lowest rate in North Metropolitan (7.5).

For residents in **Hobart**, the death rate was 12.5 deaths per 100,000 population.

In **Darwin**, the rates were all high, with 20.8 deaths per 100,000 population (10 deaths) in Palmerston-East Arm, 16.3 (8 deaths) in Litchfield Shire and 16.2 in Darwin City.

The rates in **Canberra** varied substantially, with the second highest rate of all capital city SSDs in South Canberra (16.4 deaths per 100,000 population), and the lowest rate in Tuggeranong (7.0; 19 deaths).

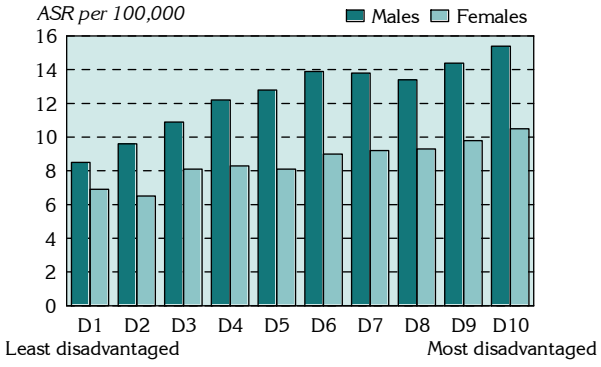
By socioeconomic status

For all capital cities and other major urban centres combined, there was a largely uninterrupted socioeconomic gradient in the rates of death from cerebrovascular diseases for both males and females (Figure 4.15).

Rates for males were higher than females in each decile, ranging from 8.5 deaths per 100,000 population in the least disadvantaged areas to 15.4 in the most disadvantaged areas. The female rates ranged from 6.5 in Decile 2 (advantaged) to 10.5 in the most disadvantaged areas.

The differentials in rates of death from cerebrovascular diseases between the most disadvantaged and least disadvantaged areas were 1.81** for males and 1.52** for females.

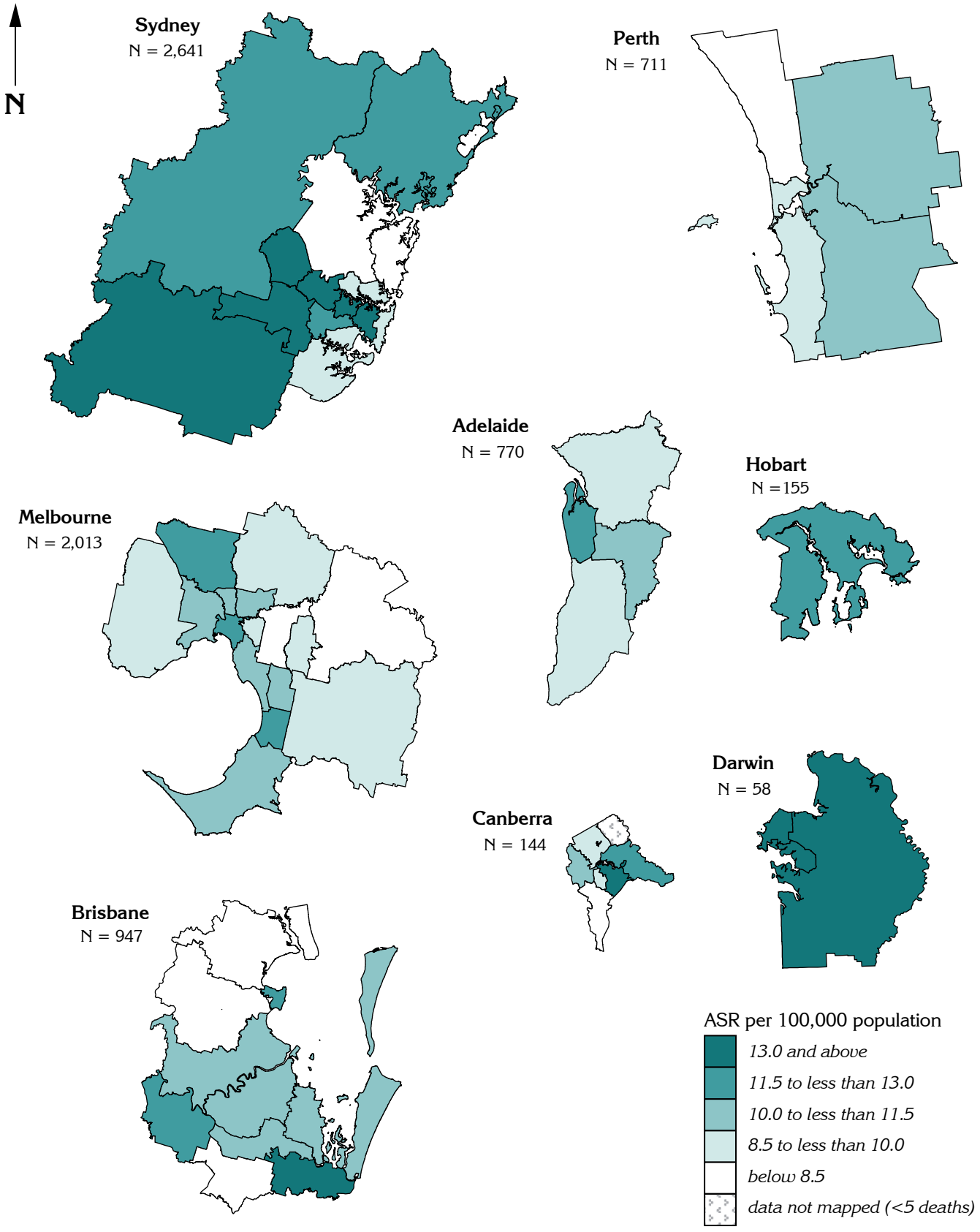
Figure 4.15: Avoidable mortality from cerebrovascular diseases by socioeconomic status and sex, capital cities and other major urban centres, Australia, 1997-2001



Map 4.13

Selected cause – Cerebrovascular diseases: avoidable mortality (0 to 74 years), capital cities, Australia, 1997-2001

age standardised deaths per 100,000 population by Statistical Subdivision



Details of map boundaries are in Appendix 1.4

Selected cause – Cerebrovascular diseases: avoidable mortality (0 to 74 years), Australia, 1997-2001

States/ Territories

Over the period 1997 to 2001, death rates from cerebrovascular diseases were higher in the rest of state/ territory areas than in the capital cities in all states except Tasmania (Table 4.22). In the Northern Territory, the rate for the rest of territory areas was substantially higher, with 27.6 deaths per 100,000 population, compared with 15.6 deaths per 100,000 population in Darwin, a rate ratio of 1.81**. The differentials in rates between the rest of state areas and capital cities in the other states were all around 1.0, other than in Western Australia, which was higher (1.15*), and Tasmania, with a marginally lower rate outside of the capital city (0.98).

Table 4.22: Avoidable mortality from cerebrovascular diseases by area, Australia, 1997-2001

ASR per 100,000 population

Area	NSW	Vic	Qld	SA	WA	Tas	NT	ACT	All
Capital city	11.3	9.9	10.9	10.5	9.3	12.5	16.9	9.8	10.5
Other major urban centres	11.4	11.1	9.5	..	..	..	..	..	10.6
Rest of state/ territory areas	12.0	10.3	11.3	11.2	10.7	12.3	30.6	#	11.5
Whole of state/ territory	**11.5**	**10.0**	**10.8**	**10.7**	**9.7**	**12.5**	**22.7**	**9.8**	**10.8**

By Statistical Subdivision (SSD)

For **New South Wales**, rates of cerebrovascular diseases were highest in Upper Darling (29.0 deaths per 100,000 population and 16 deaths), Central Murrumbidgee (17.6) and Upper Murray (17.0) (Map 4.14). The lowest rates were in Tweed Heads (8.2) and Queanbeyan (8.3; 16 deaths).

Death rates in **Victoria** were generally lower at the SSD level, with the highest rates in West Central Highlands (14.5) and North Wimmera (13.8). Almost half of the SSD rates were in the two lowest ranges mapped, with the lowest in East Ovens-Murray (5.3; 7 deaths) and East Barwon (5.8).

In **Queensland**, the highest rates were in North West (21.1 deaths per 100,000 population) and South West (21.0) SSDs. Hervey Bay City Part A (7.1) and Fitzroy SD Balance (8.4) had the lowest rates.

The rates in **South Australia** were highest in the north, in the SSDs of Flinders Ranges (20.9 deaths per 100,000 population) and Whyalla (19.4). The lowest rates were in Lower North (6.9; 10 deaths) and Upper South East (7.2; 9 deaths).

The pattern of rates in **Western Australia** was of higher rates in the north and north-eastern SSDs, with the highest rates of death from in Ord (36.6; 12 deaths) and Fitzroy (32.6; 19 deaths). Half of the SSD rates mapped were in the lowest two ranges, with the lowest rates in Preston (5.9; 10 deaths) and Avon (6.7; 12 deaths).

In **Tasmania,** deaths were highest in the North Eastern (20.1 deaths per 100,000 population) SSD and lowest in the Southern (8.6) area.

Death rates were high in all SSDs in the **Northern Territory**, with rates varying from 43.4 deaths per 100,000 population (8 deaths) in Barkly to 31.3 in Central SSD.

By remoteness

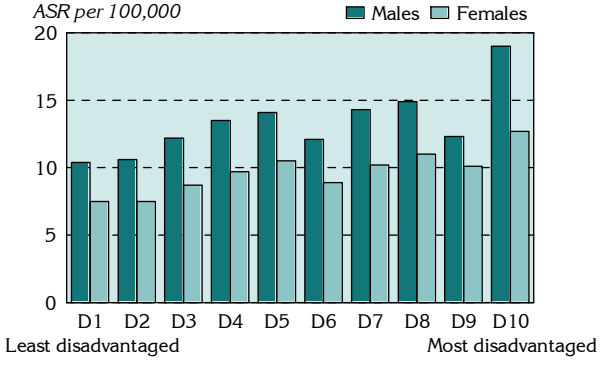
The graph of death rates from cerebrovascular diseases by remoteness shows (opposite page) the lowest rate in the Inner Regional area with a rate of 10.0, and a marginal increase to a rate of 11.9 in both the Remote area, followed by a larger increase to 19.9 in the Very Remote areas. The number of deaths decline rapidly across the remoteness classes.

By socioeconomic status

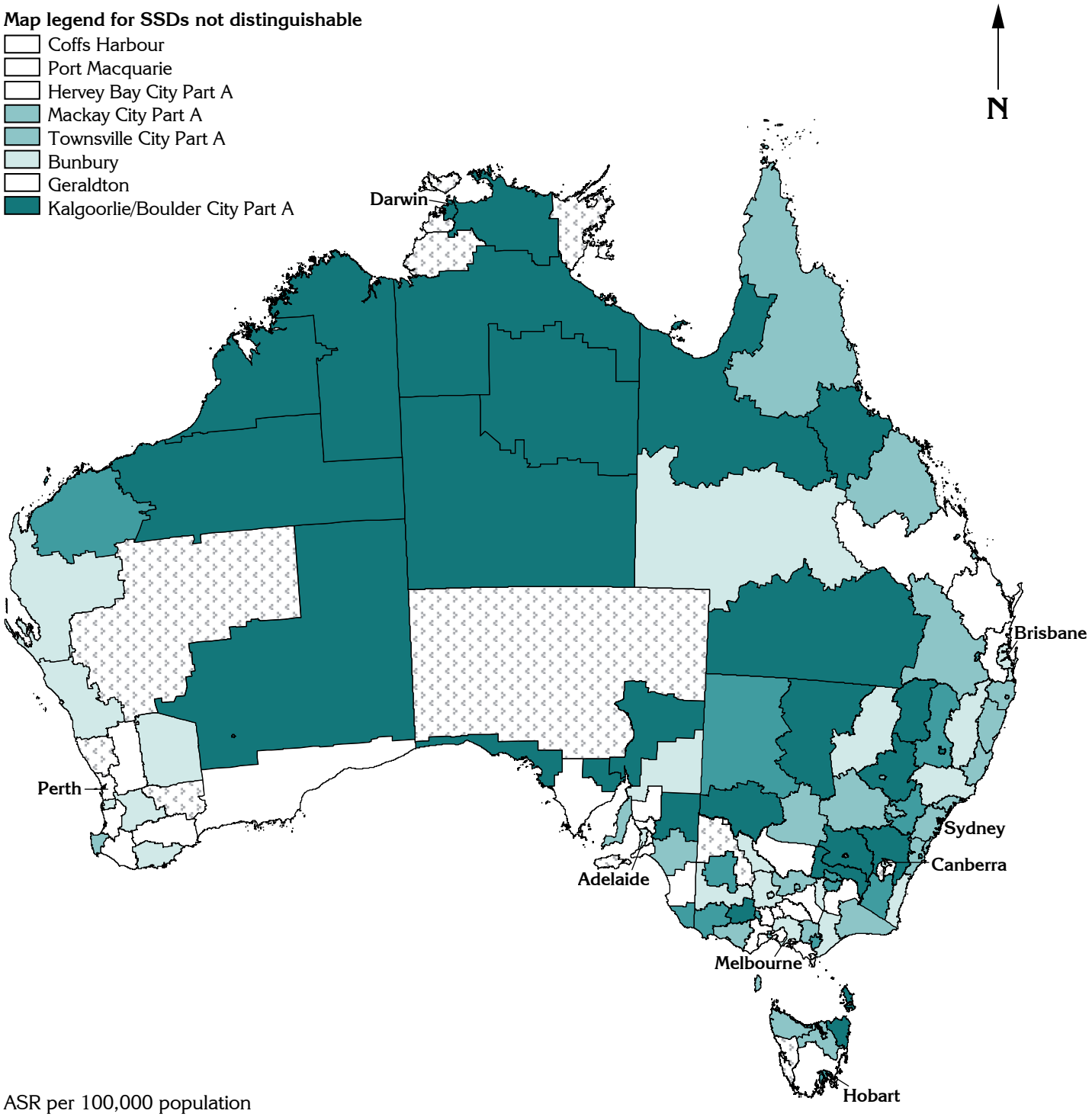
For all rest of state/ territory areas combined, there were largely uninterrupted gradients in ARS across the deciles of socioeconomic disadvantage of area for both males and females (Figure 4.16).

Rates for males were higher than females, ranging from 10.4 in the least disadvantaged areas to 19.0 in the most disadvantaged areas, compared with rates of 7.5 and 12.7 for females, respectively. The differentials in rates between the most and least disadvantaged areas were 1.83** for males and 1.69** for females.

Figure 4.16: Avoidable mortality from cerebrovascular diseases by socioeconomic status and sex, rest of states/ territories, Australia, 1997-2001

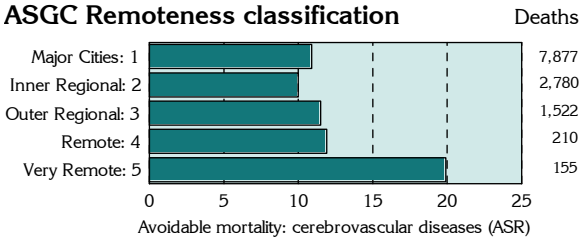


Map 4.14
Selected cause – Cerebrovascular diseases: avoidable mortality (0 to 74 years), Australia, 1997-2001
age standardised deaths per 100,000 population by Statistical Subdivision



ASR per 100,000 population

- *14.0 and above*
- *12.5 to less than 14.0*
- *11.0 to less than 12.5*
- *9.5 to less than 11.0*
- *below 9.5*
- *data not mapped (<5 deaths)*



Details of map boundaries are in Appendix 1.4

Major condition group – Respiratory diseases: avoidable mortality (0 to 74 years), capital cities, Australia, 1997-2001

Capital cities

Over the period 1997 to 2001, deaths from respiratory diseases considered avoidable ranged from a rate of 7.9 per 100,000 population in Perth to almost double (1.9) the rate in Hobart (15.0) (Table 4.23). The rate for all capitals combined was 9.0 deaths per 100,000 population.

Table 4.23: Avoidable mortality from respiratory diseases, capital cities, Australia, 1997-2001

ASR per 100,000 population

Sydney	Melbourne	Brisbane	Adelaide	Perth	Hobart	Darwin	Canberra	All capitals
9.4	8.1	10.6	8.6	7.9	15.0	15.1	8.9	9.0

Other major urban centres

Rates in the other major urban centres ranged from 7.5 deaths per 100,000 population in Gold Coast-Tweed Heads to 12.7 in Townsville-Thuringowa (details in Table A4, Appendix 1.3).

By Statistical Subdivision (SSD)

For **Sydney**, there is a clear distinction between high and low rates at the SSD level (Map 4.15). The highest rates were in Outer South Western Sydney (15.1 deaths per 100,000 population), Blacktown (14.8) and Inner Sydney (13.8); the lowest rates were in Central Northern Sydney (4.9) and Lower Northern Sydney (6.9).

The SSD level rates in **Melbourne** are also clearly differentiated, being highest in Frankston City (13.3), Melton-Wyndham (12.4) and Hume City (11.9). The lowest rates were in Eastern Middle Melbourne (4.7) and Boroondara City (4.8), the two lowest rates of all capital city SSDs.

In **Brisbane,** the highest rates were in Redcliffe City (17.4 deaths per 100,000 population) (the second highest rate of all capital city SSDs), Logan City (14.3) and Ipswich City (Part in BSD) (14.0). The lowest rate was in Pine Rivers Shire (6.9).

The rates in **Adelaide** were within a smaller range, varying from a high of 10.2 deaths per 100,000 population in Northern Adelaide to a low of 6.9 in Southern Adelaide.

Rates in **Perth** were more uniform, with the highest rates in the eastern SSDs of East Metropolitan and South East Metropolitan (both 9.3), and the lowest in North Metropolitan (6.5).

The highest capital city rate (15.0 deaths per 100,000 population) was in **Hobart**, 67% higher than the overall rate for the capital cities.

The rates in **Darwin** were high, ranging from 22.9 (10 deaths) - the highest rate of all capital city SSDs - in Palmerston-East Arm, to a low of 11.2 (5 deaths) in Litchfield Shire.

In **Canberra**, the rates were highest in South Canberra (14.0) and North Canberra (8.8). Belconnen (7.9) and Weston Creek-Stromlo (8.1) had the lowest rates.

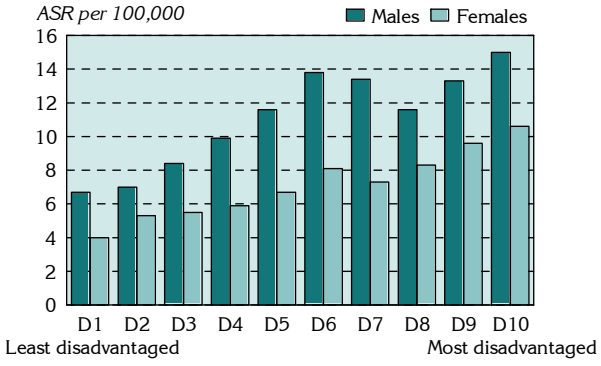
By socioeconomic status

For all capital cities and other major urban centers combined, there was a relatively uninterrupted socioeconomic gradient in the rates of death from avoidable respiratory diseases for both males and females (Figure 4.17).

Rates for males were higher than for females in each decile, ranging from 6.7 deaths per 100,000 population in the least disadvantaged areas to 15.0 in the most disadvantaged areas. The female rates ranged from 4.0 in the least disadvantaged areas to 10.6 in the most disadvantaged areas.

The differential in the rates of death from avoidable respiratory diseases between the most disadvantaged areas and least disadvantaged areas was greater for females (2.65**) than for males (2.24**).

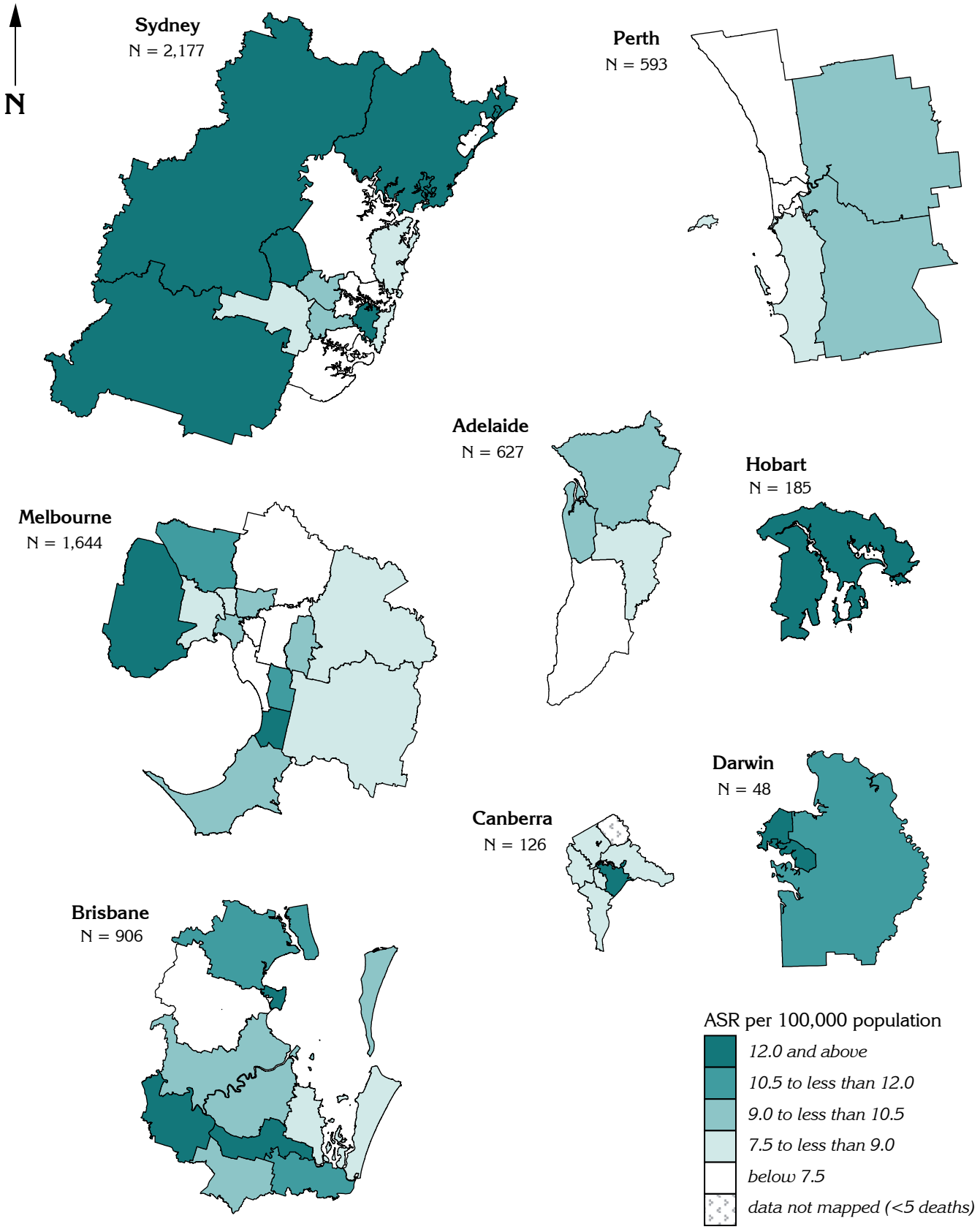
Figure 4.17: Avoidable mortality from respiratory diseases by socioeconomic status and sex, capital cities and other major urban centres, Australia, 1997-2001



Map 4.15

Major condition group – Respiratory diseases: avoidable mortality (0 to 74 years), capital cities, Australia, 1997-2001

age standardised deaths per 100,000 population by Statistical Subdivision



Details of map boundaries are in Appendix 1.4

Major condition group – Respiratory diseases: avoidable mortality (0 to 74 years), Australia, 1997-2001

State/ Territory comparison

Death rates from respiratory diseases considered avoidable were higher in the rest of state/ territory areas than in the capital cities and other major urban centres (Table 4.24). In Northern Territory, the rate was substantially higher in the rest of territory areas, with 39.3 deaths per 100,000 population, compared with a rate of 15.1 in Darwin, a rate ratio of 2.60**. For the other states, rates in the rest of state areas were between 5% (a rate ratio of 1.05, in Tasmania) and 40% (1.40**, in New South Wales) above those in the capital cities.

Table 4.24: Avoidable mortality from respiratory diseases by area, Australia, 1997-2001

ASR per 100,000 population

Area	NSW	Vic	Qld	SA	WA	Tas	NT	ACT	All
Capital city	9.4	8.1	10.6	8.6	7.9	15.0	15.1	8.9	9.0
Other major urban centres	10.5	10.0	8.6	..	..	..	..	..	9.6
Rest of state/ territory areas	13.2	10.8	11.8	9.6	10.3	15.8	39.3	#	12.2
Whole of state/ territory	**10.7**	**8.9**	**10.7**	**8.9**	**8.5**	**15.5**	**25.8**	**8.9**	**10.1**

By Statistical Subdivision (SSD)

High rates of death from respiratory diseases considered avoidable occurred across much of **New South Wales**, and were highest in North Central Plain (32.4 deaths per 100,000 population), Upper Darling (25.5; 14 deaths) and Macquarie-Barwon (23.7) (Map 4.16). The lowest rates were in Lismore (7.7; 14 deaths), Tweed Heads (8.1) and Lower South Coast (8.5).

The rates in **Victoria** were lower, with the highest rates in West Ovens-Murray (14.5), East Mallee (13.5) and La Trobe Valley (12.9). The lowest rates were in South Loddon (7.2; 13 deaths) and Warrnambool City (7.3; 13 deaths).

In **Queensland**, rates were high in the western SSDs of North West (31.4 deaths per 100,000 population), Central West (24.9; 19 deaths) and South West (20.8), and low in Gladstone (6.7; 11 deaths) and Gold Coast City Part B (7.4).

Death rates in **South Australia** were highest in Far North (17.1; 7 deaths) and Whyalla (15.9), and lowest in Lincoln (4.8; 9 deaths) and Fleurieu (5.0; 18 deaths) (the two lowest rates of all SSDs).

Rates in **Western Australia** were high in Ord (32.0 deaths per 100,000 population and 10 deaths), Carnegie (31.1; 5 deaths) and Lefroy (25.0; 6 deaths). King (6.2; 17 deaths) and Preston (6.7; 12 deaths) had the lowest rates.

In **Tasmania**, rates were relatively high, with the highest rates in Lyell (21.3; 6 deaths) and Greater Launceston (17.4) and the lowest in North Western Rural (10.5; 14 deaths) and Southern (13.6).

The **Northern Territory** rates were all notably high, ranging from 108.2 in Alligator (15 deaths), 78.2 (18 deaths) in East Arnhem, and 77.6 in Daly (7 deaths) (the three highest rates of all the SSDs) to 22.1 deaths per 100,000 population in Central.

By remoteness

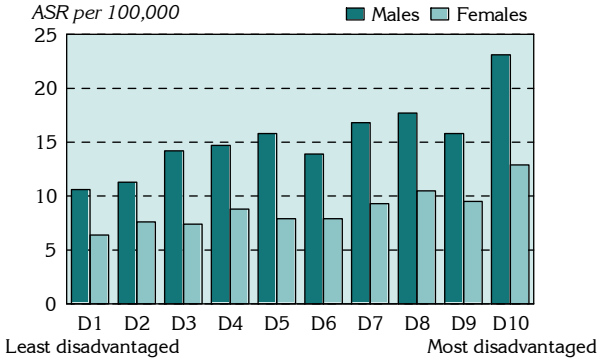
The graph of death rates by remoteness shows (opposite page) a steady increase between the Major Cities areas, with a rate of 9.3, and the Remote areas (13.7), followed by a larger increase to 23.5 in the Very Remote areas. The number of deaths decline rapidly across the remoteness classes.

By socioeconomic status

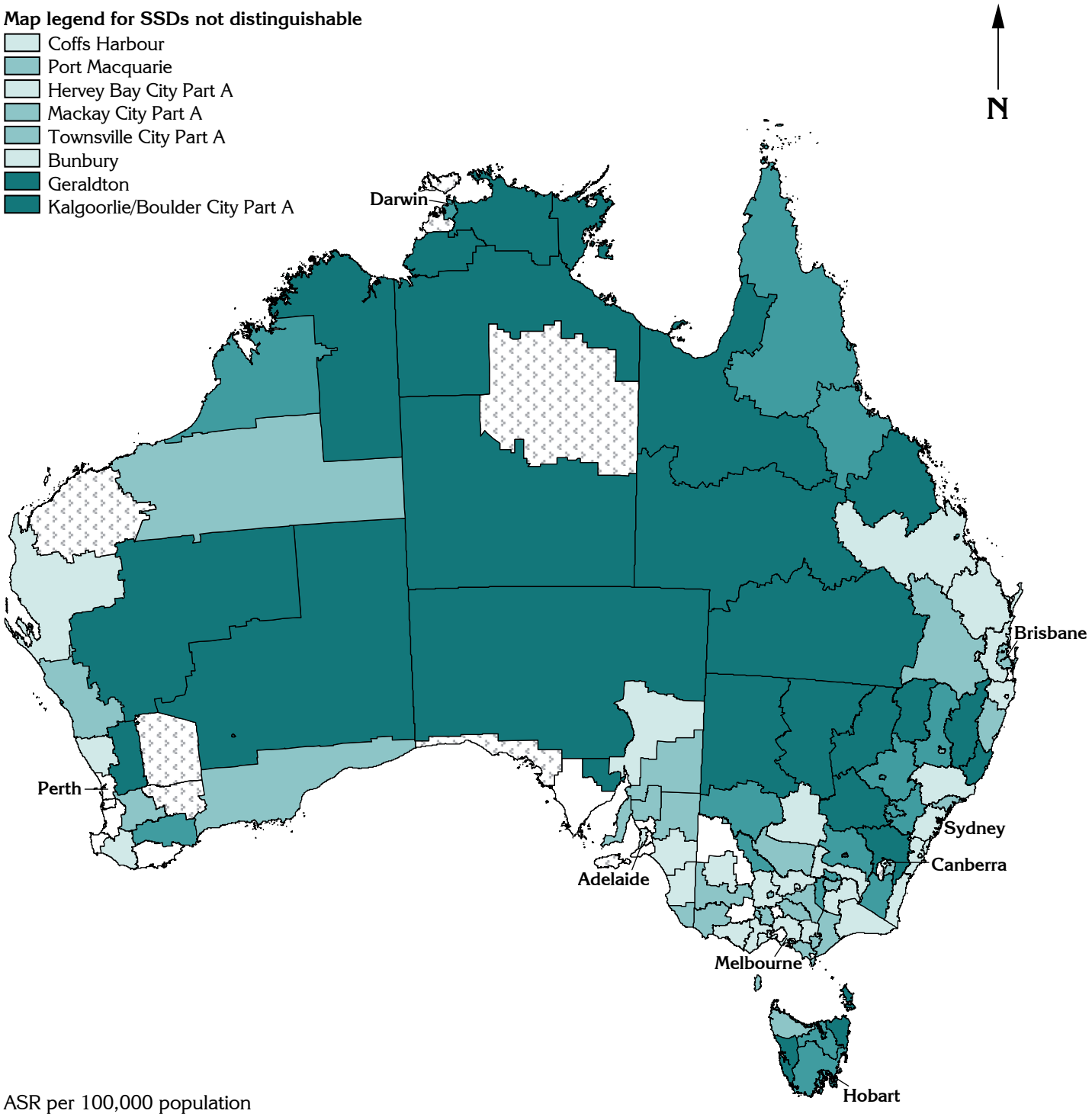
For all rest of state/ territory areas combined, there was a largely uninterrupted gradient in death rates by decile of socioeconomic disadvantage of area for males and for females (Figure 4.18).

Rates for males were more than one and a half times those for females in each decile, ranging from 10.6 in the least disadvantaged areas to 23.1 in the most disadvantaged areas. The female rates ranged from 6.4 in the least disadvantaged areas to 12.9 in the most disadvantaged areas. The differential in the rates between the most disadvantaged areas and least disadvantaged areas was 2.18** for males and 2.02** for females.

Figure 4.18: Avoidable mortality from respiratory diseases by socioeconomic status and sex, rest of states/ territories, Australia, 1997-2001



Map 4.16
Major condition group – Respiratory diseases: avoidable mortality (0 to 74 years), Australia, 1997-2001
age standardised deaths per 100,000 population by Statistical Subdivision



Details of map boundaries are in Appendix 1.4

Selected cause – Chronic obstructive pulmonary disease: avoidable mortality (45 to 74 years), capital cities, Australia, 1997-2001

Capital cities

Over the period 1997 to 2001, deaths from chronic obstructive pulmonary disease (COPD) ranged from a rate of 6.7 per 100,000 population in Perth to more than double (2.3) in Darwin, a rate of 15.3 (Table 4.25). The rate for all capitals combined was 7.9.

Table 4.25: Avoidable mortality from COPD, capital cities, Australia, 1997-2001

ASR per 100,000 population

Sydney	Melbourne	Brisbane	Adelaide	Perth	Hobart	Darwin	Canberra	All capitals
8.2	7.1	9.5	7.3	6.7	13.9	15.3	7.5	7.9

Other major urban centres

Rates in the other major urban centres ranged from 6.6 in Gold Coast-Tweed Heads to 11.5 deaths from COPD per 100,000 population in Townsville-Thuringowa (details in Table A4, Appendix 1.3).

By Statistical Subdivision (SSD)

Death rates from COPD varied widely in **Sydney**, with the highest in Blacktown (13.4 deaths per 100,000 population), Outer South Western Sydney (12.7) and Inner Sydney (12.4) SSDs (Map 4.17). In contrast, there was a very low rate in Central Northern Sydney SSD (4.1), with low rates also in St George-Sutherland and Inner Western Sydney (both 6.1) and Lower Northern Sydney (6.2) SSDs.

The rates in **Melbourne** also varied across the city, but were generally lower, with the highest being in Hume City (11.7) and Frankston City (11.6). The lowest rates were in Eastern Middle Melbourne (4.0 - the lowest rate of all capital city SSDs) and Boroondara City (4.2).

Over half of the SSDs in **Brisbane** had death rates from COPD in the highest range mapped, with the highest rates in Redcliffe City (15.4 deaths per 100,000 population) and Logan City (13.6), and the lowest rate in Pine Rivers Shire (5.6).

There was little variation at the SSD level in **Adelaide**, with rates ranging from a high of 8.5 deaths per 100,000 population in Northern Adelaide to a low of 6.1 in Southern Adelaide.

The rates were also relatively even, and comparatively low, in **Perth**, varying from 8.1 deaths per 100,000 population in East Metropolitan to 5.4 per 100,000 in North Metropolitan.

Hobart residents had a high rate of deaths from COPD, 13.9 deaths per 100,000 population.

For **Darwin**, the rates were all high, with 22.0 deaths per 100,000 population (9 deaths) in Palmerston-East Arm (the highest of all SSDs), 14.7 in Darwin City and 12.0 (5 deaths) in Litchfield Shire.

The rates in **Canberra** varied from 11.8 deaths per 100,000 population in South Canberra (19 deaths) to 5.8 in Weston Creek-Stromlo (8 deaths) and 6.2 in Tuggeranong (14 deaths).

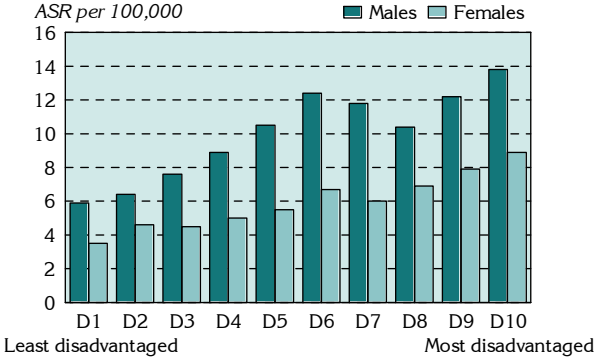
By socioeconomic status

For all capital cities and other major urban centres combined, there was a largely uninterrupted socioeconomic gradient in the rates of death from COPD for both males and females (Figure 4.19).

Rates for males were higher than females in each decile, ranging from 5.9 deaths per 100,000 population in the least disadvantaged areas to 13.8 in the most disadvantaged areas. The female rates ranged from 3.5 in the least disadvantaged areas to 8.9 in the most disadvantaged areas.

The differential in the rates of death from COPD between the most disadvantaged areas and least disadvantaged areas was greater for females (2.54**) than for males (2.34**).

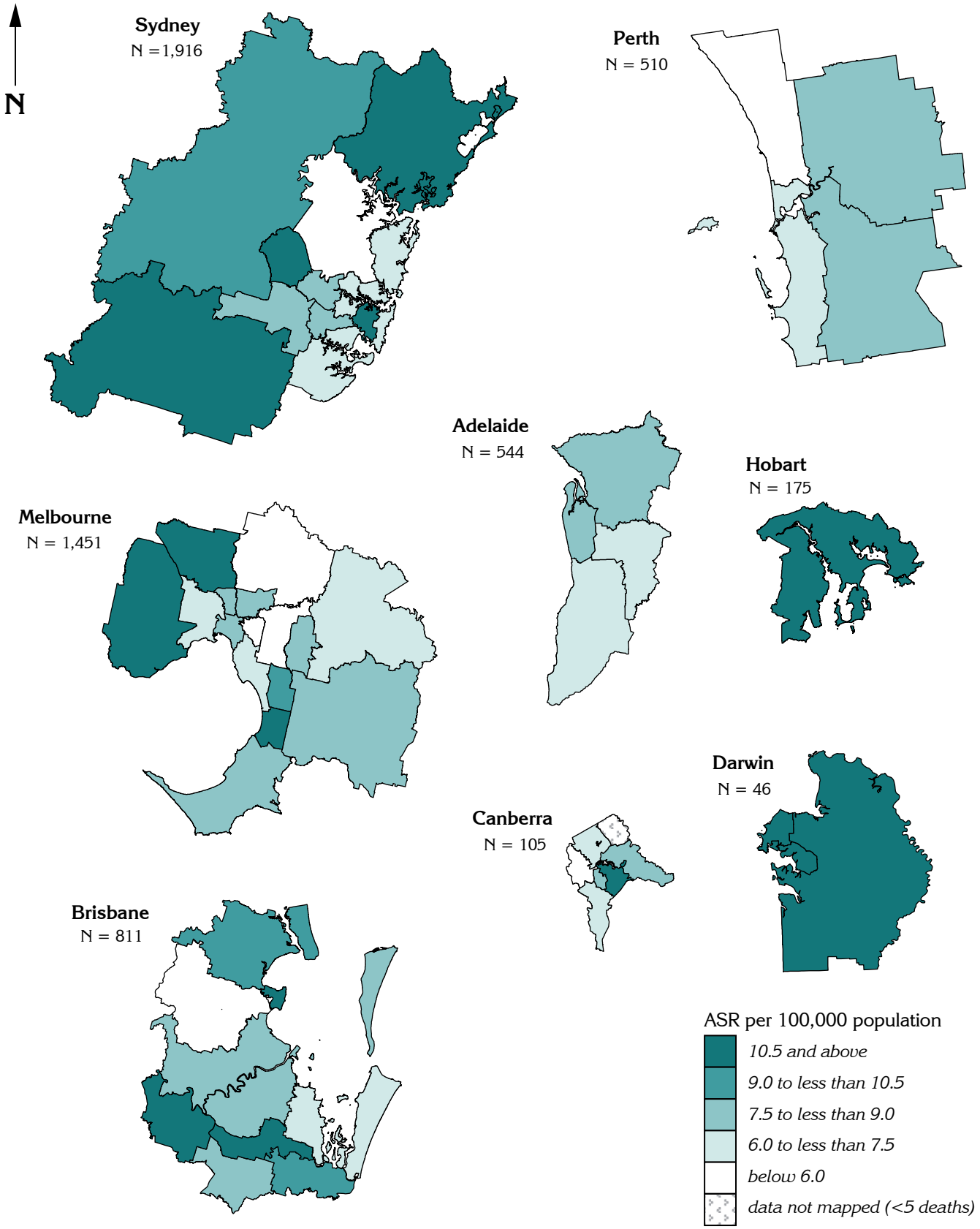
Figure 4.19: Avoidable mortality from COPD by socioeconomic status and sex, capital cities and other major urban centres, Australia, 1997-2001



Map 4.17

Selected cause – Chronic obstructive pulmonary disease: avoidable mortality (45 to 74 years), capital cities, Australia, 1997-2001

age standardised deaths per 100,000 population by Statistical Subdivision



Details of map boundaries are in Appendix 1.4

Selected cause – Chronic obstructive pulmonary disease: avoidable mortality (45 to 74 years), Australia, 1997-2001

States/ Territories

Over the period 1997 to 2001, death rates from COPD were higher in the rest of state/ territory areas than in the capital cities and other major urban centres in all states, except Tasmania (Table 4.26). Rates in Northern Territory were substantially higher in the rest of territory areas, with 39.8 deaths per 100,000 population, compared with 15.3 deaths per 100,000 population in Darwin, a rate ratio of 2.60**. The rates in the rest of state areas ranged from 13% (a rate ratio of 1.13*, in Queensland) to 45% (1.45**, New South Wales) above those in the capital cities, other than in Tasmania (where there was a very small difference in rates).

Table 4.26: Avoidable mortality from COPD by area, Australia, 1997-2001

ASR per 100,000 population

Area	NSW	Vic	Qld	SA	WA	Tas	NT	ACT	All
Capital city	8.2	7.1	9.5	7.3	6.7	13.9	15.3	7.5	7.9
Other major urban centres	9.3	8.9	7.7	..	..	..	..	..	8.5
Rest of state/ territory areas	11.9	9.6	10.7	8.3	8.7	13.8	39.8	#	10.9
Whole of state/ territory	**9.5**	**7.8**	**9.6**	**7.6**	**7.2**	**13.9**	**26.1**	**7.5**	**8.9**

By Statistical Subdivision (SSD)

The pattern of COPD deaths in **New South Wales** is one of higher rates across much of the inland areas of the State (Map 4.18), with the highest rates in North Central Plain (30.3 deaths per 100,000 population), Upper Darling (23.7; 13 deaths) and Macquarie-Barwon (21.7). The lowest rates were in Tweed Heads (7.0) and Lismore (7.3; 13 deaths).

The rates were lower, and more uniform, in **Victoria**, with the highest rates in West Ovens-Murray (12.7) and East Mallee (12.3). West Central Highlands (8 deaths), and South Loddon (11 deaths) (both 6.1) and West Gippsland (6.4; 13 deaths) had the lowest rates.

In **Queensland**, the highest death rates from COPD were also inland, in North West (32.3 deaths per 100,000 population), Central West (21.8; 17 deaths) and South West (20.5) SSDs, with the lowest rate in Gold Coast City Part B (6.5).

The highest rates in **South Australia** were in the Far North (15.1; 6 deaths) and Whyalla (14.2) SSDs. The lowest rates were in Fleurieu (4.0; 15 deaths) (the lowest of all the SSDs), Lincoln (4.1; 8 deaths) and Mt Lofty Ranges (5.6; 11 deaths).

For **Western Australia**, the highest rates were in Ord (33.8; 10 deaths), Carnegie (32.7; 5 deaths), Lefroy (28.0; 6 deaths) and Kalgoorlie/Boulder City Part A (20.9; 16 deaths). King (4.6 deaths) and Preston (5.5; 10 deaths) had the lowest rates.

The rates in **Tasmania** were highest in Lyell (17.8; 5 deaths) and Greater Launceston (15.6). The lowest rates were in the SSDs of North Western Rural (10.4; 14 deaths) and Southern (12.0).

In the **Northern Territory**, the rates were substantially higher overall, with the highest rates in Alligator (121.1; 15 deaths) and East Arnhem (92.3; 18 deaths), and the lowest in Central (23.8).

By remoteness

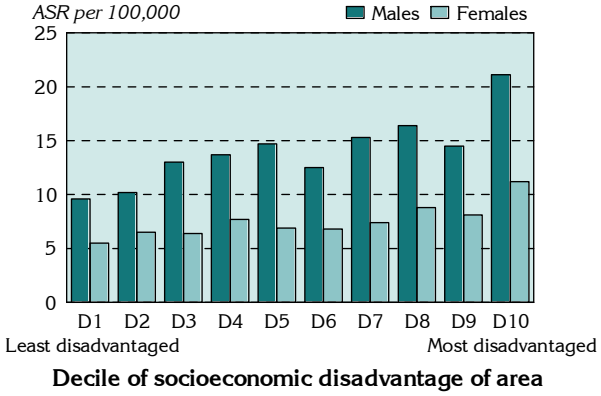
The graph of death rates from COPD by remoteness shows (opposite page) a steady increase between the Major Cities areas, with rate of 8.1, and the Remote areas (12.4), followed by a larger increase to 22.0, in the Very Remote areas. The number of deaths from COPD decline rapidly across the remoteness classes.

By socioeconomic status

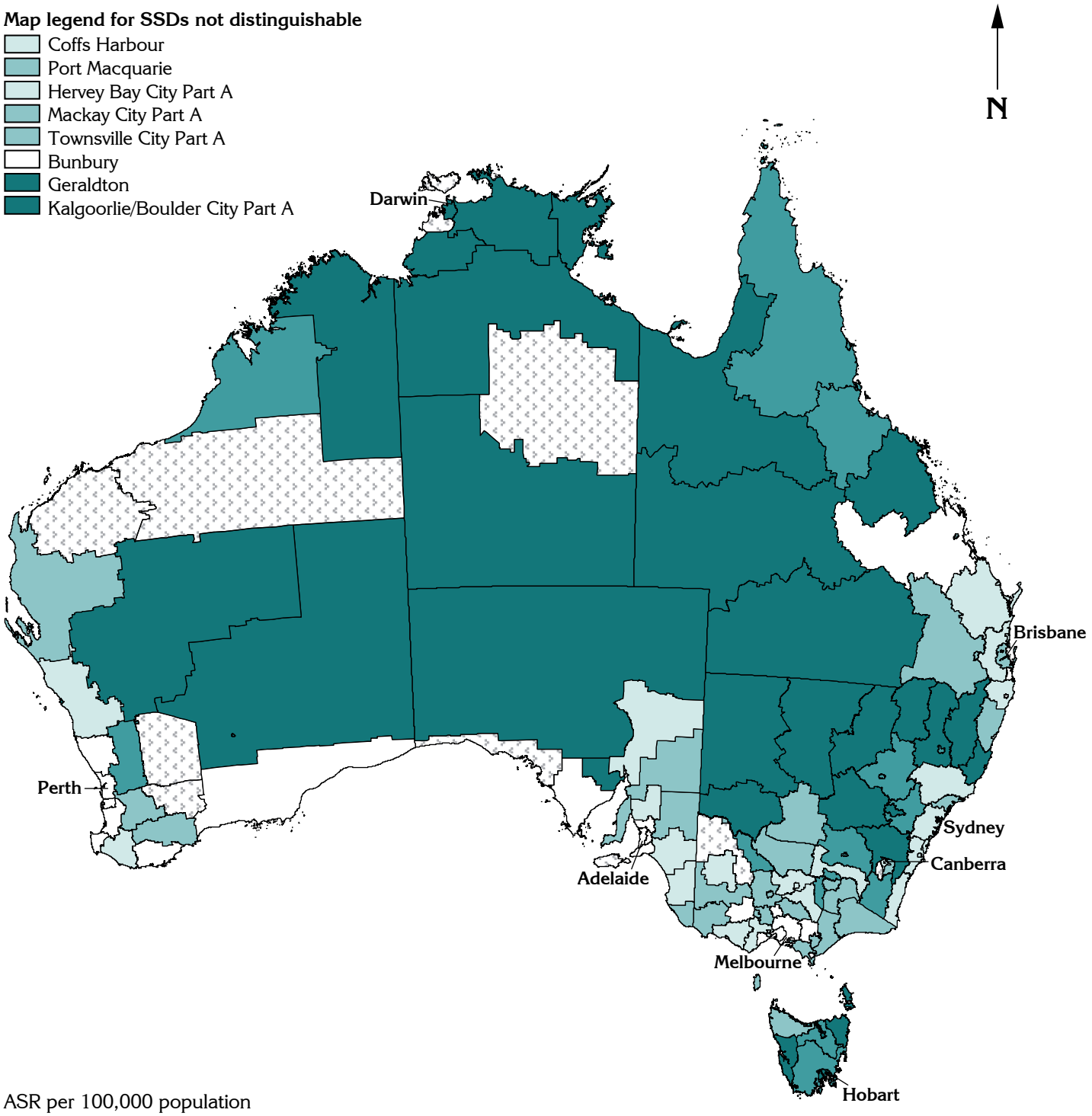
For all rest of state/ territory areas combined, there were largely uninterrupted socioeconomic gradients in death rates from COPD for both males and females (Figure 4.20).

Rates for males were more than 70% higher than those for females in each decile, ranging from 9.6 in the least disadvantaged areas to 21.1 in the most disadvantaged areas. The female rates ranged from 5.5 in the least disadvantaged areas to 11.2 in the most disadvantaged areas. The differential in the rates between the most disadvantaged areas and least disadvantaged areas was 2.20** for males and 2.04** for females.

Figure 4.20: Avoidable mortality from COPD by socioeconomic status and sex, rest of states/ territories, Australia, 1997-2001



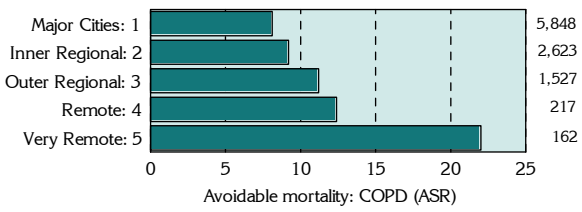
Map 4.18
Selected cause – Chronic obstructive pulmonary disease: avoidable mortality (45 to 74 years), Australia, 1997-2001
age standardised deaths per 100,000 population by Statistical Subdivision



ASR per 100,000 population

- *13.5 and above*
- *11.5 to less than 13.5*
- *9.5 to less than 11.5*
- *7.5 to less than 9.5*
- *below 7.5*
- *data not mapped (<5 deaths)*

ASGC Remoteness classification



Details of map boundaries are in Appendix 1.4

Selected cause – Road traffic injuries: avoidable mortality (0 to 74 years), capital cities, Australia, 1997-2001

Capital cities

Over the period 1997 to 2001, deaths from road traffic injuries, ranged from a rate of 6.1 per 100,000 population in both Canberra to a rate of 16.6 in Darwin (Table 4.27). The rate for all capitals combined was 6.9 deaths per 100,000 population.

Table 4.27: Avoidable mortality from road traffic injuries, capital cities, Australia, 1997-2001

ASR per 100,000 population

Sydney	Melbourne	Brisbane	Adelaide	Perth	Hobart	Darwin	Canberra	All capitals
6.4	7.2	6.6	7.4	7.3	7.2	16.6	6.1	6.9

Other major urban centres

Rates in the other major urban centres ranged from 6.4 deaths per100,000 population in Wollongong to 9.1 in Newcastle (details in Table A4, Appendix 1.3).

By Statistical Subdivision (SSD)

The pattern of avoidable mortality from road traffic injuries is similar for the larger capital cities (excluding Hobart, Canberra and Darwin), with the lowest rates in the inner city, increasing to the highest rates in the outer SSDs (Map 4.19).

In **Sydney**, rates of avoidable mortality from road traffic injuries were highest in the Outer Western Sydney (9.8 deaths per 100,000 population) and Outer South Western Sydney (9.3) SSDs. The two lowest rates of all SSDs were in Eastern Suburbs (3.1) and Lower Northern Sydney (3.6).

The highest rates in **Melbourne** were in Frankston City (12.9) and Mornington Peninsula Shire (11.8), and the lowest rates were in Boroondara City (4.6) and Inner Melbourne (4.9).

In **Brisbane**, the highest rates were in Caboolture Shire Part A (11.4 deaths per 100,000 population) and Gold Coast City Part A (9.5). Pine Rivers Shire (4.9) and Brisbane City (5.2) had the lowest rates.

Death rates from road traffic injuries in **Adelaide** varied from 8.6 deaths per 100,000 population in Northern Adelaide to 6.0 in Eastern Adelaide.

For **Perth**, the highest rate was in South East Metropolitan SSD (9.4). The lowest rates were in North Metropolitan (5.3) and Central Metropolitan (4.7).

The death rate for residents of **Hobart** was 7.2 deaths per 100,000 population.

The rates in **Darwin** were all comparatively high, with rates of 29.4 in Litchfield Shire, 18.1 in Palmerston-East Arm, and 13.4 in Darwin City.

In **Canberra**, the highest rates were in Woden Valley (8.8 deaths per 100,000 population and 14 deaths) and Belconnen (7.3), and the lowest were in South Canberra (4.5; 5 deaths), Tuggeranong (4.7) and Weston Creek-Stromlo (5.1; 6 deaths).

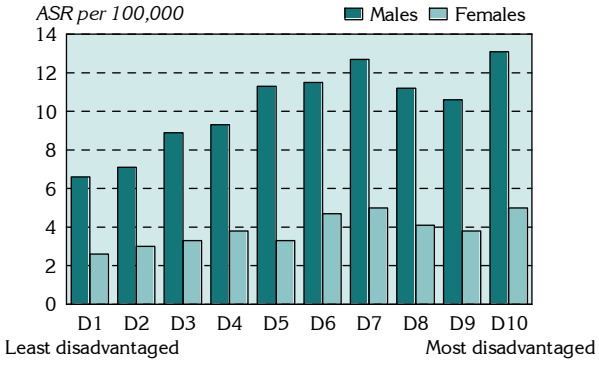
By socioeconomic status

For all capital cities and other major urban centres combined, there was a largely uninterrupted socioeconomic gradient in the rates of death from road traffic injuries, for both males and females (Figure 4.21).

Rates for males were more than twice those for females in each decile, ranging from 6.6 deaths per 100,000 population in the least disadvantaged areas to 13.1 in the most disadvantaged areas. The female rates ranged from 2.6 in the least disadvantaged areas to 5.0 in the most disadvantaged areas.

The differential in rates between the most disadvantaged areas and least disadvantaged areas was 1.98** for males and 1.92** for females.

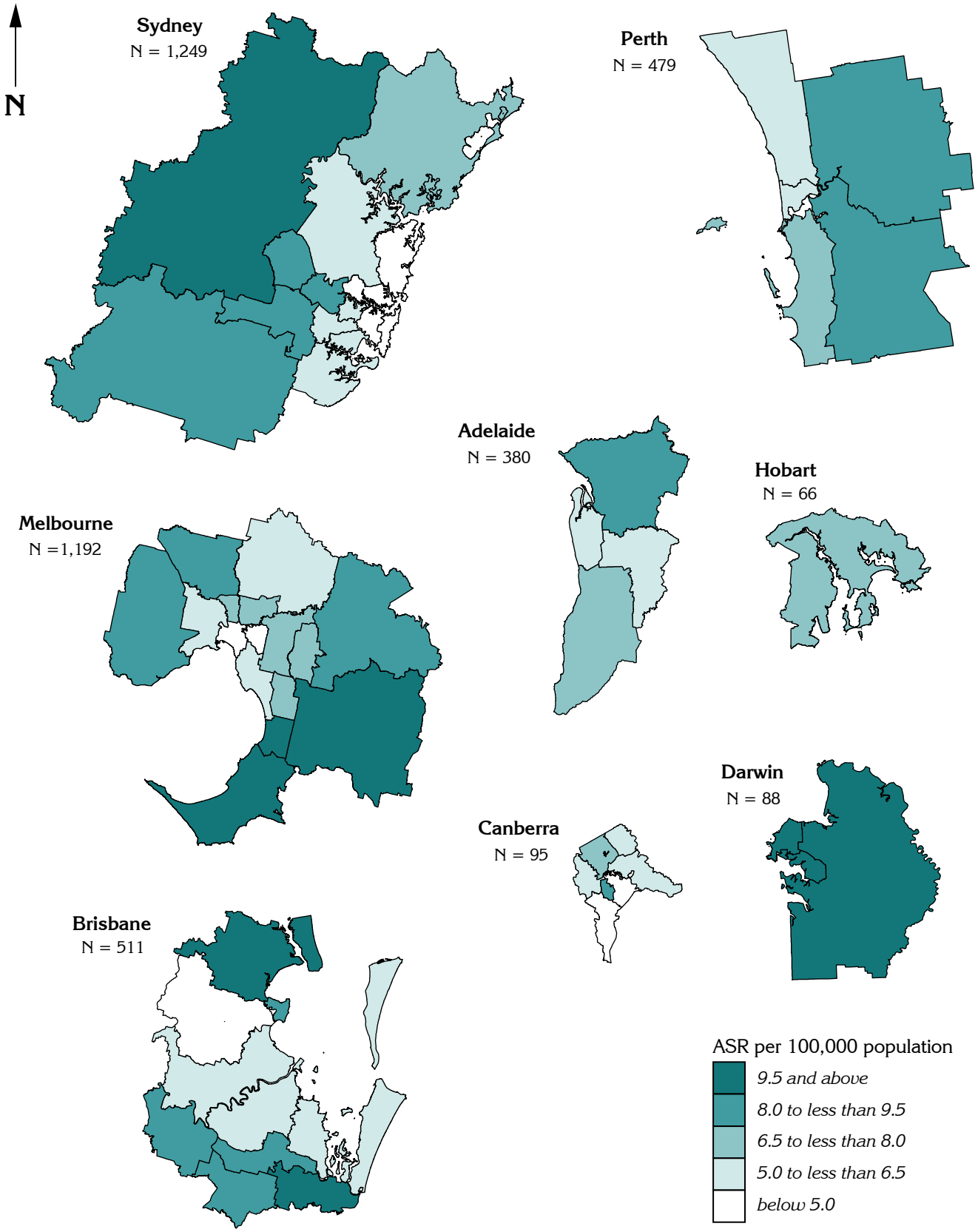
Figure 4.21: Avoidable mortality from road traffic injuries, by socioeconomic status and sex, capital cities and other major urban centres, Australia, 1997-2001



Map 4.19

Selected cause – Road traffic injuries: avoidable mortality (0 to 74 years), capital cities, Australia, 1997-2001

age standardised deaths per 100,000 population by Statistical Subdivision



Details of map boundaries are in Appendix 1.4

Selected cause – Road traffic injuries: avoidable mortality (0 to 74 years), Australia, 1997-2001

States/ Territories

Death rates from road traffic injuries were notably higher for residents in the rest of state/ territory areas than for those in the capital cities and other major urban centres in all states (Table 4.28). Rates in the Northern Territory were substantially higher in the rest of territory areas, with 29.0 deaths per 100,000 population, compared to 16.6 in Darwin, a rate ratio of 1.75**. The differential in rates between the rest of state areas and capital cities was highest in Western Australia (2.55**), followed by South Australia (2.23**), New South Wales (2.09**) and Queensland (2.08**). Lower differentials applied in Victoria (1.82**) and Tasmania (1.38**).

Table 4.28: Avoidable mortality from road traffic injuries by area, Australia, 1997-2001

ASR per 100,000 population

Area	NSW	Vic	Qld	SA	WA	Tas	NT	ACT	All
Capital city	6.4	7.2	6.6	7.4	7.3	7.2	16.6	6.1	6.9
Other major urban centres	8.1	7.0	7.5	..	..	..	..	..	7.7
Rest of state/ territory areas	13.4	13.1	13.7	16.5	18.6	9.9	29.0	#	14.2
Whole of state/ territory	**8.3**	**8.6**	**9.3**	**9.8**	**10.3**	**8.8**	**22.7**	**6.1**	**9.0**

By Statistical Subdivision (SSD)

For **New South Wales**, the highest death rates from road traffic injuries were in North Central Plain (20.7 deaths per 100,000 population) and Macquarie-Barwon (19.4; 18 deaths) (Map 4.20). The lowest rates were in Wollongong (6.4), Coffs Harbour (6.7; 13 deaths) and Tweed Heads (7.5; 14 deaths).

The highest rates in **Victoria** were in East Central Highlands (19.9) and North Wimmera (19.4; 14 deaths), with the lowest rates in Mildura Rural City Part A (6.1; 12 deaths) and Ballarat City (6.2).

Rates in **Queensland** were highest in Central West (22.2 deaths per 100,000 population and 13 deaths) and Darling Downs SD Balance (18.9). The lowest rates were in the SSDs of Townsville City Part A (5.6) and Gold Coast City Part B (7.1).

In **South Australia**, the highest rates were in West Coast (31.6; 9 deaths), Far North (24.8; 15 deaths) and Barossa (23.2). The SSDs of Whyalla (5.4; 6 deaths), Lincoln (11.3; 14 deaths), Lower North (11.7; 10 deaths) and Fleurieu (12.6) had the lowest rates.

Death rates from road traffic injuries were high throughout much of **Western Australia**, with the highest rates in Ord (48.1 deaths per 100,000 population), Lefroy (41.0) and Moore (40.1). The lowest rates were in Fortescue (6.7; 7 deaths) and Greenough River (9.9; 7 deaths).

Rates in **Tasmania** varied from a high of 17.2 deaths per 100,000 population in the Southern SSD to a low of 6.9 in Greater Launceston.

In the **Northern Territory** the rates were all high, with the highest rates in Daly (52.6; 10 deaths), Finniss (52.0; 5 deaths) and Lower Top End (34.0). The lowest rates were in East Arnhem (12.4; 8 deaths) and Central (28.6).

By remoteness

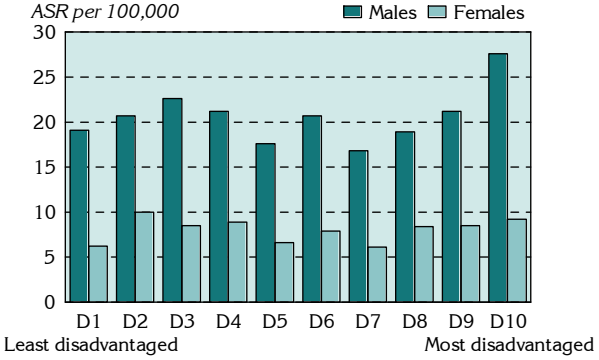
The graph of death rates from road traffic injuries shows (opposite page) a strong relationship with remoteness, increasing steadily across the remoteness areas, from a rate of 7.0 in the Major Cities areas to 22.5 in the Very Remote areas. The number of deaths from road traffic injuries considered to be avoidable decline rapidly across the remoteness classes.

By socioeconomic status

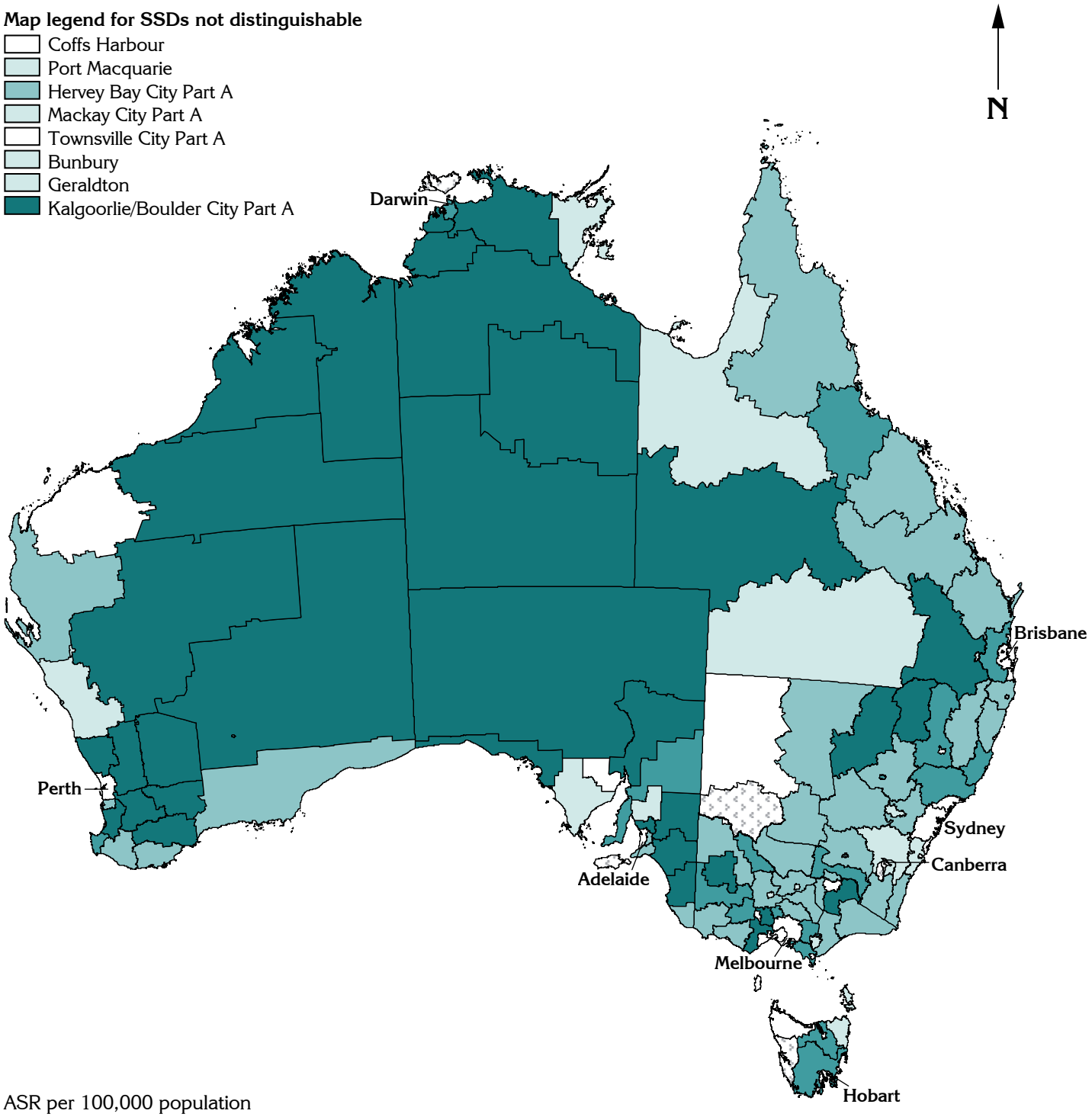
There is no clear pattern by decile in the rates of socioeconomic disadvantage for all rest of state/ territory areas combined (Figure 4.22).

Rates for males were notably higher than for females, ranging from 19.1 deaths per 100,000 population in the least disadvantaged areas to 27.6 in the most disadvantaged areas. Rates for females ranged from 6.2 in the least disadvantaged areas to 9.2 in the most disadvantaged areas. The differential in rates between the most disadvantaged areas and least disadvantaged areas was slightly greater for females (1.48**) than for males (1.45**).

Figure 4.22: Avoidable mortality from road traffic injuries by socioeconomic status and sex, rest of states/ territories, Australia, 1997-2001



Map 4.20
Selected cause – Road traffic injuries: avoidable mortality (0 to 74 years), Australia, 1997-2001
age standardised deaths per 100,000 population by Statistical Subdivision



Details of map boundaries are in Appendix 1.4

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

Capital cities

Over the period 1997 to 2001, deaths from suicide and self inflicted injuries ranged from a rate of 10.6 per 100,000 population in Sydney to a rate of 18.6 in Darwin (Table 4.29). The rate for all capitals combined was 11.8.

Table 4.29: Avoidable mortality from suicide and self inflicted injuries, capital cities, Australia, 1997-2001

ASR per 100,000 population

Sydney	Melbourne	Brisbane	Adelaide	Perth	Hobart	Darwin	Canberra	All capitals
10.6	10.7	14.7	13.3	12.7	14.6	18.6	11.7	11.8

Other major urban centres

Rates in the other major urban centres ranged from 11.8 deaths per 100,000 population from suicide and self inflicted injuries in Geelong to 17.4 in the Sunshine Coast (details in Table A4, Appendix 1.3).

By Statistical Subdivision (SSD)

Rates for suicide and self inflicted injuries in **Sydney** were relatively low, with the highest rates in the SSDs of Inner Sydney (14.1) and Gosford-Wyong (13.8 deaths per 100,000 population) (Map 4.21). Central Northern Sydney (7.8) and St George-Sutherland (8.6) had the lowest rates.

At the SSD level in **Melbourne**, rates were also low, with the highest rates in Greater Dandenong City (14.3) and Mornington Peninsula Shire (13.9), and the lowest rates in Eastern Middle Melbourne (7.9) and Boroondara City (8.6).

The rates in **Brisbane** were relatively high, with the highest rates in Gold Coast City Part A (22.3) and Beaudesert Shire Part A (18.1). The lowest rate was in Redland Shire (12.2 deaths per 100,000 population).

In **Adelaide,** death rates from suicide and self inflicted injuries varied from 14.6 deaths per 100,000 population in Western Adelaide to 11.6 in South Adelaide.

The SSDs in **Perth** with the highest death rates were East Metropolitan (14.1) and Central Metropolitan (13.9); the lowest rate was in South West Metropolitan (11.7).

For those living in **Hobart**, the rate of deaths from suicide and self inflicted injuries was 14.6 deaths per 100,000 population.

The rates were high in each of **Darwin's** SSDs, with 23.4 deaths per 100,000 population in Palmerston-East Arm (the highest rate of the capital city SSDs), 18.0 in Darwin City, and 16.2 (14 deaths) in Litchfield Shire.

The SSD in **Canberra** with the highest rate was North Canberra (16.1), with the lowest rates in Gungahlin-Hall (9.9; 10 deaths) and Tuggeranong (10.2).

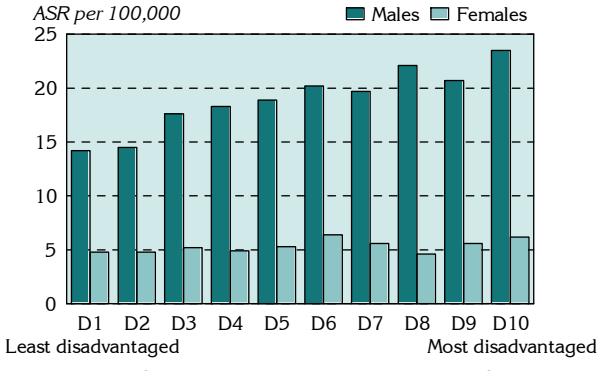
By socioeconomic status

For all capital cities and other major urban centres combined, there was a largely uninterrupted socioeconomic gradient in the rates of death from suicide and self inflicted injuries, for both males and females (Figure 4.23).

Rates for males in the most disadvantaged areas (23.5 deaths per 100,000 population) were more than two and a half times those in the least disadvantaged areas (14.2). The female rates ranged from 4.8 in the least disadvantaged areas (D1) to 6.4 in Decile 6.

The differentials in rates between the most disadvantaged and least disadvantaged areas was 1.65** for males and 1.29** for females.

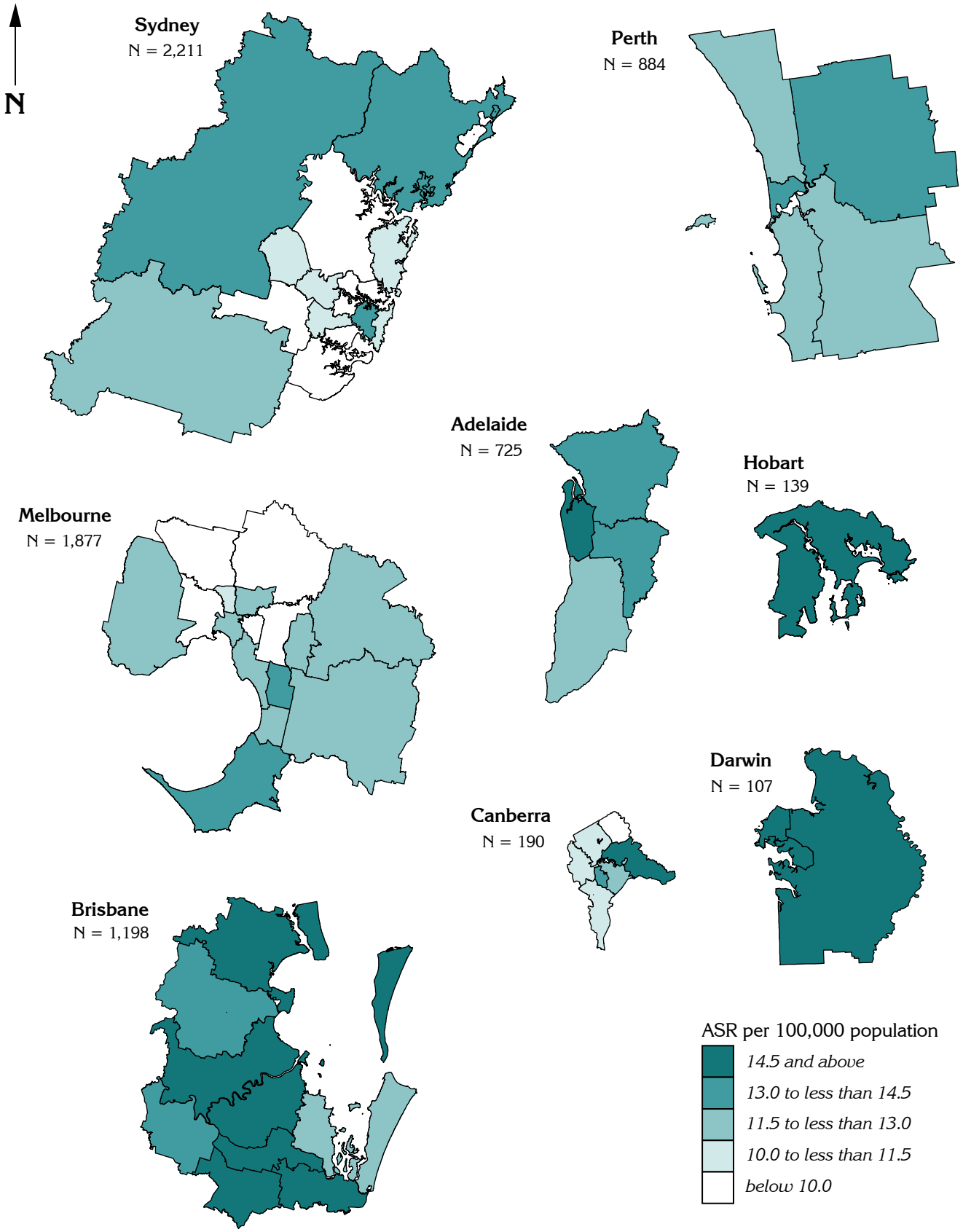
Figure 4.23: Avoidable mortality from suicide and self inflicted injuries by socioeconomic status and sex, capital cities and other major urban centres, Australia, 1997-2001



Map 4.21

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

age standardised deaths per 100,000 population by Statistical Subdivision



Details of map boundaries are in Appendix 1.4

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

State/ Territory comparison

Over the period 1997-2001, death rates from suicide and self inflicted injuries were higher in the rest of state/ territory areas than in the capital cities and other major urban centres in all jurisdictions, except for Tasmania (Table 4.30). The rate in the rest of territory areas was highest in the Northern Territory, with 21.3 deaths per 100,000 population, compared to 18.6 in Darwin, a rate ratio of 1.15**. The differentials in rates between the rest of state areas and capital cities were largest in New South Wales (1.45**) and Victoria (1.33**), with rate ratios of 1.19** in Western Australia, 1.08** in Queensland and South Australia, and 0.78** in Tasmania, reflecting the lower rate outside of the capital city.

Table 4.30: Avoidable mortality from suicide and self inflicted injuries by area, Australia, 1997-2001

ASR per 100,000 population

Area	NSW	Vic	Qld	SA	WA	Tas	NT	ACT	All
Capital city	10.6	10.7	14.7	13.3	12.7	14.6	18.6	11.7	11.8
Other major urban centres	13.6	11.8	15.7	..	..	..	..	..	14.4
Rest of state/ territory areas	15.4	14.2	15.9	14.3	15.1	11.4	21.3	#	15.0
Whole of state/ territory	**12.2**	**11.6**	**15.4**	**13.6**	**13.4**	**12.7**	**20.2**	**11.8**	**13.0**

By Statistical Subdivision (SSD)

For **New South Wales,** the highest rates were in the SSDs of Lismore (24.4 deaths per 100,000 population) and Far West (23.7) (Map 4.22). The lowest rates were in Bathurst-Orange (10.9) and Lower Murrumbidgee (11.8).

Rates of death from suicide and self inflicted injuries in **Victoria** were highest in North Loddon (18.2) and Wellington Shire (18.0). South Loddon (9.3; 16 deaths), West Barwon (9.8; 18 deaths) and East Ovens-Murray (10.1; 8 deaths) had the lowest rates.

In **Queensland,** the highest rates were in North West (33.0) and Hervey Bay City Part A (25.4). The lowest rates were in Thuringowa City Part A (9.1; 19 deaths) and Central West (9.6; 6 deaths).

The highest rates in **South Australia** were in the north, with high rates in Flinders Ranges (24.2), Far North (18.1; 12 deaths) and Pirie (16.5). Yorke (6.0; 7 deaths), the Upper South East (9.6; 9 deaths) and Fleurieu (10.6) had the lowest rates.

Rates in **Western Australia** were highest in Ord (44.4 deaths per 100,000 population) (the second highest rate of all areas) and Fitzroy (26.1). The SSDs of Moore (9.0; 6 deaths), and Vasse (10.0; 15 deaths) and Preston (10.2; 16 deaths) had the lowest rates.

In **Tasmania**, rates were highest in the North Eastern (16.3; 11 deaths), North Western Rural (17 deaths) and Southern (both 14.1) SSDs. The rates were lowest in Central North (8.9; 9 deaths) and Greater Launceston (9.8).

For the **Northern Territory**, rates in all SSDs were, with the highest in Bathurst-Melville (70.6; 8 deaths) and Alligator (27.3; 9 deaths), and the lowest rate in the Lower Top End (14.2; 13 deaths).

By remoteness

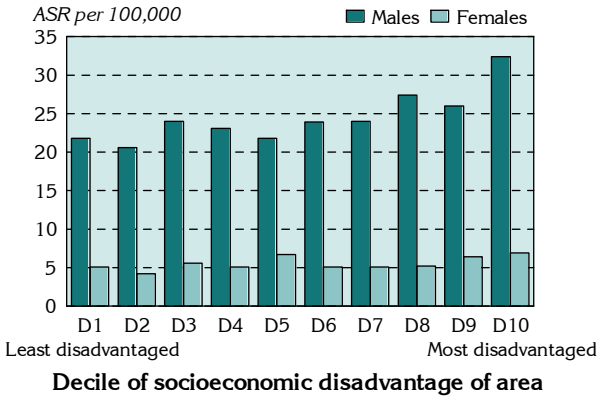
The graph of death rates from suicide and self inflicted injuries by remoteness shows (opposite page) the lowest rate in the Major Cities areas, with a rate of 12.2, followed by a steady increase to the Remote areas and a larger increase to 20.1 in the Very Remote areas. The number of deaths decline rapidly across the remoteness classes.

By socioeconomic status

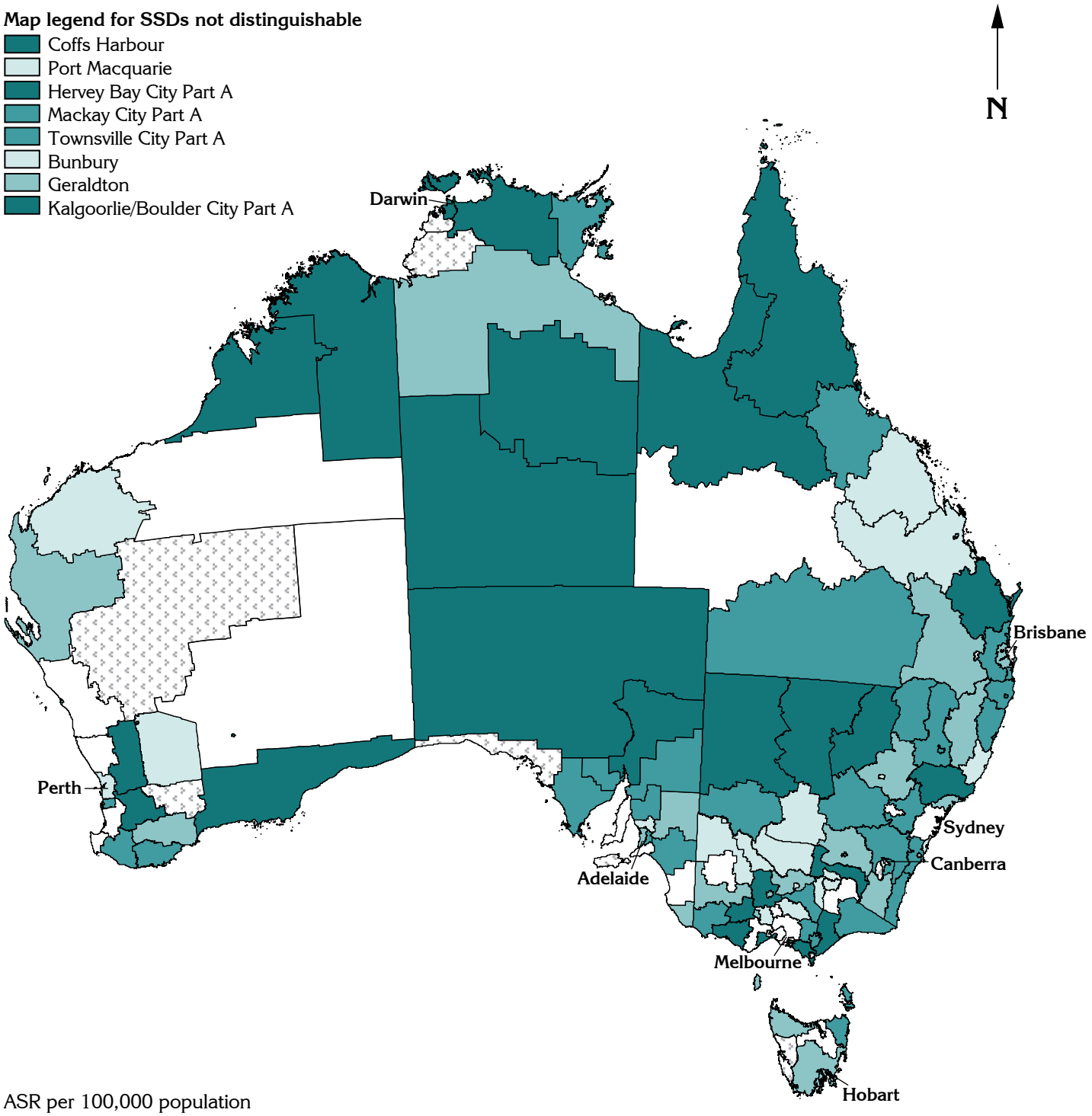
For all rest of state/ territory areas combined, the pattern in the rates by decile of socioeconomic disadvantage of area was unclear for both males and, in particular, for females (Figure 4.24).

Rates for males were higher than females, ranging from 20.6 in Decile 2 (less disadvantaged) to 32.4 in the most disadvantaged areas. The female rates ranged from 4.2 in Decile 2 to 6.9 in the most disadvantaged areas. The differentials in rates between the most disadvantaged areas and least disadvantaged areas was1.49** for males and 1.35 for females.

Figure 4.24: Avoidable mortality from suicide and self inflicted injuries by socioeconomic status and sex, rest of states/ territories, Australia, 1997-2001



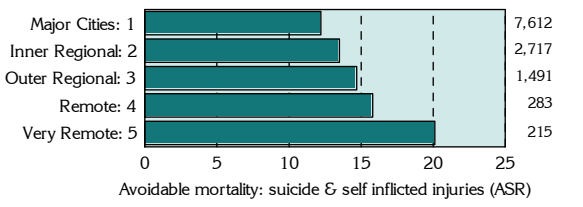
Map 4.22
Selected cause – Suicide and self inflicted injuries: avoidable mortality (0 to 74 years), Australia, 1997-2001
age standardised deaths per 100,000 population by Statistical Subdivision



ASR per 100,000 population

- *17 and above*
- *15 to 16*
- *13 to 14*
- *11 to 12*
- *below 11*
- *data not mapped (<5 deaths)*

ASGC Remoteness classification



Details of map boundaries are in Appendix 1.4

4.5 Avoidable mortality by socioeconomic status

This section examines avoidable 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

Table 4.31 shows avoidable mortality by decile of socioeconomic disadvantage of area for the capital cities and other major urban centres combined, and the rest of state/ territory areas combined; it also shows the ratio of rates between these geographic areas for each decile.

For more than half of the deciles, there is a differential in rates between the rest of state/ territory areas and the capital cities and other major urban centres of around 15% to 30%: Deciles 6 to 9 have smaller differentials.

In both the capital cities and rest of state/ territory areas, there is an almost continuous socioeconomic gradient in the rates of avoidable death. The rate ratios in the last row of Table 4.31 highlight the differentials in rates between the most and least disadvantaged populations for each of the capital cities and other major urban centres, rest of states/ territories, and for the whole of Australia.

Table 4.31: Avoidable 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	9,149	118.9	4,647	154.4	1.30**	12,798	122.6
2	9,903	132.3	5,004	164.3	1.24**	15,189	141.5
3	11,736	150.2	5,345	182.6	1.22**	15,840	154.9
4	11,498	158.0	5,824	187.0	1.18**	17,489	166.7
5	12,449	167.2	6,033	196.0	1.17**	19,381	182.1
6	14,002	185.6	6,461	195.4	1.05**	20,190	185.6
7	14,116	182.2	6,354	197.2	1.08**	20,681	187.5
8	14,523	184.4	6,686	208.9	1.13**	21,353	189.1
9	15,043	194.3	6,578	199.7	1.03	22,286	201.5
10: Most disadvantaged	16,353	209.7	7,622	267.3	1.27**	24,119	225.8
Total	**128,198**	**168.1**	**61,130**	**195.7**	**1.16****	**189,845**	**176.6**
RR–Decile 10:Decile 1	..	**1.76****	..	**1.73****	..	..	**1.84****

By selected major condition group/ cause and area

The charts in Figure 4.25 also show almost continuous socioeconomic gradients in the rates of avoidable death for the majority of selected major condition groups and causes: the exception is deaths from road traffic injuries in the rest of state/ territory areas, where there is no clear pattern. However, although there was no discernable pattern, there was a substantial differential, of 1.46**, between rates in the most disadvantaged and least disadvantaged areas. The differential for deaths from road traffic injuries in the capital cities and other major urban centres was larger, being 1.96**.

The differentials in rates for all causes of avoidable mortality were 1.76** in the capital cities and other major urban centres, and 1.73** in the rest of state/ territory areas.

For respiratory diseases, the rates in the most disadvantaged areas in the capital cities and other major urban centres, and rest of states/territories, were more than twice those in the least disadvantaged areas (2.43** and 2.12**, respectively).

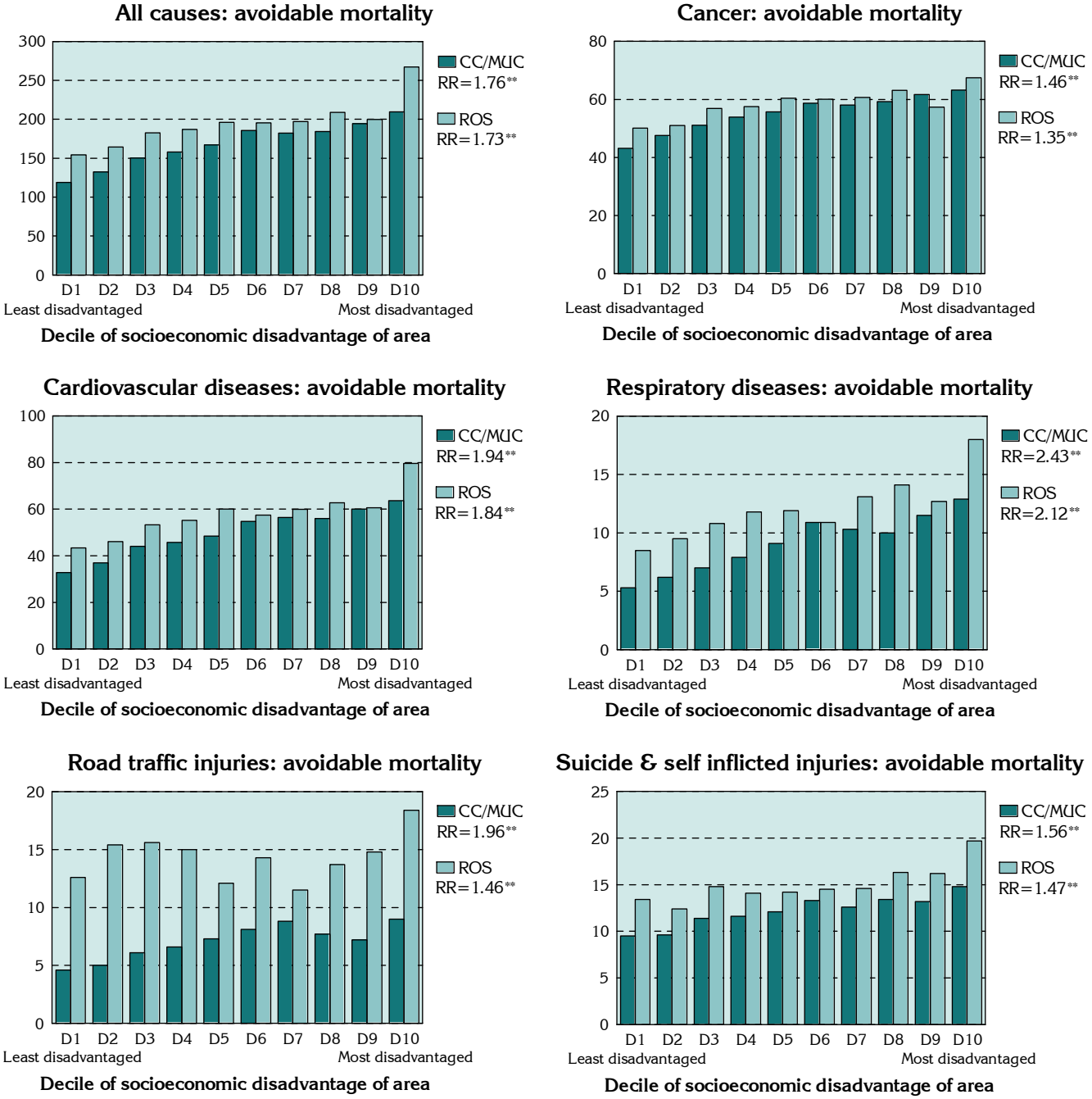
The differentials in rates from cardiovascular diseases were 1.94** in the capital cities and other major urban centres, and 1.84** in the rest of state/ territory areas.

Rates for suicide and self inflicted injuries differed by 1.56** between the most and least disadvantaged areas for capital cities and other major urban centres, and by 1.47** in the rest of state/ territory areas.

For avoidable cancer deaths, the differentials were 1.46** and 1.35** for the capital cities and other major urban centres, and rest of states/ territories, respectively.

Figure 4.25: Avoidable mortality (0 to 74 years) by socioeconomic status, selected major condition group/ cause and area, Australia, 1997-2001

ASR per 100,000 population: Note the different scales



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

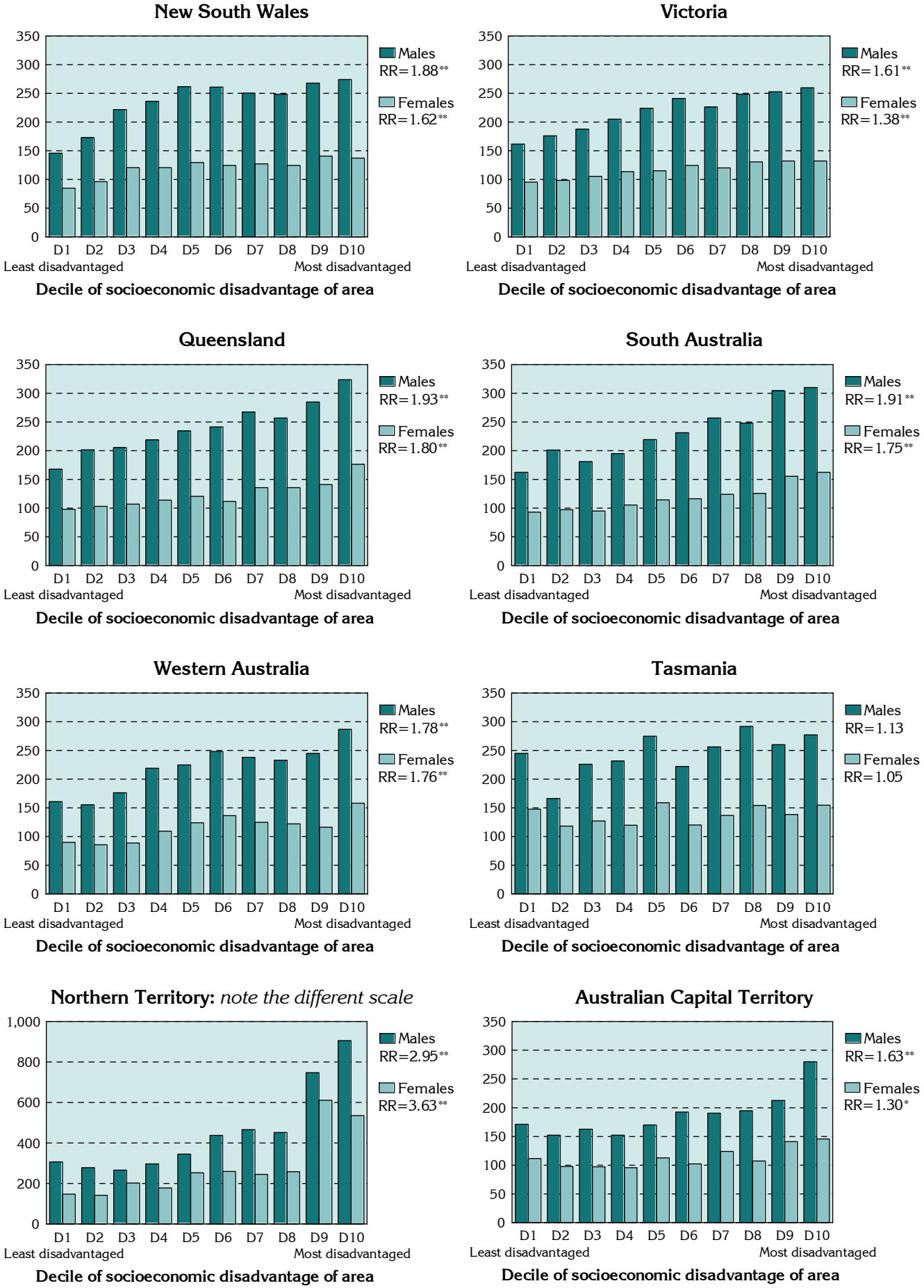
By state/ territory and sex

The charts in Figure 4.26 show death rates for avoidable mortality by socioeconomic status, state/ territory and sex. For all jurisdictions apart from Tasmania, there is a pattern of the least disadvantaged areas having the lowest rates and the most disadvantaged areas having the highest rates. For the majority of jurisdictions there is a socioeconomic gradient in death rates; the exceptions are the variable patterns in Tasmania, the Northern Territory (for females) and the Australian Capital Territory.

The differentials in rates were greater for males than for females in all jurisdictions, apart from the Northern Territory (and only slightly higher in Western Australia). The largest differentials between rates in the most disadvantaged areas and the least disadvantaged areas were in the Northern Territory, with rates almost three times (2.95**) higher for males and more than three and a half times (3.63**) for females. Differentials were also substantially higher (around 1.90 times) for males in New South Wales, Queensland and South Australia.

Figure 4.26: Avoidable mortality (0 to 74 years) by socioeconomic status, state/ territory and sex, 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

By state/ territory and area

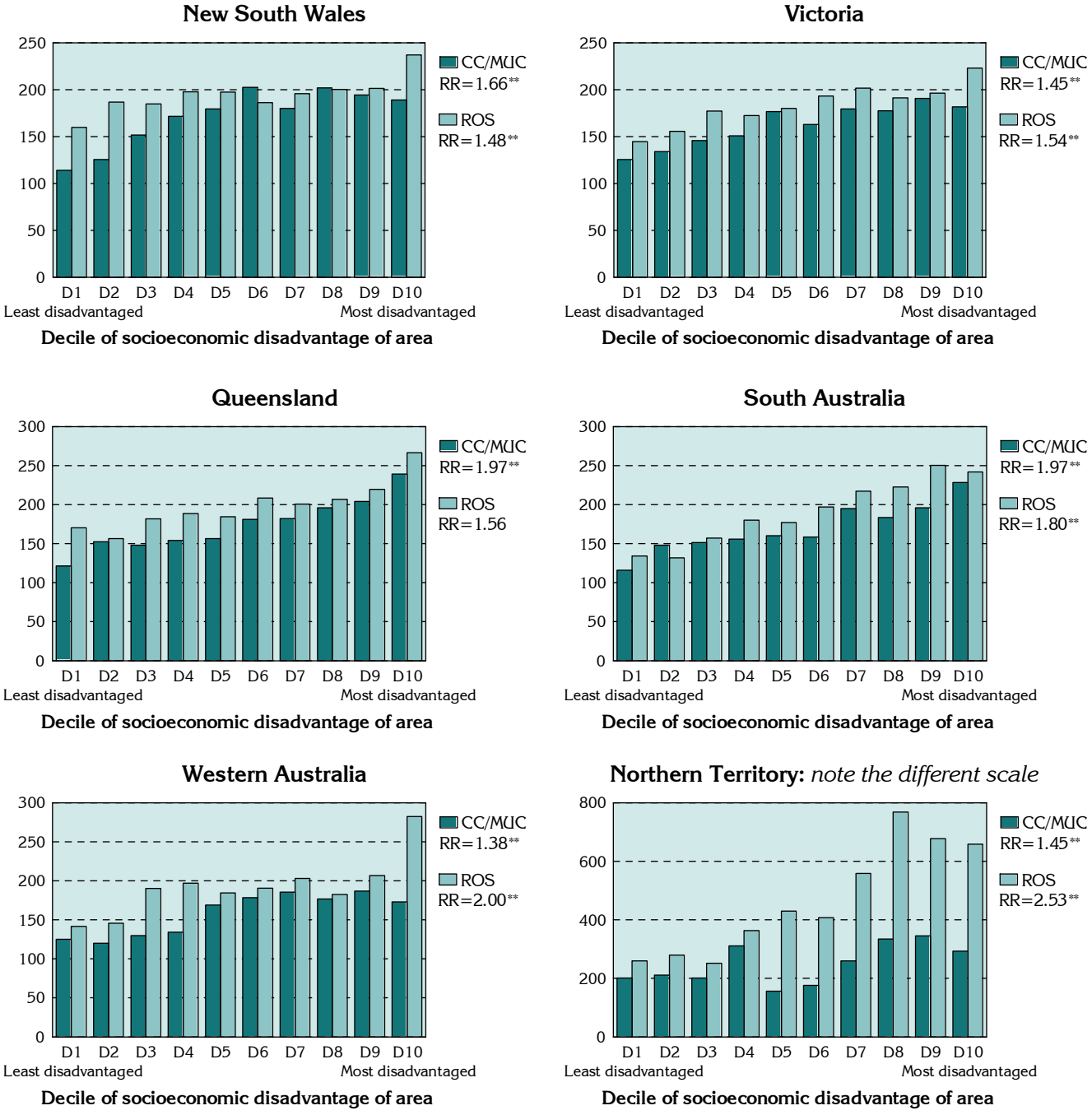
Figure 4.27 shows death rates for avoidable mortality by socioeconomic status, state/ territory, capital city and other major urban centres, and rest of state/ territory areas. For all areas, there is a pattern of the least disadvantaged areas having the lowest rates and the most disadvantaged areas having the highest rates. There are also clear socioeconomic gradients in rates for most of these area levels: however, this was less clear at the capital city level in Western Australia and for both areas shown in the Northern Territory.

The differentials in rates were higher in the rest of state/ territory areas than in the capital city and other major urban centres areas in Victoria, Western Australia and Northern Territory, and lower in the remaining states.

The largest differential was in the rest of territory areas in Northern Territory, with rates two and a half times (2.53**) in the most disadvantaged areas. Large differentials were also recorded for the capital cities and other major urban centres in Queensland and South Australia (both 1.97**), and in the rest of state areas in Western Australia (2.00**).

Figure 4.27: Avoidable 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

By excess deaths[3]

The number of excess deaths increased with increasing socioeconomic disadvantage, with the fewest excess deaths in Quintile 2 and the largest number in Quintile 5 (most disadvantaged) (Table 4.32).

The size of the impact of socioeconomic inequality is noteworthy: if avoidable mortality in all socioeconomic groups equalled that of the least disadvantaged group (those in Quintile 1), total avoidable deaths would be reduced from 189,845 (see Table 4.31, page 84) to 142,887. The 46,958 excess deaths that occurred over the observation period accounted for almost one quarter (24.7%) of total avoidable mortality.

Males accounted for 33,013 excess deaths, almost two and a half times the total for females, of 13,945. Excess deaths for males were also more than twice those for females in each quintile.

[3] See Chapter 2, *Methods*

Table 4.32: Excess deaths[1] from avoidable 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	(Q2:Q5)	of total
Males	(0)	4,309	7,861	8,894	11,949	**33,013**	70.3
Females	(0)	1,630	3,193	3,543	5,579	**13,945**	29.7
Total	**(0)**	**5,939**	**11,054**	**12,437**	**17,528**	**46,958**	**100.0**
Ratio–M:F	**..**	**2.64**	**2.46**	**2.51**	**2.14**	**2.37**	**..**

[1] **Excess deaths are 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

Total excess deaths increased with age, with 36,849 excess deaths (78.5% of excess deaths) in the two oldest age groups, and the lowest (1,247) in the youngest age group (Table 4.33).

In the 65 to 74 year age group there were 18,533 excess deaths around two fifths (39.5%) of total excess deaths, and marginally more than in the 45 to 64 year age group, with 18,316 (39.0%). In the younger age groups, there were 1,247 excess deaths (2.7%) in those aged 0 to 14 years, and 1,982 (4.2%) in the 15 to 24 year age group. The 25 to 44 year age group recorded 6,860 excess deaths (14.6%).

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 36% and 40% of excess deaths in each Quintile) in the 45 to 64 year and 65 to 74 year age groups, and the smallest (less than 5%) in the 0 to 14 year age group.

In Quintile 2, excess deaths in the 45 to 64 year (2,366) and 65 to 74 year (2,159) age groups accounted for 4,525 deaths, or 76.2% of total deaths. There were 307 excess deaths in the 15 to 24 year (5.2%) and 1,013 (17.1%) in the 25 to 44 year age group.

In Quintile 3, the 65 to 74 year age group had 4,429 excess deaths, two fifths (40.1%) of total excess deaths in these areas, and marginally more than the 4,192 deaths (37.9%) in those aged 45 to 64 years.

Excess deaths in the 65 to 74 year (5,031 deaths) and 45 to 64 year (4,918) age groups in Quintile 4 represented 80% of total excess deaths in these areas. There were fewer excess deaths in the 25 to 44 year age group in Quintile 4 (1,662; 13.4%) than in Quintile 3 (1,692; 15.3%).

In Quintile 5, the 65 to 74 year (6,933 excess deaths) and 45 to 64 year age groups (6,839) comprised four fifths (80.0%) of total excess deaths. The smallest number of deaths was in the 0 to 14 year age group (572 deaths), comprising 3% of excess deaths in Quintile 5.

Table 4.33: Excess deaths from avoidable mortality by quintile of socioeconomic status and age, Australia, 1997-2001

Age (years)	Number					Total	Per cent
	Q1	Q2	Q3	Q4	Q5	(Q2:Q5)	of total
0-14	(0)	94	211	370	572	**1,247**	2.7
15-24	(0)	307	531	455	689	**1,982**	4.2
25-44	(0)	1,013	1,692	1,662	2,494	**6,860**	14.6
45-64	(0)	2,366	4,192	4,918	6,839	**18,316**	39.0
65-74	(0)	2,159	4,429	5,031	6,933	**18,533**	39.5
Total	**(0)**	**5,939**	**11,054**	**12,437**	**17,528**	**46,958**	**100.0**

By excess deaths, age and sex

Total excess deaths for males were between two and three and a half times those for females in each age group of the analysis (Table 4.34). The pattern of excess deaths across age groups differed between the sexes, with the highest number of excess deaths for males (13,005; 39.4% of male excess deaths) in the 45 to 64 year age group in each socioeconomic grouping, compared to the 65 to 74 year age group (6,228; 44.6%) for females.

The 45 to 64 year and 65 to 74 year age groups accounted for more than three quarters of male excess deaths (76.7%; 25,330 deaths) and over four fifths of female excess deaths (82.7%; 11,539). Male excess deaths were two and a half times those for females in the 45 to 64 year age group, and twice those for females aged 65 to 74 years (the smallest differential of the age groups).

While male excess deaths in the 0 to 24 year age group (2,295) were two and a half times the excess deaths for females (934), the proportions were similar (7.0% of male deaths and 6.7% for females).

The largest differential in the number of male and female excess deaths was in the 25 to 44 year age group, where males deaths (5,388; 16.3%) were over three and a half times those for females (1,472; 10.6%).

Similarly, Quintile 2 had the largest differential in male and female excess deaths in any age group, with male deaths in the 25 to 44 year age group (905) more than eight times those for females (108). The 0 to 24 year age group also had a large differential, with excess deaths for males (330) over four and a half times those for females (70).

In Quintile 3, male deaths in the 25 to 44 year age group (1,289) were more than three times those for females (403). Differentials for the other age groups ranged between just over two (in the 65 to 74 year age group) to two and two thirds (45 to 64 years).

Excess deaths for males aged 25 to 44 years in Quintile 4 (1,321) were almost four times those for females (341). In the 45 to 64 year age group, excess deaths for males (3,610) were two and three quarters times those for females (1,309).

In Quintile 5, male excess deaths were three times higher than for females in the 25 to 44 year age group (1,874, compared to 620). Differentials in the other age groups ranged from just under two in the 65 to 74 year age group (4,517, compared to 2,416) to over two in the 0 to 24 year age group (884, and 378).

Table 4.34: Excess deaths from avoidable mortality 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)	330	509	571	884	**2,295**	7.0
25-44	(0)	905	1,289	1,321	1,874	**5,388**	16.3
45-64	(0)	1,673	3,048	3,610	4,675	**13,005**	39.4
65-74	(0)	1,400	3,015	3,392	4,517	**12,325**	37.3
Total	**(0)**	**4,308**	**7,861**	**8,894**	**11,950**	**33,013**	**100.0**
Females							
0-24	(0)	70	232	254	378	**934**	6.7
25-44	(0)	108	403	341	620	**1,472**	10.6
45-64	(0)	693	1,144	1,309	2,165	**5,311**	38.1
65-74	(0)	759	1,414	1,639	2,416	**6,228**	44.6
Total	**(0)**	**1,630**	**3,193**	**3,543**	**5,579**	**13,945**	**100.0**
Ratio–M:F							
0-24	..	4.71	2.19	2.25	2.34	**2.46**	..
25-44	..	8.38	3.20	3.87	3.02	**3.66**	..
45-64	..	2.41	2.66	2.76	2.16	**2.45**	..
65-74	..	1.84	2.13	2.07	1.87	**1.98**	..
Total	..	**2.64**	**2.46**	**2.51**	**2.14**	**2.37**	..

4.6 Avoidable mortality by Indigenous status

Introduction and data quality issues

It is useful to identify the extent to which the variations evident in these data between men and women, when examined by age group and geographically, reflect the differing experience of Aboriginal and Torres Strait Islander people, and of the non-Indigenous population. This is necessary to determine whether avoidable mortality in Australia is largely an Indigenous issue, or one of relevance to both Indigenous and non-Indigenous populations.

Despite the limitations of death registrations in identifying Indigenous deaths, the available data provide at least an order of magnitude of the difference between Indigenous and non-Indigenous deaths from avoidable causes.

The analysis in this section 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.

These jurisdictions, highlighted in Table 4.35, are the Northern Territory, Western Australia, South Australia and Queensland: estimated coverage for the years covered by this analysis vary from 100% in the Northern Territory to 54% in Queensland.

Table 4.35: Estimated coverage[1] of Indigenous deaths in death registration records

Per cent

Year	NSW	Vic	Qld	SA	WA	Tas	NT	ACT	Aust
1997	9	43	**58**	**68**	**70**	4	**100**	20	49
1998	47	56	**63**	**64**	**74**	10	**88**	14	61
1999	43	59	**55**	**57**	**68**	8	**83**	27	56
2000	46	48	**54**	**69**	**77**	6	**92**	–	59
2001	45	41	**56**	**59**	**62**	22	**85**	–	55

[1] **Based on 1996 Census populations**

Source: ABS *Deaths Australia, 2001*, cat. no. 3302.0

The ABS has calculated death rates for the Indigenous and non-Indigenous populations for Australia as a whole, and for the four jurisdictions, to illustrate the likely effect of under-reporting of Indigenous status at the national level. They report an indirectly standardised death rate for the Indigenous population for Australia as a whole of 12 deaths per 1,000 population at all ages, twice the rate of the non-Indigenous population: when calculated for the four jurisdictions, the Indigenous rate is 15 deaths per 1,000 population, compared with the non-Indigenous rate of 6, a differential in the rates of two and a half (ABS 2002).

Repeating this comparison for avoidable mortality (and limited to ages 0 to 74) produces a similar result, although the differentials in Indigenous/ non-Indigenous death rates are larger. When all jurisdictions are included, the Indigenous rate is almost three times that for the non-Indigenous (2.86**, not shown in table); and, when limited to the jurisdictions with the most complete coverage, it is almost four times (3.70**, Table 4.36).

Overall impact by Indigenous status

The proportion of deaths at ages 0 to 74 years from avoidable causes is slightly higher among the Indigenous population, being 76.2% of all deaths at these ages, compared with 71.9% for the non-Indigenous population (Table 4.36).

This is a relatively small difference, in particular when compared with the difference in rates between the Indigenous and non-Indigenous populations (the Indigenous rate is 3.70** times that for the non-Indigenous population). As such, it highlights the substantial impact of deaths from avoidable causes on both Indigenous and non-Indigenous populations.

Similar proportions of all deaths are considered to be amenable to health care for both the Indigenous (31.1%) and non-Indigenous (29.0%) populations.

Table 4.36: Avoidable mortality (0 to 74 years) by Indigenous status, Queensland, South Australia, Western Australia and Northern Territory, 1997-2001

Mortality category	Number			% of total	ASR per 100,000 population			Rate ratio Indig: Non-Indig
	Indigenous	Non-Indigenous	Total		Indigenous	Non-Indigenous	Total	
Avoidable mortality	4,838	65,793	70,631	72.2	636.6	172.1	181.1	3.70**
(Amenable mortality)	(1,974)	(26,419)	(28,392)	(29.0)	(264.7)	(68.8)	(72.5)	(3.85**)
Unavoidable mortality	1,510	25,740	27,250	27.8	197.7	67.4	69.9	2.93**
Total mortality	**6,348**	**91,533**	**97,881**	**100.0**	**834.1**	**239.4**	**251.0**	**3.48****

By sex

As noted, the overall death rate from avoidable causes for the Indigenous population (636.6 deaths per 100,000 population) was more than three and half times (3.70**) the rate for the non-Indigenous population (172.1) (Table 4.37).

The rate for Indigenous males (787.1 deaths per 100,000 males) was 64% above the rate for Indigenous females (481.3), and 3.45** times the rate for non-Indigenous males (227.9 deaths per 100,000 males).

The differential in death rates for Indigenous and non-Indigenous females was even larger, at 4.14** (481.3 Indigenous female deaths per 100,000 females and 116.2 for non-Indigenous females).

Table 4.37: Avoidable 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	2,888	43,282	46,170	787.1	227.9	238.5	3.45**
Females	1,950	22,511	24,461	481.3	116.2	123.7	4.14**
Total	**4,838**	**65,793**	**70,631**	**636.6**	**172.1**	**181.1**	**3.70****
RR–M:F	..	..	..	**1.64****	**1.96****	**1.93****	..

By age

Indigenous avoidable mortality rates were from two and a half to just under five times the rates for the non-Indigenous population for all of the age groups in the analysis (Figure 4.28, Table 4.38). Whilst the highest rate for both populations was in the 65 to 74 year age group, the largest rate differentials were in the 45 to 64 year (4.82**) and the 25 to 44 year (4.63**) age groups, where the Indigenous rates were 1,428.6 and 363.4 deaths per 100,000 population, respectively, compared to 296.6 and 78.5 deaths per 100,000 population, respectively, for the non-Indigenous population.

Figure 4.28: Avoidable mortality by Indigenous status and age, Qld, SA, WA and NT, 1997-2001

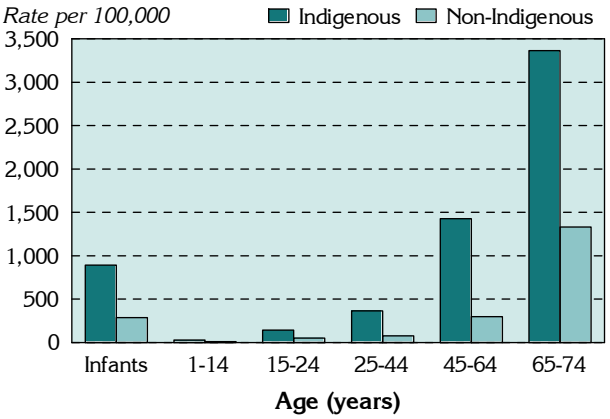


Table 4.38: Avoidable mortality by Indigenous status and age, Queensland, South Australia, Western Australia and Northern Territory, 1997-2001

Age (years)	Number		Rate per 100,000 population[1]		Rate ratio
	Indigenous	Non-Indigenous	Indigenous	Non-Indigenous	Indig:Non-Indig
Infants (<1)	267	1,218	893.4	287.6	3.11**
1-14	137	673	27.5	10.3	2.67**
15-24	362	2,550	142.3	52.1	2.73**
25-44	1,379	8,279	363.4	78.5	4.63**
45-64	1,831	22,379	1,428.6	296.6	4.82**
65-74	862	30,694	3,364.0	1,330.1	2.53**
Total	**4,838**	**65,793**	**636.6**	**172.1**	**3.70****

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

The impact of avoidable mortality on the Indigenous population is most evident at ages below 45 years; for the non-Indigenous population the impact is more noticeable at older ages. For example, the proportion of years of life lost (YLL) from avoidable causes for Indigenous infants under one year of age (7.8%) and from children aged 1 to 14 years (3.9%) were over twice (2.42** and 2.24**) those for non-Indigenous children (Table 4.39). The ratios of the proportions in the 15 to 24 year (1.57**) and 25 to 44 year (1.83**) age groups were also above one, indicating higher proportions of YLL from avoidable causes among the Indigenous population.

In the remaining age groups analysed, the differentials in YLL are reversed. The proportion of YLL for the Indigenous population aged 45 to 64 years (34.3%) was less than that of the non-Indigenous population (36.7%), and the proportion of YLL in the Indigenous population in the 65 to 74 year age group (10.9%) was less than one third that of the non-Indigenous population (33.9%).

Table 4.39: YLL from avoidable 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)	8,152	37,186	7.8	3.2	2.42**
1-14	4,097	20,167	3.9	1.7	2.24**
15-24	10,250	72,098	9.8	6.3	1.57**
25-44	34,833	209,373	33.3	18.2	1.83**
45-64	35,865	422,530	34.3	36.7	0.94**
65-74	11,410	391,147	10.9	33.9	0.32**
Total	**104,607**	**1,152,501**	**100.0**	**100.0**	**..**

Indigenous deaths by age and sex

Rates of death from avoidable mortality were higher for Indigenous males than for Indigenous females in all age groups (Figure 4.29, Table 4.40). While the highest rate for both males and females were in the 65 to 74 year age group, the largest differentials in rates were in the 15 to 24 year and 25 to 44 year age groups. The rate for Indigenous males aged 15 to 24 years (208.7 deaths per 100,000 males) was almost three times (2.75**) that for Indigenous females (75.8); and Indigenous males aged 25 to 44 years (479.9) were almost twice (1.95**) as likely to die from avoidable causes than Indigenous females (246.1) at these ages.

Figure 4.29: Avoidable mortality by age and sex, Indigenous population, Qld, SA, WA and NT, 1997-2001

Table 4.40: Avoidable mortality by age and sex, Indigenous population, Queensland, South Australia, Western Australia and Northern Territory, 1997-2001

Age (years)	Number			% of total avoidable mortality	Rate per 100,000 population[1]			Rate ratio Males: Females
	Males	Females	Total		Males	Females	Total	
Infants (<1)	149	118	267	5.5	984.3	802.7	893.4	1.23
1-14	73	64	137	2.8	28.8	26.3	27.5	1.10
15-24	265	97	362	7.5	208.7	75.8	142.3	2.75**
25-44	903	476	1379	28.5	479.9	246.1	363.4	1.95**
45-64	1,049	782	1831	37.8	1,722.8	1,121.5	1,428.6	1.54**
65-74	449	413	862	17.8	3,856.3	2,743.1	3,364.0	1.41**
Total	**2,888**	**1,950**	**4,838**	**100.0**	**787.1**	**481.3**	**636.6**	**1.64****

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

By cause

Ischaemic heart disease was the highest ranking cause of avoidable death for both the Indigenous and non-Indigenous populations, resulting in over one fifth of deaths in both population groups (21.1% and 23.2%, respectively) (Table 4.41).

However, two of the next three causes have quite different rankings between the Indigenous and non-Indigenous populations. Diabetes, the second ranked cause of death for Aboriginal and Torres Strait Islander peoples, accounted for 10.6% of deaths from avoidable causes. For the non-Indigenous population, diabetes was ranked ninth, and the Indigenous ASR of 87.8 deaths per 100,000 population was almost twenty times the non-Indigenous rate of 4.9.

Deaths from alcohol related disease accounted for 6.1% of Indigenous deaths and were ranked fourth, compared with a ranking of eleventh for the non-Indigenous population. The ASR of 40.9 deaths per 100,000 population was ten times the non-Indigenous rate. Deaths from cerebrovascular diseases, ranked third for the Indigenous population, were similarly ranked for the non-Indigenous population, with the fifth highest ASR, and accounted for similar proportions of avoidable deaths (5.5% and 6.3%, respectively).

Two other causes of death that are much more evident for the non-Indigenous population in this broad age group are selective invasive bacterial and protozoal infections (rank of 8, compared with 15 for the non-Indigenous population) and nephritis and nephrosis (ranks of 9 and 24, respectively).

Conversely, deaths from suicide and self-inflicted injuries have a lower ranking of seventh most important cause for the Indigenous population, compared with third for the non-Indigenous population. Other avoidable causes with notably lower rankings for the Indigenous population are road traffic injuries (10), colorectal cancer (16) and breast cancer (18).

However, readers should note the impact of particular causes by age group (Table 4.42, below).

Table 4.41: Avoidable 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	1,020	183.5	21.1	1	15,264	37.7	23.2	1
Diabetes	515	87.8	10.6	2	1,972	4.9	3.0	9
Cerebrovascular diseases	264	45.6	5.5	3	4,165	10.2	6.3	5
Alcohol related disease	297	40.9	6.1	4	1,500	3.9	2.3	11
Lung cancer	212	38.7	4.4	5	7,596	19.1	11.5	2
COPD (45-74 years)	179	35.9	3.7	6	3,454	8.4	5.2	7
Suicide and self-inflicted injuries	366	31.8	7.6	7	4,850	14.1	7.4	3
Selected invasive bacterial and protozoal infections	228	27.7	4.7	8	986	2.6	1.5	15
Nephritis and nephrosis	154	26.4	3.2	9	518	1.3	0.8	24
Road traffic injuries	305	23.9	6.3	10	3,087	9.5	4.7	6
Birth defects	155	8.9	3.2	14	1,143	4.2	1.7	10
Colorectal cancer	42	7.2	1.8	16	4,733	12.0	7.2	4
Breast cancer (female)	52	7.0	1.2	18	2,963	7.7	4.5	8

[1] **Per cent is the proportion of total avoidable 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**

Indigenous deaths by cause and age

The three major causes of avoidable death in Indigenous infants were complications of the perinatal period (a rate of 384.4 deaths per 100,000 population, 43.1% of deaths in this age group), birth defects (365.0, 40.8%) and selected invasive bacterial and protozoal infections (103.7, 11.6%) (Table 4.42).

In the 1 to 14 year age group, the major causes of avoidable death were road traffic injuries (9.1 deaths per 100,000 population, 32.8% of deaths in this age group), birth defects (3.4, 12.4%), drownings (3.1, 11.7%) and infections (2.8, 10.2%).

Suicide and self inflicted injuries were the primary cause of avoidable death for Indigenous youth aged 15 to 24 years (a rate of 60.4 deaths per 100,000 population), comprising 42.3% of deaths in this age group. Road traffic injuries (32.8 deaths per 100,000 population) resulted in just under one quarter of deaths (23.2%), with violence the third rated cause (11.8 deaths per 100,000 population, 8.3%).

In the 25 to 44 year age group, ischaemic heart disease resulted in just under one fifth of deaths (72.5 deaths per 100,000 population, 18.3%), with suicide and self inflicted injuries (47.1, 13.3%) the next ranked cause of avoidable mortality.

Alcohol related disease (43.6 deaths per 100,000 population, 11.2%) and road traffic injuries (32.1, 9.2%) together accounted for one fifth of deaths from avoidable causes in this age group.

Ischaemic heart disease was also the leading cause of these deaths for the Indigenous population in the 45 to 64 year age group (430.8 deaths per 100,000 population, 28.8%). Diabetes was the second ranked cause (243.4, 16.6%), followed by lung cancer (111.3, 7.4%) and cerebrovascular diseases (91.8, 6.3%).

The main cause of death in the 65 to 74 year age group was again ischaemic heart disease (927.3 deaths per 100,000 population, 26.9%), followed by diabetes (497.8, 15.0%). Cerebrovascular diseases was the third rated cause of deaths (384.6 deaths per 100,000 population) resulting in 11.3% of deaths, followed by COPD (349.5), with one tenth (10.2%) of deaths in this age group.

Table 4.42: Avoidable mortality by major cause and age, Indigenous population, Queensland, South Australia, Western Australia and Northern Territory, 1997-2001

Age (years)	Cause	Number	Rate per 100,000[1]	% of total in age group	YLL
Infants (<1)	Complications of perinatal period	115	384.4	43.1	3,511
	Birth defects	109	365.0	40.8	3,328
	Selected invasive bacterial and protozoal infections	31	103.7	11.6	946
1-14	Road traffic injuries	45	9.1	32.8	1,345
	Birth defects	17	3.4	12.4	508
	Drownings	16	3.1	11.7	483
	Selected invasive bacterial and protozoal infections	14	2.8	10.2	422
15-24	Suicide and self inflicted injuries	153	60.4	42.3	4,332
	Road traffic injuries	84	32.8	23.2	2,377
	Violence	30	11.8	8.3	850
25-44	Ischaemic heart disease	253	72.5	18.3	6,254
	Suicide and self inflicted injuries	183	47.1	13.3	4,773
	Alcohol related disease	154	43.6	11.2	3,853
	Road traffic injuries	127	32.1	9.2	3,262
45-64	Ischaemic heart disease	528	430.8	28.8	10,344
	Diabetes	304	243.4	16.6	5,836
	Lung cancer	135	111.3	7.4	2,555
	Cerebrovascular diseases	116	91.8	6.3	2,219
65-74	Ischaemic heart disease	232	927.3	26.9	3,104
	Diabetes	129	497.8	15.0	1,724
	Cerebrovascular diseases	97	384.6	11.3	1,258
	COPD	88	349.5	10.2	1,146

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

Table 4.43 provides estimates of years of life lost (YLL) for the Indigenous population for the ten causes with the greatest impact under this measure.

From 1997 to 2001, deaths from ischaemic heart disease resulted in the highest total number of YLL from avoidable causes (19,899 years) at ages 0 to 74 years: this was the top ranking cause of YLL in the 25 to 44 (6,254 YLL), 45 to 64 (10,344) and 65 to 74 (3,104) year age groups (see Table 4.42 above).

The second highest cause of YLL was suicide and self inflicted injuries (9,841 YLL), which was ranked first in the 15 to 24 year age group (4,332 YLL) and second in the 25 to 44 year age group (4,773).

The third ranked cause of YLL from avoidable causes, diabetes, accounted for an estimated 9,577 YLL, and was ranked second in both the 45 to 64 year (5,836 YLL) and 65 to 74 (1,724) year age groups.

Deaths from road traffic injuries resulted in a total of 7,983 YLL in the Indigenous population. Road traffic injuries were the highest ranked cause of YLL in the 1 to 14 year age group (1,345 YLL), second highest in the 15 to 24 year age group (2,377), and fourth in the 25 to 44 year age group (3,262).

Table 4.43: YLL from avoidable mortality (0 to 74 years) by major cause, Indigenous population, Queensland, South Australia, Western Australia and Northern Territory, 1997-2001

Cause	Number	ASR	YLL
Ischaemic heart disease	1,020	183.5	19,899
Suicide and self inflicted injuries	366	31.8	9,841
Diabetes	515	87.8	9,577
Road traffic injuries	305	23.9	7,983
Alcohol related disease	297	40.9	6,740
Selected invasive bacterial and protozoal infections	228	27.7	5,145
Cerebrovascular diseases	264	45.6	4,751
Birth defects	155	8.9	4,543
Violence	155	12.2	4,013
Lung cancer	212	38.7	3,723

By socioeconomic status

There is a clear socioeconomic gradient in the rates of avoidable mortality for both the Indigenous and non-Indigenous populations, with the exception of Quintile 4 for the Indigenous population (Figure 4.30). The gradient is much more pronounced for the Indigenous than the non-Indigenous population, with differentials in rates ranging from almost double (1.90**) in the least disadvantaged areas (Quintile 1) to just over four times (4.01**) in the most disadvantaged (Quintile 5).

The highest ASR for the Indigenous population was 877.5 deaths per 100,000 population in Quintile 5 and the lowest was 248.1 in Quintile 1, a differential in rates of 3.54** 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 1.68**, ranging from 219.1 deaths per 100,000 population in the most disadvantaged areas to 130.7 in the least disadvantaged areas. The greatest differential in rates between the Indigenous and non-Indigenous populations was in the most disadvantaged areas (Quintile 5), where the Indigenous rate (877.5 deaths per 100,000 population) was four times (4.01**) that of the non-Indigenous population (219.1). In the least disadvantaged areas, the Indigenous rate of 248.1 deaths per 100,000 population was just less than twice (1.90**) the rate for the non-Indigenous population (130.7).

Figure 4.30: Avoidable mortality (0 to 74 years) by Indigenous status and socioeconomic status, Qld, SA, WA and NT, 1997-2001

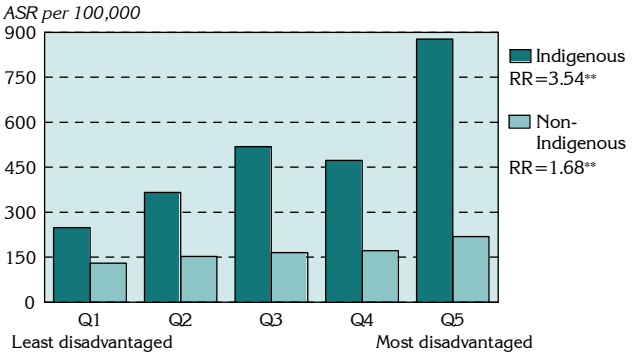


Table 4.44: Avoidable mortality (0 to 74 years) by Indigenous status and socioeconomic status, Queensland, South Australia, Western Australia and Northern Territory, 1997-2001

Quintile	Number		ASR per 100,000 population		Rate ratio
	Indigenous	Non-Indigenous	Indigenous	Non-Indigenous	Indig:Non-Indig
1: Least disadvantaged	87	7,255	248.1	130.7	1.90**
2	402	12,528	366.1	153.0	2.39**
3	633	11,364	518.9	165.4	3.14**
4	808	15,097	472.6	172.2	2.74**
5: Most disadvantaged	2,825	19,417	877.5	219.1	4.01**
Total	**4,838**	**65,793**	**636.6**	**172.1**	**3.70****
RR–Quintile 5:Quintile 1	**..**	**..**	**3.54****	**1.68****	**..**

By socioeconomic status and sex

The patterns of the socioeconomic gradients for males and females (Table 4.45) follow those for the total Indigenous and non-Indigenous populations shown above, with the ASRs in Quintile 4 of the Indigenous population lower than that in Quintile 3.

The gradient for Indigenous males is much more pronounced than that for Indigenous females (Figure 4.31). The highest ASR for Indigenous males was 1,085.5 deaths per 100,000 population in Quintile 5, and the lowest was 293.6 in the least Quintile 1, a differential of 3.70** between the most disadvantaged and the least disadvantaged areas.

The ASRs for Indigenous females ranged from 663.0 deaths per 100,000 population in the most disadvantaged areas to 200.1 in the least disadvantaged areas, a differential of 3.31**.

For the non-Indigenous population, ASRs for males ranged from 290.2 deaths per 100,000 population in the most disadvantaged areas to 168.0 in the least disadvantaged areas (a differential of 1.73**), and for females from 148.0 to 93.3 (1.59**).

Figure 4.31: Avoidable mortality (0 to 74 years) by socioeconomic status and sex, Indigenous population, Qld, SA, WA and NT, 1997-2001

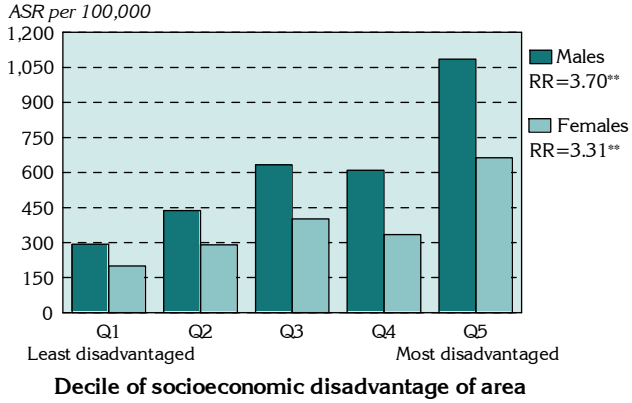


Table 4.45: Avoidable mortality (0 to 74 years) by Indigenous status, socioeconomic status and sex, Queensland, South Australia, Western Australia and Northern Territory, 1997-2001

Quintile	Number		ASR per 100,000 population		Rate ratio
	Indigenous	Non-Indigenous	Indigenous	Non-Indigenous	Indig:Non-Indig
Males					
1: Least disadvantaged	50	4,555	293.6	168.0	1.75**
2	231	8,232	437.1	203.1	2.15**
3	377	7,511	632.9	217.9	2.90**
4	500	10,048	610.1	230.4	2.65**
5: Most disadvantaged	1,686	12,817	1,085.5	290.2	3.74**
Total	**2,888**	**43,282**	**787.1**	**227.9**	**3.45****
RR–Quintile 5:Quintile 1	**..**	**..**	**3.70****	**1.73****	**..**
Females					
1: Least disadvantaged	37	2,700	200.1	93.3	2.14**
2	171	4,296	290.7	102.9	2.83**
3	256	3,853	401.6	112.9	3.56**
4	308	5,049	333.9	114.0	2.93**
5: Most disadvantaged	1,139	6,600	663.0	148.0	4.48**
Total	**1,950**	**22,511**	**481.3**	**116.2**	**4.14****
RR–Quintile 5:Quintile 1	**..**	**..**	**3.31****	**1.59****	**..**

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).

[1] See Chapter 2, *Methods*

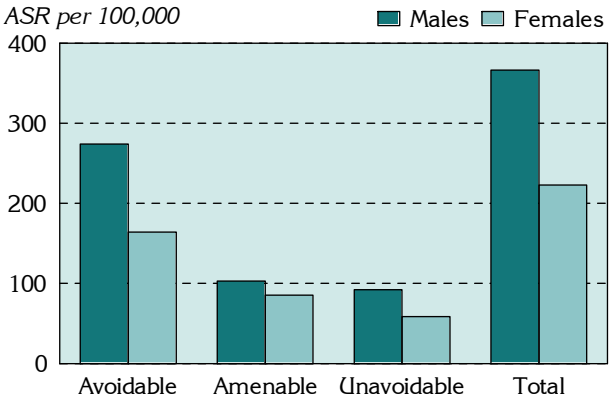
Table 5.1: Avoidable mortality (0 to 74 years) by sex, New Zealand, 1997-2001

Mortality category	Number			Per cent	ASR per 100,000			Rate ratio
	Males	Females	Total	of total	Males	Females	Total	M:F
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

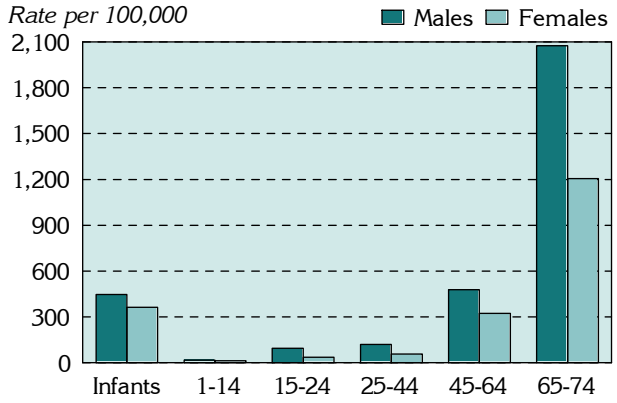
Age (years)	Number			Per cent of total	Rate per 100,000 population[1]			Rate ratio M:F
	Males	Females	Total		Males	Females	Total	
Infants (<1)	628	482	1,109	2.5	448.0	363.5	405.8	1.23**
1-14	369	276	644	1.5	18.4	14.5	16.5	1.27**
15-24	1,239	473	1,712	3.9	95.9	36.8	66.4	2.61**
25-44	3,211	1,688	4,900	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).

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



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).

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, with13.2% 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 contributed13.0% 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				Females			
		Number	Rate[1]	Per cent[2]	Rank[3]	Number	Rate[1]	Per cent[2]	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*.

[2] See Chapter 2, *Methods*

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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

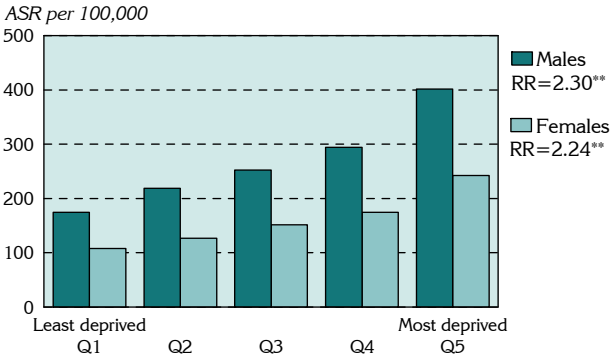
For both males and females, there was a marked deprivation gradient in the rates of death from avoidable conditions (Figure 5.3).

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.

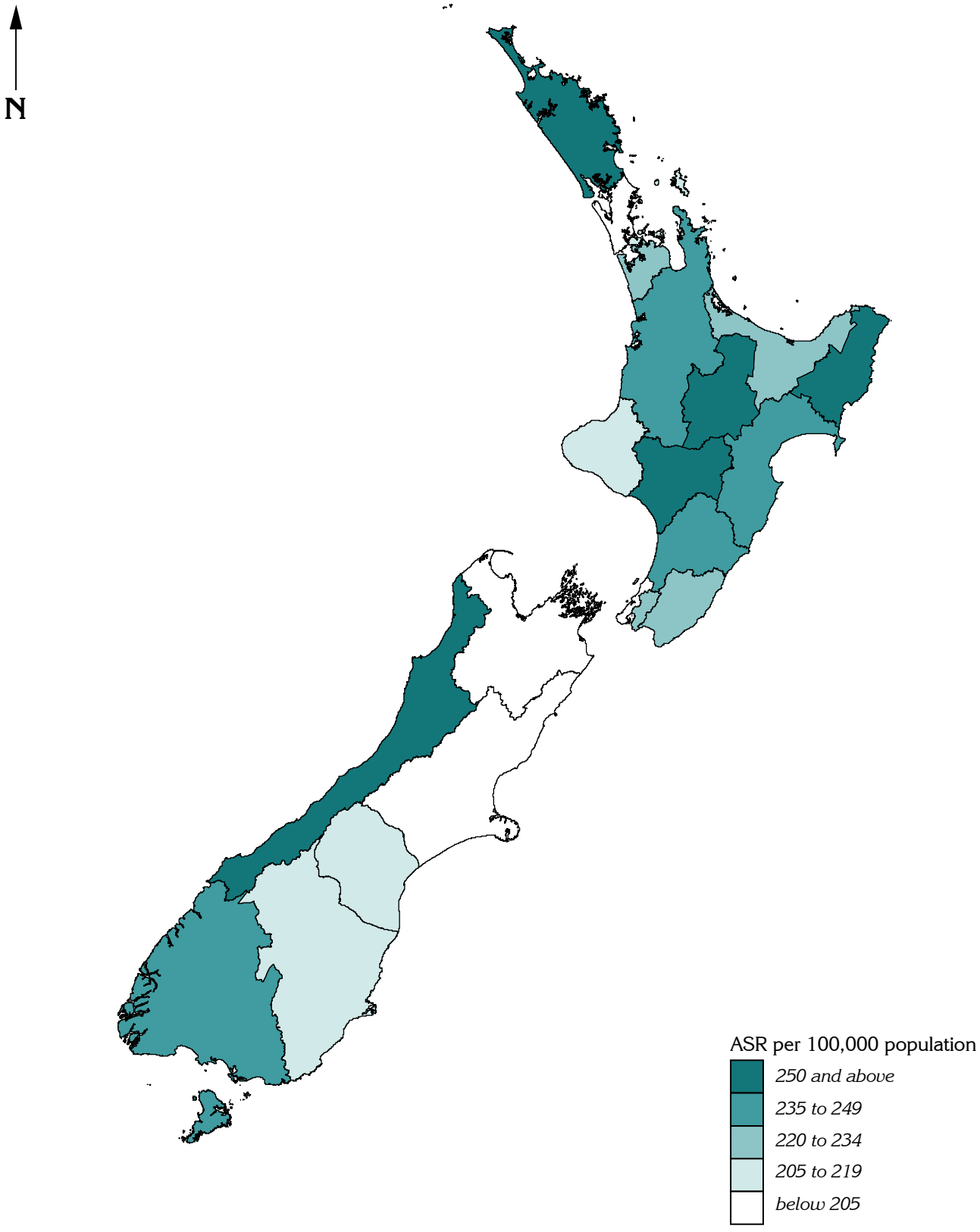
The differential in rates between the Mäori and European/ others was greater for females (a rate ratio of 3.02**) than for males (2.54**). For Pacific peoples, the differentials between the European/ others rates were approximately double, for both males and females.

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



Details of map boundaries are in Appendix 1.4

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**

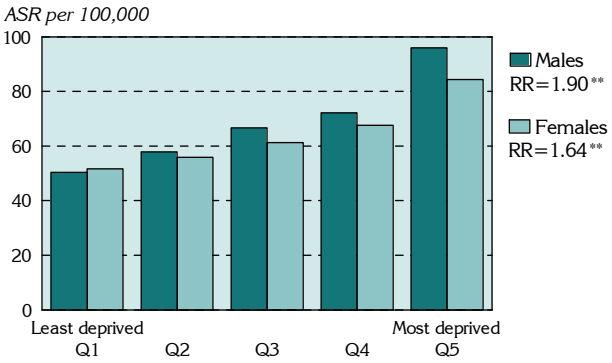
By deprivation

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 Mäori (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 Mäori population, the female rate was marginally lower than the male rate (a rate ratio of 0.98).

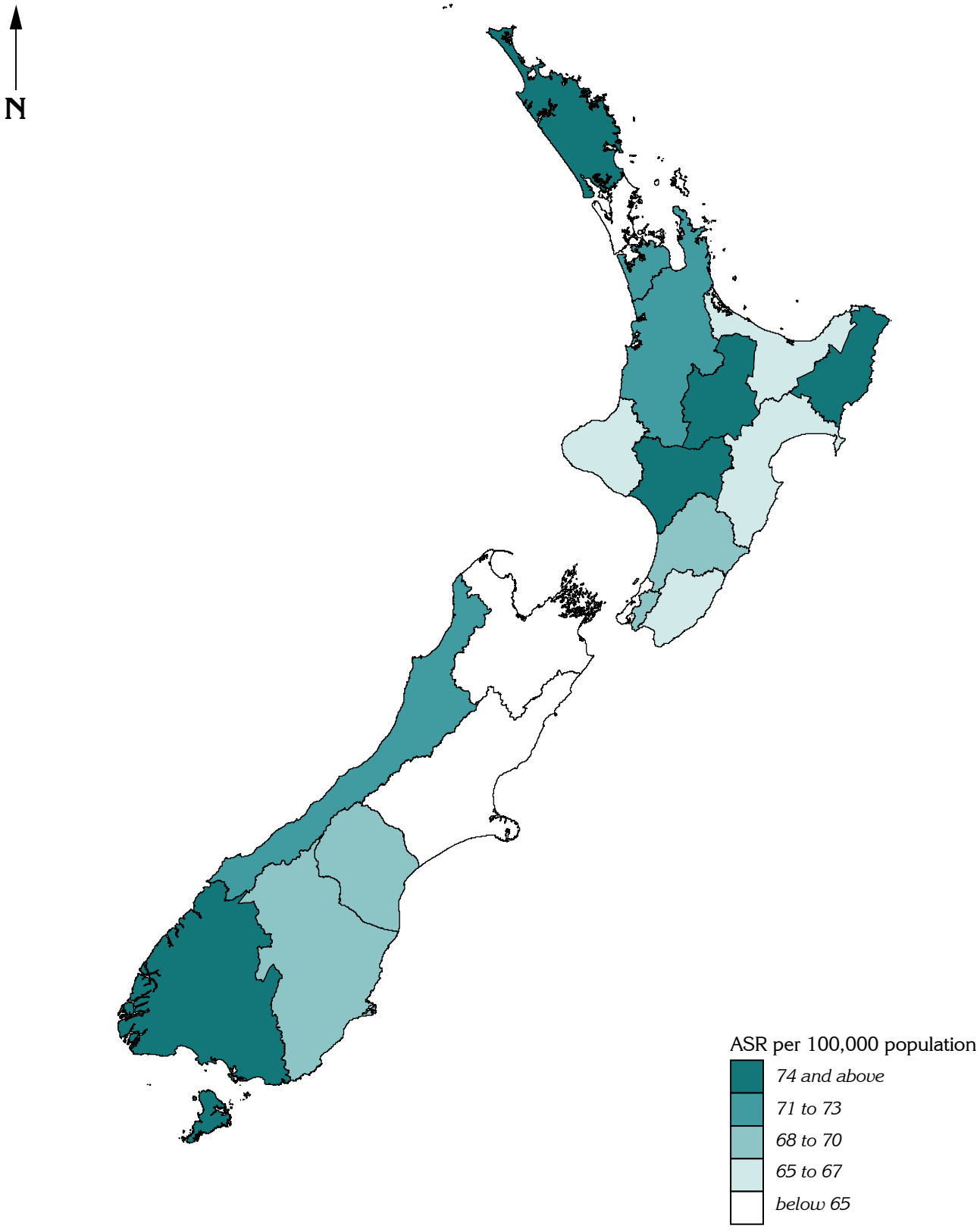
The differential in death rates between the Mäori and European/ others was greater for females (2.45**) than for males (2.21**): for Pacific peoples, the differential was greater for males (1.86**) than for females (1.65**).

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
Mäori	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–Mäori: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



Details of map boundaries are in Appendix 1.4

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**

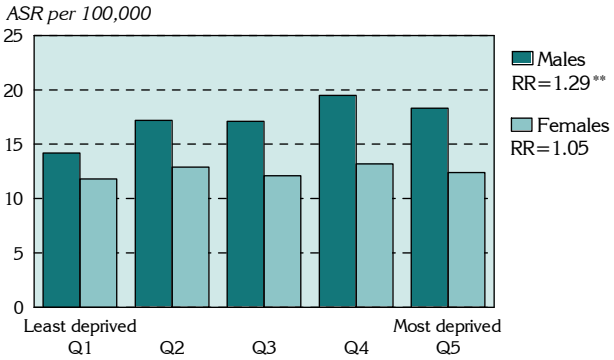
By deprivation

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

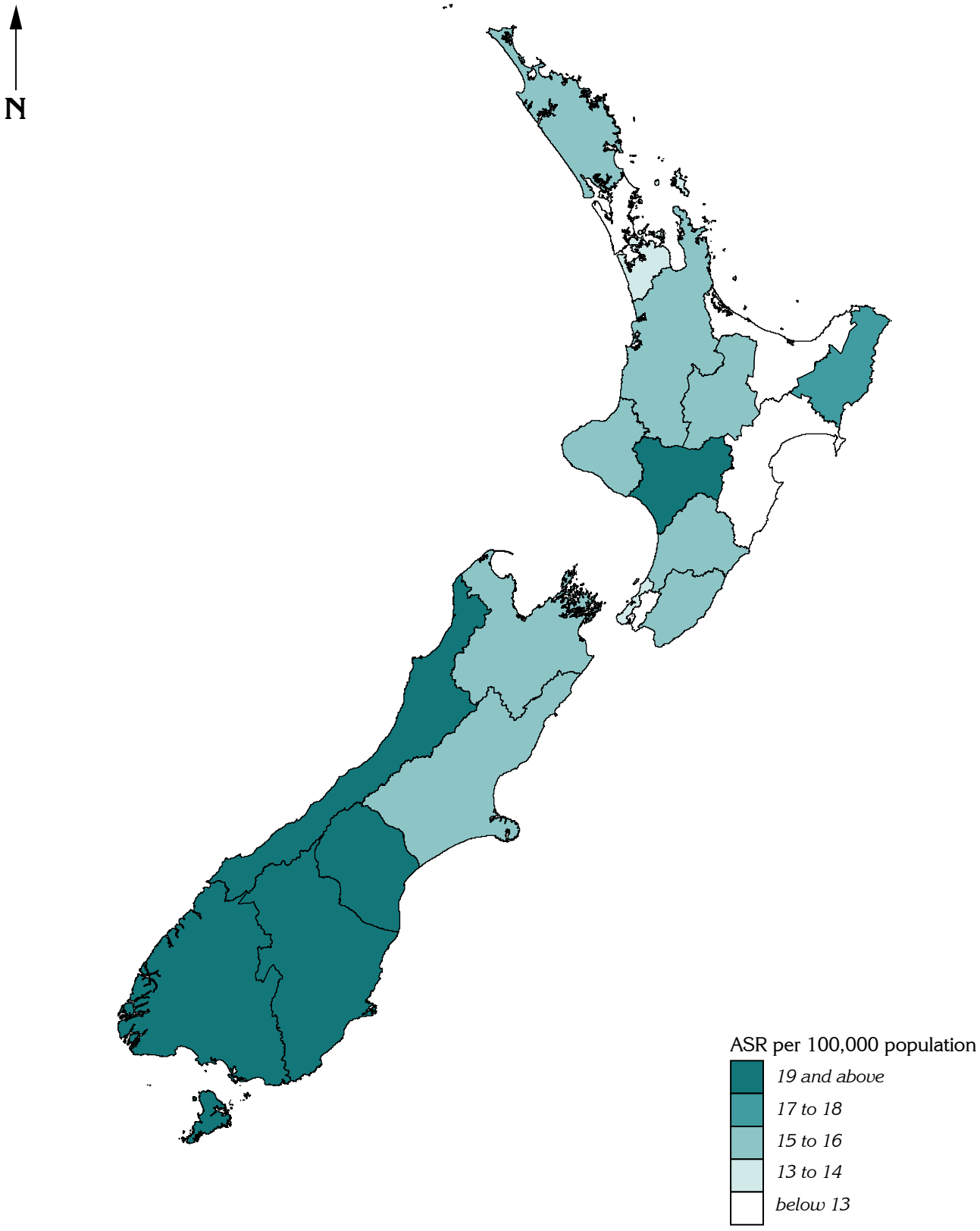
For both males and females, the rates for Mäori and Pacific peoples were between 74% and 90% of the European/ others rates.

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



Details of map boundaries are in Appendix 1.4

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**

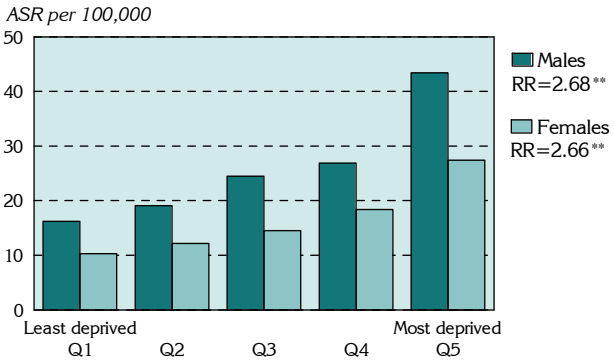
By deprivation

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 Mäori (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**).

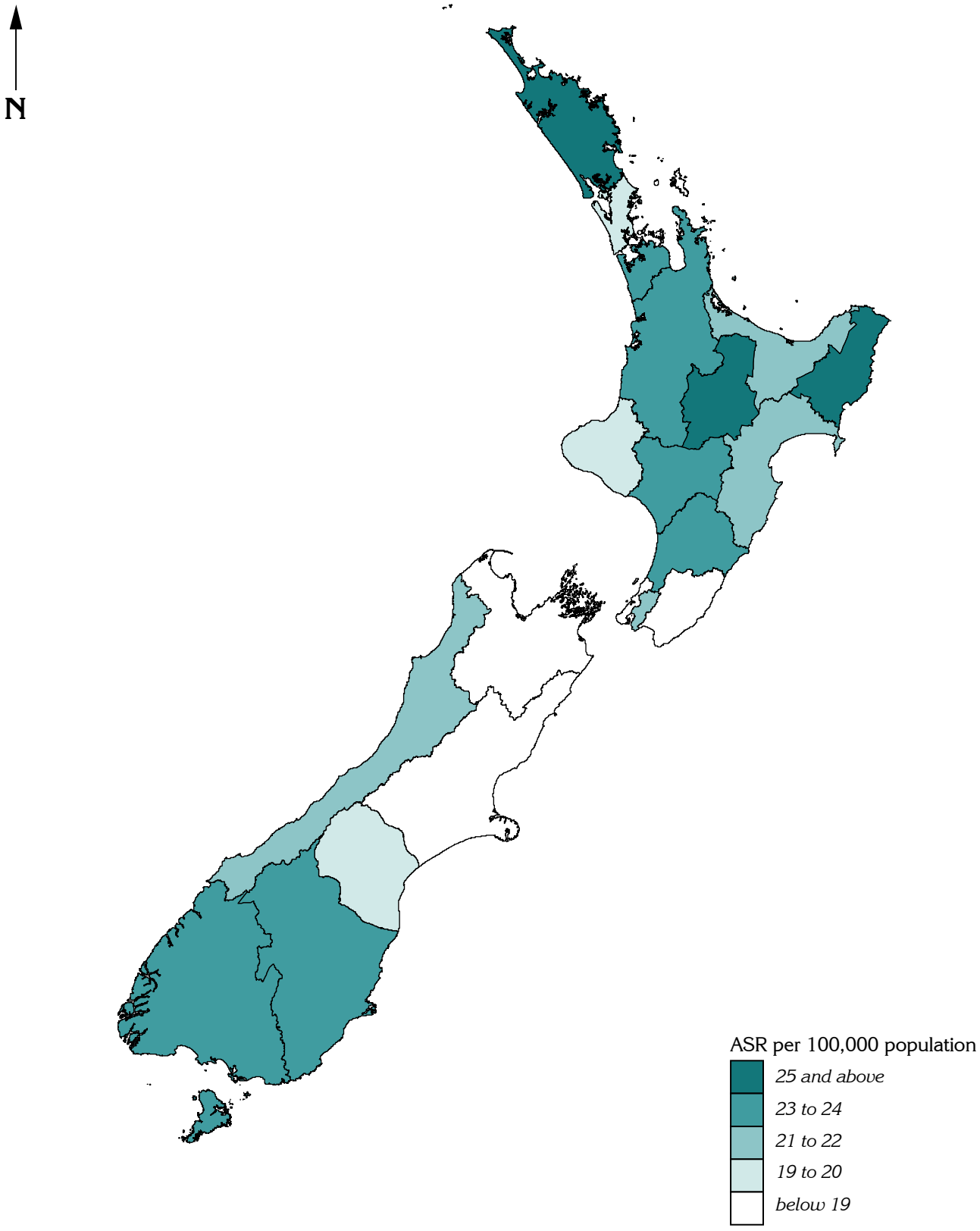
The differential in rates between the Mäori and European/ others was greater for females (5.07**) than for males (3.44**): for Pacific peoples, the differential was greater for males (2.55**) than for females (1.43**).

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
Mäori	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–Mäori: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



Details of map boundaries are in Appendix 1.4

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**

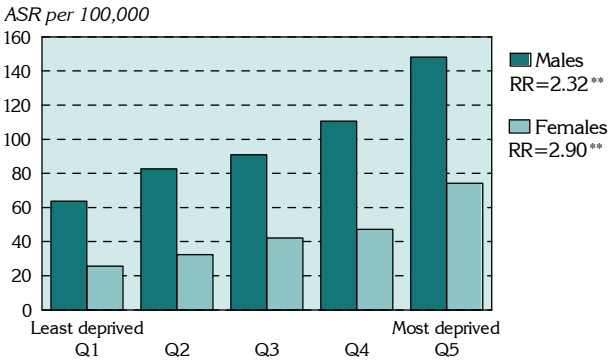
By deprivation

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

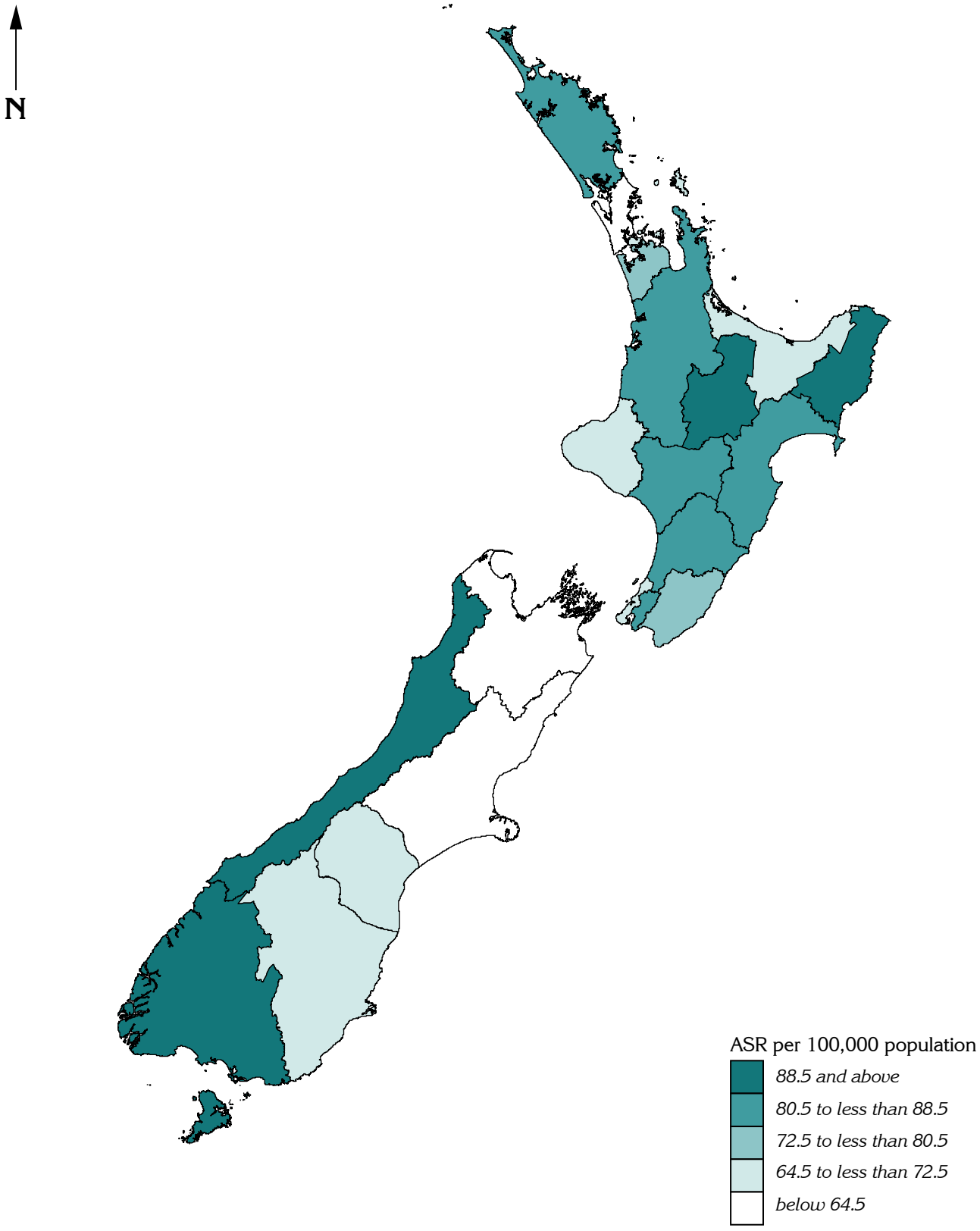
ASR per 100,000 population

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



Details of map boundaries are in Appendix 1.4

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**

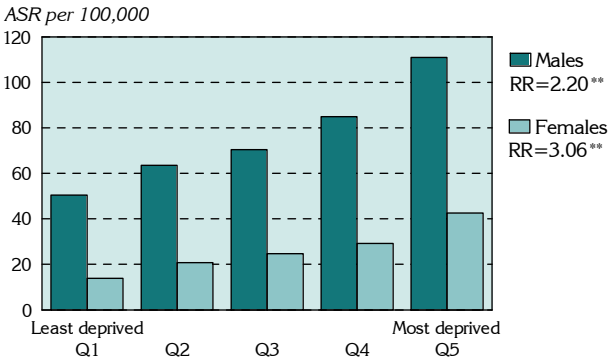
By deprivation

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 Mäori 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**).

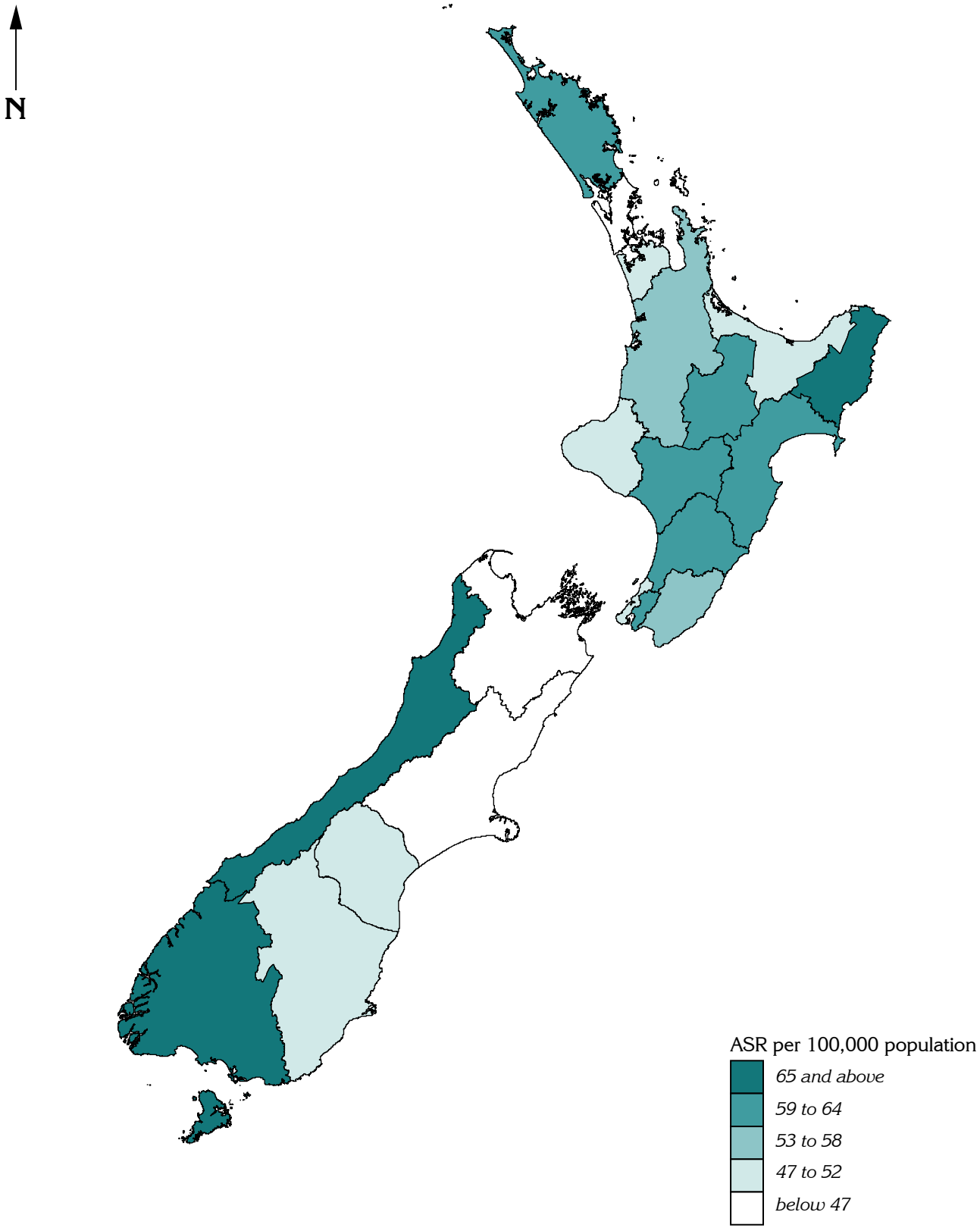
The differential between the Mäori and the European/ others rates was notably higher for females (4.11**) than for males (2.94**): for Pacific peoples, the differential was slightly larger for males (2.22**) than for females (2.05**).

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
Mäori	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–Mäori: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



Details of map boundaries are in Appendix 1.4

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**

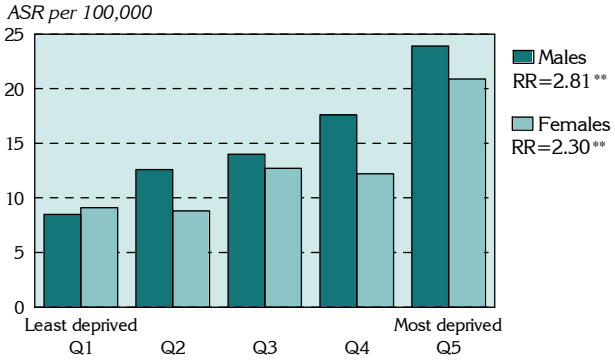
By deprivation

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.

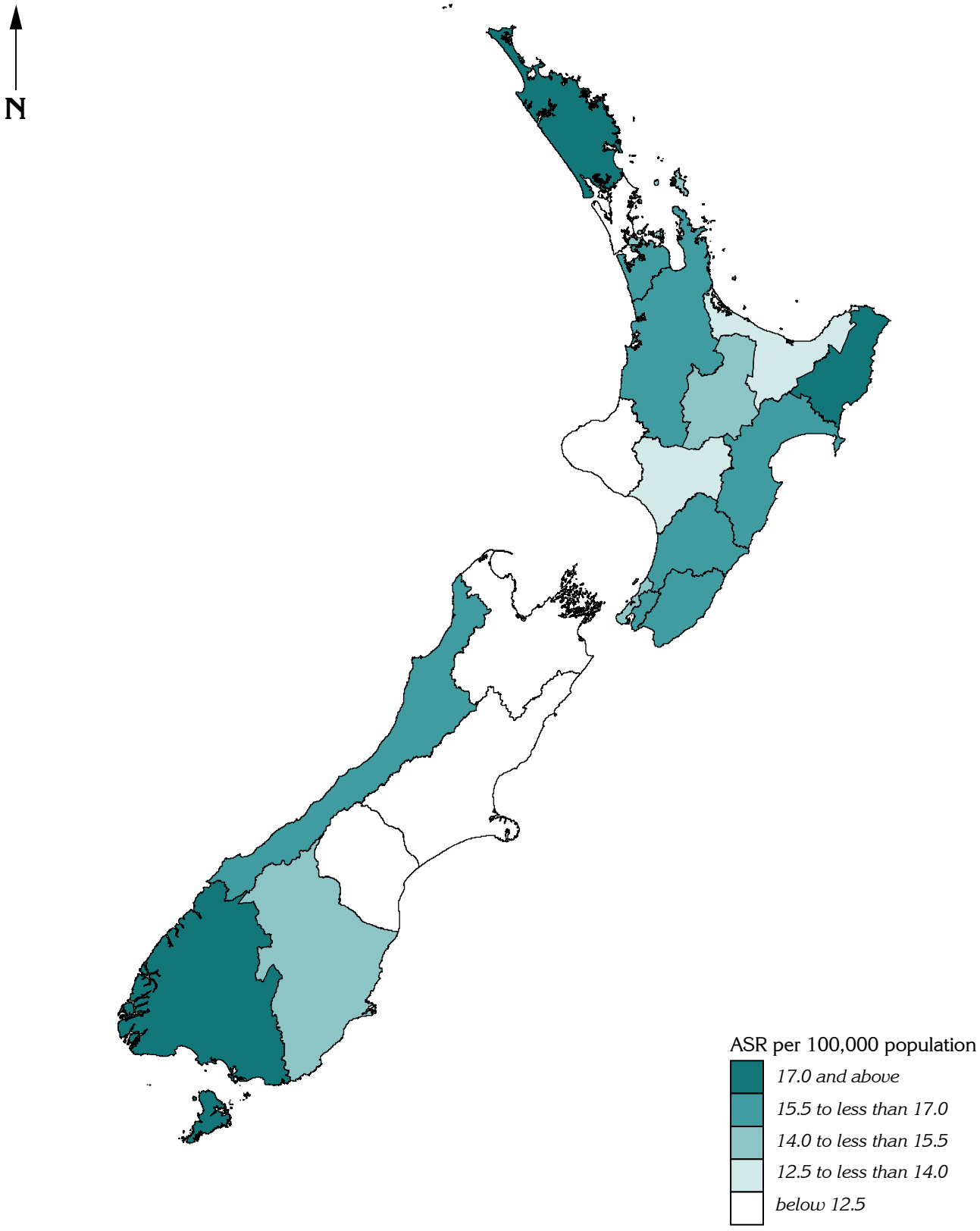
The differential in rates between Pacific peoples and European/ others was greater for females (3.33**) than for males (2.82**): and, similarly, between Mäori and European/ others, with differentials of 3.24** for females and 2.03** for males.

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



Details of map boundaries are in Appendix 1.4

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**

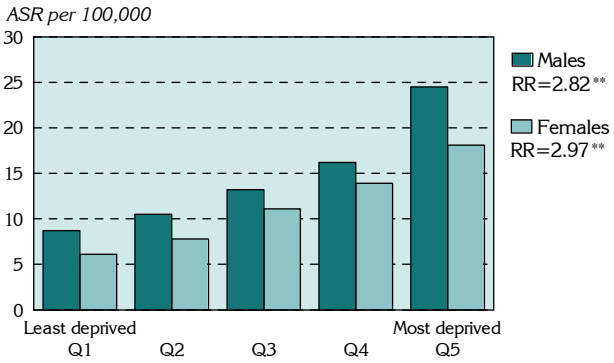
By deprivation

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 Māori (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 Māori, the male rate was 14% lower than the female rate (a rate ratio of 0.86).

The differential in rates between the Māori 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

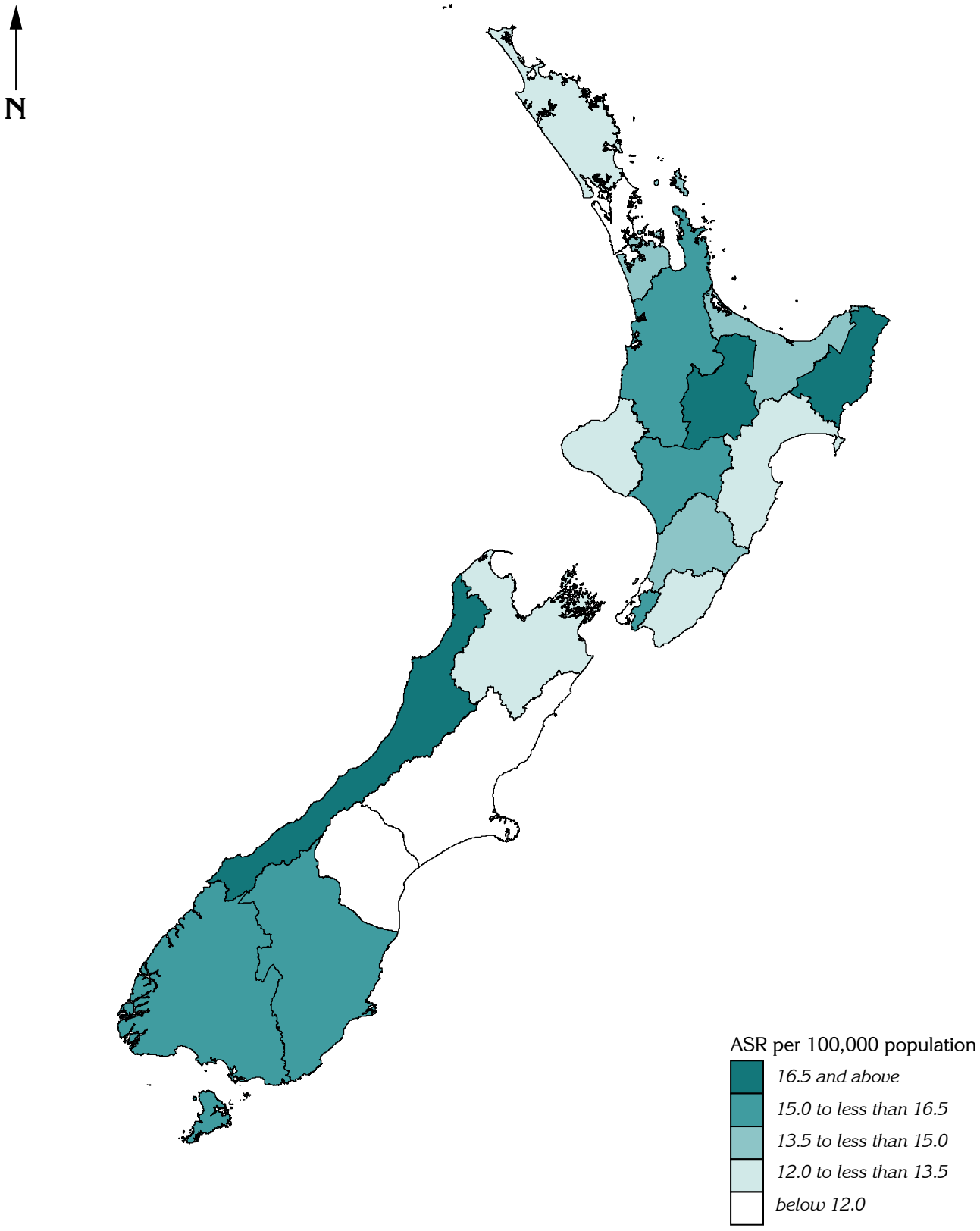
ASR per 100,000 population

Ethnic group	Males	Females	Total	RR M:F
Māori	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–Māori: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



Details of map boundaries are in Appendix 1.4

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**

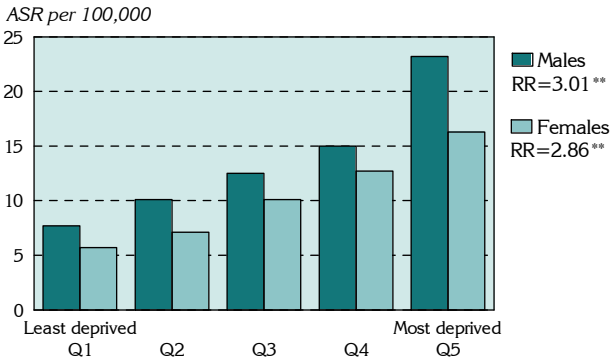
By deprivation

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 Māori (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 Māori, the male rate was 15% lower than the female rate (a rate ratio of 0.85).

The differential between the Māori 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

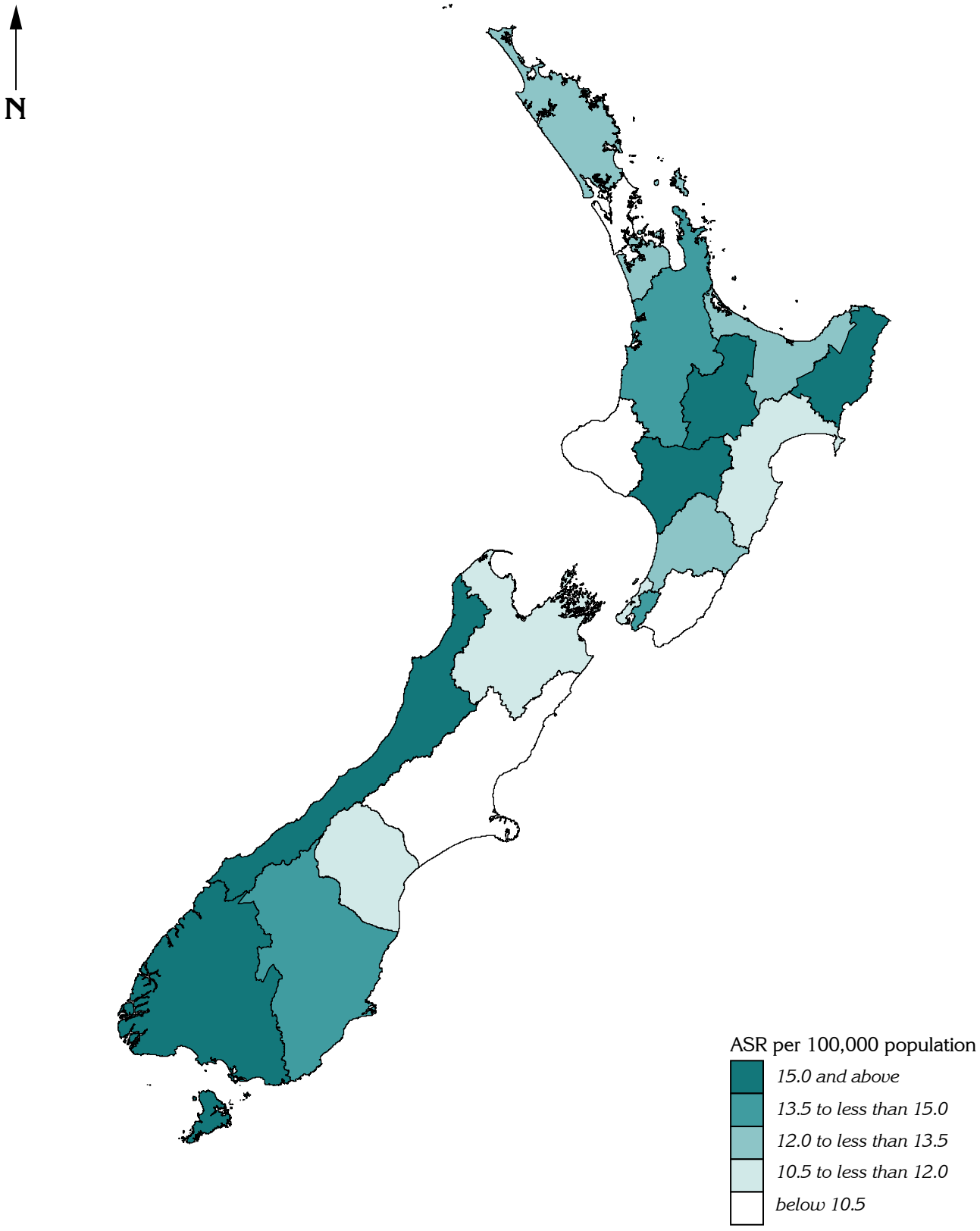
ASR per 100,000 population

Ethnic group	Males	Females	Total	RR M:F
Māori	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–Māori: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



Details of map boundaries are in Appendix 1.4

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**

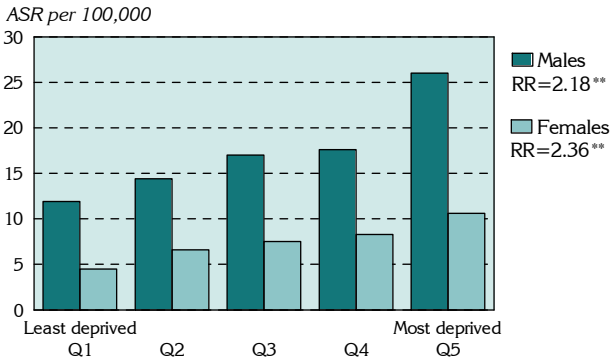
By deprivation

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 Mäori (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.

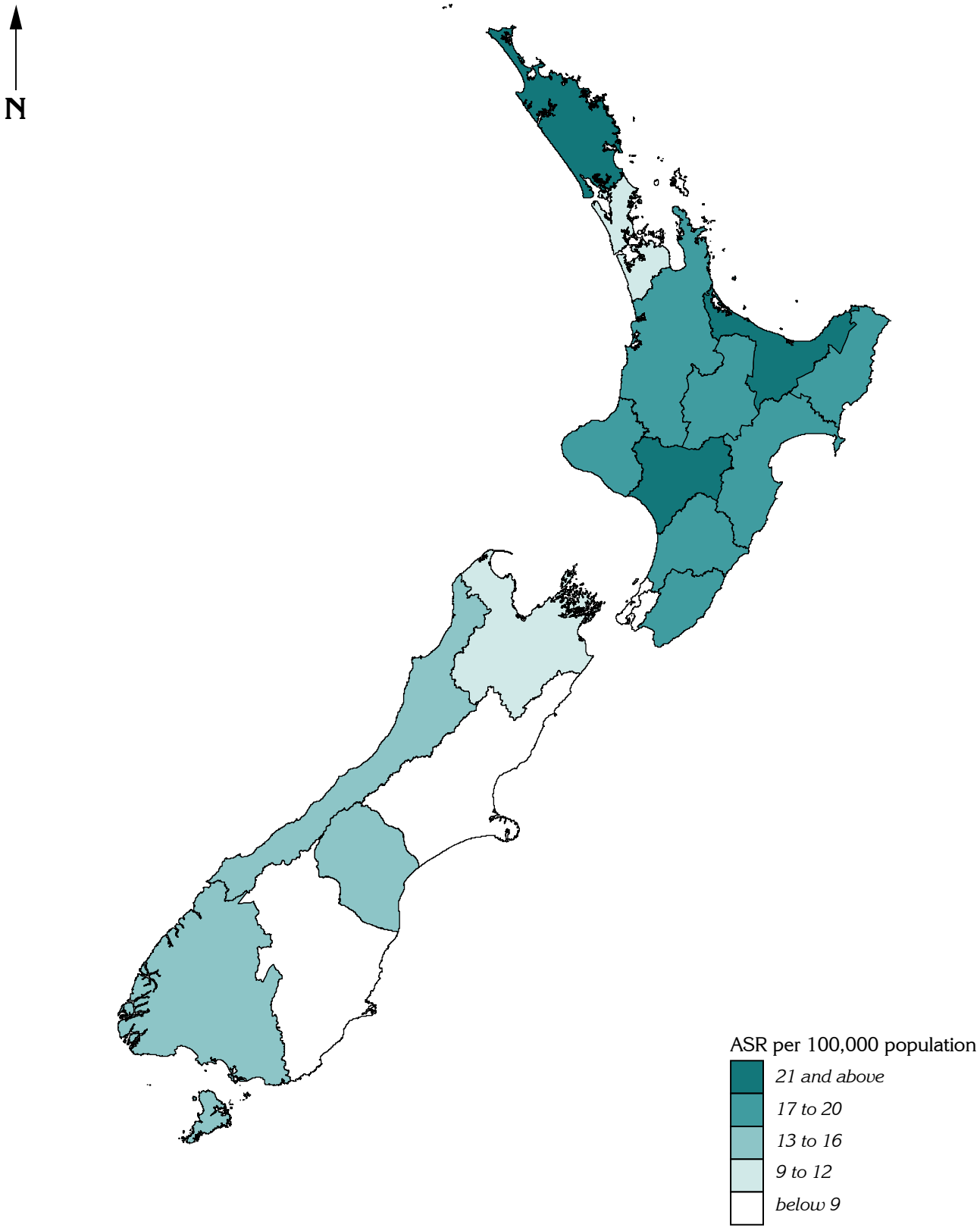
The differential in rates between the Mäori and European/ others was greater for females (2.56**) than for males (2.25**). For Pacific peoples, rates were lower than for the European/ others population, at 92% (of the European/ others rate) for females and 99% for males.

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
Mäori	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–Mäori: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



Details of map boundaries are in Appendix 1.4

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**

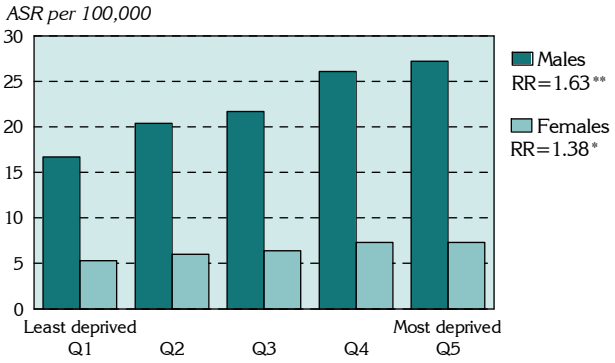
By deprivation

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 Mäori (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 Mäori 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

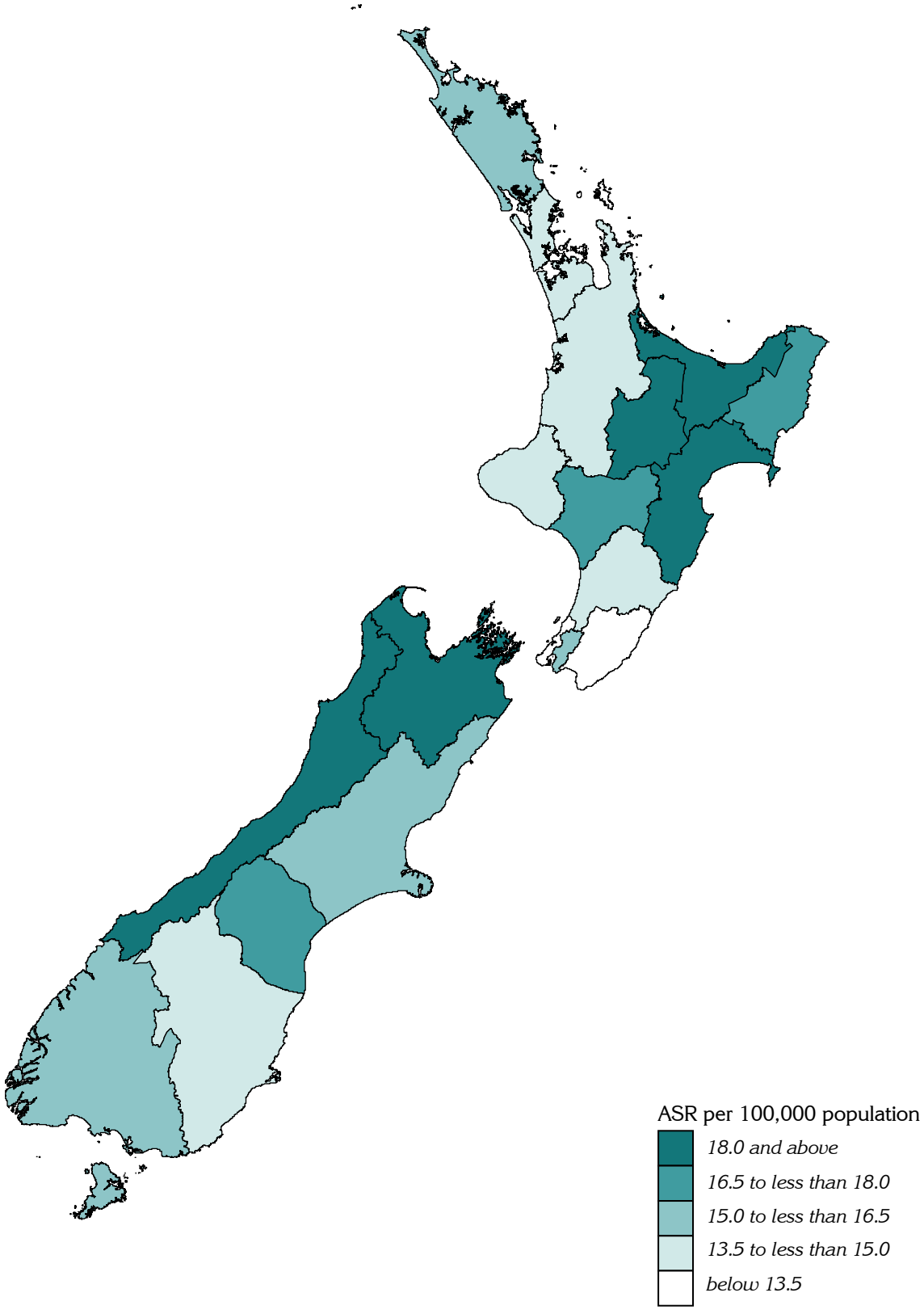
ASR per 100,000 population

Ethnic group	Males	Females	Total	RR M:F
Mäori	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–Mäori: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



Details of map boundaries are in Appendix 1.4

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

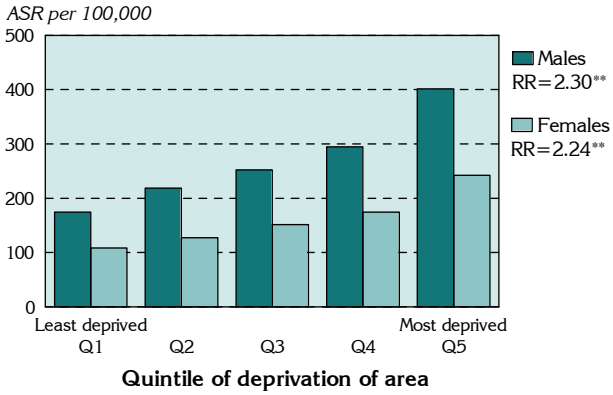


Table 5.30: Avoidable mortality (0 to 74 years) by deprivation and sex, New Zealand, 1997-2001

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.

[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

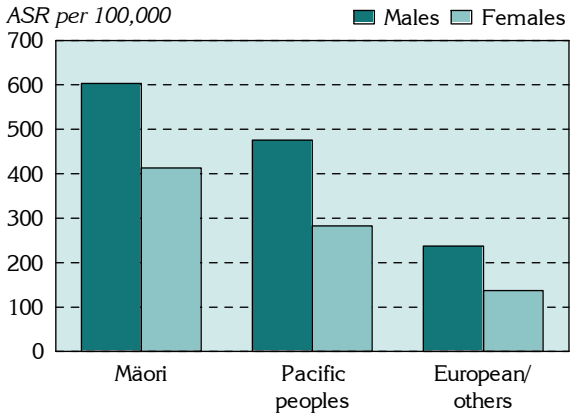


Table 5.35: Avoidable mortality (0 to 74 years) by ethnicity and sex, New Zealand, 1997-2001

Ethnic group	Number			ASR per 100,000 population			Rate ratio
	Males	Females	Total	Males	Females	Total	M:F
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, Māori 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 Māori, 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 Māori and 335.6 for European/ others. The largest differential in the Māori 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**.

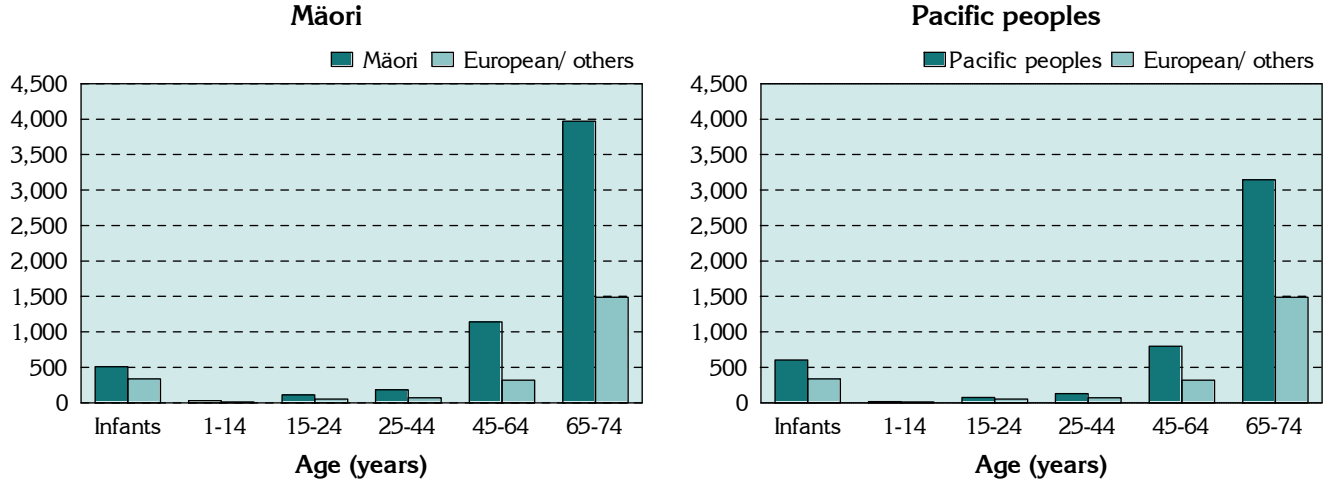
Table 5.36: Avoidable mortality by ethnicity and age, New Zealand, 1997-2001

Age (years)	Number			Rate per 100,000[1]			Rate ratio Māori: Euro/ others	Rate ratio Pacific: Euro/ others
	Māori	Pacific peoples	Euro/ others	Māori	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 Māori 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 Māori 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 Māori (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	Ratio
	Māori	Pacific peoples	Euro/ others	Māori	Pacific peoples	Euro/ others	Māori: Euro/ others	Pacific: 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 Māori and European/ others, but no clear pattern for Pacific peoples (Table 5.38). The gradient is more pronounced for Māori 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 Māori, compared to 1.77** for European/ others.

The greatest differential in rates between the Māori and European/ others was in the most deprived areas, where the Māori 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	Rate ratio
	Māori	Pacific peoples	Euro/ others	Māori	Pacific peoples	Euro/ others	Māori: Euro/ others	Pacific: 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

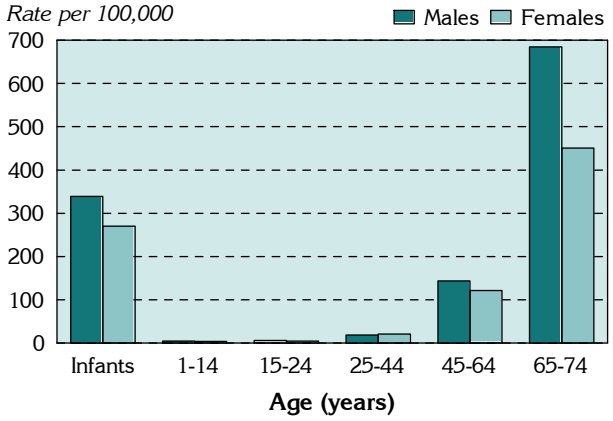
Age (years)	Number			Per cent of total	Rate per 100,000 population[1]			Rate ratio M:F
	Males	Females	Total		Males	Females	Total	
Infants (<1)	2,083	1,577	3,661	4.8	338.7	270.4	304.5	1.25**
1-14	399	302	701	0.9	4.2	3.4	3.8	1.24
15-24	428	294	722	0.9	6.3	4.5	5.4	1.40**
25-44	2,804	3,141	5,946	7.8	18.8	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).

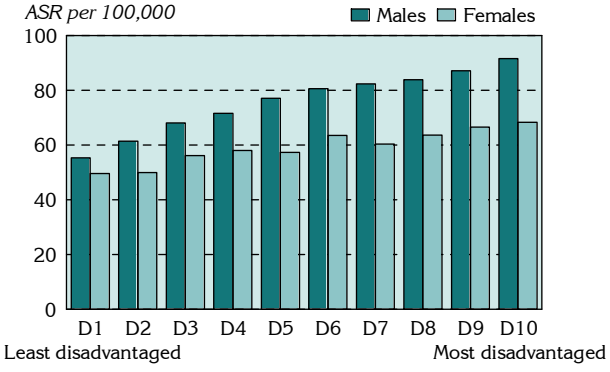
By socioeconomic status

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).

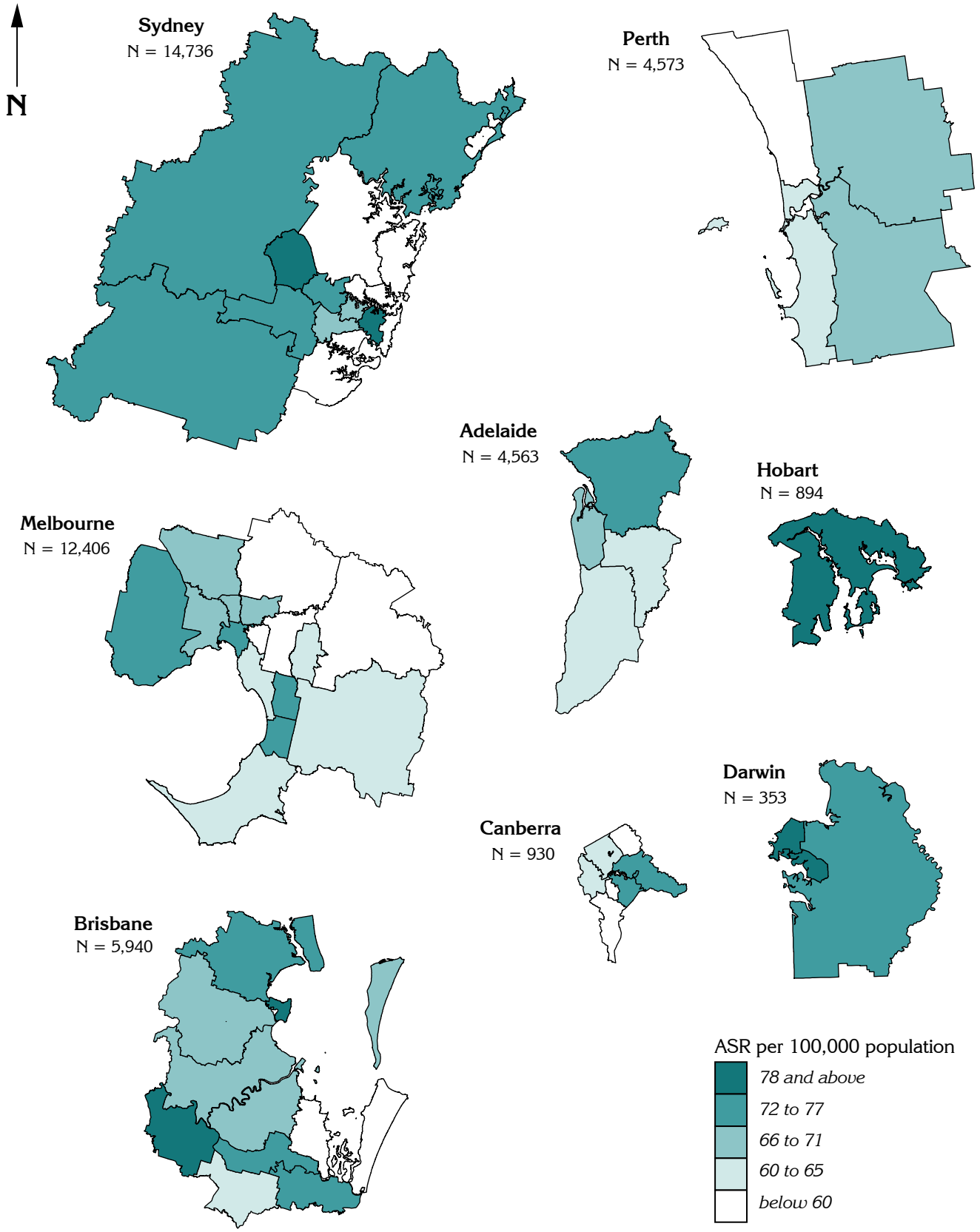
Rates for males were higher than for females in each decile, ranging from 55.3 male deaths per 100,000 population in the least disadvantaged areas to 91.5 in the most disadvantaged areas. The rates for females ranged from 49.6 in the least disadvantaged areas to 68.3 in the most disadvantaged areas.

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



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



Details of map boundaries are in Appendix 1.4

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

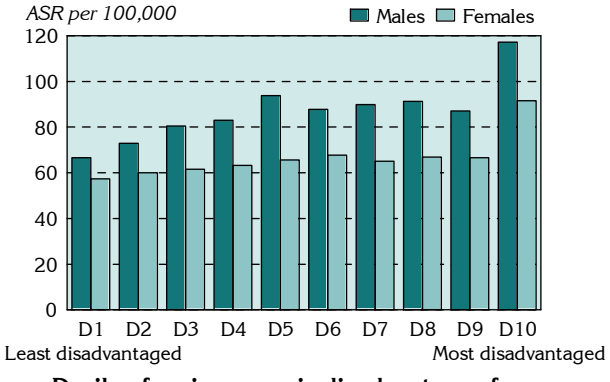
The graph of death rates by remoteness shows (opposite page) the lowest rate, of 69.4, in the Inner Regional areas, increasing to 84.4 in the Remote areas, followed by a sharp increase to 135.0 in the Very Remote areas. The numbers of deaths from amenable mortality decline rapidly across the remoteness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

By socioeconomic status

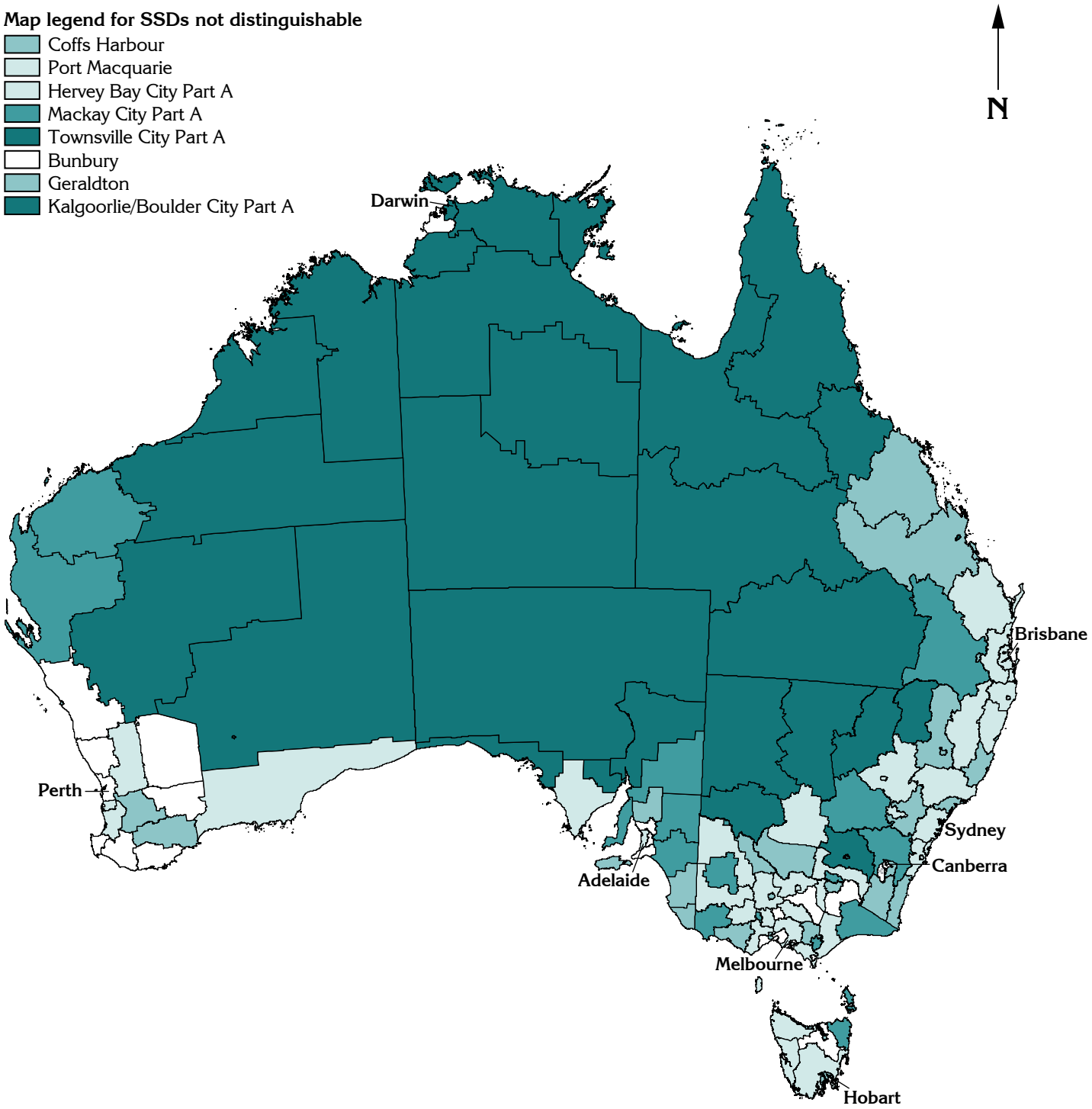
For males, there was a socioeconomic gradient in the rates of all rest of state/ territory areas combined: for females, the pattern was less clear (Figure 6.3), although the female rate was lowest in Decile 1 and highest in Decile 10.

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

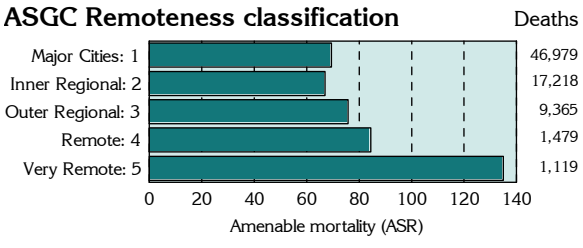


Map 6.2
All causes: amenable mortality (0 to 74 years), Australia, 1997-2001
age standardised deaths per 100,000 population by Statistical Subdivision



ASR per 100,000 population

- *88 and above*
- *80 to 87*
- *72 to 79*
- *64 to 71*
- *below 64*
- *data not mapped (<5 deaths)*



Details of map boundaries are in Appendix 1.4

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

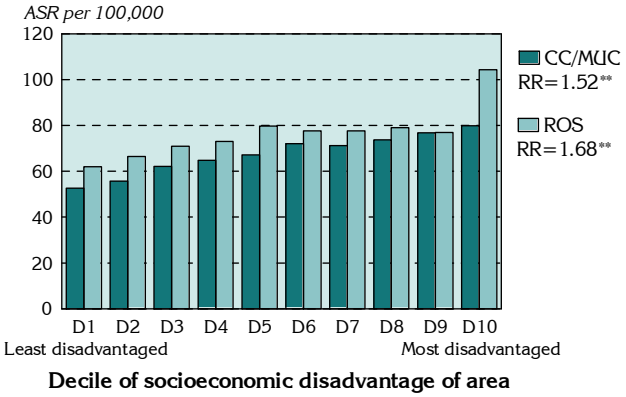


Table 6.10: Amenable mortality (0 to 74 years) by socioeconomic status and area, Australia, 1997-2001

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****

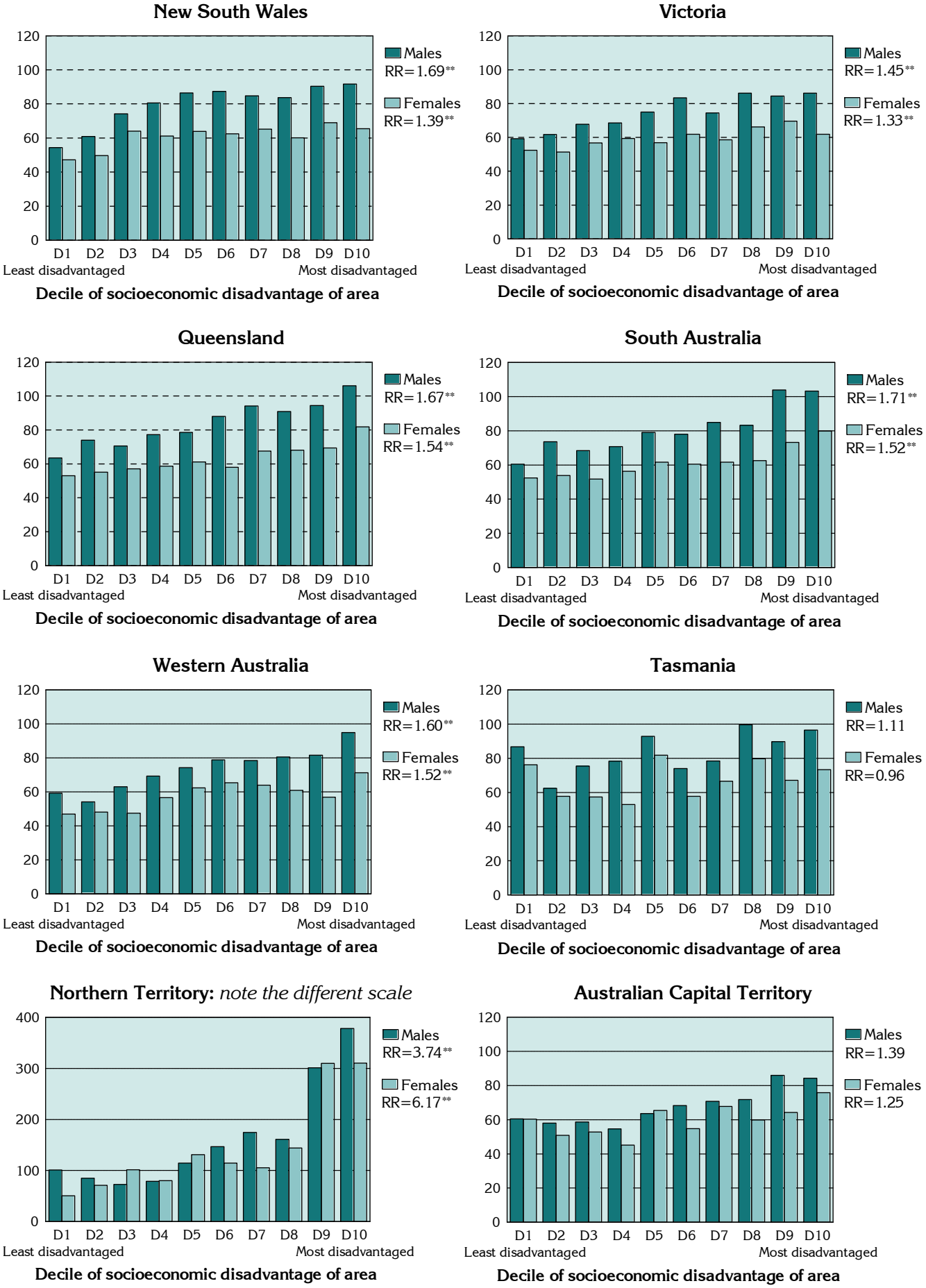
By state/ territory and sex

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



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

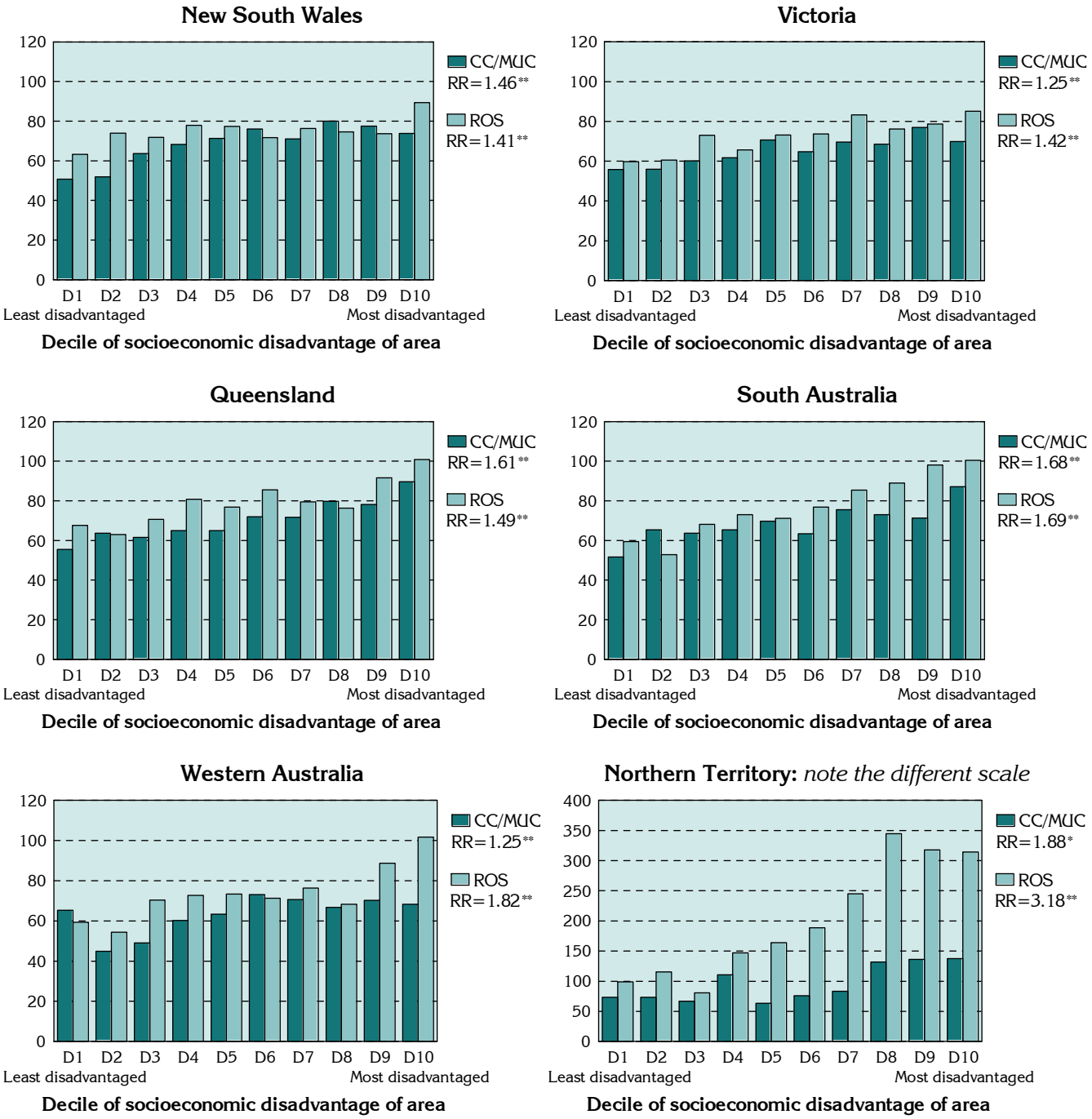
Figure 6.6 shows death rates for amenable mortality by decile of socioeconomic status in the capital city/ other major urban centre and rest of state/ territory areas by jurisdiction. For all areas the least disadvantaged areas had the lowest rates and the most disadvantaged areas had the highest rates. 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**

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	Per cent
	Q1	Q2	Q3	Q4	Q5	(Q2:Q5)	of total
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

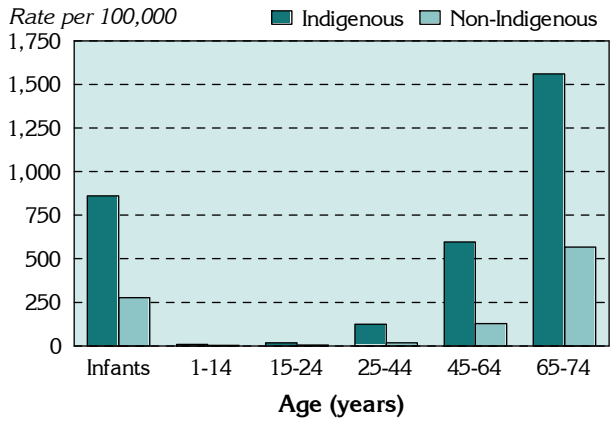


Table 6.15: Amenable mortality by Indigenous status and age, Queensland, South Australia, Western Australia and Northern Territory, 1997-2001

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

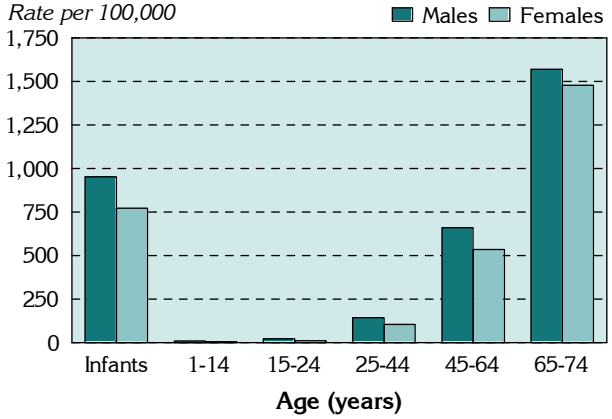


Table 6.17: Amenable mortality by age and sex, Indigenous population, Queensland, South Australia, Western Australia and Northern Territory, 1997-2001

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**

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

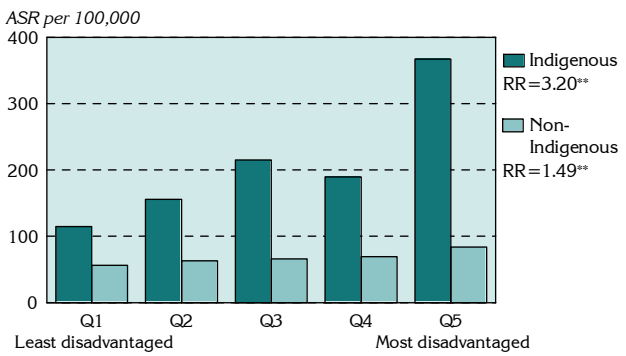
There is a clear socioeconomic gradient in the rates of amenable mortality for both the Indigenous and non-Indigenous populations, with the lowest rates in the least disadvantaged areas (Quintile 1) and the highest in the most disadvantaged areas (Quintile 5) (Table 6.19, Figure 6.9).

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



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.

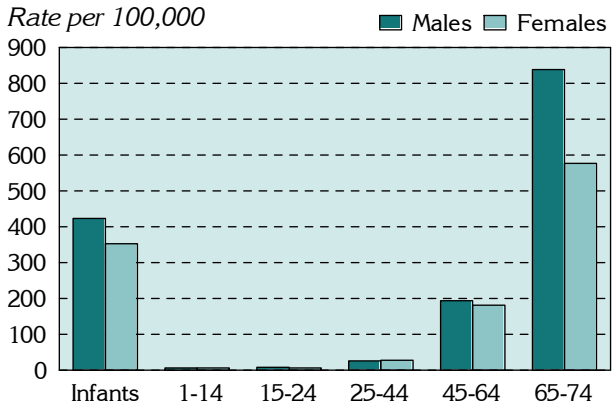
Table 7.1: Amenable mortality by age and sex, New Zealand, 1997-2001

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**).

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



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).

[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.

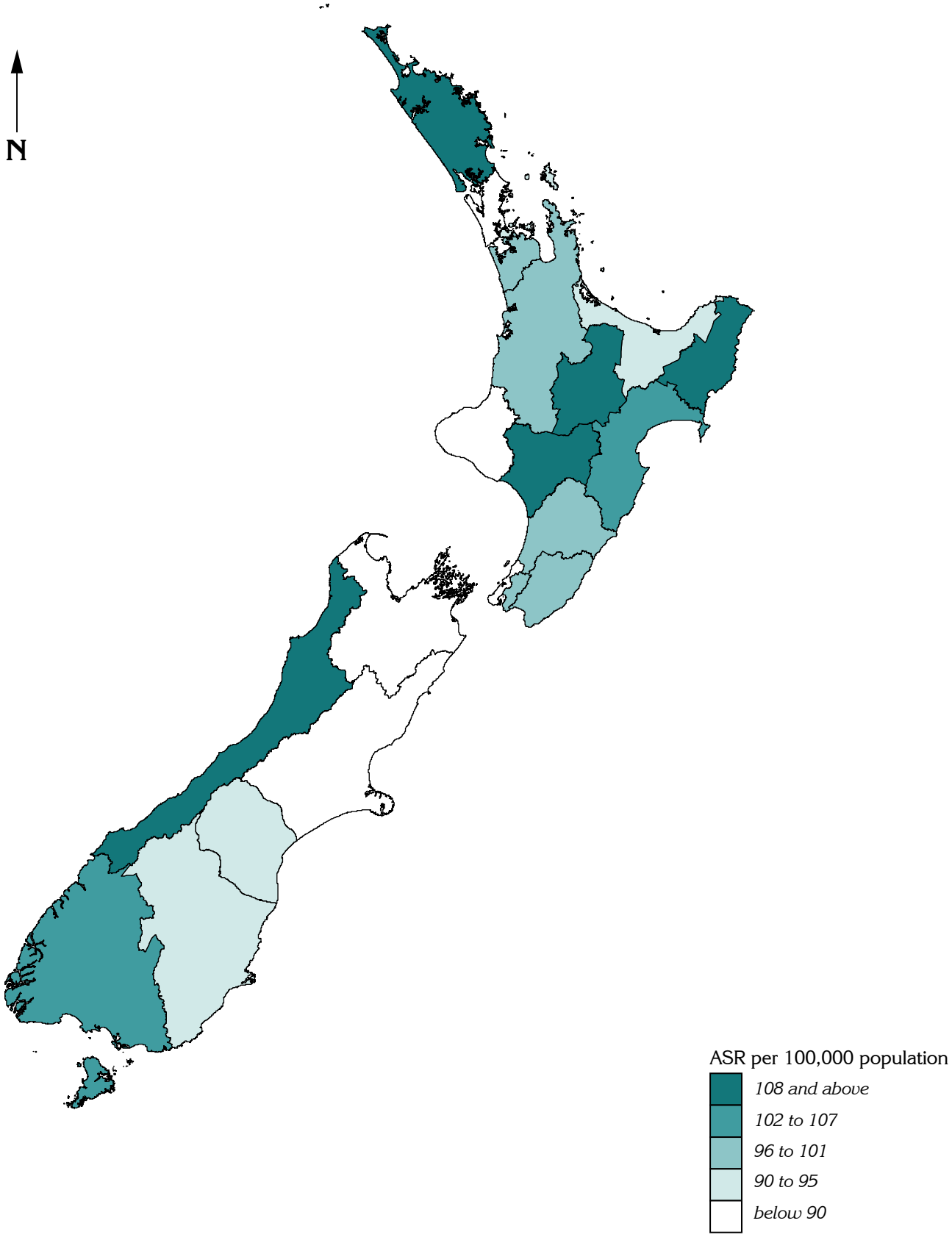
The highest rates of amenable mortality were in Tairawhiti (133.1 deaths per 100,000 population), Lakes (114.5), Northland (113.1), West Coast (110.4) and Whanganui (109.6) (Map 7.1).

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



Details of map boundaries are in Appendix 1.4

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

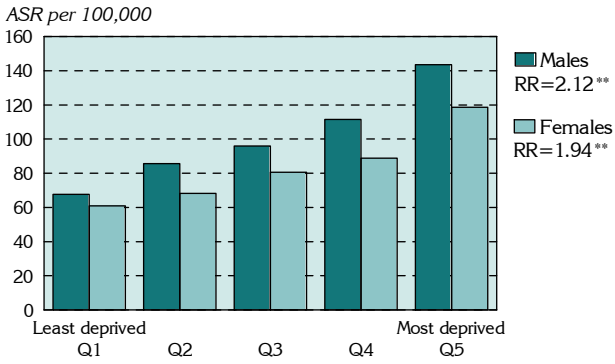


Table 7.8: Amenable mortality (0 to 74 years) by deprivation and sex, New Zealand, 1997-2001

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.

[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	Per cent
	Q1	Q2	Q3	Q4	Q5	(Q1:Q5)	of total
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

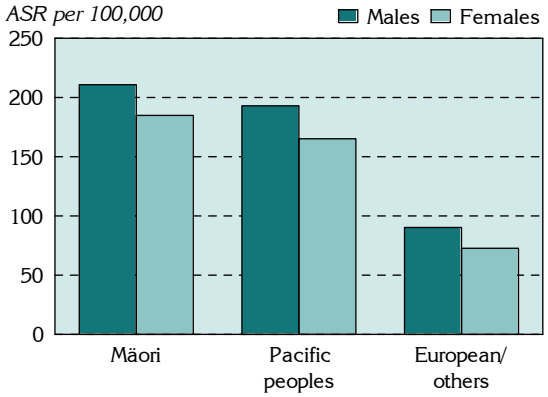


Table 7.11: Amenable mortality (0 to 74 years) by ethnicity and sex, New Zealand, 1997-2001

Ethnic group	Number			ASR per 100,000 population			Rate ratio
	Males	Females	Total	Males	Females	Total	M:F
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**).

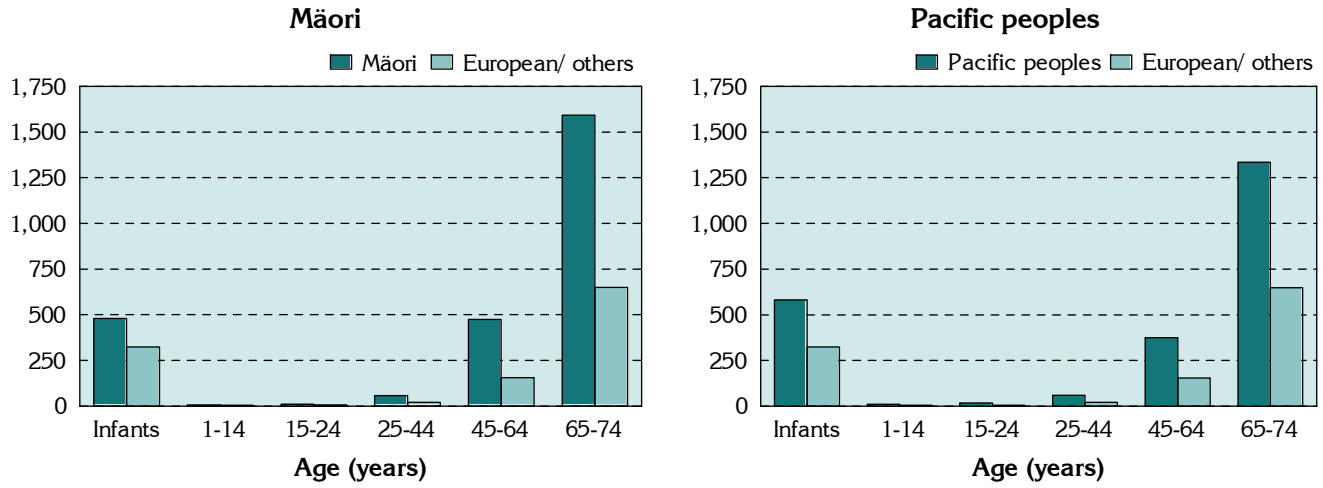
Table 7.12: Amenable mortality by ethnicity and age, New Zealand, 1997-2001

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**

Figure 7.4: Amenable mortality by ethnicity and age, New Zealand, 1997-2001

Rate per 100,000 population



As with avoidable mortality, the impact of amenable mortality on each of the ethnic populations is most evident at younger ages in the Māori 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 Māori (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 Māori (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	Ratio
	Māori	Pacific peoples	Euro/ others	Māori	Pacific peoples	Euro/ others	Māori: Euro/ others	Pacific: 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 Māori 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 Māori compared to the European/ others, with a differential in rates of 2.10** between the most deprived areas and the least deprived areas for Māori, compared to 1.58** for European/ others.

The greatest differential in rates between the Māori and European/ others was in the most deprived areas (Quintile 5), where the Māori 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 Māori 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	Rate ratio
	Mäori	Pacific peoples	Euro/ others	Mäori	Pacific peoples	Euro/ others	Mäori: Euro/ others	Pacific: 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

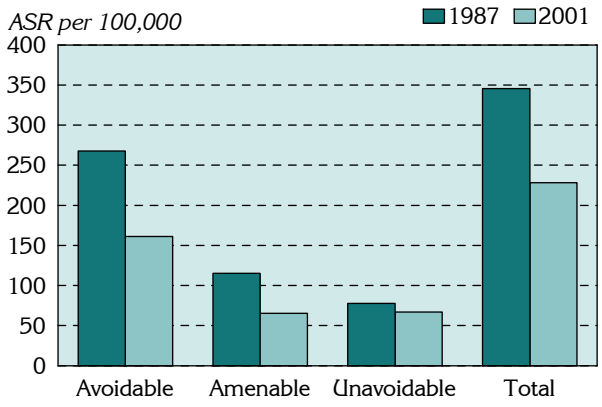
Of all deaths at ages 0 to 74 years in 2001, 70.6% were considered to have been avoidable, a smaller proportion than in 1987 (77.4%). Over one quarter (28.7%) of the total deaths at ages 0 to 74 in 2001 are considered to have been amenable to health care, compared to one third (33.3%) in 1987 (Table 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 was161.3 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).

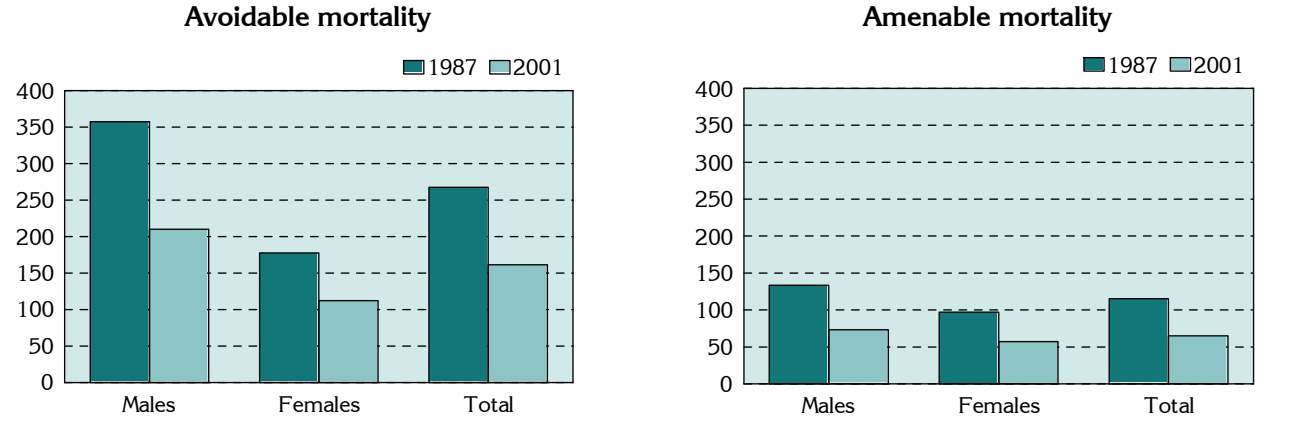
For unavoidable mortality, the rate for males in 1987 was 96.6 deaths per 100,000 population, almost two thirds (63%) higher than the female rate of 59.3 deaths per 100,000 population. In 2001, the rate for males was 81.2 deaths per 100,000 population, just over one and a half times the female rate of 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	ASR per 100,000		Per cent		
	1987	2001	change	1987	2001	change	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 per100,000 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**

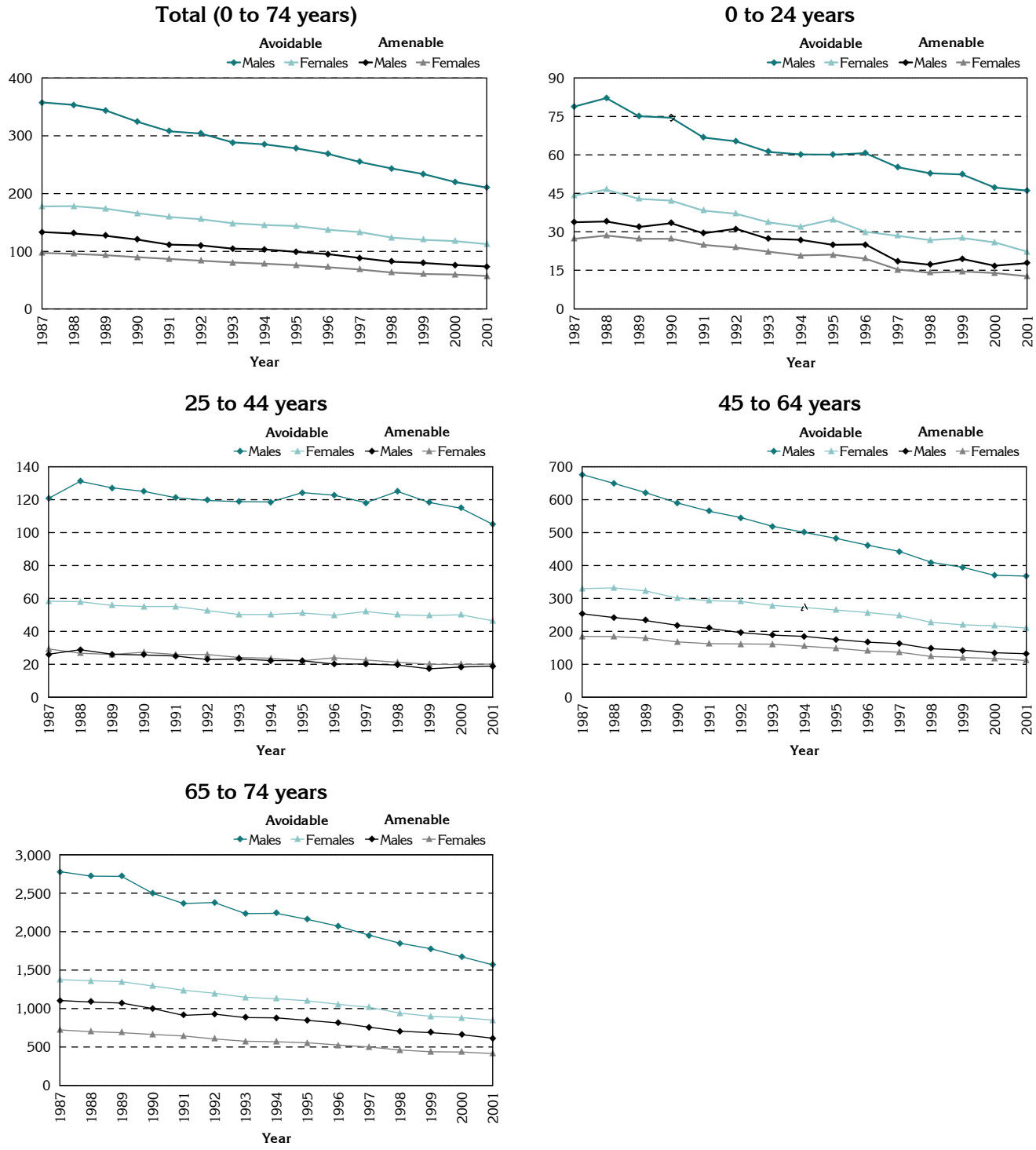
[1] **Rates are age standardised within age categories**

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.

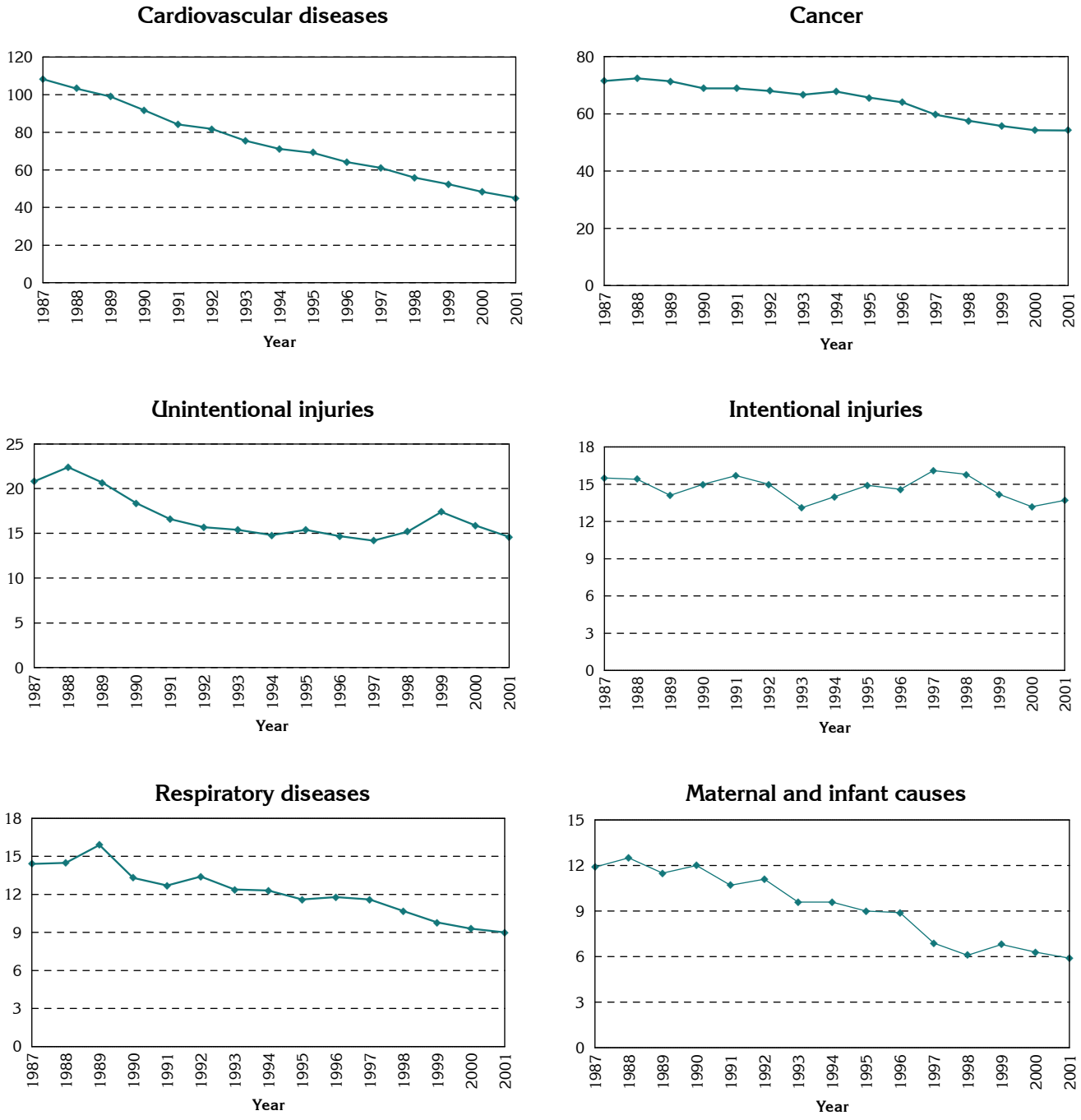
Table 8.6: Change in avoidable mortality (0 to 74 years) by major condition group, Australia, 1987 and 2001

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



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%).

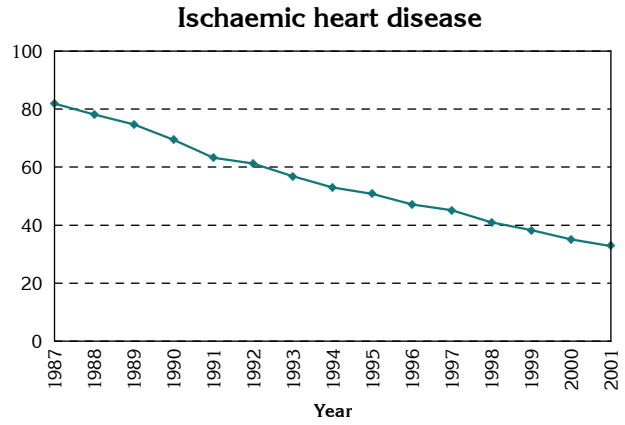
The rate of deaths from diabetes declined marginally (3.8%) over this 14 year period, with the number of deaths increased by one quarter (25.4%). There was a corresponding rise in rank from twelfth in 1987 to ninth in 2001.

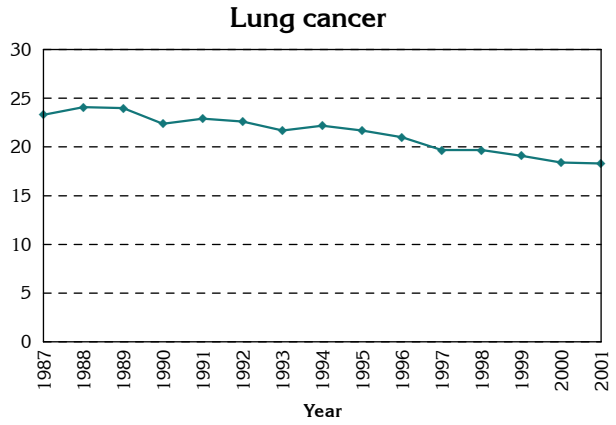
Table 8.7: Change in major causes of avoidable mortality (0 to 74 years), Australia, 1987 and 2001

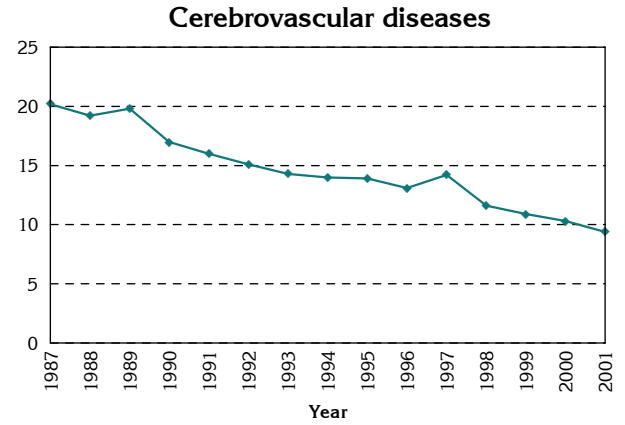
Cause	Number		Per cent	ASR per 100,000		Per cent	Rank	
	1987	2001	change	1987	2001	change	1987	2001
Ischaemic heart disease	15,004	7,778	-48.2	81.9	32.8	-60.0	1	1
Lung cancer	4,185	4,271	2.1	23.3	18.3	-21.5	2	2
Cerebrovascular diseases	3,774	2,263	-40.0	20.2	9.4	-53.5	3	5
Road traffic injuries	2,581	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**	**..**	**..**

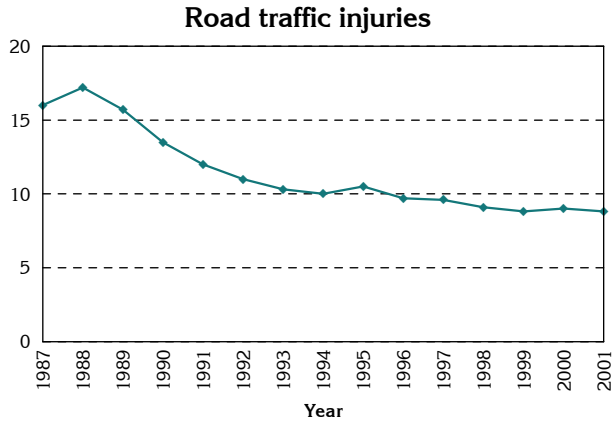
Figure 8.5: Trends in major causes of avoidable mortality (0 to 74 years), Australia, 1987 to 2001

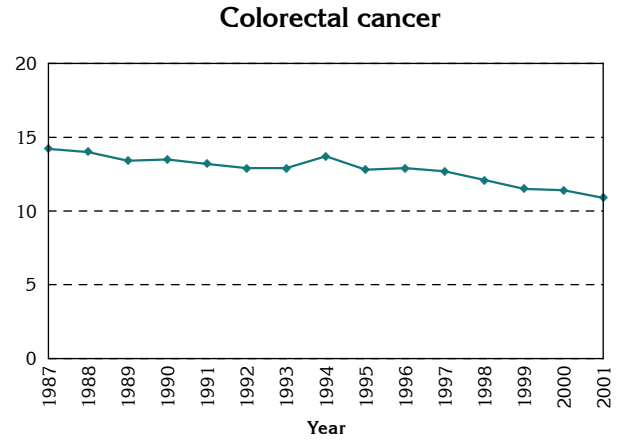
ASR per 100,000 population: note the different scales

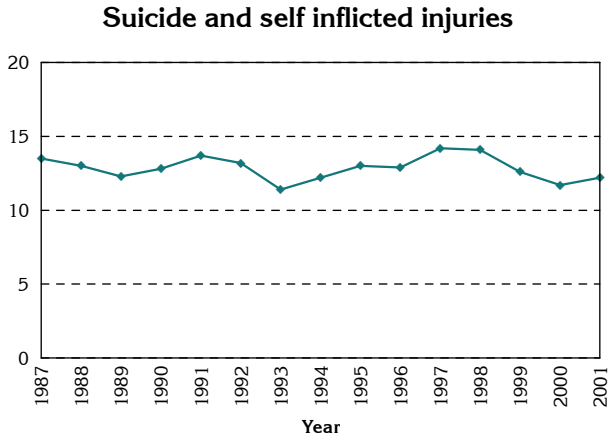


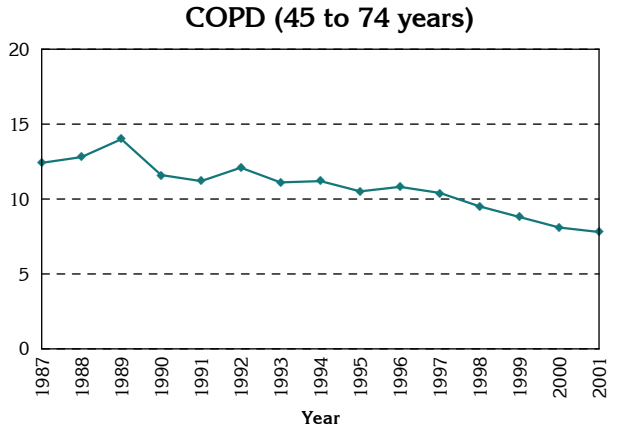


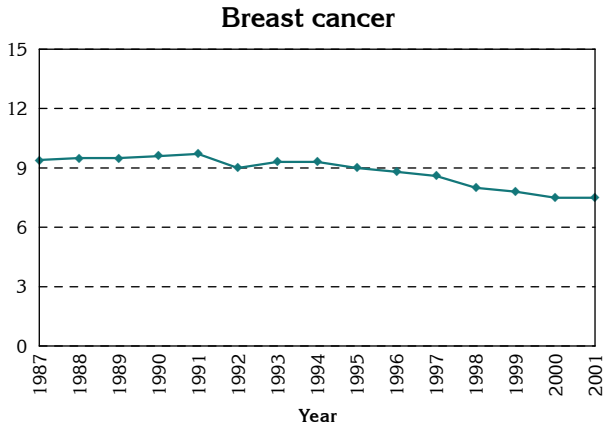










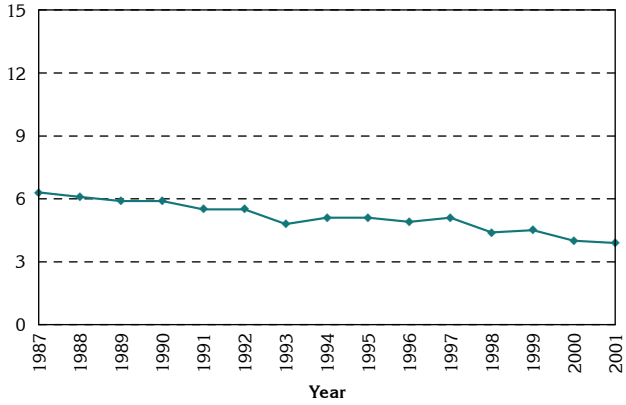


… continued

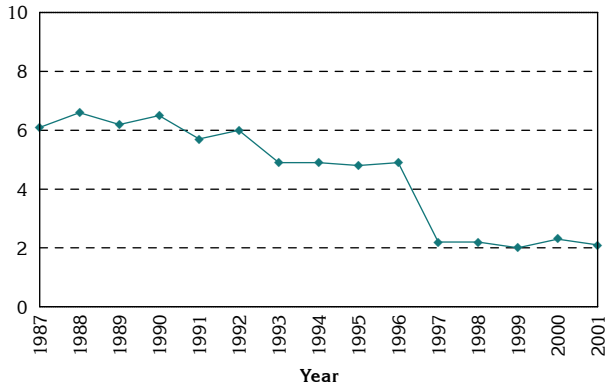
Figure 8.5: Trends in major causes of avoidable mortality (0 to 74 years), Australia, 1987 to 2001
… continued

ASR per 100,000 population: note the different scales

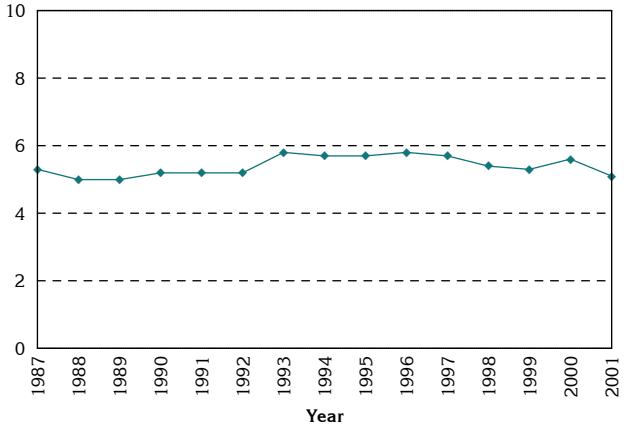
Alcohol related disease



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 to124.0.

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.

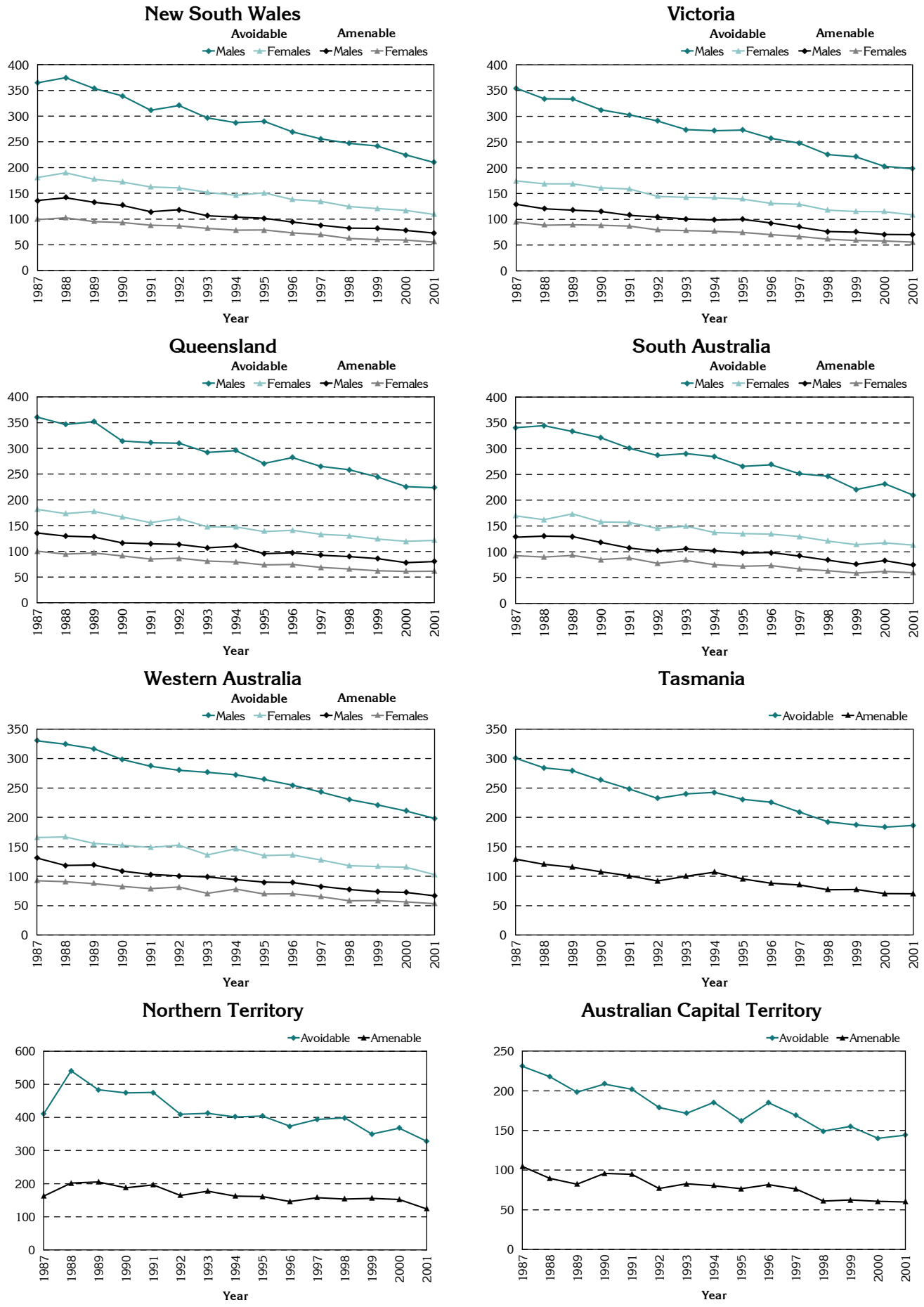
For deaths from amenable mortality, the decrease in ASR for males (an average of 44.9%) was higher than that for females (an average of 41.3%) in each of the states over the period. Western Australia recorded the highest relative decrease in ASR for males (48.9%), while the highest fall in rate for females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

[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



[1] ASRs are not shown by sex for Tasmania, NT and ACT due to the small numbers of death

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

9.1 Change in total avoidable and unavoidable mortality

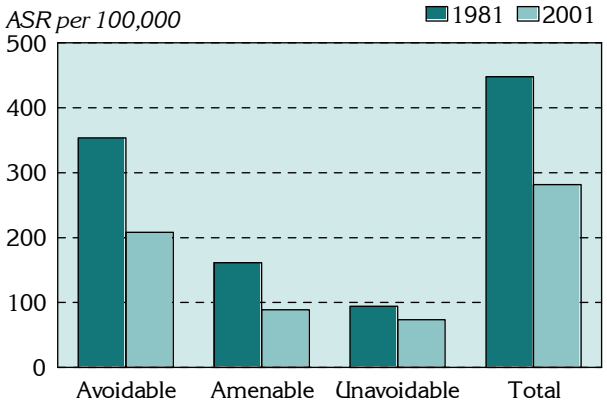
Almost three quarters (74.3%) of all deaths at ages 0 to 74 years in 2001 are considered to be from avoidable causes, slightly less than in 1981 (79.2%). Of all deaths at these ages in 2001, almost one third (31.9%) are considered to be amenable to health care, again lower than in 1981 (36.0%) (Table 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



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).

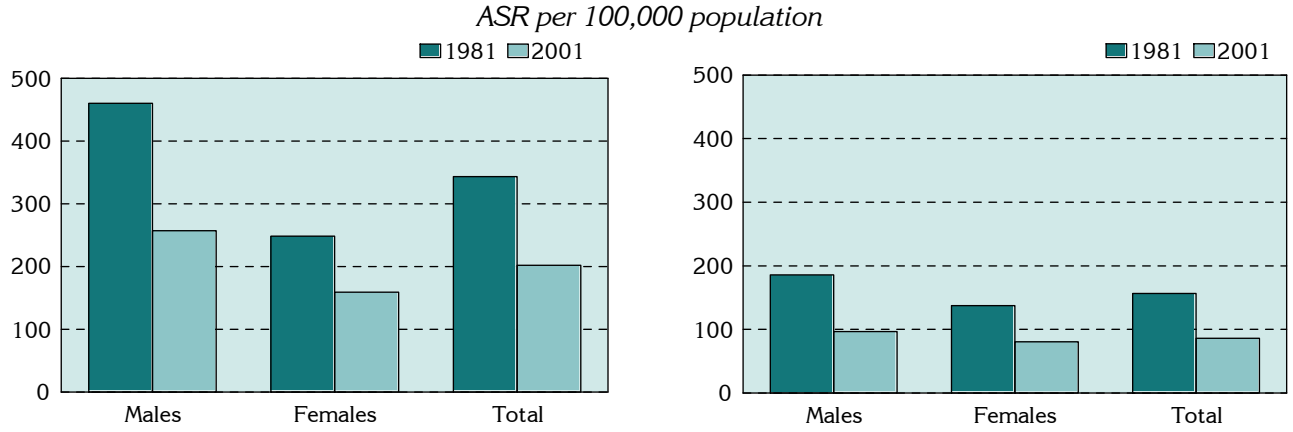
In 1981 the avoidable mortality rate for males was 459.9 deaths per 100,000 population, 1.85** times the female rate of 248.2. By 2001, the rates of death from avoidable causes had declined to 257.3 deaths per 100,000 population for males and 158.9 for females, a smaller differential, of 1.62**.

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 change	ASR		Per cent change		
	1981	2001		1981	2001		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



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.

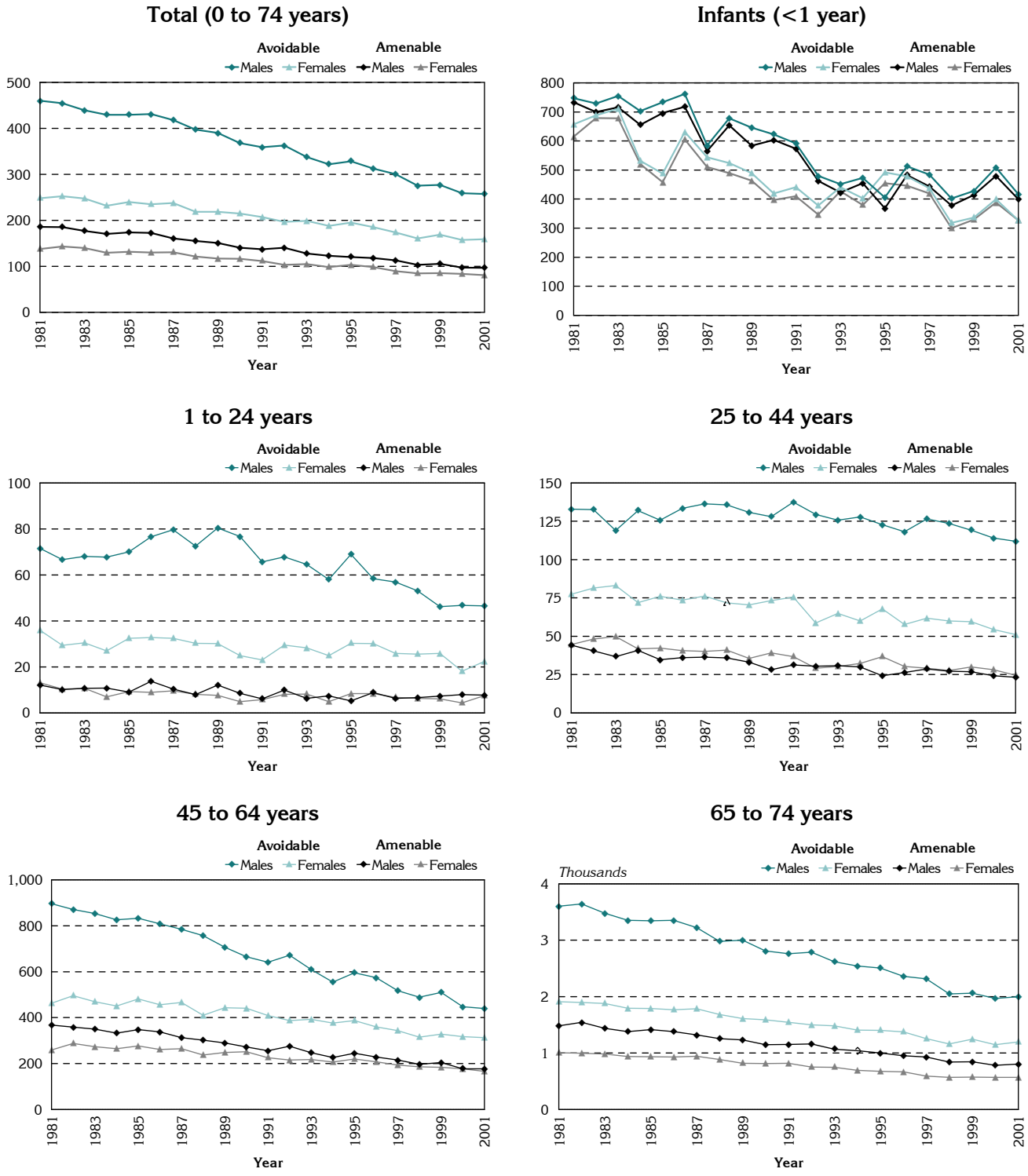
Table 9.5: Change in avoidable and amenable mortality by age and sex, New Zealand, 1981 and 2001

Age (years)	Males			Females		
	Rate per 100,000[1]		Per cent change	Rate per 100,000[1]		Per cent change
	1981	2001		1981	2001	
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.

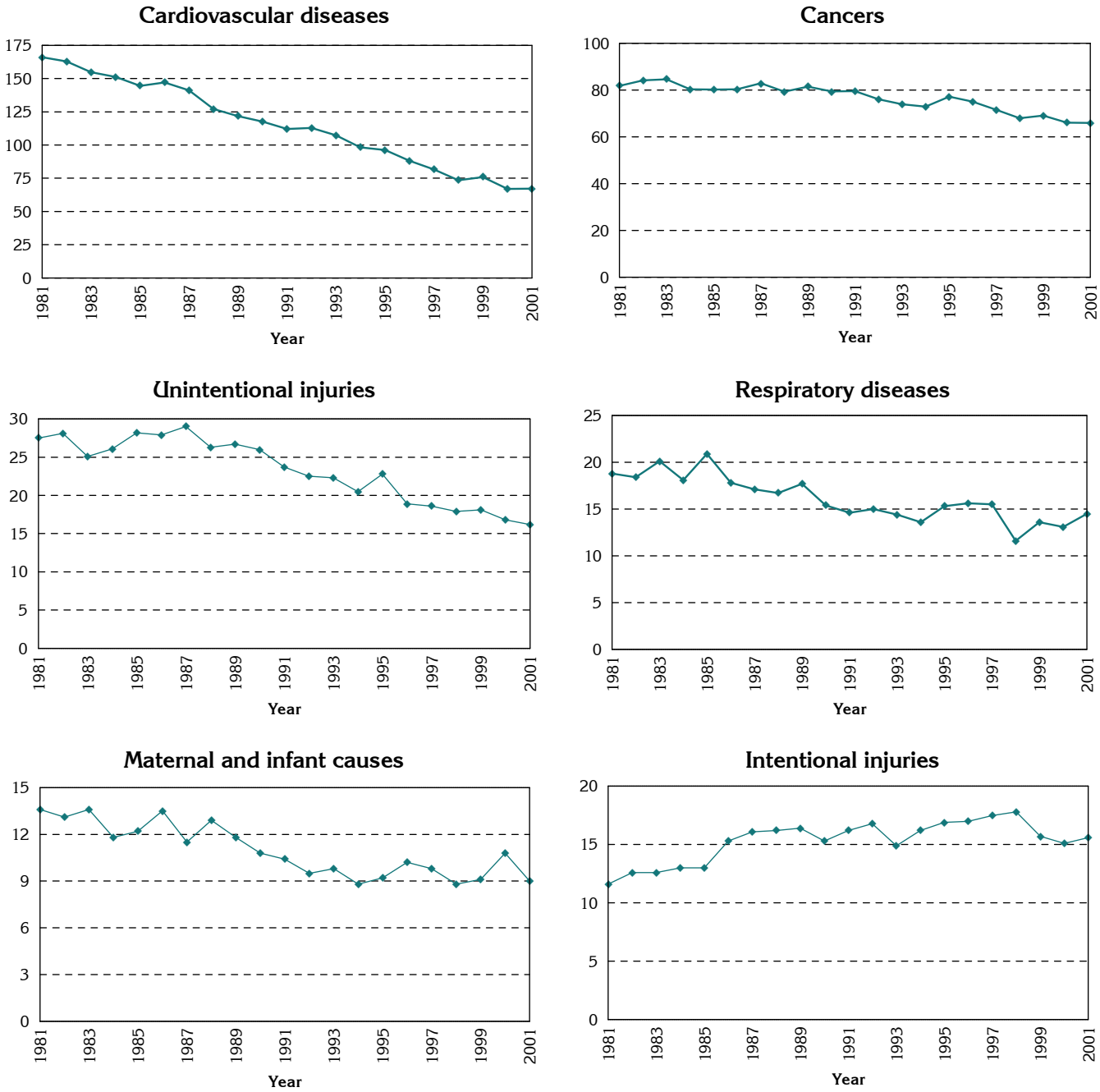
Table 9.6: Change in avoidable mortality (0 to 74 years) by major condition group, New Zealand, 1981 and 2001

Major condition group	Number		Per cent	ASR		Per cent
	1981	2001	change	1981	2001	change
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

Figure 9.4: Trends in avoidable mortality (0 to 74 years) by selected major condition group, New Zealand, 1981 to 2001

ASR per 100,000 population: note the different scales



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	ASR		Per cent	Rank	
	1981	2001	change	1981	2001	change	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

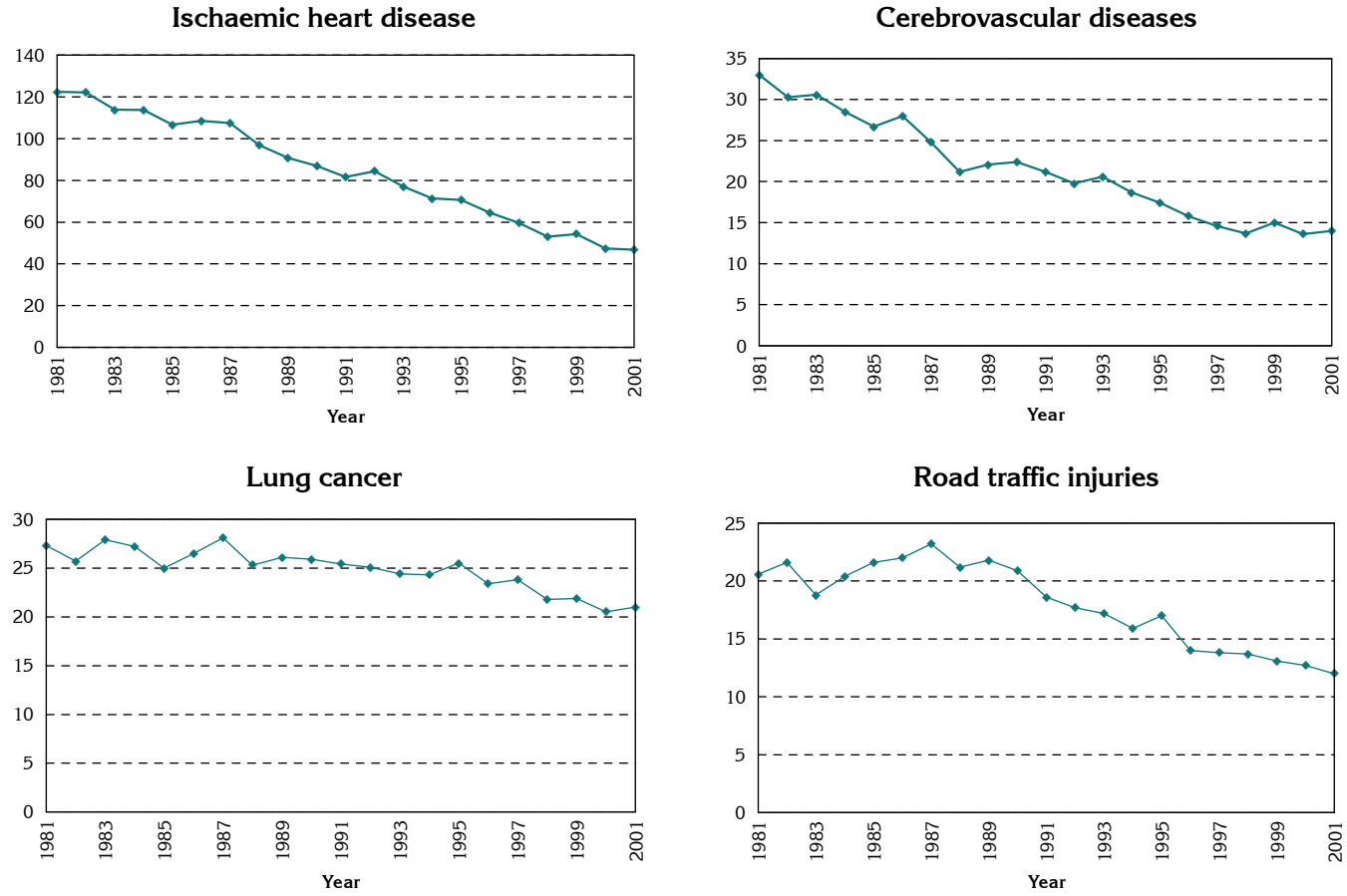


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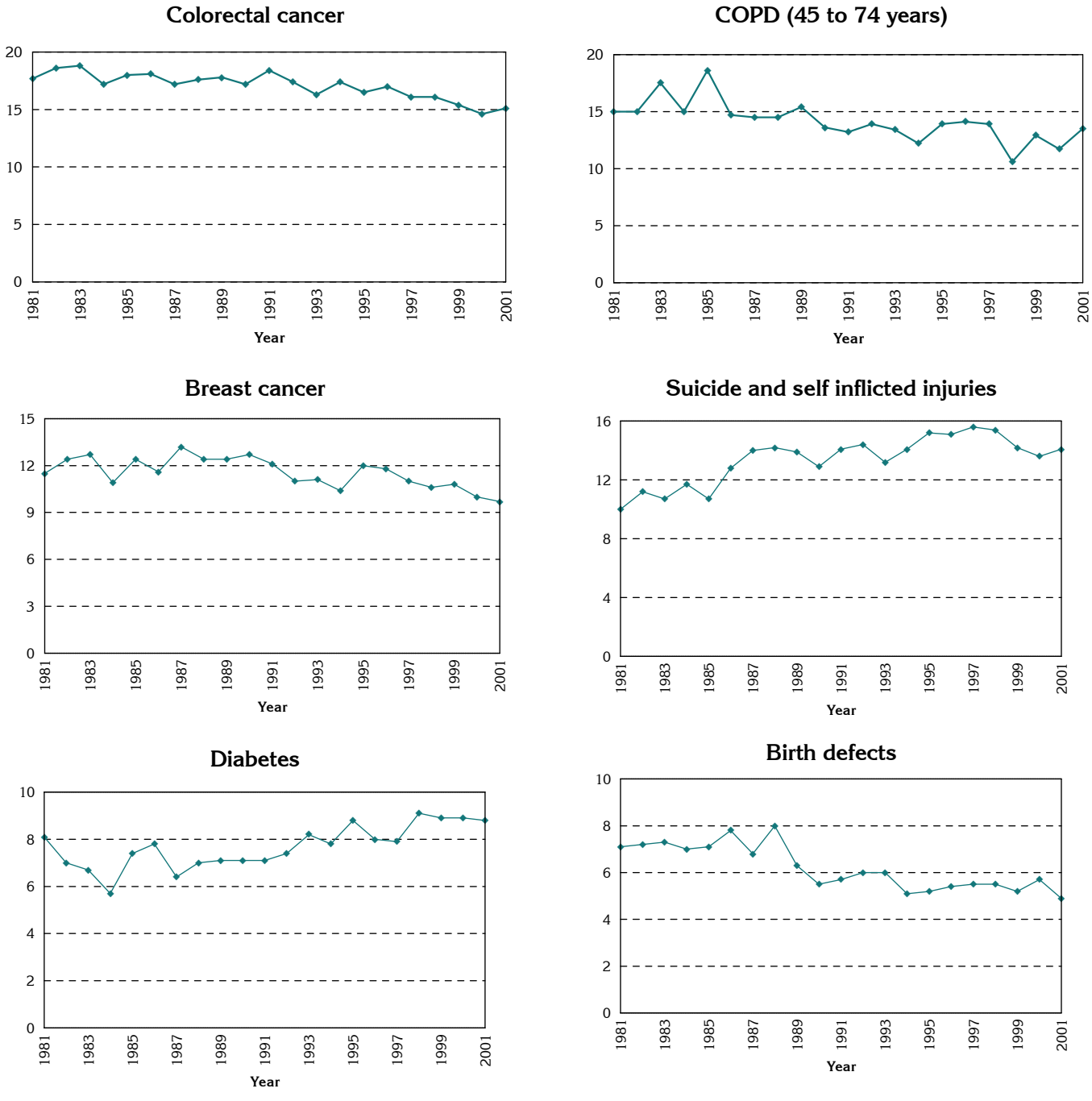
Figure 9.5: Trends in major causes of avoidable mortality (0 to 74 years), New Zealand, 1981 to 2001
… continued

ASR per 100,000 population: note the different scales



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).

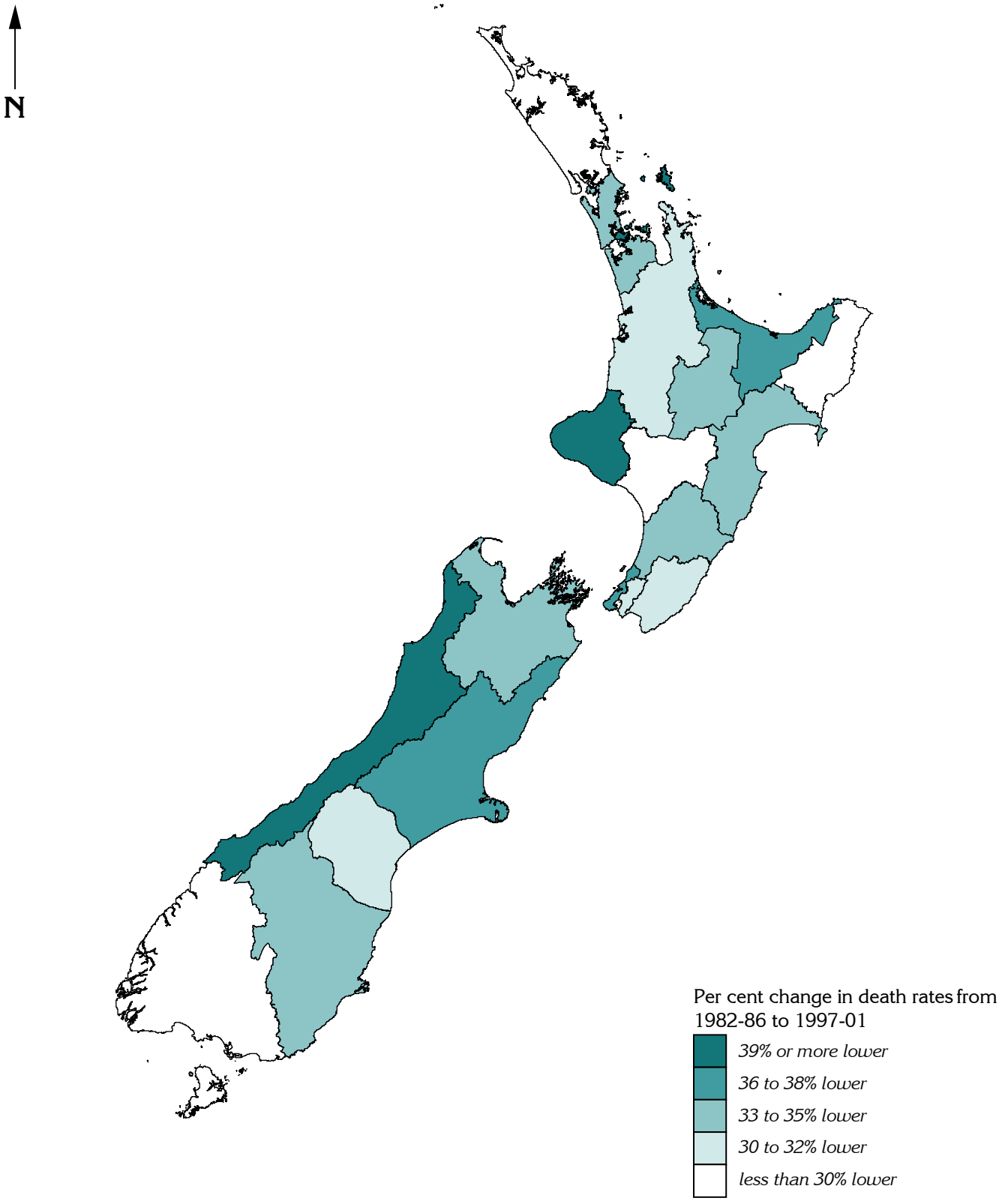
The number of deaths from avoidable causes declined by more than 30% between 1982-1986 and 1997-2001 in the District Health Boards of West Coast (43.1%; from 865 deaths to 492), Auckland (41.5%; from 6,196 deaths to 3,624), Taranaki (35.9%; from 1,992 deaths to 1,277) and Otago (32%; from 3,194 deaths 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	ASR		Per cent	Rank	
	1982-86	1997-01	change	1982-86	1997-01	change	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



Details of map boundaries are in Appendix 1.4

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).

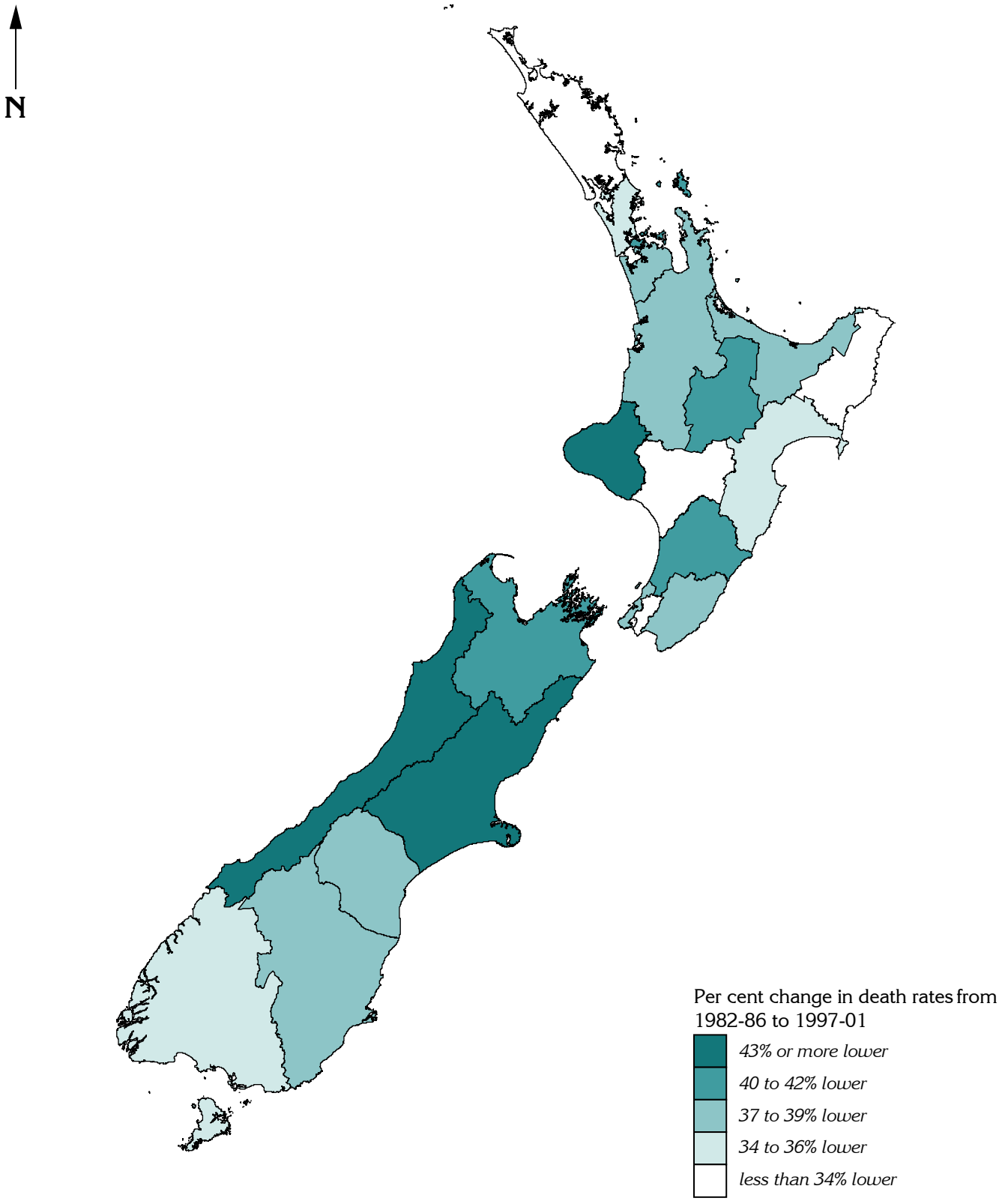
The number of deaths from causes amenable to health care declined by more than 40% between 1982-1986 and 1997-2001 in the District Health Boards of West Coast (46.3%; from 382 deaths to 205), Auckland (42.2%; from 2,762 deaths to 1,596) and Taranaki (41.7%; from 942 deaths to 549).

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



Details of map boundaries are in Appendix 1.4

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.

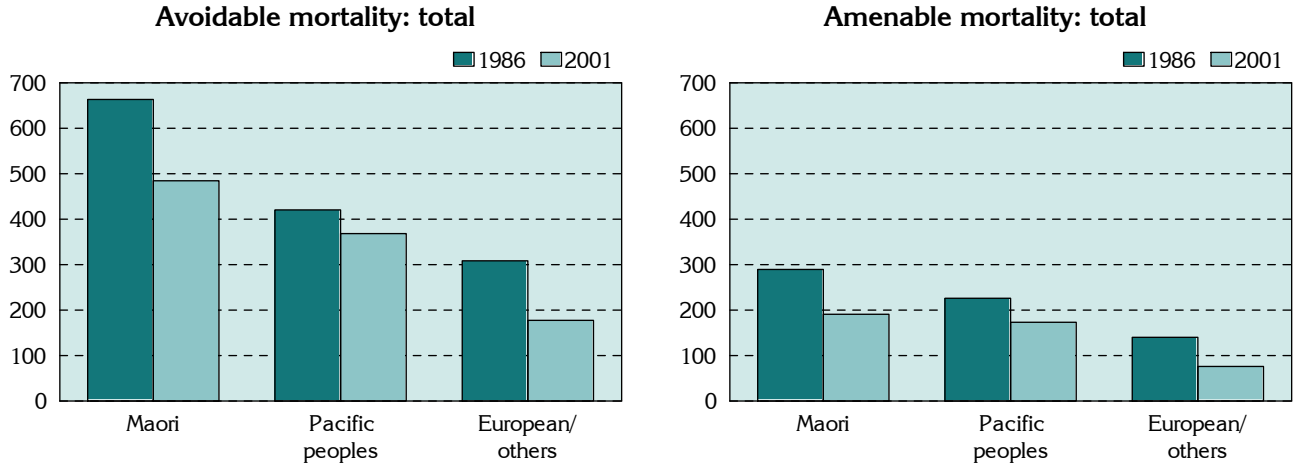
The European/ others had the largest decline in ASR for amenable mortality, 45.7%, falling from 140.3 deaths per 100,000 population in 1986 to 76.2 in 2001. The ASR for Mäori declined by 33.9% (from 289.3 deaths per 100,000 population to 191.2), and the decline for Pacific peoples was 23.4% (from 226.3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



References: Chapters 3 to 6

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Australian Bureau of Statistics (ABS) (2002). *Population distribution, Aboriginal and Torres Strait Islander Australians 2001*. Cat. no. 4705.0. Canberra: ABS.

Statistics New Zealand (2002). *2001 Census of population and dwellings*. Wellington: Statistics New Zealand.

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ABS (2002) *Deaths, Australia 2001*. Cat. no. 3302.0. Canberra: ABS.

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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

Condition			Limits: Age, sex	Amenable to health care	Rationale for including in:	
No.	Group	Cause			avoidable mortality	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)*

… 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
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*)

… 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
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)

… 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
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

Condition			Limits: Age, sex	Amenable to health care	Rationale for including in:	
No.	Group	Cause			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 appropriate 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

Condition			Limits: Age, sex	Amenable to health care	Rationale for including in:	
No.	Group	Cause			avoidable mortality	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

Condition			Limits: Age, sex	Amenable to health care	Rationale for including in:	
No.	Group	Cause			avoidable mortality	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

Condition			Limits: Age, sex	Amenable to health care	Rationale for including in:	
No.	Group	Cause			avoidable mortality	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

Condition			Limits: Age, sex	Amenable to health care	Rationale for including in:	
No.	Group	Cause			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)*

… 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
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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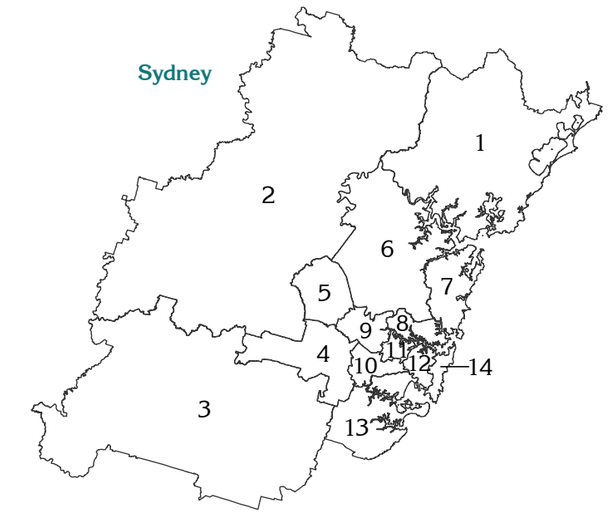
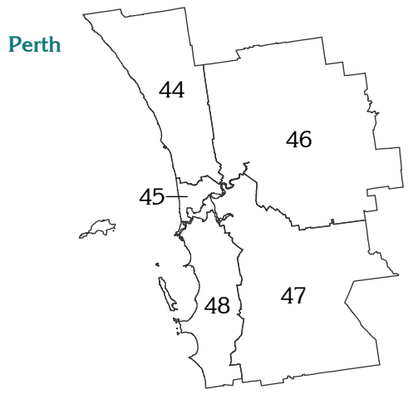
Alphabetical Key to Statistical Subdivisions in the capital cities, Australia, 2001

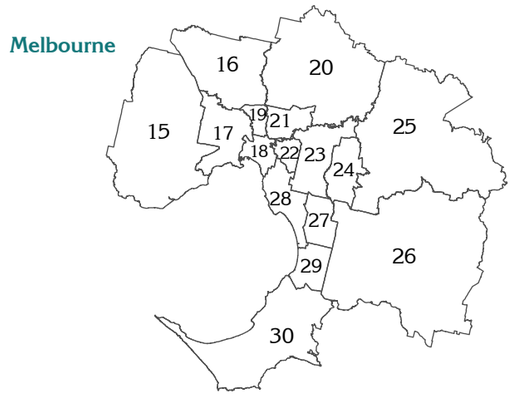
Statistical Subdivision name	Map Ref.
Sydney	
Blacktown	5
Canterbury-Bankstown	10
Central Northern Sydney	6
Central Western Sydney	9
Eastern Suburbs	14
Fairfield-Liverpool	4
Gosford-Wyong	1
Inner Sydney	12
Inner Western Sydney	11
Lower Northern Sydney	8
Northern Beaches	7
Outer South Western Sydney	3
Outer Western Sydney	2
St George-Sutherland	13
Melbourne	
Boroondara City	22
Eastern Middle Melbourne	23
Eastern Outer Melbourne	24
Frankston City	29
Greater Dandenong City	27
Hume City	16
Inner Melbourne	18
Melton-Wyndham	15
Moreland City	19
Mornington Peninsula Shire	30
Northern Middle Melbourne	21
Northern Outer Melbourne	20
South Eastern Outer Melbourne	26
Southern Melbourne	28
Western Melbourne	17
Yarra Ranges Shire Part A	25
Brisbane	
Beaudesert Shire Part A	36
Brisbane City	34
Caboolture Shire Part A	31

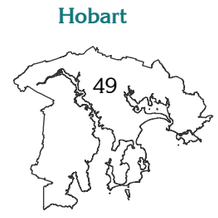
Statistical Subdivision name	Map Ref.
Brisbane…*continued*	
Gold Coast City Part A	38
Ipswich City	35
Logan City	37
Pine Rivers Shire	32
Redcliffe City	33
Redland Shire	39
Adelaide	
Eastern Adelaide	42
Northern Adelaide	40
Southern Adelaide	43
Western Adelaide	41
Perth	
Central Metropolitan	45
East Metropolitan	46
North Metropolitan	44
South East Metropolitan	47
South West Metropolitan	48
Hobart	
Greater Hobart	49
Darwin	
Darwin City	50
Litchfield Shire	52
Palmerston-East Arm	51
Canberra	
Belconnen	54
Gungahlin-Hall	53
North Canberra	59
South Canberra	58
Tuggeranong	57
Weston Creek-Stromlo	55
Woden Valley	56

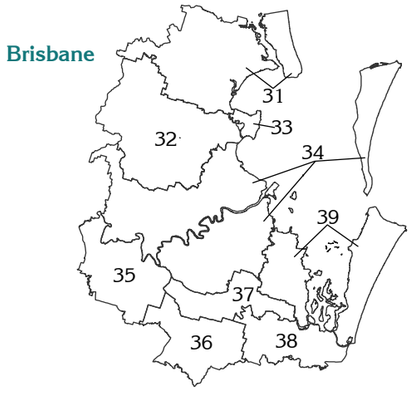
Map A1
Key to Statistical Subdivisions mapped for the capital cities, Australia

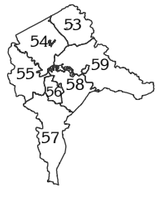


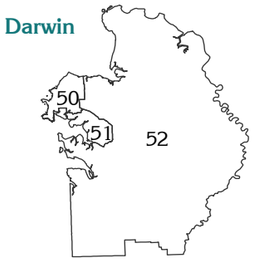












Map A1

Key to Statistical Subdivisions mapped for the capital cities, Australia ... *continued*

Numerical Key to Statistical Subdivisions in the capital cities, Australia, 2001

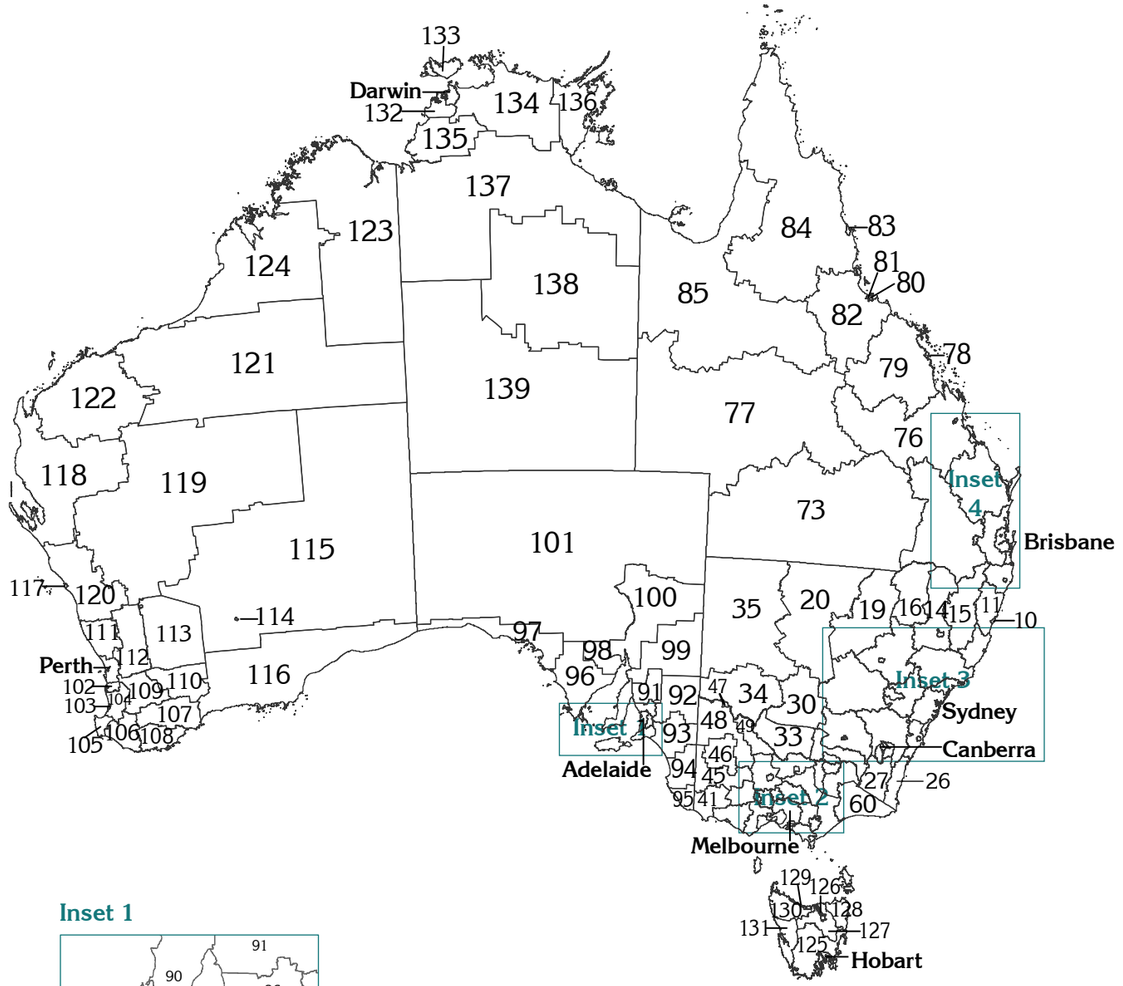
Statistical Subdivision name	Map Ref.
Sydney	
Gosford-Wyong	1
Outer Western Sydney	2
Outer South Western Sydney	3
Fairfield-Liverpool	4
Blacktown	5
Central Northern Sydney	6
Northern Beaches	7
Lower Northern Sydney	8
Central Western Sydney	9
Canterbury-Bankstown	10
Inner Western Sydney	11
Inner Sydney	12
St George-Sutherland	13
Eastern Suburbs	14
Melbourne	
Melton-Wyndham	15
Hume City	16
Western Melbourne	17
Inner Melbourne	18
Moreland City	19
Northern Outer Melbourne	20
Northern Middle Melbourne	21
Boroondara City	22
Eastern Middle Melbourne	23
Eastern Outer Melbourne	24
Yarra Ranges Shire Part A	25
South Eastern Outer Melbourne	26
Greater Dandenong City	27
Southern Melbourne	28
Frankston City	29
Mornington Peninsula Shire	30
Brisbane	
Caboolture Shire Part A	31
Pine Rivers Shire	32
Redcliffe City	33

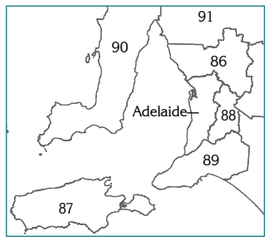
Statistical Subdivision name	Map Ref.
Brisbane...*continued*	
Brisbane City	34
Ipswich City	35
Beaudesert Shire Part A	36
Logan City	37
Gold Coast City Part A	38
Redland Shire	39
Adelaide	
Northern Adelaide	40
Western Adelaide	41
Eastern Adelaide	42
Southern Adelaide	43
Perth	
North Metropolitan	44
Central Metropolitan	45
East Metropolitan	46
South East Metropolitan	47
South West Metropolitan	48
Hobart	
Greater Hobart	49
Darwin	
Darwin City	50
Palmerston-East Arm	51
Litchfield Shire	52
Canberra	
Gungahlin-Hall	53
Belconnen	54
Weston Creek-Stromlo	55
Woden Valley	56
Tuggeranong	57
South Canberra	58
North Canberra	59

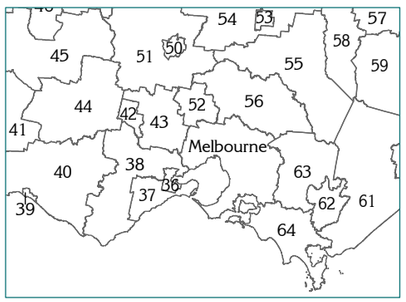
Alphabetical Key to Statistical Subdivisions in the rest of state/territory areas, Australia, 2001

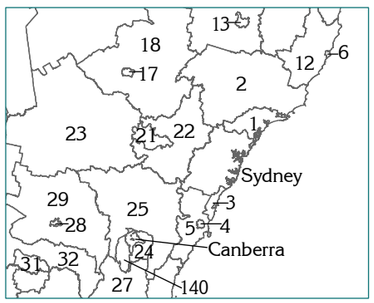
Statistical Subdivision name	Map Ref.
New South Wales	
Albury	31
Bathurst-Orange	21
Central Macquarie	18
Central Murray	33
Central Murrumbidgee	29
Central Tablelands	22
Clarence	11
Coffs Harbour	10
Dubbo	17
Far West	35
Hastings	12
Hunter SD Balance	2
Illawarra SD Balance	5
Lachlan	23
Lismore	8
Lower Murrumbidgee	30
Lower South Coast	26
Macquarie-Barwon	19
Murray-Darling	34
Newcastle	1
North Central Plain	16
Northern Slopes	14
Northern Tablelands	15
Nowra-Bomaderry	4
Port Macquarie	6
Queanbeyan	24
Richmond-Tweed SD Bal.	9
Snowy	27
Southern Tablelands	25
Tamworth	13
Tweed Heads	7
Upper Darling	20
Upper Murray	32
Wagga Wagga	28
Wollongong	3
Victoria	
Ballarat City	42
East Barwon	37
East Central Highlands	43
East Gippsland Shire	60
East Mallee	49
East Ovens-Murray	59
Glenelg	41
Greater Bendigo City Part A	50
Greater Geelong City Part A	36
Greater Shepparton City Part A	53
Hopkins	40
La Trobe Valley	62
Mildura Rural City Part A	47
North Goulburn	54
North Loddon	51
Victoria…*continued*	
North Wimmera	46
South Gippsland	64
South Goulburn	55
South Loddon	52
South West Goulburn	56
South Wimmera	45
Warrnambool City	39
Wellington Shire	61
West Barwon	38
West Central Highlands	44
West Gippsland	63
West Mallee	48
West Ovens-Murray	58
Wodonga	57
Queensland	
Bundaberg	68
Cairns City Part A	83
Central West	77
Darling Downs SD Balance	72
Far North SD Balance	84
Fitzroy SD Balance	76
Gladstone	75
Gold Coast City Part B	65
Hervey Bay City Part A	69
Mackay City Part A	78
Mackay SD Balance	79
Moreton SD Balance	67
North West	85
Northern SD Balance	82
Rockhampton	74
South West	73
Sunshine Coast	66
Thuringowa City Part A	81
Toowoomba	71
Townsville City Part A	80
Wide Bay-Burnett SD Bal	70
South Australia	
Barossa	86
Far North	101
Fleurieu	89
Flinders Ranges	100
Kangaroo Island	87
Lincoln	96
Lower North	91
Lower South East	95
Mt Lofty Ranges	88
Murray Mallee	93
Pirie	99
Riverland	92
Upper South East	94
South Australia…*continued*	
West Coast	97
Whyalla	98
Yorke	90
Western Australia	
Avon	112
Blackwood	106
Bunbury	103
Campion	113
Carnegie	119
De Grey	121
Fitzroy	124
Fortescue	122
Gascoyne	118
Geraldton	117
Greenough River	120
Hotham	109
Johnston	116
Kalgoorlie/Boulder City Part A	114
King	108
Lakes	110
Lefroy	115
Mandurah	102
Moore	111
Ord	123
Pallinup	107
Preston	104
Vasse	105
Tasmania	
Burnie-Devonport	129
Central North	127
Greater Launceston	126
Lyell	131
North Eastern	128
North Western Rural	130
Southern	125
Northern Territory	
Alligator	134
Barkly	138
Bathurst-Melville	133
Central	139
Daly	135
East Arnhem	136
Finniss	132
Lower Top End	137
Australian Capital Territory	
Australian Capital Territory Balance	140

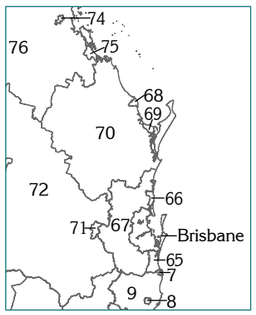
Map A2
Key to Statistical Subdivisions mapped for Australia











Map A2

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.
New South Wales	
Newcastle	1
Hunter SD Balance	2
Wollongong	3
Nowra-Bomaderry	4
Illawarra SD Balance	5
Port Macquarie	6
Tweed Heads	7
Lismore	8
Richmond-Tweed SD Bal.	9
Coffs Harbour	10
Clarence	11
Hastings	12
Tamworth	13
Northern Slopes	14
Northern Tablelands	15
North Central Plain	16
Dubbo	17
Central Macquarie	18
Macquarie-Barwon	19
Upper Darling	20
Bathurst-Orange	21
Central Tablelands	22
Lachlan	23
Queanbeyan	24
Southern Tablelands	25
Lower South Coast	26
Snowy	27
Wagga Wagga	28
Central Murrumbidgee	29
Lower Murrumbidgee	30
Albury	31
Upper Murray	32
Central Murray	33
Murray-Darling	34
Far West	35
Victoria	
Greater Geelong City Part A	36
East Barwon	37
West Barwon	38
Warrnambool City	39
Hopkins	40
Glenelg	41
Ballarat City	42
East Central Highlands	43
West Central Highlands	44
South Wimmera	45
North Wimmera	46
Mildura Rural City Part A	47
West Mallee	48
East Mallee	49
Greater Bendigo City Part A	50
Victoria…*continued*	
North Loddon	51
South Loddon	52
Greater Shepparton City Part A	53
North Goulburn	54
South Goulburn	55
South West Goulburn	56
Wodonga	57
West Ovens-Murray	58
East Ovens-Murray	59
East Gippsland Shire	60
Wellington Shire	61
La Trobe Valley	62
West Gippsland	63
South Gippsland	64
Queensland	
Gold Coast City Part B	65
Sunshine Coast	66
Moreton SD Balance	67
Bundaberg	68
Hervey Bay City Part A	69
Wide Bay-Burnett SD Bal	70
Toowoomba	71
Darling Downs SD Balance	72
South West	73
Rockhampton	74
Gladstone	75
Fitzroy SD Balance	76
Central West	77
Mackay City Part A	78
Mackay SD Balance	79
Townsville City Part A	80
Thuringowa City Part A	81
Northern SD Balance	82
Cairns City Part A	83
Far North SD Balance	84
North West	85
South Australia	
Barossa	86
Kangaroo Island	87
Mt Lofty Ranges	88
Fleurieu	89
Yorke	90
Lower North	91
Riverland	92
Murray Mallee	93
Upper South East	94
Lower South East	95
Lincoln	96
West Coast	97
Whyalla	98
South Australia…*continued*	
Pirie	99
Flinders Ranges	100
Far North	101
Western Australia	
Mandurah	102
Bunbury	103
Preston	104
Vasse	105
Blackwood	106
Pallinup	107
King	108
Hotham	109
Lakes	110
Moore	111
Avon	112
Campion	113
Kalgoorlie/Boulder City Part A	114
Lefroy	115
Johnston	116
Geraldton	117
Gascoyne	118
Carnegie	119
Greenough River	120
De Grey	121
Fortescue	122
Ord	123
Fitzroy	124
Tasmania	
Southern	125
Greater Launceston	126
Central North	127
North Eastern	128
Burnie-Devonport	129
North Western Rural	130
Lyell	131
Northern Territory	
Finniss	132
Bathurst-Melville	133
Alligator	134
Daly	135
East Arnhem	136
Lower Top End	137
Barkly	138
Central	139
Australian Capital Territory	
Australian Capital Territory Balance	140

Map A3
Key to District Health Boards mapped for New Zealand