5 Health status

Introduction

Differences in social and economic circumstances have been illustrated in the previous chapters for areas of Western Australia. The maps and analysis in this chapter illustrate differences in the health status of residents of these areas.

The mapping technique is particularly useful in highlighting differences in the health status of the population (as measured by the indicators available) in areas across Western Australia, and in demonstrating associations with the socioeconomic status and health service utilisation patterns. The results of the correlation analysis (which shows the extent of interdependence between the measures when mapped) are included in the text to support these associations.

Background

Health has been defined by the World Health Organisation as 'a state of complete physical, mental and social well being and not merely the absence of disease or infirmity'. Health status "refers to the level of health experienced by an individual or a community by placing them along a continuum, from health through distress, disease and disability, to death" (SAHC 1988).

Data collected since early this century have shown a steady improvement in the health status of Australians, as measured by a range of indicators including life expectancy, infant mortality and overall death rates. However, as noted in the *Introduction* (page 1), there are overwhelming inequalities in health status for disadvantaged groups. For example, all cause mortality rates are, on average, around 50 per cent higher for people aged under 65 years and living in the lowest socioeconomic areas when compared to the population groups of the same age and sex living in the areas of highest socioeconomic status (**Table 5.1**).

These differentials exist for both males and females in all the age groups studied, for all cause mortality and for a number of selected causes.

Table 5.1: Health status indicators by socioeconomic disadvantage of area and sex, Australia, late 1980s
Note: First quintile is high socioeconomic status and fifth quintile is low socioeconomic status

Age group (years)		Rate ratio for quintile of socioeconomic disadvantage of area			
		Males		Females	
		1st quintile	5th quintile	1st quintile	5th quintile
Children (0 to 14 years):	Mortality	1.00	1.46***	1.00	1.63***
	Serious chronic illness	1.00	1.25	1.00	1.18
	Reduced activity	1.00	1.36***	1.00	1.03
	Not breastfed: 0 to 4 yrs	1.00	1.46*	1.00	1.09
Youth (15 to 24 years):	Mortality	1.00	1.46***	1.00	1.49***
	Serious chronic illness	1.00	1.03	1.00	1.03
	Reduced activity	1.00	0.74***	1.00	0.95
	Fair/poor health	1.00	1.33	1.00	1.40
	Inactivity	1.00	1.07	1.00	1.34**
	Smoking: 18 yrs & over	1.00	1.24*	1.00	1.22
Adults (25 to 64 years):	Mortality	1.00	1.67***	1.00	1.49***
	Serious chronic illness	1.00	1.12	1.00	1.22**
	Reduced activity	1.00	1.56***	1.00	0.98
	Fair/poor health	1.00	1.61***	1.00	1.67***
	Overweight/obesity	1.00	0.99	1.00	1.23***
	Inactivity	1.00	1.26***	1.00	1.17**
	Smoking	1.00	1.43***	1.00	1.53***
	Alcohol risk	1.00	1.44***	1.00	0.95
Older people (65 & over):	Mortality	1.00	1.13***	1.00	1.10***
	Serious chronic illness	1.00	1.06	1.00	1.06
	Reduced activity	1.00	1.08**	1.00	1.22***
	Fair/poor health	1.00	1.34**	1.00	1.30**
	Overweight/obesity	1.00	1.05	1.00	1.17
	Inactivity	1.00	1.25	1.00	1.27**
	Smoking	1.00	1.47*	1.00	1.32
	Alcohol risk	1.00	1.12	1.00	1.05
All ages :	Mortality	1.00	1.23***	1.00	1.23***
	Serious chronic illness	1.00	1.11*	1.00	1.13**
	Fair/poor health	1.00	1.50***	1.00	1.51***
	Overweight/obesity	1.00	1.01	1.00	1.20***
	Inactivity	1.00	1.23***	1.00	1.21***
	Smoking: 18 yrs & over	1.00	1.34***	1.00	1.44***
	Alcohol risk: 18 yrs & over	1.00	1.34***	1.00	0.98

Statistical significance: the greater the number of * the higher the level of significance : * p < 0.05: ** p < 0.01: *** p < 0.001
Source: Mathers, C. Health Monitoring Series Nos. 1 to 4, Australian Institute of Health & Welfare, Canberra, 1994

Young people and adults from the lowest socioeconomic areas are also more likely to report their health as being 'fair' or 'poor' (in comparison with 'excellent' or 'good') than those living in the areas of highest socioeconomic status. The largest differential is that for 25 to 64 year old females: a differential of 67 per cent. Most risk factors, for example smoking, are also highly elevated for both men and women in the 'young' (by 24 per cent for males and 22 per cent for females) and 'adult' (by 43 per cent for males and 53 per cent for females) age groups living in the most disadvantaged areas. Male adult residents of these areas are also at high risk of poor health from high levels of alcohol consumption.

Despite overall decline in mortality rates between 1985-87 and 1995-97 for the majority of conditions, the differentials observed in the earlier period were still evident a decade later (Mathers in press). For example, during 1995-97 infants and children living in the most disadvantaged areas experienced the highest mortality rates for perinatal conditions and sudden infant death syndrome, and for injury and poisoning (**Table 5.2**)[1]. Similarly, males and females aged from 25 to 64 years residing in the most disadvantaged areas, experienced the highest death rates for all cause mortality; for specific causes such as circulatory, respiratory and digestive system diseases; and for selected causes, such as coronary heart disease and stroke, motor vehicle traffic accidents and pneumonia/bronchitis. Although data for the individual quintiles are not presented in the table, almost without exception, death rates for these quintiles exhibited a clear gradient from high to low socioeconomic status. These widening differentials give cause for concern.

For some conditions, the authors found an actual increase in the mortality rates over the decade. Among those aged 15 to 24, there was an increase in the rate of male suicide in the middle (third) and low (fifth) socioeconomic status quintiles, and a corresponding increase for females in the high (first) and middle socioeconomic status quintiles (and also in the rate ratio). Among males aged 25 to 64, mortality rates increased (or remained largely unchanged) for diabetes mellitus, suicide, and asthma/emphysema, and for females of the same age increases in death rates were evident for diabetes mellitus, lung cancer and asthma/emphysema.

Although not statistically significant, the large reductions in rate ratios for deaths of 15 to 24 year old males and females from causes of drug dependence may reflect an increase in deaths of residents of higher socioeconomic status areas from these causes.

[1]Age standardised mortality rates were calculated for males and females in the first (least disadvantaged), third, and fifth (most disadvantaged) quintiles of the ABS SEIFA Index of Relative Socio-Economic Disadvantage. Only the rate ratio of the fifth quintile to the first quintile is shown in the table.

Table 5.2: Rate ratio of mortality inequality by socioeconomic disadvantage of area, 1985-87 and 1995-97

Age group/Mortality type	Rate ratio [1]			
	Males		Females	
	1985-87	1995-97	1985-87	1995-97
0 to 14 years				
All Cause	1.50	1.62***	1.67	1.45***
Perinatal conditions	1.54	1.39***	1.90	1.41***
Sudden infant death syndrome	1.20	2.73***	1.69	3.24***
Injury and Poisoning	2.02	2.21**	1.84	1.75
MV Traffic Accident	1.53	2.49***	1.95	1.40***
15 to 24 years				
All Cause	1.49	1.78***	1.54	1.40***
Drug dependence	1.91	0.98	1.52	0.94
Injury and Poisoning	1.47	1.98***	1.66	1.49**
MV Traffic Accident	1.40	2.26***	1.56	1.83***
Suicide	1.35	1.75***	1.30	0.95***
25 to 64 years				
All Cause	1.68	1.64***	1.50	1.45***
Circulatory System	1.65	1.87***	1.97	2.01
Coronary HD	1.55	1.88***	2.22	2.34***
Stroke	2.10	2.07	1.71	1.70
Diabetes mellitus	1.73	2.07***	3.04	3.49***
Cancer	1.28	1.39***	1.10	1.14***
Lung cancer	1.60	1.98***	1.58	1.73***
Injury and Poisoning	1.96	1.76***	1.69	1.47***
Suicide	1.73	1.52***	1.42	1.15***
MV Traffic Accident	1.73	2.33***	1.66	2.21***
Respiratory System	2.31	2.49***	2.06	2.64***
Pneumonia, bronchitis	3.72	1.76***	4.24	2.80***
Asthma, emphysema	1.90	3.02***	1.43	2.94***
Digestive System	3.06	2.20***	2.26	2.21

[1]Ratio of Standardised Mortality Ratio for fifth quintile (low socioeconomic status) to first quintile (high socioeconomic status)
Note: Rate ratios of mortality inequality differ significantly from no inequality at significance level p<0.001.
Asterisks indicate level of significance of the difference from the corresponding 1985-87 value: * p <0.05, ** p <0.01, *** p <0.001
Source: Mathers C. Australian Institute of Health and Welfare (in press)

Measurement of health status

Current situation

In the absence of accepted measures of good health as a positive entity, health status is largely indicated by measures of morbidity (sickness), mortality (death, in particular infant and other premature deaths, and life expectancy), disability, risk factors and, in some instances, utilisation of health services. Broader aspects of health, such as social and economic wellbeing, or of life satisfaction, are rarely measured in the administrative collections from which most health data are drawn. To be useful in describing health status at a local area level, datasets need to include descriptive information associated both with the particular event being recorded (eg. cause of death) and the person about whom it was recorded (eg. age, sex and place of usual residence).

The deaths 'data collections undertaken by the Australian Bureau of Statistics (ABS) have provided one of the few datasets to include such detail at a local area level. Therefore, mortality data have been the major indicator of health status used over the years in small area analyses. Data on the extent of morbidity (illness or disease), disability and risk factors in the community have generally not been available at the local area level, apart from proxy measures such as hospital admissions and for some States and Territories, cancer incidence data.

Use of Synthetic Predictions

Information on the levels of morbidity in the community has been collected by the ABS since 1977 in the five-yearly National Health Survey (NHS) (prior to 1989 called the Australian Health Survey, AHS). In these surveys, a sample of the Australian population is asked to report on medical conditions, diseases, etc. experienced in the two weeks prior to being interviewed. Information is also collected on personal attributes (eg. age, sex, height, weight, income and occupation), and on a number of lifestyle and behavioural factors including smoking and alcohol consumption.

In the 1989 AHS and 1995 NHS, a sample of the Australian population was asked to indicate its perception of its own health status, on a scale of 'excellent', 'very good' (only asked in the 1995 NHS), 'good', 'fair' and 'poor'. The purpose of this question was to obtain information about health status in a more subjective way, in order to provide an alternate measure to that derived solely from statistics of illness, death, or service use.

As a further development, the 1995 NHS also included the SF-36 (Ware et al. 1993), a survey questionnaire designed to provide general self-reported health status profiles of the population. The SF-36 provides an indicator across eight dimensions of health and well being: physical functioning; role limitations due to physical health problems; bodily pain; general health; vitality (energy/fatigue); role limitations due to emotional problems; and mental health (psychological stress and psychological well being). Two summary measures, a Physical Component Summary and a Mental Component Summary[2], can be calculated from the eight dimensions.

[2]Preliminary investigations by the ABS found that it was not possible to obtain a model capable of reliably predicting the Mental Component Score.

Data from the NHS are generally available only at the State and Territory level, or for large regional areas such as State health regions. In recognition of the importance of local area level data, the ABS was contracted (as part of this national atlas project) to produce estimates for two variables (the self-assessed health status of the population and the Physical Component Summary of the SF-36) for SLAs across Australia, using the synthetic prediction technique. The variables and the synthetic prediction technique, are described on page 109.

This section also includes estimates of the number of people with a handicap, which were also produced using the synthetic prediction technique.

Data mapped

In this chapter, data have been mapped for a number of measures of health status. These include the measures, discussed above, from the NHS; the population with a handicap; premature deaths of males and females, selected causes of death and years of potential life lost; and the Total Fertility Rate. These variables are discussed in more detail in the introduction to the maps on each topic.

A comparison of the mapped distribution of these measures of health status with the distributions in other chapters indicates the possible extent of association at the local area level between health status, and socioeconomic status and health service use. The extent of association is supported by the results of the correlation analysis in Chapter 8.

Other gaps and deficiencies in the data

Health status of Aboriginal and Torres Strait Islander people

Indigenous people have the poorest health of any group in Australia: they are also the group least well identified in statistical collections. **Table 3.2** in Chapter 3 documents problems in the counts of Indigenous Australians from the population Census. Data for the birth and death records for Indigenous people used in this chapter are similarly inaccurate.

Despite the inclusion of a question to identify Indigenous people on the death information statements and medical certificates of cause of death, they are under-reported in death records[3]. Over the past few years only the Northern Territory, Western Australia, South Australia and the Australian Capital Territory were considered to have had reasonably complete coverage. The coverage in other States has not improved since the early 1990s, with the exception of Queensland, which has been estimated to have moved close to complete coverage since 1996. However, between 1991 and 1996 there has been a largely unexplained increase in the population of Indigenous people: see pages 16 and 17 for further details. Thus, estimates of the completeness of Indigenous birth and death notifications for some States and

[3]The death information statement is authorised by a relative or other person who has knowledge of the deceased and is usually filled out by a funeral director; the medical certificate of cause of death is completed by a medical practitioner or coroner.

Territories (which are, in part, based on Census counts) will need to be reviewed.

Cancer incidence and notifications of communicable diseases are other important collections of relevance to the measurement of health status which also inadequately identify Indigenous Australians.

The Australian Bureau of Statistics and the Australian Institute of Health and Welfare (ABS/AIHW 1999) have identified that "among the most important issues relating to data quality is: the estimation of the size and composition of the Indigenous population; the identification of Indigenous people in administrative data collections; and issues related to the collection of survey data about Indigenous people. The availability of data are also affected by the number of Indigenous people included in surveys and the regularity with which the surveys are conducted". The ABS, AIHW, State and Territory health authorities and the heads of Aboriginal and Torres Strait Islander health organisations are currently working together to reduce the long term issues related to the accurate and appropriate collection of an Indigenous people identifier for demographic and health collections.

Influence of deaths of Indigenous people on ARIA results

There has been considerable discussion on the extent to which high death rates in the non-metropolitan areas of Australia result from the much higher mortality experience of Indigenous populations. A Queensland study, using the Rural, Remote and Metropolitan Areas classification (RRMA) has shown that across most major classes of diseases remote areas had higher rates than urban areas. Once the Indigenous component was taken out of the analysis, the differences between the RRMA groups were greatly reduced for most diseases. Significant differences remained for diseases of the circulatory and genitourinary systems and all causes (Muller, Ring & Kennedy 1998 unpublished).

An initial examination of data for deaths in 1997 of Indigenous people aged from 15 to 64 years was undertaken by the new Accessibility/Remoteness of Australia (ARIA) as part of the atlas project. Data were examined for Western Australia, South Australia and the Northern Territory, which are considered to have the best identification of Indigenous people in their deaths statistics. Preliminary findings suggest that, for the Northern Territory, death rates for all of the ARIA categories are likely to be affected by deaths identified as Indigenous. In South Australia, the affect on death rates is substantial in the Very Remote category and is also likely (although to a much lesser extent) to impact on results for the Remote category. In Western Australia, the affect on death rates in the Very Remote category is again substantial, and is also likely to be significant in the Moderately Accessible category (driven by the impact of male deaths) and the Remote category (driven by the impact of female deaths).

As this analysis was undertaken as the first volume of the atlas went to print, the data on which these initial findings were based were not able to be incorporated in the printed version. The data are, however, available on the atlas World Wide Web site, at www.publichealth.gov.au. It is planned to extend the analysis to include more years of data, and to use age standardised rates, rather than the age-specific rates as used in this initial analysis.

Health status and socioeconomic status

As noted in Chapter 2 (*Measurement of socioeconomic status*), most collections of health statistics do not include data items which directly allow for analysis of socioeconomic status at the local area level. This is a major deficiency in Australian health information.

Even the death notification form, which requires the inclusion of the deceased person's occupation (a potential indicator of socioeconomic status), is of limited value. The data available are of questionable quality and is not published by the ABS.

The area of usual residence of the person is therefore used here as a proxy measure of socioeconomic status in the absence of any direct measures. The validity of using the area of usual residence in this way is discussed in Chapter 2, *Methods* under the heading *Usual residence*.

Health status and the physical environment

There is limited information on the impact on the health of Australians of environmental factors, such as air quality and soil and water contamination (Peach 1997). Overseas studies have found a relationship between the levels of several pollutants in the air, and death rates or signs of sickness (such as hospital admissions or use of medications for respiratory system disease). Some relate an increase in signs of poor health with increased levels of sulphur dioxide and total suspended particulate matter in the air (Dept. of the Environment, Sport and Territories 1996).

However recent developments in Australia provide the potential to improve the range and quality of data available. In February 1998 the National Environment Protection Council agreed to establish the National Pollutant Inventory. The National Pollutant Inventory (NPI) is the first of a series of National Environment Protection Measures to be developed in Australia. When fully developed, the NPI will provide a national database of pollutant emissions and will be available on the Internet.

Since 1 July 1998, larger Australian industrial facilities which use more than a specified amount of the chemicals listed on the NPI have been required to estimate and report annually their emissions for the NPI. Estimates of emissions from facilities using less than the specified amount of the chemicals listed on the NPI and emissions from the community (such as nutrient emissions to waterways and air emissions from motor vehicles, lawn mowers etc.) will also be made available. Information regarding the composition of substances listed on the NPI, their uses, and the associated risks to human health and the environment, will be included on the database. The data from the first year of reporting are now expected to be available in 2003. In the first two reporting years for the NPI, facilities will be required to report their emissions to air, land and water (from 36 of the 90 chemicals listed on the NPI). In late 1999, a review of the NPI will consider whether reporting requirements should extend to the full list of chemicals.

The establishment of this inventory and its promulgation using the Internet, will bring to a wide audience important data on pollutant emissions by type of emission and the location of the

facility responsible for the emission. This spatial element will enable comparisons with data from other sources and will better inform the work in Australia on the impact of air quality and soil and water contamination on the health of Australians.

Other National Environment Protection Measures being developed include ambient air quality, movement of controlled waste across State and Territory borders and assessment of contaminated sites.

The homeless

Chamberlain (1999) has estimated that there were 105,000 homeless people in Australia on Census night in 1996. Where there are a disproportionately large number of homeless people in a city, a town or a regional area, they may also be represented disproportionately in the maps in this atlas. For example, if they are not captured in the population data for the same area of address that is given in administrative records following a hospital admission or a visit to a general medical practitioner, or on a death certificate, the rates for these events will be overstated for that area.

Rates of death and hospital admission in inner and near city SLAs in the capital cities are particularly likely to be affected, as many of those who live ôn the street ’frequent these areas, and these SLAs are also the location of much of the sheltered accommodation and many of the low-cost boarding houses used by the homeless in general.

Other gaps and deficiencies

There are a number of important areas for which health status data are not available at the small area level. These include oral health, nutrition (including information on height and weight) and mental health and wellbeing, all of which are key areas affecting health status. Details of the incidence of cancer are also not mapping. For example, data are available for some States at the SLA level and for others at the postcode level. The National Cancer Statistics Clearing House has this small area data, although it has not been edited or used to date. Similarly, details are available from the State and Territory operations of the National Cervical Screening Program and Breast Screen Australia. As yet small area data are not held nationally, although the National Screening Information Project will eventually hold such information.

Although small area data could have been obtained from the individual States and Territories, this was not done because, for a number of jurisdictions, the data would have to be converted from postcode to SLA for mapping. This is an inexact process (see page 11) and could well produce rates that overstate the true incidence of cancer in an SLA (and possibly overstate the rate many times). Given the concerns that high rates estimated from these datasets at the small area level would evoke in the community (when the rate may well be inaccurate), a decision was taken not to map this data.

Area mapped/Boundary issues

Data for deaths used in this chapter were registered over the four year period from 1992 to 1995. For statistical purposes, each death was allocated the code of the Statistical Local Area (SLA) of usual residence of the deceased. However, during the data collection period changes were made to some SLA boundaries in Western Australia. As a result, it has been necessary to merge some SLAs when presenting data for deaths which were registered over the period from 1992 to 1995.

In describing these data in the text, the groupings of merged SLAs have been assigned a generic name. The generic names, together with the SLAs which comprise the grouping, are shown in **Table 5.3**.

Table 5.3: Generic names for merged Statistical Local Areas

Grouping of 1996 SLAs resulting from boundary changes	Generic name used in text
Wanneroo (C) - Central Coastal, - North-East, - North-West, - South East, - South-West	Wanneroo
Wiluna (S); Ngaanyatjarraku (S)	Wiluna/Ngaanyatjarraku
Cambridge (T); Perth (C: Remainder); Vincent (T)	Cambridge/Perth/Vincent

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Synthetic predictions of selected health status measures

Introduction

As noted above (page 105), some important data in Australia are only collected in household surveys such as the 1995 National Health Survey and the 1993 Survey of Disability and Ageing. Data from the these surveys are generally available only at the State and Territory level; in some instances (eg. for the largest States) they may also be available for large regional areas, such as State health regions. In recognition of the importance, for strategic planning and policy development, of local area level data for the measures included in these surveys, estimates were made for SLAs across Australia for selected variables from the NHS, using the synthetic prediction technique.

The variables are the self-assessed health status of the population and the Physical Component Summary of the SF-36. The ABS has previously produced estimates (using the synthetic prediction technique) at the SLA level of the number of people in the population with a disability and, of those, the number handicapped by that disability. The estimates of the population with a handicap are included in this section.

Description of the technique[4]

Synthetic predictions represent, in effect, a prorating of the Australian estimate (for the particular variable) across SLAs. The predictions are based on a model fitted to survey information, in which associations in the survey data for Australia are identified. For the purpose of the analysis, the survey data used in the model are limited to variables for which data are also available at the SLA level (these are the predictors). The model is then applied to the SLA counts of the predictors. The prediction is, effectively, the likely value for a typical area with those characteristics.

For example, in predicting the population with a disability (using data in the Survey of Disability and Ageing), the data variables were limited to those that were also available at the SLA level. These included variables from the 1991 Census, various socioeconomic (eg. unemployed, Indigenous) and demographic characteristics (age, sex, predominantly non-English speaking birthplace) and other sources (Disability Support Pensions). Relationships identified in the survey data (between levels of disability and age, sex, receipt of a Disability Support Pension) are then modelled in the SLA level data, and predictions produced of the number of a people with a disability.

The estimates were then age-sex standardised to remove variations (between SLAs) solely related to variations in age and sex.

Cautions

The synthetic predictions are intended as an indicator of regional distribution of the population with a handicap, where no other Australia-wide indicator exists (ABS 1996). Therefore, the extent to which the estimates reflect the number of people with a disability in any region will be, in part, dependent on the predictive value of the characteristics used in the model.

In making decisions based on the synthetic predictions, it is important to take into account any specific knowledge about a particular area (ie. the characteristics of its population) that is not incorporated into the model.

The synthetic predictions are also subject to sampling error because they are based on a model fitted to survey data. They are, however, fairly stable, most having sampling error comparable to the Australian estimates for the same variable from the survey (ie. lower than sampling error normally associated with survey estimates for small areas).

Users should note that the estimates will not necessarily agree with other (published) State estimates produced from the relevant surveys, as the predictions are based on Australian totals. Each of the surveys includes people in institutions such as hospitals, specialised long-term accommodation for people with a disability, gaols, etc.

Variables mapped

Physical Component Summary of the SF-36

As noted on page 105, the SF-36 (the Rand Short Form, 36 questions) is one of a number of multi-dimensional or general health status profiles under development in the world (Ware et al. 1993). Although it is becoming widely used, questions remain as to its validity as a measure of health and wellbeing. There are also concerns as to its applicability to particular population groups (such as Indigenous populations, children, or the elderly) and, in particular, to older people born overseas in countries where English is not the predominant language.

It has, however, been included in a number of major studies in the health field in Australia. In 1995 it was incorporated in the NHS. In the light of this general acceptance, one of the summary measures from the SF-36, the Physical Component Summary (PCS), has been estimated at the SLA level (using the synthetic prediction technique) and included in this atlas. The PCS is derived from a subset of items that ask respondents to the NHS aged 18 years and over, about their general physical health and wellbeing. A higher score indicates a better state of physical health and wellbeing.

Self-assessed health status

Self-assessed health status refers to a person's perception of their general health status. In the 1995 NHS, the population aged 18 years and over was asked to indicate its perception of its own health status, on a scale of 'excellent', 'very good', 'good', 'fair' and 'poor'. In the following analysis, details are shown of that proportion of the population who reported their health as being fair or poor. The ABS report that how people rated their health was strongly related to their illness experience (ABS 1997). This is consistent with the finding by McCallum et al. (1994) that people rate their health as poor on the objective basis of illness and disability. For Indigenous people, the factors associated with reporting fair or poor health have been examined using data from the 1994 National Aboriginal and Torres Strait Islander Survey (ABS/AIHW 1999). Among the factors most strongly associated

[4] A more detailed description of the production of the synthetic estimates in Appendix 1.5.

with self-assessed health status were reported health conditions and recent health actions, age, main language spoken and labour force status (Cunningham, Sibthorpe & Anderson 1997).

Survey of Disability and Ageing

The 1993 Survey of Disability, Ageing and Carers (ABS 1993) provides estimates of the numbers of persons with disabilities and those who were handicapped by the disability and who were living in private dwellings. The following definitions apply:

- a person was recorded as having a disability if he/she had one or more of a group of selected limitations, restrictions or impairments which had lasted, or was likely to last, for six months or more.
- a handicap results from a disability which limits a person's ability to perform certain tasks associated with daily living. The limitations must be in relation to one or more tasks of self-care, mobility, verbal communication, schooling or employment.

These definitions of disability and handicap are based on the *International Classification of Impairments, Disabilities and Handicaps* published by the World Health Organisation (1980).

It was estimated from the 1993 Survey of Disability, Ageing and Carers that 305,000 people in Western Australia (18.2 per cent of the population) had a disability. Of these, 288,500 (17.2 per cent of the population) were living in 'households', with the remainder living in establishments such as nursing homes and hostels.

The majority (238,600, or 14.3 per cent of the population) of those with a disability had a handicap of varying levels of severity, ranging from profound (14.2 per cent of all people with a handicap), through severe (12.0 per cent) and moderate (19.6 per cent), to mild (38.6 per cent). The rate of disability per thousand population increased with age.

Following the release of the 1993 Survey results, the Australian Bureau of Statistics (ABS) produced a set of 'synthetic predictions' for the Heads of Disability Services of the Commonwealth and the States and Territories, for use as a component of assessing the demand for disability services at a regional level.

Estimates for the population with a disability and the number handicapped by that disability are included in the tables in Volume 6.1, however only the dataset for the population with a handicap has been mapped in this atlas.

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People reporting their health as fair or poor, 1995

Capital city comparison (Australia as the Standard)

The majority of Australians aged 18 years and over consider themselves to be in good health, with 83 per cent reporting their health status as good, very good or excellent (ABS 1997); similar proportions were reported by males and females. Self-assessed health status was, however, strongly related to age, with the proportion reporting their health as excellent or very good declining with age, and the proportion reporting fair or poor health increasing with age.

In 1995, the standardised ratios (SRs) recorded for people reporting their health as fair or poor, ranged from 109** in **Hobart** to 90** in **Perth**. The other capital cities with ratios below the level expected from the Australian rates were **Melbourne** (with an SR of 96**) and **Canberra** (98**). For the five cities with data recorded in both periods in **Table 5.4**, none of the changes in the ratios were very large. The largest changes were recorded in **Perth** (with a higher proportion reporting their health as fair or poor, relative to the Australian rate) and **Adelaide** (fewer people reporting their health as fair or poor, relative to the Australian rate).

Table 5.4: People reporting their health as fair or poor, capital cities
Standardised ratios

	Sydney	Melbourne	Brisbane	Adelaide	Perth	Hobart	Darwin	Canberra[1]	All capitals
1995	102**	96**	100	102**	90**	109**	105**	98**	99**
1989-90	104**	99**	97**	106**	85**	..	..	..	100

[1]Includes Queanbeyan (C)
Source: See *Data sources*, Appendix 1.3
Statistical significance: * significance at 5 per cent; ** significance at 1 per cent

Perth (Western Australia as the standard)

There were an estimated 130,618 people aged 18 years and over who reported their health as fair or poor (as distinct from those who reported their health as being good, very good or excellent) in **Perth** in 1995; this was as expected from the State rates (an SR of 100).

The SLAs with the highest ratios generally reflected the patterns of socioeconomic disadvantage mapped in Chapter 3 (**Map 5.1**). Between 18 per cent and 20 per cent of residents aged 18 years and over of the inner SLAs of Perth, Shepperton and Belmont, and from the coastal SLAs of Fremantle and Kwinana, reported their health as fair or poor. Relatively high levels of people reporting fair or poor health were also estimated for Bassendean, Mosman Park, Rockingham and Stirling (Central, Western and South-Eastern).

In Kwinana and the City of Perth, 31 per cent more people than expected reported their health as fair or poor (both with an SR of 131**). Relatively high ratios were also recorded for people in Fremantle (an SR of 116**), Shepperton (114**), Belmont (113**) and Bassendean (111**). The SLAs of Swan and Cockburn (both with an SR of 108**), Rockingham (107**), Vincent (106**) and Armadale (105**) also had ratios elevated by five per cent or more.

In just under a half (45.2 per cent) of the SLAs in **Perth**, fewer people than expected reported their health as fair or poor, with the lowest ratios in the higher socioeconomic status SLAs of Peppermint Grove (an SR of 75**), Nedlands (76**) and Cottesloe (77**).

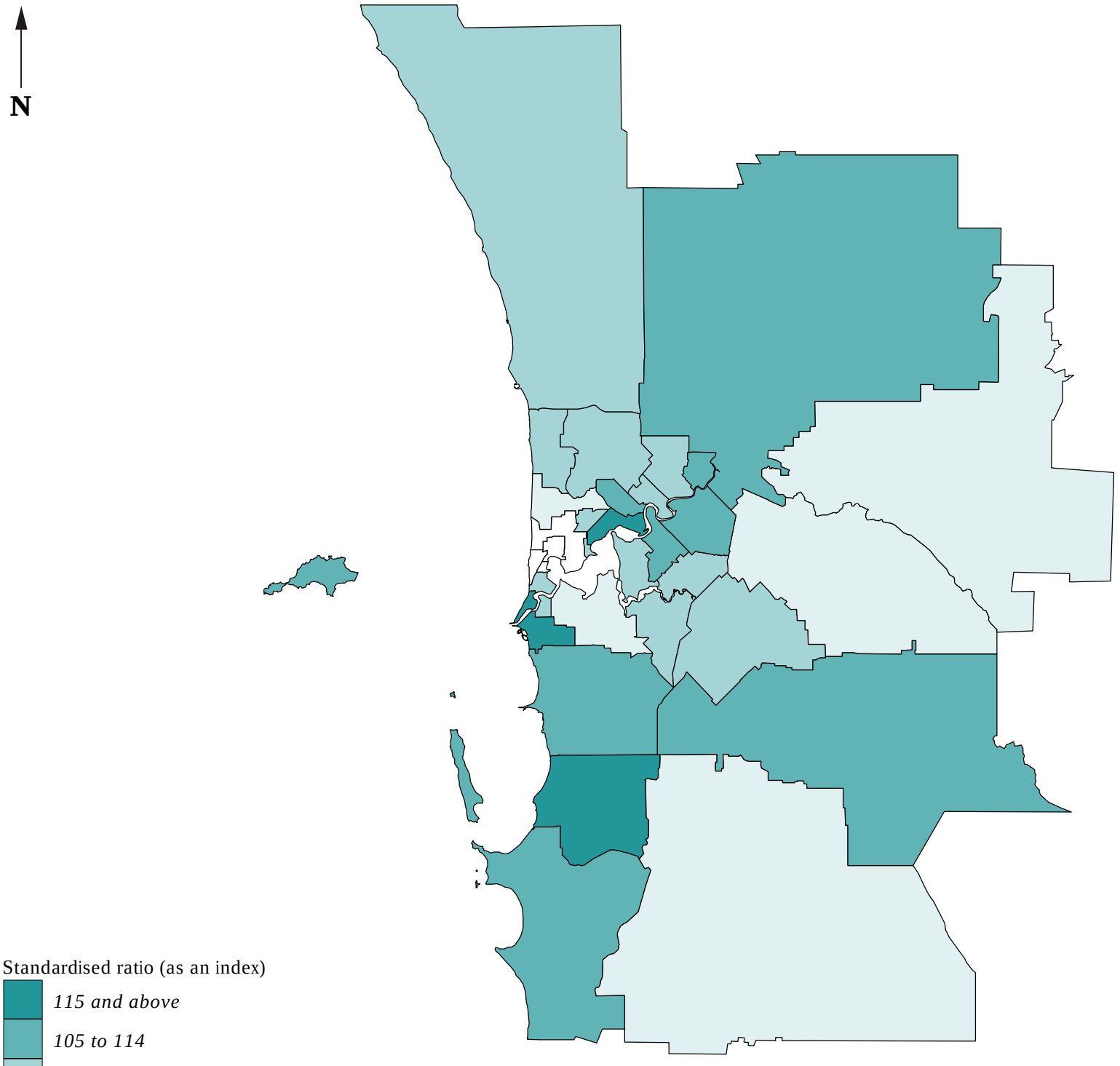
In 1995, the largest numbers of people reporting fair or poor health were in Wanneroo (estimated at 17,570 people) and Stirling: Central (12,495). There were more than 6,000 people in this category in Melville (an estimated 8,898 people), Gosnells (7,254), Canning (6,805), Swan (6,715), Stirling: West (6,678), Rockingham (6,384) and Cockburn (6,045).

There were correlations of substantial significance with most of the indicators of socioeconomic disadvantage, including low income families (0.91), unemployed people (0.90), dwellings rented from the State housing authority (0.81), the Indigenous population (0.77), single parent families (0.76), unskilled and semi-skilled workers (0.74) and early school leavers (0.71). There was also an inverse correlation of substantial significance with the variable for high income families (-0.83). These results, together with the inverse correlation of substantial significance with the IRSD (-0.90), indicate the existence of an association at the SLA level between high proportions of people reporting fair or poor health and socioeconomic disadvantage. There were also correlations of meaningful significance with the variables for deaths of males aged from 15 to 64 years (0.64) and years of potential life lost (the summary measure of premature death, 0.62).

Map 5.1

People reporting their health as fair or poor, Perth, 1995

Standardised Ratio: number of people reporting their health as fair or poor in each Statistical Local Area compared with the number expected*



*Expected numbers were derived by indirect age-sex standardisation, based on WA totals

Source: **See *Data sources*, Appendix 1.3**

Details of map boundaries are in Appendix 1.2

People reporting their health as fair or poor, 1995

State/Territory comparison

There was little difference in the levels of fair or poor health reported by residents of the capital cities and the *Rest of State/Territory* areas for Australia as a whole (**Table 5.5**). The most highly elevated standardised ratios (SRs) for people reporting their health as fair or poor in the non-metropolitan areas of Australia were in Tasmania (with an SR of 115**) and the Northern Territory (111**). Only in Western Australia (91**) and Victoria (95**) were the ratios below the level expected from the Australian rates. Responses given by Indigenous people are particularly relevant in non-metropolitan areas. After adjusting for age, Indigenous people in these areas were about twice as likely as their non-Indigenous counterparts to report their health as fair or poor (ABS 1999).

For the five States with data recorded in both periods, none of the changes in the ratios were very large. As for the capital cities, the largest changes were recorded in Western Australia (with a higher proportion reporting their health as fair or poor, relative to the Australian rate) and South Australia (fewer people reporting their health as fair or poor, relative to the Australian rate). For both these States the differential in the ratios from the Australian rate was twice that in their capital cities.

Table 5.5: People reporting their health as fair or poor, State/Territory
Standardised ratios

	NSW	Vic	Qld	SA	WA	Tas	NT	ACT	Total
1995									
Capital city	102**	96**	100	102**	90**	109**	105**	98**[1]	99**
Other major urban centres[2]	108**	103**	103**	..	..	..	..	..	105**
Rest of State/Territory	103**	95**	103**	101	91**	115**	111**	–[3]	101**
Whole of State/Territory	103**	96**	102**	102**	90**	112**	108**	97**	100
1989-90									
Rest of State/Territory	104**	97**	103**	110**	82**	..	..	..	101**

[1]Includes Queanbeyan (C)
[2]Includes Newcastle and Wollongong (NSW); Geelong (Vic); and Gold Coast-Tweed Heads and Townsville-Thuringowa (Qld)
[3] Data included with ACT total
Source: See *Data sources*, Appendix 1.3
Statistical significance: * significance at 5 per cent; ** significance at 1 per cent

Rest of State (Western Australia as the standard)

There were an estimated 43,220 people aged 18 years and over in the non-metropolitan areas of Western Australia who reported their health as fair or poor in 1995 (as distinct from those who reported their health as being good, very good or excellent). This was as expected from the State rates (an SR of 100).

Less than one third (31.9 per cent) of the SLAs had elevated ratios for this variable; the majority of these were located in the more remote and northern parts of the State (**Map 5.2**,).

The highest ratios were in Ngaanyatjarraku (with 35 per cent more people reporting fair or poor health than expected from the State rates, an SR of 135**; and an estimated 146 people), Menzies (125; 43) and Halls Creek (124**; 267). Relatively high rates of fair or poor health were also reported by the populations in Wiluna (an SR of 119), Murchison (115), Derby-West Kimberley (115**) and the towns of Broome (115**) and Mandurah (113**).

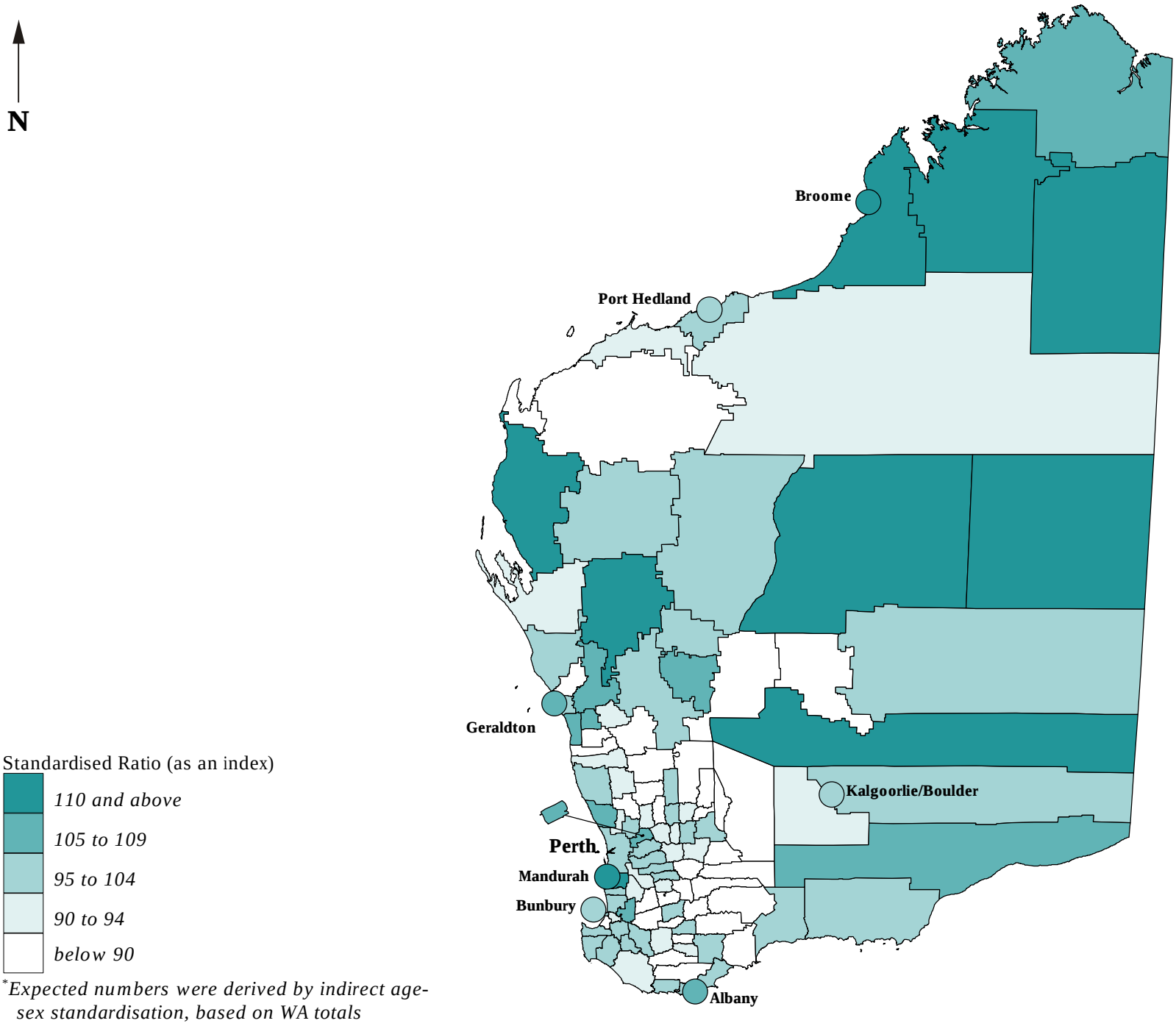
Ratios of at least 20 per cent below the levels expected from the State rates were estimated for West Arthur (with 28 per cent fewer people reporting fair or poor health than expected, an SR of 72**), Victoria Plains (75*), Lake Grace (77**), Westonia (77) and Dumbleyung (77*). In these areas, people were more likely to report their health as being good, very good or excellent.

The largest number of people reporting fair or poor health were in the larger population centres, the towns, including Mandurah (estimated at 4,982 people), Bunbury (2,691), Kalgoorlie/Boulder (2,247), Geraldton (2,008), Busselton (1,871) and Albany (1,753).

The correlation analysis revealed an association with many of the indicators of socioeconomic status. There were correlations of meaningful significance with the variables for dwellings without a motor vehicle (0.68), single parent families (0.64) and the Indigenous population (0.60), and inverse correlations of meaningful significance with managers and administrators (-0.58) and female labour force participation (-0.54). These results, together with the inverse correlation of substantial significance with the IRSD (-0.75), indicate the existence of an association at the SLA level between high rates of people reporting their health as fair or poor and socioeconomic disadvantage. There were also weaker, but consistent, correlations at the SLA level between high rates of people reporting fair or poor health and the variables for deaths of 15 to 64 year old males (0.42) and females (0.43), and with the variable for years of potential life lost (the summary measure of premature death, 0.49).

Map 5.2
People reporting their health as fair or poor, Western Australia, 1995

Standardised Ratio: number of people reporting their health as fair or poor in each Statistical Local Area compared with the number expected*

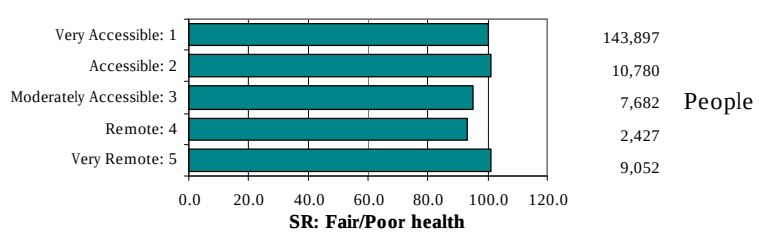


*Expected numbers were derived by indirect age-sex standardisation, based on WA totals

Source: See Data sources, Appendix 1.3

Details of map boundaries are in Appendix 1.2

Accessibility/Remoteness Index of Australia



143,897	
10,780	
7,682	People
2,427	
9,052	

The Very Remote, Accessible and Very Accessible areas under ARIA all had similar levels (and close to the level expected from the State rates) of people reporting their health as fair or poor. Lower rates were estimated for people aged 18 years and over in the Remote (a standardised ratio of 93, 7.0 per cent fewer people than expected from the State rates reporting their health as fair or poor) and Moderately Accessible (a standardised ratio of 95) categories.

Source: Calculated on ARIA classification, DHAC

Physical Component Summary, SF-36, 1995

Capital city comparison (Australia as the Standard)

The Physical Component Summary (PCS) is expressed as a mean score, with higher scores indicating better physical health. The PCS score for the Australian population aged 18 years and over was 49.7, ranging from a high of 53.1 for 18 to 24 year olds and 53.0 for 25 to 34 year olds, to 50.0 in the 45 to 54 year age group, before declining at each subsequent ten year age group to a mean score of 38.5 for people aged 75 years and over (ABS 1997). Males had a marginally higher score than females (49.8 compared with 49.6). Scores for males and females were the same at ages 55 to 64 years (a PCS score of 46.6), and higher for males at ages under 55 years, and lower at older ages (in the 65 to 74 years and 75 years and over age groups). The PCS score also varies by employment status, with employed males recording the highest mean score (52.2), with lower scores for the unemployed (51.0) and those not in the labour force (47.4). The major difference for males and females was recorded for females not in the labour force, with a score of 49.8, higher than that for males, with a score of 45.1. There are also notable variations for people reporting selected illness conditions such as cancer (those with cancer had a PCS score of 44.6, compared with those with no cancer, 49.3), heart disease (40.3, compared with 48.3), diabetes (44.0, compared with 49.9), asthma (47.3, compared with 50.0) and injury (45.9, compared with 50.2). There was a striking gradient in the PCS score for people reporting no serious physical conditions (a mean score of 53.1), when compared with those with one serious physical condition (49.8) and two or more such conditions (44.8).

The capital city scores varied over a narrow range (**Table 5.6**), from 49.4 in **Adelaide** to 50.2 in **Melbourne**.

Table 5.6: Physical Component Summary, capital cities, 1995
Standardised score

Sydney	Melbourne	Brisbane	Adelaide	Perth	Hobart	Darwin	Canberra[1]	All capitals
49.8	50.2	49.8	49.4	49.7	49.9	49.5	50.1	49.9

[1]Includes Queanbeyan (C)
Source: See *Data sources*, Appendix 1.3

Perth (Western Australia as the standard)

The PCS score estimated for the population aged 18 years and over in **Perth** in 1995 was 49.9, which was at the level expected from the State rates for a population of this size and age/sex composition.

The distribution across **Perth** of mean scores for the PCS score was similar to that recorded for many of the indicators of socioeconomic disadvantage, with the highest scores (indicating better physical health) in SLAs located to the north of the Swan River and between the city and the coast, and the lowest in the eastern inner areas and south-west industrialised areas (**Map 5.3**).

The highest PCS score was estimated for residents of Peppermint Grove, with a mean score of 51.2. Relatively high scores were also recorded in the nearby SLAs of Nedlands (a PCS score of 51.1), Cottesloe (51.0), Claremont (50.8), Cambridge (50.7) and Melville (50.6).

The lowest scores were estimated for people aged 18 years and over in Kwinana (a PCS score of 48.7), the City of Perth (49.0), Belmont (49.2), Bassendean and Fremantle (both 49.3) and Shepperton (49.4).

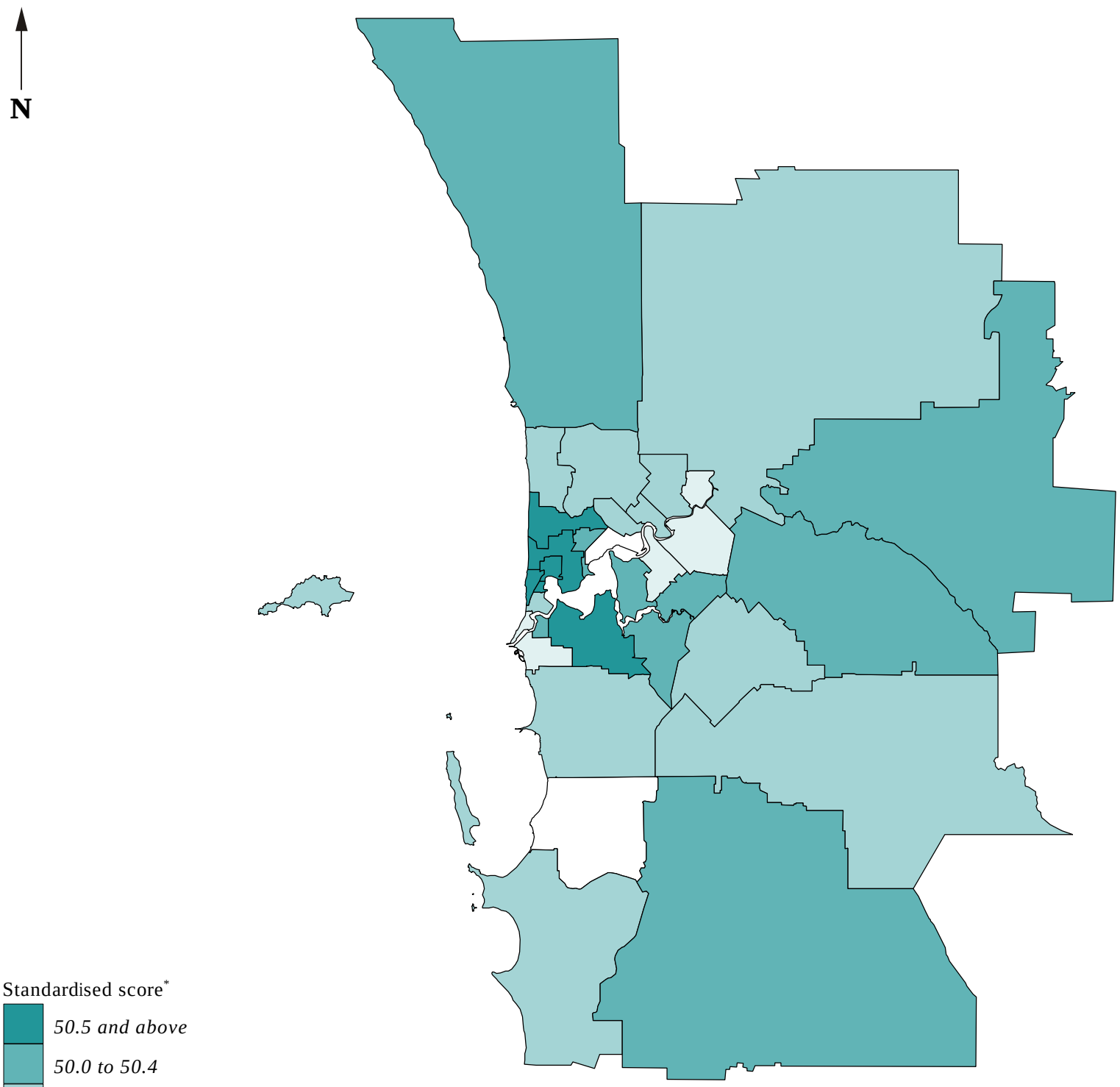
The results of the correlation analysis revealed a positive association between high PCS scores (indicating better physical health) and many of the indicators of high socioeconomic status. The strongest of these were with the variables for high income families (0.89) and managers and administrators, and professionals (0.76). There were also inverse correlations of substantial significance with the variables for low income families (-0.93), unemployed people (-0.89), unskilled and semi-skilled workers and dwellings rented from the State housing authority (both -0.77), and early school leavers and the Indigenous population (both -0.76).

The correlation of substantial significance with the IRSD (0.93) supports the existence of an association at the SLA level between low Physical Component Summary scores and socioeconomic disadvantage.

There were also inverse correlations of meaningful significance with the variable for deaths of males aged from 15 to 64 years (-0.63) and years of potential life lost (the summary measure of premature death, of -0.61).

Map 5.3
Physical Component Summary, SF-36, Perth, 1995

mean Physical Component Summary (PCS) score* in each Statistical Local Area



Standardised score*

- *50.5 and above*
- *50.0 to 50.4*
- *49.5 to 49.9*
- *49.0 to 49.4*
- *below 49.0*

**The PCS has been age-sex standardised, based on WA totals*

Source: Calculated on data from ABS 1996 Census

Details of map boundaries are in Appendix 1.2

National Social Health Atlas Project, 1999

Physical Component Summary, SF-36, 1995

State/Territory comparison

The Physical Component Summary (PCS) is expressed as a mean score, with higher scores indicating better physical health. Details of variations in the PCS score by selected population characteristics are given on the previous page.

The scores in the non-metropolitan areas are all either the same as, or lower than, those in the capital cities (**Table 5.7**). The lowest PCS score was in the Northern Territory (a score of 49.3) and the highest in Victoria (50.2).

Table 5.7: Physical Component Summary, capital cities, 1995
Standardised score

	NSW	Vic	Qld	SA	WA	Tas	NT	ACT	Total
Capital city	49.8	50.2	49.8	49.4	49.7	49.9	49.5	50.1[1]	49.9
Other major urban centres[2]	49.5	49.9	49.7	..	..	..	..	..	49.6
Rest of State/Territory	49.6	50.2	49.7	49.4	49.7	49.6	49.3	–[3]	49.7
Whole of State/Territory	49.7	50.2	49.7	49.4	49.7	49.8	49.4	50.1	49.8

[1]Includes Queanbeyan (C)
[2]Includes Newcastle and Wollongong (NSW); Geelong (Vic); and Gold Coast-Tweed Heads and Townsville-Thuringowa (Qld)
[3] Data included with ACT total
Source: See *Data sources*, Appendix 1.3

Rest of State (Western Australia as the standard)

The PCS score estimated for the population in the non-metropolitan areas of Western Australia was 50.0, as expected from the State rates.

As can be seen from **Map 5.4**, SLAs with the highest scores (indicating better physical health) were distributed widely throughout the wheat belt and south-west regions, as well as in SLAs characterised by mining development.

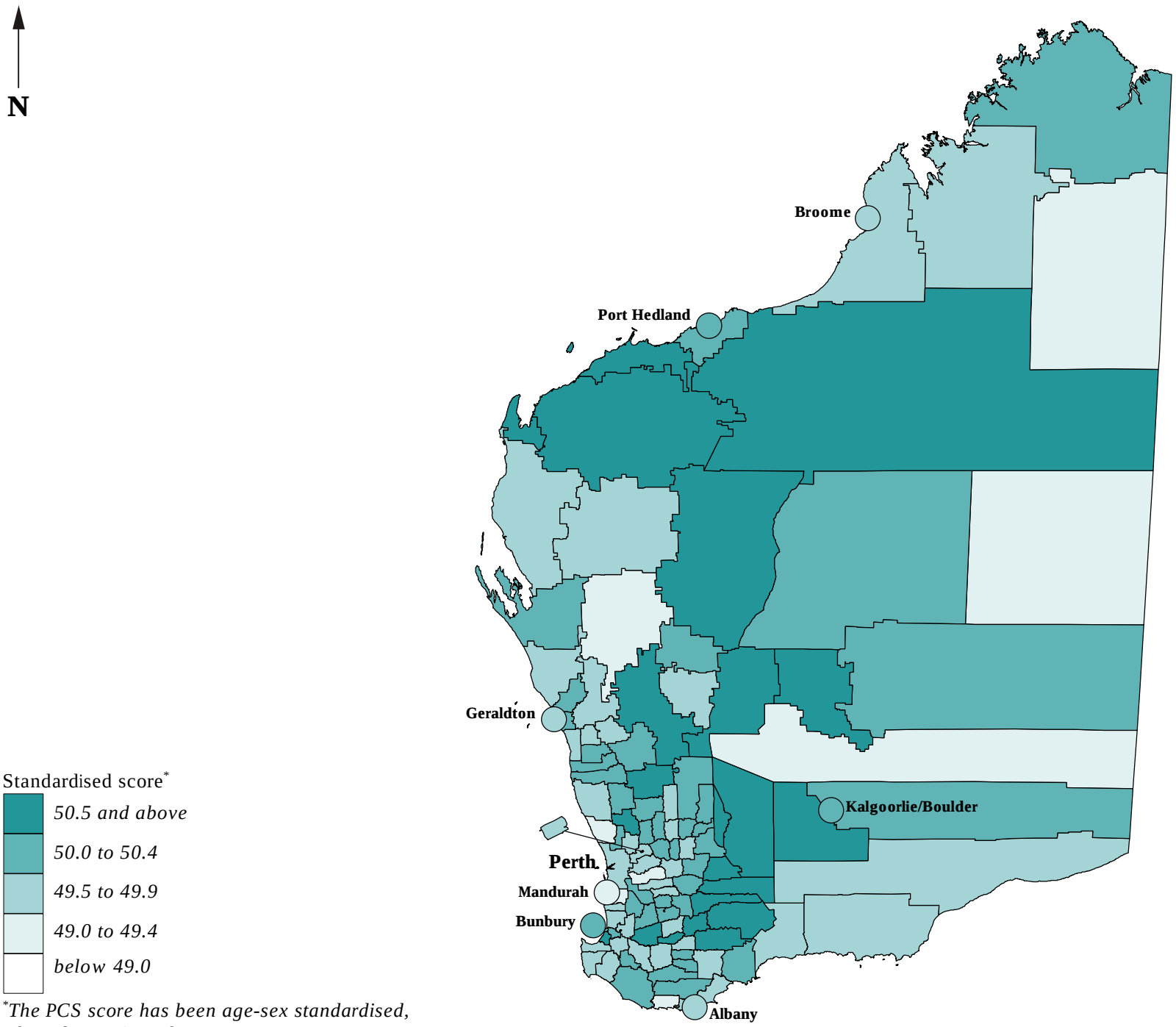
Three SLAs had a PCS score of 51.0 or higher: Sandstone and Ashburton (both with a PCS score of 51.2) and Leonora (51.0). Relatively high scores of 50.8 were estimated for the population in each of West Arthur, Kent, Lake Grace, Coolgardie and Westonia, and of 50.7 in East Pilbara, Yilgarn and Dumbleyung. A further 16 SLAs (14.2 per cent of all SLAs) had scores of just below this level.

SLAs with the lowest scores were also widely distributed throughout the State, but with a higher incidence in the more remote regions than was the case with the higher scores. The lowest score, a PCS score of 49.2, was shared by two contrasting SLAs, being the inner remote Ngaanyatjarraku, and coastal Mandurah. Interestingly, the process of age-sex standardisation slightly increased the score for Mandurah (with its older population profile) and reduced it for Ngaanyatjarraku. The PCS score in Murray was 49.3, while Halls Creek and Beverley both recorded scores of 49.4. Nine SLAs had an estimated PCS score of 49.5; they were Ravensthorpe, York, the town of Albany, Carnarvon, Irwin, Gingin, Denmark, Menzies and Murchison.

There was a correlation of meaningful significance with the variable for managers and administrators (0.54) and inverse correlations of meaningful significance with the variables for low income families (-0.69) and unemployed people (-0.52). These results, together with the inverse correlation with the IRSD (0.44), suggest the existence of an association at the SLA level between high Physical Component Summary scores and high socioeconomic status.

Map 5.4
Physical Component Summary, SF-36, Western Australia, 1995

mean Physical Component Summary (PCS) score* in each Statistical Local Area

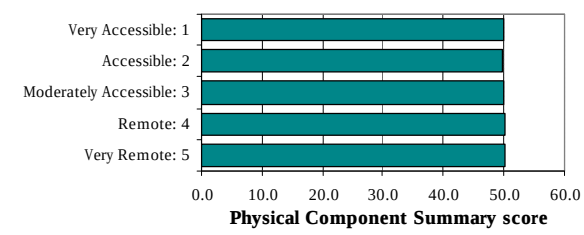


*The PCS score has been age-sex standardised, based on WA totals

Source: See Data sources, Appendix 1.3

Details of map boundaries are in Appendix 1.2

Accessibility/Remoteness Index of Australia



There is virtually no difference in Physical Component Summary (PCS) scores across the ARIA categories. The highest scores are in the Very Remote and Remote categories (with PCS scores of 50.3 and 50.1, respectively), with the lowest in the Accessible and Very Accessible categories (49.8 and 49.9, respectively).

Source: Calculated on ARIA classification, DHAC

Estimated number of people with a handicap, 1993

Capital city comparison (Australia as the Standard)

The estimates presented below do not include people living in institutional accommodation but do include those living more independently in, for example, community or group housing.

Age-sex Standardised Ratios (SRs) calculated from the 1993 Survey of Disability and Ageing of the estimated number of people with a handicap ranged from 14 per cent lower than expected (in relation to the Australian rates) in **Sydney** (86**) 13 8 per cent lower in **Darwin** (87**), to 11 per cent higher in **Perth** (111**). The ratios cover a wider range than those calculated from the 1988 Survey (**Table 5.8**). Most other capital cities had SRs in 1993 which were close to the level expected from the Australian rates.

Table 5.8: Estimated number of people with a handicap, capital cities
Standardised ratios

	Sydney	Melbourne	Brisbane	Adelaide	Perth	Hobart	Darwin	Canberra[1]	All capitals
1993	**86****	**100**	**102****	**110****	**111****	**102****	**87****	**97****	**98****
1988	**97****	**100**	**93****	**101****	**104****	**..**	**..**	**..**	**98****

[1]Includes Queanbeyan (C)
Source: See *Data sources*, Appendix 1.3
Statistical significance: * significance at 5 per cent; ** significance at 1 per cent

The regional distribution of people with a disability (and who are handicapped by that disability) is likely to be affected by a number of factors associated with their disability, in addition to any association between a higher prevalence of disability and poorer socioeconomic status. Such factors include the location of dedicated therapeutic, educational and employment facilities, as well as the location of accommodation, both group or community housing and institutional accommodation. For example, people who have moved out of institutional accommodation into group or private housing often remain close to the institution in which they previously lived. This may reflect a choice to remain near to available services eg. day centre, education or employment services (which may be located with or near to the institution), or because group housing has been provided in the local area.

Another important influence is likely to be that people may have chosen to live in an area in which such therapeutic and educational services are available. While this may have been a more important influence in the past, when transport to these services was less readily available than it is now, such historical influences can remain for many years.

Perth (Western Australia as the Standard)

There were an estimated 162,299 people with a handicap in **Perth** in 1993, marginally fewer than expected from the State rates (an SR of 99**).

Almost two thirds of the SLAs in **Perth** had standardised ratios in the middle range mapped (**Map 5.5**), within 5 per cent of the level expected from the State rates. Three SLAs had ratios in the highest range mapped. These were in Kwinana (an SR of 117**), situated south of the Swan River; and in Stirling: South-Eastern (111**) and Bassendean (110**), located to the east of the city.

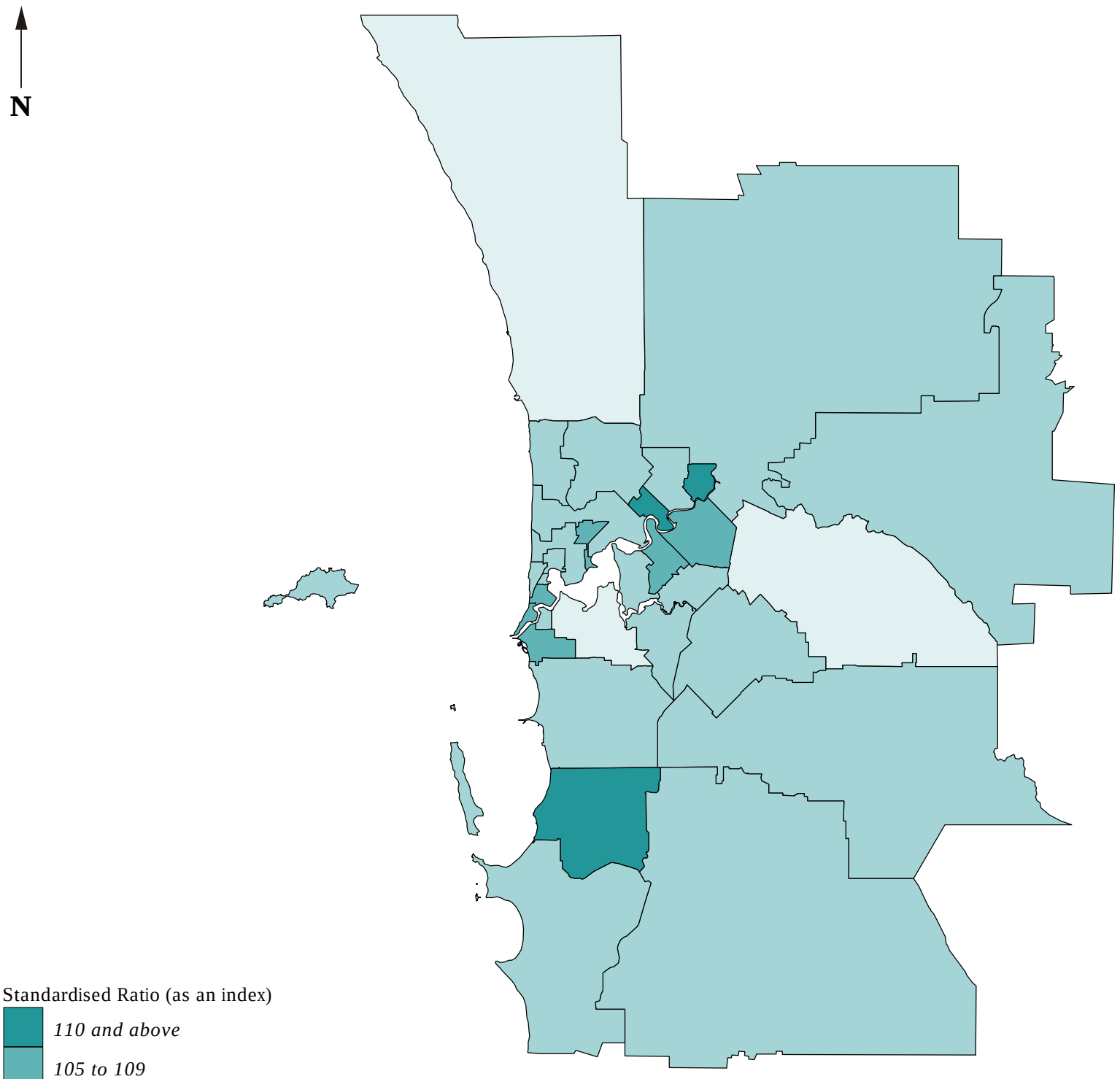
The lowest ratios, indicating fewer people with a handicap than expected from the State rates, were recorded for people in Wanneroo (with an SR of 93**), Kalamunda (93**) and Melville (94**).

The largest numbers of people with a handicap were estimated to live in Wanneroo (19,357 people), Stirling: Central (15,587) and Melville (12,476).

There were correlations of substantial significance with the variables for dwellings without a motor vehicle and unemployed people (0.73), and of meaningful significance with low income families (0.64), single parent families (0.62) and dwellings rented from the State housing authority (0.56). These results, together with the weak inverse correlation with the IRSD (-0.44), suggest the existence of an association at the SLA level between high proportions of the population with a handicap and socioeconomic disadvantage.

Map 5.5
Estimated number of people with a handicap, Perth, 1993

Standardised Ratio: number of people in each Statistical Local Area compared with the number expected*



Standardised Ratio (as an index)

- *110 and above*
- *105 to 109*
- *95 to 104*
- *90 to 94*
- *below 90*

*Expected numbers were derived by indirect age-sex standardisation, based on WA totals

Source: See Data sources, Appendix 1.3

Details of map boundaries are in Appendix 1.2

Estimated number of people with a handicap, 1993

State/Territory comparison (Australia as the Standard)

The estimates presented below do not include people living in institutional accommodation but do include those living more independently in, for example, community or group housing.

At the *Whole of State/Territory* level, standardised ratios (SRs) calculated from the 1993 Survey of Disability and Ageing of the estimated number of people with a handicap ranged from a high of 112** in Western Australia and 110** in South Australia to a low of 91** in New South Wales (**Table 5.9**). There was a similar range across the non-metropolitan areas of the remaining States and the Northern Territory.

The SRs in the *Rest of State/Territory* areas were less variable in the later period shown (when compared with those calculated from the 1988 survey), with the highest ratios occurring in Western Australia and South Australia and the lowest in the Northern Territory.

Table 5.9: Estimated number of people with a handicap, State/Territory
Standardised ratios

	NSW	Vic	Qld	SA	WA	Tas	NT	ACT	Total
1993									
Capital city	86**	100	102**	110**	111**	102**	87**	97**[1]	98**
Other major urban centres[2]	95**	131**	102**	..	..	..	..	..	101**
Rest of State/Territory	98**	106**	106**	112**	115**	105**	97*	–[3]	104**
Whole of State/Territory	91**	103**	104**	110**	112**	104**	92**	98**	100
1988									
Rest of State/Territory	98**	119**	96**	90**	99**	..	..	..	102**

[1]Includes Queanbeyan (C)
[2]Includes Newcastle and Wollongong (NSW); Geelong (Vic); and Gold Coast-Tweed Heads and Townsville-Thuringowa (Qld)
[3] Data included with ACT total
Source: See *Data sources*, Appendix 1.3
Statistical significance: * significance at 5 per cent; ** significance at 1 per cent

Rest of State

There were an estimated 57,997 people with a handicap in the non-metropolitan areas of Western Australia, two per cent more than expected from the State rates (an SR of 102**).

The SLAs with the highest estimated standardised ratios tended to be in the more remote areas of Western Australia, many of which also had high proportions of Indigenous Australians (**Map 5.6**). These included the northern-most SLAs of Halls Creek (with an SR of 127** and 375 people), Wyndham–East Kimberley (117**; 751), Broome (117**; 1,078) and Derby-West Kimberly (115**; 862). Wiluna/Ngaanyatjarraku, in central Western Australia, had 20 per cent more people with a handicap than expected from the State rates (an SR of 120**). Other SLAs in the highest range mapped included Menzies (an SR of 118), Carnarvon (114**), Wyalkatchem (112), Cue (111), Toodyay (111*), Murchinson (110) and Mandurah (110**).

Just over half (53.6 per cent) of the SLAs in the non-metropolitan areas of Western Australian had ratios within five per cent of the level expected from the State rates. Most of these SLAs were located in the southern regions of the State.

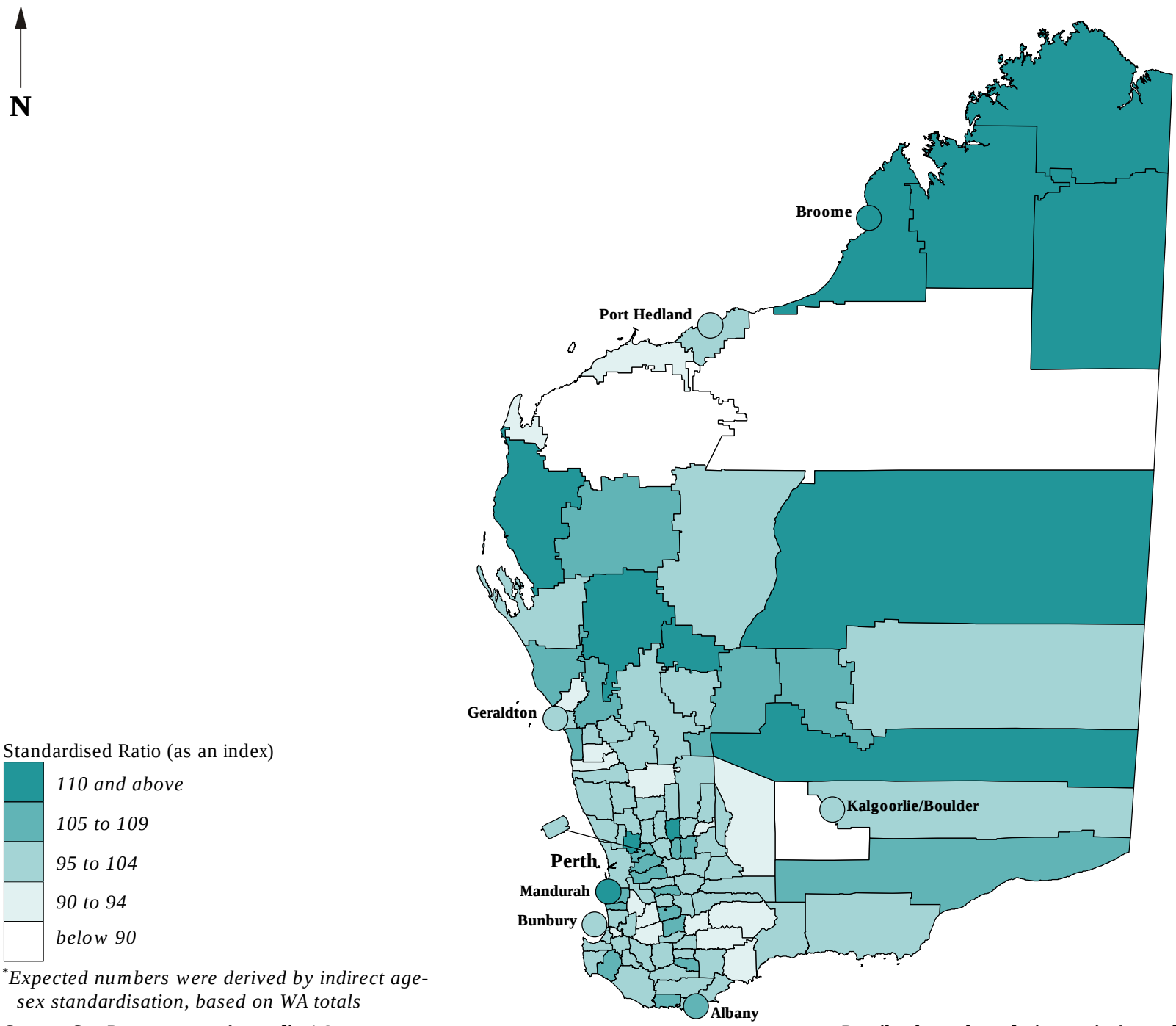
Only three SLAs in the non-metropolitan areas of Western Australia had ratios in the lowest range mapped, of 10 per cent or more lower than expected. The lowest ratio (an SR of 84**) was recorded in Ashburton, with 16 per cent fewer people with a handicap than expected. Low ratios were also recorded in Coolgardie (86** and 465 people) and East Pilbara (87**; 190 people).

The largest numbers of people with a handicap tended to live in coastal SLAs, in Mandurah (an estimated 5,121 people) and Bunbury (3,725) just south of **Perth**; and Geraldton, to the north (2,809). Further inland, Kalgoorlie/Boulder had an estimated 2,938 people with a handicap.

Correlations of meaningful significance were recorded with the variables for low income families (0.63), dwellings with no motor vehicles (0.59), single parent families (0.55) and the Indigenous population (0.54). These results, together with the inverse correlation of meaningful significance with the IRSD (-0.66), suggest the existence of an association at the SLA level between high proportions of the population with a handicap and socioeconomic disadvantage.

Map 5.6
Estimated number of people with a handicap, Western Australia, 1993

Standardised Ratio: number of people in each Statistical Local Area compared with the number expected*

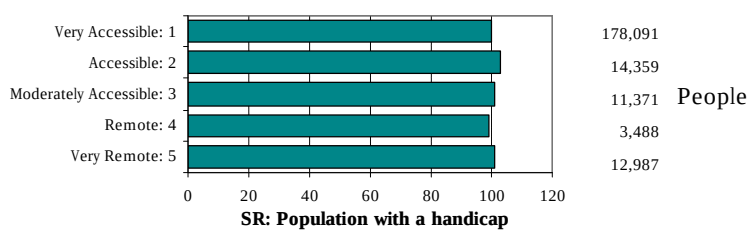


*Expected numbers were derived by indirect age-sex standardisation, based on WA totals

Source: See Data sources, Appendix 1.3

Details of map boundaries are in Appendix 1.2

Accessibility/Remoteness Index of Australia



There are only minor variations across the ARIA categories in standardised ratios (SRs) for the estimated number of people with a handicap. The range is from an SR of 103 in the Accessible category (with three per cent more people than expected from the State rates estimated as having a handicap) to an SR of 99 in the Remote areas (1.0 per cent fewer than expected). The estimated numbers of people with a handicap are similar in the Accessible, Moderately Accessible and Very Remote categories.

Source: Calculated on ARIA classification, DHAC

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Deaths

Introduction

Variations in death rates attributable to measures of equity (such as social class) are perhaps the most telling of all the indicators relevant to a social health analysis. The maps in this section include infant deaths and premature deaths of males and females, and by major cause of death. Details of years of potential life lost are also shown.

Variations in death rates by social class

Variations in death rates related to social class have been shown in a wide range of studies in overseas countries, and in some studies in Australia. The most detailed Australian work in this area is an analysis of deaths occurring in 1985, 1986 and 1987, undertaken for the National Health Strategy (1992) and published in more detail by the Australian Institute of Health and Welfare as part of their Health Monitoring Series (Mathers 1994) (**Table 5.1**). As noted above, Mathers has recently updated this work by adding the period 1995-97 (**Table 5.2**). Mathers' study is discussed in detail in Chapter 1 but shows that the differentials in mortality rates that were evident in 1985-87 have persisted over the decade. This analysis provides details of the extent of disparities in mortality rates according to the relative social disadvantage of the population, as measured by the ABS SEIFA Index of Relative Socio-Economic Disadvantage.

Both the NSW and Victorian governments have also recently released health reports that examine socioeconomic variations in death rates in some detail (NSW Health Department 1997; Department of Human Services Victoria, in press). In NSW over the period 1990 to 1994, premature deaths from all causes were inversely related (-0.59) to high socioeconomic status. Moreover, four out of the five areas with the highest mortality rates and the lowest socioeconomic status also had the highest percentage of Indigenous people. In Victoria in 1996, socioeconomic status was also found to be correlated with premature death, with socioeconomic disadvantage explaining 36 per cent of the variance in life expectancy of males and 30 per cent of the variance in females.

Changes in numbers and rates, 1986 to 1995

Australia

As Australia's population continues to grow and age, the number of deaths each year is expected to increase over the next several decades (AIHW 1998). Over the nine year period from 1986 to 1995 the number of deaths in Australia increased by 8.8 per cent, rising from 114,981 deaths in 1986 to 125,133 deaths in 1995. However, this trend was a reflection of the increased number of deaths experienced among people aged 65 years and over, which rose by 17.6 per cent over this period. In line with increasing life expectancy in Australia, the number of deaths declined in all other age groups. The most substantial decline was for infants (those aged under 12 months), for whom the number of deaths decreased by 32.7 per cent, from 2,154 deaths in 1986 to 1,449 deaths in 1995. This is largely due to a decline in deaths attributed to sudden infant death syndrome, which declined from 2.2 deaths per 1,000 live births in 1987 to 0.8 per 1,000 live births in 1996 (AHIW 1998). Deaths recorded for 15 to 64 year olds in Australia also declined, from 29,892 to 26,532 over this nine year period, a decrease of 11.2 per cent.

Death rates have declined over this nine year period for all ages and in the age groups under 12 months (deaths per 1,000 live births), 15 to 64 years and 65 years and over.

Western Australia

The number of deaths in Western Australia over the nine year period from 1986 to 1995 increased by 11.4 per cent, rising from 9,307 in 1986 to 10,364 in 1995. Male deaths increased by 7.0 per cent, while a more substantial increase of 17.0 per cent was recorded for female deaths. Although there has been an overall increase in the number of deaths, this increase was evident only for people aged 65 years and over (an increase of 20.2 per cent). In 1995, there were 129 infant deaths (79 males and 50 females) recorded in Western Australia, a decrease of 39.4 per cent since 1986. There was also a decrease in the number of deaths of people aged from 15 to 64 years, down by 6.4 per cent, from 2,469 deaths in 1986 to 2,311 deaths in 1995.

Death rates have declined for all ages and in the age groups under 12 months, 15 to 64 years and 65 years and over.

Changes in death rates by cause, 1986 to 1995

Australia

Over the period from 1986 to 1995, death rates of people aged from 15 to 64 years have declined for all major causes of death, with the largest decline occurring for deaths from circulatory system diseases, a decrease of 43.1 per cent (**Figure 5.1**). Other large decreases were recorded for deaths from respiratory system diseases (28.3 per cent); accidents, poisonings and violence (16.7 per cent); and cancer (13.1 per cent).

Western Australia

In Western Australia, death rates of people aged from 15 to 64 years have declined for all major causes of deaths, with the largest decline recorded for deaths from circulatory system diseases, a decrease of 42.3 per cent (**Figure 5.2**). Other large decreases were recorded for deaths from respiratory system diseases (31.2 per cent); cancer (19.5 per cent); and accidents, poisonings and violence (4.7 per cent).

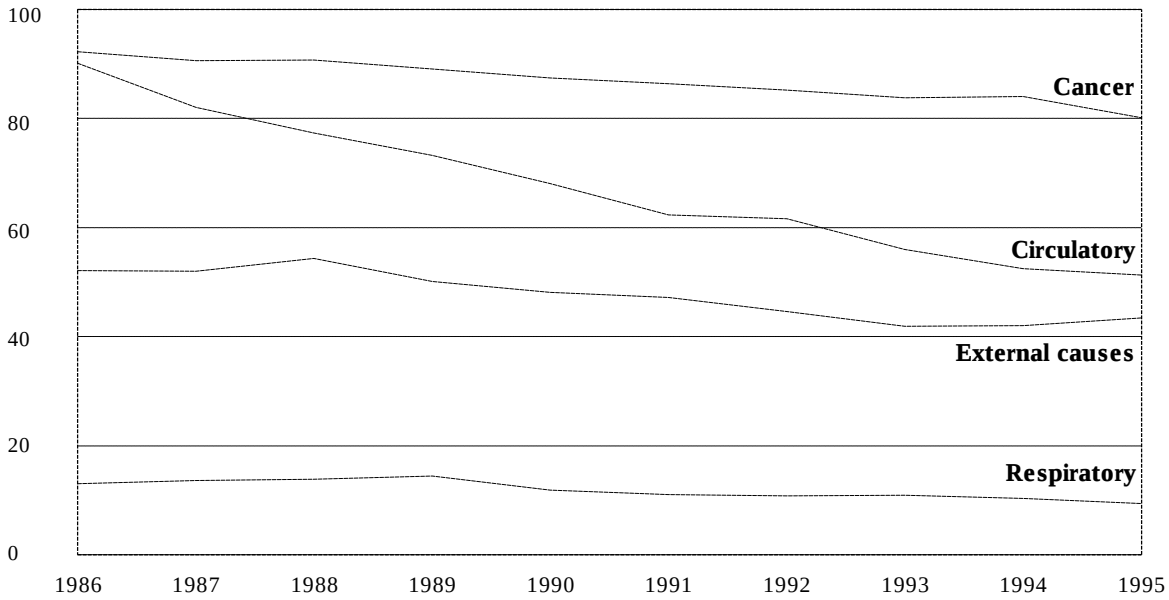
Changes in death rates by age group and sex, 1986 to 1995

Australia

Overall, premature death rates (ie. deaths of people aged from 15 to 64 years) declined at a greater rate for males (22.0 per cent fewer male deaths) than females (20.2 per cent fewer) over the years from 1986 to 1995. Male death rates from malignant neoplasms declined by 14.1 per cent over this nine year period, whereas female deaths from the same cause decreased by 11.7 per cent.

Figure 5.1: Death rates of people aged from 15 to 64 years, by cause, Australia

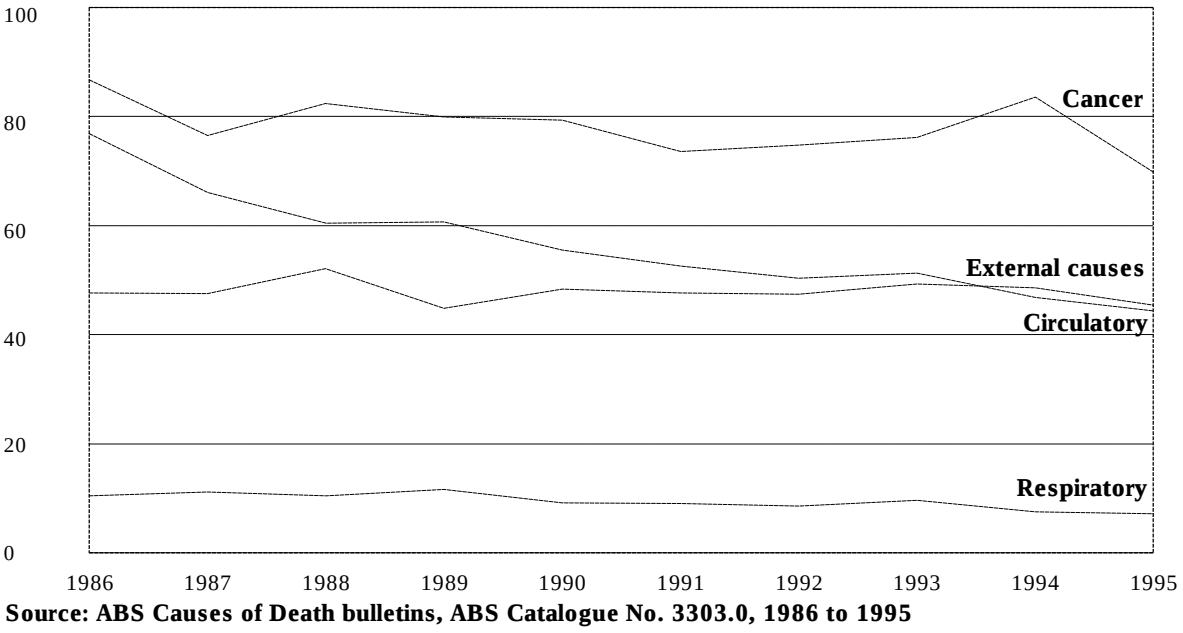
Deaths per 100,000



Source: ABS Causes of Death bulletins, ABS Catalogue No. 3303.0, 1986 to 1995

Figure 5.2: Death rates of people aged from 15 to 64 years, by cause, Western Australia

Deaths per 100,000



Source: ABS Causes of Death bulletins, ABS Catalogue No. 3303.0, 1986 to 1995

Death rates of males and females from accidents, poisonings and violence were similar, with male deaths down by 16.4 per cent and females by 16.6 per cent over the years studied. Female death rates for circulatory system diseases declined at a greater than for males, with decreases of 46.1 per cent and 41.7 per cent, respectively.

The biggest differential in the rates of change recorded for males and females occurred for deaths due to diseases of the respiratory system. Between 1986 and 1995, death rates among 15 to 64 year olds from these diseases declined by 34.9 per cent for males. In contrast, female death rates over this same time period declined less substantially, from 9.5 deaths per 100,000 population in 1986 to 8.0 in 1995, a decrease of 16.4 per cent.

Western Australia

In Western Australia, premature death rates of males declined at a greater rate (23.4 per cent) than for females (18.0 per cent). Male death rates from malignant neoplasms declined by 25.5 per cent, while female death rates from this cause declined by 11.7 per cent, and male death rates from respiratory system diseases declined by 37.6 per cent compared with 13.9 per cent for females. Death rates recorded for diseases of the circulatory system over this nine year period showed a reverse in this pattern. Between 1986 and 1995, female deaths from diseases of the circulatory system decreased at a rate of 47.9 per cent, while male deaths decreased by a marginally lower rate of 40.1 per cent. Male death rates from the combined causes of accidents, poisonings and violence decreased at a rate of 6.7 per cent, while female deaths from these causes increased by 4.3 per cent.

Data mapped

Age range

There are two main reasons for basing the analysis on the death rates of the 15 to 64 year age group: these are outlined below.

The population aged from 15 to 64 years can be considered to be of 'working' age, and examined as a group. Although in recent years the lower age of the 'working' age population has been set at 20 years in some analyses, fifteen years of age has been retained here mainly for consistency with the first edition. Note however, that participation of 15 to 19 year olds in the labour force has declined over the ten years from 1986 to 1996, from 52.9 per cent to 47.0 per cent for males, and from 55.5 per cent to 47.7 per cent for females.

The exclusion of deaths of persons aged 65 years or more (which account for three quarters of all deaths) is important not only because of the focus on prematurity. A significant proportion of people aged 65 years and over die while residents of nursing homes and other aged care facilities. Aged care facilities are unlikely to be located in the same area as the person's previous (domestic) home and are over-represented in capital cities compared with the non-metropolitan areas. Their inclusion would increase the rates for those SLAs in which nursing homes are largely concentrated and reduce the rates in other areas, thereby distorting the analysis. The concern is that deaths of people resident in aged care facilities may influence the rate for that SLA, when it is not necessarily the area, in terms of its socioeconomic profile, in which they would have lived throughout much of their life.

Residents of some nursing homes and other types of supported accommodation (such as hostels, boarding houses and shelters used by people with psychiatric conditions and community houses for those with an intellectual disability) are more likely than the population in general to die at ages below 65 years.

Since the mid-1980s (the period on which the analysis in the first edition of the atlas was based) the number of deaths occurring at ages from 15 to 64 years has declined, and the age of people dying in nursing homes has increased. It would have been possible, therefore, to increase the age range in this analysis to include deaths between the ages of 65 and 74 years (thereby increasing the number of cases and strengthening the analysis at the SLA level). To do so would, however, have reduced the possibility of comparison with the analysis in the first edition. On balance, it was considered to be more important to retain comparability than to boost the numbers.

Measure mapped

Age-sex standardised ratios (Standardised Death Ratios, SDRs) have been calculated and mapped for a range of causes of death, by place of usual residence, to illustrate the extent of variation in death rates between the populations in the areas mapped. A brief description of the technique of standardisation, its purposes, and method of calculation is in Appendix 1.3. For infant deaths, the more traditional infant death rate (infant deaths per 1,000 live births) has been mapped.

Readers should be aware that two standards have been used in this atlas. Standardised ratios calculated for the States, Territories, capital cities and other major urban centres have the Australian rates as the standard. Those ratios calculated for Statistical Local Areas are based on the rates applicable to the relevant State or Territory.

Thus, the text describing the variables refers to two standards: the discussion in the 'Capital city comparison' and 'State/Territory comparison' sections has Australia as the standard (as do the tables in this section), whereas the discussion describing 'Perth' or 'Rest of State' has Western Australia as the standard. In this way the capital cities, States, etc, can be compared to each other against the Australian rates, and the smaller area data within each State and Territory can be compared with each other against the State/Territory rates.

Variables mapped

Only a selection of the total number of causes of death of the population aged from 15 to 64 years has been mapped. These include deaths from all causes (separately for females and males) and from four major cause groups – deaths from diseases of the circulatory system, diseases of the respiratory system, from all cancers (and separately for deaths from lung cancer) and from the external causes of accidents, poisonings and violence. **Table 5.10** shows the number of deaths for the age groups and causes for which data were analysed and mapped.

Infant deaths are analysed separately as they are recognised internationally as a group with historically high mortality rates, and rates with marked socioeconomic differentials. The four cause of death groups mapped were chosen because they represent a large proportion of the deaths in the 15 to 64 year age group (85.7 per cent, compared to 87.4 per cent in the mid-1980s). They are also predominant among the causes for which persons of lower socioeconomic status have been shown to have higher death rates than those of higher socioeconomic status.

Table 5.10: Deaths by cause and age, Western Australia, 1992 to 1995

Age at death	Cancers	Circulatory system diseases	Respiratory system diseases	Accidents, poisonings & violence	All other causes	Total deaths
Infant (under 1 year)	**4**	**6**	**30**	**19**	**531**	**590**
15 to 64 years	**3,472**	**2,172**	**371**	**2,142**	**1,316**	**9,473**
males	1,856	1,629	249	1,659	855	6,248
females	1,616	543	122	483	461	3,225
Other ages	**7,821**	**14,716**	**2,679**	**696**	**4,759**	**30,671**
All ages	**11,297**	**16,894**	**3,080**	**2,857**	**6,606**	**40,734**

Source: ABS Causes of Death bulletins, 1992 to 1995

Importantly, they provide a sufficient number of deaths (by aggregating four years of data, from 1992 to 1995) to be analysed at the SLA level for presentation in the State and Territory atlases. Some other important causes of death which are of public concern (eg. deaths from suicide) and/or are important causes of death among the most disadvantaged in the population (eg. deaths from mental disorders) have insufficient numbers for the production of meaningful statistics for most areas at the local level. As the combined causes of accidents, poisonings and violence (which include suicides) are the major cause of death for young people, deaths from these causes have been mapped separately for the 15 to 24 year age group. A separate discussion on deaths from suicides is on page 130.

Table 5.11 shows the number of deaths for the causes mapped for **Perth** (the Perth Statistical Division) and the *Rest of the State* (the remainder of Western Australia).

Table 5.11: Deaths by selected cause and area, Western Australia, 1992 to 1995

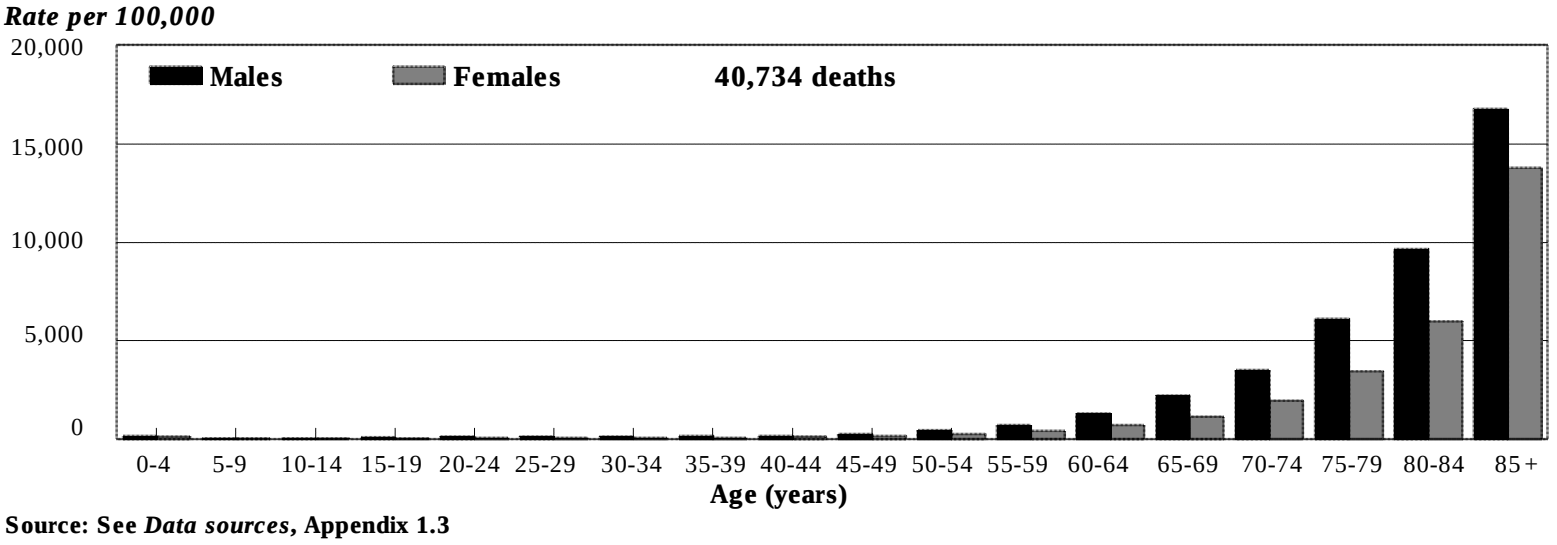
Cause of death	Perth	Rest of State	Total
Infant: all causes	**370**	**220**	**590**
15 to 64 years	**6,473**	**3,000**	**9,473**
Cancers	2,575	897	3,472
Circulatory system diseases	1,448	724	2,172
Respiratory system diseases	211	160	371
Accidents, poisonings & violence	1,346	796	2,142
15 to 24 years	**514**	**295**	**809**
Accidents, poisonings & violence	376	241	617
All ages	**30,138**	**10,596**	**40,734**

Source: See *Data sources*, Appendix 1.3

Figures 5.3 to **5.7** give a graphical presentation of death rates in Western Australia by age and sex for each of the major causes analysed (apart from infant deaths). Please note that the scales for the rates per 100,000 are different for each figure.

Figure 5.3 highlights both the steeply rising death rates from age 50 years for males and from age 60 years for females, as well as the predominance of male deaths across all the age groups.

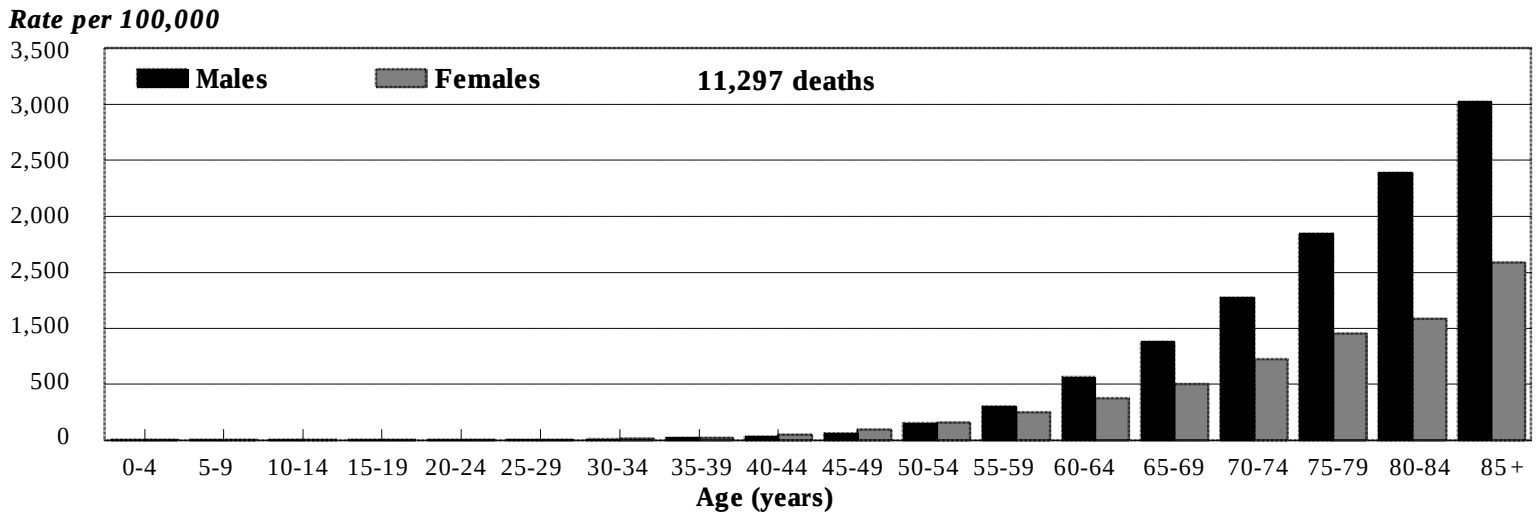
Figure 5.3:Deaths from all causes, by age and sex, Western Australia, 1992 to 1995



Source: See *Data sources*, Appendix 1.3

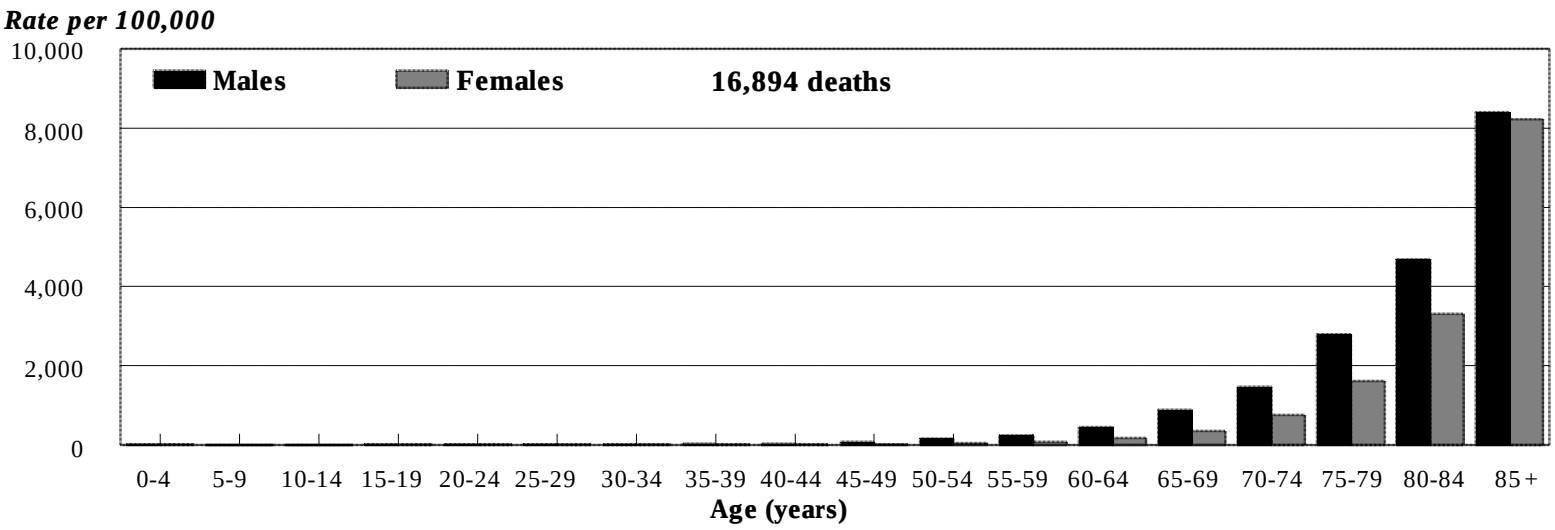
Figure 5.4 shows the predominance of males in deaths from cancer, whereas in **Figure 5.5** the similar pattern for deaths from circulatory system diseases is broken in the 85 years and over age group, where female death rates closely approximate those of males. Death rates from respiratory system diseases (**Figure 5.6**) reflect the 'all causes' pattern.

Figure 5.4: Deaths from cancer, by age and sex, Western Australia, 1992 to 1995



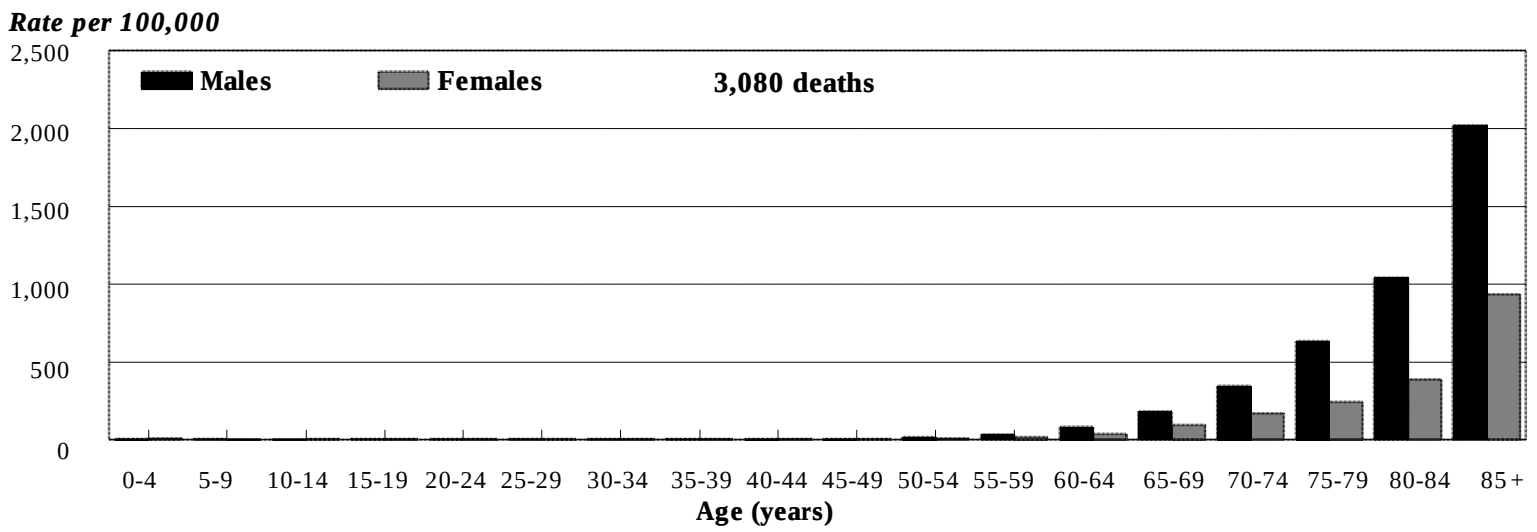
Source: See *Data sources*, Appendix 1.3

Figure 5.5: Deaths from circulatory system diseases, by age and sex, Western Australia, 1992 to 1995



Source: See *Data sources*, Appendix 1.3

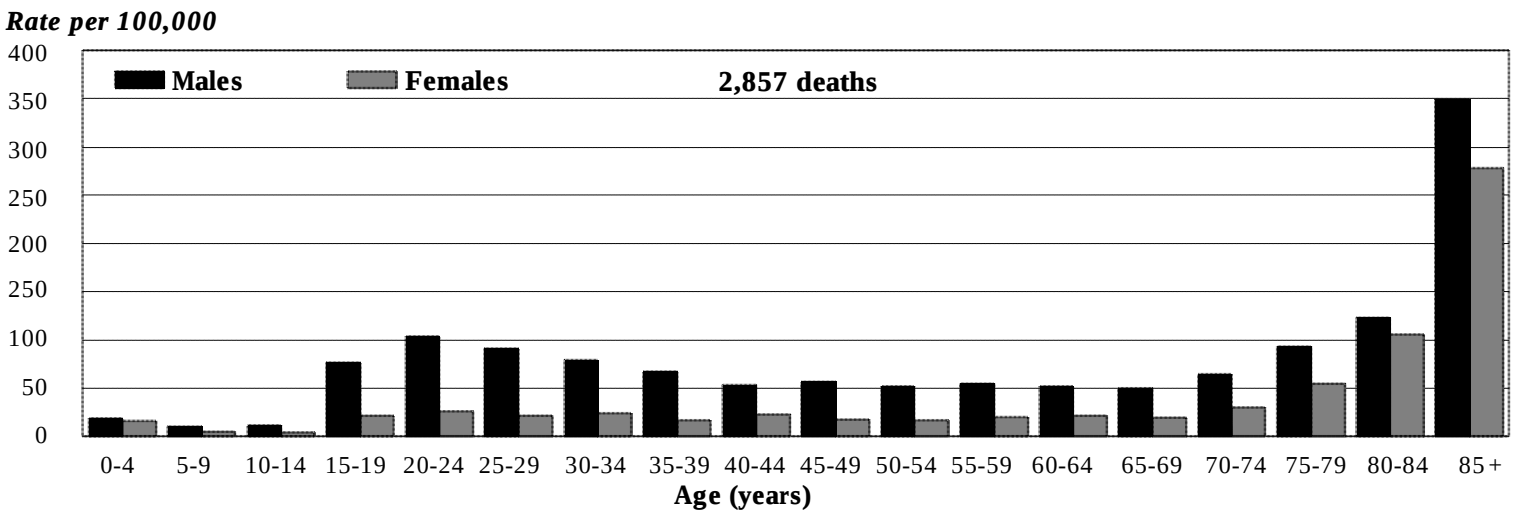
Figure 5.6: Deaths from respiratory system diseases, by age and sex, Western Australia, 1992 to 1995



Source: See *Data sources*, Appendix 1.3

Deaths from the external causes of accidents, poisonings and violence (**Figure 5.7**) occur at earlier ages than is the case for other causes, and occur across all age groups. Again, males predominate across the age groups, with peaks at younger ages (from 15 to 29 years, where motor vehicle accidents and suicides are major causes), in middle age (50 to 59) and in the oldest age group shown (85 years and over).

Figure 5.7: Deaths from accidents, poisonings and violence diseases, by age and sex, Western Australia, 1992 to 1995



Source: See *Data sources*, Appendix 1.3

Deaths from suicide

Taylor et al. (1998) found that risks for suicide increased significantly with decreasing socioeconomic status in males, but not in females. An even stronger relationship existed when suicide rates were controlled for country of birth. When adjusted for age and country of birth, suicide rates were 66 per cent higher in the lowest socioeconomic status quintile compared to the highest quintile and 39 per cent higher in the 15 to 24 year age group (youth suicide). These findings suggest that socioeconomic status plays an important role in male suicide rates among Australians and residents from non-English speaking countries, and among young people.

Despite suicide being an important cause of death, in particular amongst young people[5], it has not been mapped in this chapter. As the number of recorded suicides is quite low at the SLA level there is a possibility that mapping them will lead to misinterpretation of results. The following is an overview of the deaths recorded for suicides over the period from 1986 to 1995 for Western Australia as a whole, as well as separately for **Perth** and the *Rest of the State*.

In Australia, deaths are classified as self-inflicted by the coroner or a Government Medical Officer upon consideration of the evidence, but it is likely that the number of suicides is under-reported. A death intended as suicide may appear as the result of an unrelated cause, ie. a motor vehicle accident, and thus is not recorded as such by the coroner. For example, young male residents of country areas are over represented in single vehicle accidents.

There were 2,052 deaths of all ages from suicide in Western Australia over the nine year period from 1986 to 1995. Of these, 89.1 per cent (1,828) were aged from 15 to 64 years and 21.2 per cent (434) were aged from 15 to 24 years at death. Over this time period there has been a 32.9 per cent increase in the number of deaths recorded for all suicides at all ages, rising from 164 in 1986 to 218 in 1995. A similar increase was recorded among 15 to 24 year olds, where the number of suicides rose from 30 in 1986 to 53 in 1995, an increase of 76.7 per cent.

While there has been a significant recent increase in suicide in the young, Goldney and Harrison (1998) have highlighted continuing reductions in suicide rates in middle aged and older Australians over the last hundred years.

Males predominated in these deaths, accounting for 81.7 per cent of all suicides of all ages, 82.3 per cent of 15 to 64 year olds and 87.8 per cent of 15 to 24 year olds. However, research has suggested that females attempt suicide more often, but that males use more violent, and therefore more successful means, such as firearms (see box).

Attempted suicide

A study by the Health Department of Western Australia (1996) found that over the period from 1981 to 1993 attempted suicide rates were considerably higher among females than males, an age standardised rate of 162 compared to 105 per 100,000 person-years respectively. Female rates were highest in the 15 to 19 year age group (455 attempted suicides per 100,000 person-years), followed by those aged from 20 to 24 years (346 per 100,000). For males, rates were highest in the 20 to 24 year age group (273 per 100,000), with slightly lower rates among those aged 25 to 29 (228 per 100,000). Despite the overall higher rates recorded for females, over the years from 1981 to 1993 female rates declined by 2.4 per cent per year while male rates declined by only 0.2 per cent.

Numbers of suicides not only vary by age and sex, but also by place of residency. While there were more deaths from suicide of residents of **Perth** (1,501 deaths compared to 551 in the non-metropolitan areas of Western Australia over the nine years from 1986 to 1995), because it contains a higher proportion of the State's population, it is more informative to consider death rates.

[5]Suicide is also an important cause of death at older ages.

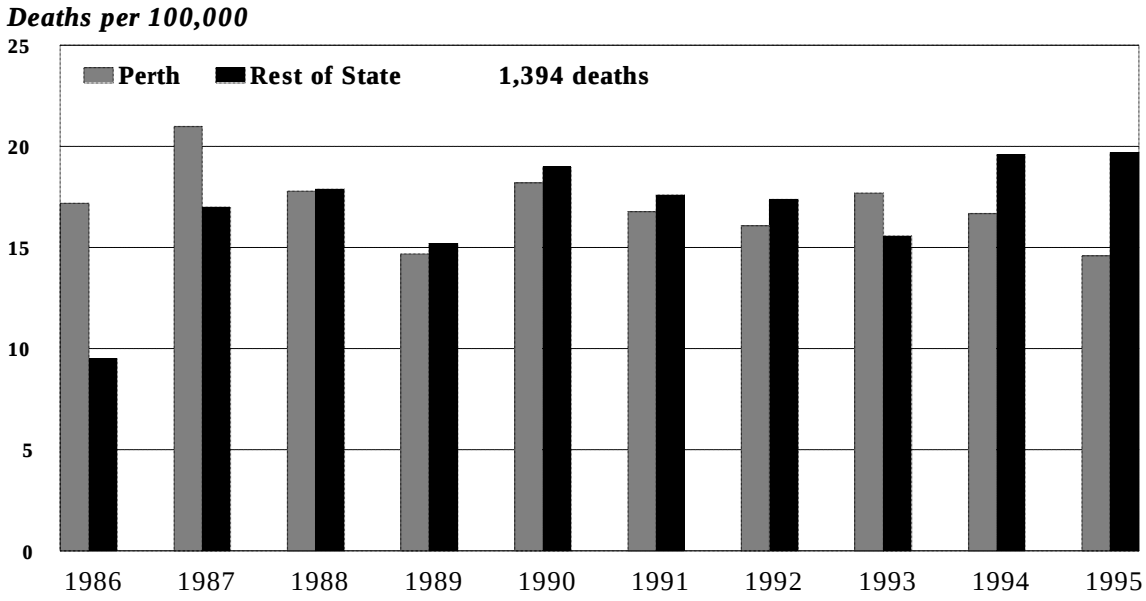
In 1995, death rates from suicide among 15 to 64 year olds were 41.2 per cent higher in the non-metropolitan areas of Western Australia than in **Perth**, a rate of 21.6 per 100,000 population compared to 15.3 per 100,000, respectively. The difference in 1995 was more substantial in the 15 to 24 year age group, with a death rate of 29.0 per 100,000 non-metropolitan residents, more than twice the rate (of 17.3) for residents of **Perth**.

In the following charts, suicide rates are shown separately for the 15 to 24 and 25 to 64 year age groups. Among the older age group (**Figure 5.8**) rates were higher for residents of **Perth** than for residents of non-metropolitan areas in the earliest years shown, with the reverse being the case over the years from 1989 to 1992 and for 1994 and 1995.

For the 15 to 24 year age group, rates were higher in country areas of Western Australia in all but 1986 and 1994 (**Figure 5.9**). There was no clear pattern in the differentials between the rates for the two age groups, although there was a trend in the later years for slightly higher rates in the younger age groups.

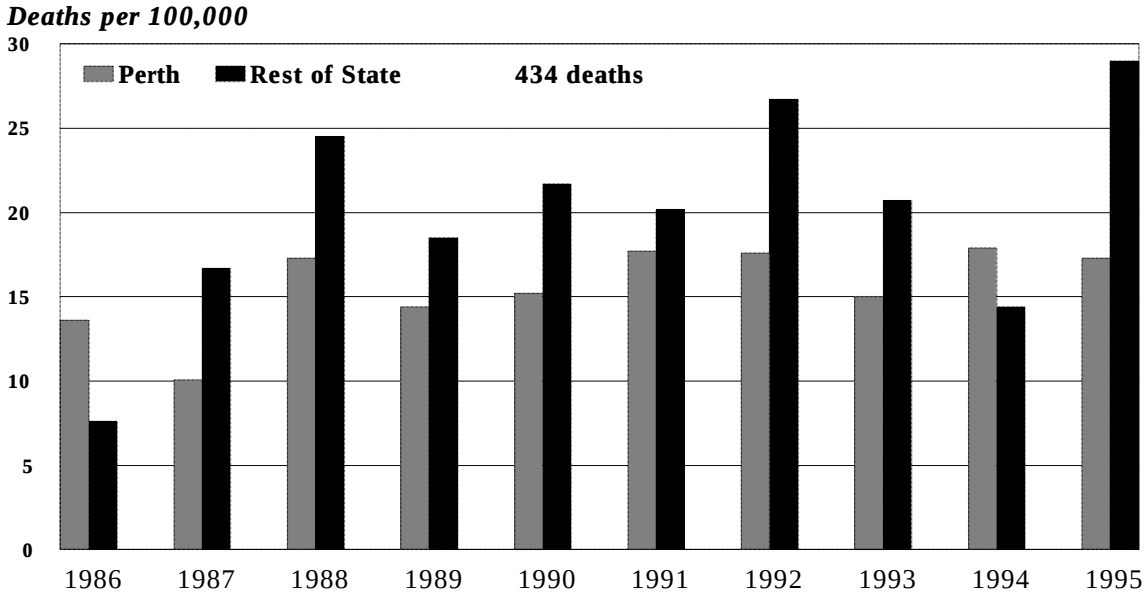
It is likely that the higher rates in country areas relate to factors such as a relative lack of job and training opportunities, the decline of many rural communities and the relatively larger numbers of Indigenous people in the population, a group which has higher suicide rates.

Figure 5.8: Suicide rates of people aged from 25 to 64 years, Perth and Rest of State



Source: Various issues, ABS Causes of Death bulletins

Figure 5.9: Suicide rates of people aged from 15 to 24 years, Perth and Rest of State



Source: Various issues, ABS Causes of Death bulletins

Infant deaths, 1992 to 1995

Capital city comparison

The infant death rate is calculated as the number of infant deaths (deaths under one year of age) per 1,000 live births. Over the years 1992 to 1995, the rate varied between the capital cities, from a high of 10.3** in **Darwin** to around half that level in a number of cities. **Hobart** had the second highest rate.

The *All capitals* infant death rate has declined by one third between the two periods for which data have been analysed (**Table 5.12**). As noted earlier (page 125), this is largely the result of the decline in deaths from sudden infant death syndrome. There were similar reductions in all of the capital cities other than **Darwin**, where the infant death rate rose, from 9.4** for the period 1985 to 1989, to 10.3** for the years 1992 to 1995. **Darwin** now has the highest infant death rate (10.3 infant deaths per 1,000 live births), followed by **Hobart** (7.5), a reversal of the ranking over the period from 1985 to 1989. All capital cities except these show significant improvements in the rate.

Table 5.12 Infant deaths, capital cities
Infant deaths per 1,000 live births

	Sydney	Melbourne	Brisbane	Adelaide	Perth	Hobart	Darwin	Canberra[1]	All capitals
1992-95	**6.1**	**5.2**	**6.7**	**5.2**	**5.3**	**7.5**	**10.3**	**5.9**	**5.8**
1985-89[2]	**9.3**	**8.2**	**8.9**	**7.5**	**8.4**	**9.5**	**9.4**	**8.3**	**8.7**

[1]Includes Queanbeyan (C)
[2]For 1985-89 the rate was calculated per 1,000 children aged under 12 months plus infant deaths: this approximates live births
Source: See *Data sources*, Appendix 1.3

Over the years from 1992 to 1995, there were 590 infant deaths of children resident in Western Australia. This represented a decline from an average of 206 to 148 infant deaths per year between the two periods analysed.

Neonatal deaths (deaths of infants aged under 28 days) accounted for 60.8 per cent of all infant deaths. Neonatal deaths result mostly from the circumstances of the birth, or from pre-natal conditions resulting in disabilities at birth. The remaining (post-neonatal) deaths are related to infections, respiratory disorders, accidents and deaths attributed to Sudden Infant Death Syndrome and other causes.

Although Aboriginal infant mortality has generally improved, rates remain high. The Australian Institute of Health and Welfare (1998) has published estimates of infant death rates in the Indigenous populations of SA, WA and NT, the only States and Territory with reliable data. In 1991-96 infant death rates were 19.2 per 1,000 live births in the Indigenous population compared to 6.1 per 1,000 in the non Indigenous population. The high rates for Aboriginal and Torres Strait Islander people are likely to influence the regional rates in areas with very high proportions of Indigenous people in the population, in particular the remote areas of Australia.

Perth[6]

There were 370 infant deaths in **Perth** over the four year period from 1992 to 1995, 5.3 infant deaths per 1,000 live births.

More than one third of SLAs were not mapped, as there were considered to be too few deaths at the SLA level from which to calculate reliable rates (**Map 5.7**).

By far the highest infant death rates were recorded in the SLAs of Subiaco and Gosnells, both with 9.8 infant deaths per 1,000 live births. Also mapped in the highest range was Kwinana, with a rate of 8.6. Relatively high rates (of above six infant deaths per 1,000 live births) were also recorded to the north-east of the city in the SLAs of Bayswater (an infant death rate of 7.7), Bassendean (7.0) and Belmont (6.0).

More than half (52.6 per cent) of the SLAs in **Perth** were mapped in the middle range, with infant deaths rates ranging from 4 to 5.9. Within this range, the highest rates were recorded in Mundaring, Stirling: Central and Cockburn, while the lowest were in Rockingham, Armadale and Swan.

The lowest rates were recorded in the eastern SLA of Kalamunda (with 2.8 infant deaths per 1,000 live births) and in the inner SLAs of Cambridge and Melville (with 3.4 and 3.6 infant deaths per 1,000 live births, respectively).

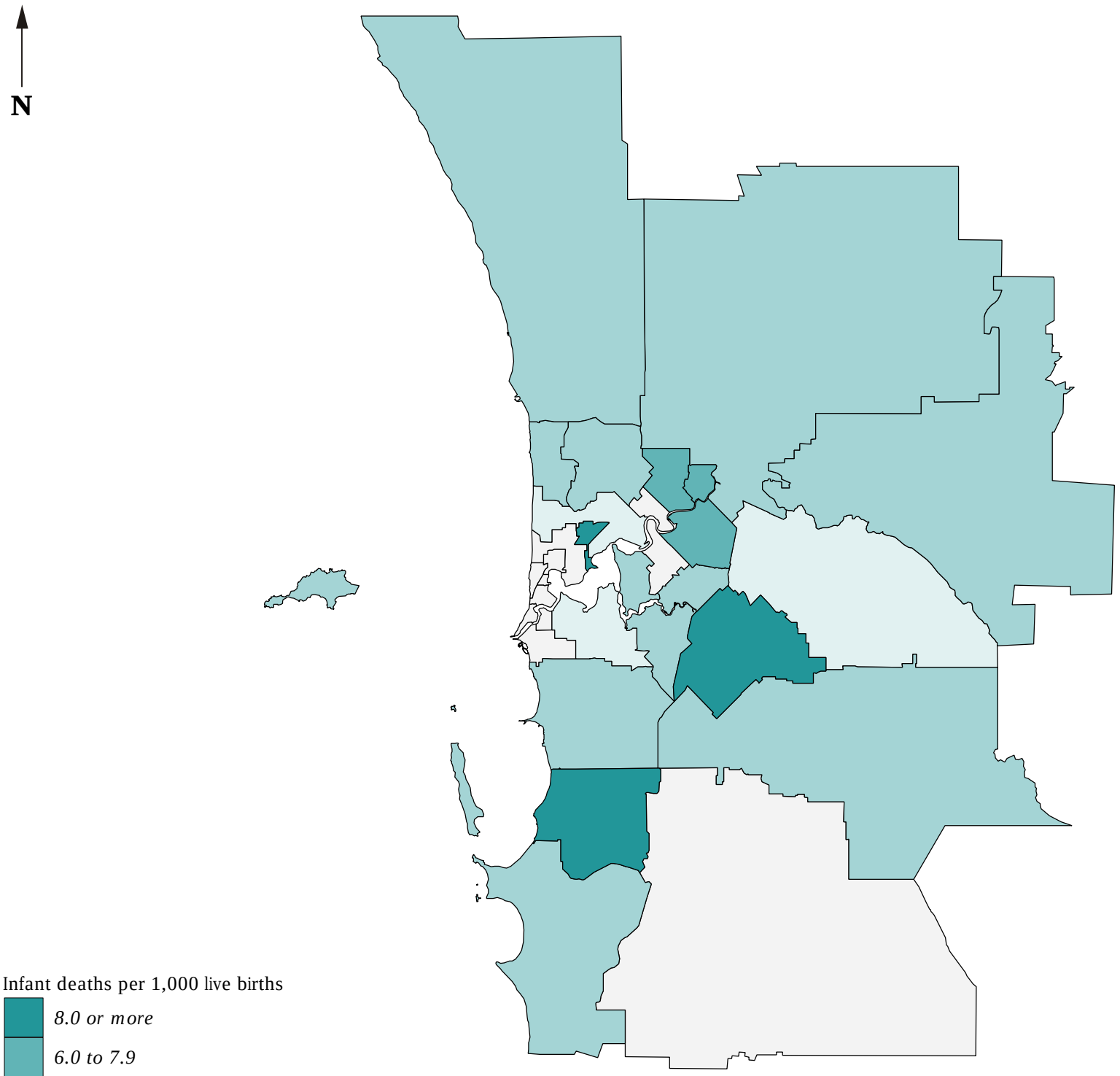
The SLAs of Wanneroo (with 66 infant deaths), Gosnells (48), Stirling: Central (33) and Cockburn (22) had the largest numbers of infant deaths over the four year period from 1992 to 1995. The eastern SLA of Swan also had 22 infant deaths.

There were weak correlations with the indicators of socioeconomic disadvantage (the strongest with the variable for early school leavers (0.42)), and weak inverse correlations with the indicators of high socioeconomic status (including with managers and administrators, and professionals (-0.49)). These results, together with the weak inverse correlation with the IRSD (-0.30), suggest the existence of an association at the SLA level between high infant death rates and socioeconomic disadvantage.

[6]As there are relatively few areas with sufficient cases to analyse for this variable in non-metropolitan Western Australia, the data has not been mapped. A summary of the main features is on page 165.

Map 5.7
Infant deaths, Perth, 1992 to 1995

infant deaths per 1,000 live births in each Statistical Local Area



Source: See Data sources, Appendix 1.3

Details of map boundaries are in Appendix 1.2

National Social Health Atlas Project, 1999

Deaths of males aged 15 to 64 years from all causes, 1992 to 1995

Capital city comparison (Australia as the standard)

Over the four years from 1992 to 1995, Standardised Death Ratios (SDRs) for males aged from 15 to 64 years ranged from 81** in **Canberra** to 143** in **Darwin**. The other capital cities (except **Hobart** with an SDR of 103) had fewer deaths than expected.

There was a higher differential (from the Australian rates) in the SDR recorded for **Darwin** in the later period shown in **Table 5.13**. The higher SDR in this later period suggests a worsening (relative to the Australian rates) in the male death ratios from all causes between the periods analysed. The differential in the ratios for **Adelaide** between these periods also suggest a deterioration, while those in **Brisbane** and **Canberra** indicate a relative improvement.

Table 5.13: Deaths of males aged 15 to 64 years from all causes, capital cities
Standardised death ratios

	Sydney	Melbourne	Brisbane	Adelaide	Perth	Hobart	Darwin	Canberra[1]	All capitals
1992-95	99	92**	94**	93**	87**	103	143**	81**	94**
1985-89	100	92**	97*	89**	87**	101	124**	82**	94**

[1]Includes Queanbeyan (C)
Source: See *Data sources*, Appendix 1.3
Statistical significance: * significance at 5 per cent; ** significance at 1 per cent

Malignant neoplasms (cancer), diseases of the circulatory system and the combined external causes of accidents, poisonings and violence were the main causes of premature death (deaths between the age of 15 to 64 years) for males over this period. There were 15,787 deaths of males in **Perth** over the period from 1992 to 1995, of which 4,194 (26.6 per cent) were of males aged from 15 to 64 years. Males most likely to die prematurely include Indigenous people; those who are homeless, or who live in sheltered accommodation or low-cost boarding houses; those earning low incomes; and those who are unemployed.

Perth (Western Australia as the standard)

There were 4,194 deaths of males aged from 15 to 64 years in **Perth**, eight per cent fewer than expected from the State rates (an SDR of 92**).

Four SLAs had SDRs for males elevated by 30 per cent or more. Of these, Stirling: South Eastern (with an SDR of 166**), Mosman Park (140*) and Victoria Park (138**) are located in the older parts of **Perth**, whilst Kwinana (with an SDR of 136**) is an industrialised SLA to the south. Belmont (128**) and Bassendean (115) also had elevated SDRs.

As **Map 5.8** shows, there is a broad sweep of SLAs with ratios lying within 15 per cent of the level expected from the State rates (the middle range mapped, comprising 12 SLAs). Generally, these areas were developed during the sixties and seventies.

SLAs with ratios of between 15 per cent and 30 per cent lower than expected are generally located adjacent to either the Swan River or the coast, and represent the higher socioeconomic status areas of **Perth**. Serpentine-Jarrahdale (S) is an exception, in location terms, but it is also characterised by a population of relatively high socioeconomic status.

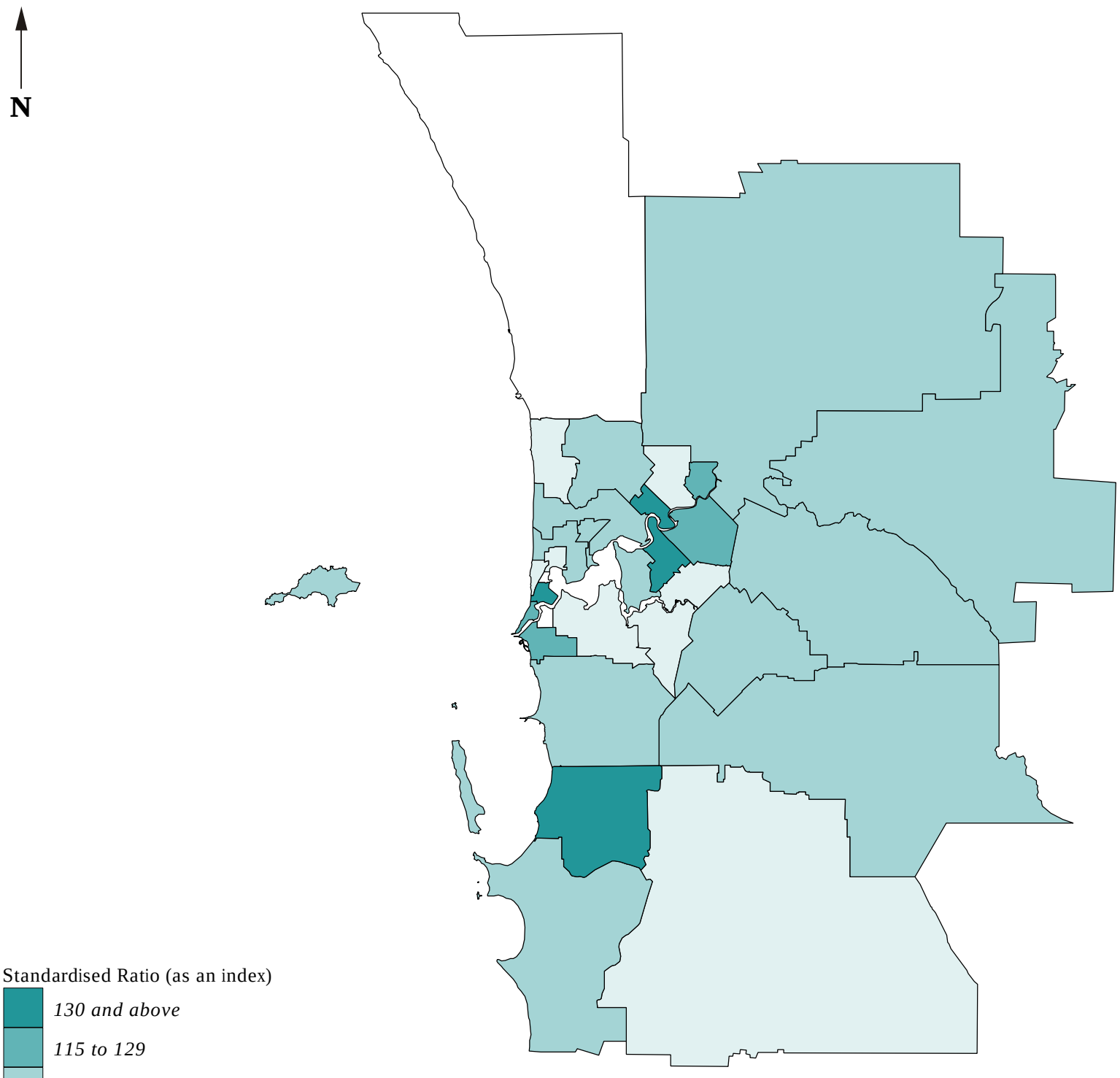
The very lowest ratios were recorded in Peppermint Grove (where there were no deaths of males at these ages, when five were expected for a population of this size and age composition), Wanneroo (with an SDR of 64**) and East Fremantle (68).

The largest numbers of deaths of males aged from15 to 64 years were in Stirling: Central (427 deaths), Wanneroo (423) and Melville (259). More than 100 premature deaths of males were recorded in 15 other SLAs in **Perth**.

There were correlations of meaningful significance with the variables for low income families (0.60), housing authority rented dwellings (0.62) and of lesser significance with the Indigenous population (0.45). An inverse correlation of meaningful significance was recorded with high income families (-0.50). These correlations, together with the inverse correlation of meaningful significance with the IRSD (-0.50), indicate the existence of an association at the SLA level between high rates of premature death of males and socioeconomic disadvantage.

Map 5.8
Deaths of males aged 15 to 64 years from all causes, Perth, 1992 to 1995

Standardised Death Ratio: number of deaths in each Statistical Local Area compared with the number expected*



Standardised Ratio (as an index)

- *130 and above*
- *115 to 129*
- *85 to 114*
- *70 to 84*
- *below 70*

*Expected numbers were derived by indirect age standardisation, based on WA totals

Source: See Data sources, Appendix 1.3

Details of map boundaries are in Appendix 1.2

Deaths of males aged 15 to 64 years from all causes, 1992 to 1995

State/Territory comparison

Standardised Death Ratios (SDRs) for males aged from 15 to 64 years over the years 1992 to 1995 were higher in the *Rest of State/Territory* areas than in the capital cities. At the *Whole of State/Territory* level, the Northern Territory (199**), Tasmania (110**) and New South Wales (104**) had more deaths than expected from the Australian rates. The Australian Capital Territory had the lowest ratio (an SDR of 78**).

Most States had similar differentials (from the Australian rates) in the SDR recorded for their non-metropolitan areas in the later period shown in **Table 5.14**. The major exceptions were Western Australia, with a higher SDR (suggesting an increase in death rates relative to the Australian experience), and the Northern Territory, with a lower SDR. While the SDR for males in the non-metropolitan areas of the Northern Territory was 7.1 per cent lower in this later period (suggesting a decline in death rates relative to the Australian experience), it continues to be substantially elevated, and more than twice the next highest ratio.

Table 5.14: Deaths of males aged 15 to 64 years from all causes, State/Territory
Standardised death ratios

	NSW	Vic	Qld	SA	WA	Tas	NT	ACT	Total
1992 to 1995									
Capital city	99	92**	94**	93**	87**	103	143**	81**[1]	94**
Other major urban centres[2]	104*	114**	96	..	..	..	..	..	102
Rest of State/Territory	113**	103*	105**	108**	112**	114**	260**	–[3]	110**
Whole of State/Territory	104**	95**	100	98	94**	110**	199**	78**	100
1985 to 1989									
Rest of State/Territory	113**	105**	110**	106**	103	109**	280**	–[3]	111**

[1]Includes Queanbeyan (C)
[2]Includes Newcastle and Wollongong (NSW); Geelong (Vic); and Gold Coast-Tweed Heads and Townsville-Thuringowa (Qld)
[3] Data included with ACT total
Source: See *Data sources*, Appendix 1.3
Statistical significance: * significance at 5 per cent; ** significance at 1 per cent

Over the four years from 1992 to 1995, the major causes of premature death for male residents of the non-metropolitan areas of Western Australia were accidents, poisonings and violence, circulatory system diseases and malignant neoplasms (cancer). There were 6,327 deaths of males resident in these non-metropolitan areas, 59.7 per cent of all deaths. Of these deaths, 2,054 were of males aged from 15 to 64 years, 32.5 per cent of all male deaths.

Rest of State

There were 2,054 deaths of males aged from 15 to 64 years resident in the non-metropolitan areas of Western Australia, 20 per cent more deaths than expected from the State rates (an SDR of 120**). This was twice the number of female deaths.

As many of the SDRs are very high, the ranges mapped (**Map 5.9**) have been changed to enhance the pattern of differentiation at the SLA level. The highest and lowest ranges have been set at 60 per cent, rather than 30 per cent as in the map for **Perth** for this variable.

Six SLAs had standardised death ratios elevated by more than twice the level expected from the State rates. Most of these SLAs were in areas with relatively large Indigenous populations. In Halls Creek (with an SDR of 473** and 38 deaths) and Wiluna-Ngaanyatjarraku (428**; 24 deaths), there were more than four times the number of male deaths expected (from the State rates) for a population of this size and age composition. The other SLAs in this category were Derby-West Kimberley (with an SDR of 319** and 74 deaths), Wyndham-East Kimberley (283**; 53), Dundas (261**; 15) and Broome (223**; 62).

SLAs with ratios elevated by between 30 per cent and 60 per cent above the level expected were scattered throughout the State, with the highest ratios in the town of Albany (with an SDR of 149**) and Carnarvon (146*).

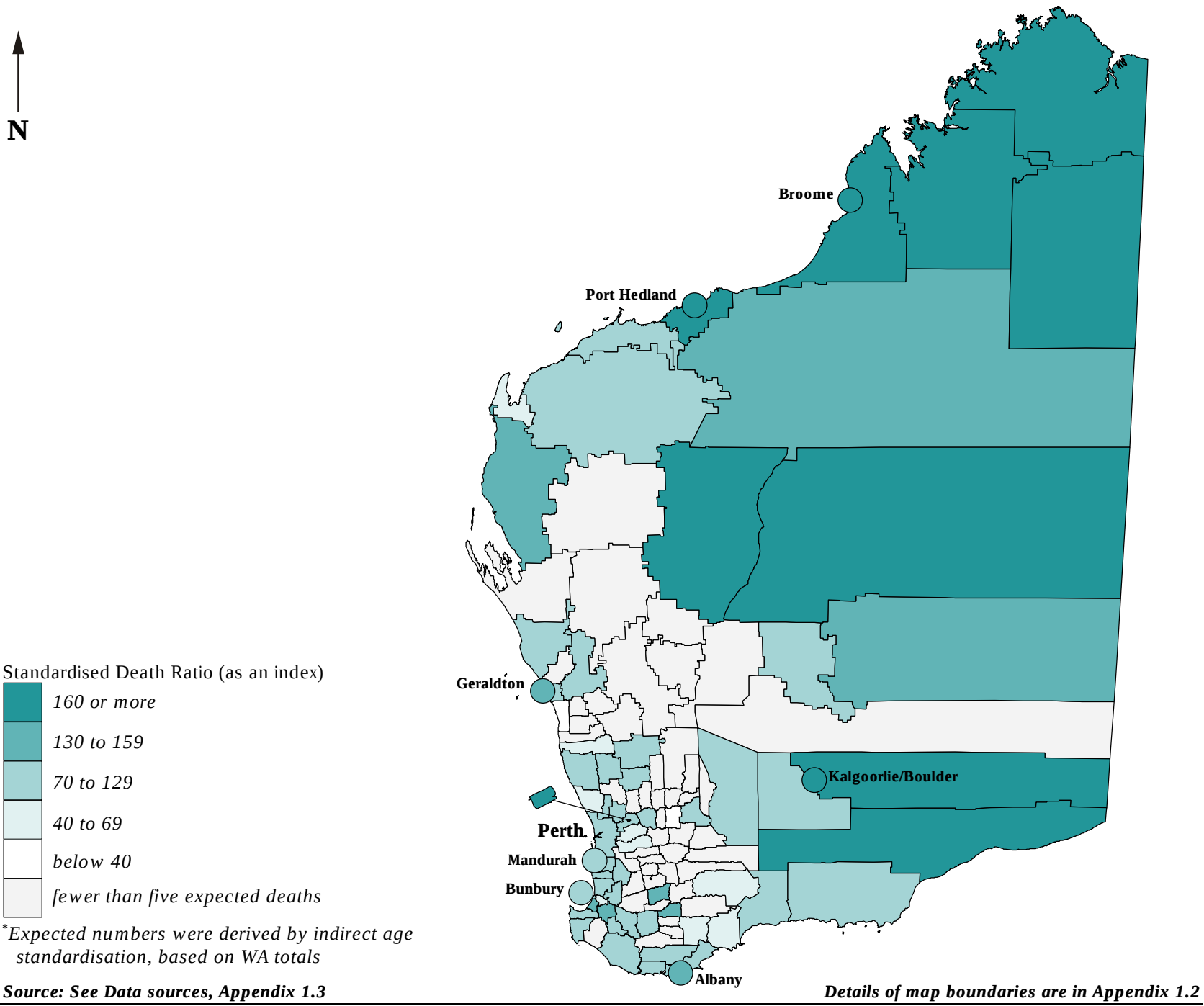
The lowest SDRs for deaths of males aged from 15 to 64 years were in Kellerberrin (with an SDR of 19 and 1 death), located about 150 kilometres east of **Perth,** and Irwin (30* and 3 deaths), some 200 kilometres north of **Perth**. SLAs with ratios of between 30 and 60 per cent lower than expected were predominantly located in the south-west corner of the State and included Jerramungup (an SDR of 55), Dardanup (56*) and Coorow and Gnowangerup (both with 69).

The largest numbers of deaths were of males from the towns of Kalgoorlie/Boulder (171 deaths over the four years from 1992 to 1995), Mandurah (153) and Geraldton (101).

There were correlations of meaningful significance at the SLA level with the variables for dwellings without a motor vehicle (0.67), the Indigenous population (0.58) and single parent families (0.57). These results, together with the inverse correlation with the IRSD (-0.46), suggest the existence at the SLA level of an association between high rates of premature death of males and socioeconomic disadvantage.

Map 5.9
Deaths of males aged 15 to 64 years from all causes, Western Australia, 1992 to 1995

Standardised Death Ratio: number of deaths in each Statistical Local Area compared with the number expected*

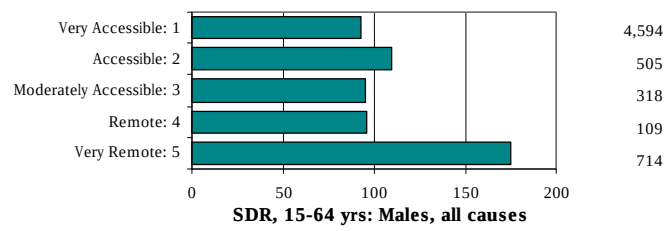


*Expected numbers were derived by indirect age standardisation, based on WA totals

Source: See Data sources, Appendix 1.3

Details of map boundaries are in Appendix 1.2

Accessibility/Remoteness Index of Australia



	Male deaths
Very Accessible: 1	4,594
Accessible: 2	505
Moderately Accessible: 3	318
Remote: 4	109
Very Remote: 5	714

There are three distinct levels in SDRs for premature deaths of males across the ARIA categories. The lowest SDRs were recorded in the Very Accessible (93), Moderately Accessible (95) and Remote (96) categories. There were 10 per cent more premature deaths of males than expected in the Accessible areas (an SDR of 110) and a highly elevated 75 per cent more than expected in the Very Remote areas (175). The elevated SDR in the Very Remote areas (representing the second largest number of deaths) is likely to reflect the very high premature death rates experienced by Indigenous males.

Source: Calculated on ARIA classification, DHAC

Deaths of females aged 15 to 64 years from all causes, 1992 to 1995

Capital city comparison (Australia as the standard)

Over the four years from 1992 to 1995, Standardised Death Ratios (SDRs) for females aged from 15 to 64 years ranged from 87** in **Canberra** to 115** in **Hobart** and 126** in **Darwin**. The other capital cities had ratios of below 100, indicating that there were fewer deaths than were expected from the Australian rates.

There was a higher differential (from the Australian rates) in the SDR recorded for **Darwin** in the later period (from 1992 to 1995) shown in **Table 5.15**. The higher SDR suggests a worsening (relative to the Australian rates) in the female death rates from all causes between the periods analysed. The remaining States and Territories experienced small increases (**Adelaide**, **Perth** and **Hobart**) or decreases (**Sydney**, **Melbourne**, **Brisbane** and **Canberra**) in their ratios.

Table 5.15: Deaths of females aged 15 to 64 years from all causes, capital cities
Standardised death ratios

	Sydney	Melbourne	Brisbane	Adelaide	Perth	Hobart	Darwin	Canberra[1]	All capitals
1992-95	**98***	**92****	**96**	**98**	**90****	**115****	**126****	**87****	**95****
1985-89	**100**	**95****	**98**	**93****	**86****	**112****	**112**	**88****	**96****

[1]Includes Queanbeyan (C)
Source: See *Data sources*, Appendix 1.3
Statistical significance: * significance at 5 per cent; ** significance at 1 per cent

As for males, cancer was the main cause of premature death (deaths between the ages of 15 to 64 years) for females, followed by diseases of the circulatory system and the combined causes of accidents, poisonings and violence. Overall, there were 14,351 deaths of female residents in **Perth**, of whom 2,279 were of females aged from 15 to 64 years. The data that have been mapped for this variable therefore represents 15.9 per cent of all female deaths.

Females most likely to die prematurely include Aboriginal and Torres Strait Islander women; single mothers; those earning low incomes; and those who were unemployed.

Perth (Western Australia as the standard)

There were 2,279 deaths of females aged from 15 to 64 years in **Perth**, 6 per cent fewer than expected from the State rates (an SDR of 94**).

Substantially higher than expected standardised death ratios were recorded in SLAs comprising some of **Perth's** older established suburbs (**Map 5.10**). The most highly elevated ratio was recorded in Mosman Park (with an SDR of 160*), with 60 per cent more deaths than expected for an SLA with a population of this size and age composition. Relatively highly elevated ratios were also recorded in Stirling: South East (with an SDR of 144**), Bassendean (140*), Belmont (138**), South Perth (132**), Victoria Park (124), Armadale (120) and Cockburn (120*).

The distribution of SLAs with ratios for female deaths within 15 per cent of the level expected from the State rates was similar to that noted for males, comprising areas developed during the sixties and seventies.

The lowest ratios were recorded in the more affluent areas, especially those situated adjacent to the Swan River and in close proximity to the northern beaches. The lowest of these were recorded in Mundaring (with an SDR of 64** and 41 deaths of 15 to 64 year old females), Wanneroo (72**; 246) and Nedlands (72; 29).

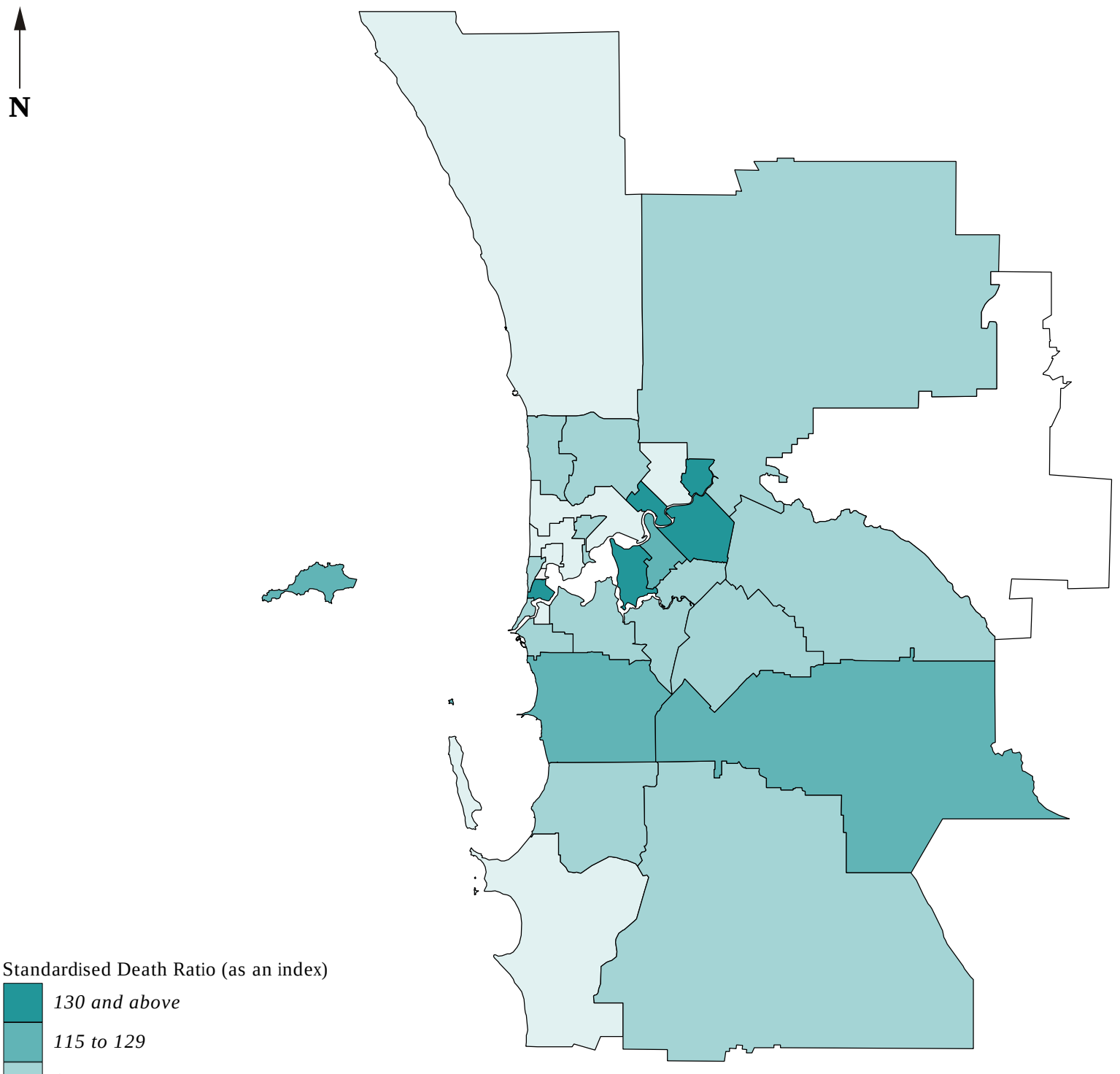
The largest numbers of premature deaths of females over the period from 1992 to 1995 were in Wanneroo (246 deaths), Stirling: Central (192) and Melville (178). More than 100 deaths were recorded in six other **Perth** SLAs.

There was a correlation of meaningful significance at the SLA level with the variables for housing authority rented dwellings (0.53), and of lesser significance with single parent families (0.44), the Indigenous population (0.41) and low income families (0.34. These results, together with the weak inverse correlation with the IRSD (-0.28), suggest the existence of a weak association at the SLA level in **Perth** between high rates of premature death of females and socioeconomic disadvantage.

Map 5.10

Deaths of females aged 15 to 64 years from all causes, Perth, 1992 to 1995

Standardised Death Ratio: number of people in each Statistical Local Area compared with the number expected*



*Expected numbers were derived by indirect age standardisation, based on WA totals

Source: See Data sources, Appendix 1.3

Details of map boundaries are in Appendix 1.2

National Social Health Atlas Project, 1999

Deaths of females aged 15 to 64 years from all causes, 1992 to 1995

State/Territory comparison

Standardised Death Ratios (SDRs) for females aged from 15 to 64 years were higher in the *Rest of State/Territory* areas than in the capital cities, with the most highly elevated ratio being in the Northern Territory (an SDR of 289**). At the *Whole of State/Territory* level, only Tasmania (116**) and the Northern Territory (210**) had substantially more female deaths than expected from the Australian rates.

Most States had similar differentials (from the Australian rates) in the SDR recorded for their non-metropolitan areas in the later period shown in **Table 5.16**. The major exceptions were Tasmania, South Australia and Western Australia, with higher SDRs (suggesting an increase in death rates relative to the Australian experience); and the Northern Territory and New South Wales, with lower SDRs (suggesting a decline in death rates relative to the Australian experience). The SDR for females aged from 15 to 64 years in the Northern Territory, however, remains substantially elevated, at more than twice the next highest level.

Table 5.16: Deaths of females aged 15 to 64 years from all causes, State/Territory
Standardised death ratios

	NSW	Vic	Qld	SA	WA	Tas	NT	ACT	Total
1992 to 1995									
Capital city	98*	92**	96	98	90**	115**	126**	87**[1]	95**
Other major urban centres[2]	109**	109	96	..	..	..	..	..	105*
Rest of State/Territory	108**	101	106**	109*	112**	117**	289**	–[3]	109**
Whole of State/Territory	102	94**	101	101	96*	116**	210**	86**	100
1985 to 1989									
Rest of State/Territory	113**	101	106**	96	105	106	328**	–[3]	108**

[1]Includes Queanbeyan (C)
[2]Includes Newcastle and Wollongong (NSW); Geelong (Vic); and Gold Coast-Tweed Heads and Townsville-Thuringowa (Qld)
[3] Data included with ACT total
Source: See *Data sources*, Appendix 1.3
Statistical significance: * significance at 5 per cent; ** significance at 1 per cent

Unlike males living in the non-metropolitan areas of Western Australia, the major cause of premature death among female residents was malignant neoplasms (cancer), followed by circulatory system diseases and the combined causes of accidents, poisonings and violence. The premature deaths mapped for this variable accounted for 22.2 per cent of all female deaths. This figure was 10.3 per cent lower than that recorded for males (32.5 per cent), highlighting the fact that female life expectancy is higher.

Rest of State

There were 946 deaths of females aged from 15 to 64 years in the non-metropolitan areas of Western Australia between 1992 and 1995, 17 per cent more than expected from the State rates (an SDR of 117**).

As many of the ratios are very high, the ranges mapped (**Map 5.11**) have been changed to enhance the pattern of differentiation at the SLA level. The highest and lowest ranges have been set at 60 per cent, rather than 30 per cent as in the map for **Perth** for this variable.

The most highly elevated ratios for premature deaths of females were in areas with relatively large Indigenous populations. Of the eight SLAs in the highest range mapped, seven form a contiguous area in the most northerly part of the State. They are Wyndham-East Kimberley (with an SDR of 392** and 26 deaths of females aged from 15 to 64 years), Derby-West Kimberley (291**; 28 deaths), East Pilbara (265**; 28), Ashburton (246**; 19), Port Hedland (198**; 30), Broome (196**; 23) and Carnarvon (178**; 20). Closer to **Perth**, the town of Northam also had twice the expected number of deaths of females at these ages (an SDR of 203** and 24 deaths).

There were five SLAs with SDRs in the range 130 to 159. Of these, Plantagenet (an SDR of 156 and 14 deaths) was the highest, and Collie (134; 22) the lowest. In all the SLAs in this range, there were between 30 per cent and 59 per cent more deaths than expected from the State rates.

As the map shows, most of the 21 SLAs with ratios within 30 per cent of the level expected from the State rates lie in close proximity to the coastline, stretching from Geraldton (an SDR of 127) and Northampton (94) in the north to Denmark (89) and the Shire of Albany (73) in the south.

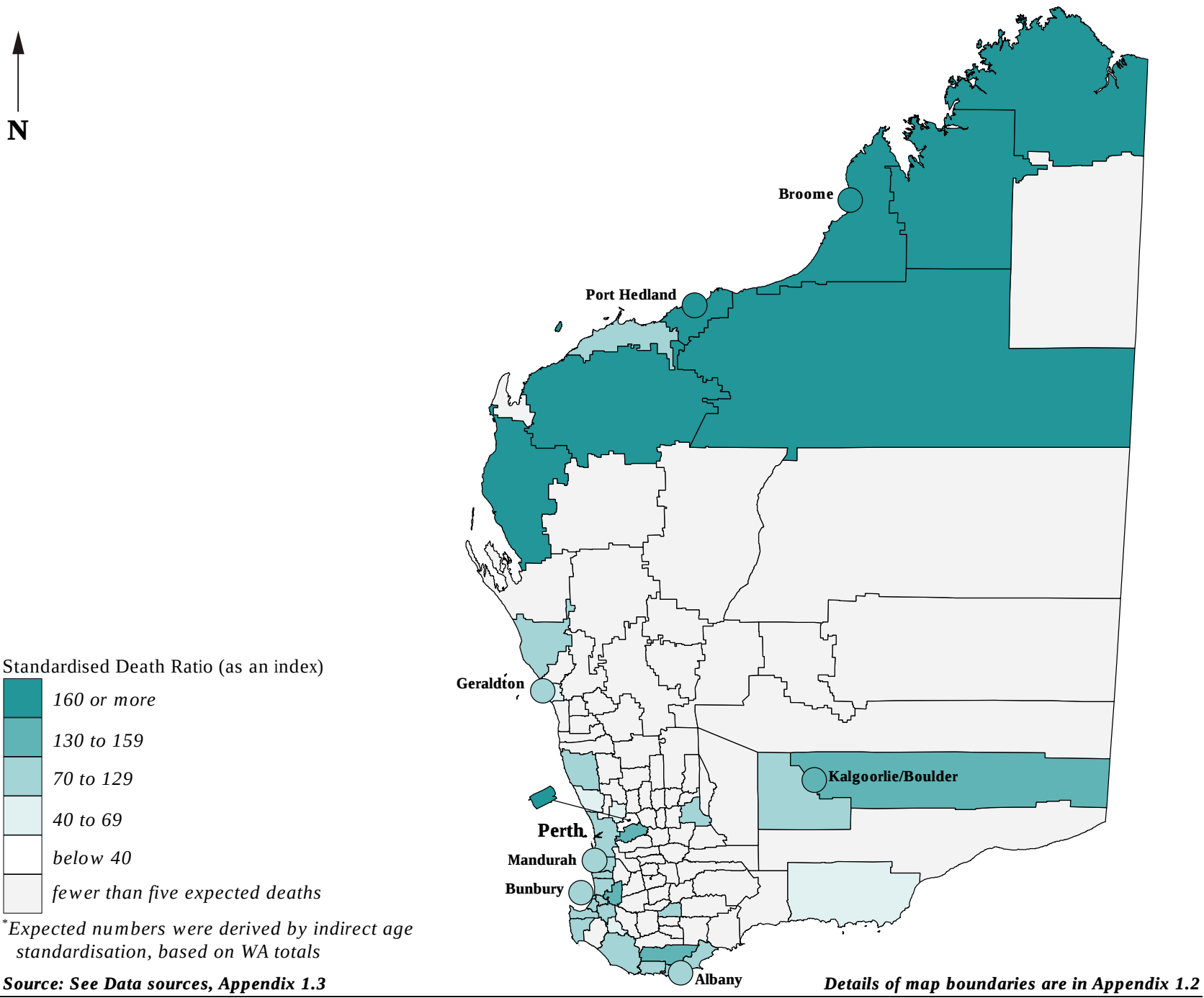
Northam Shire (with an SDR of 29), situated 100 kilometres east of **Perth**, had the lowest ratio for premature deaths of females in Western Australia. There were just two deaths over the four years of the analysis, when seven were expected (from the State rates) for a population of this size and age composition. As noted above, the ratio for the town of Northam was a highly elevated 203**. Other ratios of less than 50 were recorded in Toodyay (with an SDR of 42 and 3 deaths), Esperance Shire (48*; 10 deaths) and Bridgetown-Greenbushes (49; 4 deaths).

The largest numbers of deaths of females aged from 15 to 64 years were in Mandurah (78 deaths), Bunbury (59), Kalgoorlie/Boulder (54) and Geraldton (50).

There were correlations of meaningful significance the SLA level with the variables for dwellings without a motor vehicle (0.56) and the Indigenous population (0.53), and of lesser significance with single parent families (0.42). These results, together with the weak inverse correlation with the IRSD (-0.38), suggest the existence at the SLA level of an association between high rates of premature death of females and socioeconomic disadvantage.

Map 5.11
Deaths of females aged 15 to 64 years from all causes, Western Australia, 1992 to 1995

Standardised Death Ratio: number of deaths in each Statistical Local Area compared with the number expected*

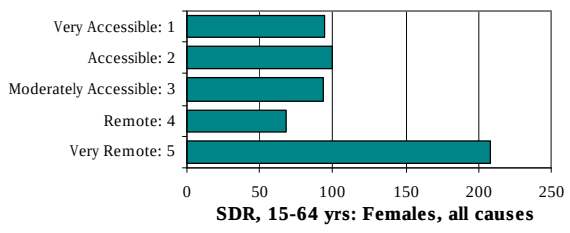


*Expected numbers were derived by indirect age standardisation, based on WA totals

Source: See Data sources, Appendix 1.3

Details of map boundaries are in Appendix 1.2

Accessibility/Remoteness Index of Australia



Very Accessible: 1	2,490
Accessible: 2	236
Moderately Accessible: 3	147
Remote: 4	35
Very Remote: 5	315

Female deaths

Standardised Death Ratios (SDRs) for females show a similar distribution across the ARIA categories to those for males, but with a higher ratio in the Very Remote areas. The ratios in the three 'accessible' categories are all close to the level expected from the State rates (SDRs of 100 in the Accessible, 95 in the Very Accessible and 93 in the Moderately Accessible areas). The lowest ratio was recorded in the Remote areas (an SDR of 68) and the highest, a highly elevated SDR of 208, in the Very Remote category. The elevated SDR in the Very Remote category is likely to reflect the very high premature death rates experienced by Indigenous females.

Source: Calculated on ARIA classification, DHAC

Deaths of people aged 15 to 64 years from cancer, 1992 to 1995

Capital city comparison (Australia as the standard)

Over the four years from 1992 to 1995, **Darwin**, with a Standardised Death Ratio (SDR) of 117*, and **Hobart**, with an SDR of 112*, were the only capital cities with elevated ratios for deaths from cancer of people aged from 15 to 64 years. **Canberra** had the lowest ratio, with 9 per cent fewer deaths than expected from the Australian rates: ratios in the other capitals were close to the *All capitals* average.

Overall, the variations from the Australian rates in SDRs from cancer between the two time periods analysed (**Table 5.17**) were marginal, with the exception of **Darwin**, where there was a substantial differential (from the Australian rates) between the two periods. The higher SDR in the later period suggests a worsening (relative to the Australian rates) in the death rates for residents of **Darwin** from this cause.

Table 5.17: Deaths of people aged 15 to 64 years from cancer, capital cities
Standardised death ratios

	Sydney	Melbourne	Brisbane	Adelaide	Perth	Hobart	Darwin	Canberra[1]	All capitals
1992-95	99	100	98	97	95**	112*	117*	91*	98*
1985-89	100	102	100	96*	99	109*	96	92*	100

[1]Includes Queanbeyan (C)
Source: See *Data sources*, Appendix 1.3
Statistical significance: * significance at 5 per cent; ** significance at 1 per cent

Deaths from cancers (malignant neoplasms) were the second most common cause of death of residents of all ages of **Perth**, accounting for 28.3 per cent of all deaths (8,525 deaths) over the four years from 1992 to 1995. Moreover, it was the most common cause of death in the 15 to 64 year age group, representing 39.8 per cent of deaths.

Different cancers have different causes and are influenced by a range of risk factors, the most widely accepted being tobacco smoking (it is estimated that as many as one in three cancer deaths are caused by smoking and could therefore be prevented (AIHW 1998)) and dietary influences. Both the incidence and mortality of cancer are higher among males than among females, a fact largely attributed to their greater use of tobacco.

There is a strong association between socioeconomic status and certain types of cancer. Mathers (1994) has examined the extent of disparities in mortality rates, which are related to socioeconomic status of area of residence. Differentials in mortality rates from cancers were clearly evident for males aged from 25 to 64 years in the most socioeconomically disadvantaged areas: 28 per cent more male deaths than in the most advantaged areas, with the highest elevation being 60 per cent for lung cancer. Deaths of females in the most disadvantaged areas were less highly elevated (by 10 per cent over deaths in the most advantaged areas), although lung cancer rates were elevated by 58 per cent. In more recent work, Mathers (in press) has reported that the socioeconomic differentials in mortality rates related to cancer have persisted in 1995-97 (**Table 5.2**). In NSW in 1990-94 an inverse relationship was specifically found between high socioeconomic status and cervical cancer (-0.22) and lung cancer (-0.25) (NSW Health Department 1997). In Victoria in 1996 increased rates of (age standardised) years of life lost were found for mouth, stomach, lung and larynx cancer for males and lung cancer for females in the lowest compared to the highest socioeconomic quintiles of the population (Department of Human Services Victoria, in press).

Perth (Western Australia as the standard)

Over the period from 1992 to 1995, there were 2,575 deaths from cancer of 15 to 64 year olds resident in **Perth**, one per cent more than expected from the State rates (an SDR of 101).

Consistent with this low overall ratio, nearly 60 per cent of SLAs in **Perth** had ratios in the middle range mapped, of within 15 per cent of the level expected from the State rates (**Map 5.12**).

The highest rates of premature death from cancer were recorded for residents of Stirling: South-Eastern (with an SDR of 135*) and Belmont (134**). Relatively high rates of premature death from cancer were also recorded in a number of long established SLAs, including South Perth (with an SDR of 129*), Mosman Park (129), Cottesloe (125) and Victoria Park (122). Outside of these SLAs, with their relatively older populations, two more recently urbanised SLAs with younger populations, Armadale (121*) and Kwinana (115), had similarly elevated ratios.

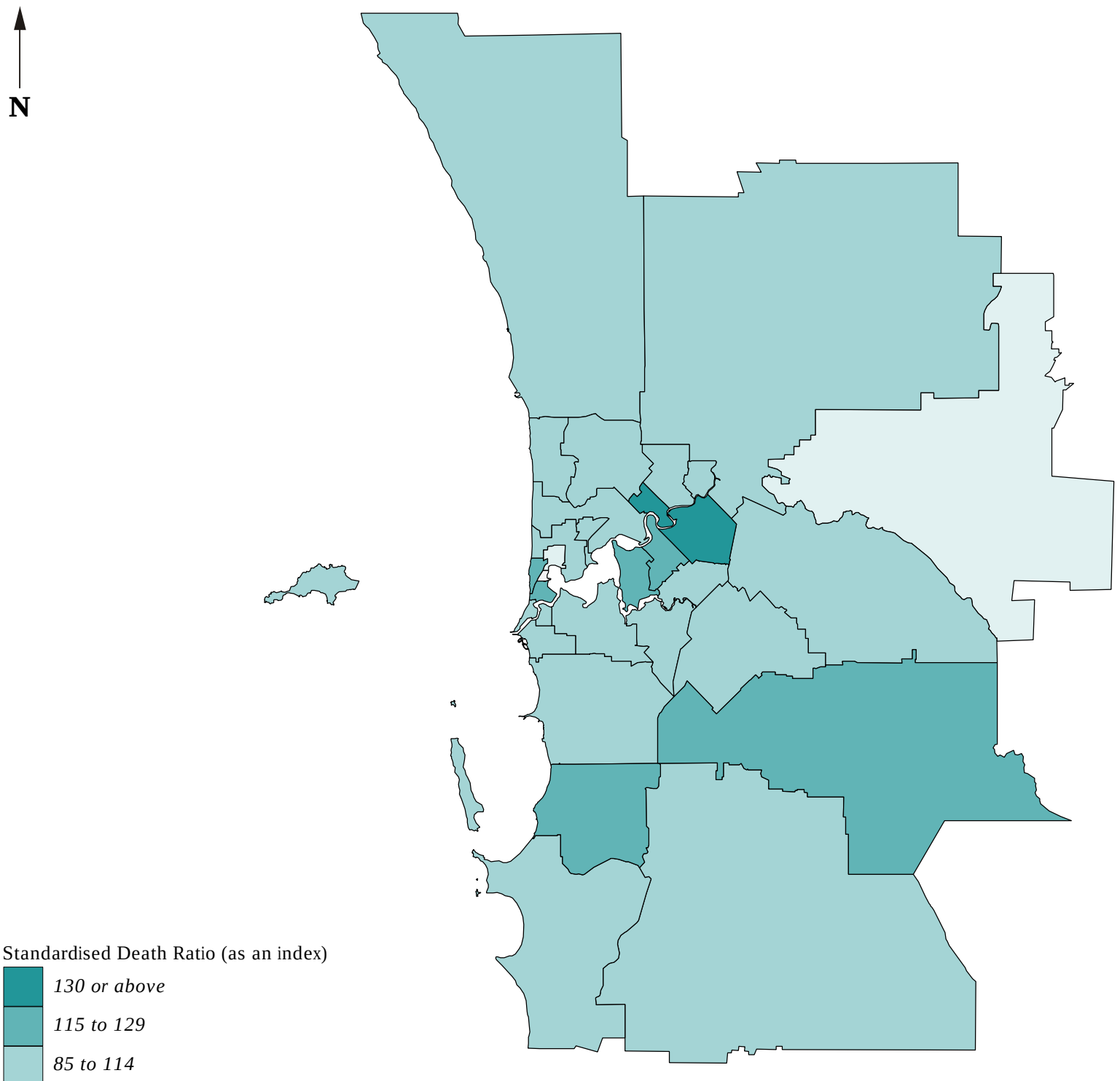
Claremont (with an SDR of 75) and Mundaring (78), had the lowest rates of premature death from cancer.

The largest numbers of deaths from cancer of people aged from 15 to 64 years over the four years from 1992 to 1995 were in Wanneroo (306 deaths), Stirling: Central (240), Melville (186) and Canning (151).

There was a weak association in the correlation analysis at the SLA level with the variables for housing authority rented dwellings (0.46), single parent families (0.36), the Indigenous population (0.34) and low income families (0.28). These results, together with the weak inverse correlation with the IRSD (-0.20), suggest the existence at the SLA level of an association between high rates of premature death from cancer and socioeconomic disadvantage.

Map 5.12
Deaths of people aged 15 to 64 years from cancer, Perth, 1992 to 1995

Standardised Death Ratio: number of deaths in each Statistical Local Area compared with the number expected*



*Expected numbers were derived by indirect age-sex standardisation, based on WA totals

Source: Calculated on data from ABS 1996 Census

Details of map boundaries are in Appendix 1.2

Deaths of people aged 15 to 64 years from cancer, 1992 to 1995

State/Territory comparison (Australia as the standard)

The highest Standardised Death Ratio (SDR) for deaths from cancer of people aged from 15 to 64 years in the *Rest of State/Territory* areas was recorded in the Northern Territory (an SDR of 148**). The other States all had SDRs within 10 per cent of the level expected from the Australian rates. At the *Whole of State/Territory* level, only the Northern Territory (137**) and Tasmania (110**) had notably more deaths from cancer than expected from the Australian rates.

The non-metropolitan areas of New South Wales, Victoria and Queensland had similar differentials (from the Australian rates) in the SDR recorded in the later period shown in **Table 5.18**. The Northern Territory had the highest SDR (suggesting a worsening in death rates relative to the Australian experience); South Australia, Western Australia and Tasmania also had noticeably higher SDRs in the later period, although with much smaller increases than that for the Northern Territory.

Table 5.18: Deaths of people aged 15 to 64 years from cancer, State/Territory
Standardised death ratios

	NSW	Vic	Qld	SA	WA	Tas	NT	ACT	Total
1992 to 1995									
Capital city	99	100	98	97	95**	112*	117*	91*[1]	98*
Other major urban centres[2]	106*	123**	99	..	..	..	..	..	105**
Rest of State/Territory	103	105**	100	96	93*	109*	148**	–[3]	102*
Whole of State/Territory	101	102	99	97	94**	110**	137**	91*	100
1985 to 1989									
Rest of State/Territory	103	104*	98	86**	87**	103	123**	–[3]	99

[1]Includes Queanbeyan (C)
[2]Includes Newcastle and Wollongong (NSW); Geelong (Vic); and Gold Coast-Tweed Heads and Townsville-Thuringowa (Qld)
[3] Data included with ACT total
Source: See *Data sources*, Appendix 1.3
Statistical significance: * significance at 5 per cent; ** significance at 1 per cent

As for **Perth**, deaths from cancers (malignant neoplasms) were also the second most common cause of death of people of all ages in the non-metropolitan areas of Western Australia, accounting for 26.2 per cent of all deaths (2,772 deaths) over the four year period from 1992 to 1995. Cancer was, however, the most common cause of premature death, accounting for 29.9 per cent of all deaths of people aged from 15 to 64 years. Although the largest absolute numbers of cancer deaths were recorded for people aged 65 years and over, they accounted for only 25.7 per cent of deaths at those ages.

Rest of State (Western Australia as the standard)

Over the four years from 1992 to 1995, there were 897 premature deaths from cancer of residents of the non-metropolitan areas of Western Australia, two per cent fewer than expected from the State rates (an SDR of 98).

There were three discrete areas within the State with high SDRs of the 15 to 64 year old population for cancer (**Map 5.13**). The most highly elevated ratios were recorded in the south-west of the State, in Capel (with an SDR of 175**), Katanning (144), Donnybrook-Balingup (141) and Chittering (125), and the town SLAs of Northam (153), Narrogin (140) and Albany (127). The second area, in the north-west, included the SLAs of Port Hedland (with an SDR of 141), Ashburton (140), Carnarvon (122) and Broome (121). The third was Kalgoorlie/Boulder (with 45 per cent more deaths than expected from the State rates, an SDR of 145**).

Almost half (41.9 per cent) of SLAs had SDRs for premature death from cancer within 15 per cent of the level expected from the State rates. Most of these were situated in coastal locations in the south-west corner, but concentrations also occurred in the north of the State.

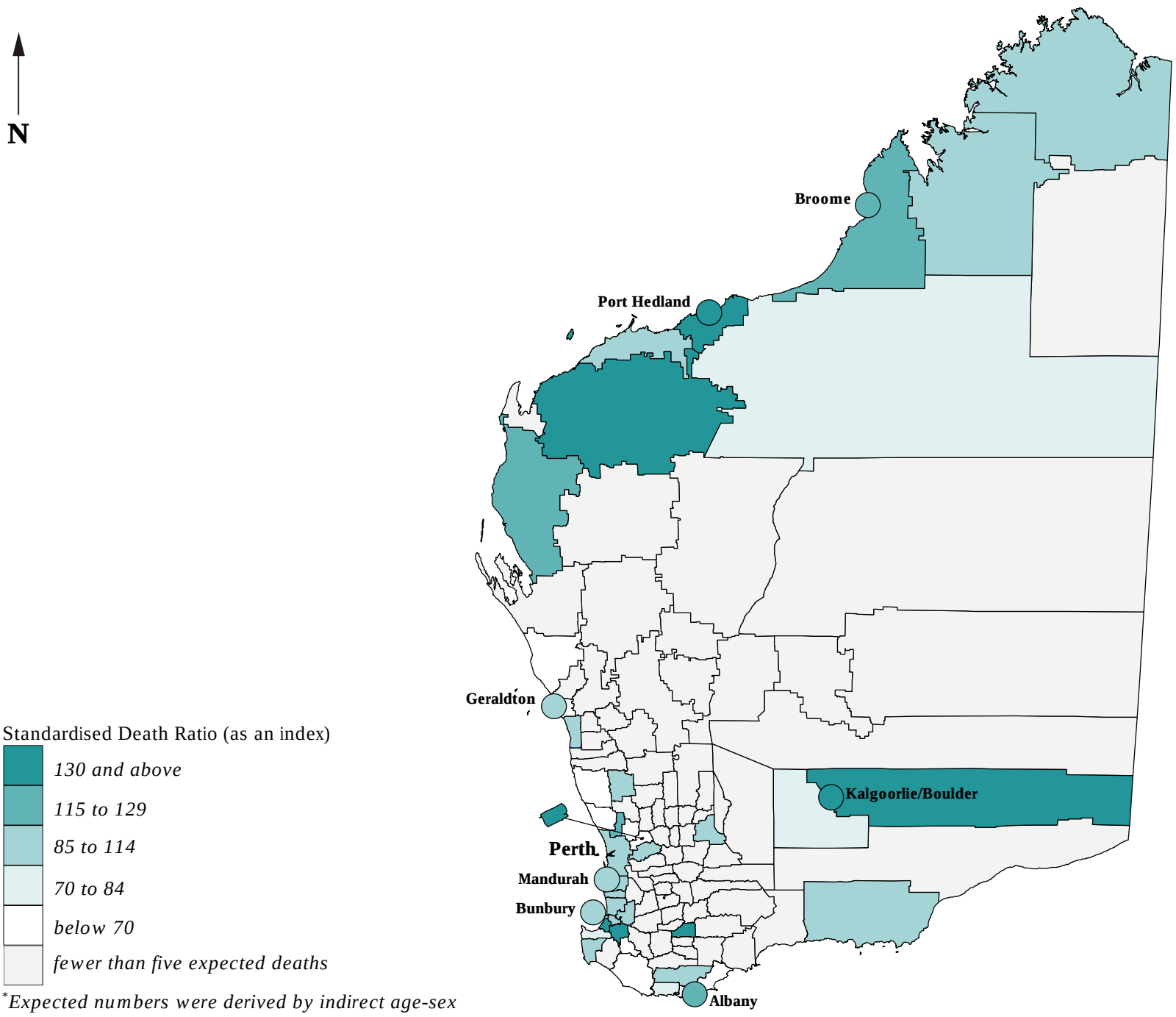
Most of the SLAs with the lowest SDRs, of 70 or less, were confined to coastal locations from Albany Shire (48**) to Northampton (69).

The largest numbers of deaths from cancer were recorded for residents in the retirement settlement of Mandurah (98 deaths), in Kalgoorlie/Boulder (59) and Bunbury (56).

The correlation analysis was not undertaken as there were too many SLAs with small numbers of cases.

Map 5.13
Deaths of people aged 15 to 64 years from cancer, Western Australia, 1992 to 1995

Standardised Death Ratio: number of deaths in each Statistical Local Area compared with the number expected*



Standardised Death Ratio (as an index)

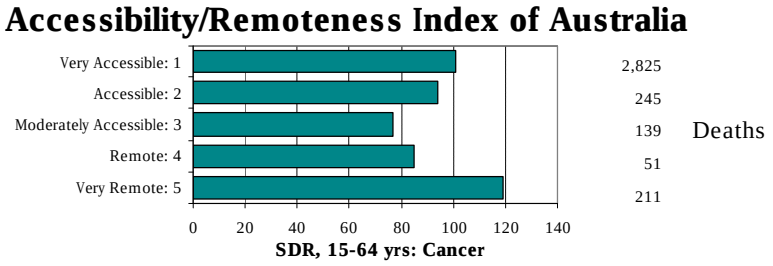
- *130 and above*
- *115 to 129*
- *85 to 114*
- *70 to 84*
- *below 70*
- *fewer than five expected deaths*

*Expected numbers were derived by indirect age-sex standardisation, based on WA totals

Source: See Data sources, Appendix 1.3

Details of map boundaries are in Appendix 1.2

Accessibility/Remoteness Index of Australia



The SDRs for deaths of people aged from 15 to 64 years from all cancers decline with increasing remoteness from a ratio of 101 in the Very Accessible areas to a low of 77 in the Moderately Accessible ARIA category, before increasing to the highest ratio of 119 in the Very Remote areas.

Source: Calculated on ARIA classification, DHAC

Deaths of people aged 15 to 64 years from lung cancer, 1992 to 1995

Capital city comparison (Australia as the standard)

Over the four years from 1992 to 1995, **Darwin** with a Standardised Death Ratio (SDR) of 164**, and **Hobart**, with an SDR of 120, had the most highly elevated ratios of the capital cities for deaths from lung cancer of people aged from 15 to 64 years. **Canberra** (77*) had the lowest ratio, with 23 per cent fewer deaths than expected from the Australian rates; ratios in the other capitals were close to the *All capitals* average.

Overall, the variations from the Australian rates between the two time periods analysed (**Table 5.19**) were relatively small, with the exception of ratios in **Darwin** and **Hobart**. In **Darwin**, the higher SDR in the later period suggests a worsening (relative to the Australian rates) in the death rates for residents from lung cancer between the periods analysed. This is in line with the rates for deaths from all cancers and all causes, recorded above. The lower SDR for **Hobart** suggests an improvement relative to the Australian deaths 'experience.

Table 5.19: Deaths of people aged 15 to 64 years from lung cancer, capital cities
Standardised death ratios

	Sydney	Melbourne	Brisbane	Adelaide	Perth	Hobart	Darwin	Canberra[1]	All capitals
1992-95	102	94*	103	95	90*	120	164**	77*	98*
1985-89	101	99	108*	92*	99	134**	131	82*	100

[1]Includes Queanbeyan (C)
Source: See *Data sources*, Appendix 1.3
Statistical significance: * significance at 5 per cent; ** significance at 1 per cent

In **Perth**, deaths from cancer of the trachea, bronchus and lung (referred to here as lung cancer) accounted for 17.9 per cent of all cancer deaths among 15 to 64 year olds from 1992 to 1995. Although males accounted for around three quarters of these deaths, the rate among females has increased sharply since the 1970s, as a result of increased cigarette consumption since the 1950s. For example, the ratio of male to female mortality rates from lung cancer in the 1970s and 1980s was consistently above 5, however, in 1996 the ratio fell to an all time low of 2.9 (AIHW, 1998).

A relationship also exists between socioeconomic status and lung cancer. Standardised death rates from lung cancer for both males and females from low socioeconomic status areas were highly elevated in relation to those from high socioeconomic status areas (Mathers 1994). The rates were 60 per cent higher for males and 58 per cent higher for females.

Perth[7] (Western Australia as the standard)

There were 462 deaths of 15 to 64 year olds from lung cancer in **Perth** in the years from 1992 to 1995, two per cent fewer deaths than expected from the State rates (an SDR of 98).

The highest ratios were recorded in Kwinana (an SDR of 167), Victoria Park (165) and South Perth (161). SLAs with ratios elevated by at least 15 per cent were Stirling: Central (with an SDR of 122), Cockburn (121), Gosnells (116) and Belmont, Bassendean and Armadale (all 115).

Excluding eight SLAs where there were fewer than five deaths from lung cancer expected from the State rates (which have not been mapped), the lowest ratios were in Subiaco (with an SDR of 40), Melville (50**) and Kalamunda (63).

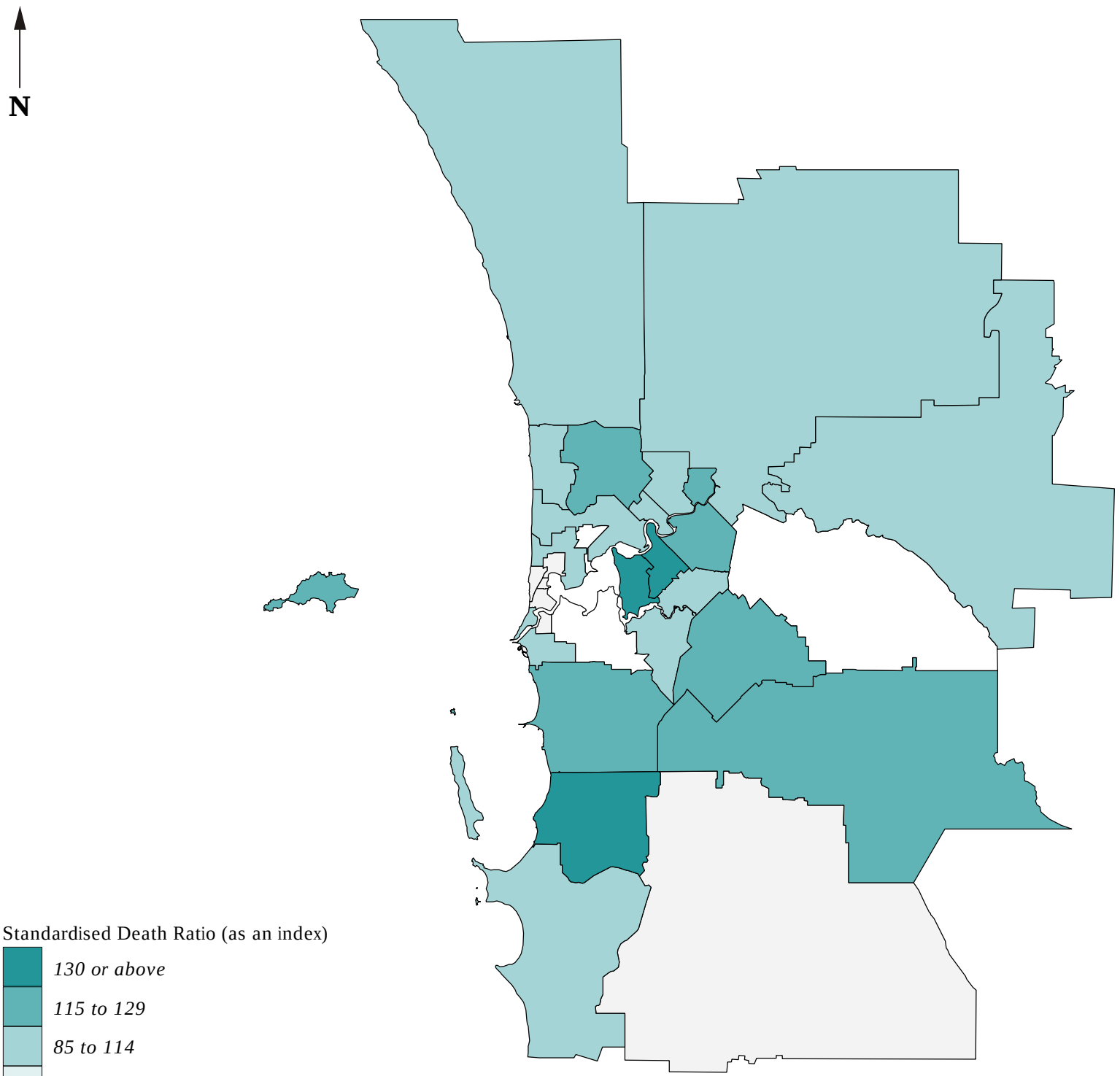
The largest numbers of deaths of 15 to 64 year olds from lung cancer over this four year period were in Wanneroo (60 deaths) and Stirling: Central (55). In all other SLAs there were fewer than 30 deaths.

The correlation analysis showed there to be a stronger association between premature deaths from lung cancer and socioeconomic disadvantage than was the case for deaths from all cancers. There were correlations of meaningful significance with the variables for the Indigenous population (0.58), housing authority rented dwellings (0.53) and low income families (0.53), and at a lower level of significance with unemployment (0.47) and unskilled and semi-skilled workers (0.44). Inverse correlations were recorded with the variables for high income families (of meaningful significance, -0.50), female labour force participation (-0.42) and managers and administrators, and professionals (-0.41). These results, together with the inverse correlation of meaningful significance with the IRSD (-0.55), suggest the existence of an association, at the SLA level, between high rates of death from lung cancer and socioeconomic disadvantage.

[7]As there were too few areas with sufficient cases to analyse for this variable in non-metropolitan Western Australia, the data has not been mapped. A summary of the main features is on page 166.

Map 5.14
Deaths of people aged 15 to 64 years from lung cancer, Perth, 1992 to 1995

Standardised Death Ratio: number of deaths in each Statistical Local Area compared with the number expected*



Standardised Death Ratio (as an index)

- *130 or above*
- *115 to 129*
- *85 to 114*
- *70 to 84*
- *below 70*
- *fewer than five expected deaths*

*Expected numbers were derived by indirect age-sex standardisation, based on WA totals

Source: Calculated on data from ABS 1996 Census

Details of map boundaries are in Appendix 1.2

National Social Health Atlas Project, 1999

Deaths of people aged 15 to 64 years from circulatory system diseases, 1992 to 1995

Capital city comparison (Australia as the standard)

Over the four years from 1992 to 1995, Standardised Death Ratios (SDRs) for deaths from circulatory system diseases of people aged from 15 to 64 years ranged from 77** in **Canberra** to 118 in **Darwin**. With the exception of **Hobart** (with an SDR of 105), the other capital cities had fewer deaths than expected from the Australian rates. **Perth** and **Melbourne** also had relatively low ratios, of 82** and 85**, respectively. There was a higher differential (from the Australian rates) in the SDR recorded for **Darwin** in the later period shown in **Table 5.20**, although neither of the SDRs was statistically significant. The higher SDR in this later period suggests a worsening (relative to the Australian rates) in rates of death from circulatory system diseases between the periods analysed. The movement in the ratios for **Brisbane** suggests an improvement in death rates relative to the Australian rates, although neither ratio was statistically significant.

Table 5.20: Deaths of people aged 15 to 64 years from circulatory system diseases, capital cities
Standardised Death Ratios

	Sydney	Melbourne	Brisbane	Adelaide	Perth	Hobart	Darwin	Canberra[1]	All capitals
1992-95	98	85**	96	94*	82**	105	118	77**	91**
1985-89	101	87**	103	94**	80**	104	94	77**	94**

[1]Includes Queanbeyan (C)
Source: See *Data sources*, Appendix 1.3
Statistical significance: * significance at 5 per cent; ** significance at 1 per cent

Circulatory system diseases (diseases of the heart and blood vessels) are the major cause of death in the population. In **Perth**, they accounted for 42.3 per cent of deaths of people of all ages (12,745 deaths) and 22.4 per cent of deaths (1,448 deaths) among people aged from 15 to 64 years over the period from 1991 to 1995. Overall, roughly equal numbers of males and females die from these causes, although it is an important cause of death for males at a much earlier age than for females. For example, the ratio of male to female deaths from this cause was approximately 3:1 between the ages of 45 to 64 years, and it is only above age 75 years that it changes to 2:3 (male to female deaths).

The main causes of death within this group were heart disease (67.5 per cent) – in particular ischaemic heart disease – and cerebrovascular disease (stroke, 24.9 per cent). The AIHW (1994) reports that among people aged 35 to 69 years, men who were current smokers had 2.9 times the age-adjusted risk of a first coronary event (fatal or non-fatal) than non-smokers. For female current smokers, the risk was 3.5 times that of non-smokers.

Perth[8] (Western Australia as the standard)

There were 1,448 premature deaths from diseases of the circulatory system in **Perth** over the period 1992 to 1995, nine per cent fewer than expected from the State rates (an SDR of 91**).

The most striking observation from the map of the distribution of deaths from circulatory system diseases (**Map 5.15**) is the location of the areas with the lowest ratios, in the older established, and more affluent, SLAs situated adjacent to the Swan River or near the northern coastline, and in the sprawling middle class SLA of Wanneroo, to the north. The lowest ratios were in East Fremantle (with an SDR of 54), Nedlands (57*), Melville (63**), Stirling: West (65**) and Wanneroo (66**). Peppermint Grove had only one death in this category, compared with two deaths expected from the State rates, and the SDR was not mapped. Canning (with an SDR of 72**), Kalamunda (72*) and Bayswater (71*) also had lower ratios of statistical significance.

Seven SLAs had ratios for premature deaths from circulatory system diseases elevated by 25 per cent or more; they were Stirling: South Eastern (with an SDR of 159**), Kwinana (143*), Belmont (136*), Mosman Park (129), Swan (128*), Perth-South (128) and Bassendean (125).

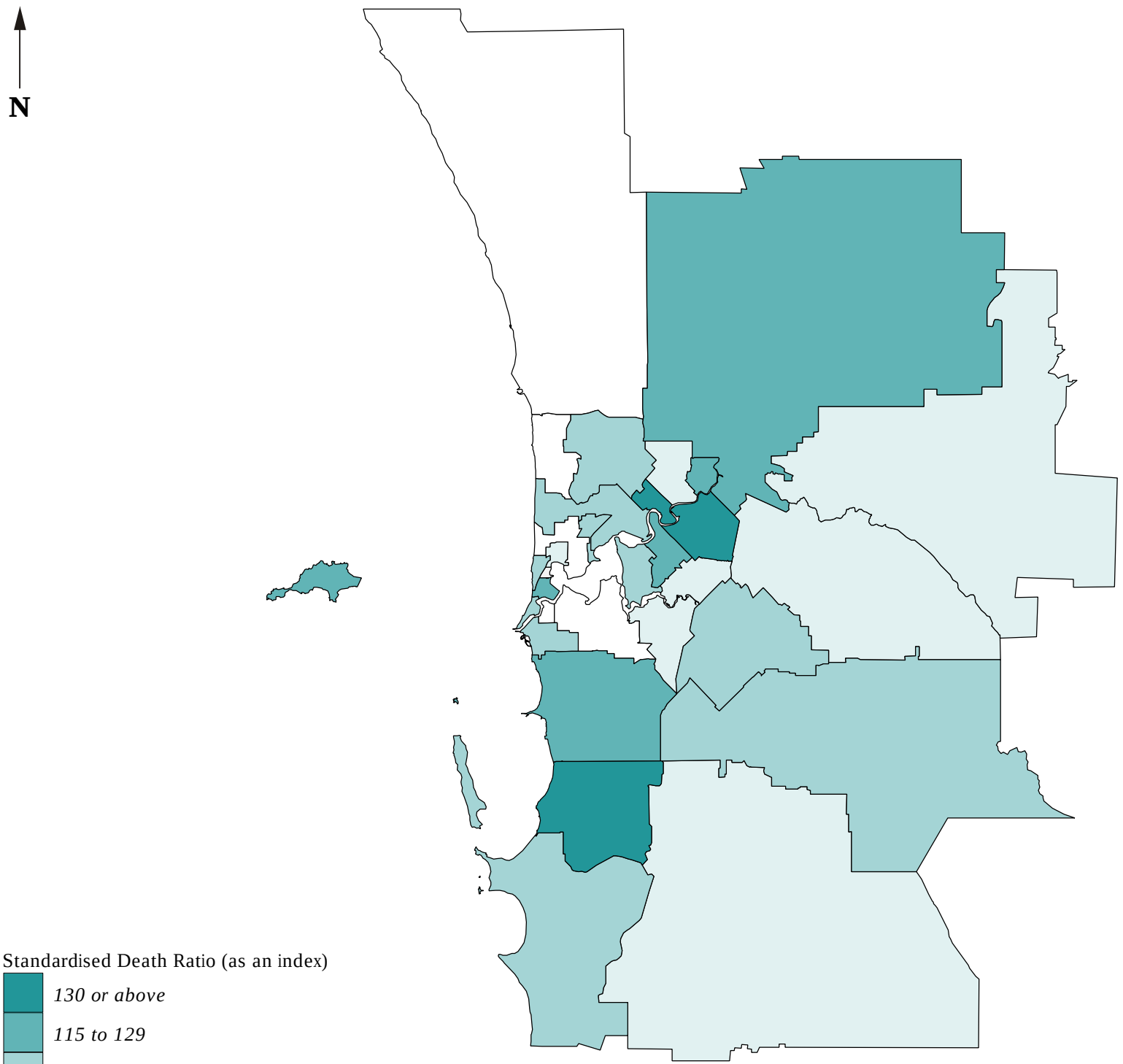
There were 155 deaths from circulatory system disease of 15 to 64 year old residents of Stirling: Central and 147 from Wanneroo. The remaining SLAs had fewer than 100 of these deaths, with the largest numbers in Gosnells (94) and Melville (80).

Correlations of meaningful significance were recorded with the variables for housing authority rented dwellings (0.67), the Indigenous population (0.65), single parent families (0.58), low income families (0.56) and unemployment (0.51). These correlations, together with the inverse correlation with the IRSD (-0.55), suggest the existence of an association between high rates of death from circulatory system diseases and socioeconomic disadvantage.

[8]As there were too few areas with sufficient cases to analyse for this variable in non-metropolitan Western Australia, the data has not been mapped. A summary of the main features is on page 167.

Map 5.15
Deaths of people aged 15 to 64 years from circulatory system diseases, Perth, 1992 to 1995

Standardised Death Ratio: number of deaths in each Statistical Local Area compared with the number expected*



Standardised Death Ratio (as an index)

- *130 or above*
- *115 to 129*
- *85 to 114*
- *70 to 84*
- *below 70*

*Expected numbers were derived by indirect age-sex standardisation, based on WA totals

Source: Calculated on data from ABS 1996 Census

Details of map boundaries are in Appendix 1.2

National Social Health Atlas Project, 1999

Deaths of people aged 15 to 64 years from respiratory system diseases, 1992 to 1995

Capital city comparison (Australia as the Standard)

Over the four years from 1992 to 1995, Standardised Death Ratios (SDRs) for deaths from respiratory system diseases of people aged from 15 to 64 years ranged from 64** in **Perth** to 193** in **Darwin**. With the exception of **Hobart** (with an SDR of 115), the other capital cities had fewer deaths than expected. There was a larger differential (from the Australian rates) in the SDR recorded in a number of the capital cities in the later period shown in **Table 5.30**, with the largest in **Darwin**. The higher SDR in this later period suggests a worsening (relative to the Australian rates) in rates of death from respiratory system diseases between the periods analysed. The movement in the ratios for **Perth** and **Melbourne** suggest a marked improvement in death rates relative to the Australian rates.

Table 5.30: Deaths of people aged 15 to 64 years from respiratory system diseases, capital cities
Standardised death ratios

	Sydney	Melbourne	Brisbane	Adelaide	Perth	Hobart	Darwin	Canberra[1]	All capitals
1992-95	94	79**	98	87*	64**	115	193**	79	87**
1985-89	90**	90**	101	74**	73**	98	124	71**	88**

[1]Includes Queanbeyan (C)
Source: See *Data sources*, Appendix 1.3
Statistical significance: * significance at 5 per cent; ** significance at 1 per cent

The organs of the respiratory system include the nose, pharynx, larynx, trachea, bronchi and lungs. There were 2,638 deaths from diseases of the respiratory system over the period from 1992 to 1995, 7.9 per cent of all deaths of residents of **Perth.** More than a half (59.5 per cent) of the deaths from diseases of the respiratory system were from chronic obstructive pulmonary disease (largely deaths from bronchitis, emphysema and asthma), while 24.5 per cent were deaths from pneumonia and influenza. People aged from 15 to 64 years accounted for 9.8 per cent of these deaths. It is these premature deaths that are presented in **Map 5.17**.

There is a strong association between deaths from respiratory system diseases and socioeconomic status. Mathers (1994) noted substantial differentials in mortality rates from respiratory system diseases among working age Australians: men aged from 25 to 64 years living in areas of greatest socioeconomic disadvantage had death rates 2.3 times higher than those living in areas of least disadvantage (rates elevated by 130 per cent). For females the differential was just more than double (106 per cent). These differentials have persisted in 1995-97 (**Table 5.2**). In NSW, a marked correlation (-0.45) has been found between premature deaths from respiratory illness and socioeconomic status over the period 1990-94 (NSW Health Department 1997). Increased rates of (age standardised) years of life lost have also been found in the lowest socioeconomic quintile in Victoria in 1996 (Department of Human Services Victoria, in press).

Deaths from respiratory system diseases are also a major cause of death for Indigenous people. Over the period from 1992 to 1994, these death rates were reported to be over 7 times higher than expected in SA, WA and the NT. This represented 17 per cent of the excess deaths in Indigenous men and 12 per cent of the excess deaths in Indigenous women in these States (ABS/AIHW 1996). More recent figures indicate that respiratory diseases accounted for 13.4 per cent of excess deaths in Indigenous men and 15.8 per cent of excess deaths in Indigenous women in SA, WA and the NT (ABS/AIHW 1999).

Perth[9] (Western Australia as the Standard)

Over the period from 1992 to 1995, 211 residents of **Perth** aged from 15 to 64 years died from respiratory system diseases, 22 per cent fewer than expected from the State rates (an SDR of 78**).

The highest ratios (for SLAs where five or more deaths were expected from the State rates) were recorded in Cockburn (an SDR of 125), Belmont (122) and Gosnells (117).

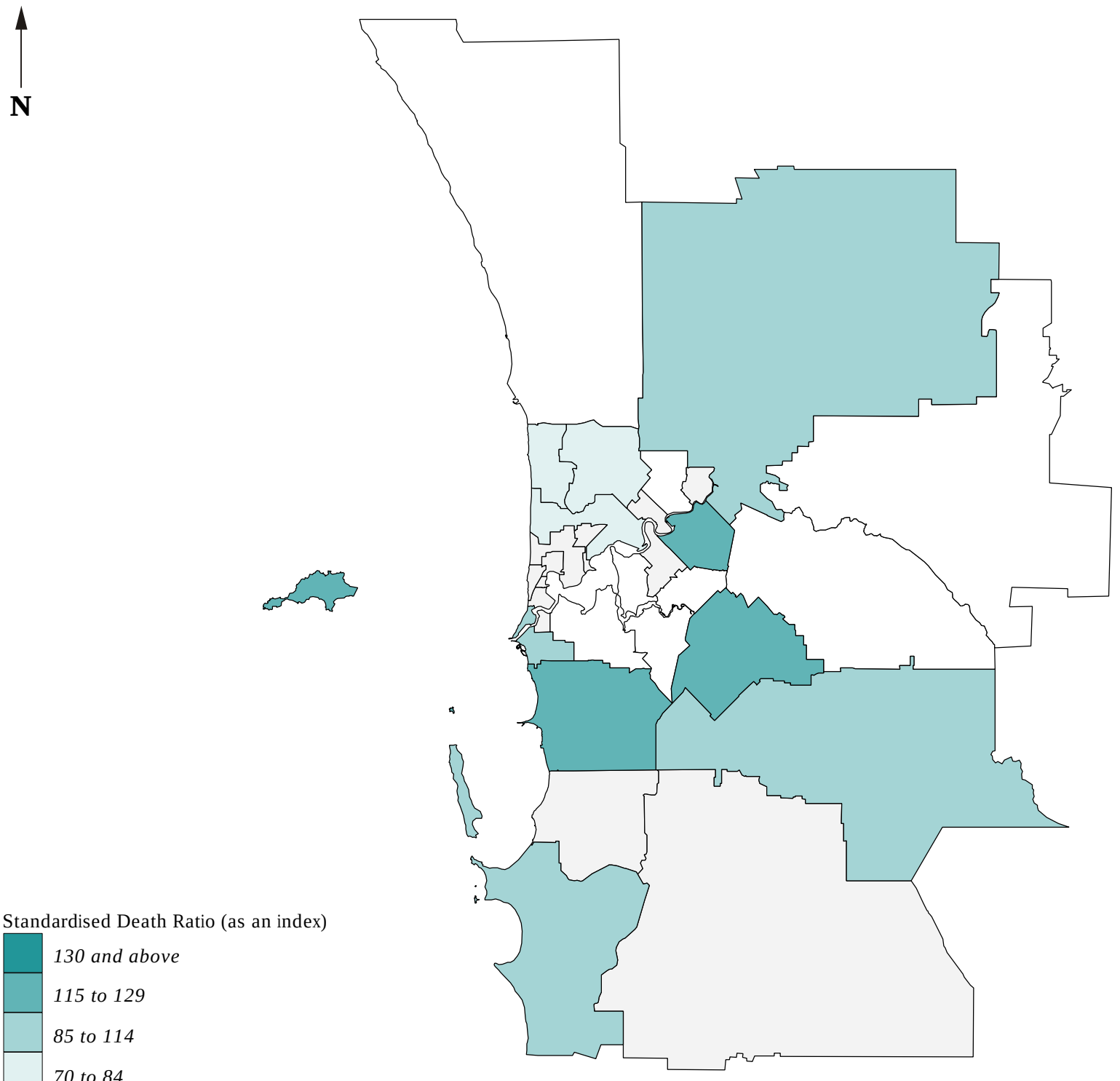
Kalamunda (with an SDR of 28*, 54 per cent fewer deaths from these diseases than were expected from the State rates), Canning (44*) and Wanneroo (46**) had the lowest rates.

There were 19 premature deaths from respiratory system diseases of people from Stirling: Central and 17 from both Wanneroo and Gosnells.

[9]As there were too few areas with sufficient cases to analyse for this variable in non-metropolitan Western Australia, the data has not been mapped. A summary of the main features is on page 168.

Map 5.16
Deaths of people aged 15 to 64 years from respiratory system diseases, Perth, 1992 to 1995

Standardised Death Ratio: number of deaths in each Statistical Local Area compared with the number expected*



Standardised Death Ratio (as an index)

- *130 and above*
- *115 to 129*
- *85 to 114*
- *70 to 84*
- *below 70*
- *fewer than five expected deaths*

*Expected numbers were derived by indirect age-sex standardisation, based on WA totals

Source: See Data sources, Appendix 1.3

Details of map boundaries are in Appendix 1.2

National Social Health Atlas Project, 1999

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Accidents, poisonings and violence as a cause of death

Introduction

Accidental and violent deaths are classified according to the external cause of death, that is, according to the circumstances of the accident or violent incident that produced the fatal injury, rather than the nature of the injury. This differs from the other causes of death analysed, which are classified according to the underlying disease or condition.

The main causes of death in this classification of accidents, poisonings and violence are comprised of the following:

- suicide (30.2 per cent);
- motor vehicle traffic accidents (29.3 per cent),
- accidental falls (9.9 per cent, mainly of elderly people); and
- accidental poisonings (9.7 per cent).

Although representing only 7.0 per cent of deaths of people of all ages, deaths from the external causes of accidents, poisonings and violence are a major cause of premature death, accounting for 22.6 per cent of deaths in the 15 to 64 year age group. Among people aged from 15 to 64 years, the major causes of death from external causes are as follows:

- suicide (36.3 per cent);
- motor vehicle traffic accidents (31.4 per cent);
- accidental poisonings (8.3 per cent); and
- accidental drownings (4.7 per cent).

Over the period from 1992 to 1995, there were 617 deaths in Western Australia from the combined causes of accidents, poisonings and violence among people aged from 15 to 24 years, representing 73.2 per cent of all deaths in this age group. Motor vehicle traffic accidents and suicide accounted for the majority of these deaths (76.5 per cent in total: 45.4 per cent form motor vehicle traffic accidents and 31.1 per cent from suicides).

Males predominated in this cause of death, accounting for 77.5 per cent of deaths from these causes in the 15 to 64 year age group (ranging from 83.0 per cent of suicides to 74.7 per cent of motor vehicle traffic accidents) and 79.6 per cent of deaths among 15 to 24 year olds (see **Table 5.21**).

Table 5.21: Deaths from accidents, poisonings & violence, by cause, Western Australia, 1992 to 1995

Age (years) and sex	Motor vehicle traffic accidents		Suicides		All accidents, poisonings & violence[1]	
	No.	%	No.	%	No.	%
15 to 24						
Males	208	74.3	170	88.5	491	79.6
Females	72	25.7	22	11.5	126	20.4
Total	**280**	**100.0**	**192**	**100.0**	**617**	**100.0**
15 to 64						
Males	502	74.7	646	83.0	1,659	77.5
Females	170	25.3	132	17.0	483	22.5
Total	**672**	**100.0**	**778**	**100.0**	**2,142**	**100.0**

[1]Includes other accidents, poisonings and violence.
Source: See *Data sources*, Appendix 1.3

As can be seen from **Table 5.22**, death rates from the combined causes of accidents, poisonings and violence were substantially higher, across all age groups, in the non-metropolitan areas of Western Australia than in **Perth**. The biggest difference was recorded among males aged from 15 to 24 years, where the rates ranged from 136.4 per 100,000 population in the non-metropolitan areas to 75.3 per 100,000 population in **Perth**.

Table 5.22: Deaths from accidents, poisonings and violence, by area of residence, Western Australia, 1992 to 1995

Age (years) and sex	Perth		Rest of Western Australia		Total	
	No.	Rate	No.	Rate	No.	Rate
15 to 24						
Males	304	75.3	187	136.4	491	90.8
Females	72	18.3	54	44.5	126	24.5
Total	**376**	**47.1**	**241**	**99.3**	**617**	**58.4**
15 to 64						
Males	1,036	61.5	623	97.6	1,659	71.4
Females	310	18.4	173	30.4	483	21.5
Total	**1,346**	**40.0**	**796**	**65.9**	**2,142**	**46.8**
All ages						
Males	1,287	51.9	752	80.0	2,039	59.6
Females	548	21.3	270	33.1	818	24.2
Total	**1,835**	**36.7**	**1,022**	**56.7**	**2,857**	**42.0**

[1]Rate per 100,000 population of same age and sex
Source: See *Data sources*, Appendix 1.3

Mathers (1994) noted substantial differentials in mortality rates from accidents, poisonings and violence among working age Australians, with men aged from 25 to 64 years living in areas of greatest socioeconomic disadvantage having death rates almost twice as high (96 per cent higher) as those living in areas of least disadvantage. For females the differential was 69 per cent. Similar differentials for males and females have persisted over the period from 1995 to 1997, with differentials for motor vehicle traffic accidents becoming substantially larger (**Table 5.2**, page 104).

The NSW Health Department (1997) found an inverse relationship (-0.23) between high socioeconomic status and death by accidents, poisoning and violence in 15 to 64 year olds over the period from 1990 to 94.

Indigenous people also have higher death rates from these causes. The ABS and AIHW (1999) report that for Indigenous men, the standardised mortality ratio (from accidents, poisonings and violence) was 3.2 times that expected from the overall Australian rates, and deaths from causes in this group were responsible for 19.3 per cent of the excess mortality experienced. For Indigenous women, the standardised mortality ratio was 3.6 times that expected, and deaths from causes in this group were responsible for 16.9 per cent of the excess mortality. These figures were derived from data for deaths of Indigenous people in SA, WA and the NT for the three-year period 1995-1997.

Years of potential life lost from accidents, poisonings and violence

Estimates have been made of the number of years of potential life lost (YPLL: see discussion on page 160 for additional details of this concept) from deaths from the external causes of accidents, poisonings and violence (Ginpil et al 1992). For people of 'working life' (ages 18 to 65 years) it is estimated that 180,234 years of (potential) life have been lost due to premature deaths from these external causes. This is 34.2 per cent of the total number of YPLL from all causes of death, of which 15.0 per cent were from road crashes, 8.9 per cent from suicides, 8.4 per cent from other accidents, and 1.9 per cent from violence. For males, 32.5 per cent of YPLL during their working life were from these external causes and, for females, 16.0 per cent.

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Deaths of people aged 15 to 64 years from accidents, poisonings and violence, 1992 to 1995

Capital city comparison (Australia as the standard)

Over the four years from 1992 to 1995, Standardised Death Ratios (SDRs) for deaths from accidents, poisonings and violence, of people aged from 15 to 64 years ranged from 75** in **Canberra** to 149** in **Darwin**. With the exception of **Darwin**, and **Hobart** (an SDR of 114*), the other capital cities had fewer deaths than expected. **Melbourne** and **Sydney** also had relatively low ratios, of 80** and 84**, respectively.

There was a higher differential (from the Australian rates) in the SDRs recorded for **Hobart** and **Darwin** in the later period shown in **Table 5.23**, suggesting a worsening (relative to the Australian rates) in rates of death from accidents, poisonings and violence between the periods analysed. The movement in the ratios for **Canberra** indicates an improvement in death rates relative to the Australian rates; similar, but smaller movements were evident in the ratios for **Sydney** and **Melbourne**.

Table 5.23: Deaths of people aged 15 to 64 years from accidents, poisonings and violence, capital cities
Standardised death ratios

	Sydney	Melbourne	Brisbane	Adelaide	Perth	Hobart	Darwin	Canberra[1]	All capitals
1992-95	84**	80**	99	96	95	114*	149**	75**	88**
1985-89	91**	86**	92**	86**	82**	98	141**	88**	89**

[1]Includes Queanbeyan (C)
Source: See *Data sources*, Appendix 1.3
Statistical significance: * significance at 5 per cent; ** significance at 1 per cent

Within **Perth**, there were 1,835 deaths from the combined causes of accidents, poisonings and violence (64.2 per cent of all deaths from these causes). Some 73.4 per cent of these (1,346 deaths) were deaths of 15 to 64 year olds, and 77.0 per cent were males. There were 7.3 per cent more deaths from these external causes over the period from 1992 to 1995 than over the years from 1985 to 1989, rising from an average of 314 per year to 337 per year.

Perth[10] (Western Australia as the standard)

Between 1992 and 1995 in **Perth**, there were 1,346 deaths of 15 to 64 year olds from accidents, poisonings and violence, 14 per cent fewer deaths than expected from the State rates (an SDR of 86**).

There were six SLAs with ratios elevated by more than 15 per cent, none of which was statistically significant; these were Mosman Park (139 and 13 deaths), Victoria Park (130; 44), Kwinana (126; 29), Stirling: South-Eastern (123; 34) and Bassendean (120; 21 deaths). The majority of SLAs in **Perth** were in the middle range mapped, with SDRs within 15 per cent of the level expected from the State rates (**Map 5.16**). The distribution of SLAs within this range was widespread, and included old established areas such as Nedlands (107) and South Perth (89), industrialised areas such as Cockburn (103) and developing urban areas such as Armadale (107) and Kalamunda (95).

In ten SLAs, ratios were at least 15 per cent below the level expected from the State rates; they included Wanneroo (with an SDR of 54**), Bayswater (57**), Canning (65**) and Gosnells (77*).

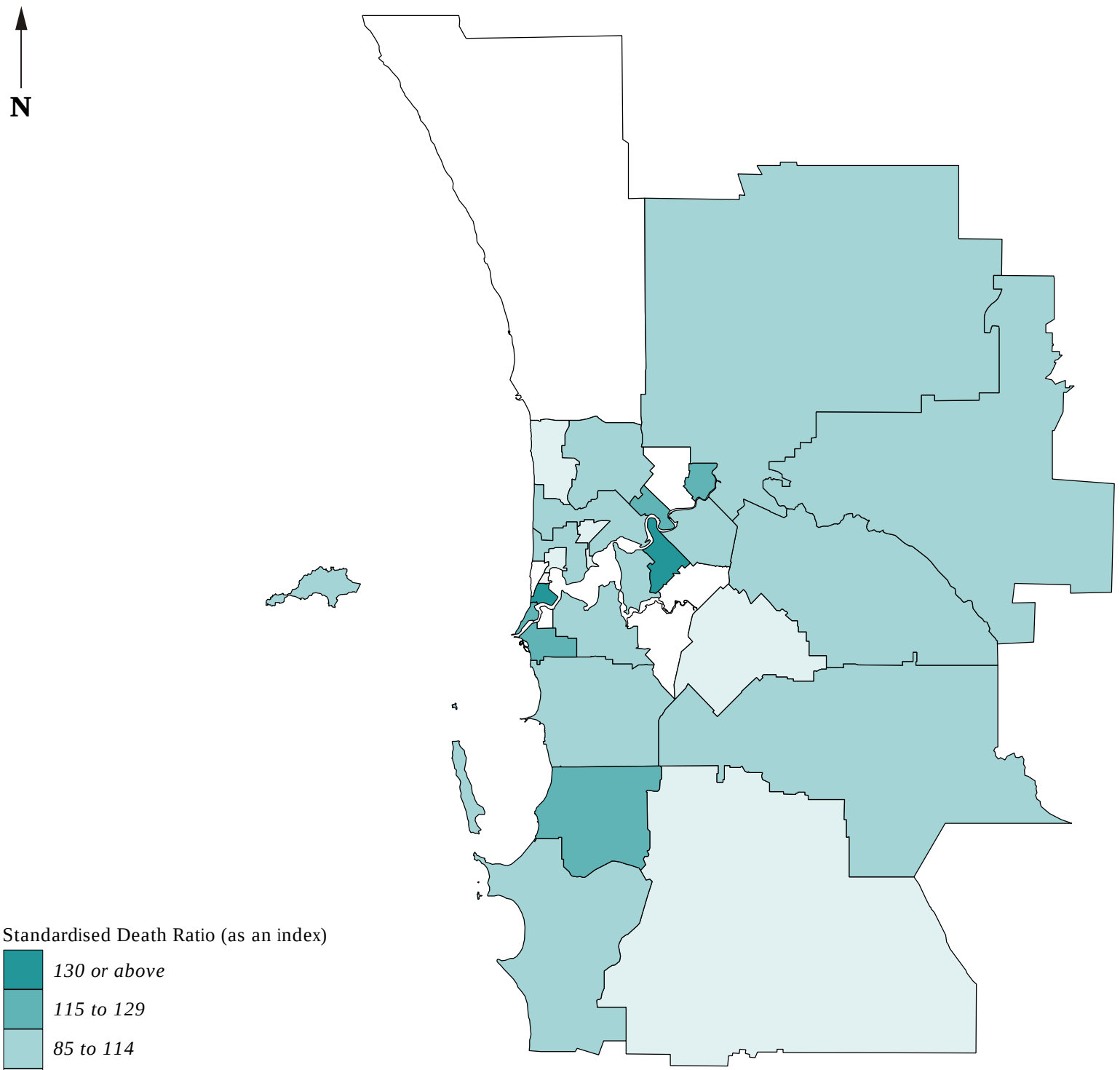
The largest numbers of deaths of 15 to 64 year olds from accidents, poisonings and violence were recorded for residents of Wanneroo (134 deaths), Stirling: Central (114) and Melville (103).

There were correlations of meaningful significance at the SLA level with the variables for housing authority rented dwellings (0.54) and single parent families (0.50), and of lesser significance with low income families (0.47), unemployment (0.43) and the Indigenous population (0.41). These results, together with the weak inverse association with the IRSD (-0.36), suggest the existence of an association at the SLA level between high rates of premature death from accidents, poisonings and violence and socioeconomic disadvantage.

[10]As there were too few areas with sufficient cases to analyse for this variable in non-metropolitan Western Australia, the data has not been mapped. A summary of the main features is on page 169.

Map 5.17
Deaths of people aged 15 to 64 years from accidents, poisonings and violence, Perth, 1992 to 1995

Standardised Death Ratio: number of deaths in each Statistical Local Area compared with the number expected*



Standardised Death Ratio (as an index)

- *130 or above*
- *115 to 129*
- *85 to 114*
- *70 to 84*
- *below 70*

*Expected numbers were derived by indirect age-sex standardisation, based on WA totals

Source: Calculated on data from ABS 1996 Census

Details of map boundaries are in Appendix 1.2

National Social Health Atlas Project, 1999

Deaths of people aged 15 to 24 years from accidents, poisonings and violence, 1992 to 1995

Capital city comparison (Australia as the standard)

Over the four years from 1992 to 1995, Standardised Death Ratios (SDRs) for deaths from accidents, poisonings and violence of people aged from 15 to 24 years ranged from 65** in **Canberra** to 127* in **Hobart**. With the exception of **Darwin** (with an SDR of 124) and **Brisbane** (104), the other capital cities recorded fewer deaths than expected. **Sydney** and **Melbourne** also had relatively low ratios, of 76** and 78**, respectively.

There was a higher differential (from the Australian rates) in the SDRs recorded for **Perth**, **Brisbane**, **Hobart** and **Darwin** in the later period shown in **Table 5.24**, suggesting a worsening (relative to the Australian rates) in rates of death from accidents, poisonings and violence between the periods analysed. The movements in the ratios for the other capitals (and in particular in **Canberra)** indicate an improvement in death rates relative to the Australian rates.

Table 5.24: Deaths of people aged 15 to 24 years from accidents, poisonings and violence, capital cities
Standardised death ratios

	Sydney	Melbourne	Brisbane	Adelaide	Perth	Hobart	Darwin	Canberra[1]	All capitals
1992-95	76**	78**	104	85**	97	127*	124	65**	84**
1985-89	88**	81**	83**	89*	76**	95	112	97	85**

[1]Includes Queanbeyan (C)
Source: See *Data sources*, Appendix 1.3
Statistical significance: * significance at 5 per cent; ** significance at 1 per cent

Deaths from the external causes of accidents, poisonings and violence were the major cause of death for people aged from 15 to 24 years. Over the four year period from 1992 to 1995, they represented 73.2 per cent of all deaths in Western Australia in this age group - 79.2 per cent of male deaths and 55.4 per cent of female deaths. Males predominated, accounting for 80.9 per cent of all deaths from these external causes. Almost half (42.4 per cent) of male deaths were from motor vehicle traffic accidents and more than one third (34.6 per cent) were from suicides.

Mathers (1994) examined the extent of disparities (related to socioeconomic status of areas of residence) in mortality rates according to the major cause of death. Differentials in mortality rates for deaths from injury and poisonings were clearly evident for both males and females (aged from 15 to 24 years) from the most socioeconomically disadvantaged areas - 47 per cent more deaths of males than in the most advantaged areas, and 66 per cent for females. This relationship was also evident between socioeconomic status and suicides, with 35 per cent more male deaths and 30 per cent more female deaths in the most socioeconomically disadvantaged areas than there were in the most advantaged areas. Mathers (in press) has recently reported an increase in the rates of male suicide in areas of low socioeconomic status over the decade from 1985.

Perth[11] (Western Australia as the standard)

There were 376 deaths of 15 to 24 year old residents in **Perth** in the four years from 1992 to 1995, 19 per cent fewer deaths than expected from the State rates (an SDR of 81**).

In light of the relatively small number of deaths from these causes in **Perth**, particular care should be taken to refer to the absolute numbers, published in Volume 6.1.

The highest ratios for deaths from these external causes were recorded in the south-eastern fringe SLAs of Armadale (with an SDR of 159** and 30 deaths) and Kalamunda (132; 24 deaths), and the inner SLAs of Stirling: South-East (147; 11 deaths) and Victoria Park (119; 13 deaths).

The lowest ratios (of SLAs with at least five expected deaths) were recorded in Subiaco (with an SDR of 29), Wanneroo (43**) and Bayswater (44*).

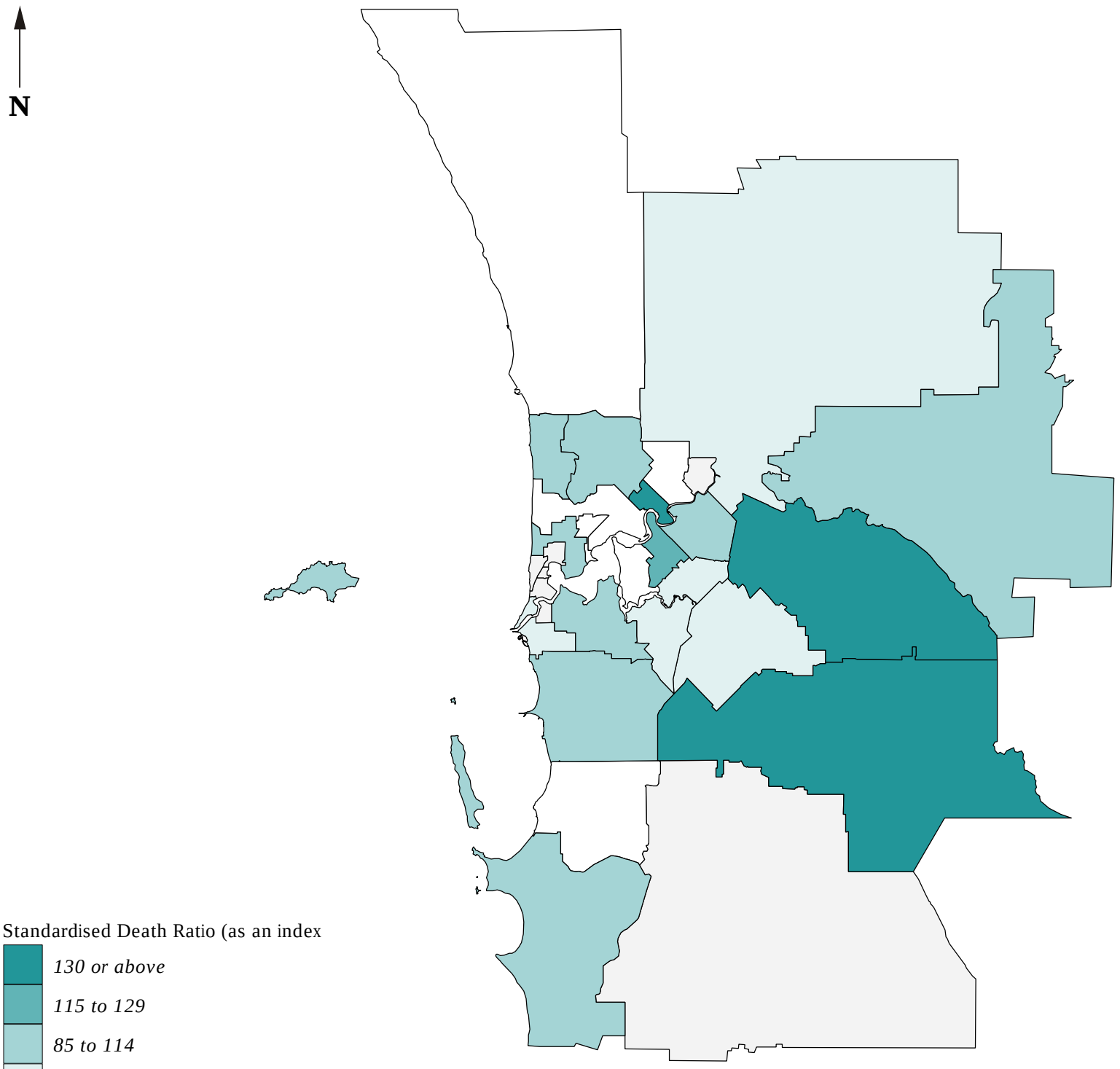
The largest number of deaths of 15 to 24 year olds from accidents, poisonings and violence were from Stirling: Central (36 deaths), Melville (35) and Wanneroo (32).

The correlation analysis was not undertaken as there were too many SLAs with small numbers of cases.

[11]As there were too few areas with sufficient cases to analyse for this variable in non-metropolitan Western Australia, the data has not been mapped. A summary of the main features is on page 170.

Map 5.18
Deaths of people aged 15 to 24 years from accidents, poisonings and violence, Perth, 1992 to 1995

Standardised Death Ratio: number of deaths in each Statistical Local Area compared with the number expected*



Standardised Death Ratio (as an index

- *130 or above*
- *115 to 129*
- *85 to 114*
- *70 to 84*
- *below 70*
- *fewer than five expected deaths*

*Expected numbers were derived by indirect age-sex standardisation, based on WA totals

Source: See Data sources, Appendix 1.3

Details of map boundaries are in Appendix 1.2

National Social Health Atlas Project, 1999

Deaths of people aged 15 to 64 year olds: years of potential life lost, 1992 to 1995

Capital city comparison (Australia as the Standard)

One measure of the impact of premature death is the number of potential years of life lost as a result of death before the age of 65 years. This measure is calculated as the sum of all the years of life that could potentially have been lived had people not died before the age of 65 years. The total number of years of potential life lost (YPLL) is calculated by assuming that people who died at 17 years of age would have otherwise lived to the age of 65 years (ie. 65 minus 17 years), or 48 years. In this analysis, deaths included were of people aged from 15 to 64 years. The results are expressed as rates per 100,000 population, and age standardised to the Australian population.

People in most capital cities had fewer years of potential life lost (YPLL) than were expected from the Australian rates, with the lowest standardised ratios (SRs) in **Canberra** (81**), **Perth** (89**) and **Melbourne** (90**) (**Table 5.25**). **Darwin** (with an SR of 137**) and **Hobart** (108**) had the only elevated ratios: the ratio of 137** in **Darwin** indicates that there were 37 per cent more YPLL by 15 to 64 year old residents of **Darwin** than would be expected from the Australian rates. Overall, ratios for females (95**) were generally higher than for males (94**), the exceptions being **Sydney** and **Darwin** (**Table 5.25**).

Table 5.25: Deaths of people aged 15 to 64 years: years of potential life lost, capital cities, 1992 to 1995
Standardised ratios

	Sydney	Melbourne	Brisbane	Adelaide	Perth	Hobart	Darwin	Canberra[1]	All capitals
Males	**99****	**90****	**93****	**93****	**88****	**104****	**144****	**79****	**94****
Females	**96****	**91****	**97****	**100**	**91****	**114****	**122****	**84****	**95****
Total	**98****	**90****	**94****	**96****	**89****	**108****	**137****	**81****	**94****

[1]Includes Queanbeyan (C)
Source: See *Data sources*, Appendix 1.3
Statistical significance: * significance at 5 per cent; ** significance at 1 per cent

Perth (Western Australia as the Standard)

Over the years from 1992 to 1995, there were an estimated 181,368 YPLL as a result of deaths of residents of **Perth** aged from 15 to 64 years, eight per cent fewer than were expected from the State rates (an SR of 92**). There were more YPLL for males (112,542 years, 62.1 per cent) than for females (68,826 years, 37.9 per cent).

The distribution of standardised ratios for this summary indicator of premature death (**Map 5.18**) produces a pattern consistent with that evident for many of the measures of socioeconomic status in Chapter 3. The highest ratios were mainly in SLAs located immediately to the east of the city, and in a band extending south from Mosman Park to Kwinana and then east to the boundary of the metropolitan area.

There were nine SLAs with elevated ratios, with the most highly elevated being in Mosman Park (with an SR of 154**) and Stirling: South-Eastern (152**). Ratios elevated by at least 15 per cent for YPLL from deaths at ages from 15 to 64 years were also recorded in Belmont (an SR of 131**), Victoria Park and Kwinana (both 128**), Bassendean (124**), Armadale (117**) and Fremantle (115**).

Of the 20 SLAs in which YPLL were lower than expected, the lowest ratios were recorded for residents of Peppermint Grove (with 21 YPLL, 91 per cent fewer than expected from the State rates, an SR of 9**), Wanneroo (63**), East Fremantle (68**), Bayswater (70**), Canning and Claremont (both 80**).

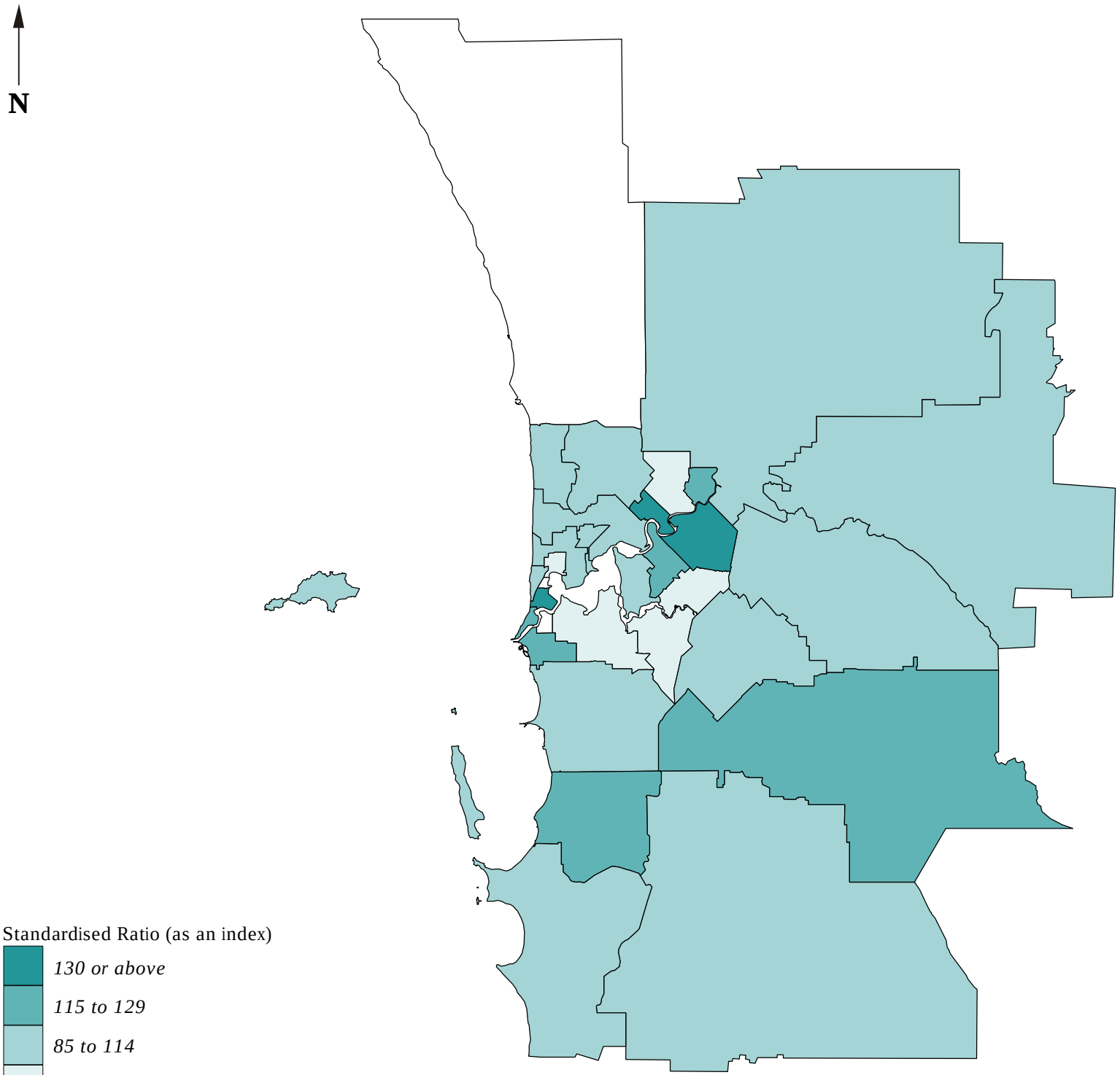
The largest numbers of YPLL from premature death were recorded for residents of the larger SLAs of Wanneroo (19,073 years), Stirling: Central (16,851), Melville (12,431) and Gosnells (10,448).

Males accounted for substantially more YPLL in Stirling: South-Eastern (3,467 years compared to 1,496 years for females), Mundaring (3,073; 1,247) and Nedlands (2,212; 903).

There were correlations of meaningful significance with the variables for single parent families (0.68) and housing authority rented dwellings (0.63), as well as a weaker correlation with female sole parent pensioners (0.45). These results, together with the inverse correlation of meaningful significance with the IRSD (-0.50), support the existence of an association at the SLA level between high rates of premature death and socioeconomic disadvantage.

Map 5.19
Deaths of people aged 15 to 64 years: years of potential life lost, Perth, 1992 to 1995

Standardised Death Ratio: number of years of potential life lost in each Statistical Local Area compared with the number expected*



*Expected numbers were derived by indirect age-sex standardisation, based on WA totals

Source: Calculated on data from ABS 1996 Census

Details of map boundaries are in Appendix 1.2

National Social Health Atlas Project, 1999

Deaths of people aged 15 to 64 years: years of potential life lost, 1992 to 1995

State/Territory comparison (Australia as the Standard)

All of the *Rest of State/Territory* areas in **Table 5.26** had higher standardised ratios (SRs) for years of potential life lost (YPLL) than were calculated for the capital cities. The largest differential was in the Northern Territory, with more than twice the SR in the *Rest of State/Territory* areas than was calculated for **Darwin**; the next highest differential was in Western Australia. In contrast to the male and female rates recorded in the metropolitan areas, male rates (113**) were generally above those recorded for females (111**), with the exceptions being Queensland, the Northern Territory and Tasmania.

Table 5.26: Deaths of people aged 15 to 64 years; years of potential life lost, State/Territory, 1992 to 1995
Standardised ratios

	NSW	Vic	Qld	SA	WA	Tas	NT	ACT	Total
Capital city	98**	90**	94**	96**	89**	108**	137**	81**[1]	94**
Other major urban centres[2]	104**	108**	97**	..	..	..	..	..	102**
Rest of State/Territory	112**	102**	109**	112**	118**	117**	278**	–[3]	113**
Whole of State/Territory	102**	94**	101**	100	97**	113**	210**	79**	100
Rest of State/Territory									
Males	114**	103**	108**	112**	119**	117**	273**	–[3]	113**
Females	108**	102**	110**	112**	117**	117**	287**	–[3]	111**

[1]Includes Queanbeyan (C)
[2]Includes Newcastle and Wollongong (NSW); Geelong (Vic); and Gold Coast-Tweed Heads and Townsville-Thuringowa (Qld)
[3] Data included with ACT total
Source: See *Data sources*, Appendix 1.3
Statistical significance: * significance at 5 per cent; ** significance at 1 per cent

Rest of State (Western Australia as the Standard)

There were an estimated 86,843 YPLL as a result of deaths of residents of the non-metropolitan areas of Western Australia aged from 15 to 64 years over the period from 1992 to 1995, 22 per cent more than were expected from the Western Australia rates (a ratio of 122**). The elevated ratio is in contrast to the lower than expected rate among metropolitan residents. Males accounted for two thirds (66.0 per cent) of these years of potential years lost, 57,279 years.

Highly elevated standardised ratios are found in SLAs extending from the margins of the wheat belt into most of the State's remote regions (**Map 5.19**), with elevated ratios in over half of the SLAs in the State (52.7 per cent). Lower ratios predominate in a broad coastal strip, extending from Esperance to Exmouth.

The most highly elevated ratios (of three to five times the level expected from the State rates) were in the State's far north in Halls Creek (with an SR of 510**; and 1,863 YPLL), Wiluna-Ngaanyatjarraku (411**; 1,075) and Wyndham-East Kimberley (292**; 2,465), and in Derby-West Kimberley (317**; 3,246), in central Western Australia. Other SLAs in the north with highly elevated ratios were Broome (an SR of 226**), Meekatharra (198**) and East Pilbara (184**). Elsewhere, elevated ratios were recorded for YPLL from deaths of 15 to 64 year olds from Dundas (an SR of 248** and 582 YPLL), Menzies (214**; 97), Morawa (204**; 341) and Wagin (192**; 556).

Excluding SLAs in which there were fewer than 50 YPLL, the lowest ratios were recorded in Coorow (with 70 per cent fewer YPLL than expected from the State rates, an SR of 30**), Cuballing (45**), Wyalkatchem (48**), Lake Grace (53**), Brookton (58**) and Three Springs (59**). Each of these SLAs were located within 300 kilometres from **Perth**.

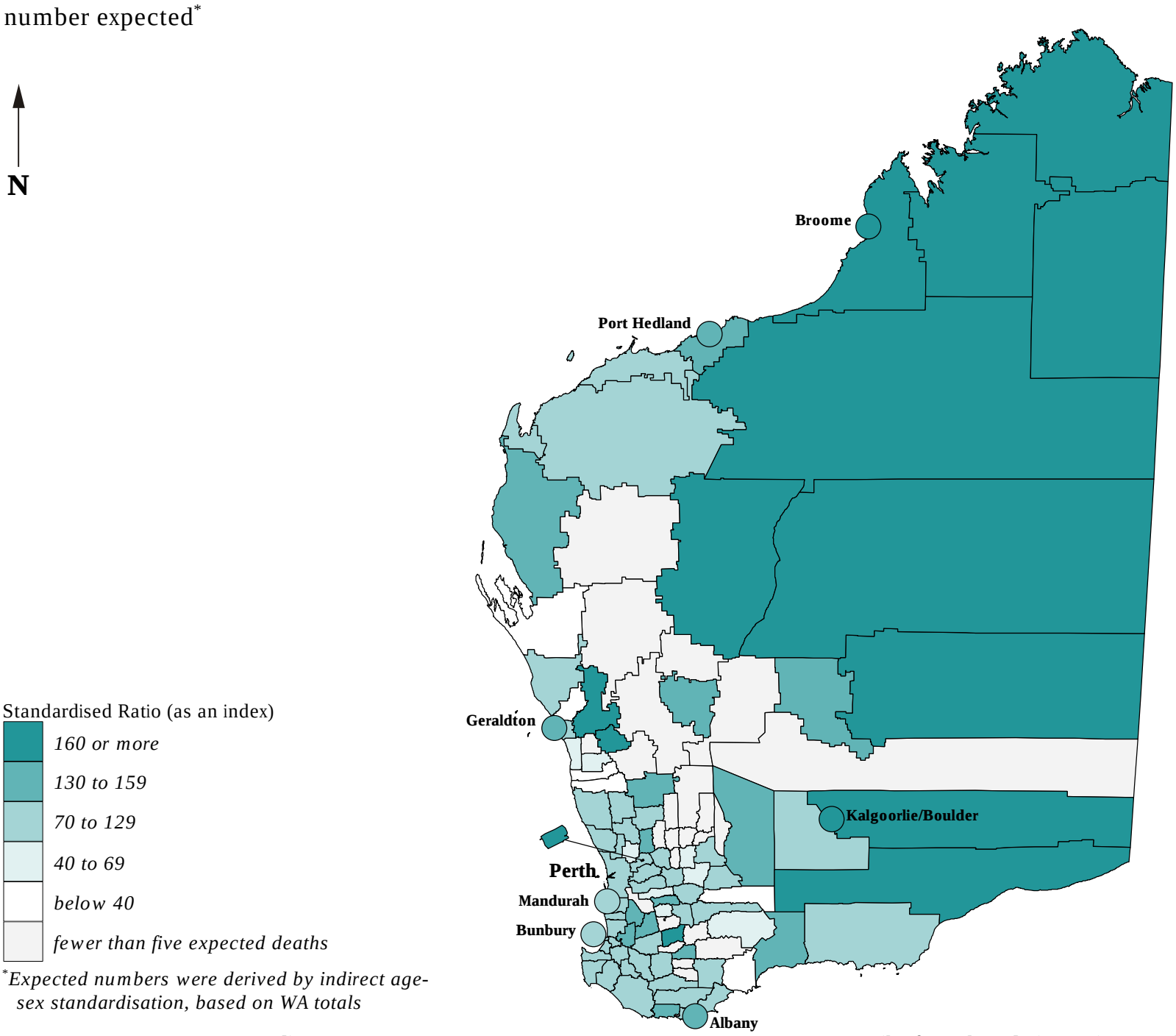
There were six SLAs in which premature deaths were estimated to have resulted in more than 3,000 years of potential life being lost. Of these, Mandurah (5,971 years), Geraldton (4,259), Bunbury (4,003) and Albany (3,183) were all regional centres with older populations. The other SLAs with the highest number of YPLL had younger age profiles; they were Kalgoorlie/Boulder (with 6,838 YPLL) and Derby-West Kimberley (3,246).

Males accounted for substantially more YPLL in Esperance (1,196 years compared to 280 years for females), Northam (324; 77), Boddington (263; 54), Nannup (182; 42) and Dumbleyung (174; 30).

There were correlations of meaningful significance at the SLA level with the variables for dwellings with no motor vehicles (0.70), the Indigenous population (0.61) and single parent families (0.53). These results, together with the weaker inverse correlation with the IRSD -0.47), suggest the existence of an association at the SLA level between high rates of premature death (as measured by this variable for YPLL) and socioeconomic disadvantage.

Map 5.20
Deaths of people aged 15 to 64 years: years of potential life lost, Western Australia, 1992 to 1995

Standardised Ratio: number of years of potential life lost in each Statistical Local Area compared with the number expected*

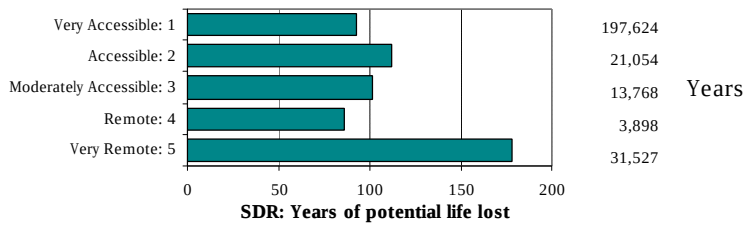


*Expected numbers were derived by indirect age-sex standardisation, based on WA totals

Source: See Data sources, Appendix 1.3

Details of map boundaries are in Appendix 1.2

Accessibility/Remoteness Index of Australia



197,624
21,054
13,768
3,898
31,527

Years

The ARIA graph of years of potential life lost (YPLL) highlights the overall impact of premature death seen in the previous graphs. SDRs for premature deaths are similar across the first four ARIA categories, ranging from a high of 112 in the Accessible category to a low of 86 in the Remote category. The most highly elevated ratio is in the Very Remote areas (an SDR of 178), where the higher death rates of Indigenous people are likely to be an important influence. The second largest numbers of YPLL are in these most remote areas.

Source: Calculated on ARIA classification, DHAC

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The information on these six pages provides summary details for variables where it was considered that there were too few cases to map the data at the SLA level. Where SLA data is available it is in the tables in Volume 6.1.

Infant deaths, 1992 to 1995

State/Territory comparison (Australia as the Standard)

The infant death rate is calculated as the number of infant deaths (deaths under one year of age) per 1,000 live births. The rate varied between the States and Territories, from a high of 13.9 in the Northern Territory to less than half that level in a number of States and the Australian Capital Territory. Rates in the *Rest of State/Territory* areas were similarly highest in the Northern Territory and were higher than the capital city rates for all but Queensland (where they were the same) and Tasmania (where they were lower).

Infant death rates in the *Rest of State/Territory* areas were 26.7 per cent lower over the years from 1992 to 1995 than over the years from 1985 to 1989 (**Table 5.27**). The largest reductions occurred in the non-metropolitan areas of Tasmania (down by 46.7 per cent) and the smallest in the Northern Territory (down by 10.4 per cent). Western Australia (22.8 per cent) and Queensland (24.4 per cent) experienced the next smallest reductions, with declines of around one third occurring in the remaining States.

Table 5.27: Infant deaths, State/Territory
Infant deaths per 1,000 live births

	NSW	Vic	Qld	SA	WA	Tas	NT	ACT	Total
1992 to 1995									
Capital city	6.1	5.2	6.7	5.2	5.3	7.5	10.3	5.9[1]	5.8
Other major urban centres[2]	6.4	4.6	7.1	..	..	..	..	..	6.2
Rest of State/Territory	7.1	5.4	6.7	5.9	7.1	5.7	16.3	–[3]	6.8
Whole of State/Territory	6.4	5.3	6.8	5.4	5.9	6.4	13.9	5.1	6.2
1985 to 1989[4]									
Rest of State/Territory	9.3	8.3	9.0	9.0	9.2	10.7	18.2	–[3]	9.3

[1]Includes Queanbeyan (C)
[2]Includes Newcastle and Wollongong (NSW); Geelong (Vic); and Gold Coast-Tweed Heads and Townsville-Thuringowa (Qld)
[3] Data included with ACT total
[4]For 1985-89 the rate was calculated per 1,000 children aged under 12 months plus infant deaths: this approximates live births
Source: See *Data sources*, Appendix 1.3

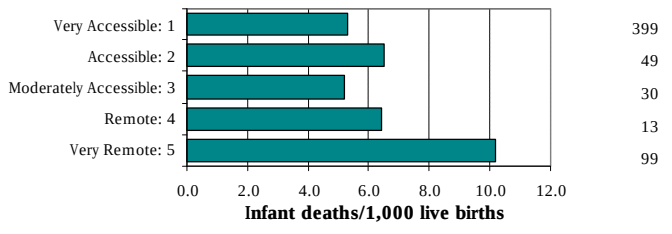
Rest of State

Over the four year period from 1992 to 1995, there were 220 infant deaths recorded in the non-metropolitan areas of Western Australia, 7.1 infant deaths per 1,000 live births.

There were fewer than five deaths expected from the State rates in most SLAs; those with five deaths or more, and the most highly elevated ratios, were generally located in the central and north-eastern regions of the State, in areas with the largest populations of Indigenous people. They included Wiluna-Ngaanyatjarraku (with an infant death rate of 54.3 and 5 infant deaths), Derby-West Kimberley (21.6; 13 deaths), Halls Creek (20.3; 5) and Wyndham-East Kimberley (19.0; 11). High rates were also recorded in East Pilbara (11.4 infant deaths per 1,000 live births), Murray (11.0), Broome (10.5), Collie (9.6), Esperance (9.4) and Albany (8.0). SLAs with ratios around the *Rest of State* average were Roebourne (with 7.1 infant deaths per 1,000 live births), Geraldton (6.8), Kalgoorlie/Boulder (6.7) and Mandurah (6.2). Residents of Bunbury, located in the south, recorded the lowest infant death rate, with 5.4 infant deaths per 1,000 live births, a higher rate than the average for **Perth**.

The largest number of infant deaths (other than in areas listed above) were in Kalgoorlie/Boulder (16 infant deaths), Mandurah (12) and Geraldton (11).

Accessibility/Remoteness Index of Australia



Infant death rates generally increase with remoteness. The lowest rates are in the Moderately Accessible and Very Accessible ARIA categories (5.2 and 5.3 infant deaths per 1,000 live births, respectively) and the highest are in the Very Remote ARIA category (10.2 infant deaths per 1,000 live births, and the second highest number of births). The Remote and Accessible areas had similar rates, of 6.4 and 6.5, respectively. The very high figure in the most remote areas is likely to reflect the high infant death rates among Indigenous Australians.

Source: Calculated on ARIA classification, DHAC

Deaths of people aged 15 to 64 years from lung cancer, 1992 to 1995

State/Territory comparison (Australia as the Standard)

The highest Standardised Death Ratio (SDR) for deaths from lung cancer of people aged from 15 to 64 years in the *Rest of State/Territory* areas was recorded in the Northern Territory (an SDR of 258**). Apart from the relatively low ratio in South Australia (an SDR of 84*), the other States all had SDRs within 10 per cent of the level expected from the Australian rates. At the *Whole of State/Territory* level, only the Northern Territory (214**) had substantially more deaths from lung cancer than expected from the Australian rates.

Most States had similar differentials (from the Australian rates) in the SDR recorded for their non-metropolitan areas in the later period shown in **Table 5.28**. The major exception is the Northern Territory, with a markedly higher SDR (suggesting an increase in death rates relative to the Australian experience) between the periods analysed.

Table 5.28: Deaths of people aged 15 to 64 years from lung cancer, State/Territory
Standardised death ratios

	NSW	Vic	Qld	SA	WA	Tas	NT	ACT	Total
1992 to 1995									
Capital city	102	94*	103	95	90*	120	164**	77*[1]	98*
Other major urban centres[2]	105	125	104	..	..	..	..	..	107
Rest of State/Territory	106	100	99	84*	96	107	258**	–[3]	102
Whole of State/Territory	104	97	102	92*	92*	113	214**	80*	100
1985 to 1989									
Rest of State/Territory	100	98	99	83**	94	112	165**	–[3]	99

[1]Includes Queanbeyan (C)
[2]Includes Newcastle and Wollongong (NSW); Geelong (Vic); and Gold Coast-Tweed Heads and Townsville-Thuringowa (Qld)
[3] Data included with ACT total
Source: See *Data sources*, Appendix 1.3
Statistical significance: * significance at 5 per cent; ** significance at 1 per cent

In the non-metropolitan areas of Western Australia**,** 17.8 per cent of all cancer deaths were from cancers of the trachea, bronchus and lung (referred to here as lung cancer). This was a minor cause of death in the non-metropolitan areas, accounting for 5.6 per cent of deaths at all ages; 5.7 per cent of deaths of people aged 65 years and over; and 6.0 per cent of all deaths before age 65.

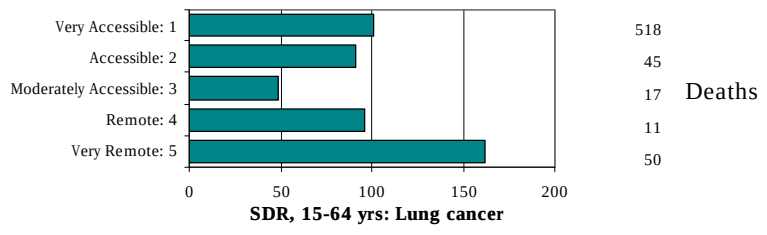
Rest of State (Western Australia as the Standard)

There were 179 deaths from lung cancer of people aged from 15 to 64 years over the years from 1992 to 1995, five per cent more deaths than expected from the State rates (an SDR of 105).

Only eight SLAs had more than five deaths from lung cancer, and in five of these, the ratios were elevated. The highest ratios were recorded in Kalgoorlie/Boulder (with an SDR of 242**), Bunbury (140), Mandurah (129), Geraldton (128) and Harvey (123). The lowest ratios were recorded in Busselton (with an SDR of 42) and the town of Albany (64).

The largest numbers of deaths from lung cancer at these ages were of residents in Mandurah (22 deaths), Kalgoorlie/Boulder (17) and Bunbury (14).

Accessibility/Remoteness Index of Australia



The SDRs for deaths from lung cancer in the three 'accessible' ARIA categories are similar to those recorded for all cancers, although the lowest and highest ratios are more extreme. SDRs decline with increasing remoteness from a ratio of 101 in the Very Accessible areas to a low of 49 in the Moderately Accessible ARIA category, before increasing to a highly elevated ratio of 162 in the Very Remote areas.

Source: Calculated on ARIA classification, DHAC

Deaths of people aged 15 to 64 years from circulatory system diseases, 1992 to 1995

State/Territory comparison

Residents of the non-metropolitan areas of all States and the Northern Territory had higher Standardised Death Ratios (SDRs) from diseases of the circulatory system than those living in the capital cities. The largest differentials were in the Northern Territory and Western Australia, with the Northern Territory also recording the highest non-metropolitan SDR, of 289**. At the *Whole of State/Territory* level SDRs ranged from 26 per cent lower than expected in the Australian Capital Territory, an SDR of 74**, to almost twice the number of deaths expected in the Northern Territory, an SDR of 191**.

There was little difference in the SDRs for the two periods shown in **Table 5.29** for most States and Territories, although the higher SDRs in the later period for the Northern Territory, Tasmania and Western Australia suggest a worsening (relative to the Australian rates) in the death rates from these causes.

Table 5.29: Deaths of people aged 15 to 64 years from circulatory system diseases, State/Territory
Standardised death ratios

	NSW	Vic	Qld	SA	WA	Tas	NT	ACT	Total
1992 to 1995									
Capital city	98	85**	96	94*	82**	105	118	77**[1]	91**
Other major urban centres[2]	120**	107	95	..	..	..	..	..	111**
Rest of State/Territory	121**	101	109**	117**	112**	127**	289**	–[3]	115**
Whole of State/Territory	107**	90**	101	101	90**	118**	191**	74**	100
1985 to 1989									
Rest of State/Territory	119**	99	105**	114**	103	120**	260**	–[3]	111**

[1]Includes Queanbeyan (C)
[2]Includes Newcastle and Wollongong (NSW); Geelong (Vic); and Gold Coast-Tweed Heads and Townsville-Thuringowa (Qld)
[3] Data included with ACT total
Source: See *Data sources*, Appendix 1.3
Statistical significance: * significance at 5 per cent; ** significance at 1 per cent

Over the four year period from 1992 to 1995, 39.2 per cent of deaths of people of all ages (4,149 deaths) in the non-metropolitan areas of Western Australia were attributable to circulatory system diseases. These causes of death accounted for 24.1 per cent of deaths of people aged from 15 to 64 years and 47.3 per cent of deaths of people aged 65 years and over. Deaths from circulatory system diseases were a more important cause of death for males at a much earlier age than for females. Between the ages of 45 and 64 years, there were 455 male deaths and only 146 female deaths from this cause (over the years from 1992 to 1995). This relationship turned around at the age of 75 years and over, when the number of female deaths (1,293) exceeded the number of male deaths (1,187).

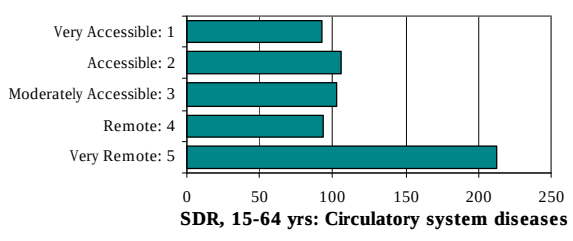
Rest of State

There were 724 deaths of 15 to 64 year old residents of the non-metropolitan areas of Western Australia from circulatory system diseases between 1992 and 1995, 24 per cent more than expected from the State rates (an SDR of 124**). This is much higher than the SDR of 91** recorded for residents of **Perth**.

Of the 33 SLAs in the non-metropolitan areas of Western Australia with five or more expected deaths, 14 had ratios elevated by 30 per cent or more. The most highly elevated of these were in Wyndham-East Kimberley (with an SDR of 398**; and 20 deaths), Derby-West Kimberley (390**; 27), East Pilbara (228**; 22), Donnybrook-Balingup (225**; 13), Kalgoorlie/Boulder (218**; 58), Broome (199**; 17), Port Hedland (179**; 21) and the town of Albany (157**; 32). The lowest ratios were in Capel (40) and Gingin (50).

The largest numbers of premature deaths from circulatory system diseases were of people from Mandurah (60 deaths) and Kalgoorlie/Boulder (58). All other SLAs had fewer than 40 deaths from these causes.

Accessibility/Remoteness Index of Australia



SDR, 15-64 yrs: Circulatory system diseases

Death rates of people aged from 15 to 64 years from circulatory system diseases are similar across the first four ARIA categories, ranging from a high of 106 in the Accessible category to a low of 92 in the Very Accessible category. The highly elevated ratio of 212 in the Very Remote areas indicates that there are more than twice the number of premature deaths from these diseases than expected from the State rates. The elevated SDR in the Very Remote category is likely to reflect the very high premature death rates experienced by Indigenous people.

Source: Calculated on ARIA classification, DHAC

Deaths of people aged 15 to 64 years from respiratory system diseases, 1992 to 1995

State/Territory comparison

Residents of the non-metropolitan areas of all States and the Northern Territory had higher Standardised Death Ratios (SDRs) from diseases of the respiratory system than those living in the capital cities. The largest differentials were in the Northern Territory, Tasmania and Western Australia, with the Northern Territory also recording the highest non-metropolitan ratio, an exceptionally high SDR of 908**.

There were differences in the SDRs for the two periods shown in **Table 5.31** for all but Victoria; the higher SDRs in the later period for Tasmania, the Northern Territory, South Australia and Western Australia suggest a worsening (relative to the Australian rates) in the death rates from these causes.

Table 5.31: Deaths of people aged 15 to 64 years from respiratory system diseases, State/Territory
Standardised death ratios

	NSW	Vic	Qld	SA	WA	Tas	NT	ACT	Total
1992 to 1995									
Capital city	94	79**	98	87*	64**	115	193**	79[1]	87**
Other major urban centres[2]	112	90	75**	..	..	..	..	..	98
Rest of State/Territory	116**	111*	118**	123*	134**	133**	908**	–[3]	128**
Whole of State/Territory	102	88**	104	97	82**	125**	511**	76	100
1985 to 1989									
Rest of State/Territory	127**	111*	129**	98	115	93	805**	–[3]	124**

[1]Includes Queanbeyan (C)
[2]Includes Newcastle and Wollongong (NSW); Geelong (Vic); and Gold Coast-Tweed Heads and Townsville-Thuringowa (Qld)
[3] Data included with ACT total
Source: See *Data sources*, Appendix 1.3
Statistical significance: * significance at 5 per cent; ** significance at 1 per cent

There were 905 deaths from diseases of the respiratory system over the period from 1992 to 1995 in the non-metropolitan areas of Western Australia, 8.5 per cent of all deaths**.** The majority of these deaths (79.4 per cent, 719 deaths) were of people aged 65 years and over, with under one fifth (17.8 per cent) being of deaths of people aged from 15 to 64 years. Deaths from these causes represented 5.3 per cent of all deaths for this age group.

Rest of State

There were 160 deaths of 15 to 64 year old non-metropolitan residents from respiratory system diseases, 62 per cent more deaths than were expected from the State rates (an SDR of 162**).

Only Bunbury (with an elevated SDR of 120) and Mandurah (with a low SDR of 52) had five or more expected deaths from these causes. The largest numbers of deaths from respiratory system diseases were recorded in Kalgoorlie/Boulder (19 deaths) and Broome and Geraldton (both with 10 deaths).

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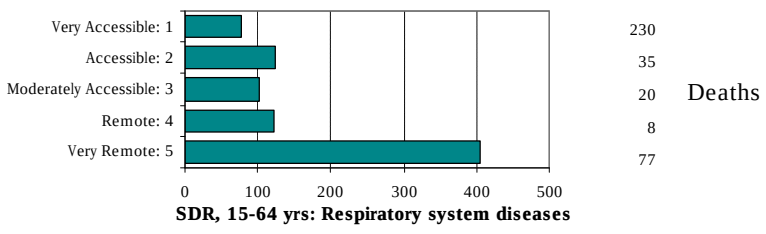


Death rates of people aged from 15 to 64 years from respiratory system diseases increase with remoteness. They increase from an SDR of 77 in the Very Accessible areas to an SDR of 122 in the Remote category, before increasing markedly to a highly elevated SDR of 404 in the Very Remote areas (in excess of four times the number of premature deaths from these diseases than expected from the State rates). The extremely highly elevated SDR in the Very Remote category is likely to reflect the high premature death rates experienced by Indigenous people.

Source: Calculated on ARIA classification, DHAC

Deaths of people aged 15 to 64 years from accidents, poisonings and violence, 1992 to 1995

State/Territory comparison

Residents of the non-metropolitan areas of all States and the Northern Territory had higher Standardised Death Ratios (SDRs) from the external causes of accidents, poisonings and violence than those living in the capital cities. Apart from Tasmania, the differentials were substantial, with the largest being in the Northern Territory: the Northern Territory also had the highest non-metropolitan SDR, of 254**. The main differences from the Australian rates in the SDRs for the two periods (**Table 5.32**) were in Western Australia (the higher SDR in the later period suggesting a worsening, relative to the Australian rates, in the death rates from these external causes) and the Northern Territory, with a somewhat lower ratio, suggesting an improvement (relative to the Australian rates) in the death rates from these causes.

Table 5.32: Deaths of people aged 15 to 64 years from accidents, poisonings and violence, State/Territory
Standardised death ratios

	NSW	Vic	Qld	SA	WA	Tas	NT	ACT	Total
1992 to 1995									
Capital city	84**	80**	99	96	95	114*	149**	75**[1]	88**
Other major urban centres[2]	95	111	108	..	..	..	..	..	101
Rest of State/Territory	121**	108**	131**	132**	152**	129**	254**	–[3]	127**
Whole of State/Territory	94**	88**	113**	105*	110**	123**	204**	74**	100
1985 to 1989									
Rest of State/Territory	122**	120**	133**	126**	123**	116**	285**	–[3]	126**

[1]Includes Queanbeyan (C)
[2]Includes Newcastle and Wollongong (NSW); Geelong (Vic); and Gold Coast-Tweed Heads and Townsville-Thuringowa (Qld)
[3] Data included with ACT total
Source: See *Data sources*, Appendix 1.3
Statistical significance: * significance at 5 per cent; ** significance at 1 per cent

There were 1,022 deaths in the non-metropolitan areas of Western Australia attributable to accidents, poisonings and violence, representing 9.6 per cent of all deaths for all ages. Unlike deaths from all causes, where the highest proportion is experienced among people aged 65 years and over, deaths from accidents, poisonings, and violence are a major cause of premature death, of people between the ages 15 and 64 years. Premature deaths accounted for 77.9 per cent of the 1,022 deaths recorded in the non-metropolitan areas of Western Australia, in comparison only 12.9 per cent of these deaths occurred at the age of 65 years and over.

Rest of State

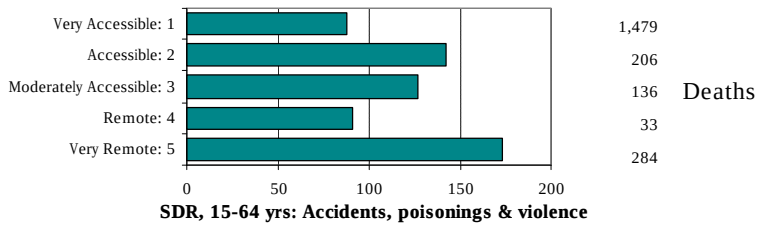
There were 796 deaths of 15 to 64 year olds from accidents, poisonings and violence outside **Perth**, 38 per cent more than expected from the State rates (an SDR of 138**).

Almost two thirds (62.1 per cent) of SLAs with five or more expected deaths from accidents, poisonings and violence at or these ages had standardised death ratios elevated by 30 per cent more above the level expected from the State rates. The relatively higher death rates of Indigenous people from this group of causes are likely to have influenced the ratios in the more remote areas. For example, Wyndham-East Kimberley (with an SDR of 267**), Derby-West Kimberley (266**) and East Pilbara (212**) each had ratios of more than twice the level expected. In addition, highly elevated ratios were also recorded in the town of Northam (an SDR of 267**), Broome (195**), the town of Albany (163**), Collie (161*), Port Hedland (154*), Busselton (149*) and Kalgoorlie/Boulder (138*).

Dardanup (an SDR of 52) and Harvey (62) had the lowest SDRs for deaths from accidents, poisonings and violence in the non-metropolitan areas of Western Australia.

In Kalgoorlie/Boulder there were 55 deaths from this cause in the period from 1992 to 1995, with 47 in Mandurah and 36 in Geraldton.

Accessibility/Remoteness Index of Australia



There are major differences in SDRs for accidents, poisonings and violence in the 15 to 64 year age group across the ARIA categories. The most highly elevated ratios are almost twice the level in the lowest ARIA category, with an SDR of 173 in the Very Remote category, compared with 88 in the Very Accessible category. The Accessible, Moderately Accessible and Remote categories also had elevated ratios, of 106 and 134 and 118, respectively. Again, the influence of Indigenous deaths is likely to be an important influence in the high ratios for the most remote areas.

Source: Calculated on ARIA classification, DHAC

Deaths of people aged 15 to 24 years from accidents, poisonings and violence, 1992 to 1995

State/Territory comparison

Residents of the non-metropolitan areas of all States and the Northern Territory had higher Standardised Death Ratios (SDRs) from the external causes of accidents, poisonings and violence than those living in the capital cities. In all cases the differentials were substantial, with the largest being in the Northern Territory, Western Australia and South Australia: the Northern Territory also had the highest non-metropolitan SDR, of 267**. The main differences from the Australian rates in the SDRs for the two periods shown in **Table 5.33** were in the ratios for Western Australia and the Northern Territory, with the higher SDRs in the later period suggesting a worsening, relative to the Australian rates, in the death rates from these causes.

Table 5.33: Deaths of people aged 15 to 24 years from accidents, poisonings and violence, State/Territory
Standardised death ratios

	NSW	Vic	Qld	SA	WA	Tas	NT	ACT	Total
1992 to 1995									
Capital city	76**	78**	104	85**	97	127*	124	65**[1]	84**
Other major urban centres[2]	89	94	110	..	..	..	..	..	98
Rest of State/Territory	127**	123**	136**	158**	188**	144**	267**	–[3]	140**
Whole of State/Territory	89**	89**	117**	102	120**	137**	202**	66**	100
1985 to 1989									
Rest of State/Territory	135**	132**	132**	146**	139**	130**	235**	–[3]	136**

[1] Includes Queanbeyan (C)
[2] Includes Newcastle and Wollongong (NSW); Geelong (Vic); and Gold Coast-Tweed Heads and Townsville-Thuringowa (Qld)
[3] Data included with ACT total
Source: See *Data sources*, Appendix 1.3
Statistical significance: * significance at 5 per cent; ** significance at 1 per cent

Over the four year period from 1992 to 1995, there were 241 deaths of people aged from 15 to 24 years from this group of external causes in the non-metropolitan areas of Western Australia. Although this was a relatively small number of deaths, they accounted for 81.7 per cent of all deaths in this age group - 84.6 per cent of male deaths and 73.0 per cent of female deaths. The data mapped for this variable represented 23.6 per cent of deaths at all ages from this cause.

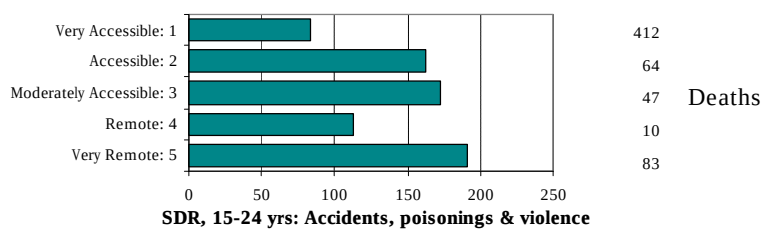
Rest of State

There were 241 deaths of 15 to 24 year olds from accidents, poisonings and violence (between 1992 and 1995) in the non-metropolitan areas of Western Australia, 57 per cent more than expected from the State rates (an SDR of 157**).

Only six SLAs were expected to have five or more deaths of 15 to 24 year olds from these causes. Of these, the highest ratios were recorded in the town of Albany (with an SDR of 244** and 13 deaths), Kalgoorlie/Boulder (147; 18) and Geraldton (144; 12). Only in Bunbury (76) and Harvey (S) (80) were there fewer deaths than expected recorded over these four years.

There were also 12 deaths at these ages in Mandurah.

Accessibility/Remoteness Index of Australia



SDR, 15-24 yrs: Accidents, poisonings & violence

The distribution of SDRs for deaths of 15 to 24 year olds from accidents, poisonings and violence varies across the ARIA categories. The lowest ratios are in the Very Accessible (an SDR of 83) and Remote (113) areas; and the highest are in the Moderately Accessible (173) and Very Remote (an SDR of 191) areas. The highly elevated ratio in the most remote areas indicates that there were 91 per cent more deaths from these causes than were expected from the State rates.

Source: Calculated on ARIA classification, DHAC

National Social Health Atlas Project, 1999

Total Fertility Rate

Introduction

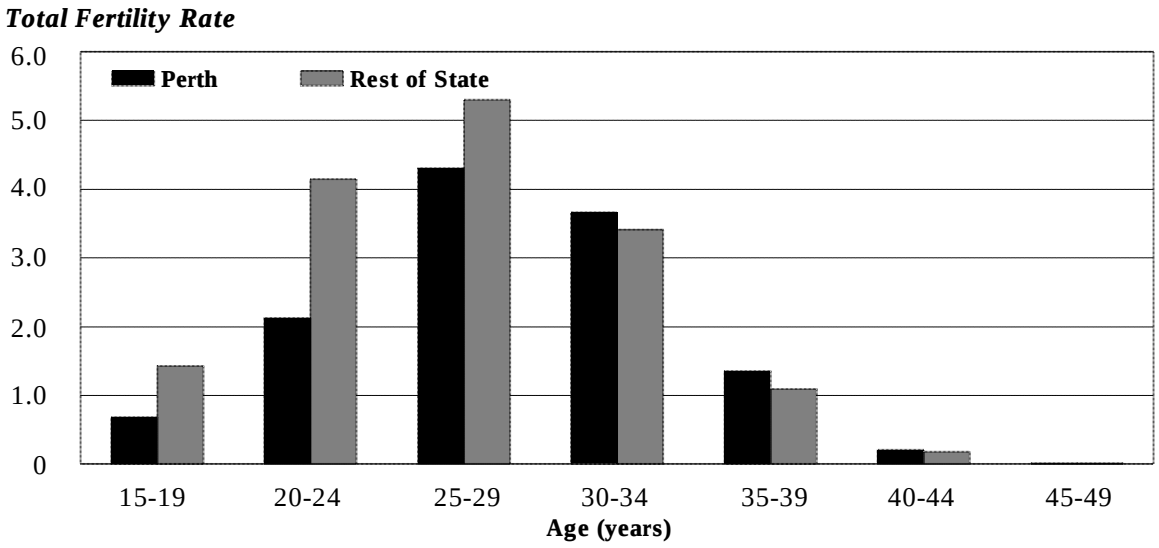
The Total Fertility Rate (TFR) is a measure of the production of children and is calculated from details of the age of the female population, the number of live births and the age of the mother at birth. It represents the mean number of children which females, living right through their child-bearing period, will (on average) bear, if they are subject to the fertility conditions holding in a particular area during the given period.

A TFR of 2.11 is the level at which a population replaces itself over the long term – ie. each woman has, on average, 2.11 births. In order to keep the ranges as simple as possible, the distribution mapped here has been split at 1.5 or 2.0 (and at intervals of 0.5 above and below), rather than at the replacement level figure of 2.11.

Details of the TFR are included in this chapter (rather than in Chapter 3 with the other demographic variables) because they have been compiled on the same boundaries as other data in this chapter. Common boundaries are important in enabling the correlation and cluster analysis to be undertaken, and to enhance the value of the maps in highlighting associations in the patterns of distribution.

The highest Total Fertility Rates (TFRs) in Western Australia are those for females aged from 25 to 29 years living in areas outside **Perth** (**Figure 5.10**). Females aged from 25 to 29 years and living in **Perth**, as well as those aged from 20 to 24 years and living in the non-metropolitan areas of Western Australia, and those aged from 30 to 34 years, regardless of residence, had the next highest TFRs. The largest difference in TFRs between residents of **Perth** and the rest of Western Australia was in the 20 to 24 year age group.

Figure 5.10: Total Fertility Rates, Perth and Rest of State, 1992 to 1995



Source: See *Data sources*, Appendix 1.3

Total Fertility Rate, 1992 to 1995

Capital city comparison

The capital cities recorded similar Total Fertility Rates (TFRs) over the four years from 1992 to 1995 (**Table 5.34**), with the exception of a higher rate in **Darwin** (2.06). The lowest TFR was that in **Adelaide** (1.64).

Table 5.34: Total Fertility Rate, capital cities, 1992 to 1995

Sydney	Melbourne	Brisbane	Adelaide	Perth	Hobart	Darwin	Canberra[1]	All capitals
1.81	1.70	1.73	1.64	1.76	1.79	2.06	1.72	1.75

[1]Includes Queanbeyan (C)
Source: See *Data sources*, Appendix 1.3

Areas with fewer than 20 births over this four year period have been excluded from the analysis.

Perth

The TFR for **Perth** over the four year period from 1992 to 1995 was 1.76, slightly lower than the State rate of 1.87. The highest rates were recorded for women aged 25 to 29 years (a TFR of 4.31), followed by those aged 30 to 34 (a TFR of 3.66) (**Figure 5.10**).

The majority of SLAs in **Perth** had TFRs of between 1 and 2.5, with no recordings in either of the highest or lowest ranges mapped.

Map 5.20 shows that SLAs with higher TFRs were located in the outer southern and north-eastern areas, with the highest rates recorded in Kwinana (with a TFR of 2.45) and Serpentine-Jarrahdale (2.30). Armadale (with a TFR of 2.20), Rockingham (2.13), Gosnells (2.12) and Cockburn (2.07), also located in the south, had TFRs of 2 or higher. Of SLAs located in the north-east, those with the highest rates were Swan (with a TFR of 2.18), Mundaring (2.13) and Bassendean (2.00).

Just over one third (36.7 per cent) of the SLAs in **Perth** had TFRs of between 1.50 and 2.00. TFRs in this range were generally located in the areas surrounding the inner city, and included Bayswater (a TFR of 1.82), Belmont (1.78), Canning (1.73), Melville (1.65), Stirling: Central (1.64), East Fremantle (1.61), Nedlands (1.53) and Victoria Park (1.51). Rates in this range were also recorded in the northern SLA of Wanneroo, with a TFR of 1.92, and the eastern SLA of Kalamunda, with a TFR of 1.91.

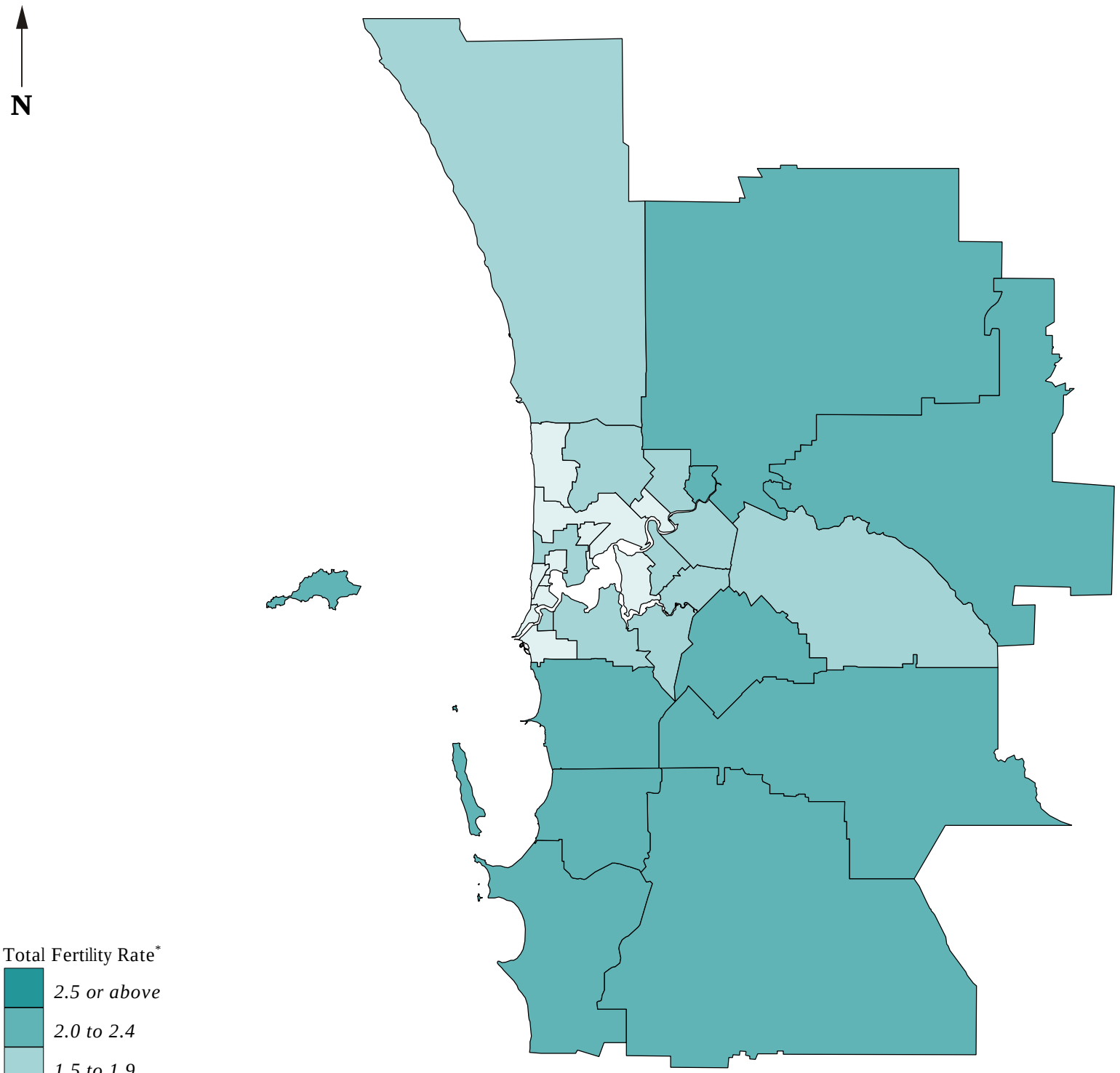
SLAs located near the city generally recorded the lowest TFRs. Claremont had the lowest TFR in **Perth** (a TFR of 1.12), with other low rates in Peppermint Grove (1.18), South Perth (1.20) and Subiaco (1.21).

Over the four year period from 1992 to 1995, there were 69,456 births to women aged from 15 to 49 years in **Perth**, with the largest numbers being in Wanneroo (11,578 births), Stirling: Central (5,657) and Swan (4,944). At the other end of the scale, fewer than 250 births were recorded in the SLAs of Peppermint Grove (34 births) and Claremont (247).

There were correlations of substantial significance at the SLA level with the variables for children aged from 0 to 4 years (as would be expected, a very high 0.93), early school leavers (0.88) and unskilled and semi-skilled workers (0.86). Inverse correlations were recorded with the variables for managers and administrators, and professionals (-0.84), people aged 65 years and over (-0.77) and high income families (-0.70). These results, together with the inverse correlation of meaningful significance with the IRSD (-0.66), indicate an association at the SLA level in **Perth** between high Total Fertility Rates and socioeconomic disadvantage.

Map 5.21
Total Fertility Rate*, Perth, 1992 to 1995

Total Fertility Rate* in each Statistical Local Area



Total Fertility Rate*

- *2.5 or above*
- *2.0 to 2.4*
- *1.5 to 1.9*
- *1.0 to 1.4*
- *below 1.0*

**Source: Calculated on data from ABS 1996 Census*

Details of map boundaries are in Appendix 1.2

*The Total Fertility Rate is a measure of the number of children a woman can expect to bear in her lifetime: it was derived by indirect age standardisation, based on WA totals

Total fertility rate, 1992 to 1995

State/Territory comparison

The Total Fertility Rates (TFRs) were higher in the non-metropolitan areas of Australia in each State and the Northern Territory (**Table 5.35**). The Northern Territory had the highest non-metropolitan rate, as did **Darwin** among the capital cities, although there was less difference between the rates than was evident for the capital cities. The lowest non-metropolitan TFRs were in Tasmania (2.06) and Queensland (2.07). At the *Whole of State/Territory* level, the Northern Territory again had the highest rate and the Australian Capital Territory and South Australia had the lowest rates.

Table 5.35: Total fertility rate, State/Territory, 1992 to 1995

	NSW	Vic	Qld	SA	WA	Tas	NT	ACT	Total
Capital city	1.81	1.70	1.73	1.64	1.76	1.79	2.06	1.72[1]	1.75
Other major urban centres[2]	1.91	1.86	1.73	..	..	..	..	..	1.84
Rest of State/Territory	2.24	2.15	2.07	2.12	2.22	2.08	2.66	–[3]	2.16
Whole State/Territory	1.91	1.79	1.86	1.75	1.87	1.95	2.38	1.69	1.86

[1]Includes Queanbeyan (C)
[2]Includes Newcastle and Wollongong (NSW); Geelong (Vic); and Gold Coast-Tweed Heads and Townsville-Thuringowa (Qld)
[3] Data included with ACT total
Source: See *Data sources*, Appendix 1.3

Rest of State

The TFR for females resident in the non-metropolitan areas of Western Australia over the four year period from 1992 to 1995 was 2.22, above the **Perth** rate of 1.76. The highest rates were recorded for women aged from 25 to 29 years (a TFR of 5.30), followed by those aged from 20 to 24 (a TFR of 4.15) (**Figure 5.10**).

As many of the TFRs in these non-metropolitan SLAs are relatively high, the ranges mapped have been changed to enhance the pattern of differentiation in the map. The highest and lowest ranges have been set at 3.00 (or more) and less than 1.50 respectively, rather than 2.50 and 1.00 as in the map of **Perth** for this variable.

SLAs with the highest TFRs were generally distributed throughout the northern region of the State, while a large proportion of SLAs in the eastern area had lower values (**Map 5.21**). The highest rates were recorded in the SLAs of Cue (a TFR of 4.27), Mullewa (3.90), Menzies (3.65) and Tammin (3.63). Relatively high rates were also evident in Dumbleyung (a TFR of 3.46), Williams (3.41), Dalwallinu (3.31), Tambellup (3.28), Kondinin and Morawa (both 3.22), and Dundas (3.21).

Forty per cent of SLAs outside of **Perth** had TFRs in the middle range mapped, of between 2.00 and 2.50. The highest rates in this range were in the SLAs of Beverley and Narrogin, both with a TFR of 2.49, and Ravensthorpe and Carnarvon, both with 2.47. Albany (2.01), Busselton and Mount Magnet (both 2.02) had the lowest values in this class interval.

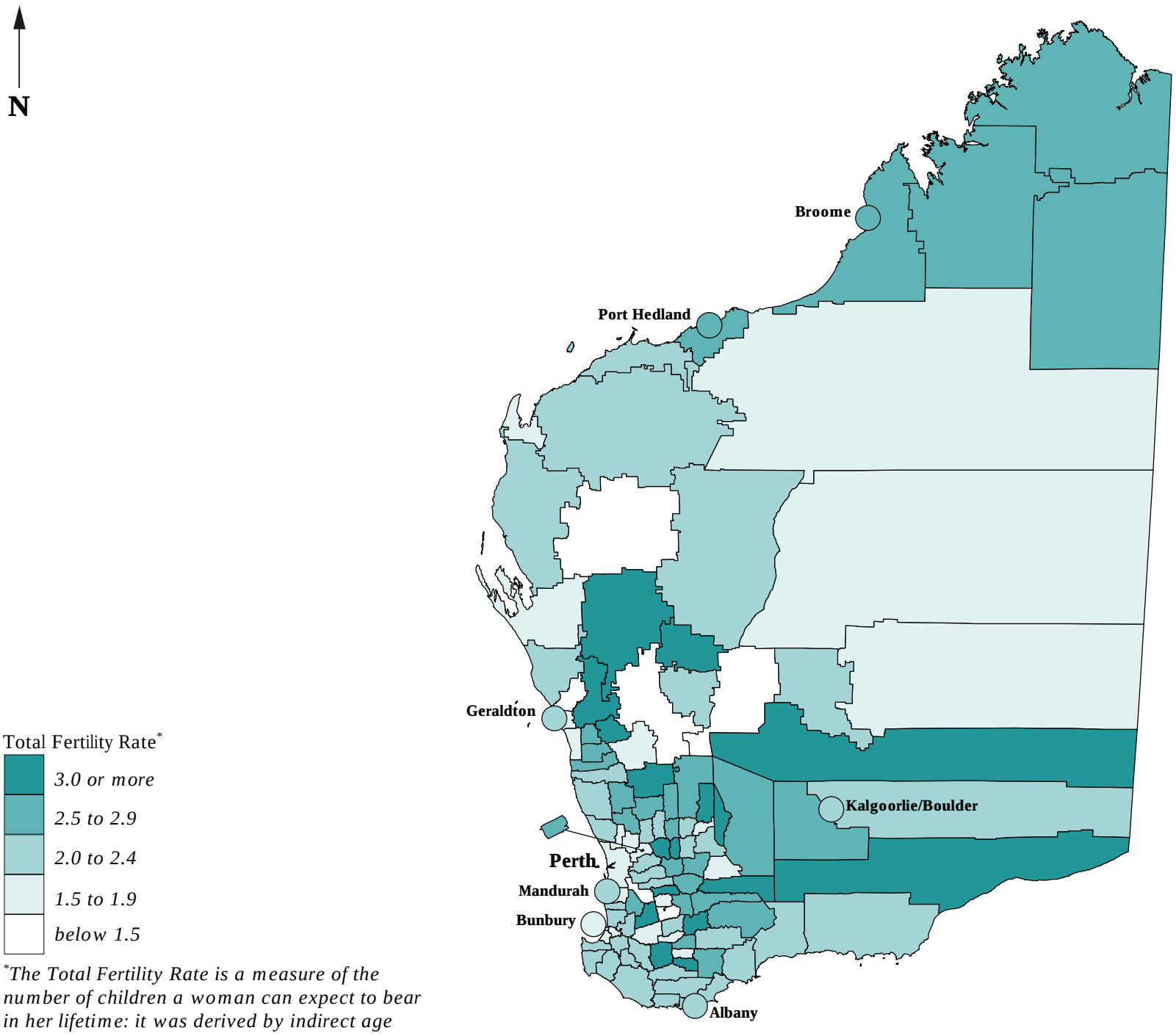
The lowest rate was recorded in Chapman Valley, with a TFR of 1.15. This was the only SLA mapped in the lowest range; however, Perenjori and Northam also recorded low TFRs, of 1.54 and 1.55 respectively.

In the non-metropolitan areas of Western Australia, the largest numbers of births to women aged from 15 to 49 years were recorded in the towns of Kalgoorlie/Boulder (with 2,395 births and a TFR of 2.30), Mandurah (1,951; and 2.15), Geraldton (1,620; and 2.41) and Bunbury (1,487; and 1.78). There were 30,870 births outside **Perth** over this period.

In contrast to **Perth**, the results of the correlation analysis for the non-metropolitan areas of Western Australia do not indicate any clear association at the SLA level between TFRs and socioeconomic status. The only correlation of note was a correlation of 0.42 with high proportions of children aged from 0 to 4 years.

Map 5.22
Total Fertility Rate*, Western Australia, 1992 to 1995

Total Fertility Rate* in each Statistical Local Area

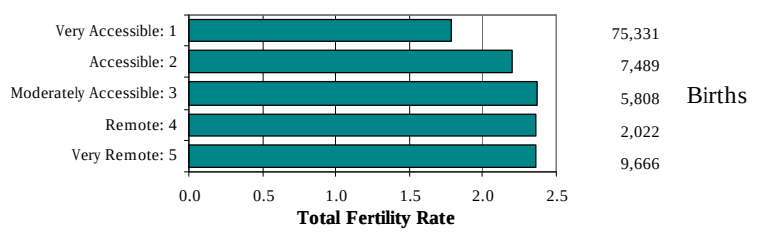


*The Total Fertility Rate is a measure of the number of children a woman can expect to bear in her lifetime: it was derived by indirect age standardisation, based on WA totals

Source: See Data sources, Appendix 1.3

Details of map boundaries are in Appendix 1.2

Accessibility/Remoteness Index of Australia



The Total Fertility Rate increases markedly, from a low of 1.78 in areas in the Very Accessible category to 2.2 in the Accessible category, before increasing again to a rate of 2.37 in the Very Remote category (33.1 per cent higher than the TFR in the Very Accessible category), with similar rates in the two 'remote' categories.

Source: Calculated on ARIA classification, DHAC

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