6 Health status and risk factors

Introduction

The chapter includes, for the first time, information on the geographic distribution of participation and outcome indicators for screening services for women – breast screening and cervical screening – and for the dental health of 12 year old children. Similarly, estimates of the prevalence of selected chronic conditions, associated risk factors and self-reported summary measures of health, as well as avoidable mortality, are new additions. Rates of smoking during pregnancy, overweight and obesity among four old year old boys, and children fully immunised at 12 months of age, previously included in the *Social Health Atlas of Young South Australians* (Tennant et al. 2003), have been updated and included in this atlas. Cancer incidence, reported in the first edition of the atlas, is also presented.

Data for termination of pregnancies and premature deaths are continuing series over the three editions, although details of causes of death are not in the atlas, but are available on the PHIDU website (at http://www.publichealth.gov.au).

The chapter has been organised under the following headings.

Perinatal:

- low birthweight babies
- pregnancy outcomes
- termination of pregnancy
- smoking during pregnancy

Immunisation status at one year of age

Overweight and obese four year old boys

Dental health of 12 year old children

Chronic disease and injury events

Self-reported health

Risk factors

Cancer incidence

Premature mortality

Avoidable mortality

Burden of disease

Notes on the data presented

In addition to the notes included with each topic, further information is provided here on the estimates of chronic disease and associated risk factors, and on avoidable mortality. Many of the indicators are presented as standardised ratios: these are described in Appendix 1.3.

Synthetic predictions

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, or incidence of cancers.

If data are available for the State, or Australia, it is possible to estimate them at the small area level, using the technique of Synthetic Prediction. This technique has been used to produce estimates of a selection of chronic diseases and associated risk factors, and two summary measures of health, for SLAs across South Australia. The estimates were produced from data collected in the 2001 ABS National Health Survey (NHS). Synthetic predictions represent, in effect, a prorating of the Australian estimate (from the 2001 NHS) for a particular variable to the chosen area level (in this case, an SLA). This analysis was undertaken, under contract, by the Australian Bureau of Statistics, as they hold the NHS unit record files.

The approach used was to undertake an analysis of the NHS data for Australia to identify associations in the data between the variables that we wish to predict at the area level (eg. prevalence of chronic conditions and risk factors) and the data we have at the area level (eg. socioeconomic status, use of health services). The relationship between these variables for which area level data are available (the predictors) and the reporting of chronic conditions in the NHS is also a part of the model developed by the ABS. For example, such associations might be between the number of people reporting specified chronic conditions in the NHS and:

- the number of hospital admissions (in total, to public and to private hospitals, by age and sex),
- socioeconomic status (as indicated by Census data, or for recipients of government pensions and benefits), and
- the number of visits to a general medical practitioner.

The results of the modelling exercise are then applied to the SLA counts of the predictors. The prediction is, effectively, the likely value for a typical area with those characteristics. The raw numbers were then age-standardised, to control for the effects of differences in the age profiles of areas.

The NHS has two major limitations for producing these estimates. One is that it only covers people living in private dwellings: those excluded are residents of nursing homes or other aged care facilities, hospitals, boarding houses, hotels, motels, and so forth. The other is that the survey excludes the sparsely settled areas of Australia (these areas are equivalent to the Very Remote areas under the AGSC remoteness classification).

The implication of the absence of residents of non-private dwellings from the NHS for the estimates is that the model based on the NHS excludes these populations, whereas the local area data include them. Further, applying rates from the model to a local area with a relatively large population in non-private dwellings, incorrectly assigns chronic conditions to the area. Offsetting this is that people in non-private dwellings are likely to report higher, or much higher, rates of chronic conditions. A simple sensitivity analysis was undertaken to ascertain the impact of limiting the model to populations under 75 years, and then to populations under 65 years, as these age cut-offs are likely to exclude the majority of those in nursing homes, hostels and other non-private dwellings outside the coverage of the NHS.

The exclusion of the sparsely settled areas means that the predictions cannot be produced for these areas.

A more detailed description of the production of these estimates is in Appendix 1.5.

Details of the particular variables for which estimates have been made, and the way in which the information was gathered on each topic in the NHS are provided on page 219.

Avoidable mortality

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

Further studies followed. In the United Kingdom, Charlton and colleagues chose 14 disease groups from Rutstein's original list, for which mortality in a developed country such as the United Kingdom should be wholly avoidable (Charlton et al. 1983). The list included certain conditions, such as appendicitis, where prevention of death conferred an all-of-life benefit, and others, such as hypertensive disease, where intervention might lead only to death being deferred (Jamrozik & Hobbs 2002).

The concept of studying 'avoidable' mortality as an indicator of the outcome of health care has been applied mainly in studies of time-trends and geographical and socioeconomic variations within one country, between countries or in a region of the world (Westerling & Rosén 2002; Treurniet et al. 2004). A number of atlases of preventable mortality for countries of the European Community have been published (Holland et al. 1988, 1993, 1997). The approach has also been extended from studies of avoidable mortality and morbidity to those of potentially avoidable hospitalisations (for example, Weissman et al 1992; Billings et al. 1996).

There has been much debate about the extent of the contribution of advances in health care to the decline in amenable or potentially avoidable mortality that can be demonstrated by studies of this kind. Many of the studies seeking to link amenable mortality directly with health care resources have failed to do so, especially within countries (Nolte & McKee 2003).

An atlas of avoidable mortality in Australia and New Zealand is currently being prepared by the Public Health Information Development Unit, for release in 2006. This chapter includes an analysis at the SLA level of deaths from avoidable conditions, for those deaths at ages 0 to 74 years.

Gaps and deficiencies in the data

Some major gaps and deficiencies in the data available for mapping are described below.

Data for Aboriginal people and Torres Strait Islanders

The identification of Aboriginal people and Torres Strait Islanders in most statistical collections is of poor quality. Health statistical collections are no exception, and where data are required at an area level, they are more problematic.

The text draws attention to situations where it is believed that the presence of the Indigenous population is likely to have influenced the data for an area. This is of particular importance for the more remote areas of the State, in both the maps and the data presented by the AGSC remoteness classification.

Other gaps and deficiencies

Examples of topics for which data were not available, in areas that impact on health and wellbeing, are given in Chapter 1 (Table 1.2, page 8).

At this stage, there are no small area datasets that reliably describe these factors. However, just as estimates have been made at the local area level from the 2001 National Health Survey, it is planned that local area estimates will be produced from the 2003 Survey of Disability, Ageing and Carers. No date has yet been set for the release of these estimates.

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Low birthweight babies, 2000 to 2002

Low birthweight babies are babies (both live-born and stillborn) weighing less than 2,500 grams at birth. Low birthweight increases the risk of death in infancy, and the risk of other health problems. An infant may be small when it is born for two reasons: it may be born early (preterm), or it may be small for its gestational age (intra-uterine growth restriction). Risk factors include socioeconomic disadvantage; maternal size, age and nutritional status; the number of babies previously born; illness, and alcohol, tobacco and drug use during pregnancy; and duration of the pregnancy (AIHW 2004). Babies born to Indigenous women in 2001 were more than twice as likely to be of low birthweight (12.9%) than those born to non-Indigenous women (6.0%). Indigenous women in South Australia had the highest low-birthweight proportions (16.5%) of the States and Territories (Laws & Sullivan 2004).

The number of low birthweight babies born to female residents of Metropolitan Adelaide dropped, from 943 per year over 1989 to 1992, to 875 per year over 2000 to 2002, a decline of 7.2%. However, as the total number of babies born also declined, the proportion of babies born with a low birthweight increased marginally (by 2.6%) (Table 6.1) The number of low birthweight babies born in country South Australia also declined, from 359 per year over 1989 to 1992, to 333 per year over 2000 to 2002, again down by 7.2%. There was a larger decline in the total number of births in this period, resulting in an increase (of 7.9%) in the proportion of babies that have a low birthweight from 6.3% in 1989 to 1992, to 6.8% in 2000 to 2002.

Table 6.1: Low birthweight babies

Per cent of live births

Area	1989-1992	1995-1997	2000-2002	Per cent change[1]
Metropolitan Adelaide (incl. Gawler)	6.7	6.9	6.9	2.6
Country	6.3	6.9	6.8	7.9
South Australia	6.6	6.9	6.8	3.7

[1]**Per cent change over ten years in the proportion of low birthweight babies**

Metropolitan regions

There were 2,571 low birthweight babies born in the metropolitan regions (excluding Gawler) in 2000 to 2002 (Table 6.2), with rates at the SLA level consistent with the pattern of socioeconomic disadvantage (Map 6.1).

High rates of low birthweight babies were very strongly correlated with high rates of smoking during pregnancy and strongly correlated with perinatal risk factors and the total fertility rate. There were also very strong, and strong correlations with indicators of disadvantage such as jobless families (very strong), single parent and low income families and Indigenous people (all strong correlations). Together with a very strong inverse correlation with the Index of Relative Socio-Economic Disadvantage, these results indicate a strong association at the SLA level between high rates of low birthweight babies and socioeconomic disadvantage (Table 8.1).

Central Northern Adelaide

There were 1,890 low birthweight babies born in Central Northern, 7.0% of all births. Of all metropolitan SLAs, babies with low birthweight were most predominant in Playford - Elizabeth (11.2%, 152 babies). There were also high proportions of low birthweight babies, but much smaller numbers, in Salisbury Balance (10.4%, 23 babies), Playford - West Central (9.1%, 63), Port Adelaide Enfield - Port (8.6%, 91), Port Adelaide Enfield - Inner (8.5%, 65), Playford - East Central (8.3%, 71), Salisbury - North-East (8.0%, 62), Playford - West (7.7%, 21), Playford - Hills (7.6%, eleven) and West Torrens - East (7.6%, 66).

In addition to Playford - Elizabeth, several SLAs had large numbers of low birthweight babies: Salisbury - South-East (92 babies, 7.0%), Salisbury - Central (90, 7.4%), Salisbury - Inner North (80, 7.2%), Tea Tree Gully - North (75, 6.8%), Port Adelaide Enfield - East (71, 6.8%), Charles Sturt - North-East (66, 6.7%), Port Adelaide Enfield - Coast (65, 7.3%) and Tea Tree Gully - South (65, 5.8%).

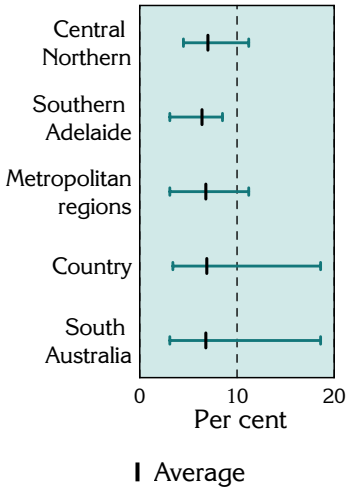
The SLAs of Adelaide Hills - Ranges (4.5%, 16 babies) and - Central (4.6%, 18), Charles Sturt - Coastal (5.1%, 40), Norwood Payneham St Peters - East (5.2%, 24), Adelaide (5.4%, 15) and Burnside - South-West (5.4%, 28) all had proportions in the lowest range mapped.

Southern Adelaide

The proportion of low birthweight babies born to residents of the Southern region (6.4%, 681 babies) was slightly lower than for Central Northern (7.0%). There were relatively high rates of low birthweight babies at the SLA level within the region, with the highest in Onkaparinga - Hackham (8.5%, 43) and - North Coast (7.7%, 50).

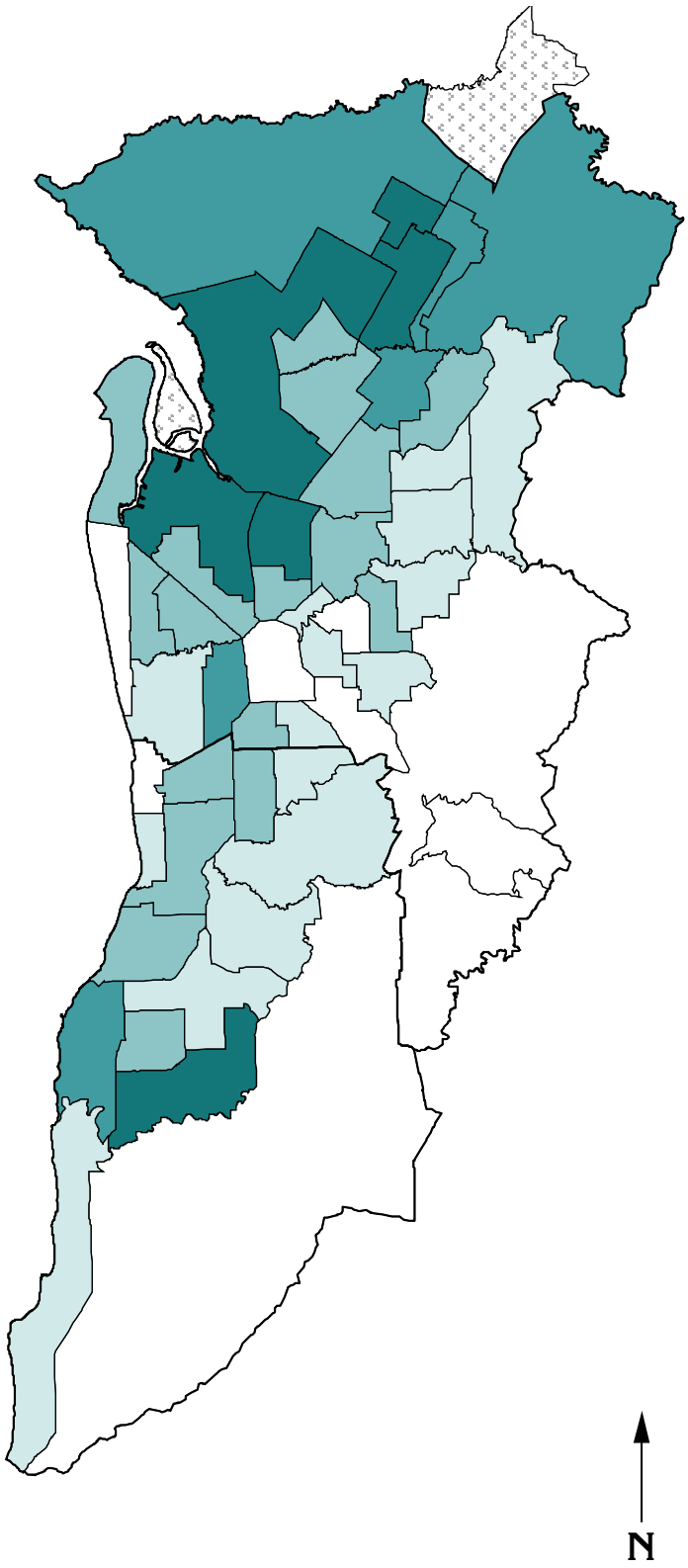
The largest numbers of low birthweight babies recorded in the south were in the SLAs of Onkaparinga - Woodcroft (80 babies, 6.1%) and - Morphett (72, 6.6%), and Marion - Central (62, 6.9%). There were few low birthweight babies in Holdfast Bay - North (3.1%, 14) and Onkaparinga - Hills (5.1%, 17).

Map 6.1
Low birthweight babies, metropolitan regions, 2000 to 2002



Note: The black vertical lines show the average proportion for this indicator in each region; the horizontal lines show the range of the indicator at the SLA level within the region.

Low birthweight babies* (per cent of all births), by SLA



*Low birthweight babies are babies (both live-born and stillborn) weighing less than 2,500 grams at birth

#Data were not mapped for Torrens Island (mapped with Port Adelaide): Gawler has been mapped in the State map

Source: See data sources, Appendix 1.3 ***Details of map boundaries are in Appendix 1.2***

Country South Australia

There were 1,053 babies born with a low birth weight to country residents in 2000 to 2002, representing 6.9% of all births.

The country regions with the highest proportions of low birthweight babies were **Northern and Far Western** (7.8%, 156 babies) and **Riverland** (7.3%, 97) (Table 6.2).

Table 6.2: Regional totals, low birthweight babies, 2000 to 2002

Region	No.	%
Hills Mallee Southern	235	6.3
Wakefield[1]	225	7.0
South East	160	6.4
Northern & Far Western	156	7.8
Eyre	99	6.8
Mid North	81	7.0
Riverland	97	7.3
Country SA	**1,053**	**6.9**
Central Northern	1,890	7.0
Southern	681	6.4
Metropolitan regions	**2,571**	**6.8**
South Australia	**3,624**	**6.8**

[1]**Gawler is included in Wakefield region**

There was a strong correlation between high proportions of low birthweight babies and poor perinatal outcomes. This variable was consistently weakly correlated with a number of the indicators of disadvantage, suggesting an association at the SLA level between low birthweight babies and socioeconomic disadvantage (Table 8.2).

The Regions

There were 156 low birthweight babies in **Northern and Far Western**, 7.8% of all babies born. There were very high rates of low birthweight babies in the SLAs of Unincorporated Flinders Ranges (18.6%, eight babies), Port Augusta (11.5%, 64) and Unincorporated Far North (8.3%, ten).

In **Riverland**, 7.3% of babies born were of low birthweight (97 babies). Berri and Barmera - Berri had a high proportion of 10.3% (30 babies).

There were 225 low birthweight babies born to residents in **Wakefield** (7.0% of babies). Within this region, there were high rates in Yorke Peninsula - North (11.3%, 24), Gawler (8.9%, 55), Mallala (8.6%, 23) and Barossa - Angaston (7.7%, 20).

The proportion of babies born with a low birth weight in **Mid North** was 7.0% (81 babies). At the SLA level, there were high rates of low birthweight babies in Peterborough (8.9%, five babies) and Port Pirie - City (8.5%, 51).

In **Eyre**, the proportion of babies born with a low birthweight was 6.8% (99 babies), with high proportions in Unincorporated West Coast (10.1%, five babies), Ceduna (9.7%, 20) and Cleve (7.7%, six).

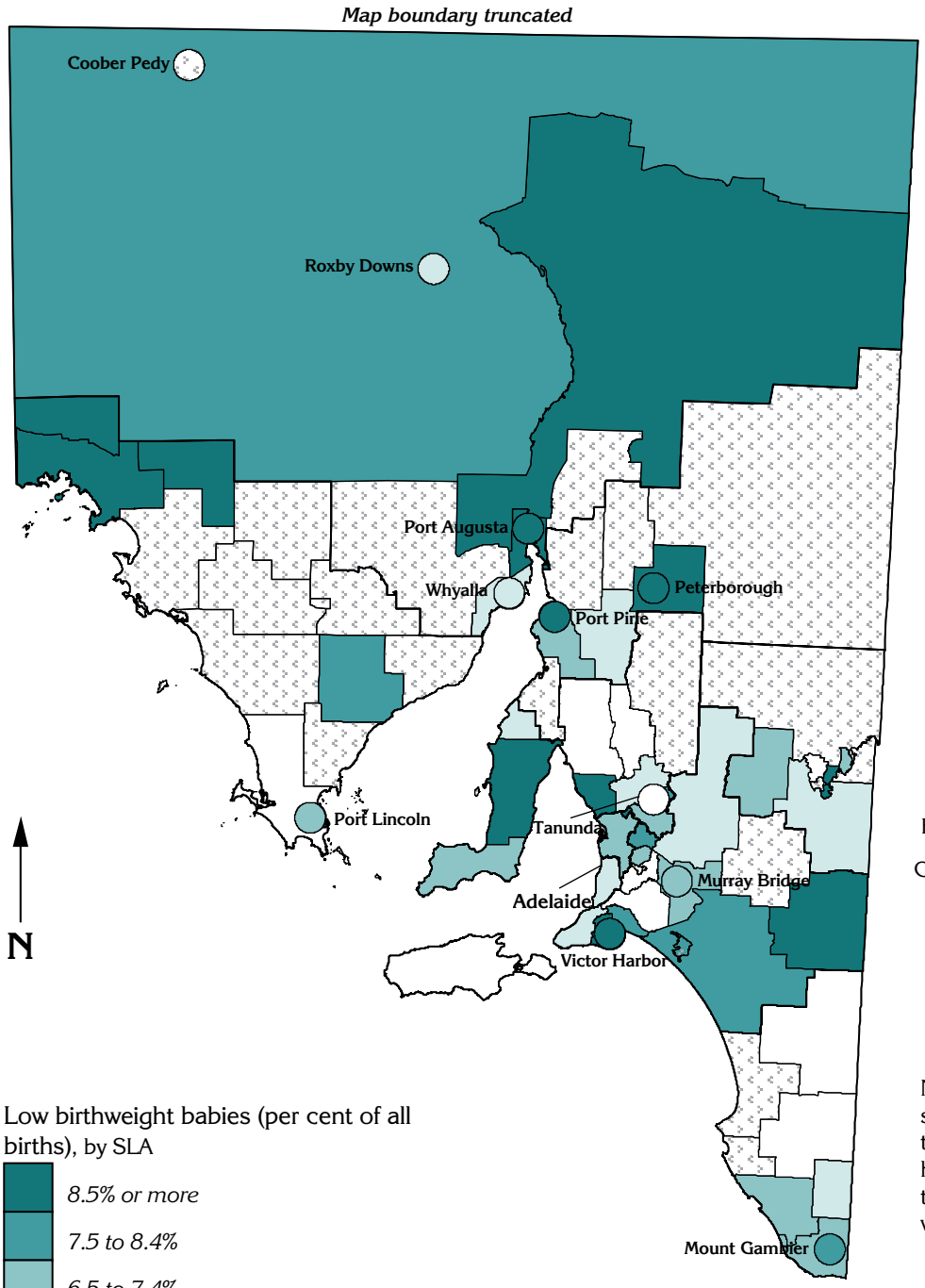
There were 160 low birthweight babies in **South East**, 6.4% of all babies. Just over half of these births were to residents of Mount Gambier (83 babies, 8.4%).

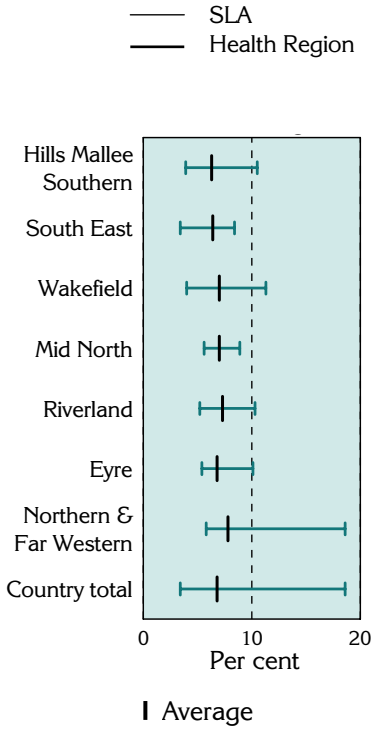
The largest number of low birthweight babies was born to residents of **Hills Mallee Southern** (235 babies, 6.3%). Within this region, there were high rates of low birthweight babies in Victor Harbor (10.5%, 24), Southern Mallee (9.1%, eight), Alexandrina - Coastal (8.3%, 21), The Coorong (7.8%, 16) and Adelaide Hills - North (7.5%, 16).

ASGC Remoteness classification

There was no consistent pattern across the remoteness areas for low birthweight babies, with fairly consistent proportions in most classes other than for Very Remote, where the proportion was 8.3%, compared to 6.9% in Major Cities.

Map 6.2
Low birthweight babies, South Australia, 2000 to 2002





Note: The black vertical lines show the average proportion for this indicator in each region; the horizontal lines show the range of the indicator at the SLA level within the region.

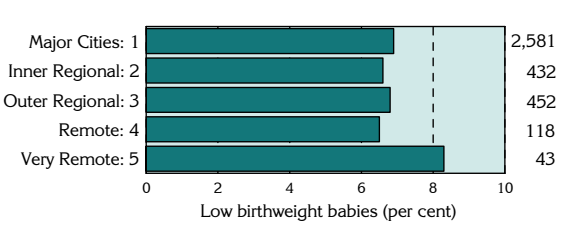
Low birthweight babies (per cent of all births), by SLA

- *8.5% or more*
- *7.5 to 8.4%*
- *6.5 to 7.4%*
- *5.5 to 6.4%*
- *fewer than 5.5%*
- *data not mapped#*

*Low birthweight babies are babies (born live-born and stillborn) weighing less than 2500 grams at birth

#Data were not mapped because the SLA has a population of less than 100 or there were fewer than five low birthweight babies

ASGC Remoteness classification



Source: See data sources, Appendix 1.3

Details of map boundaries are in Appendix 1.2

Pregnancy outcomes, 2000 to 2002

The Pregnancy Outcome Unit, Epidemiology Branch, South Australian Department of Health, obtains data for births of babies of at least 400 grams birthweight or 20 weeks' gestation (terminations of pregnancy of at least 20 weeks' gestation, most of which are for congenital abnormalities, are included). The data, provided by hospital and homebirth midwives through the Perinatal Statistics Collection, include maternal socio-demographic, medical and obstetric information, as well as characteristics and outcomes of the baby.

Studies undertaken by the Epidemiology Branch in 1986 on these data identified seventeen risk factors that were most predictive of adverse perinatal outcomes (see box).

Risk factors most predictive of adverse perinatal outcomes

Aboriginal maternal race; single marital status; high parity; previous stillbirths; previous neonatal death; previous pregnancy termination; few antenatal visits; young maternal age; obstetric complications; complications of labour/delivery; homebirth; low birthweight; pre-term birth; low Apgar score; prolonged time to establish regular breathing; congenital abnormality; perinatal death.

An analysis using risk factors is useful for a number of reasons. Not only does it provide a range of variables for examination, it also suggests reasons for any observed elevations in adverse perinatal outcomes. A number of these risk factors directly or indirectly reflect the socioeconomic status of women for whom these events are recorded: for example, direct association with single, teenaged and Aboriginal and Torres Strait Islander women; and indirectly, with the birth of a low birthweight baby occurring more frequently to women who are of lower socioeconomic status.

Detailed analysis of the seventeen risk factors for adverse outcomes was subsequently published in 1988 (SAHC 1988) with a follow-up study published in 1995 (Taylor et al. 1995). The analysis was repeated by the Epidemiology Branch for the years from 1995 to 1997 for the second edition of this atlas, and again for the years 2000 to 2002, for *A Social Health Atlas of Young South Australians* (Tennant et al. 2003).

For the purpose of publication, a summary perinatal risk factor score has been calculated for each SLA. The score is calculated by examining the frequency with which a poorer outcome was recorded on individual risk factors (e.g. percentage of mothers with low birthweight babies, or with previous stillbirths) in relation to the South Australian average. SLAs were considered to be 'high risk' for adverse perinatal outcomes if ten or more individual risk factors had a poor outcome, in comparison with the South Australian average.

Metropolitan regions

The majority of SLAs in the metropolitan regions were not considered to be high risk for adverse perinatal outcomes. SLAs that were high risk were located in clusters, with twelve SLAs in one cluster in Central Northern and two smaller clusters in Southern, with a total of six SLAs (Map 6.3).

SLAs identified as being at high risk for adverse perinatal outcomes were very strongly correlated with the variables for single parent families, unskilled and semi-skilled workers, female sole parent pensioners and jobless families. Strong correlations were found with smoking during pregnancy, high rates of admission to public hospitals, unemployment, low income families, clients of community health and Child and Adolescent Mental Health Services, and dwellings rented from the SA Housing Trust. These results, together with a very strong inverse correlation with the Index of Relative Socio-Economic Disadvantage, indicate an association at the SLA level between high risk factors for adverse perinatal outcomes and socioeconomic disadvantage (Table 8.1).

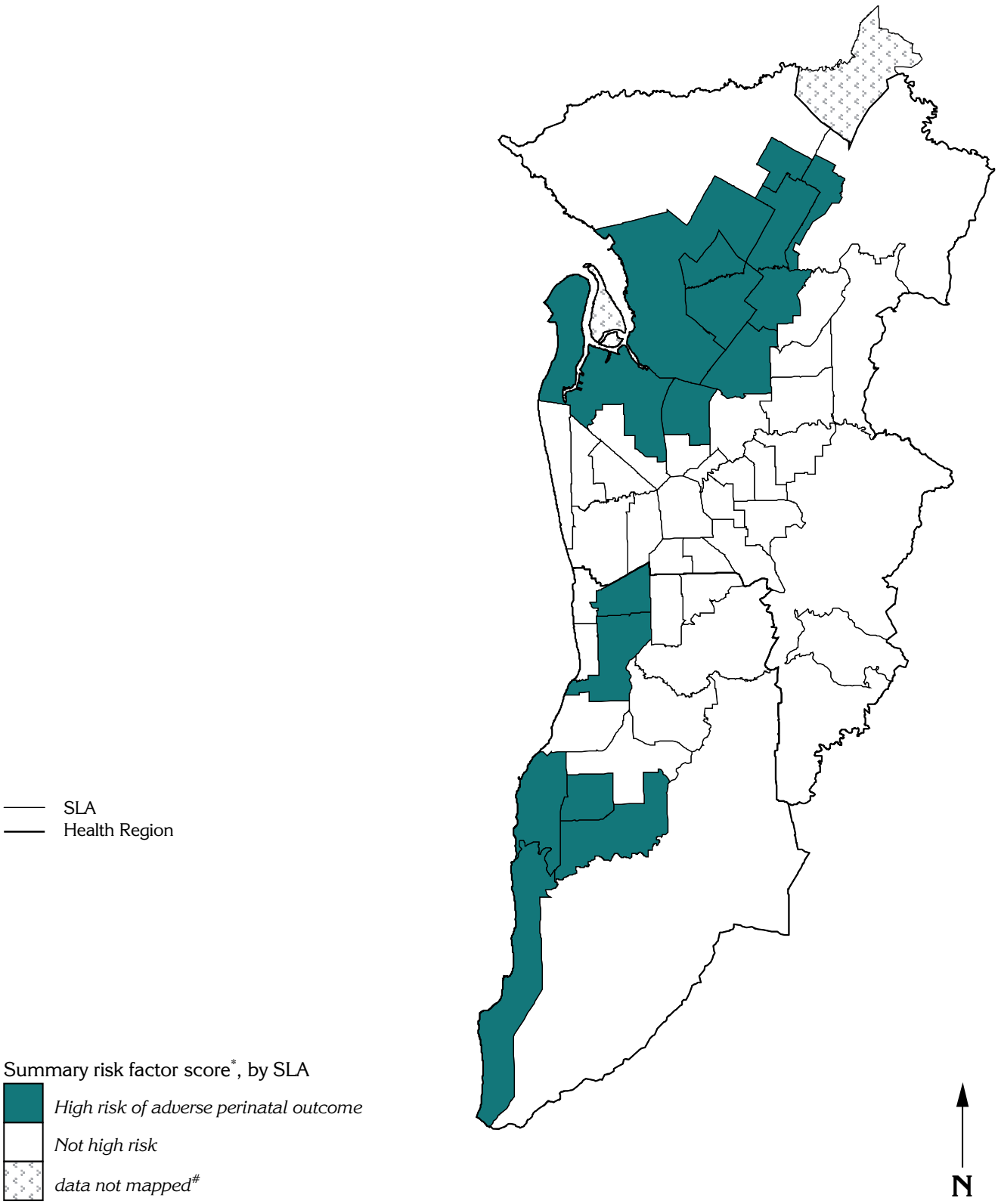
Central Northern Adelaide

At the regional level, seven SLAs had adverse rates compared with the State rates. Playford - Elizabeth had the highest possible perinatal risk factor score, with rates in 17 risk factors indicating a poor outcome in comparison with the South Australian average. In addition to having the highest risk score in the metropolitan regions, this SLA had the largest number of births over the years 2000 to 2002. The surrounding SLAs of Salisbury - Central (15 risk factors) and Salisbury - Inner North (15) also had a very high risk of poor perinatal outcomes. The other high risk SLAs in this region were Playford - West Central (13 risk factors), Port Adelaide Enfield - Port (13), Playford - East Central (12), Port Adelaide Enfield - Inner (12), Salisbury Balance (12), Port Adelaide Enfield - Coast (ten), and Salisbury - North-East (ten) and - South East (ten).

Southern Adelaide

Eight SLAs had adverse rates at the regional level, in comparison with the State rates. The SLAs that were high risk for adverse perinatal outcomes in Southern were the Onkaparinga SLAs of - Hackham (14 risk factors), - North Coast (13), - Morphett (eleven) and - South Coast (ten), and the Marion SLAs of - Central (ten) and - North (ten).

Map 6.3
Perinatal risk factor scores, metropolitan regions, 2000 to 2002



*See text for details of risk factors and calculations of risk factor scores

#Data were not mapped for Torrens Island (mapped with Port Adelaide): Gawler has been mapped in the State map

Source: See data sources, Appendix 1.3 ***Details of map boundaries are in Appendix 1.2***

Country South Australia

The twelve SLAs in country South Australia with high risk factor scores, indicating adverse perinatal outcomes, were spread across the State, in a number of towns, and in remote SLAs with high proportions of Aboriginal and Torres Strait Islander peoples (Map 6.4).

The rates were also calculated at a regional level, to provide a summary score for each region (Table 6.3). **Northern and Far Western** had the highest number of risk factors and **Hills Mallee Southern** had the lowest.

Table 6.3: Regional totals, perinatal risk factors, 2000 to 2002

Region	Risk factors[1]
Country SA	
Hills Mallee Southern	3
Wakefield[2]	7
South East	7
Northern & Far Western	13
Eyre	9
Mid North	7
Riverland	7
Metropolitan regions	
Central Northern	7
Southern	8

[1]**Number of risk factors in the region with rates above the State average**
[2]**Gawler is included in Wakefield region**

There was a strong correlation at the SLA level between perinatal risk factors and low birthweight babies. Perinatal risk factors were consistently weakly correlated with a number of the indicators of disadvantage. These results, together with the weak inverse correlation with the Index of Relative Socio-Economic Disadvantage, suggest an association at the SLA level between socioeconomic disadvantage and perinatal risk factors (Table 8.2).

The Regions

Northern and Far Western was the only region identified as being high risk overall (with 13 risk factors indicating adverse outcomes). Within this region, three SLAs were also high risk: these were Port Augusta (14 risk factors), Unincorporated Flinders Ranges (12) and Whyalla (ten).

Although it was not recorded as high risk, **Eyre** was just below the cut-off of ten risk factors, with a score of nine. The three SLAs of Port Lincoln (13 risk factors), Ceduna (12) and Unincorporated West Coast (12) were all high risk for adverse perinatal outcomes.

Seven risk factors were calculated for **Wakefield**, with high numbers of risk factors in the SLAs of Gawler (12 risk factors) and Yorke Peninsula - North (12).

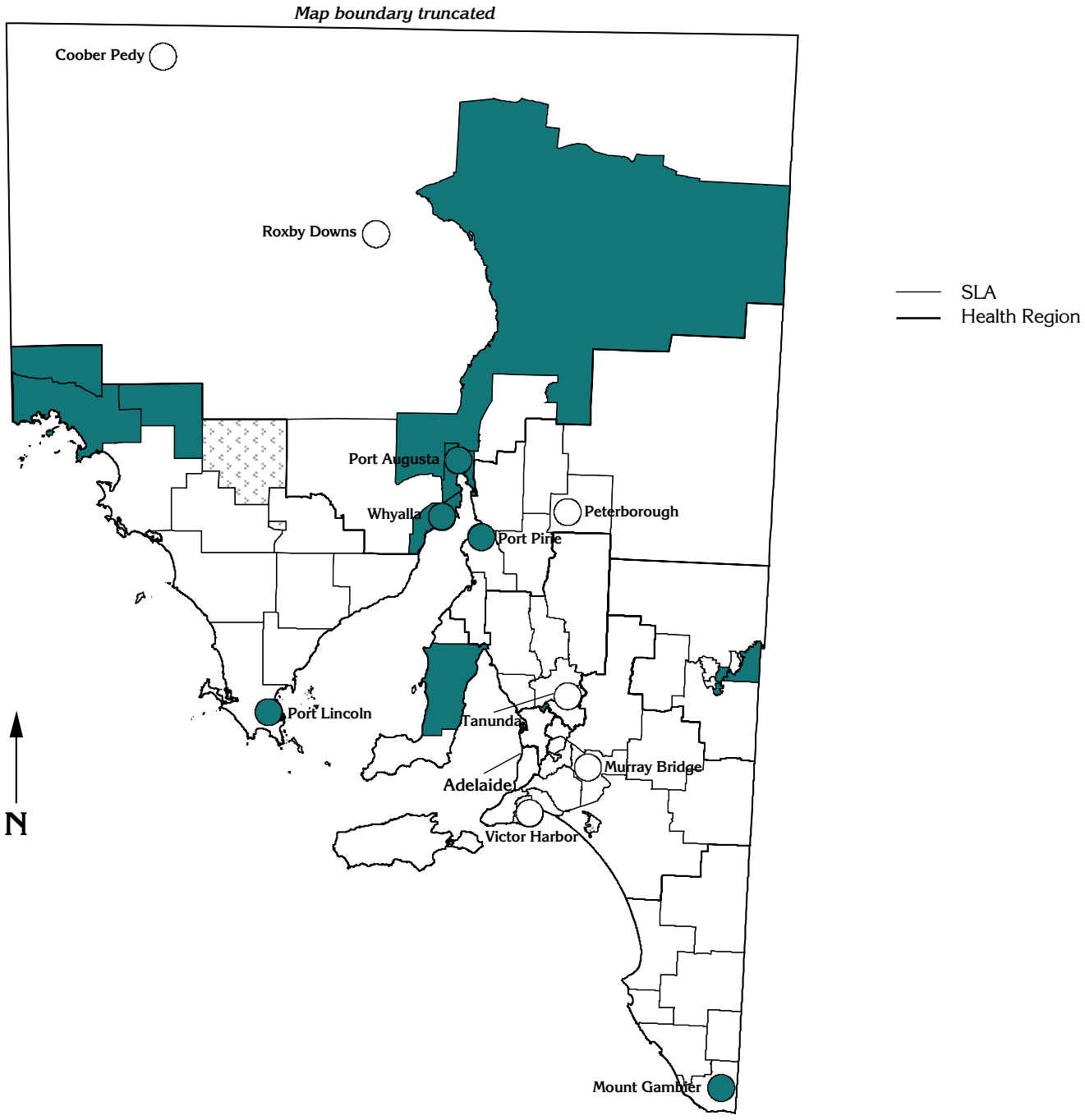
A summary score of seven risk factors was calculated for **South East**. Mount Gambier was identified as being high risk, with a score of ten.

Mid North also had a summary score of seven risk factors, indicating a poor outcome in comparison with the South Australian average. Port Pirie - City had elevated scores for 12 of the 17 risk factors.

Similarly, **Riverland** had a score of seven of the risk factors. There were two SLAs classified as being high risk in this region. They were Berri and Barmera - Berri (eleven risk factors) and Renmark Paringa - Paringa (ten).

Hills Mallee Southern recorded the lowest score, with elevated scores for just three risk factors. None of the SLAs were classified as high risk; however, the SLAs of Murray Bridge (nine risk factors), The Coorong (nine), Alexandrina - Coastal (eight) and Southern Mallee (eight) were all just below the high risk level of ten risk factors.

Map 6.4
Perinatal risk factor scores, South Australia, 2000 to 2002



Summary risk factor score*, by SLA

- *High risk of adverse perinatal outcome*
- *Not high risk*
- *data not mapped#*

*See text for details of risk factors and calculations of risk factor scores

#Data were not mapped because the SLA has a population of less than 100

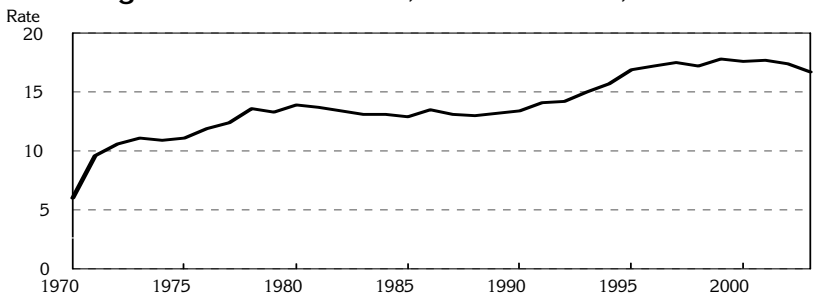
Source: See data sources, Appendix 1.3 ***Details of map boundaries are in Appendix 1.2***

A Social Health Atlas of South Australia, 2006

Termination of pregnancy, 2000 to 2002

The number of terminations per 1,000 women aged 15 to 44 years (the abortion rate) rose quickly from 1970 and was generally stable through the 1980s, before rising again to 16.6 per 1000 women at these ages in 1995. The rate has stabilised since then, and in 2003, it was 16.7 (Figure 6.1). The highest abortion rates were recorded for women in the 20 to 24 year age group (27.4% of terminations in 2002, 31.0% in 1985 to 1987), followed by those under 20 years (23.1% in 2002, 24.6% in 1985 to 1987). Since 2001, there has been a decline in the abortion rate: down to 15.9 per 1000 women aged 15 to 44 years in 2004, with falls in all age groups compared with the rates in 2003.

Figure 6.1: Abortion rate, South Australia, 1970 to 2003



Source: Pregnancy Outcome in South Australia, 2002, SA Dept of Health

Between 1985 to 1987 and 2000 to 2002, the abortion rate increased by nearly one-third (29.3%) (Table 6.4).

Table 6.4: Termination of pregnancy

Age standardised abortion rate per 1,000 females aged 15 to 44 years

Area	1985-1987	1990-1992	2000-2002	Per cent change[1]
Metropolitan Adelaide (incl. Gawler)	14.7	15.3	18.8	27.6
Country	10.1	10.0	13.2	30.6
South Australia	13.5	14.0	17.5	29.3

[1]**Per cent change over 15 years in abortion rates**

Metropolitan regions

There were 13,402 terminations of pregnancy in the metropolitan regions (excluding Gawler) in 2000 to 2002, seven per cent more than expected from the State rates (a standardised ratio (SR) of 107**, 13,402) (Table 6.5). The areas with high termination ratios (Map 6.5) follow the pattern of low socioeconomic status.

High rates of termination of pregnancy were very strongly correlated with the indicators for receiving an unemployment benefit or a Disability Support Pension, the unemployment rate, jobless families, low income families, premature male deaths, avoidable mortality, outpatient attendances, children in welfare-dependent and other low income families and community mental health clients. These results, together with a very strong inverse correlation with the Index of Relative Socio-Economic Disadvantage, indicate a strong association at the SLA level between socioeconomic disadvantage and termination of pregnancy (Table 8.1).

Central Northern Adelaide

Residents of Central Northern had 13% more terminations than expected from the State rates (an SR of 113**, 10,016 terminations), with over two thirds more terminations than expected in Port Adelaide Enfield - Port (169**, 473). Highly elevated ratios were also recorded in Playford - Elizabeth (157**, 449), Charles Sturt - North-East (149**, 442) and - Inner East (145**, 347), Salisbury - Central (140**, 468) and Balance (139**, 101), Adelaide (137**, 297), Salisbury - Inner North (131**, 426), Port Adelaide Enfield - Inner (129**, 284), Playford - West Central (126**, 200) and Port Adelaide Enfield - Coast (125**, 367).

Large numbers of terminations were recorded in Salisbury - South-East (419 terminations, an SR of 106), Port Adelaide Enfield - East (384, 116**), West Torrens - West (363, 118**), Charles Sturt - Coastal (356, 113) and Tea Tree Gully - South (351, 92).

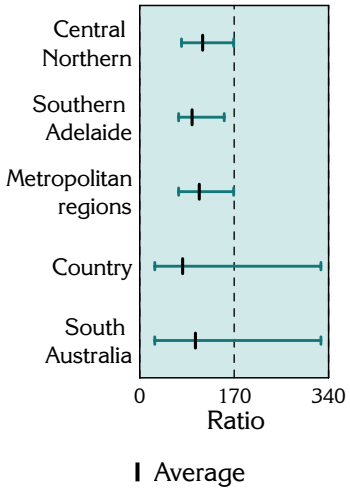
Southern Adelaide

There were 3,385 terminations of pregnancy in the Southern region, six per cent fewer than expected from the State rates (an SR of 94**). Onkaparinga - North Coast had 52% more terminations than expected (an SR of 152**, 275 terminations). Elevated ratios were also recorded for the Onkaparinga SLAs of - Hackham (120*, 200) and - South Coast (113*, 292). The Marion SLAs of - Central (331 terminations, an SR of 97) and Marion - North (304, 108) had large numbers.

The majority of SLAs with the lowest rates were located in Southern, including Onkaparinga - Reservoir (an SR of 70**, 203 terminations), Mitcham - Hills (73**, 188), Marion - South (75**, 182), Onkaparinga - Hills (76*, 77) and Mitcham - North-East (79**, 127).

* **indicates statistical significance: see page 24**

Map 6.5
Termination of pregnancy, metropolitan regions, 2000 to 2002

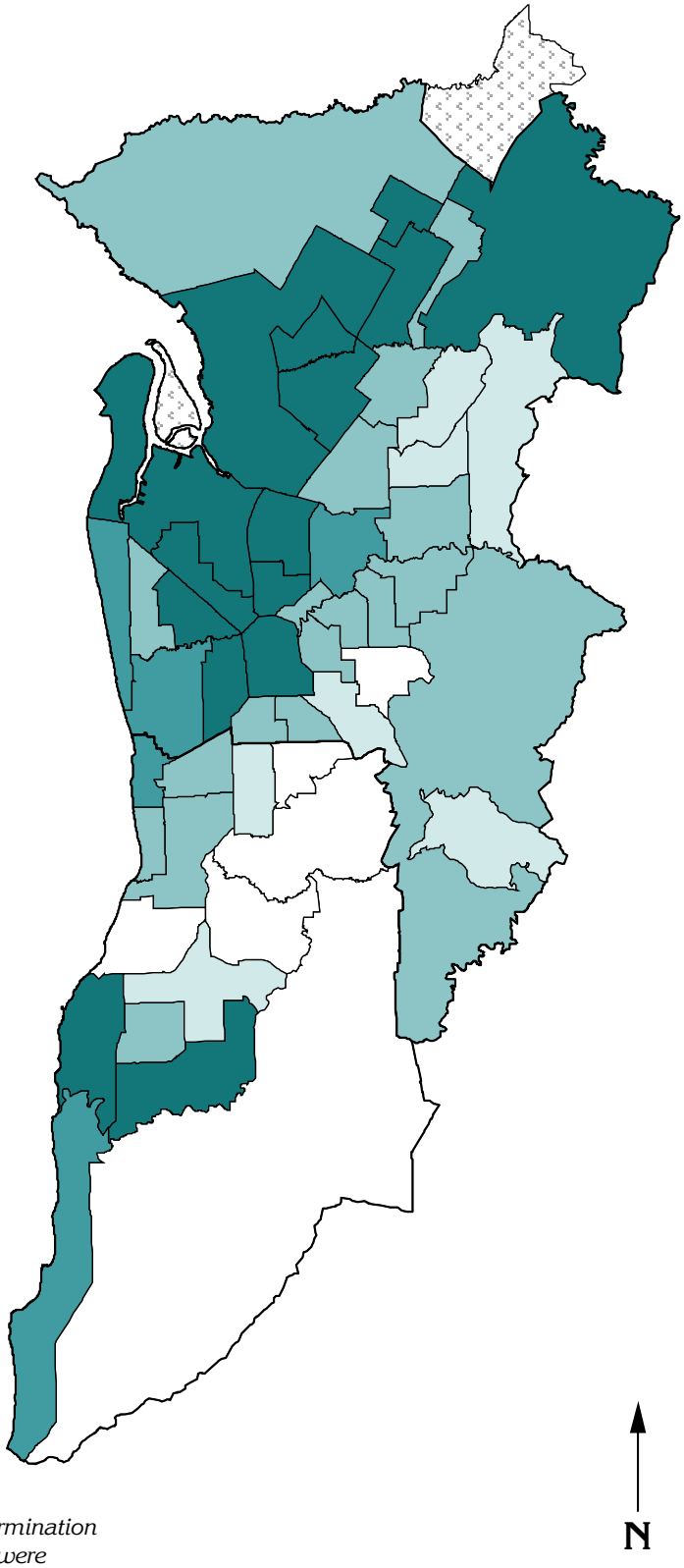


Note: The black vertical lines show the average ratio for this indicator in each region; the horizontal lines show the range of the indicator at the SLA level within the region.

SLA
Health Region

Standardised Ratio (as an index)*, by SLA

- *120 and above*
- *110 to 119*
- *90 to 109*
- *80 to 89*
- *below 80*
- *data not mapped*#



*Index shows the number of women in the SLA having a termination compared with the number expected: expected numbers were derived by indirect age standardisation, based on SA totals

#Data were not mapped for Torrens Island (mapped with Port Adelaide): Gawler has been mapped in the State map

Source: See data sources, Appendix 1.3 ***Details of map boundaries are in Appendix 1.2***

Country South Australia

There were 3,097 terminations of pregnancy in country South Australia, 33% fewer than expected from the State rates (a standardised ratio (SR) of 77**) (Table 6.5), with SLAs in the country typified by very low ratios (Map 6.6).

The reason for the low overall abortion rate is not clear. It may represent the actual situation, of fewer terminations to country residents; it is also possible that women are giving a metropolitan address to the provider, possibly to protect their privacy. Data purchased from the Health Insurance Commission for Medicare item numbers which include terminations of pregnancy showed there were few terminations for South Australian women occurring outside the State.

Table 6.5: Regional totals, termination of pregnancy, 2000 to 2002

Region	No.	Ratio
Hills Mallee Southern	861	85**
Wakefield[1]	713	81**
South East	437	68**
Northern & Far Western	433	77**
Eyre	224	69**
Mid North	172	63**
Riverland	258	78**
Country SA	**3,097**	**77****
Central Northern	10,016	113**
Southern	3,385	94**
Metropolitan regions	**13,402**	**107****
South Australia	**16,499**	**100**

[1]**Gawler is included in Wakefield region**

Termination of pregnancy was strongly correlated with receiving a Disability Support Pension, jobless families and Child and Adolescent Mental Health Service clients. These results, together with the weak inverse correlation with the Index of Relative Socio-Economic Disadvantage, suggest an association at the SLA level between socioeconomic disadvantage and termination of pregnancy (Table 8.2).

The Regions

Hills Mallee Southern had the highest standardised ratio, although it was 15% below the level expected from the State rates (an SR of 85**, 861 terminations). There were low ratios in Alexandrina - Strathalbyn (59**, 42 terminations), Adelaide Hills - North (66**, 42), Kangaroo Island (69, 24), The Coorong (72*, 37), Southern Mallee (76, 14), Yankalilla (77, 23) and Mid Murray (78, 53).

Wakefield had nearly 20% fewer terminations than expected (an SR of 81**, 713 terminations). There were a number of SLAs with particularly low ratios, including Yorke Peninsula - North (48**, 23 terminations), Barossa - Tanunda (59**, 25) and Barossa - Angaston (60**, 46), Light (61**, 65), Clare and Gilbert Valleys (61**, 43), Wakefield (68*, 38), Copper Coast (72*, 61), Goyder (73, 25) and Barossa - Barossa (78, 51).

Riverland had a ratio of 78 (258 terminations). The lowest ratio in this region had nearly half the number of expected terminations, with 51** calculated for Loxton Waikerie - East (36 terminations). There were also low ratios in Loxton Waikerie - West (an SR of 73, 33 terminations) and Berri and Barmera - Barmera (78, 31).

There were 433 terminations recorded for women in **Northern and Far Western** (an SR of 77**), with considerable variation at the SLA level (see graph opposite). Unincorporated Far North had approximately one quarter of the expected number (27**, 20 terminations), followed by Flinders Ranges (57, eight) and Port Augusta (71**, 106).

The SLAs in **Eyre** had small numbers, with low ratios calculated for Cleve (an SR of 40*, six terminations), Tumby Bay (40*, seven), Lower Eyre Peninsula (43**, 15), Streaky Bay (49*, eight) and Elliston (53, five). The region had 31% fewer terminations than expected (69**, 224).

There were 437 terminations recorded for **South East** (an SR of 68**). Low ratios were recorded for women in Naracoorte and Lucindale (51**, 42 terminations), Wattle Range - West (52**, 45), Grant (56**, 41), Wattle Range - East (62*, 21), Tatiara (66**, 44) and Mount Gambier (79**, 216).

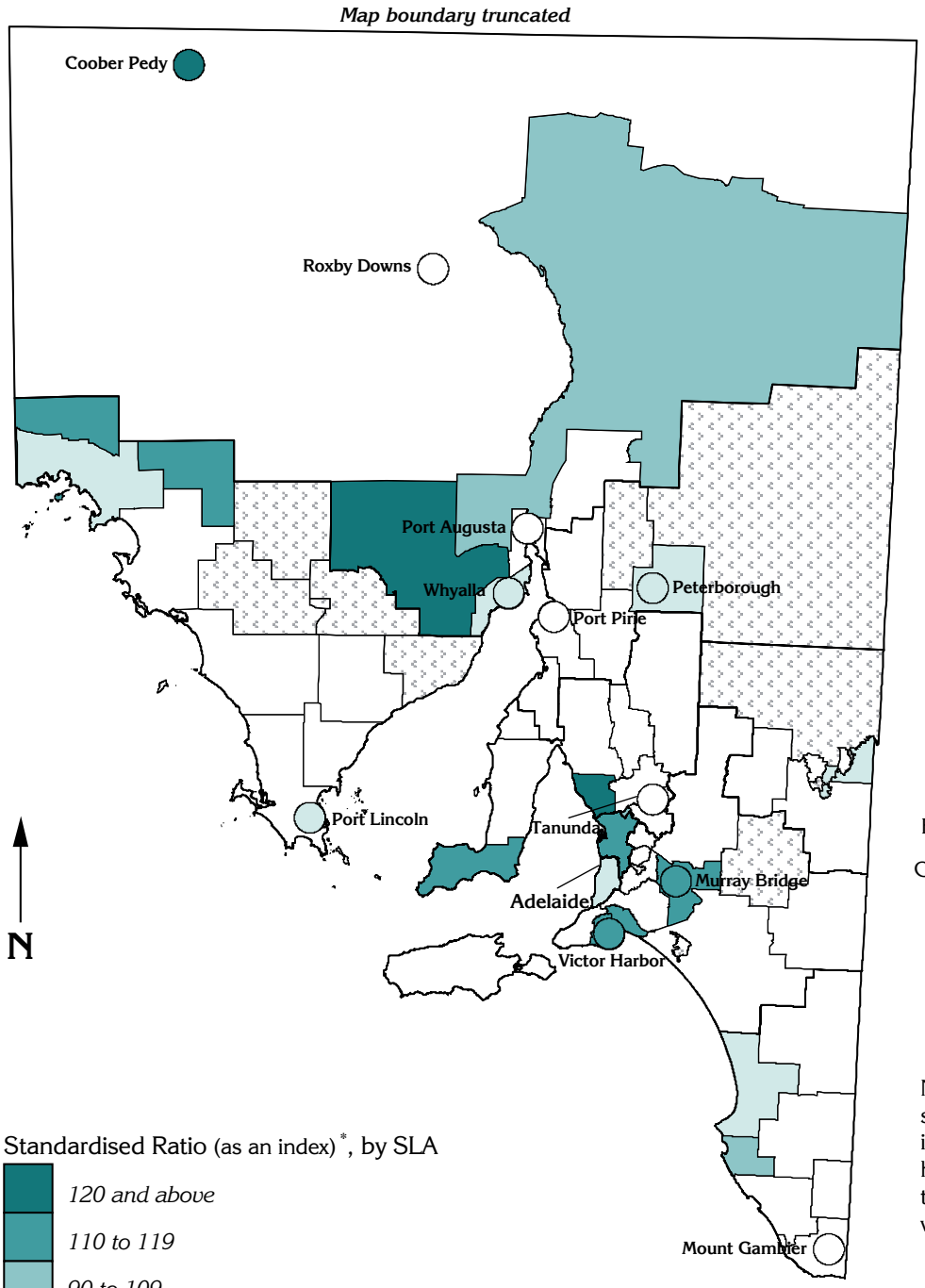
The lowest regional ratio was calculated for **Mid North**, with 27% fewer terminations than expected (an SR of 63**, 172 terminations). Within this region, there were low ratios in Barunga West (44*, eight terminations), Port Pirie Balance (44**, 13), Mount Remarkable (48*, eleven), Port Pirie City (67**, 94) and Northern Areas (70, 27 terminations).

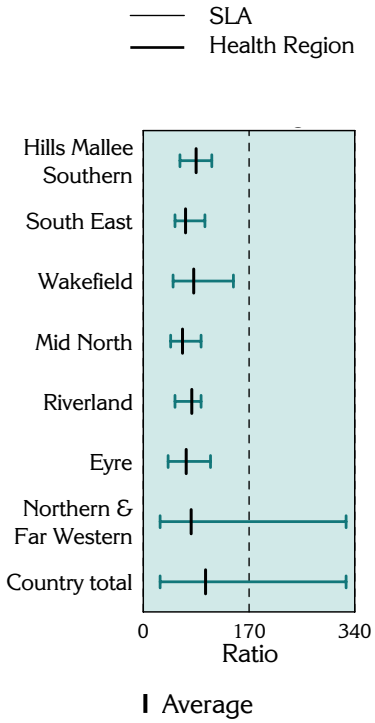
ASGC Remoteness Classification

There was a gradient across the remoteness areas, with the highest ratio calculated for the Major Cities class (an SR of 107**, 13,360 terminations) and a low ratio, of 64**, in the Very Remote areas (99 terminations).

* **indicates statistical significance: see page 24**

Map 6.6
Termination of pregnancy, South Australia, 2000 to 2002





Note: The black vertical lines show the average ratio for this indicator in each region; the horizontal lines show the range of the indicator at the SLA level within the region.

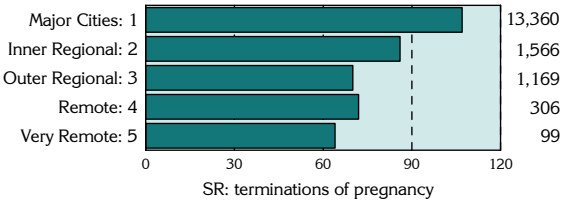
Standardised Ratio (as an index) *, by SLA

- *120 and above*
- *110 to 119*
- *90 to 109*
- *80 to 89*
- *below 80*
- *data not mapped#*

*Index shows the number of women in the SLA having a termination compared with the number expected: expected numbers were derived by indirect age standardisation, based on SA totals

#Data were not mapped because the SLA has a population of less than 100 or there were fewer than five terminations

ASGC Remoteness classification Women



Source: See data sources, Appendix 1.3 ***Details of map boundaries are in Appendix 1.2***

Smoking during pregnancy, 1998 to 2001

Maternal smoking during pregnancy has many consequences before and after delivery, such as preterm birth, miscarriage and perinatal death, low birthweight, and infants being smaller at birth than they should be. These problems may affect children through to adulthood, including a higher risk of disability and developmental delay, obesity, decreased lung function and increased respiratory illness (NHMRC 1997; Wideroe et al. 2003). The data presented here were provided by hospital and homebirth midwives through the Perinatal Statistics Collection, conducted by the Pregnancy Outcome Unit, Epidemiology Branch, South Australian Department of Health.

Over a quarter of pregnant women smoked during their pregnancy in country South Australia (26.2%), a higher percentage than in Metropolitan Adelaide (21.8%) (see Table 6.6). Over the period 1998 to 2001, the proportion of pregnancies during which women reported smoking declined from 25.0% to 21.8%; but the proportion for Indigenous women was much higher, being over half, and increased over the same period from 56.0% to 59.7% (Hetzel et al. 2004).

Table 6.6: Smoking during pregnancy, 1998 to 2001

Area	No.	Per cent
Metropolitan Adelaide (incl. Gawler)	11,005	21.8
Country	5,553	26.2
South Australia	16,558	23.2

Metropolitan regions

From 1998 to 2001, 10,794 women in the Metropolitan regions (excluding Gawler) reported smoking during a pregnancy, six per cent fewer than expected from the State rates (a standardised ratio (SR) of 94**) (Table 6.7). The highest rates of smoking during pregnancy were found in the outer northern, outer southern and north-western SLAs (Map 6.7), with considerable variation in both regions (see graph opposite).

High rates of smoking during pregnancy were very strongly correlated at the SLA level with high proportions of female sole parent pensioners; unskilled and semi-skilled workers; attendance at Accident and Emergency departments; Indigenous status; the unemployment rate; living in a jobless, low income or single parent family; and with high rates of admission to public acute hospitals and GP services, and high proportions of low birthweight babies. The very strong inverse correlation with the Index of Relative Socio-Economic Disadvantage also indicates a strong association at the SLA level between smoking during pregnancy and socioeconomic disadvantage (Table 8.1).

Central Northern Adelaide

In Central Northern, 8,097 women reported smoking during a pregnancy, two per cent fewer than expected from the State rates (an SR of 98*). The SLAs with elevated rates of smoking during pregnancy included Playford - Elizabeth (an SR of 160**, 797 pregnancies), Playford - West Central (145**, 357) and - East Central (133**, 387), Salisbury - Inner North (127**, 510), Port Adelaide Enfield - Coast (124**, 351), Port Adelaide Enfield - Port (122**, 431) and Playford - Hills (122, 55).

There were large numbers of women smoking during a pregnancy living in Port Adelaide Enfield - East (339 pregnancies, an SR of 106), Tea Tree Gully - South (313, 88*), Charles Sturt - North-East (311, SR of 104), Tea Tree Gully - Central (268, SR of 92), and Charles Sturt - Inner West (215, SR of 97) and - Inner East (213, SR of 94).

The SLAs with the lowest rates of smoking during pregnancy largely form a block across Adelaide's middle SLAs. They include Unley - East (an SR of 37**, 65 pregnancies), Burnside - South-West (38**, 49), Norwood Payneham St Peters - West (44**, 63), Walkerville (48**, 24), Unley - West (50**, 75), Burnside - North-East (50**, 68), and Adelaide Hills - Central (54**, 57) and - Ranges (56**, 53).

Southern Adelaide

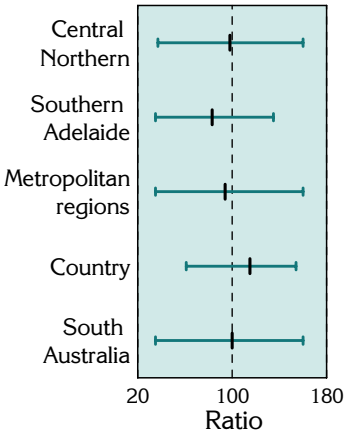
In Southern region, there were 17.0% fewer women who reported smoking during a pregnancy than expected (an SR of 83**, a total of 2,696 women). The SLAs in the south with elevated ratios were Onkaparinga - North Coast (an SR of 135**, 299 pregnancies) and Onkaparinga - Hackham (125**, 234).

Large numbers of women who reported smoking were recorded in the Onkaparinga SLAs of - Woodcroft (357 pregnancies, an SR of 85**), - Morphett (341, an SR of 95) and - South Coast (310, 108), as well as in Marion - Central (231, 86*).

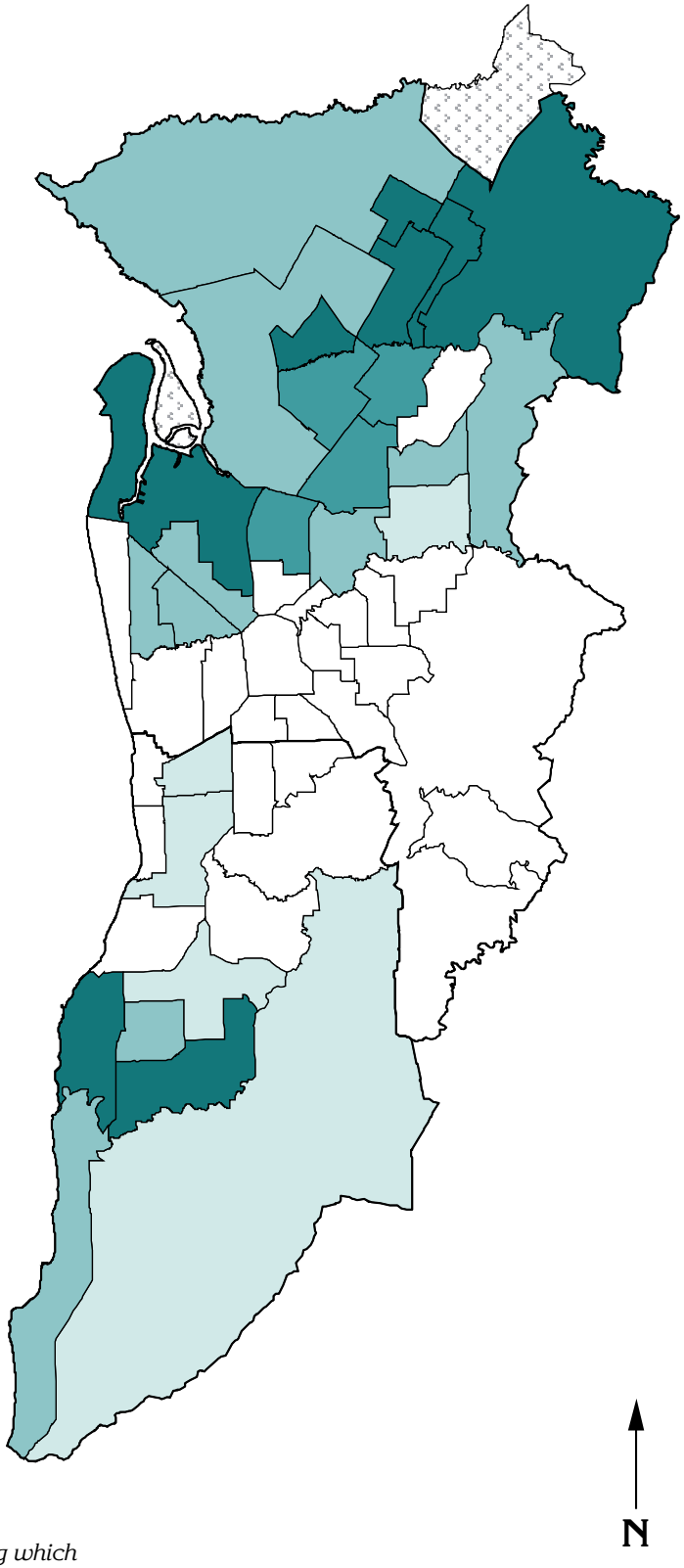
There were well below average rates of smoking during pregnancy in the SLAs of Mitcham North-East (an SR of 35**, 32 pregnancies), - Hills (38**, 68) and - West (53**, 108).

* **indicates statistical significance: see page 24**

Map 6.7
Smoking during pregnancy, metropolitan regions, 1998 to 2001



Note: The black vertical lines show the average ratio for this indicator in each region; the horizontal lines show the range of the indicator at the SLA level within the region.



SLA
Health Region

Standardised Ratio (as an index)*, by SLA

- *120 and above*
- *110 to 119*
- *90 to 109*
- *80 to 89*
- *below 80*
- *data not mapped#*

*Index shows the number of pregnancies, in the SLA, during which women reported smoking, compared with the number expected: expected numbers were derived by indirect age standardisation, based on SA totals

#Data were not mapped for Torrens Island (mapped with Port Adelaide): Gawler has been mapped in the State map

Source: See data sources, Appendix 1.3

Details of map boundaries are in Appendix 1.2

Country South Australia

From 1998 to 2001 in country South Australia, there were 5,764 women who reported smoking, 15% more than expected from the State rates (a standardised smoking ratio (SR) of 115**).

A number of SLAs throughout the State had ratios in the highest range (Map 6.8), particularly those in the far north and west of the State, along the eastern edge of **Eyre** and in parts of **Mid North**, **Hills Mallee Southern** and **South East**. There was also considerable variation within most regions (see graph opposite).

Table 6.7: Regional totals, smoking during pregnancy, 1998 to 2001

Region	No.	Ratio
Hills Mallee Southern	1,244	105
Wakefield[1]	1,084	109**
South East	911	115**
Northern & Far Western	915	124**
Eyre	589	125**
Mid North	425	108
Riverland	597	135**
Country SA	**5,764**	**115****
Central Northern	8,097	98*
Southern	2,696	83**
Metropolitan regions	**10,794**	**94****
South Australia	**16,558**	**100**

[1]**Gawler is included in Wakefield region**

Smoking during pregnancy was strongly correlated with lung cancer. It was also consistently weakly correlated with a number of the indicators of disadvantage including the Index of Relative Socio-Economic Disadvantage, suggesting an association between smoking during pregnancy and socioeconomic disadvantage at the SLA level (Table 8.2).

The Regions

The most highly elevated ratio, with 35% more women than expected smoking during pregnancy, was recorded in **Riverland** (an SR of 135**, 597 pregnancies). Within this region, there were highly elevated ratios in Berri and Barmera - Berri (an SR of 150**, 158 pregnancies) and - Barmera (150**, 80), Loxton Waikerie - East (129**, 117), Renmark Paringa - Renmark (127**, 132) and Loxton Waikerie - West (125*, 81).

Eyre also had an elevated ratio at the regional level (an SR of 125**, 589 pregnancies). SLAs with highly elevated ratios in this region included Unincorporated West Coast (an SR of 141, 23 pregnancies), Ceduna (139**, 104), Franklin Harbor (139, 17), Kimba (136, 16), Port Lincoln (128**, 270), Cleve (125, 33), Lower Eyre Peninsula (123, 52) and Tumby Bay (121, 24). Le Hunte had 39% fewer than the expected number of pregnancies during which women smoked (an SR of 61, eleven pregnancies).

There were 915 women who smoked during pregnancy in **Northern and Far Western** (an SR of 124**), with highly elevated ratios in Coober Pedy (153**, 44 pregnancies), Port Augusta (140**, 311 pregnancies), Unincorporated Flinders Ranges (an SR of 129, 18 pregnancies) and Unincorporated Far North (120, 54 pregnancies). There were 385 pregnancies in which women smoked in Whyalla (an SR of 115**).

South East had a standardised smoking ratio of 115** (911 pregnancies). There were highly elevated rates of smoking during pregnancy in Lacepede (an SR of 154*, 35 pregnancies) and Wattle Range - West (142**, 157); and a 23% lower ratio in Robe (77, 12). Relatively large numbers of women smoking during pregnancy were recorded in Mount Gambier (341 pregnancies, an SR of 108), Tatiara (112 pregnancies, 112), Naracoorte and Lucindale (103 pregnancies, 109) and Grant (101 pregnancies, 111).

In **Wakefield,** 1,084 women reported smoking during a pregnancy (an SR of 109**). Elevated ratios were found in Mallala (131**, 109) and Wakefield (129*, 85). Gawler (211 pregnancies, 106), Light (125, 116) and Copper Coast (123, 116) had relatively large numbers of these cases.

Women in **Mid North** reported smoking during a pregnancy at a similar rate to those in **Wakefield**, with an SR of 108 (425 pregnancies); significantly elevated ratios were calculated for Barunga West (153*, 34) and Peterborough (150*, 34). There were 223 pregnancies during which women smoked in Port Pirie - City (an SR of 105).

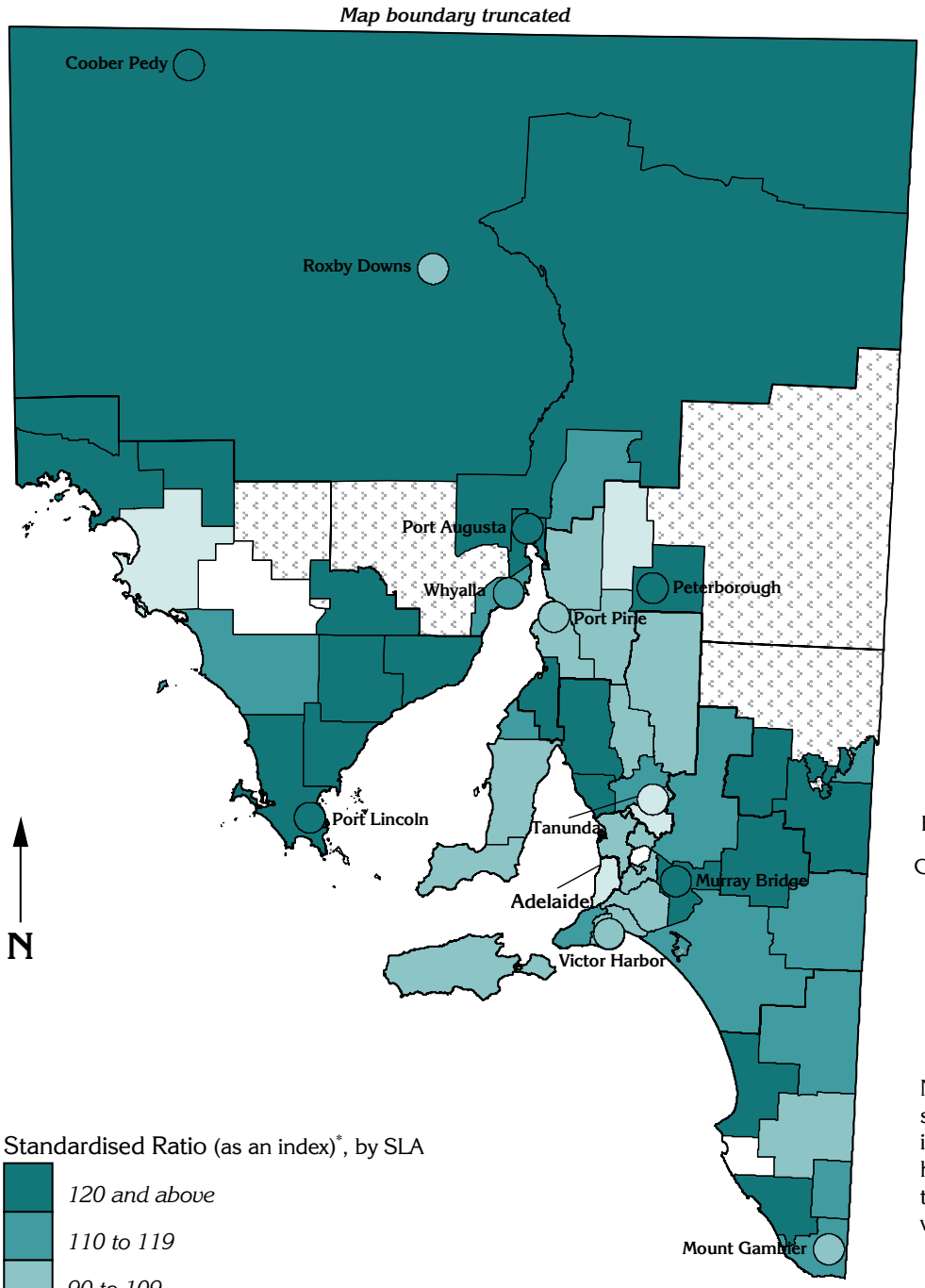
In **Hills Mallee Southern** region, 1,244 women reported smoking during pregnancy, five per cent more than expected from the State rates (105). There were elevated ratios in Karoonda East Murray (an SR of 142, 17 pregnancies) and Murray Bridge (131**, 325); and 36% fewer than expected women smoked during pregnancy in Adelaide Hills Balance (an SR of 64**, 63). Mount Barker - Central had 180 pregnancies in this category (an SR of 93).

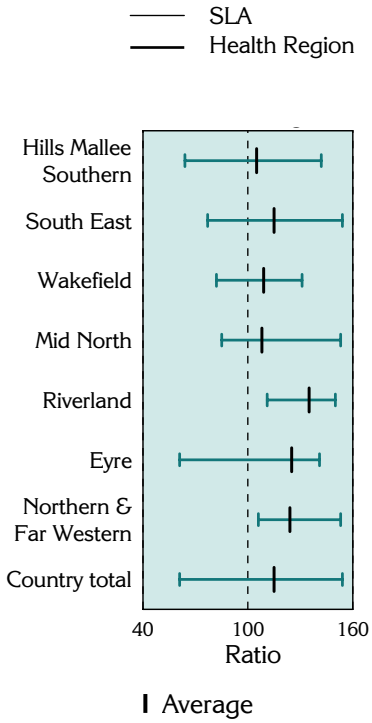
ASGC Remoteness classification

Rates of smoking during pregnancy increased with increasing remoteness in South Australia, with ratios above 100 for all the remoteness classes except Major Cities (with an SR of 94**). In the Inner Regional areas, there was a ratio of 105*, with ratios of 120** in Outer Regional, 119** in Remote and 128** in Very Remote.

* **indicates statistical significance: see page 24**

Map 6.8
Smoking during pregnancy, South Australia, 1998 to 2001





Note: The black vertical lines show the average ratio for this indicator in each region; the horizontal lines show the range of the indicator at the SLA level within the region.

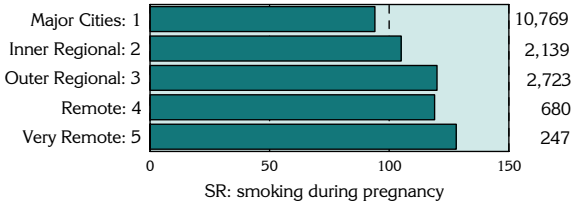
Standardised Ratio (as an index)*, by SLA

- *120 and above*
- *110 to 119*
- *90 to 109*
- *80 to 89*
- *below 80*
- *data not mapped#*

*Index shows the number of women smoking during pregnancy in the SLA compared with the number expected: expected numbers were derived by indirect age standardisation, based on SA totals

#Data were not mapped because the SLA has a population of less than 100 or there were fewer than five cases

ASGC Remoteness classification Women



Source: See data sources, Appendix 1.3 ***Details of map boundaries are in Appendix 1.2***

Immunisation status of children at 12 months of age, 2002

Immunisation coverage among Australian children is an important public health issue. If a sufficiently large proportion of children have been immunised against a particular infectious disease, then the potential for that disease to spread is greatly reduced. Immunisation data are collected by the Health Insurance Commission, which has maintained the Australian Childhood Immunisation Register (ACIR) since 1996. The ACIR provides comprehensive information on the immunisation status of children less than seven years of age in Australia. These data are used to provide a measure of coverage at a national, State/Territory and local level. By mid-1998, the register had sufficient coverage to be used for small area analysis. The data presented here are of children fully immunised at age 12 months. The proportion of immunisation coverage is similar in Metropolitan Adelaide and country South Australia in both periods, as was the rate at which coverage improved (Table 6.8).

Table 6.8: Immunisation status of children at 12 months of age

Per cent

Area	1998	2002	Per cent change[1]
Metropolitan Adelaide (incl. Gawler)	84.5	94.7	12.1
Country	83.6	94.4	12.9
South Australia	84.2	94.6	12.4

[1]**Per cent change over four years in the proportion of fully immunised children**

In the process of converting the data from postcode of address to SLA, misallocation of immunisation data may result in some SLAs having higher percentages than would be the case if accurate address data were available.

Metropolitan regions

Immunisation coverage of children at 12 months of age in the metropolitan regions (excluding Gawler) in 2002 was 94.7% (11,653 children) (Table 6.9).

Hull et al. (2002) found that, among other things, demographic factors "impacted on immunisation status. Children in larger, lower income families and families with a health care card were less likely to be age-appropriately immunised." This suggests an association between disadvantage and lower immunisation rates, a contention generally supported by the results of the correlation analysis undertaken here. This analysis shows a generally weak association between good immunisation coverage and indicators of advantage. There was a strong inverse correlation with the unemployment rate, and weak correlations with other indicators of disadvantage at the SLA level (Table 8.1). These inverse correlations suggest that children in these population groups have lower immunisation rates.

Central Northern Adelaide

The majority (94.6%) of 12 month old children in Central Northern were fully immunised, with a similar rate in Southern region (95.0%). The SLAs with the highest immunisation rates were Tea Tree Gully - North (98.5%, 369 children), Charles Sturt - Inner West (97.4%, 223), Campbelltown - East (97.1%, 290), Charles Sturt - Inner East (97.0%, 238), Tea Tree Gully - Hills (96.9%, 145), West Torrens - West (96.5%, 265), Campbelltown - West (96.2%, 196) and Playford - Hills (96.2%, 45).

There were also large numbers of fully immunised children at 12 months in the SLAs of Salisbury - South-East (431 children, 94.3%), Salisbury - Central (364, 95.1%), Tea Tree Gully - South (347, 95.4%), Salisbury - Inner North (324, 94.6%) and Port Adelaide Enfield - East (323, 95.7%).

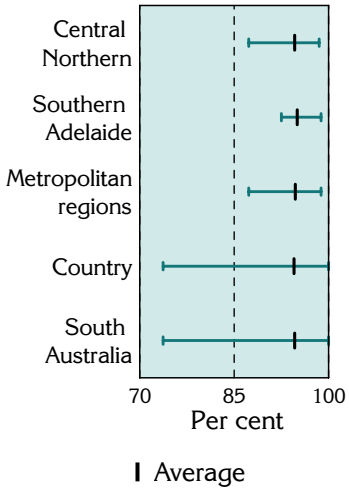
The SLAs with the lowest immunisation rates of 12 month-olds in Central Northern were Adelaide (87.3%, 76 children) and Playford - Elizabeth (88.4%, 371). Other SLAs with rates below average for the region – but not greatly so – were Playford - West Central (91.9%, 210), Port Adelaide Enfield - Inner (92.1%, 237), Adelaide Hills - Central (92.6%, 131), Adelaide Hills - Ranges (92.8%, 114), Prospect (92.9%, 219), Playford - West (93.0%, 97), Walkerville (93.8%, 65), Port Adelaide Enfield - Port (93.8%, 302) and Burnside - South-West (93.9%, 160).

Southern Adelaide

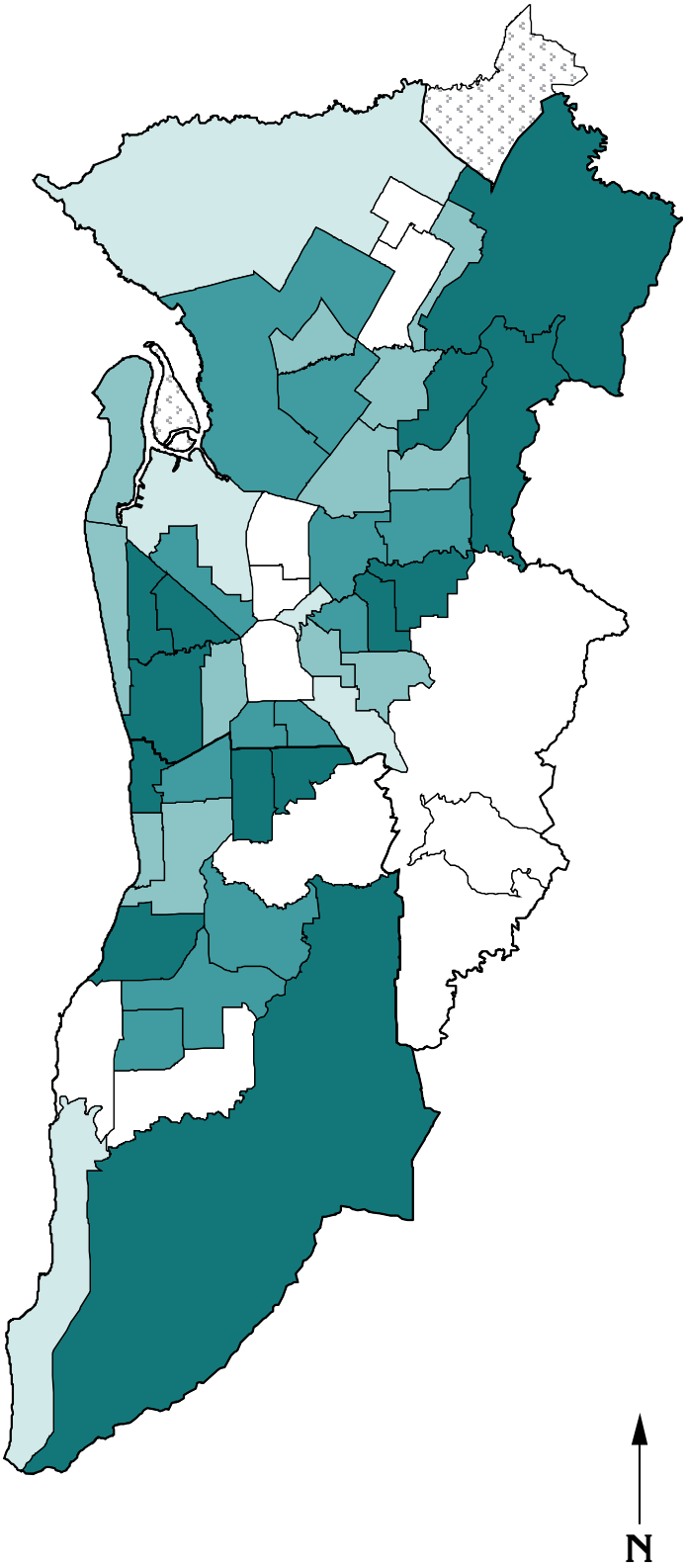
The highest proportions of fully immunised 12 month old children (with an overall rate of 95.0%) were located in Marion - South (98.8%, 232), Onkaparinga - Hills (96.1%, 105), Holdfast Bay - North (96.1%, 157), and Mitcham - North-East (96.0%, 116) and - West (96.0%, 225); and Onkaparinga - Woodcroft (412 children, 95.3%) and - Morphett (342, 95.2%) had large numbers of fully immunised children.

The lowest proportions of fully immunised children were in Onkaparinga - North Coast (92.5%, 187), Onkaparinga - Hackham (92.6%, 165), Mitcham - Hills (92.9%, 216) and Onkaparinga - South Coast (93.3%, 277).

Map 6.9
Immunisation status of children at 12 months of age, metropolitan regions, 2002



Note: The black vertical lines show the average proportion for this indicator in each region; the horizontal lines show the range of the indicator at the SLA level within the region.



SLA
Health Region

Per cent fully immunised children, by SLA

- *96.0% or more*
- *95.0 to 95.9%*
- *94.0 to 94.9%*
- *93.0 to 93.9%*
- *fewer than 93.0%*
- *data not mapped*[#]

[#]*Data were not mapped for Torrens Island (mapped with Port Adelaide): Gawler has been mapped in the State map*

Source: See Data sources, Appendix 1.3 ***Details of map boundaries are in Appendix 1.2***

Country South Australia

The level of coverage in country South Australia was 94.5%, with 5,004 children fully immunised at 12 months of age (Table 6.9). There are major variations across the State, with immunisation rates ranging from a low of 73.7% in Coober Pedy (16 children) to 100.0% in a number of SLAs (see page 23 in Chapter 2 regarding these percentages), but all with small numbers of cases (Map 6.10).

Table 6.9: Regional totals, immunisation status of children at 12 months of age, 2002

Region	No.	%
Hills Mallee Southern	1,251	94.1
Wakefield[1]	1,089	95.6
South East	819	94.7
Northern & Far Western	625	93.4
Eyre	446	94.5
Mid North	372	96.3
Riverland	402	92.8
Country SA	**5,004**	**94.5**
Central Northern	8,308	94.6
Southern	3,338	95.0
Metropolitan regions	**11,653**	**94.7**
South Australia	**16,657**	**94.6**

[1]**Gawler is included in Wakefield region**

The correlation analysis shows a weak association at the SLA level between low immunisation rates and socioeconomic disadvantage. Of particular note are the strong inverse correlations between high immunisation rates and the population born in predominantly non-English speaking countries (and resident for five years or more), and those in this group (regardless of length of residence) with poor proficiency in English, suggesting that these groups have lower immunisation rates (Table 8.2).

The Regions

Mid North had the highest proportion of children fully immunised at 12 months (96.3%, 372 children). The SLAs of Barunga West (22 children), Orroroo/Carrieton (eight children) and Peterborough (16 children) had all achieved 100% coverage (see the note on the previous text page about misallocation of data to SLA). There were also high rates in Mount Remarkable (99.2%, 28 children) and Port Pirie Balance (97.3%, 43). Port Pirie - City had 194 fully immunised children (95.0%).

In **Wakefield**, 95.6% of the 1,089 children were fully immunised, with the highest rates in Barossa - Tanunda (98.3%, 53 children), Clare and Gilbert Valleys (97.3%, 107), Gawler (97.1%, 227), Barossa - Barossa (96.6%, 91), Copper Coast (96.5%, 110) and Wakefield (96.0%, 68); and lower proportions in Mallala (90.1%, 85 children) and Yorke Peninsula - North (92.4%, 66).

In **South East,** 819 children were fully immunised at 12 months of age, 94.7% of this age group. Very high immunisation rates were recorded in Robe (99.9%, 17 children) and Lacepede (99.5%, 29); and large numbers in Mount Gambier (311, 94.9%), Wattle Range - West (118, 93.1%) and Tatiara (103, 95.0%).

There was more variation in rates within **Eyre**, with an overall rate of 94.5% (446 children). Franklin Harbor and Kimba (both with 12 children) and Streaky Bay (23 children) all had rates of 100%, compared to Unincorporated West Coast (13 children), with a lower immunisation rate (88%). There were also high rates in Cleve (99.6%, 34) and Tumby Bay (96.2%, 29); and lower rates in Ceduna (88.6%, 58) and Elliston (92.7%, 13). Port Lincoln had the largest number of children (198, 94.4%).

There were 1,251 children fully immunised at 12 months in **Hills Mallee Southern** (94.1%). Southern Mallee had a 100% immunisation rate (28 children), followed by Karoonda East Murray (99.6%, 13), Yankalilla (96.7%, 35) and Adelaide Hills Balance (96.5%, 105). There were large numbers of fully immunised children in Murray Bridge (94.2%, 217), Mount Barker - Central (93.8%, 215) and Adelaide Hills Balance (96.5%, 105). The lowest immunisation rates in this region were in Alexandrina - Strathalbyn (90.9%, 94), Mid Murray (92.7%, 75) and Victor Harbor (92.8%, 92).

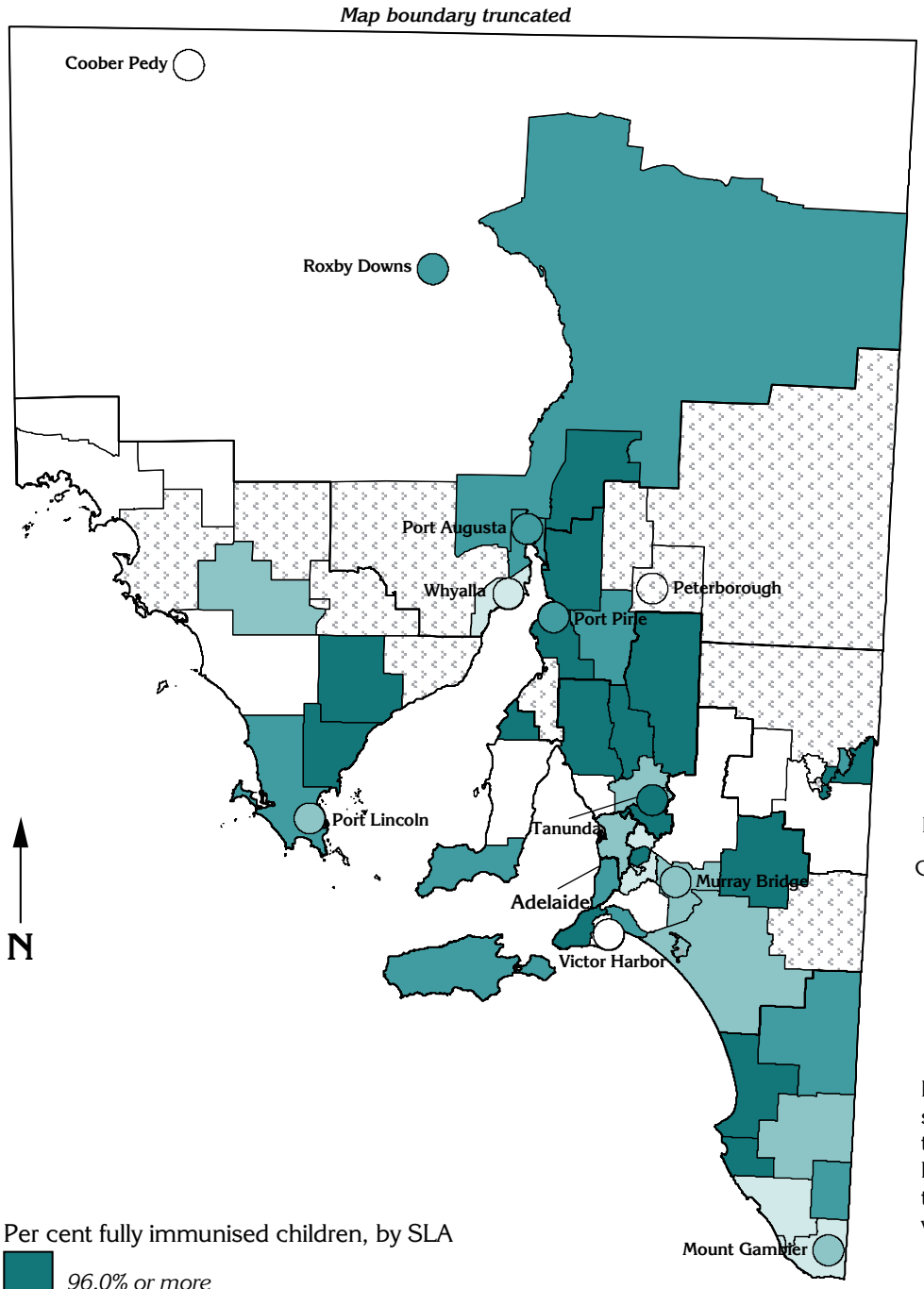
The overall level of immunisation in **Northern and Far Western** at 12 months of age was 93.4% (625 children), although the rate varied substantially (see graph opposite) with the highest level in Flinders Ranges (99.9%, 17), and lows of 73.7% (16 children) in Coober Pedy and 88.7% (52 children) in Unincorporated Far North (88.7%, 52). Whyalla (263 children, 93.2%) and Port Augusta (163, 95.9%) had large numbers of fully immunised children.

In **Riverland**, 92.8% of children were fully immunised at 12 months of age (402 children). SLAs with the highest rates were Renmark Paringa - Paringa (98.7%, 18 children) and Berri and Barmera - Berri (96.0%, 92). There were 100 fully immunised children in Renmark Paringa - Renmark (95.3%). The lowest rates were in the SLAs of Berri and Barmera - Barmera (87.6%, 58) and Loxton Waikerie - East (89.7%, 82) and - West (92.2%, 50).

ASGC Remoteness classification

The rate of immunisation was fairly consistent across the remoteness areas, ranging from 94.2% in Inner Regional (2,150 children) to 95.7% in Remote (623 children). The exception was Very Remote, with a relatively low proportion, of 88.6% (166 children).

Map 6.10
Immunisation status of children at 12 months of age, South Australia, 2002

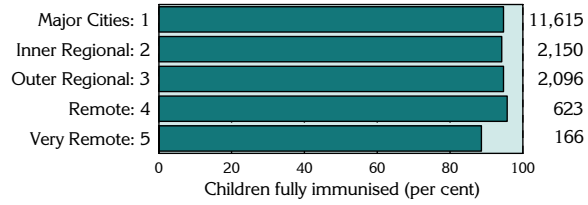


Note: The black vertical lines show the average proportion for this indicator in each region; the horizontal lines show the range of the indicator at the SLA level within the region.

Per cent fully immunised children, by SLA

- *96.0% or more*
- *95.0 to 95.9%*
- *94.0 to 94.9%*
- *93.0 to 93.9%*
- *below 93.0%*
- *data not mapped*[#]

[#]*Data were not mapped because the SLA has a population of less than 100 or there were fewer than five children*



Source: See Data sources, Appendix 1.3

Details of map boundaries are in Appendix 1.2

Overweight (not obese) four year old boys, 2000 to 2003

Overweight and obesity in childhood and adolescence can cause a wide range of physical and emotional health problems, and an increased risk of premature illness and death in adulthood. With almost one in six four year old children in South Australia being overweight or obese, Australian prevalence rates are high by international standards and represent a serious public health concern. Current rates in South Australia represent a dramatic increase since 1995, of around 70% for boys and girls at this age (Hetzel et al. 2004).

These data were provided by Child and Youth Health (CYH) who have, for a number of years, collected height and weight information for children aged from four years three months to five years (collectively referred to as four year old children in the text). The measurements are taken at child care and pre-school centres by staff of CYH, with an average coverage at these ages of 78.8%. As the numbers of children in the overweight and (in particular) the obese categories in any one year do not provide sufficient cases for mapping, several years have been grouped. The data for girls have not been shown because of concerns with data quality.

More than one in ten four year old boys, whose measurements were recorded, were assessed as being overweight (but not obese, referred to as 'pre-obese'), with a higher proportion in country South Australia (13.6%) than in Metropolitan Adelaide (11.3%) (Table 6.10)).

Table 6.10: Overweight (not obese) four year old boys, 2000 to 2003

Per cent

Area	No.	%
Metropolitan Adelaide (incl. Gawler)	1,902	11.3
Country	1,164	13.6
South Australia	3,066	12.1

Metropolitan regions

In the metropolitan regions (excluding Gawler), 11.3% of four year old boys were assessed as overweight (1,867 boys) (Table 6.11). Their geographic distribution (Map 6.11) is similar to the pattern of socioeconomic disadvantage; this is supported by the existence of weak correlations with a number of the indicators of disadvantage at the SLA level (Table 8.1).

Central Northern Adelaide

In Central Northern, 11.4% of four year old boys were classified as overweight (1,318 boys). High proportions were found in the SLAs of Port Adelaide Enfield - Coast (16.4%. 63 boys), Adelaide (16.3%, seven), Playford - West (14.9%, 28), and Charles Sturt - Inner West (13.8%, 42) and - Coastal (13.2%, 40). Relatively large numbers were also recorded in Salisbury - South-East (76 boys, 12.2%), Tea Tree Gully - North (73, 12.0%), Salisbury - Central (66, 11.0%), and Playford - Elizabeth (67, 11.5%) and - Inner North (61, 11.0%).

Low proportions of overweight four year old boys were recorded in Burnside - South-West (7.3%, 13 boys), Campbelltown - East (7.6%, 29), Adelaide Hills - Ranges (7.6%, 13), Unley - East and - West (both 8.5%, 19), Adelaide Hills - Central (8.5%, 19), Salisbury Balance (8.7%, ten) and Campbelltown - West (9.9%, 22).

Southern Adelaide

The proportion of overweight four year old boys in Southern (11.1%, 549 boys) was similar to that in Central Northern. The highest proportions in this region were mapped in the SLAs of Holdfast Bay - South (15.1%, 23 boys), Mitcham - Hills (14.1%, 46), Marion - South (13.0%, 45) and Holdfast Bay - North (12.3%, 23). Onkaparinga - Woodcroft had 75 boys classified as overweight (11.4%).

The Onkaparinga SLAs of - Hackham (5.4%, 16) and - North-Coast (8.3%, 23), both had relatively low proportions of overweight four year old boys.

The Regions

In country South Australia, there were 1,199 four year old boys classified as overweight, 13.5% of those measured. The highest proportions were in **Eyre** (15.7%, 96 boys), **South East** (14.6%, 239 boys) and **Mid North** (14.2%, 121), and the lowest in **Hills Mallee Southern** (11.2%, 234 boys).

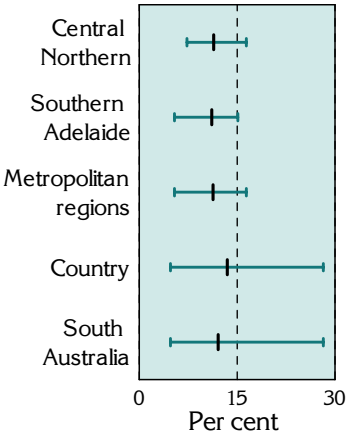
No consistent relationship was evident between overweight four year old boys and socioeconomic status in the correlation analysis at the SLA level (Table 8.2).

Table 6.11: Regional totals, overweight four year old boys, 2000 to 2003

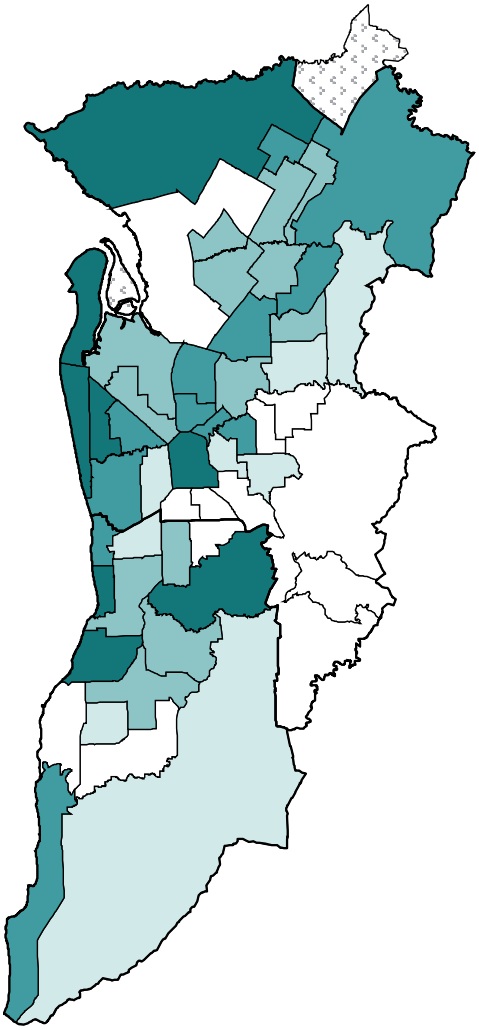
Region	No.	%
Hills Mallee Southern	234	11.2
Wakefield[1]	266	14.1
South East	239	14.6
Northern & Far Western	131	13.0
Eyre	96	15.7
Mid North	121	14.2
Riverland	114	14.1
Country SA	**1,199**	**13.5**
Central Northern	1,318	11.4
Southern	549	11.1
Metropolitan regions	**1,867**	**11.3**
South Australia	**3,066**	**12.1**

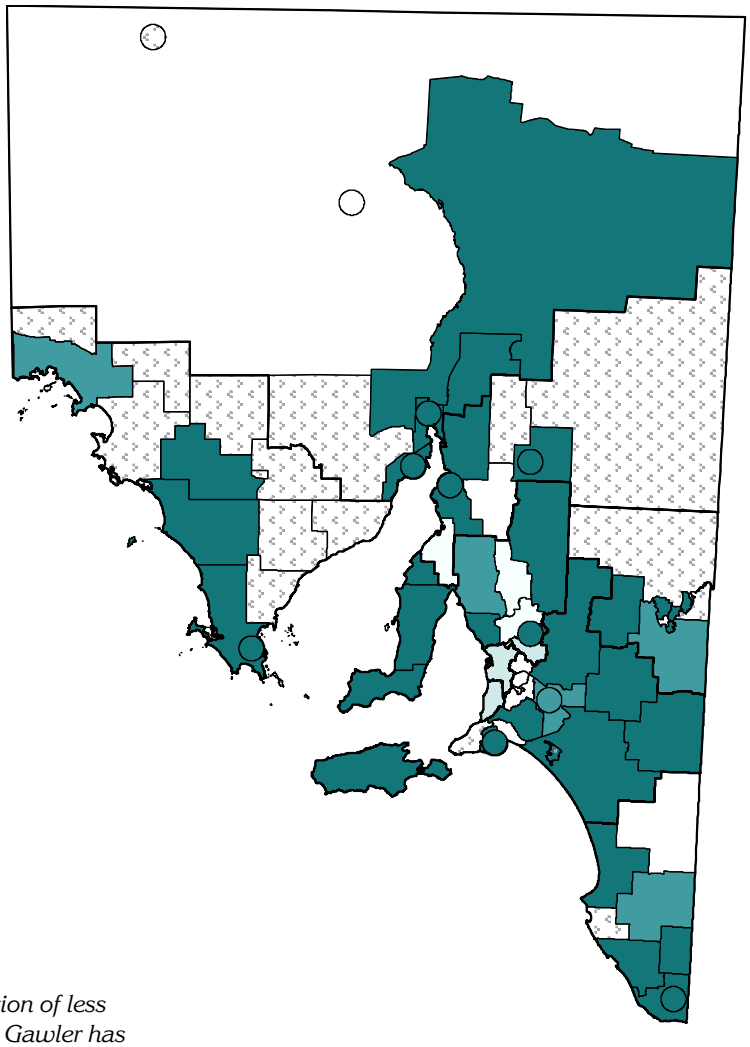
[1] **Gawler is included in Wakefield region**

Map 6.11
Overweight (not obese) four year old boys, 2000 to 2003



Note: The black vertical lines show the average ratio for this indicator in each area; the horizontal lines show the range of the indicator at the SLA level within the region.





SLA
Health Region

Per cent overweight 4 year old boys, by SLA

- *13.0% or more*
- *12.0 to 12.9%*
- *11.0 to 11.9%*
- *10.0 to 10.9%*
- *fewer than 10.0%*
- *data not mapped#*

#Data were not mapped because the SLA has a population of less than 100 or there were fewer than 5 overweight boys: Gawler has been mapped in the State map

Source: See Data sources, Appendix 1.3 ***Details of map boundaries are in Appendix 1.2***

Obese four year old boys, 2000 to 2003

Some 4.5% of four year old boys in South Australia were assessed by Child and Youth Health (see p. 210) as being obese: the same proportion was recorded for both Metropolitan Adelaide and country South Australia (Table 6.12).

Table 6.12: Obese four year old boys, 2000 to 2003

Per cent

Area	No.	%
Metropolitan Adelaide (incl. Gawler)	763	4.5
Country	385	4.5
South Australia	1,148	4.5

Metropolitan regions

In the metropolitan regions (excluding Gawler), 4.5% of four year old boys were assessed as obese (739 boys). A cluster of SLAs with above-average proportions lies across the north-west, inner- and outer-northern suburbs (Map 6.12).

This variable was strongly correlated with low income families, unemployment, female sole parent pensioners, children in welfare-dependent and other low income families, people receiving a Disability Support Pension, smoking during pregnancy, admissions to public acute hospitals, Child and Adolescent Mental Health Service and community health services clients, jobless families, unskilled and semi-skilled workers and unemployment beneficiaries. These results together with a strong inverse correlation with the Index of Relative Socio-Economic Disadvantage suggest an association at the SLA level between obese four year old boys and socioeconomic disadvantage (Table 8.1).

Central Northern Adelaide

Central Northern had a higher proportion of obese boys than Southern (4.7% compared to 4.1%), representing 548 boys (Table 6.13). SLAs with the largest proportions of these boys in their populations were the adjoining SLAs of Port Adelaide Enfield - East (8.0%, 30 boys), Charles Sturt - Inner West (6.7%, 21), Salisbury Balance (6.6%, seven boys), Port Adelaide Enfield - Port (6.6%, 24) and - Inner (6.5%, 18), and Salisbury - South-East (6.3%, 39).

Relatively large numbers of obese four year old boys were found in Playford - Elizabeth (35 boys, 6.0%), Salisbury - Central (26, 4.3%), Tea Tree Gully - South (24, 4.7%), Port Adelaide Enfield - Coast (22, 5.7%) and Campbelltown - East (22, 5.6%).

Low proportions (and relatively low numbers) were recorded for boys in Unley - East (2.0%, five boys), Tea Tree Gully - Hills (2.1%, four boys), Adelaide Hills - Central (2.6%, six), Salisbury - North-East (2.9%, 13), and Tea Tree Gully - North (3.4%, 21).

Southern Adelaide

In Southern, 4.1% of four year old boys (202 boys) were obese. None of the SLAs had proportions mapping in the highest range (Map 6.12). The highest proportions in this region were located in Onkaparinga - South Coast (5.7%, 24 boys) and - Hackham (5.3%, 16), and Marion - North (5.4%, 16).

The Onkaparinga SLAs of - Woodcroft (27 boys, 4.1%), and - Morphett (22, 4.8%) both had relatively large numbers of obese four year old boys.

Mitcham - Hills (2.2%, seven boys), Onkaparinga - Reservoir (2.9%, 14), Mitcham - West (3.0%, eleven) and Holdfast Bay - North (3.8%, seven) all had low proportions of obese four year old boys.

The Regions

In country South Australia, 397 four year old boys were assessed as being obese, 4.5% of those measured. **Eyre** had the highest proportion of 6.4% (39 boys), with 5.2% (42 boys) in **Riverland**. The lowest proportion was recorded for **Hills Mallee Southern** (3.4%, 72).

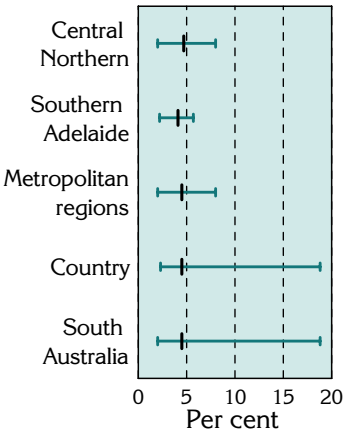
No consistent relationship was evident between obese four year old boys and socioeconomic status in the correlation analysis at the SLA level (Table 8.2).

Table 6.13: Regional totals, obese four year old boys, 2000 to 2003

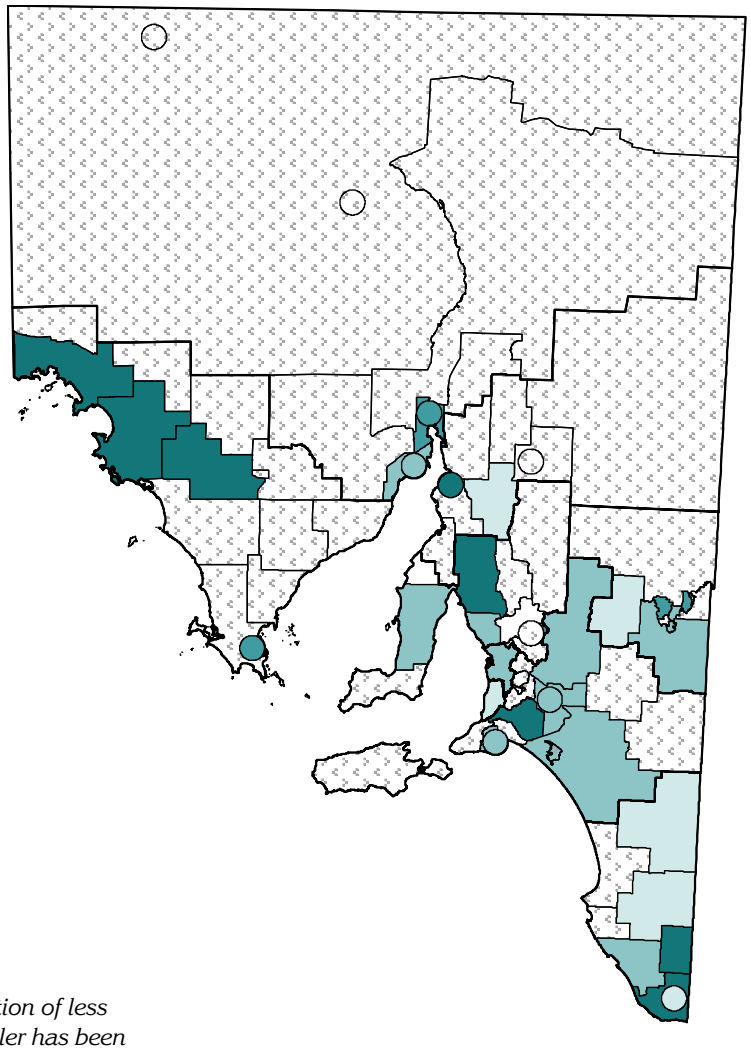
Region	No.	%
Hills Mallee Southern	72	3.4
Wakefield[1]	77	4.1
South East	74	4.5
Northern & Far Western	51	5.1
Eyre	39	6.4
Mid North	43	5.0
Riverland	42	5.2
Country SA	**397**	**4.5**
Central Northern	548	4.7
Southern	202	4.1
Metropolitan regions	**751**	**4.5**
South Australia	**1,148**	**4.5**

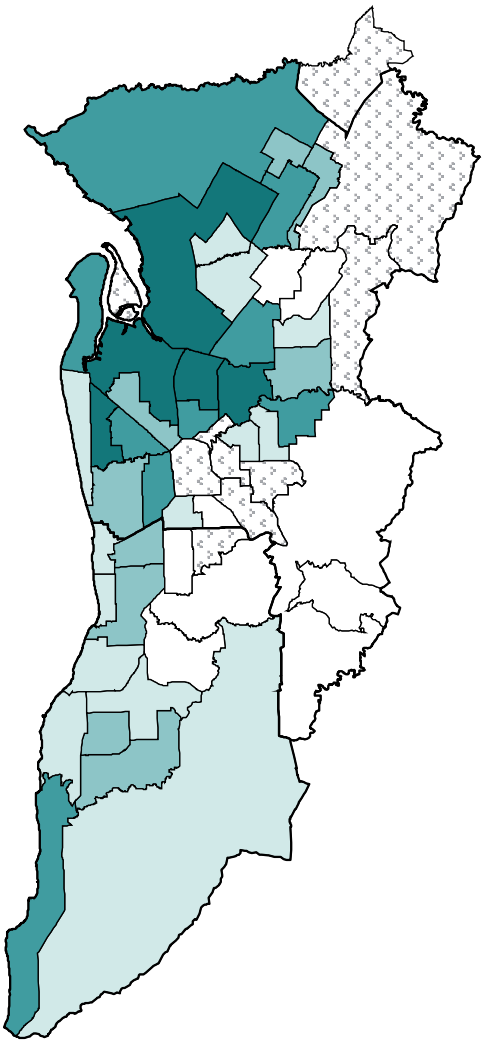
[1] **Gawler is included in Wakefield region**

Map 6.12
Obese four year old boys, 2000 to 2003



Note: The black vertical lines show the average ratio for this indicator in each area; the horizontal lines show the range of the indicator at the SLA level within the region.





SLA
Health Region

Per cent obese 4 year old boys, by SLA

- *6.5% or more*
- *5.5 to 6.4%*
- *4.5 to 5.4%*
- *3.5 to 4.4%*
- *fewer than 3.5%*
- *data not mapped#*

#Data were not mapped because the SLA has a population of less than 100 or there were fewer than 5 obese boys: Gawler has been mapped in the State map

Source: See Data sources, Appendix 1.3

Details of map boundaries are in Appendix 1.2

Dental health of 12 year old children, 2002 to 2004

Dental decay and gum disease are costly health burdens, and yet, are also some of the most preventable health conditions. Overall, Australian children experience comparatively low levels of dental decay. However, a minority of children experience extensive decay and carry most of the burden of this disease (Armfield et al. 2004). Fluoride plays a crucial role in the prevention of dental caries. While some water supplies outside the metropolitan regions have optimal levels of fluoride to protect against dental caries, many do not (DSRU 2000).

In South Australia, fewer than two thirds (61.2%) of twelve year old children attending the School Dental Service (SDS) had healthy teeth (where healthy is defined as having no decayed, missing or filled teeth) (Table 6.1Table 6.4). The proportion was higher in Metropolitan Adelaide than in country South Australia.

Table 6.14: Children with no decayed, missing or filled teeth, 2002 to 2004

Area	Children attending	No.	Per cent
Metropolitan Adelaide (incl. Gawler)	13,736	8,636	62.9
Country	6,260	3,594	57.4
South Australia	20,025	12,254	61.2

Metropolitan regions

The SLAs with the highest proportions of 12 year old children with healthy teeth were located in the inner and middle suburbs to the east, south and west of the city, and throughout much of the south-east and outer south. SLAs with the highest proportion of children with decayed, missing or filled teeth were located in a band, starting in Adelaide and covering SLAs to the north-west and north, and extending to the outer-north (Map 6.13). The pattern of distribution of children with poor dental outcomes under this measure is consistent with the pattern of socioeconomic disadvantage seen throughout this atlas, but is much more evident in the Central Northern Adelaide region.

This variable was consistently weakly correlated with a number of the indicators of advantage, and inversely correlated with a number of the indicators of disadvantage. These results, together with a weak correlation with the Index of Relative Socio-Economic Disadvantage suggest an association at the SLA level between 12 year old children with no decayed, missing or filled teeth and socioeconomic advantage (Table 8.1).

Central Northern Adelaide

In Central Northern, 60.9% of children aged 12 years were assessed by the SDS as being without decayed, missing or filled teeth, a total of 5,432 children. This rate was lower than that in the Southern region (Table 6.15).

Around three quarters of children from West Torrens - West (77.6%, 225) and West Torrens - East (74.6%, 185) who attended an SDS clinic had no decayed, missing or filled teeth. There were also high proportions in Burnside - South-West (69.5%, 91), Tea Tree Gully - South (69.0%, 267), Charles Sturt - Coastal (68.5%, 241) and Salisbury - North-East (68.3%, 185).

Large numbers of 12 year old children without any decayed, missing or filled teeth were recorded by the SDS in Salisbury - South-East (293, 60.4%), Tea Tree Gully - North (257, 65.7%) and Charles Sturt - Inner West (210, 66.5%). Of the 26 children aged 12 in the SLA of Adelaide and assessed by the SDS, none was free of decayed, missing or filled teeth.

Children in Charles Sturt - North-East had a poor outcome on this measure, with just 37.8% of 12 year olds attending an SDS clinic being free of decayed, missing or filled teeth (126 children aged 12 years), followed by Port Adelaide Enfield - Port (48.1%, 185), Salisbury - Inner North (51.7%, 185) and - Central (54.8%, 251), Port Adelaide Enfield - Coast (57.0%, 254) and Playford - Elizabeth (57.9%, 256).

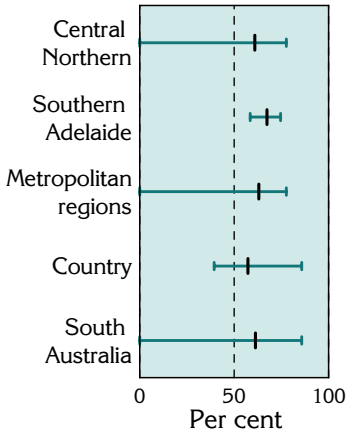
Southern Adelaide

In Southern, over two-thirds (67.3%) of 12 year old children who attended an SDS clinic had no decayed, missing or filled teeth (3,051 children), a better outcome than in Central Northern (with 60.9%).

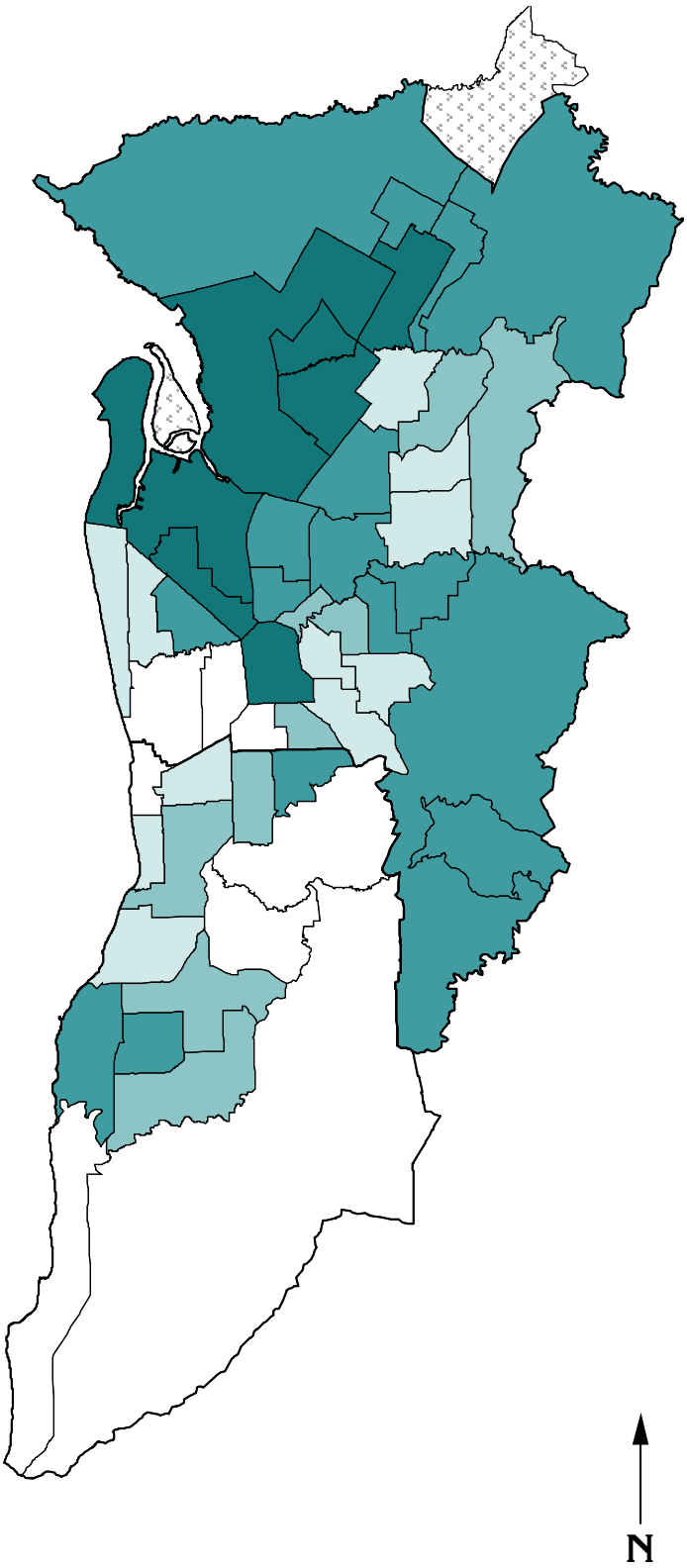
A number of SLAs in the Southern region had relatively high proportions of 12 year old children in this group. These included Mitcham - Hills (74.5%, 260), Onkaparinga - South Coast (73.4%, 326) and - Reservoir (72.5%, 338), Holdfast Bay - North (72.2%, 52), Onkaparinga - Hills (71.6%, 184), Unley - West (71.4%, 75), and Marion - North (69.6%, 119) and - South (69.1%, 259). Onkaparinga - Woodcroft had a large number of children without any decayed, missing or filled teeth (404 children, 65.5%).

The SLAs with the lowest proportions in this region were Mitcham - North-East (58.4%, 111 children), Onkaparinga - North Coast (60.1%, 166) and - Morphett (61.0%, 280), and Unley - East (62.7%, 74).

Map 6.13
Dental health of 12 year old children: no decayed, missing or filled teeth, metropolitan regions, 2002 to 2004



Note: The black vertical lines show the average proportion for this indicator in each region; the horizontal lines show the range of the indicator at the SLA level within the region.



SLA
Health Region

Per cent children with no decayed, missing or filled teeth, by SLA

- *fewer than 58.0%*
- *58.0 to 61.9%*
- *62.0 to 65.9%*
- *66.0 to 69.9%*
- *70.0% or more*
- *data not mapped*[#]

[#] *Data were not mapped for Torrens Island (mapped with Port Adelaide: Gawler has been mapped in the State map*

Source: See data sources, Appendix 1.3 ***Details of map boundaries are in Appendix 1.2***

A Social Health Atlas of South Australia, 2006

Country South Australia

A relatively low proportion, of just over half, of 12 year old children in country South Australia attending a School Dental Service (SDS) clinic were assessed as being without decayed, missing or filled teeth (57.3%, 3,747 children).

There is no clear pattern in the geographic distribution of SLAs with children with high rates of healthy teeth, although towns and other SLAs with better dental health outcomes are generally those closest to Metropolitan Adelaide (Map 6.14). At the regional level, proportions vary from 64.8% in **Mid North** to 52.7% in **Eyre** (Table 6.15).

Table 6.15: Regional totals, children with no decayed, missing or filled teeth, 2002 to 2004

Per cent

Region	No.	%
Hills Mallee Southern	813	59.0
Wakefield[1]	941	58.1
South East	750	54.7
Northern & Far Western	372	56.3
Eyre	168	52.7
Mid North	338	64.8
Riverland	365	54.8
Country SA	**3,747**	**57.3**
Central Northern	5,432	60.9
Southern	3,051	67.3
Metropolitan regions	**8,483**	**63.0**
South Australia	**12,254**	**61.2**

[1] **Gawler is included in Wakefield region**

This variable was consistently weakly correlated with indicators of advantage, and inversely correlated with indicators of disadvantage. These results, together with a weak correlation with the Index of Relative Socio-Economic Disadvantage suggest an association at the SLA level between good dental health and socioeconomic advantage (Table 8.2).

The Regions

Mid North had the highest proportion of children without decayed, missing or filled teeth, with nearly two thirds of those 12 year old children attending an SDS clinic, having good dental health (64.8%, 338 children). There were high proportions of children without these dental problems in Port Pirie Balance (74.5%, 38), Orroroo/Carrieton (72.2%, 13) and Port Pirie City (68.4%, 158); Mount Remarkable had the lowest proportion (54.4%, 31).

In **Hills Mallee Southern**, 59.0% of 12 year old children attending a clinic were free of decayed, missing and filled teeth. However, Kangaroo Island (46.3%, 37 children) and Adelaide Hills Balance (52.7%, 58) had below average proportions for the region. There were high proportions of children without these dental problems in Yankalilla (78.6%, 22), Victor Harbor (70.1%, 68), and Adelaide Hills - North (66.0%, 66). Large numbers were also found in Murray Bridge (138, 56.3%) and Mount Barker - Central (112, 56.9%).

The largest number of children aged 12 years without any decayed, missing or filled teeth was in **Wakefield** region (941 children, 58.1%). There were low proportions in Yorke Peninsula - North (44.3%, 58 children) and - South (46.2%, six), and Mallala (50.9%, 58). Barossa - Tanunda (70.4%, 57) and Wakefield (67.2%, 45) both had relatively high proportions; and Gawler (153 children, 54.6%), Copper Coast (137, 59.8) and Light (116, 63.0%) had relatively large numbers.

Perhaps surprisingly, **Northern and Far Western**, region was on a par with the other country regions, with 56.3% of 12 year old children assessed by the SDS as having no decayed, missing or filled teeth (see comments below under ASGC Remoteness). The lowest proportions (i.e. the poorest outcomes) were in Unincorporated Far North (52.9%, nine children) and Port Augusta (53.7%, 138). Over two-thirds of assessed 12 year old children in Unincorporated Flinders Ranges were without these dental problems (68.4%, 13 children); with a proportion of over half in Whyalla (57.8%, 185).

Over half (54.8%) of 12 year old children in **Riverland** who attended an SDS clinic were without these dental problems (365 children). Lower proportions were found in Renmark Paringa - Renmark (51.1%, 89) and Berri and Barmera - Berri (51.9%, 68). Loxton Waikerie - East had 91 children aged 12 years with good dental health (56.9%).

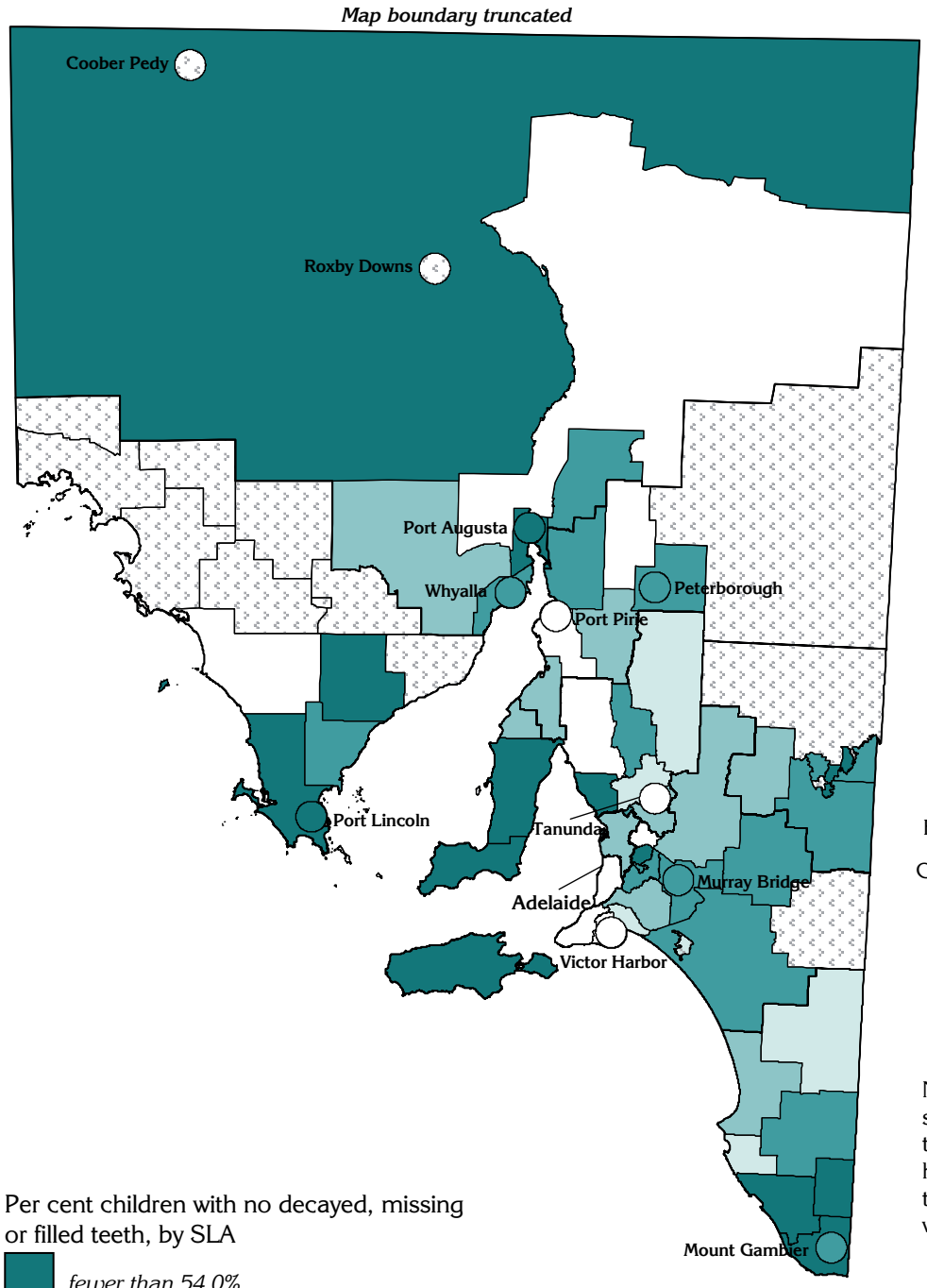
In **South East**, 54.7% of 12 year old children also had no decayed, missing or filled teeth (750 children), with similar proportions in the SLAs of Wattle Range - West (52.4%, 132), Grant (53.0%, 80) and Mount Gambier (54.0%, 269). There were 96 children aged 12 years without these dental problems in Naracoorte and Lucindale (57.5%).

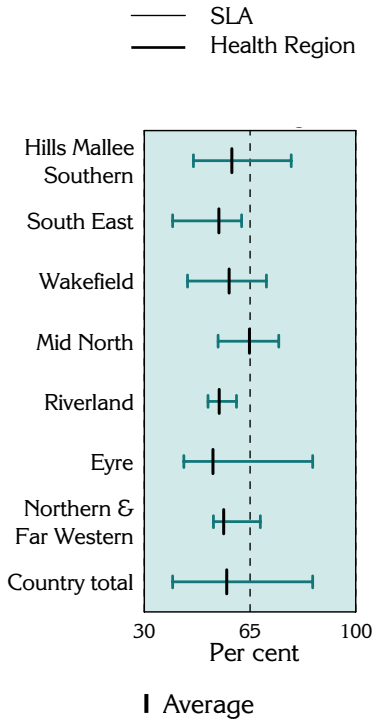
Eyre had the lowest proportion of children without decayed, missing or filled teeth, just 52.7% of all 12 year old children assessed by the SDS in the region. Lower Eyre Peninsula had a particularly low proportion, of 43.1% (22 children), followed by Cleve (50.0%, six children) and Port Lincoln (52.3%, 113). There were a high proportion of these children without these dental problems in Elliston (85.7%, but only a small number, six children).

ASGC Remoteness classification

The dental health of children attending an SDS clinic declines with increasing remoteness, other than in the Very Remote areas, which had the highest proportion of 12 year old children assessed as having no decayed, missing or filled teeth: the high rate is likely to reflect the exclusion from the data of the most remote and disadvantaged areas.

Map 6.14
Dental health of 12 year old children: no decayed, missing or filled teeth, South Australia, 2002 to 2004



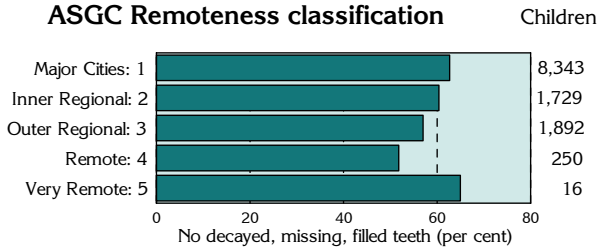


Note: The black vertical lines show the average proportion for this indicator in each region; the horizontal lines show the range of the indicator at the SLA level within the region.

Per cent children with no decayed, missing or filled teeth, by SLA

- *fewer than 54.0%*
- *54.0 to 57.9%*
- *58.0 to 61.9%*
- *62.0 to 65.9%*
- *66.0% or more*
- *data not mapped*[#]

[#] *Data were not mapped because the SLA has a population of less than 100 or there were fewer than five children*



Source: See data sources, Appendix 1.3

Details of map boundaries are in Appendix 1.2

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Prevalence estimates for self-assessed health, chronic disease and associated risk factors

The term "chronic disease" describes health problems that persist over time and require some degree of health care management (WHO 2002). Chronic diseases have complex causes, are often long lasting and seldom cured, and can produce a range of complications (Thacker et al. 1995). They are responsible for a significant proportion of the burden of disease and illness in Australia and other westernised countries. Given the ageing of the population, this trend is likely to continue.

At different life stages, risk factors for chronic diseases and their determinants include genetic predisposition; poor diet and lack of exercise; alcohol misuse and tobacco smoking; poor intra-uterine conditions; stress, violence and traumatic experiences; and inadequate living environments that fail to promote healthy lifestyles (NPHP 2001).

Risk factors are also more prevalent in areas of low socioeconomic status, and in communities characterised by low levels of educational attainment; high levels of unemployment; substantial levels of discrimination, interpersonal violence and exclusion; and poverty. There is a higher prevalence of risk factors among Indigenous communities, and other socioeconomically disadvantaged Australians (NPHP 2001).

As noted on page 187, the data for selected chronic conditions and risk factors at the SLA level have been estimated (by synthetic prediction) from the 2001 National Health Survey (NHS), conducted by the ABS. The data are self-reported data, conveyed to interviewers in the 2001 NHS, and are not based on clinical records or physical measures (Table 6.16 includes notes relevant to this data).

Table 6.16: Notes on estimates of chronic diseases and associated risk factors from the 2001 NHS

Indicator	Notes on the data
Estimates of chronic disease and injury events	
Long term conditions	- Respondents were asked whether they had been diagnosed with any long term health condition (a condition which has lasted or is expected to last for six months or more), and were also asked whether they had been told by a doctor or nurse that they had asthma, cancer, heart and circulatory conditions, and/or diabetes
Injury event	- Injuries which occurred in the four weeks prior to interview
Estimates of measures of self-reported health	
Very high psychological distress levels (K-10)	- Derived from the Kessler Psychological Distress Scale 10 items (K-10)*, which is a scale of non-specific psychological distress based on ten questions about negative emotional states in the four weeks prior to interview. 'Very high' distress is the highest level of distress category (of a total of four categories)
Fair or poor self-assessed health status	- Respondent's general assessment of their own health, against a five point scale from 'excellent' through to 'poor' – 'fair' or 'poor' being the two lowest in the scale
Estimates of selected risk factors	
Overweight & obese	- Based on self-reported height and weight; BMI calculated and grouped into categories (to allow reporting against both WHO and NHMRC guidelines) as follows – overweight: 25.0 kg/m^2 to less than 30.0 kg/m^2; obese: 30.0 kg/m^2 and greater
Smokers	- Respondent's undertaking regular (or daily) smoking at the time of interview
Physical inactivity	- Did not exercise in the two weeks prior to interview through sport, recreation or fitness (including walking) – excludes incidental exercise undertaken for other reasons, such as for work or while engaged in domestic duties
High health risk due to alcohol consumed	- Respondent's estimated average daily alcohol consumption in the seven days prior to interview (based on number of days and quantity consumed). Alcohol risk levels were grouped according to NHMRC risk levels for harm in the long term, with 'high risk' defined as a daily consumption of more than 75 ml for males and 50 ml for females

*Reference for K-10: see Kessler & Mroczek 1994

Note: For a full description, refer to ABS 2001 National Health Survey, Cat. No. 4364.0 and ABS 2001 Health Risk Factors, Cat. No. 4812.0

As the estimates were produced using a range of indicators of socioeconomic status, the correlation analysis has not been undertaken for these variables.

The NHS sample includes the majority of people in the State living in private households, but excludes the most remote areas of the State. Rather than map the few areas outside Metropolitan Adelaide for which the estimates are available, the estimates for the towns for which the estimates can be made are shown in Table 6.17.

As with the data presented in the following pages for these estimates, the standardised ratio is shown to indicate whether the estimated number of cases is above or below the level expected from the State rates, given the size and age composition of the town's population.

Table 6.17: Estimates of chronic diseases and associated risk factors for towns, 2001

Variable	Mount Gambier	Murray Bridge	Peter-borough	Port Augusta	Port Pirie	Tanunda	Victor Harbor	Whyalla
Chronic disease and injury events								
Respiratory system diseases								
Number	6,638	4,997	594	4,013	4,036	1,320	3,226	6,331
Ratio	85**	88	90	86	87	88	91	85*
Asthma								
Number	2,162	1614	187	1,359	1,318	405	982	2,120
Ratio	73**	76**	77*	77**	76**	74**	81**	75**
Circulatory system diseases								
Number	3,969	3,274	467	2,521	2,840	877	3,027	3,701
Ratio	103**	107**	109*	108**	108**	99	104**	99
Diabetes type 2								
Number	493	410	64	327	394	88	384	531
Ratio	102	101	102	106	111	77**	93*	107
Mental and behavioural problems								
Number	2,367	1,918	209	1,373	1,347	412	1,173	2,055
Ratio	101**	112**	104*	97**	97*	92	115**	91
Musculoskeletal system diseases								
Number	7,652	6,056	785	4,743	5,007	1,652	4,600	7,113
Ratio	101**	106**	107**	103**	104**	103**	105**	97**
Arthritis								
Number	3,242	2,691	394	2,081	2,356	711	2,407	3,034
Ratio	105*	109**	112*	119**	111**	98	103	100
Osteoarthritis								
Number	1,927	1,567	192	975	1,132	414	1,477	1,514
Ratio	114**	114**	96	95	95	101	105*	93**
Osteoporosis in females								
Number	283	228	34	177	212	71	247	270
Ratio	83**	85*	89	92	88	82	84**	87*
Injury events								
Number	2,879	2,106	223	1,709	1,662	549	1,179	2,765
Ratio	100**	103**	101	101*	101*	107*	110**	102**
Self-reported health								
Fair/poor health status								
Number	3,422	2,859	417	2,478	2,639	632	2,134	3,818
Ratio	96*	105*	117**	115**	114**	81**	94**	112**
Very high psychological stress (K-10)								
Number	598	553	77	473	495	94	317	733
Ratio	91*	116**	137**	120**	125**	73**	102	117**
Risk factors								
Overweight males								
Number	3,340	2,269	273	1,867	1,791	698	1,690	2,850
Ratio	105**	94**	89	94**	91**	107	103	90**
Overweight females								
Number	2,086	1,498	194	1,241	1,304	442	1,245	1,921
Ratio	108**	108**	112	111**	110**	111*	115**	108**
Obese males								
Number	1,225	1,139	145	844	976	216	582	1,499
Ratio	108**	130**	129**	116**	136**	94	102	129**
Obese females								
Number	1,791	1,371	167	1,133	1,151	311	952	1,698
Ratio	128**	136**	132**	137**	134**	111	129**	129**
Smoking								
Number	4,477	3,484	411	2,871	2,839	817	1,797	4,482
Ratio	104**	115**	121**	113**	114**	100*	102	110**
Physical inactivity								
Number	6,095	4,757	565	3,540	3,706	1,185	2,925	5,380
Ratio	106**	113**	107**	105**	105**	98	92	100**
Alcohol consumption								
Number	715	532	87	566	568	139	308	945
Ratio	100	102	140**	131**	131**	101	91	137**

Chronic disease estimates: respiratory system diseases, 2001

Chronic respiratory system diseases are those that affect the respiratory tract and include asthma, lung diseases, and breathing disorders. They often persist over many years and, if severe, may require a wide range of treatments and medications from specialised health practitioners. Some diseases may be caused by environmental pollutants such as tobacco smoke or toxic emissions from industry or transport. Others are the result of genetic conditions which affect people from a young age, such as cystic fibrosis.

The estimated rate of people with respiratory system diseases was slightly higher in the Southern region (370.7 per 1,000 population) than in Central Northern (362.9). Central Northern had one per cent fewer people reporting these diseases than expected from the rates for the metropolitan regions overall (a standardised ratio (SR of 99**) and Southern had one per cent more (an SR of 101**) (Table 6.18).

Table 6.11: Estimates of respiratory system diseases, 2001

Region	No.	Rate[1]	Ratio[2]
Central Northern	267,533	362.9	99**
Southern	115,356	370.7	101**
Metropolitan regions	382,890	365.2	100

[1]**Age-standardised rate per 1,000 population**
[2]**Percentage variation in the region from the ratio of 100 in the metropolitan regions**

Metropolitan regions

It was estimated that there were 382,890 people with respiratory system diseases in 2001. There is little variation in ratios across the metropolitan regions, with slightly elevated ratios mapped in a small number of south-western and outer northern and southern SLAs, and in the north-western SLA of Port Adelaide Enfield - Coast (Map 6.15).

Central Northern Adelaide

Central Northern had one per cent fewer people with respiratory diseases than expected from the rates for the combined metropolitan regions (an SR of 99**, 267,533 people). There was very little variation at the SLA level in Central Northern, with SRs no more than six per cent above or below the average.

Playford SLAs all had elevated ratios, with Playford - Elizabeth recording the highest (an SR of 106**, 9,513 people), followed by - West Central (103*, 4,623) and - East Central (103*, 6,846). There were also elevated ratios in Port Adelaide Enfield - Coast (104**, 10,297) and Salisbury - Inner North (101, 8,868), West Torrens - West (101, 9,852) and Walkerville (101, 2,440).

A number of SLAs in the Central Northern region were estimated to have large numbers of people with respiratory system diseases: these included Salisbury - South-East (11,928 people, an SR of 99), Charles Sturt - Coastal (11,085, 100), Port Adelaide Enfield - East (9,942, 100), Salisbury - Central (9,674, 99), and Tea Tree Gully - South (11,684 people, 99), - Central (9,469, 99) and - North (9,180, 99).

SLAs with fewer people estimated as having respiratory system diseases than expected included Campbelltown - East (an SR of 95**, 9,204 people), Adelaide (96**, 6,038), Salisbury Balance (96, 2,033), Charles Sturt - Inner West (96**, 8,301), West Torrens - East (97**, 8,258), Adelaide Hills - Ranges (98, 3,543), Campbelltown - West (98, 6,506), Charles Sturt - North-East (98*, 8,789) and - Inner East (98, 7,455), Tea Tree Gully - Hills (98, 4,416), Burnside - North-East (98, 7,200), Playford - West (98, 2,896) and Port Adelaide Enfield - Port (98, 8,778).

Southern Adelaide

Residents of Southern had a slightly elevated SR, of 101** (115,356 people with respiratory system diseases). Marginally elevated SRs were estimated for the SLAs of Marion - North (104**, 9,170 people), Holdfast Bay - South (104**, 5,138), Holdfast Bay - North (103**, 6,900), Marion - Central (103**, 11,816), Onkaparinga - North Coast (104**, 6,472), - South Coast (103*, 8,352) and - Hills (102, 3,935), and Mitcham - North-East (102, 5,469).

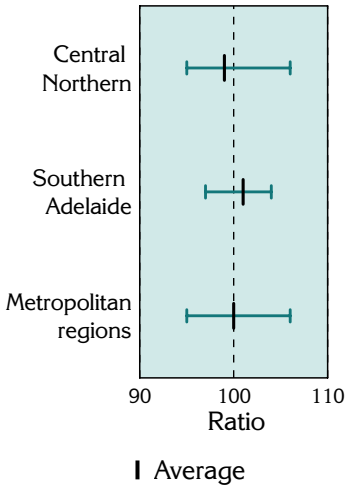
Large numbers of people with respiratory system diseases were estimated for Onkaparinga - Woodcroft (12,309 people, an SR of 100), Onkaparinga - Morphett (8,718, 101) and Mitcham - Hills (8,454, 100).

The lowest SR in the region, just three per cent below the metropolitan average, was recorded for Marion - South (an SR of 97, 7,010 people), followed by Onkaparinga - Reservoir (98, 8,627).

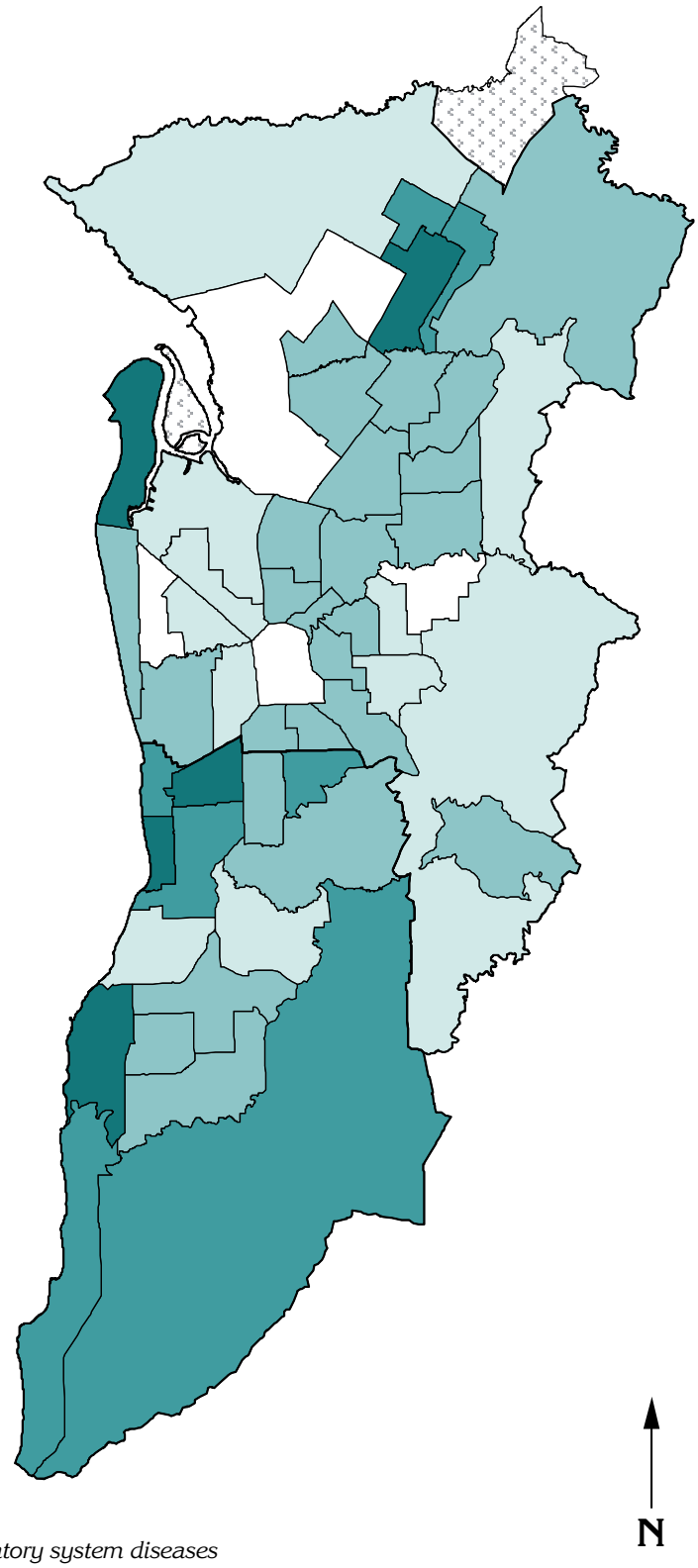
* **indicates statistical significance: see page 24**

Map 6.15

Chronic disease estimates: respiratory system diseases, metropolitan regions, 2001



Note: The black vertical lines show the average ratio for this indicator in each region; the horizontal lines show the range of the indicator at the SLA level within the region.



SLA
Health Region

Standardised Ratio (as an index)*, by SLA

- *104 and above*
- *102 to 103*
- *99 to 101*
- *97 to 98*
- *below 97*
- *data not mapped#*

**Index shows the estimated number of people with respiratory system diseases in the SLA compared with the number expected: expected numbers were derived by indirect age standardisation, based on totals for the metropolitan regions*

#Data were not mapped for Torrens Island (mapped with Port Adelaide)

Source: See Data sources, Appendix 1.3 ***Details of map boundaries are in Appendix 1.2***

Chronic disease estimates: asthma, 2001

Asthma is a disorder affecting the small airways of the lungs. People with asthma have sensitive airways that narrow in response to certain "triggers", leading to difficulty in breathing. The airway narrowing is caused by inflammation and swelling of the airway lining, the tightening of the airway muscles, and the production of excess mucus. This results in a reduced airflow in and out of the lungs. At present, the cause of asthma is not known and there is no cure. However, with appropriate management, most people with asthma can lead normal, active lives.

In 2001, an estimated 147,109 people in the metropolitan regions had asthma (Table 6.19). The rate was slightly higher in Southern (two per cent more people estimated as having asthma than expected) than in Central Northern (one per cent fewer than expected).

Table 6.19: Estimates of asthma, 2001

Region	No.	Rate[1]	Ratio[1]
Central Northern	102,274	139.0	99**
Southern	44,835	143.5	102**
Metropolitan Adelaide	147,109	140.3	100

[1]**Age-standardised rate per 1,000 population**
[2]**Percentage variation in the region from the ratio of 100 in the metropolitan regions**

Metropolitan regions

As seen for respiratory system diseases, there is little variation in ratios across the metropolitan regions (see graph opposite), with slightly elevated ratios mapped in a number of south-western and outer northern and southern SLAs, and in the north-western SLA of Port Adelaide Enfield - Coast (Map 6.16).

Central Northern Adelaide

In Central Northern, 102,274 people were estimated to have asthma in 2001, one per cent fewer than expected from the metropolitan regions rate (a standardised ratio (SR) of 99**).

The most highly elevated ratio in the metropolitan regions was mapped in Playford - Elizabeth, where eight per cent more people than expected were estimated to have asthma (an SR of 108**, 3,804 people). Other SLAs with elevated ratios were Port Adelaide Enfield - Coast (105**, 3,980 people), Playford - West Central (104, 1,911) and - East Central (102, 2,807), Charles Sturt - Coastal (102, 4,182), Walkerville (102, 919) and West Torrens - West (102, 3660).

Salisbury - South-East (4,607 people, an SR of 99); Tea Tree Gully - South (4,524, 100), - Central (3,762, 100) and - North (3,744, 99); Port Adelaide Enfield - East (3,695, 99) and - Inner (2,550, 99); Salisbury - Inner North (3,583, 99) and - North-East (3,159, 99); Burnside - South-West (2,770, 101); Unley - East (2,553, 101); and Prospect (2,518, 99) all had high estimated numbers of people with asthma.

Ratios mapped in the lowest range were all in this region, in the SLAs of Campbelltown - East (an SR of 93**, 3,469 people), Salisbury Balance (93*, 805), Port Adelaide Enfield - Port (94**, 3,170), Adelaide (94**, 2,126), Charles Sturt - North East (94**, 3,219) and - Inner West (94**, 3,070), Playford - West (96, 1,133), West Torrens - East (96*, 2,996), Salisbury - Central (96*, 3,765), Charles Sturt - Inner East (97, 2,746), Adelaide Hills - Ranges (97, 1,387), Campbelltown - West (97, 2,408) and Burnside - North-East (98, 2,713).

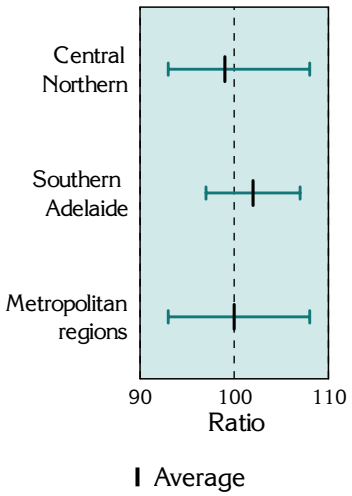
Southern Adelaide

Southern had a standardised ratio of 102** (44,835 people), with the majority of SLAs having elevated SRs. These included Holdfast Bay - South (an SR of 107**, 1,926 people), Holdfast Bay - North (106**, 2,566), Marion - North (106**, 3,420), Onkaparinga - North Coast (105**, 2,521), Marion - Central (104*, 4,442) Onkaparinga - South Coast (103, 3,317), Onkaparinga - Morphett (102, 3,461), Onkaparinga - Hills (102, 1,540) and Mitcham - Hills (102, 3,292).

Two SLAs had fewer people estimated with asthma than expected, namely Marion - South (an SR of 97, 2,825) and Onkaparinga - Reservoir (99, 3,471).

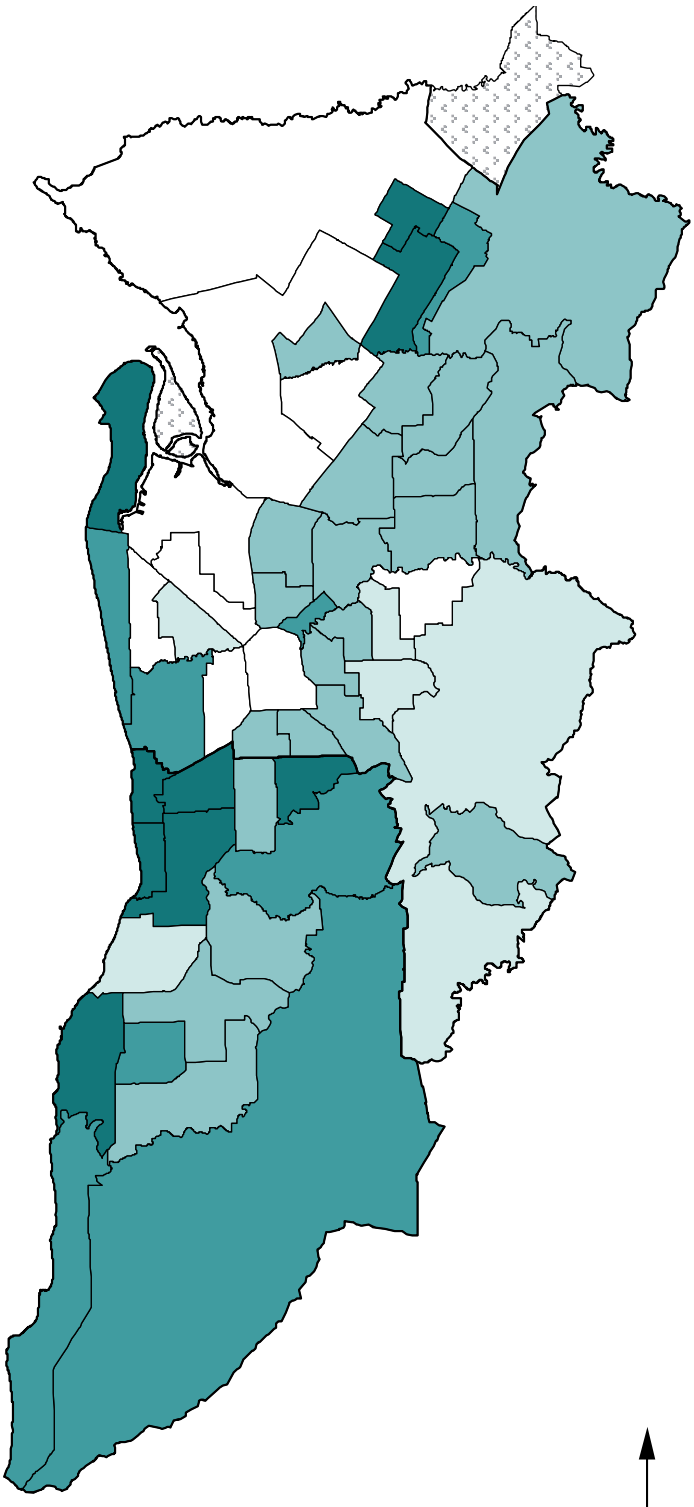
* **indicates statistical significance: see page 24**

Map 6.16
Chronic disease estimates: asthma, metropolitan regions, 2001



Average

Note: The black vertical lines show the average ratio for this indicator in each region; the horizontal lines show the range of the indicator at the SLA level within the region.



SLA
Health Region

Standardised Ratio (as an index)*, by SLA

- *104 and above*
- *102 to 103*
- *99 to 101*
- *97 to 98*
- *below 97*
- *data not mapped#*

N

*Index shows the estimated number of people with asthma in the SLA compared with the number expected: expected numbers were derived by indirect age standardisation, based on totals for the metropolitan regions

#Data were not mapped for Torrens Island (mapped with Port Adelaide)

Source: See Data sources, Appendix 1.3 ***Details of map boundaries are in Appendix 1.2***

Chronic disease estimates: circulatory system diseases, 2001

Circulatory system diseases include ischaemic or coronary heart disease, cerebrovascular accident or stroke, hypertension (high blood pressure), peripheral vascular disease and rheumatic heart disease. These diseases are mainly caused by a damaged blood supply to the heart, brain and/or limbs, and share a number of risk factors. In 1995, it was estimated that over 80% of the adult Australian population had at least one of the following risk factors: tobacco smoking, physical inactivity, high blood pressure, and overweight or obesity (AIHW 2001).

Within the Australian population, certain population groups are at increased risk for developing and dying from these conditions. These groups include Indigenous Australians, people of lower socioeconomic status, males over the age of 45 years, and males living in rural and remote areas.

In 2001, there were an estimated 193,052 people with circulatory system diseases in the metropolitan regions. There was only marginal variation across the regions, with Central Northern having the expected rate based on population size and structure (a standardised ratio (SR) of 100), and Southern having one per cent more than expected (an SR of 101) (Table 6.20).

Table 6.20: Estimates of circulatory system diseases, 2001

Region	No.	Rate[1]	Ratio[2]
Central Northern	134,751	183.7	100
Southern	58,301	185.3	101
Metropolitan regions	193,052	184.1	100

[1]**Age-standardised rate per 1,000 population**
[2]**Percentage variation in the region from the ratio of 100 in the metropolitan regions**

Metropolitan regions

None of the SLAs in the metropolitan regions had highly elevated ratios; those with the highest ratios were located in the outer north and south, and in the north-western SLA of Port Adelaide Enfield - Coast, with low ratios in the east (Map 6.17), generally following the pattern of socioeconomic disadvantage shown previously (Map 4.47, page 157).

Central Northern Adelaide

An estimated 134,751 people in Central Northern had circulatory system diseases, an SR of 100. The most highly elevated ratio in the metropolitan regions was in Salisbury - Inner North, with eleven per cent more people estimated to have circulatory system diseases than expected (an SR of 111**, 3,221 people). There were also elevated ratios in Playford - West Central (109**, 1,887), - Elizabeth (104*, 4,960) and - East Central (109**, 2,527), Port Adelaide Enfield - Coast (108**, 5,620) and - East (104**, 5,481), West Torrens - West (104**, 6,297), and - East (103, 4,463), and Charles Sturt - North-East (104*, 4,733).

There were large numbers of people with circulatory system diseases in Charles Sturt - Inner West (5,086 people, an SR of 101), Port Adelaide Enfield - Port (4,875, 101), Salisbury - Central (4,272, 101) and Campbelltown - West (4,003, 99). The majority of the SLAs mapped in the lowest range were in the Central Northern region, including Adelaide (an SR of 91**, 2,801 people), Burnside - North-East (93**, 3,973), Adelaide Hills - Ranges (93**, 1,528), Tea Tree Gully - Hills (93**, 1,983), Campbelltown - East (94**, 4,594), Adelaide Hills - Central (95*, 1,969), Walkerville (95**, 1,444), Playford - West (95, 1,201), Burnside - South-West (95**, 4,124), Norwood Payneham St Peters - West (95**, 2,978), Tea Tree Gully - North (96*, 3,149), - Central (97, 3,910) and - South (96**, 5,757), and Charles Sturt - Coastal (96**, 6,240).

Southern Adelaide

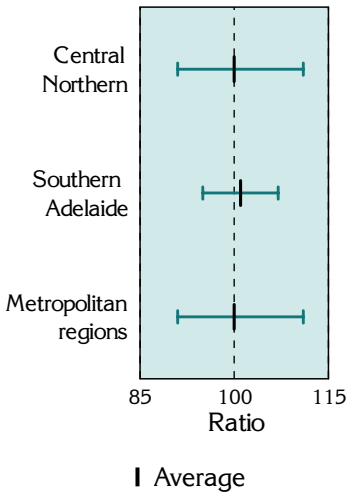
In Southern, 58,301 people were estimated to have circulatory system diseases (an SR of 101). Half of the Onkaparinga SLAs had marginally elevated ratios and half were marginally low. Those that were elevated were the Onkaparinga SLAs of - Hackham (an SR of 107**, 2,156 people), - North Coast (106**, 3,602), - South Coast (104**, 3,894) and - Morphett (104*, 4,009). There were also slightly elevated ratios in Marion - North (104**, 5,671) and - Central (103**, 7,252).

Onkaparinga - Woodcroft (4,816 people, an SR of 99) had a relatively large number of people with these diseases, as did Mitcham - West (4,336, 99) and Holdfast Bay - North (4,235, 100).

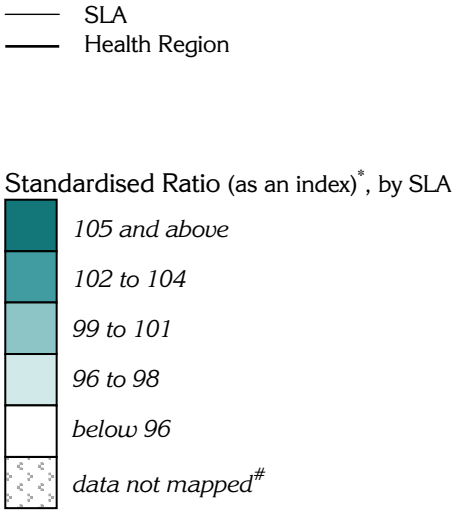
There were fewer people with circulatory system diseases than expected in the SLAs of Mitcham - Hills (an SR of 95**, 4,272 people), Marion - South (96**, 2,498), Onkaparinga - Hills (96, 1,877), Onkaparinga - Reservoir (96*, 3,404) and Mitcham - North-East (97, 3,057).

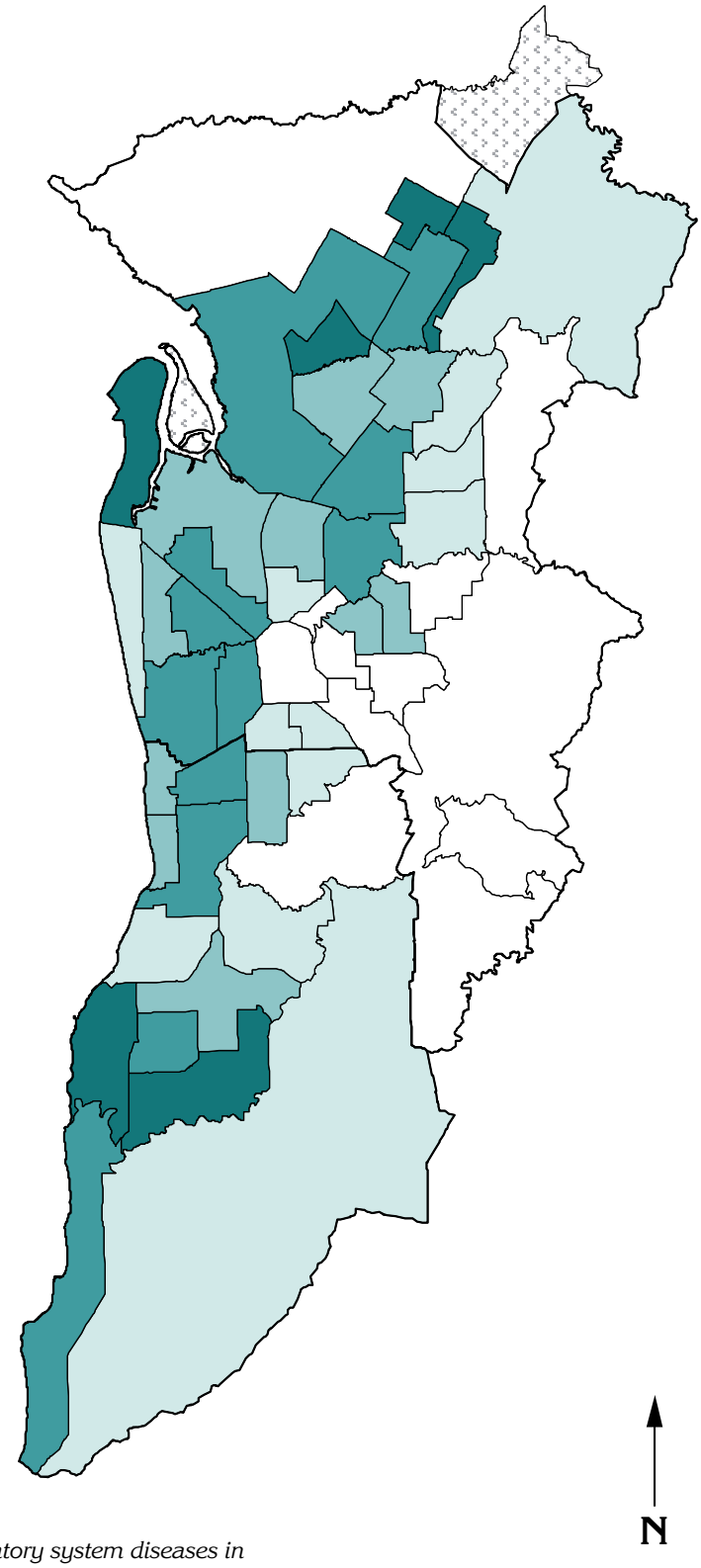
* indicates statistical significance: see page 24

Map 6.17
Chronic disease estimates: circulatory system diseases, metropolitan regions, 2001



Note: The black vertical lines show the average ratio for this indicator in each region; the horizontal lines show the range of the indicator at the SLA level within the region.





*Index shows the estimated number of people with circulatory system diseases in the SLA compared with the number expected: expected numbers were derived by indirect age standardisation, based on totals for the metropolitan regions

#Data were not mapped for Torrens Island (mapped with Port Adelaide)

Source: See Data sources, Appendix 1.3 ***Details of map boundaries are in Appendix 1.2***

Chronic disease estimates: diabetes type 2, 2001

Diabetes type 2 is the commonest form of diabetes. It affects 85 to 90 per cent of all those diagnosed with diabetes. While it usually affects mature adults, younger people are also now being diagnosed in greater numbers, as rates of overweight and obesity increase. It is strongly associated with high blood pressure, high cholesterol and excessive weight. The prevalence of diabetes type 2 among Indigenous Australians is one of the highest in the world (AIHW 2002).

It is estimated that 26,848 people reported having been told by a doctor or nurse that they had diabetes type 2, a rate of 25.6 per 1,000 population (Table 6.21). The estimated rate of people with diabetes type 2 in Central Northern (26.1 per 1,000 population) was slightly higher than expected from the metropolitan regions' rate (a standardised ratio (SR) of 102**)). The rate in Southern (24.5 per 1,000 population) was below the expected level (a standardised ratio (SR) of 96**).

Table 6.21: Estimates of diabetes type 2, 2001

Region	No.	Rate[1]	Ratio[2]
Central Northern	19,165	26.1	102**
Southern	7,683	24.5	96**
Metropolitan regions	26,848	25.6	100

[1]**Age-standardised rate per 1,000 population**
[2]**Percentage variation in the region from the ratio of 100 in the metropolitan regions**

Metropolitan regions

SLAs with elevated ratios covered much of the north, north-west, west and parts of the south of the region (Map 6.18), generally following the pattern of socioeconomic status shown in Chapters 4 and 5.

Central Northern Adelaide

Central Northern had an estimated 19,165 people with diabetes type 2 in 2001, an SR of 102**, with several SLAs mapping in the highest range. The majority of SLAs with elevated ratios were concentrated in groups, with all or most SLAs having elevated SRs in Salisbury, Port Adelaide Enfield, Charles Sturt and Playford.

The Salisbury SLAs were - Inner North (an SR of 128**, 480 people), - Balance (an SR of 117, 102), - Central (112**, 656), - South-East (109**, 887) and - North-East (109, 534). In Port Adelaide Enfield, elevated SRs were recorded for - Port (127**, 835 people), - Inner (117**, 618), - Coast (112**, 809) and - East (112**, 822). Elevated SRs in Charles Sturt were recorded for - North-East (126**, 779 people), - Inner West (117**, 841) and - Inner East (117**, 704). The Playford SLAs of - East Central (with an SR of 121**, 369 people), - West Central (120**, 284) and - Elizabeth (116**, 765) all had more people with diabetes type 2 than expected from the metropolitan rates. There were also elevated ratios in West Torrens - East (an SR of 125**, 733 people) and Campbelltown - West (114**, 643).

Relatively large numbers of people with diabetes type 2 were estimated for West Torrens - West (805 people, an SR of 95) and Campbelltown - East (660, 92).

The SLAs in this region with low ratios included Adelaide Hills - Ranges (an SR of 71**, 167 people) and - Central (76**, 225), Adelaide (75**, 329), Tea Tree Gully - Hills (77**, 247) and - North (79**, 341), Playford - Hills (an SR of 80, 48), Burnside - South-West (83**, 509), Walkerville (83*, 183), Tea Tree Gully - Central (86**, 483), Unley - West (86**, 346), Burnside - North-East (87**, 527), Unley - East (87**, 427), Tea Tree Gully - South (88**, 760), Charles Sturt - Coastal (89**, 822) and Norwood Payneham St Peters - West (89*, 382).

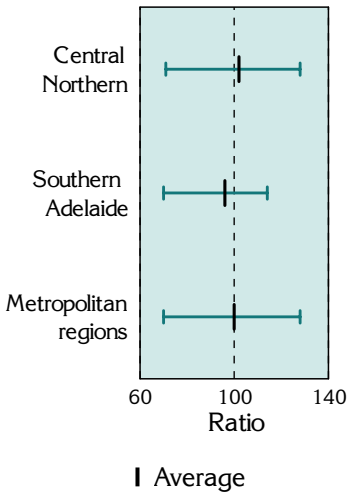
Southern Adelaide

Southern had four per cent fewer cases of diabetes type 2 than expected from the State rates (an SR of 96**, 7,683 people). Marion - North (with an SR of 114**, 839 people) and - Central (113**, 1,109) both had elevated ratios, as did a number of the Onkaparinga SLAs, including - Hackham (an SR of 111, 306), - North Coast (109*, 529), - South Coast (107, 548) and - Morphett (105, 563).

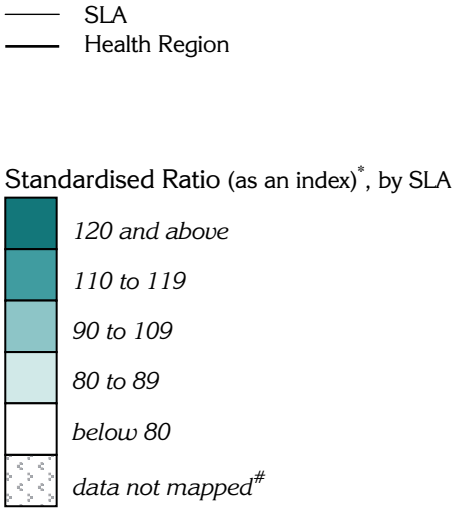
The lowest estimated ratio in the metropolitan regions was calculated for Onkaparinga - Hills, with 30% fewer people with diabetes type 2 than expected (an SR of 70**, 195 people). There were also relatively low ratios in Marion - South (81**, 274), Mitcham - North-East (87**, 377), Onkaparinga - Reservoir (81**, 388), Holdfast Bay - North (88**, 516), Onkaparinga - Woodcroft (82**, 541) and Mitcham - Hills (83**, 546).

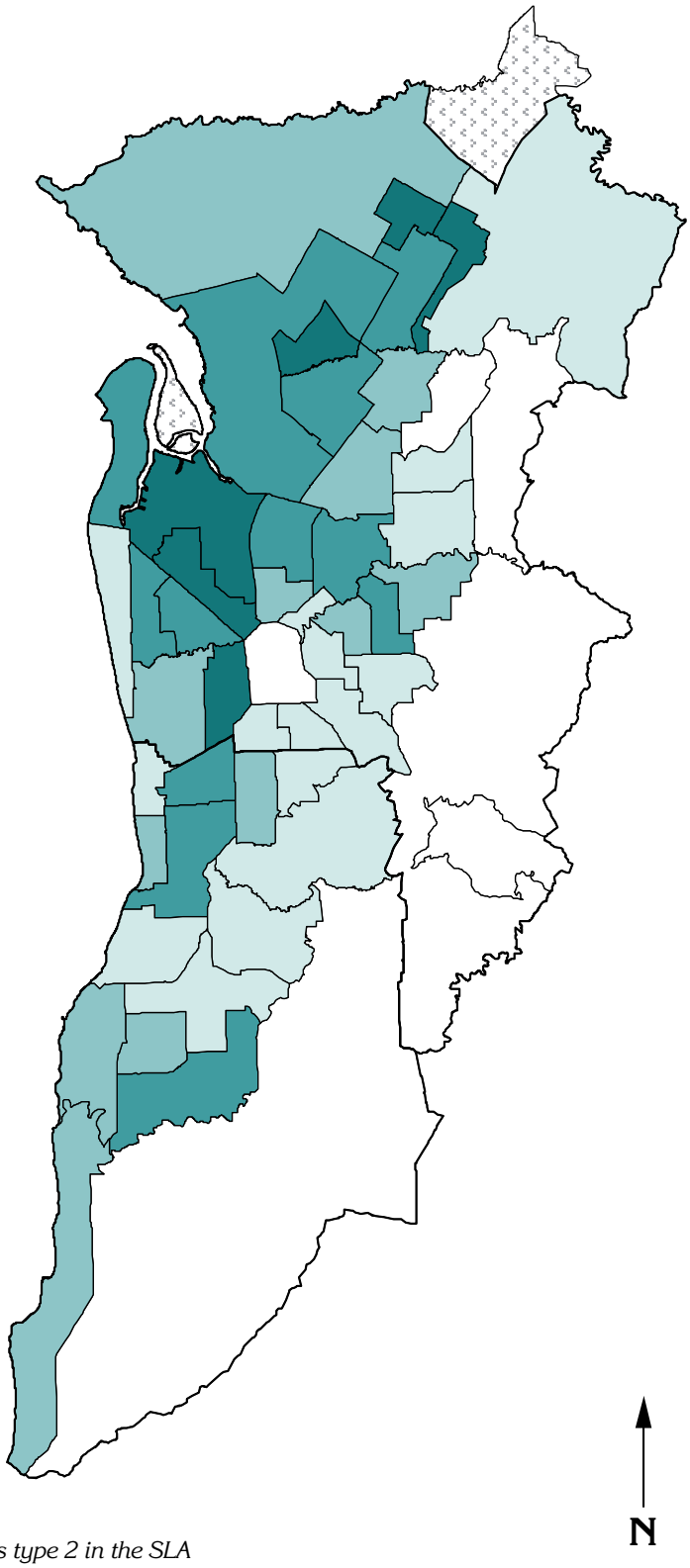
* **indicates statistical significance: see page 24**

Map 6.18
Chronic disease estimates: diabetes type 2, metropolitan regions, 2001



Note: The black vertical lines show the average ratio for this indicator in each region; the horizontal lines show the range of the indicator at the SLA level within the region.





*Index shows the estimated number of people with diabetes type 2 in the SLA compared with the number expected: expected numbers were derived by indirect age standardisation, based on totals for the metropolitan regions

#Data were not mapped for Torrens Island (mapped with Port Adelaide)

Source: See Data sources, Appendix 1.3 ***Details of map boundaries are in Appendix 1.2***

Chronic disease estimates: mental and behavioural problems, 2001

Mental health relates to an individual's ability to negotiate the daily challenges and social interactions of life without experiencing undue emotional or behavioural incapacity (DHAC & AIHW 1999). Chronic mental health conditions may require a range of community-based or institutional interventions, depending on the severity of the episode.

In Australia, one in five people is likely to develop a mental health problem at some stage in their lives (NMHS 1992), and this number will increase over the next twenty years (Mathers et al. 1999). There are significant mental health inequalities across the population, as the risk of mental ill-health is higher among those who are poor, homeless, unemployed, persons with low education, victims of violence, migrants and refugees, Indigenous populations, children and adolescents, abused women and the neglected elderly (WHO 2003).

An estimated 111,814 people in metropolitan regions reported mental and behavioural problems as chronic conditions in the 2001 NHS, a rate of 106.7 per 1,000 people. The rate was slightly higher in Central Northern (107.6) compared to Southern (104.3) (Table 6.22). The data on high levels of psychological distress, page 242, is also of relevance.

Table 6.22: Estimates of mental and behavioural problems, 2001

Region	No.	Rate[1]	Ratio[2]
Central Northern	79,229	107.6	101**
Southern	32,584	104.3	98**
Metropolitan regions	111,814	106.7	100

[1]**Age-standardised rate per 1,000 population**
[2]**Percentage variation in the region from the ratio of 100 in the metropolitan regions**

Metropolitan regions

The most highly elevated ratios were mapped in a number of northern, southern and western SLAs, with low ratios in the east and south-east (Map 6.19), following the pattern of socioeconomic status in the metropolitan regions shown in Chapters 4 and 5.

Central Northern Adelaide

Central Northern had a standardised ratio of 101**, representing 79,229 people who reported mental and behavioural problems as chronic conditions. There were estimated to be nearly one third more than the expected number in Playford - Elizabeth (an SR of 130**, 3,339 people). Other SLAs with elevated ratios included Port Adelaide Enfield - Port (an SR of 121**, 3,112 people), - East (110**, 3,139), - Coast (109**, 3,199), and - Inner (118**, 2,291); Playford - West Central (117**, 1,553); Charles Sturt - North-East (111**, 2,911), - Inner East (108**, 2,342) and Inner West (106**, 2,635); West Torrens - East (110**, 2,645) and - West (105**, 2,910); Salisbury - Inner North (109**, 2,884) and Central (107**, 3,115); and Norwood Payneham St Peters - East (105*, 1,631).

There were estimated to be large numbers of people with mental and behavioural problems in the SLAs of Salisbury - South-East (3,653 people, an SR of 104*), Tea Tree Gully - South (3,258, 95**), Charles Sturt - Coastal (3,049, 96**), Campbelltown - East (2,609, 91**) and Tea Tree Gully - Central (2,575, 91**).

The SLAs of Adelaide Hills - Ranges (with an SR of 78**, 868 people) and - Central (81**, 1,104), Burnside - North-East (82**, 1,753) and - South-West (83**, 1,765), Tea Tree Gully - North (85**, 2,433) and - Hills (85**, 1,145), Playford - Hills (86*, 275) and Walkerville (87**, 608) all had ratios below the level expected from the metropolitan rates.

Southern Adelaide

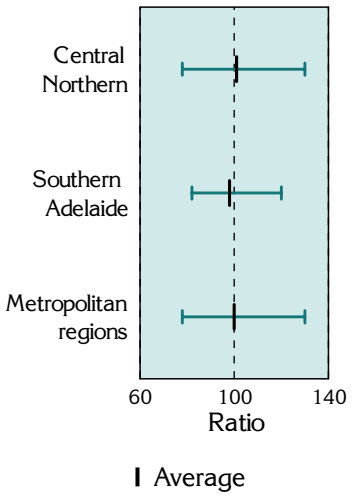
Southern had an estimated 32,584 people with mental and behavioural problems (an SR of 98**). A number of the Onkaparinga SLAs had elevated ratios, including - North Coast (an SR of 120**, 2,161 people), - Hackham (109**, 1,638), - South Coast (105*, 2,549) and - Morphett (105*, 2,638). The SLAs of Marion - North (113**, 2,801) and - Central (107**, 3,499) also had elevated ratios.

Onkaparinga - Woodcroft (3,370 people, an SR of 96**) had a large number of people with mental and behavioural problems.

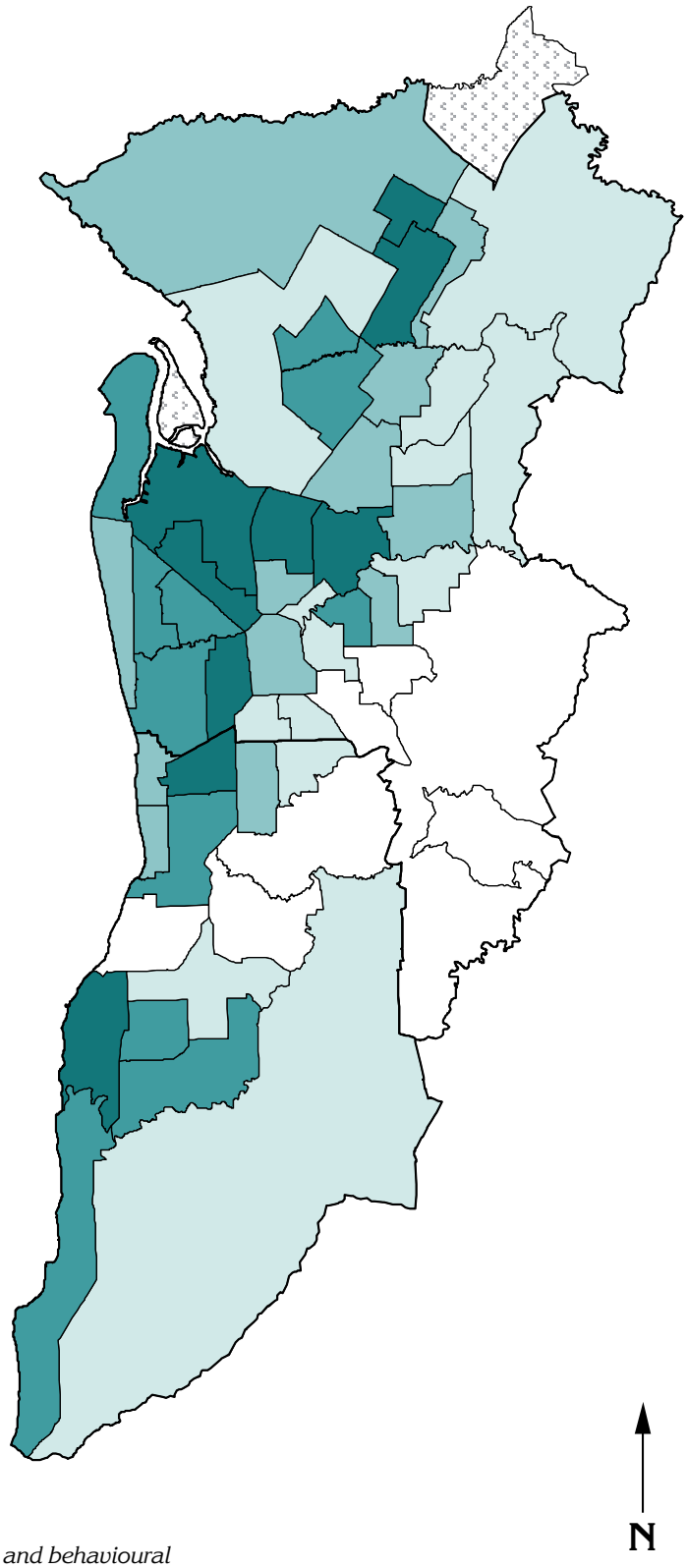
Fewer people with mental and behaviour problems than expected were estimated for the SLAs of Onkaparinga - Reservoir (an SR of 82**, 2,192 people), Marion - South (83**, 1,819), Mitcham - Hills (83**, 2,081) and - North-East (86**, 1,341), and Onkaparinga - Hills (86**, 1,007).

* **indicates statistical significance: see page 24**

Map 6.19
Chronic disease estimates: mental and behavioural problems, metropolitan regions, 2001



Note: The black vertical lines show the average ratio for this indicator in each region; the horizontal lines show the range of the indicator at the SLA level within the region.



SLA
Health Region

Standardised Ratio (as an index) *, by SLA

- *110 and above*
- *105 to 109*
- *95 to 104*
- *85 to 94*
- *below 85*
- *data not mapped*#

*Index shows the estimated number of people with mental and behavioural problems in the SLA compared with the number expected: expected numbers were derived by indirect age standardisation, based on totals for the metropolitan regions

#Data were not mapped for Torrens Island (mapped with Port Adelaide)

Source: See Data sources, Appendix 1.3 ***Details of map boundaries are in Appendix 1.2***

Chronic disease estimates: musculoskeletal system diseases, 2001

Chronic musculoskeletal system diseases are chronic disorders of the muscles and bones. Osteoarthritis, rheumatoid arthritis and osteoporosis are the most prevalent forms of musculoskeletal disease within Australia and have been found to place the highest burden on the community. The primary health burden of musculoskeletal disorders is through loss of quality of life associated with pain and disability (AIHW 2002).

It was estimated that there were 368,546 people in the metropolitan regions with diseases of the musculoskeletal system and connective tissue in 2001, a rate of 351.5 per 1,000 population. The estimated number of people with these diseases in Central Northern was at the level expected based on its population size and age structure, although Southern had a standardised ratio (SR) of one per cent more than expected (101*) (Table 6.23).

Table 6.23: Estimates of musculoskeletal system diseases, 2001

Region	No.	Rate[1]	Ratio[2]
Central Northern	258,446	350.6	100
Southern	110,101	353.7	101*
Metropolitan regions	368,546	351.5	100

[1]**Age-standardised rate per 1,000 population**
[2]**Percentage variation in the region from the ratio of 100 in the metropolitan regions**

Metropolitan regions

None of the standardised ratios in the metropolitan SLAs were highly elevated. Ratios above average were mapped in a number of outer northern and southern SLAs (and in Port Adelaide Enfield - Coast), with those below average in the city and eastern suburbs (Map 6.20), generally following the pattern of socioeconomic status in the metropolitan regions.

Central Northern Adelaide

There were estimated to be 258,446 people with musculoskeletal system diseases in Central Northern (an SR of 100). None of the SLAs in this region had highly elevated ratios, the highest being an SR of 105** (3,913 cases) in Playford - West Central. Other SLAs with marginally elevated SRs included Port Adelaide Enfield - Coast (104**, 10,163), Playford - Elizabeth (103**, 8,919) and Salisbury - Inner North (103**, 7,195).

There were also estimated to be large numbers of people with these diseases in Charles Sturt - Coastal (11,445 people, an SR of 100), Salisbury - South-East (11,311, 101), Tea Tree Gully - South (11,309, 99), West Torrens - West (10,607, 102*), Salisbury - Central (8,894, 102), Port Adelaide Enfield - East (9,939, 100) and - Port (8,922, 101**), Charles Sturt - Inner West (8,874, 100) and - North East (8,804, 101), Tea Tree Gully - Central (8,482, 99) and West Torrens - East (8,402, 100).

Fewer than expected numbers of residents were estimated as having musculoskeletal system diseases in Adelaide (an SR of 92**, 5,815 people), Adelaide Hills - Ranges (96*, 3,194), Norwood Payneham St Peters - West (96**, 5,948), Burnside - North-East (96**, 7,269), Adelaide Hills - Central (97*, 4,048), Tea Tree Gully - Hills (97*, 4,110), Campbelltown - East (97**, 9,097), Tea Tree Gully - North (97*, 7,533) and Walkerville (97, 2,529).

Southern Adelaide

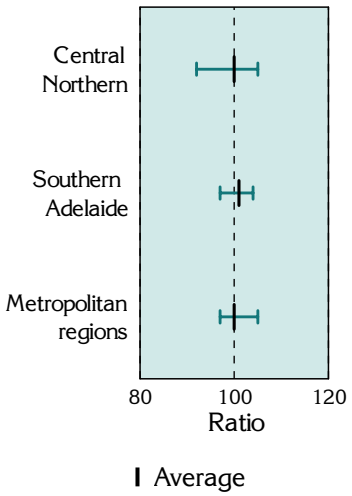
In Southern, 110,101 people were estimated to have musculoskeletal system diseases (an SR of 101*). A number of the Onkaparinga SLAs had marginally elevated ratios, including - North Coast (104**, 6,400 people), - Hackham (103*, 4,466), - South Coast (102, 7,560) and - Morphett (102, 7,961). Marion - North (103*, 9,521) also had a marginally elevated SR.

Relatively large numbers of people with musculoskeletal system diseases were estimated for the SLAs of Marion - Central (12,236 people, an SR of 101), Onkaparinga - Woodcroft (10,665, 100), Mitcham - West (7,919, 101) and Holdfast Bay - North (7,302, 101).

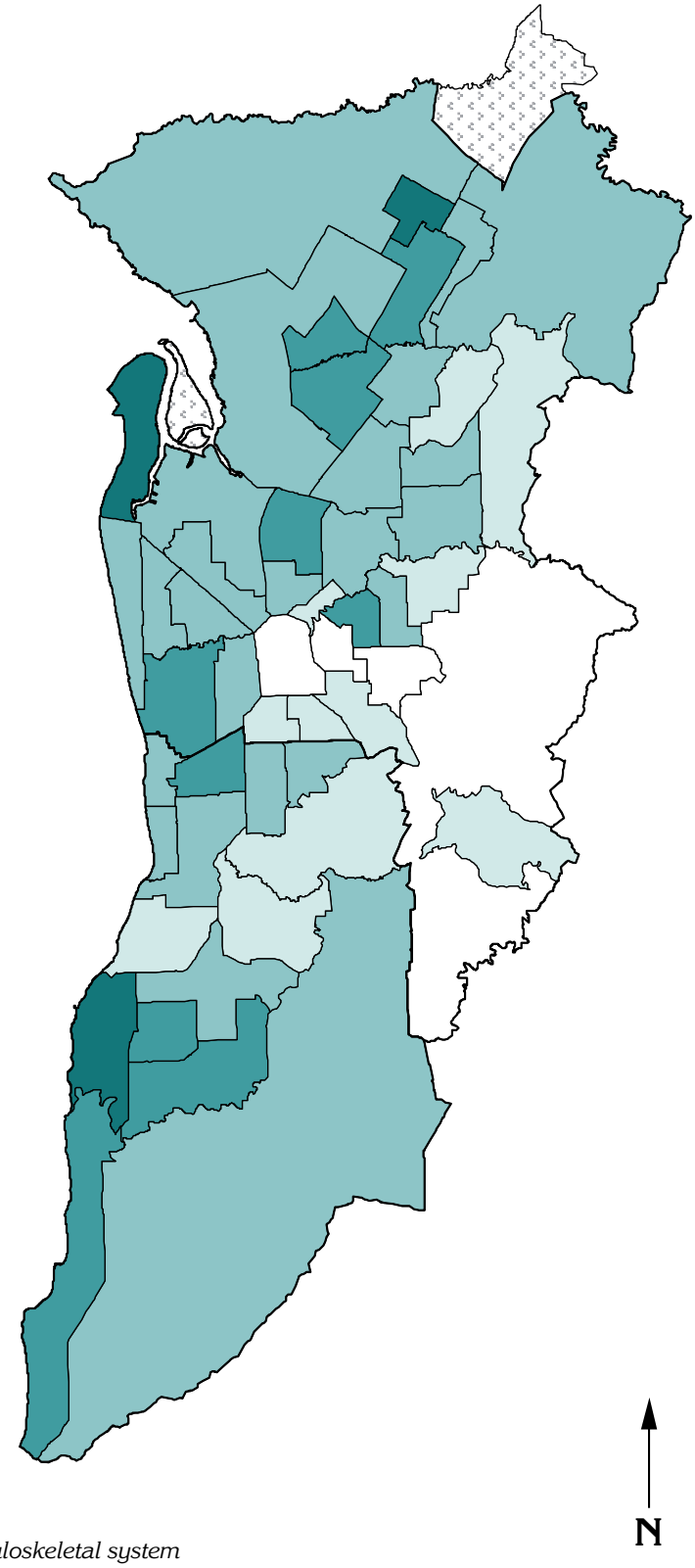
Estimated numbers were below the level expected from the metropolitan rates for Mitcham - Hills (an SR of 97**, 8,117 people), Onkaparinga - Reservoir (97*, 7,471) and Marion - South (97*, 5,878).

* **indicates statistical significance: see page 24**

Map 6.20
Chronic disease estimates: musculoskeletal system diseases, metropolitan regions, 2001



Note: The black vertical lines show the average ratio for this indicator in each region; the horizontal lines show the range of the indicator at the SLA level within the region.



SLA
Health Region

Standardised Ratio (as an index)*, by SLA

- *104 and above*
- *102 to 103*
- *99 to 101*
- *97 to 98*
- *below 97*
- *data not mapped#*

*Index shows the estimated number of people with musculoskeletal system diseases in the SLA compared with the number expected: expected numbers were derived by indirect age standardisation, based on totals for the metropolitan regions

#Data were not mapped for Torrens Island (mapped with Port Adelaide)

Source: See Data sources, Appendix 1.3 ***Details of map boundaries are in Appendix 1.2***

Chronic disease estimates: arthritis, 2001

Arthritis is an inflammatory condition affecting one or more joints within the body. There are many causes, and the treatment varies according to the cause and may involve lifestyle change, pharmaceutical medication, physiotherapy and occasionally, surgical intervention. Females are more likely to be affected than males, and the prevalence of arthritis increases with age.

Based on responses to the 2001 NHS, it was estimated that there were 157,214 people in metropolitan regions with arthritis in 2001, a rate of 150.0 per 1,000 population. The rates were consistent between the regions, with both Central Northern and Southern recording a standardised ratio (SR) of 100 (Table 6.24).

Table 6.24: Estimates of arthritis, 2001

Region	No.	Rate[1]	Ratio[2]
Central Northern	110,216	149.9	100
Southern	46,998	150.2	100
Metropolitan regions	157,214	150.0	100

[1]**Age-standardised rate per 1,000 population**
[2]**Percentage variation in the region from the ratio of 100 in the metropolitan regions**

Metropolitan regions

There were elevated ratios in a number of outer southern and outer northern SLAs, and in the north-western SLA of Port Adelaide Enfield - Coast, with low ratios in the east (Map 6.21), generally following the pattern of socioeconomic status in the metropolitan regions. The SRs contain much greater variation than do those for the musculoskeletal system diseases (see page 232).

Central Northern Adelaide

In Central Northern, 110,216 people were estimated to have arthritis (an SR of 100). Playford - West Central (1,591 people) and Salisbury - Inner North (2,653 people) both had ratios of 113**, indicating 13% more people with arthritis than expected from the State rates. Other SLAs with elevated SRs included Port Adelaide Enfield - Coast (110**, 4,642), - Port (107**, 4,215), - Inner (107**, 3,392) and - East (106**, 4,577); Playford - Elizabeth (109**, 4,200) and - East Central (108**, 2,042); Charles Sturt - North East (107**, 3,985) and - Inner East (105**, 3,739); and Salisbury - Central (106**, 3,653) and - South-East (105**, 4,797).

Large numbers of people with arthritis were estimated in the SLAs of Charles Sturt - Coastal (5,064 people, 96**), West Torrens - West (4,921, 100), Tea Tree Gully - South (4,686, 96**), Charles Sturt - Inner West (4,256, 104*), West Torrens - East (3,753, 104*), Campbelltown - West (3,178, 96*) and Tea Tree Gully - Central (3,138, 95**).

The SLAs estimated to have fewer people with arthritis than expected included Adelaide (an SR of 86**, 2,215 people), Adelaide Hills - Ranges (88**, 1,163) and - Central (90**, 1,518), Burnside - North-East (90**, 3,138) and - South-West (92**, 3,231), Tea Tree Gully - Hills (91**, 1,590) and - North (91**, 2,427), Playford - Hills (92, 313), Campbelltown - East (92**, 3,729) and Norwood Payneham St Peters - West (92**, 2,393).

Southern Adelaide

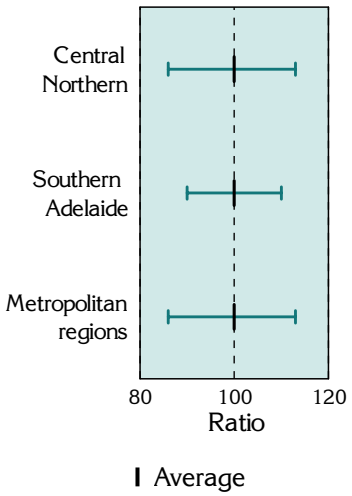
Southern had an estimated 46,998 people with arthritis (an SR of 100). Many of the Onkaparinga SLAs had elevated ratios, including Onkaparinga - North Coast (110**, 3,046), - Hackham (110**, 1,791), - South Coast (106**, 3,206) and - Morphett (106**, 3,338). Marion - North also had an elevated SR, of 107** (4,701 people).

Marion - Central (5,680 people, an SR of 101), Marion - North (4,701, 107**), Mitcham - West (3,519, 99), Holdfast Bay - North (3,451, 100), and Onkaparinga - Morphett (3,338, 106**), - South Coast (3,206, 106) and - North Coast (3,046, 110**) all had large estimated numbers of people with arthritis.

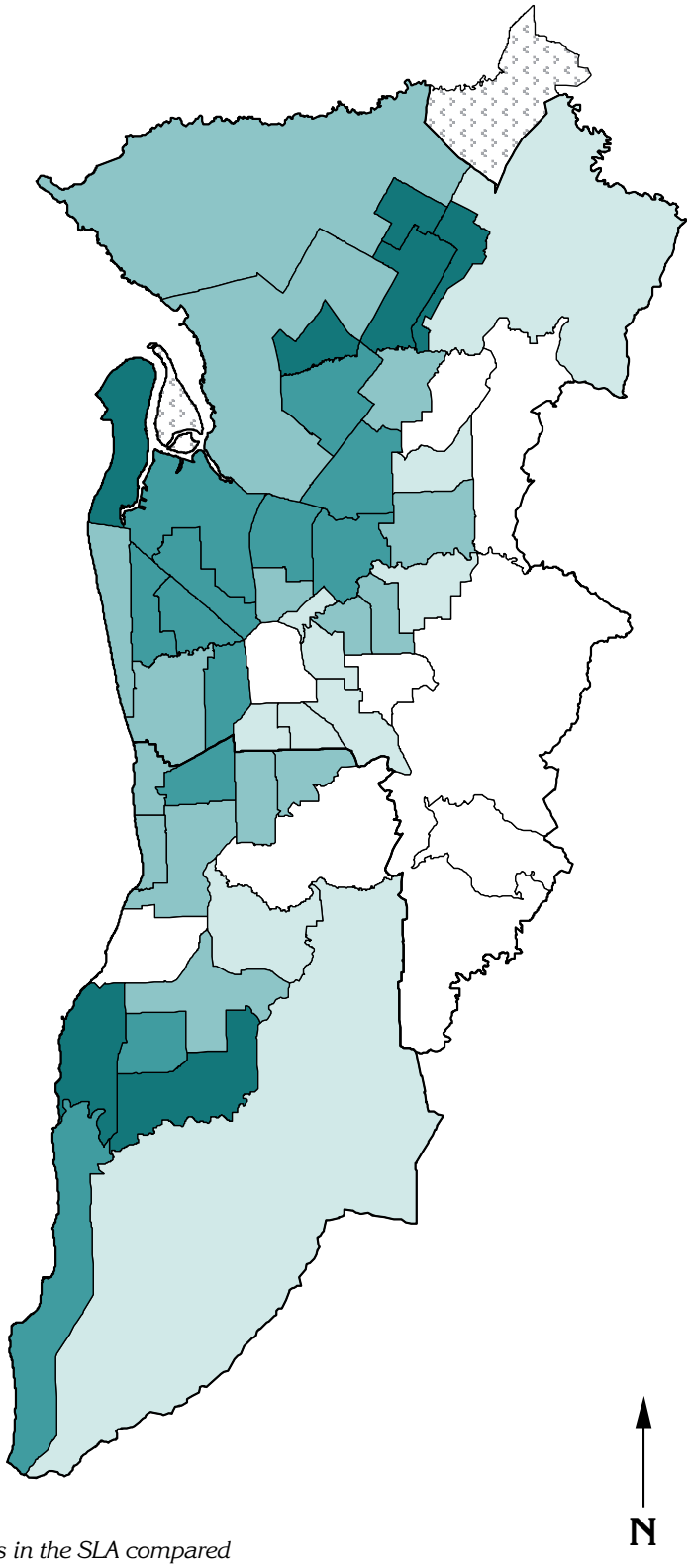
Fewer than the expected number of people with arthritis were estimated for the SLAs of Marion - South (90**, 1,912), Mitcham - Hills (91**, 3,363), Onkaparinga - Reservoir (92**, 2,616), - Hills (95*, 1,494) and - Woodcroft (97*, 3,822), and Mitcham - North-East (96*, 2,414).

* **indicates statistical significance: see page 24**

Map 6.21
Chronic disease estimates: arthritis, metropolitan regions, 2001



Note: The black vertical lines show the average rate for this indicator in each region; the horizontal lines show the range of the indicator at the SLA level within the region.



SLA
Health Region

Standardised Ratio (as an index)*, by SLA

- *108 and above*
- *104 to 107*
- *96 to 103*
- *92 to 95*
- *below 92*
- *data not mapped*#

* *Index shows the estimated number of people with arthritis in the SLA compared with the number expected: expected numbers were derived by indirect age standardisation, based on totals for the metropolitan regions*

#*Data were not mapped for Torrens Island (mapped with Port Adelaide)*

Source: See Data sources, Appendix 1.3 ***Details of map boundaries are in Appendix 1.2***

Chronic disease estimates: osteoarthritis, 2001

Osteoarthritis is the commonest form of arthritis. In osteoarthritis, the cartilage, which cushions the joint surfaces, degenerates often as a result of injury. Osteoarthritis is most commonly found in the knees, neck, lower back, hips and fingers. Weight loss and exercise to strengthen bones and muscles can provide relief for some osteoarthritis sufferers and delay progression of the disorder. New pharmaceutical agents and surgical joint replacement procedures have also improved the quality of life for people with osteoarthritis.

In 2001, it was estimated that 88,044 people in the metropolitan regions suffered from osteoarthritis, an age-standardised rate of 84.0 people per 1,000 population (Table 6.25). The rate was slightly higher in Southern, being one per cent more than expected (a standardised ratio (SR) of 101*); in comparison, the Central Northern rate of 83.5 per 1,000 population was one per cent fewer than expected.

Table 6.25: Estimates of osteoarthritis, 2001

Region	No.	Rate[1]	Ratio[2]
Central Northern	61,253	83.5	99
Southern	26,790	85.0	101*
Metropolitan regions	88,044	84.0	100

[1]**Age-standardised rate per 1,000 population**
[2]**Percentage variation in the region from the ratio of 100 in the metropolitan regions**

Metropolitan regions

The most highly elevated ratios were in parts of the north, north-west and outer northern and southern SLAs, with low ratios in the east (Map 6.22), generally following the pattern of socioeconomic disadvantage shown in Chapters 4 and 5.

Central Northern Adelaide

In Central Northern, 61,253 people were estimated to have osteoarthritis. Playford - West Central (an SR of 123**, 915 people), - East Central (116**, 1,137) and - Elizabeth (114**, 2,484) all had highly elevated SRs. Salisbury - Inner North (114**, 1,362 people) and - North-East (106*, 1,618) also had elevated ratios, as did Port Adelaide Enfield - Coast (109**, 2,612) and - East (106**, 2,544).

Large numbers of people with osteoarthritis were estimated for the populations of Charles Sturt - Coastal (2,903 people, an SR of 96), West Torrens - West (2,771, 97), Salisbury - South-East (2,576, 104*), Charles Sturt - Inner West (2,294, 98), Port Adelaide Enfield - Port (2,177, 97), Charles Sturt - North-East (2,089, 99), West Torrens - East (2,036, 101), Charles Sturt - Inner East (2,028, 99), Burnside - South-West (1,980, 97), Salisbury - Central (1,913, 102) and Port Adelaide Enfield - Inner (1,877, 102).

Ratios below average were estimated for the SLAs of Campbelltown - East (an SR of 89**, 1,980 people) and - West (92**, 1,754), Playford - West (91*, 500), Tea Tree Gully - Hills (93*, 876), Adelaide Hills - Ranges (93, 667), Burnside - North-East (93**, 1,877), Prospect (94*, 1,381), Adelaide Hills - Central (95, 875) and Tea Tree Gully - South (95**, 2,577).

Southern Adelaide

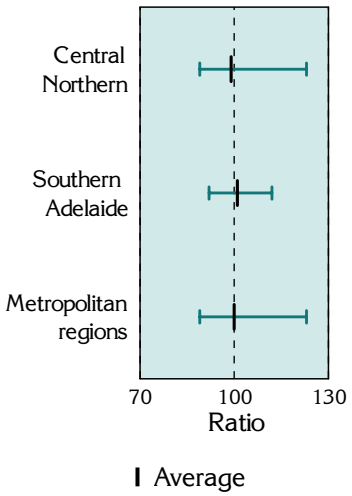
Southern had a standardised ratio of 101*, with an estimated 26,790 people with osteoarthritis. The majority of SLAs with elevated ratios were located in Onkaparinga, including - Hackham (112**, 974), - South Coast (112**, 1,854), - North Coast (111**, 1,744) and - Morphett (109**, 1,864). There was also an elevated ratio in Marion - North (107**, 2,768).

In this region, the SLAs of Marion - Central (3,230 people, an SR of 99), Holdfast Bay - North (2,065, 101) and Onkaparinga - Woodcroft (2,036, 97) all had relatively large numbers of people with osteoarthritis.

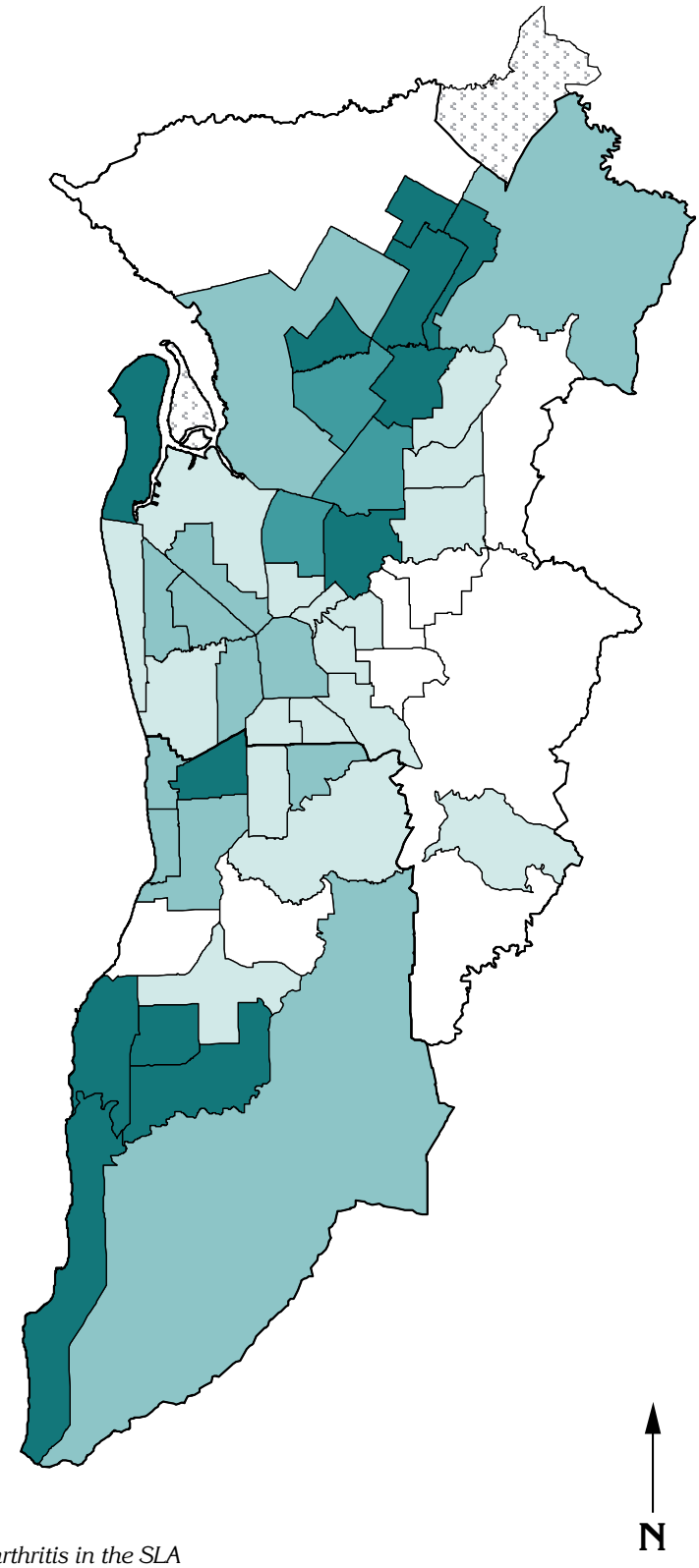
Low SRs were estimated for the SLAs of Marion - South (92, 1,014), Onkaparinga - Reservoir (93**, 1,421), and Mitcham - West (95*, 1,973) and - Hills (96*, 1,962).

* **indicates statistical significance: see page 24**

Map 6.22
Chronic disease estimates: osteoarthritis, metropolitan regions, 2001



Note: The black vertical lines show the average rate for this indicator in each region; the horizontal lines show the range of the indicator at the SLA level within the region.



SLA
Health Region

Standardised Ratio (as an index)*, by SLA

- *106 and above*
- *102 to 105*
- *98 to 101*
- *94 to 97*
- *below 94*
- *data not mapped#*

*Index shows the estimated number of people with osteoarthritis in the SLA compared with the number expected: expected numbers were derived by indirect age standardisation, based on totals for the metropolitan regions

#Data were not mapped for Torrens Island (mapped with Port Adelaide)

Source: See Data sources, Appendix 1.3 ***Details of map boundaries are in Appendix 1.2***

Chronic disease estimates: females with osteoporosis, 2001

Osteoporosis is a condition in which the bones become brittle and more susceptible to fractures through loss of bone density. Post-menopausal women are at greater risk of developing osteoporosis due to the hormonal changes which lead to more rapid loss of minerals required for healthy bone density. While all bones are susceptible to osteoporotic fractures, the commonest sites are the hip, spine, wrist, ribs, pelvis and upper arm.

In 2001, it was estimated that 19,019 females had osteoporosis in metropolitan regions, a rate of 35.4 females per 1,000 population (Table 6.26). The rate for Central Northern was marginally above that expected from the rates for the metropolitan regions, with a standardised ratio (SR) of 101. In contrast, Southern had one per cent fewer females with osteoporosis than expected (an SR of 99).

Table 6.26: Estimates of females with osteoporosis, 2001

Region	No.	Rate[1]	Ratio[2]
Central Northern	13,271	35.5	101
Southern	5,748	35.0	99
Metropolitan regions	19,019	35.4	100

[1]**Age-standardised rate per 1,000 population**
[2]**Percentage variation in the region from the ratio of 100 in the metropolitan regions**

Metropolitan regions

The most highly elevated ratios covered much of the outer north, with low ratios in a number of eastern and south-eastern SLAs (Map 6.23), generally following the pattern of socioeconomic disadvantage shown in Chapters 4 and 5.

Central Northern Adelaide

In Central Northern, it was estimated that 13,271 females had osteoporosis, an SR of 101. Salisbury Balance had over one third more females with osteoporosis than expected, an SR of 136* (65 females). Playford - West Central (an SR of 122**, 170 females) and Salisbury - Inner North (121**, 271) also had highly elevated ratios, all with over 20% more females than expected. All of the other Playford SLAs had elevated ratios: Playford - Elizabeth (110*, 520), - East Central (109, 202), - Hills (106, 36) and - West (105, 107).

It was estimated that there are large numbers of females with osteoporosis living in West Torrens - West (645 females, an SR of 101), Port Adelaide Enfield - East (524, 102) and - Port (517, 102), Salisbury - South-East (508, 100), Charles Sturt - Inner West (494, 96) and - Inner East (447, 100), West Torrens - East (438, 101), Port Adelaide Enfield - Inner (432, 103) and Campbelltown - West (412, 97).

SLAs with fewer females with osteoporosis than expected based on the metropolitan regions' rate included Burnside - North-East (an SR of 92, 420 females), Tea Tree Gully - Hills (93, 173), Adelaide Hills - Central (93, 182), Charles Sturt - Coastal (93, 618), Burnside - South-West (94, 446), Campbelltown - East (95, 433), Tea Tree Gully - South (95, 557) and - Central (95, 346), and Walkerville (95, 158).

Southern Adelaide

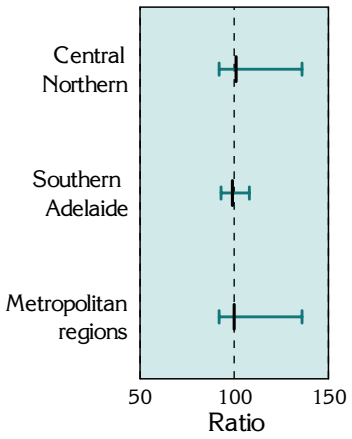
Southern had an SR of 99, representing an estimated 5,748 females with osteoporosis. Marginally elevated ratios were calculated for the Onkaparinga SLAs of - Hackham (an SR of 108, 189 females), - North Coast (103, 351), - South Coast (102, 338) and - Morphett (102, 381). Marion - South also had a marginally elevated SR (102, 221).

Large numbers of females with osteoporosis were also estimated for Marion - North (607 females, an SR of 98), Holdfast Bay - North (483, 100), Mitcham - West (464, 99) and Onkaparinga - Woodcroft (431, 101).

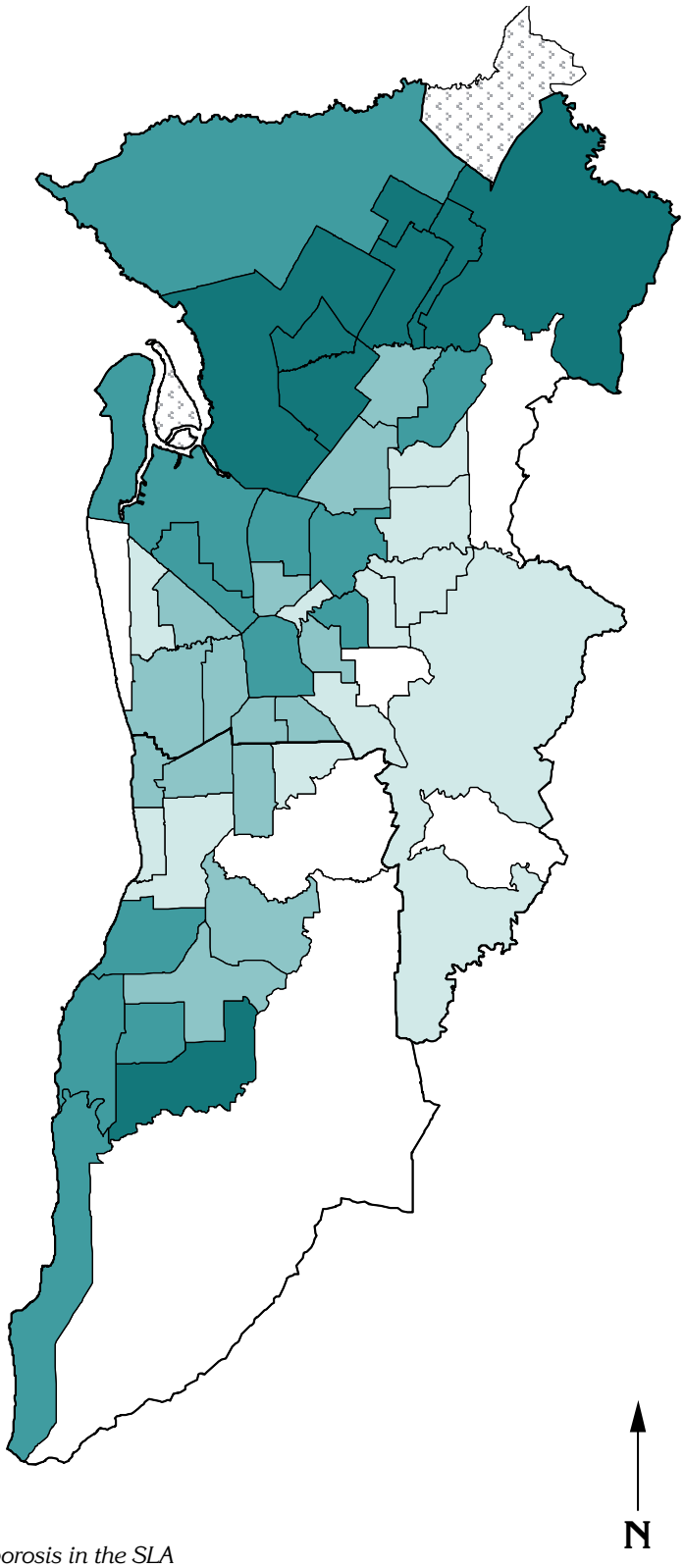
Low SRs were estimated for the SLAs of Mitcham - Hills (an SR of 93, 406 females) and - North-East (96, 336), Onkaparinga - Hills (93, 171) and Marion - Central (96, 711).

* **indicates statistical significance: see page 24**

Map 6.23
Chronic disease estimates: females with osteoporosis, metropolitan regions, 2001



Note: The black vertical lines show the average rate for this indicator in each region; the horizontal lines show the range of the indicator at the SLA level within the region.



SLA
Health Region

Standardised Ratio (as an index)*, by SLA

- *106 and above*
- *102 to 105*
- *98 to 101*
- *94 to 97*
- *below 94*
- *data not mapped#*

*Index shows the estimated number of females with osteoporosis in the SLA compared with the number expected: expected numbers were derived by indirect age standardisation, based on totals for the metropolitan regions

#Data were not mapped for Torrens Island (mapped with Port Adelaide)

Source: See Data sources, Appendix 1.3 ***Details of map boundaries are in Appendix 1.2***

Estimates of injury events, 2001

Injuries are the principal cause of death in almost half of the people under 45 years of age in Australia, and account for a range of physical, cognitive and psychological disabilities that seriously affect the quality of life of injured people and their families. Significant health costs are also attributable to injury, accounting for approximately eight per cent of the total direct costs of all diseases annually.

The estimates for injury events were based on whether a person had an injury, or injuries, in the four weeks prior to being interviewed for the 2001 National Health Survey; the data are expressed as injuries (rather than people with an injury), to account for a person having more than one injury during the reference period. For metropolitan regions, there were estimated to be 125,926 injuries, a rate of 120.1 injuries per 1,000 population (Table 6.27). Southern had a higher rate than Central Northern, with four per cent more injuries than expected (an SR of 104**). In contrast, Central Northern had two per cent fewer injuries than expected in the four-week reference period (an SR of 98**).

Table 6.27: Estimates of injury events, 2001

Region	No.	Rate[1]	Ratio[2]
Central Northern	87,097	117.9	98**
Southern	38,830	125.3	104**
Metropolitan regions	125,926	120.1	100

[1]**Age-standardised rate per 1,000 population**

[2]**Percentage variation in the region from the ratio of 100 in the metropolitan regions**

Metropolitan regions

The geographic distribution of injuries is rather different to that seen for other variables included in this atlas, with many of the highest ratios in SLAs in the Adelaide Hills and in, or adjacent to, the foothills, as well as in two beachside SLAs. The lowest ratios were estimated for the SLA of Adelaide and adjacent western, north-western and inner northern SLAs, as well as in the Campbelltown SLAs (Map 6.24).

Central Northern Adelaide

There were an estimated 87,097 injuries in Central Northern over a four week period (an SR of 98**). SLAs in the region had only marginally above-average ratios, the highest of which was estimated for Playford - Hills (an SR of 109*, 381 injuries). The other SLAs with above-average ratios included Adelaide Hills - Central (an SR of 109**, 1,611 injuries), Port Adelaide Enfield - Coast (107**, 3,395), Burnside - South-West (105**, 2,360), Tea Tree Gully - Hills (105, 1,526), Walkerville (105, 769), Playford - East Central (104*, 2,620), Charles Sturt - Coastal (104*, 3,486), Adelaide Hills - Ranges (104, 1,237), Tea Tree Gully - Central (104**, 3,361) and - North (103, 3,453), Burnside - North-East (103, 2,326) and Playford - Elizabeth (103, 3,158).

There were relatively large numbers of injuries in the SLAs of Salisbury - South-East (3,949 injuries, an SR of 99), - Inner North (3,223, 97) and - North-East (2,781, 100), and West Torrens - West (2,969, 98).

The SLAs with the lowest ratios in the metropolitan regions were all in Central Northern. They included Port Adelaide Enfield - Port (an SR of 87**, 2,528 injuries), Adelaide (89**, 1,724), Charles Sturt - North East (90**, 2,668), - Inner West (91**, 2,469) and - Inner East (93**, 2,244), West Torrens – East (91**, 2,496), Salisbury Balance (92*, 731), Campbelltown - East (92**, 2,912) and - West (93**, 1,952), Port Adelaide Enfield - Inner (92**, 2,066), Playford - West (94, 968), Salisbury - Central (94**, 3,240) and Port Adelaide Enfield - East (94**, 3,017).

Southern Adelaide

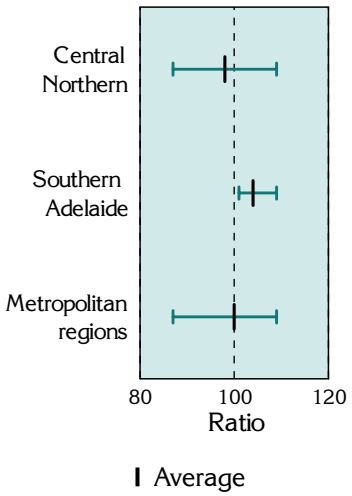
There were estimated to be four per cent more with injuries in Southern than expected from the State rates, an SR of 104** (38,830 injuries).

All of the SRs in Southern were marginally elevated, with the highest SR of 109** being recorded for the SLAs of Holdfast Bay - South (1,585 injuries), Onkaparinga - Hills (1,373) and Mitcham - North-East (1,824). These were followed by Mitcham - Hills (an SR of 107**, 2,871 injuries), Holdfast Bay - North (105*, 2,114), and Onkaparinga - Reservoir (105**, 3,174), - North Coast (105*, 2,112), - Woodcroft (104**, 4,475), - South Coast (104*, 2,907), - Morphett (103, 3,026) and - Hackham (103, 1,828). There was also a marginally elevated SR in Marion - Central (103*, 3,641 injuries).

The lowest SR, of 101, was calculated for both Marion - North (2,787 injuries) and Mitcham - West (2,530).

* **indicates statistical significance: see page 24**

Map 6.24
Estimates of injury events, metropolitan regions, 2001



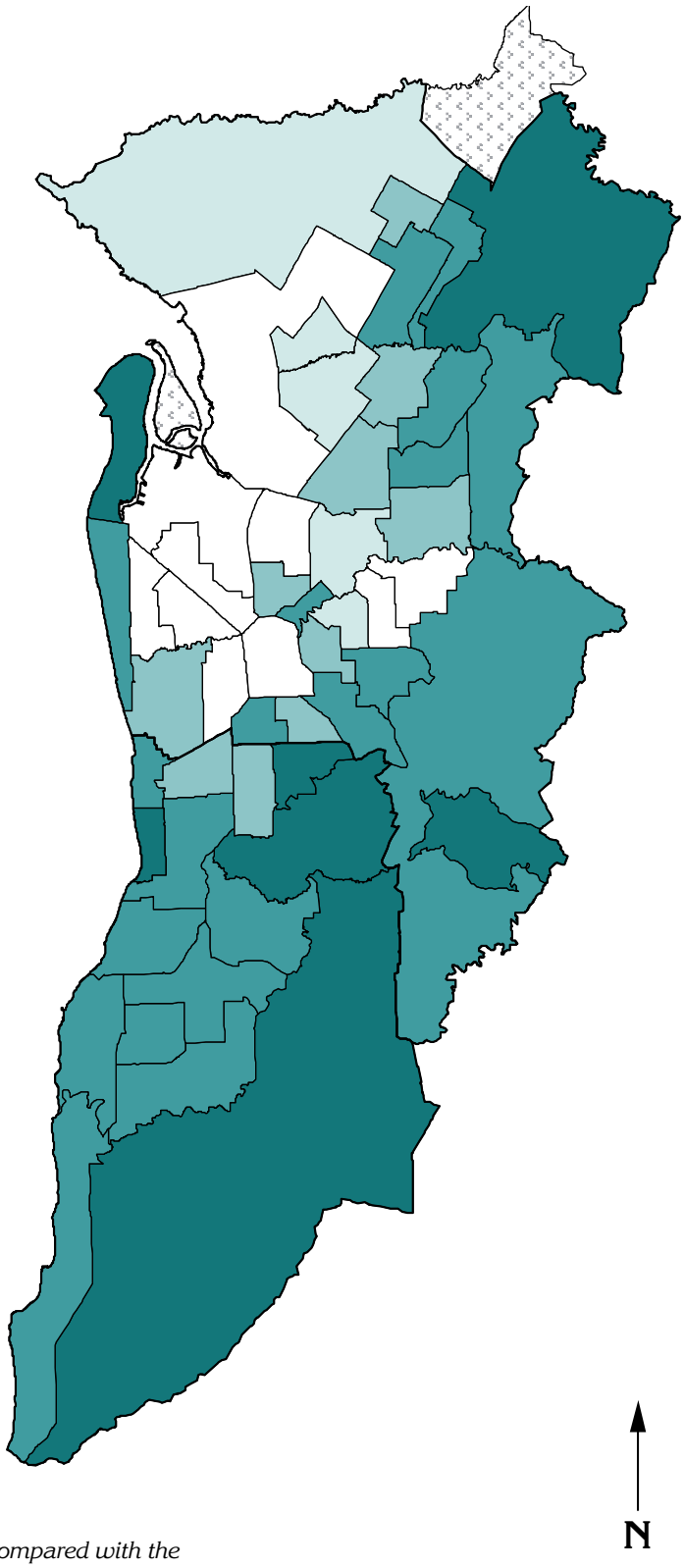
Average

Note: The black vertical lines show the average ratio for this indicator in each region; the horizontal lines show the range of the indicator at the SLA level within the region.

SLA
Health Region

Standardised Ratio (as an index)*, by SLA

- *106 and above*
- *102 to 105*
- *98 to 101*
- *94 to 97*
- *below 94*
- *data not mapped#*



*Index shows the estimated number of injuries in the SLA compared with the number expected: expected numbers were derived by indirect age standardisation, based on totals for the metropolitan regions

#Data were not mapped for Torrens Island (mapped with Port Adelaide)

Source: See Data sources, Appendix 1.3 ***Details of map boundaries are in Appendix 1.2***

Estimates of very high levels of psychological distress, people aged 18 years and over, 2001

In addition to the responses to questions on mental and behavioural problems (see page 230), information was collected using the Kessler Psychological Distress Scale (K-10). This is a scale of non-specific psychological distress, based on ten questions about negative emotional states in the four weeks prior to interview, asked of respondents 18 years and over. Based on previous research, a very high K-10 score may indicate a need for professional assistance (ABS 2002).

An estimated 32,212 people in South Australia (39.9 people per 1,000 population) were estimated to have very high levels of psychological distress (Table 6.28). The rate was higher in Central Northern (41.4 per 1,000 population), being four per cent above the expected level, compared to Southern which was nine per cent below the expected rate (a standardised ratio (SR) of 91**).

Table 6.28: Estimates of very high levels of psychological distress (K-10), 18 years and over, 2001

Region	No.	Rate[1]	Ratio[2]
Central Northern	23,453	41.4	104**
Southern	8,759	36.4	91**
Metropolitan regions	32,212	39.9	100

[1] **Age-standardised rate per 1,000 population**
[2] **Percentage variation in the region from the ratio of 100 in the metropolitan regions**

Metropolitan regions

The SLAs with elevated ratios (Map 6.25) closely follow the pattern of socioeconomic disadvantage shown in Chapters 4 and 5.

Central Northern Adelaide

Overall, Central Northern had four per cent more people with very high levels of psychological distress than expected (an SR of 104**, 23,453 people). However, there were notable variations in ratios across the region. Highly elevated ratios were recorded for people in Port Adelaide Enfield - Port (an SR of 161**, 1,218 people), Playford - Elizabeth (158**, 1,126), - Inner (134**, 773) and - West Central (155**, 515), Salisbury - Inner North (142**, 944), Charles Sturt - North East (135**, 1,026), Salisbury - Central (134**, 1,049), Salisbury Balance (124**, 202) and West Torrens - East (121**, 873).

Relatively large numbers of people with very high levels of psychological distress were estimated for the populations of Salisbury - South-East (1,123 people, an SR of 112**), Port Adelaide Enfield - Coast (964, 111**) and - East (955, 113**), West Torrens - West (899, 106), Tea Tree Gully - South (880, 88**), and Charles Sturt - Inner West (851, 114**) and - Coastal (808, 83**).

Very low ratios were recorded for Adelaide Hills - Ranges (an SR of 55**, 173 people) and - Central (57**, 222), Burnside - South-West (61**, 390) and - North-East (63**, 402), Walkerville (64**, 135), Tea Tree Gully - Hills (68**, 264), Unley - East (75**, 428) and - West (79**, 397), and Tea Tree Gully - North (79**, 594).

Southern Adelaide

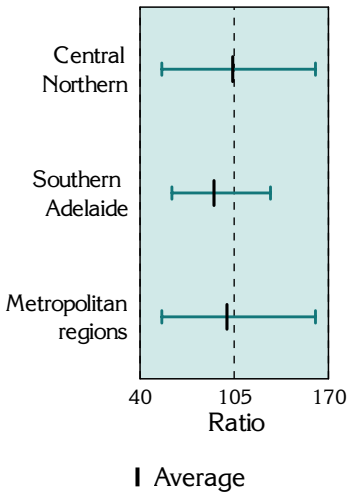
In Southern region, nine per cent fewer people than expected were assessed using the K-10 as experiencing high levels of psychological distress (an SR of 91**, 8,759 people). Highly elevated SRs were estimated for Onkaparinga - North Coast (130**, 681), - Hackham (124**, 497) and, to a lesser extent, - Morphett (110**, 773). Marion - North (111**, 842 people) also had an elevated SR.

In Marion - Central, there were 1,011 people estimated to have very high levels of psychological distress (an SR of 100).

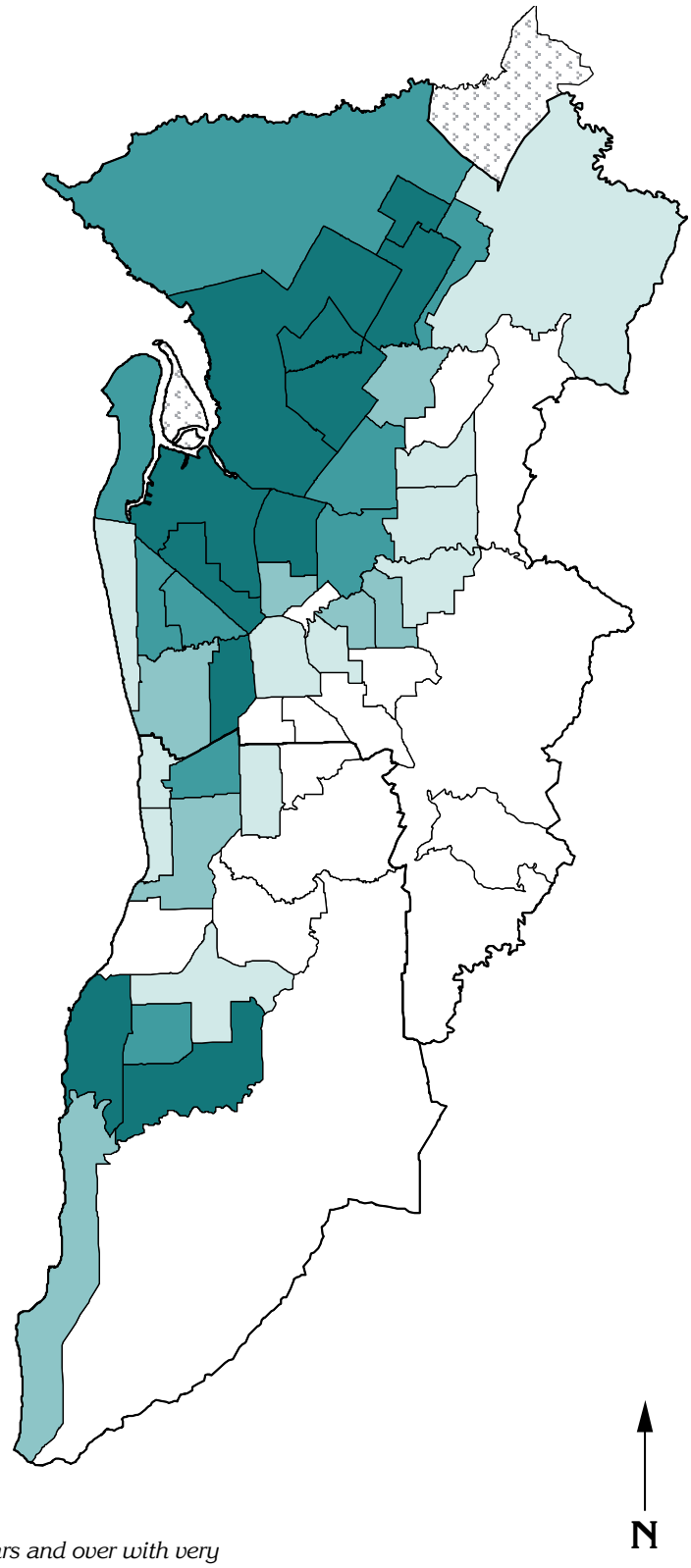
Lower than expected ratios were recorded for Mitcham - Hills (an SR of 62**, 458 people) and - North-East (64**, 296), Onkaparinga - Hills (70**, 231) and - Reservoir (70**, 513), Marion - South (78**, 456), and Holdfast Bay - North (82**, 479) and - South (82**, 365).

* **indicates statistical significance: see page 24**

Map 6.25
Estimates of very high levels of psychological distress, people aged 18 years and over, metropolitan regions, 2001



Note: The black vertical lines show the average rate for this indicator in each region; the horizontal lines show the range of the indicator at the SLA level within the region.



SLA
Health Region

Standardised Ratio (as an index) *, by SLA

- *120 and above*
- *110 to 119*
- *90 to 109*
- *80 to 89*
- *below 80*
- *data not mapped*#

*Index shows the estimated number of people aged 18 years and over with very high levels of psychological distress (as measured by the K-10) in the SLA compared with the number expected: expected numbers were derived by indirect age standardisation, based on totals for the metropolitan regions

#Data were not mapped for Torrens Island (mapped with Port Adelaide)

Source: See Data sources, Appendix 1.3 ***Details of map boundaries are in Appendix 1.2***

Estimates of fair or poor self-assessed health status, people aged 15 years and over, 2001

How people rate their health is strongly related to their experience of illness and disability (McCallum et al. 1994). This measure is therefore an important indicator of key aspects of quality of life. In the 2001 NHS, respondents aged 15 years and over were asked to rate their health on a scale from 'excellent', through 'very good', 'good' and 'fair', to 'poor' health. The data shown here relate to the 20% of the population who reported their health as 'fair' or 'poor'.

The estimated rate of people reporting their health as 'fair' or 'poor' was two per cent higher than expected in Central Northern and five per cent lower than expected in Southern (Table 6.29).

Table 6.29: Estimates of fair or poor self-assessed health status, people aged 15 years and over, 2001

Region	No.	Rate[1]	Ratio[2]
Central Northern	127,996	214.6	102**
Southern	50,833	199.8	95**
Metropolitan regions	178,829	210.2	100

[1]**Age-standardised rate per 1,000 population**
[2]**Percentage variation in the region from the ratio of 100 in the metropolitan regions**

Metropolitan regions

SLAs with highly elevated ratios were largely located in the north-west and outer northern suburbs, with low ratios in eastern, north-eastern and south-eastern SLAs (Map 6.26), generally following the pattern of socioeconomic disadvantage shown in Chapters 4 and 5.

Central Northern Adelaide

In the Central Northern region, an estimated 127,996 people rated their health as fair or poor (two per cent more than expected, a standardised ratio (SR) of 102**). A number of SLAs in this region had elevated or highly elevated ratios, including Salisbury - Inner North (an SR of 125**, 3,978 people), Port Adelaide Enfield - Port (124**, 5,368), Playford - Elizabeth (124**, 5,192), - West Central (123**, 2,114) and - West (117**, 1,444), Charles Sturt - North East (118**, 4,980), Salisbury - Central (117**, 4,821) and Balance (116**, 884), Port Adelaide Enfield - Inner (116**, 3,961), West Torrens - East (112**, 4,559), Charles Sturt - Inner East (112**, 4,275) and - Inner West (110**, 4,853), and Playford - East Central (111**, 2,729).

Large numbers of people rating their health as fair or poor were residents in Salisbury - South-East (5,754 people, an SR of 107**), West Torrens - West (5,438, 106**), Port Adelaide Enfield - East (5,243, 109**) and - Coast (5,214, 109**), Tea Tree Gully - South (5,090, 91**) and Charles Sturt - Coastal (5,082, 89**).

SLAs with fewer than expected people reporting their health as fair or poor included Adelaide Hills - Ranges (an SR of 75**, 1,214) and - Central (77**, 1,575), Burnside - South-West (80**, 3,042) and - North-East (82**, 3,060), Tea Tree Gully - Hills (82**, 1,690), Walkerville (84**, 1,091) and Playford - Hills (85**, 361).

Southern Adelaide

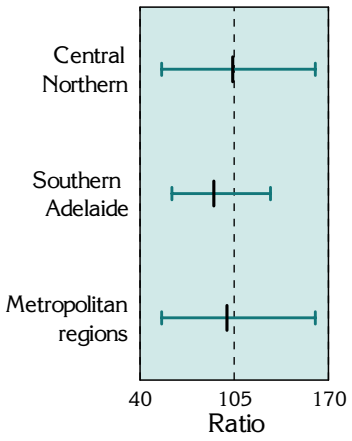
There were five per cent fewer than expected people rating their health as fair or poor in Southern (an SR of 95**, 50,833 people). Elevated SRs were calculated for Onkaparinga - Hackham (114**, 2,339), - North Coast (113**, 3,444) and - Morphett (106**, 3,989).

Relatively large numbers of people reporting their health as fair or poor were estimated for the SLAs of Marion - Central (6,136, 102), Onkaparinga - Woodcroft (4,525, 90**) and - South Coast (3,675, 103) and Mitcham - West (3,593, 93).

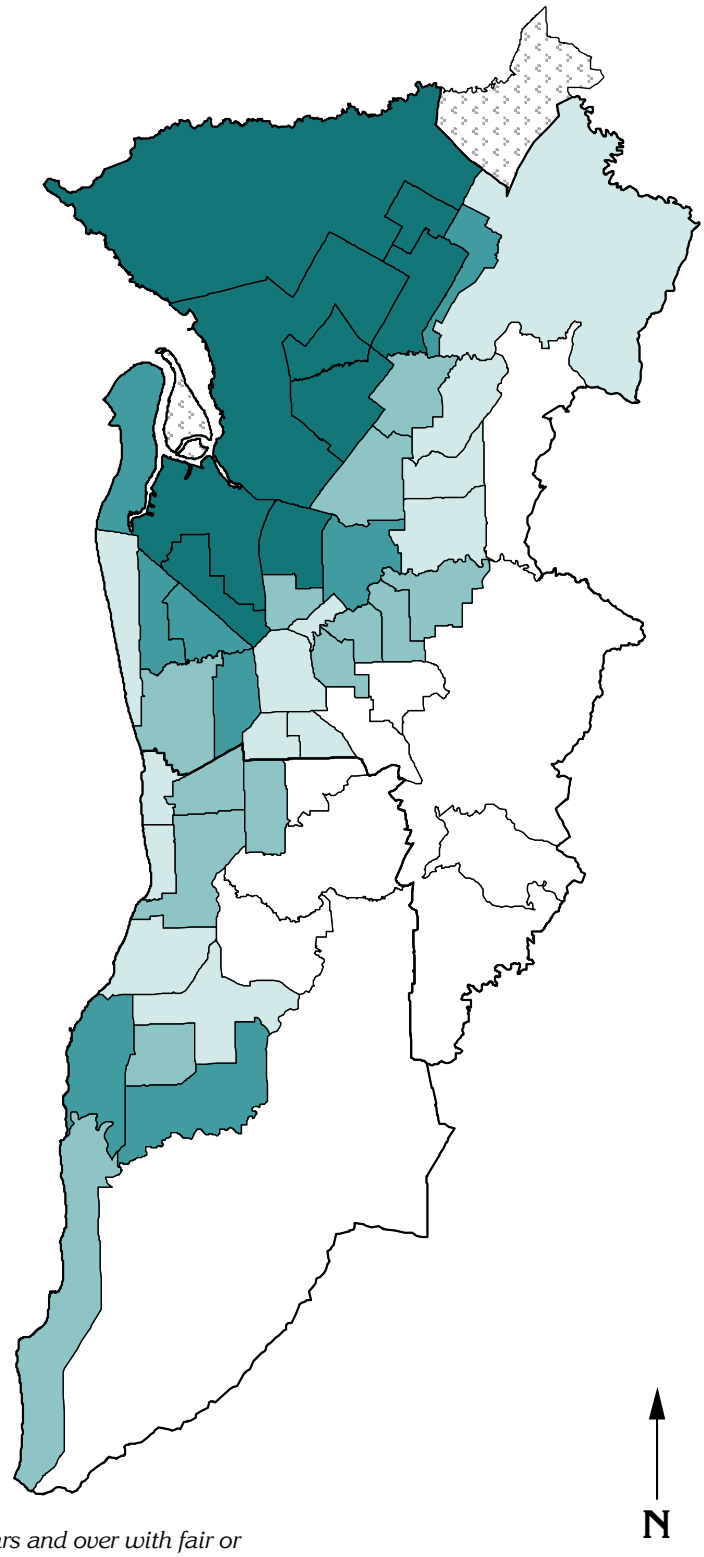
There were lower ratios than expected in Onkaparinga - Hills (80**, 1,442), Mitcham - Hills (81**, 3,334) and - North East (83**, 2,275), Onkaparinga - Reservoir (83**, 3,023) and Marion - South (85**, 2,397).

* **indicates statistical significance: see page 24**

Map 6.26
Estimates of fair or poor self-assessed health status, people aged 15 years and over, metropolitan regions, 2001



Note: The black vertical lines show the average rate for this indicator in each region; the horizontal lines show the range of the indicator at the SLA level within the region.



SLA
Health Region

Standardised Ratio (as an index) *, by SLA

- *116 and above*
- *108 to 115*
- *92 to 107*
- *84 to 91*
- *below 84*
- *data not mapped*#

*Index shows the estimated number of people aged 15 years and over with fair or poor self-assessed health status in the SLA compared with the number expected: expected numbers were derived by indirect age standardisation, based on totals for the metropolitan regions

#Data were not mapped for Torrens Island (mapped with Port Adelaide)

Source: See Data sources, Appendix 1.3 ***Details of map boundaries are in Appendix 1.2***

Estimates of overweight (not obese) males aged 15 years and over, 2001

Each increment in a person's body weight above their optimal level is associated with an increase in the risk of ill health. Overweight arises through an energy imbalance over a sustained period of time. While many factors may influence a person's weight, weight gain is essentially due to the energy intake from the diet being greater than the energy expended through physical activity. The energy imbalance need only be minor for weight gain to occur, and some people, due to genetic, biological and external factors, may be more likely to gain weight than others. Overweight is associated with higher mortality and morbidity, and those who are already overweight have a higher risk of becoming obese.

In 2001, it was estimated that 151,530 males aged 15 years and over were overweight (but not obese) (Table 6.30). There was a marginally higher standardised ratio (SR) in Southern, where the rate was one per cent above the expected level (an SR of 101*), compared to Central Northern which had the expected rate, of 368.5 per 1,000 males, for a population of its size and structure (an SR of 100).

Table 6.30: Estimates of overweight males aged 15 years and over, 2001

Region	No.	Rate[1]	Ratio[2]
Central Northern	106,514	368.5	100
Southern	45,016	374.7	101*
Metropolitan regions	151,530	370.3	100

[1]**Age-standardised rate per 1,000 population**
[2]**Percentage variation in the region from the ratio of 100 in the metropolitan regions**

Metropolitan regions

The majority of SLAs with elevated rates of overweight (not obese) males were located in the outer areas of Adelaide, from the north-east to the south-west; the lowest ratios were mainly concentrated in a band of SLAs around the city, as well as in a number of outer northern and southern SLAs (Map 6.27).

Central Northern Adelaide

Central Northern had an estimated 106,514 overweight (not obese) males (an SR of 100). SLAs with more overweight males than expected were Tea Tree Gully - North (an SR of 108**, 3,472 males), Playford - East Central (107**, 2,501) and - Hills (107, 424), Campbelltown - East (106**, 4,085), Tea Tree Gully - Central (105**, 3,861), Charles Sturt - Inner West (105**, 3,730), Adelaide Hills - Ranges (105, 1,534) and - Central (105**, 1,827), and Salisbury - North-East (105**, 3,252).

Large numbers of overweight males aged 15 years and over were usual residents in the SLAs of Tea Tree Gully - South (4,872 males, 103*), Salisbury - South-East (4,866, 103), Charles Sturt - Coastal (4,717, 101), West Torrens - West (4,222, 103*), and Port Adelaide Enfield - East (4,125, 100) and - Coast (4,087, 101).

SLAs with low ratios, having fewer overweight males than expected, included Port Adelaide Enfield - Port (an SR of 82**, 2,985 males) and - Inner (87**, 2,427), Playford - Elizabeth (84**, 2,846) and - West Central (87**, 1,400), Salisbury - Central (90**, 3,329) and - Inner North (91**, 2,795), Charles Sturt - North-East (94**, 3,402) and Adelaide (94**, 2,903).

Southern Adelaide

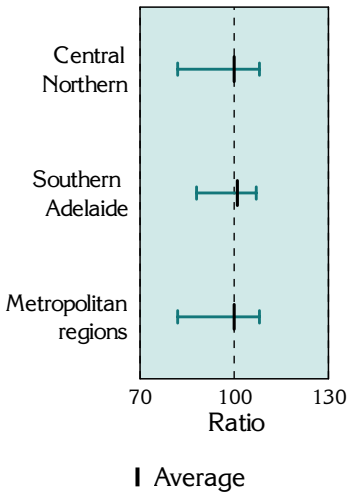
Southern had an estimated one per cent more overweight (not obese) males than expected from the metropolitan rates (an SR of 101*). The SLAs of Onkaparinga - Reservoir (an SR of 107**, 3,495 males), - Woodcroft (105**, 4,769) and - Hills (105*, 1,621) all had marginally elevated SRs.

Relatively large numbers of overweight males were usual residents in the SLAs of Marion - Central (4,766 males, an SR of 101) and - North (3,459, 98), Mitcham - Hills (3,546, 103) and Onkaparinga - Morphett (3,309, 103).

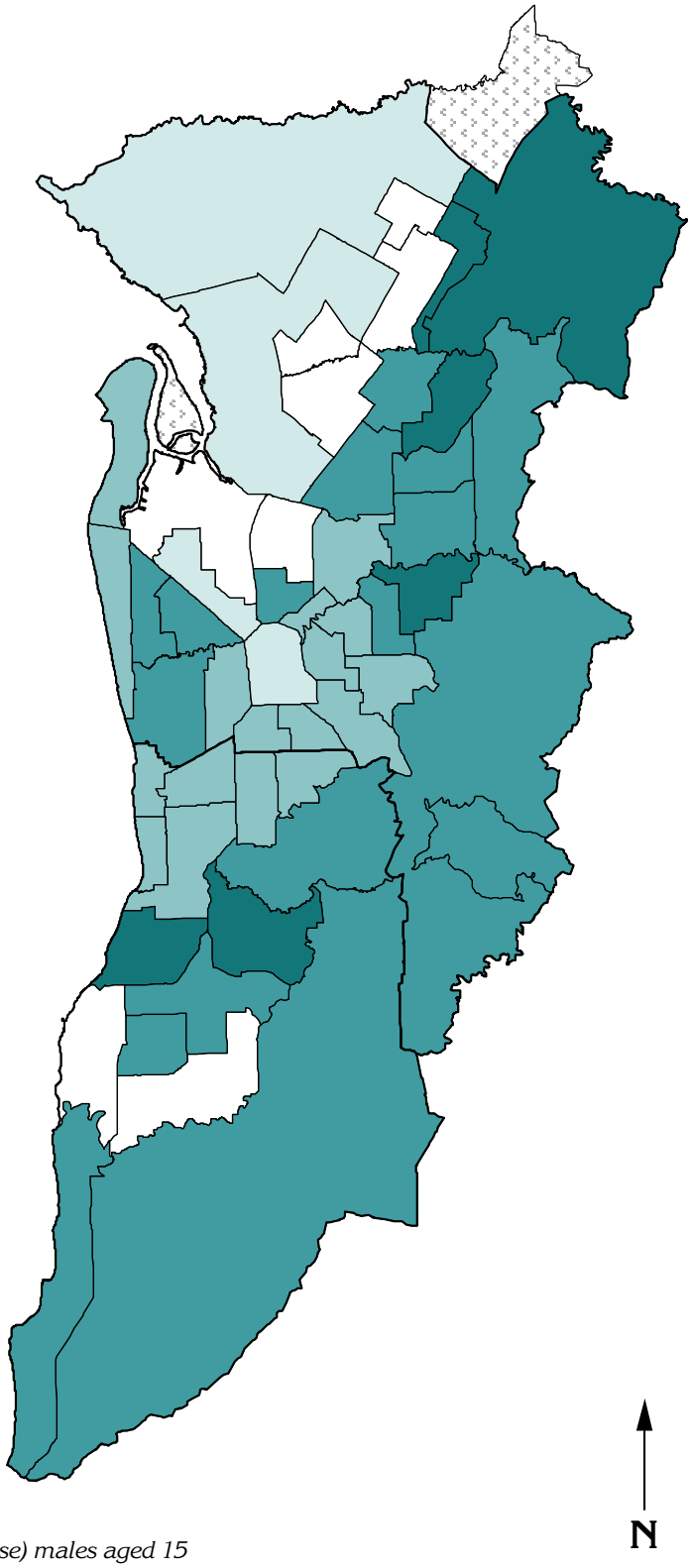
The lowest SRs in the region were calculated for the Onkaparinga SLAs of - North Coast (an SR of 88**, 2,244 males) and - Hackham (92**, 1,714).

* **indicates statistical significance: see page 24**

Map 6.27
Estimates of overweight (not obese) males aged 15 years and over, metropolitan regions, 2001



Note: The black vertical lines show the average rate for this indicator in each region; the horizontal lines show the range of the indicator at the SLA level within the region.



SLA
Health Region

Standardised Ratio (as an index) *, by SLA

- *106 and above*
- *103 to 105*
- *97 to 102*
- *94 to 96*
- *below 94*
- *data not mapped*#

*Index shows the estimated number of overweight (not obese) males aged 15 years and over in the SLA compared with the number expected: expected numbers were derived by indirect age standardisation, based on totals for the metropolitan regions

#Data were not mapped for Torrens Island (mapped with Port Adelaide)

Source: See Data sources, Appendix 1.3 ***Details of map boundaries are in Appendix 1.2***

Estimates of obese males aged 15 years and over, 2001

Over-consumption, or the consumption of more calories than are required to meet energy needs, is contributing to Australia's increase in obesity which, in turn, is a significant contributing factor in the development of many chronic diseases. Obesity can, in itself, lead to high blood pressure and high blood cholesterol. Excess body weight, high blood pressure and high blood cholesterol all contribute to the risk of heart disease and amplify each risk factor's effects if they occur together. Excess body fat also increases the risk of developing a range of other health problems, including type 2 diabetes, high blood pressure, certain cancers, sleep apnoea, osteoarthritis, psychological disorders and social problems.

It is estimated that 54,171 males aged 15 years and over in metropolitan regions at the 2001 NHS were obese, a rate of 132.4 per 1,000 males. The rate for Central Northern (133.8 per 1,000 males) was slightly higher than the rate for Southern (129.0); with a standardised ratio (SR) one per cent above the expected level in Central Northern, in contrast to three per cent below in Southern (Table 6.31).

Table 6.31: Estimates of obese males aged 15 years and over, 2001

Region	No.	Rate[1]	Ratio[2]
Central Northern	38,673	133.8	101*
Southern	15,498	129.0	97**
Metropolitan regions	54,171	132.4	100

[1]**Age-standardised rate per 1,000 population**

[2]**Percentage variation in the region from the ratio of 100 in the metropolitan regions**

Metropolitan regions

The majority of SLAs with elevated ratios were located in the north-western and outer northern and southern areas; ratios below average were mainly concentrated in the city and SLAs to the east and south-east (Map 6.28).

Central Northern Adelaide

In 2001, Central Northern had an estimated 38,673 males considered to be obese, one per cent more than expected (an SR of 101*); however, there were notable variations in ratios across the region. Playford - Elizabeth had over one third more obese males than expected (an SR of 139**, 1,642 males). The Salisbury SLAs of - Inner North (with an SR of 137**, 1,595 males), - Central (133**, 1,786) and Balance (127**, 373) all had highly elevated SRs, as well as Port Adelaide Enfield - Inner (127**, 1,237) and - Port (119**, 1,532). Playford - West (124**, 514), - West Central (123**, 720) and - East Central (111**, 971), and Charles Sturt - Inner West (111**, 1,366) also had elevated ratios.

Large numbers of obese males were estimated for the SLAs of Salisbury - South-East (1,825 males, an SR of 106*), Port Adelaide Enfield - Coast (1,566, 107**) and - East (1,510, 103), Tea Tree Gully - South (1,563, 93**), West Torrens - West (1,472, 105) and Charles Sturt - North East (1,336, 103).

The lowest ratios in Central Northern, with fewer obese males than expected, were estimated for Adelaide (an SR of 72**, 809 males), Burnside - South-West (75**, 771) and - North-East (76**, 765), Norwood Payneham St Peters - West (77**, 683), Unley - East (78**, 730) and - West (79**, 661), Adelaide Hills - Central (81**, 514) and - Ranges (82**, 445), Walkerville (81**, 278), Prospect (85**, 821) and Charles Sturt - Coastal (89**, 1,452).

Southern Adelaide

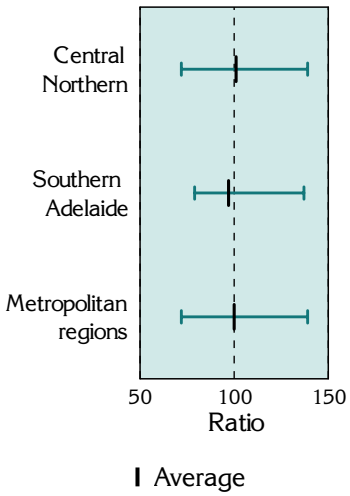
Southern had three per cent fewer obese males than expected from the metropolitan rates, a standardised ratio of 97** (15,498 males). Four Onkaparinga SLAs had the highest SRs in the region: Onkaparinga - Hackham (an SR of 137**, 934) and - North Coast (135**, 1,217) both had highly elevated SRs with over one third more obese males than expected. Onkaparinga - Morphett (108**, 1,267) and - South Coast (107, 1,198) also had elevated SRs.

Large numbers of obese males were recorded in the SLAs of Marion - Central (1,678 males, an SR of 103) and Onkaparinga - Woodcroft (1,590, 94*).

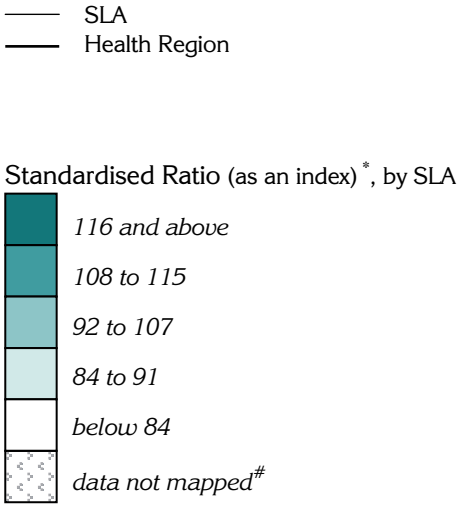
Below average ratios were calculated for Mitcham - North-East (an SR of 79**, 569 males), - Hills (82**, 1,001) and - West (87**, 949). Holdfast Bay - North (82**, 819) and - South (85**, 609), and Onkaparinga - Hills (87**, 483) also had fewer obese males than expected.

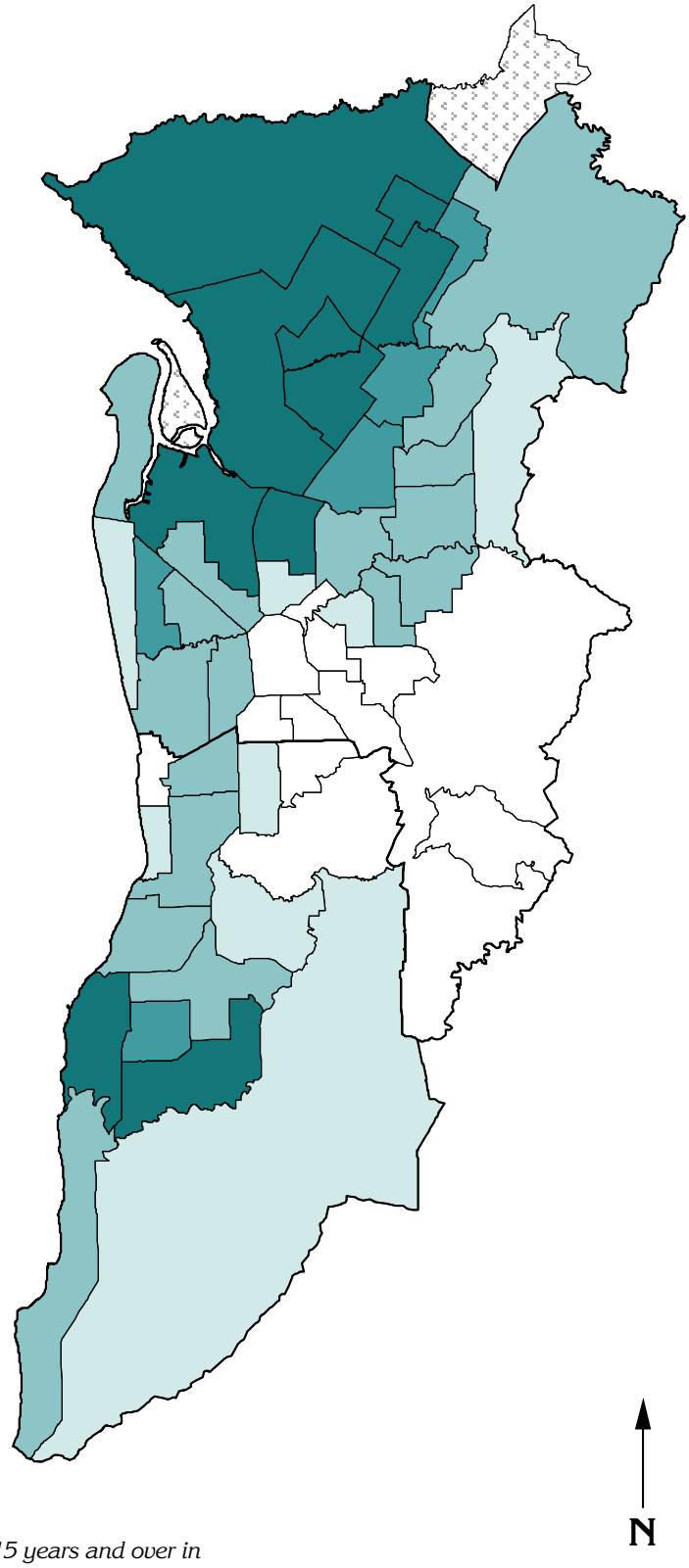
* **indicates statistical significance: see page 24**

Map 6.28
Estimates of obese males aged 15 years and over, metropolitan regions, 2001



Note: The black vertical lines show the average rate for this indicator in each region; the horizontal lines show the range of the indicator at the SLA level within the region.





*Index shows the estimated number of obese males aged 15 years and over in the SLA compared with the number expected: expected numbers were derived by indirect age standardisation, based on totals for the metropolitan regions

#Data were not mapped for Torrens Island (mapped with Port Adelaide)

Source: See Data sources, Appendix 1.3 ***Details of map boundaries are in Appendix 1.2***

Estimates of overweight (not obese) females aged 15 years and over, 2001

Each increment in a person's body weight above their optimal level is associated with an increase in the risk of ill health. Overweight arises through an energy imbalance over a sustained period of time. While many factors may influence a person's weight, weight gain is essentially due to the energy intake from the diet being greater than the energy expended through physical activity. The energy imbalance need only be minor for weight gain to occur, and some people, due to genetic, biological and external factors, may be more likely to gain weight than others. Overweight is associated with higher mortality and morbidity, and those who are already overweight have a higher risk of becoming obese.

It is estimated from the 2001 NHS that 91,012 females in the metropolitan regions aged 15 years and over were overweight (but not obese), a rate of 206.1 per 1,000 females. There was a marginally higher rate for females in Southern Adelaide (210.2 per 1,000) than in Central Northern (204.3). The Southern rate was two per cent higher than the expected rate for that population size and structure (a standardised ratio (SR) of 102**); in contrast, Central Northern had one per cent fewer overweight females (an SR of 99*) (Table 6.32).

Table 6.32: Estimates of overweight females aged 15 years and over, 2001

Region	No.	Rate[1]	Ratio[2]
Central Northern	63,362	204.3	99*
Southern	27,650	210.2	102**
Metropolitan regions	91,012	206.1	100

[1]**Age-standardised rate per 1,000 population**
[2]**Percentage variation in the region from the ratio of 100 in the metropolitan regions**

Metropolitan regions

The majority of SLAs with elevated ratios were located in outer areas, in the north-east, south-east and south; the lowest ratios were concentrated in a block of SLAs, including the city and extending from the north-west to the outer north (Map 6.29).

Central Northern Adelaide

Central Northern had 63,362 females estimated to be overweight (not obese) in 2001, one per cent fewer than expected (an SR of 99**). None of the ratios in this region were elevated by more than eight per cent. SLAs with elevated ratios included Adelaide Hills - Central (an SR of 108**, 1,101 females) and - Ranges (107*, 839), Burnside - South-West (107**, 2,042), Playford - Hills (105, 219), Burnside - North-East (105*, 1,987), Walkerville (104, 683), Unley - West (104, 1,505), Tea Tree Gully - Hills (103, 1,039) and West Torrens - West (103, 2,669).

Large numbers of overweight females were estimated for the SLAs of Charles Sturt - Coastal (2,846 females, an SR of 101), Tea Tree Gully - South (2,801, 100), Salisbury - South-East (2,751, 100), Port Adelaide Enfield - Coast (2,415, 101) and - East (2,373, 97), and Campbelltown - East (2,250, 97).

The lowest ratios in Central Northern, with fewer overweight females than expected, were estimated for Port Adelaide Enfield - Port (an SR of 89**, 1,940 females), Salisbury Balance (91, 346), Adelaide (92**, 1,238), Playford - West Central (92*, 815), Salisbury - Inner North (94*, 1,587), Port Adelaide Enfield - Inner (94*, 1,623) and Playford - Elizabeth (95*, 2,050).

Southern Adelaide

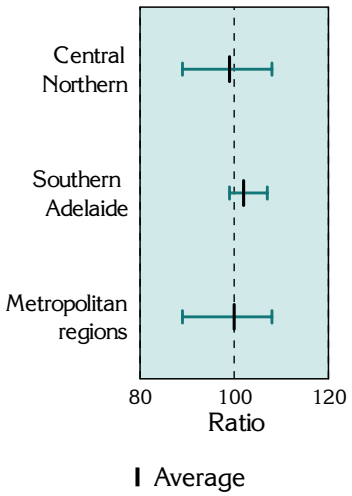
Southern had a ratio of 102** (27,650 overweight (not obese) females). The majority of SLAs in this region had marginally elevated ratios. Both Mitcham - North-East (1,493 females) and - Hills (2,188) each had an SR of 107**, and Onkaparinga - Reservoir had an SR of 105* (1,927 females). There were two per cent more overweight females than expected in the SLAs of Marion - Central (3,126 females) and - South (1,478), Onkaparinga - South Coast (1,842), - Hills (902) and - Hackham (1,058), and Holdfast Bay - South (1,398).

Large estimated numbers of overweight females aged 15 years and older were residents in Marion - North (2,392 females, an SR of 100), Mitcham - West (1,960, 100) and Onkaparinga - Morphett (1,954, 101).

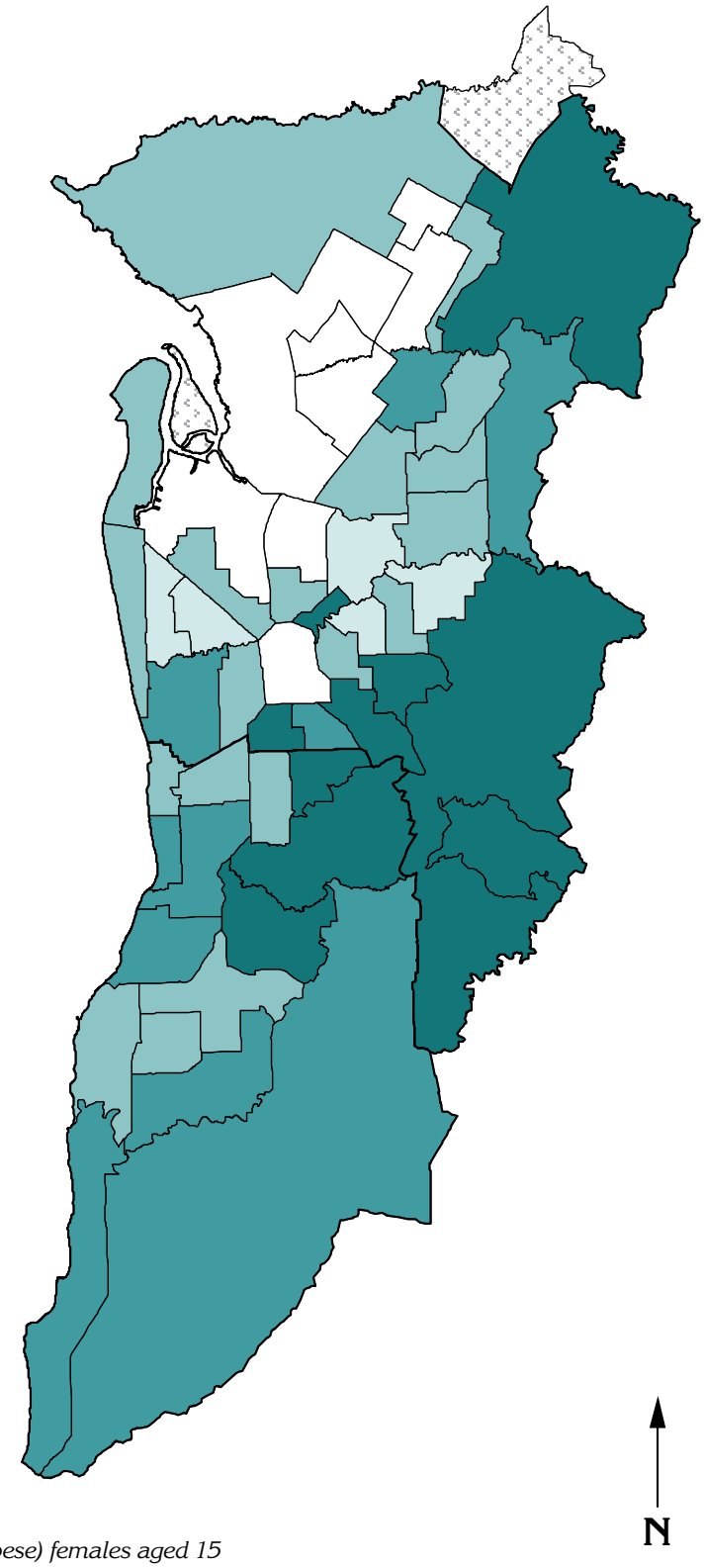
Onkaparinga - Woodcroft was the only Southern SLA to record a below average rate (an SR of 99, 2,586 females).

* **indicates statistical significance: see page 24**

Map 6.29
Estimates of overweight (not obese) females aged 15 years and over, metropolitan regions, 2001



Note: The black vertical lines show the average rate for this indicator in each region; the horizontal lines show the range of the indicator at the SLA level within the region.



SLA
Health Region

Standardised Ratio (as an index) *, by SLA

- *104 and above*
- *102 to 103*
- *99 to 101*
- *97 to 98*
- *below 97*
- *data not mapped*#

*Index shows the estimated number of overweight (not obese) females aged 15 years and over in the SLA compared with the number expected: expected numbers were derived by indirect age standardisation, based on totals for the metropolitan regions

#Data were not mapped for Torrens Island (mapped with Port Adelaide)

Source: See Data sources, Appendix 1.3 ***Details of map boundaries are in Appendix 1.2***

Estimates of obese females aged 15 years and over, 2001

Over-consumption, or the consumption of more calories than are required to meet energy needs, is contributing to Australia's increase in obesity which, in turn, is a significant contributing factor in the development of many chronic diseases. Obesity can, in itself, lead to high blood pressure and high blood cholesterol. Excess body weight, high blood pressure and high blood cholesterol all contribute to the risk of heart disease and amplify each risk factor's effects if they occur together. Excess body fat also increases the risk of developing a range of other health problems, including type 2 diabetes, high blood pressure, certain cancers, sleep apnoea, osteoarthritis, psychological disorders and social problems.

In 2001, it was estimated that there were 61,855 obese females aged 15 years and over in the metropolitan regions, a rate of 140.0 per 1,000 females (Table 6.33). The rate was higher for Central Northern, with a standardised ratio (SR) of 102**. Southern had fewer obese females than expected, with an SR of 96**.

Table 6.33: Estimates of obese females aged 15 years and over, 2001

Region	No.	Rate[1]	Ratio[2]
Central Northern	44,104	142.2	102**
Southern	17,751	134.9	96**
Metropolitan regions	61,855	140.0	100

[1]**Age-standardised rate per 1,000 population**
[2]**Percentage variation in the region from the ratio of 100 in the metropolitan regions**

Metropolitan regions

The majority of SLAs with elevated ratios were located in the inner and outer northern, western and north-western and outer southern areas; ratios below average were mainly concentrated in an area from the city to the east and south-east (Map 6.30).

Central Northern Adelaide

In 2001, Central Northern had an estimated 44,104 females considered to be obese, two per cent more than expected from the metropolitan rates (an SR of 102**). The most highly elevated ratios were calculated for Charles Sturt - Inner West (an SR of 122**, 1,782 females), Playford - West Central (119**, 755), Charles Sturt - Inner East (117**, 1,470), Playford - Elizabeth (117**, 1,648), Campbelltown - West (116**, 1,330), Charles Sturt - North-East (114**, 1,659), West Torrens - East (113**, 1,570) and - West (113**, 1,871), Salisbury - Inner North (113**, 1,415), - South-East (112**, 2,162) - North-East (110**, 1,384) and - Central (110**, 1,639), Playford - West (111**, 496), and Port Adelaide Enfield - Inner (111**, 1,221), - East (110**, 1,789) and - Coast (110**, 1,809).

Large numbers of overweight and obese females were estimated for Tea Tree Gully - South (1,816 females, an SR of 95*), Charles Sturt - Coastal (1,718, 92**), Campbelltown - East (1,560, 96) and Port Adelaide Enfield - Port (1,543, 108**).

The lowest ratios in Central Northern, with fewer obese females than expected, were estimated for Adelaide (an SR of 75**, 668 females), Adelaide Hills - Ranges (77**, 447) and - Central (80**, 586), Burnside - South-West (80**, 1,002) and - North-East (81**, 1,004), Walkerville (81**, 339), Unley - East (84**, 959) and - West (85**, 838), Tea Tree Gully - North (85**, 1,256) and - Hills (88**, 634), Norwood Payneham St Peters - West (87**, 902) and Playford - Hills (87, 138).

Southern Adelaide

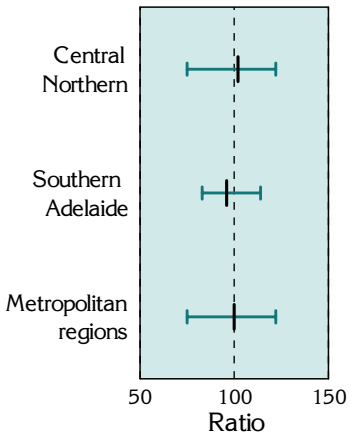
Southern had four per cent fewer obese females than expected from the metropolitan rates, a standardised ratio of 96** (17,751 females). The three most highly elevated SRs were mapped in the Onkaparinga SLAs of - North Coast (with an SR of 114**, 1,127 females), - Hackham (112**, 842) and - Morphett (111**, 1,496). Marion - North (110**, 1,659) also had an elevated SR.

Both Marion - Central (2,172 females, an SR of 109**) and Onkaparinga - Woodcroft (1,684, 89**) had large numbers of obese females aged 15 years and over.

Below average ratios were calculated for Mitcham - Hills (an SR of 83**, 1,163 females) and - North-East (83**, 749), Onkaparinga - Hills (84**, 522) and - Reservoir (84**, 1,147), and Marion - South (84**, 930).

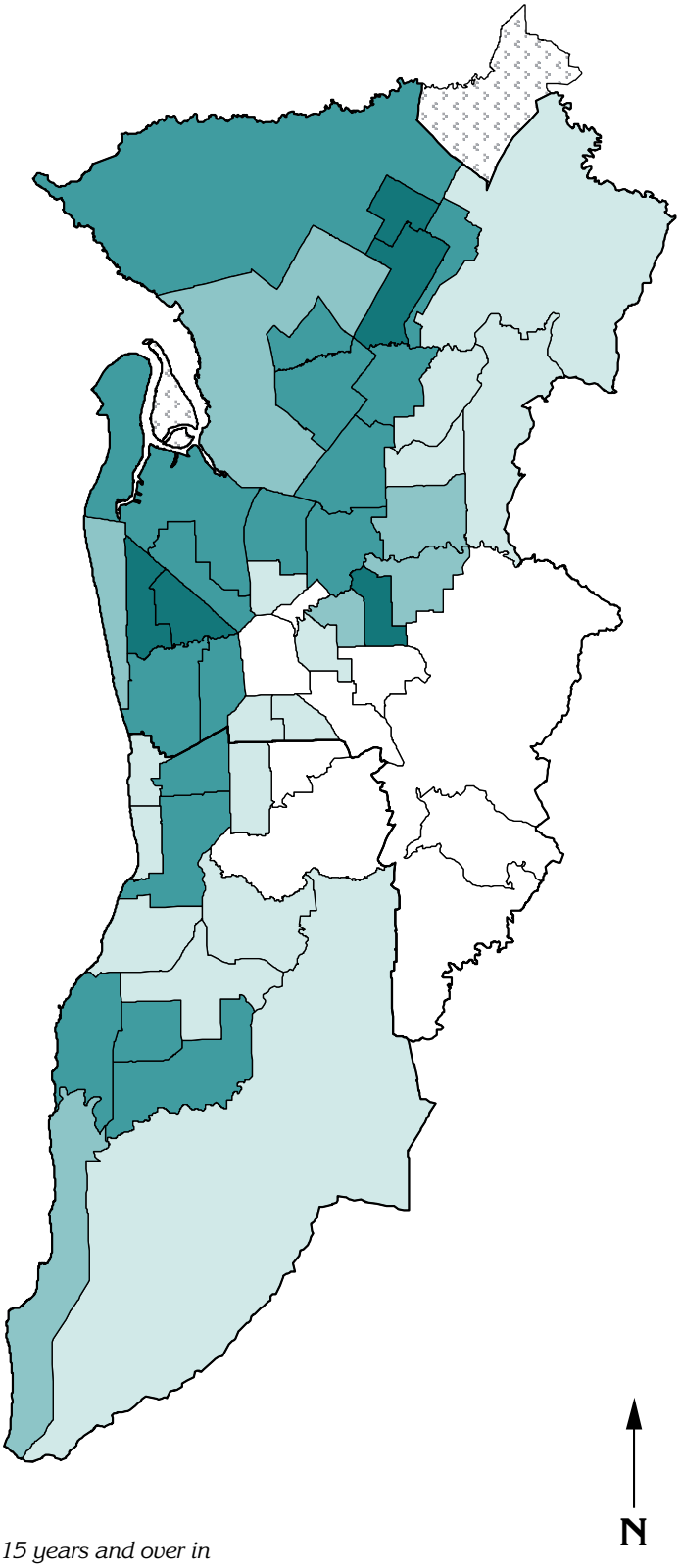
* **indicates statistical significance: see page 24**

Map 6.30
Estimates of obese females aged 15 years and over, metropolitan regions, 2001



Average

Note: The black vertical lines show the average rate for this indicator in each region; the horizontal lines show the range of the indicator at the SLA level within the region.



SLA
Health Region

Standardised Ratio (as an index) *, by SLA

- *116 and above*
- *108 to 115*
- *92 to 107*
- *84 to 91*
- *below 84*
- *data not mapped*#

*Index shows the estimated number of obese females aged 15 years and over in the SLA compared with the number expected: expected numbers were derived by indirect age standardisation, based on totals for the metropolitan regions

#Data were not mapped for Torrens Island (mapped with Port Adelaide)

Source: See Data sources, Appendix 1.3 ***Details of map boundaries are in Appendix 1.2***

Estimates of current smokers aged 18 years and over, 2001

Tobacco is the largest single cause of death and disease in Australia; and half of all regular smokers who commenced smoking as teenagers will be killed by their habit. Over 20% of adults and 25% of adolescents aged 12 to 17 years in Australia in 2004 smoked at least weekly. Smokers who consume more than forty cigarettes per day have mortality rates between two and three times that of non-smokers; and tobacco smoking has been estimated to cost $12.7 billion a year in health care expenses, lost productivity and other costs.

It was estimated that 199,583 people in the metropolitan regions in 2001 were current smokers, a rate of 247.3 people per 1,000 population. The rate in Southern was marginally higher than in Central Northern (248.0 compared to 247.0), although both regions had a standardised ratio (SR) of 100 (Table 6.34).

Table 6.34: Estimates of current smokers aged 18 years and over, 2001

Region	No.	Rate[1]	Ratio[2]
Central Northern	141,295	247.0	100
Southern	58,288	248.0	100
Metropolitan regions	199,583	247.3	100

[1]**Age-standardised rate per 1,000 population**
[2]**Percentage variation in the region from the ratio of 100 in the metropolitan regions**

Metropolitan regions

The most highly elevated ratios were mapped in a number of outer northern and southern SLAs, with low ratios in the east (Map 6.31), following the pattern of socioeconomic disadvantage shown in Chapters 4 and 5.

Central Northern Adelaide

In the Central Northern region, there were an estimated 141,295 current smokers, an SR of 100. Both Playford - West Central (with an SR of 124**, 2,768 people) and - Elizabeth (124**, 5,473) had almost one quarter more current smokers than expected from the metropolitan regions' rate. Other SLAs with elevated ratios included Salisbury - Inner North (an SR of 115**, 5,248 people), - Central (111**, 5,615), Balance (105, 1,185) and - North-East (105**, 4,397), Port Adelaide Enfield - Inner (110**, 3,942), - Port (109**, 5,064) and - Coast (107**, 5,551), and Playford - West (107**, 1,593) and - East Central (105**, 3,638).

Relatively large numbers of smokers were estimated for the SLAs of Salisbury - South-East (6,570 people, an SR of 104**), Tea Tree Gully - South (5,994, 98), Charles Sturt - Coastal (5,539, 98), Port Adelaide Enfield - East (5,424, 100), West Torrens - West (5,035, 99), Charles Sturt - North East (5,024, 104**) and Tea Tree Gully - Central (5,018, 100).

A number of SLAs in the region had low estimated numbers of smokers, most typically those SLAs with high socioeconomic status. The lowest ratios, with around 15% fewer smokers than expected from the metropolitan regions rates, included the SLAs of Burnside - North-East (an SR of 84**, 3,050 people), Walkerville (84**, 1,024) and Burnside - South-West (85**, 3,113). There were also relatively low ratios in Unley - East (87**, 3,170), Adelaide Hills - Central (88**, 1,998) and - Ranges (90*, 1,646), Adelaide (88**, 3,385), Norwood Payneham St Peters - West (90**, 3,178), Unley - West (91**, 2,904), Campbelltown - East (91**, 4,590) and - West (94**, 3,288), Prospect (93**, 3,471), Norwood Payneham St Peters - East (94**, 2,766) and Tea Tree Gully - North (95**, 4,637).

Southern Adelaide

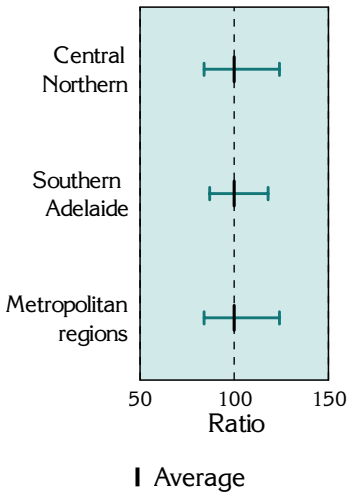
Southern had an estimated 58,288 current smokers aged 18 years and over in 2001 (an SR of 100). The four most highly elevated standardised ratios were mapped for the Onkaparinga SLAs of - North Coast (an SR of 118**, 3,705 people), - Hackham (116**, 2,965), - Morphett (109**, 4,806) and - South Coast (108**, 4,465).

Relatively large numbers of smokers were estimated for Onkaparinga - Woodcroft (6,473 people, an SR of 101), Marion - Central (5,978, 102), - North (4,721, 103*) and - South (3,556, 96*), and Holdfast Bay - North (3,402, 97).

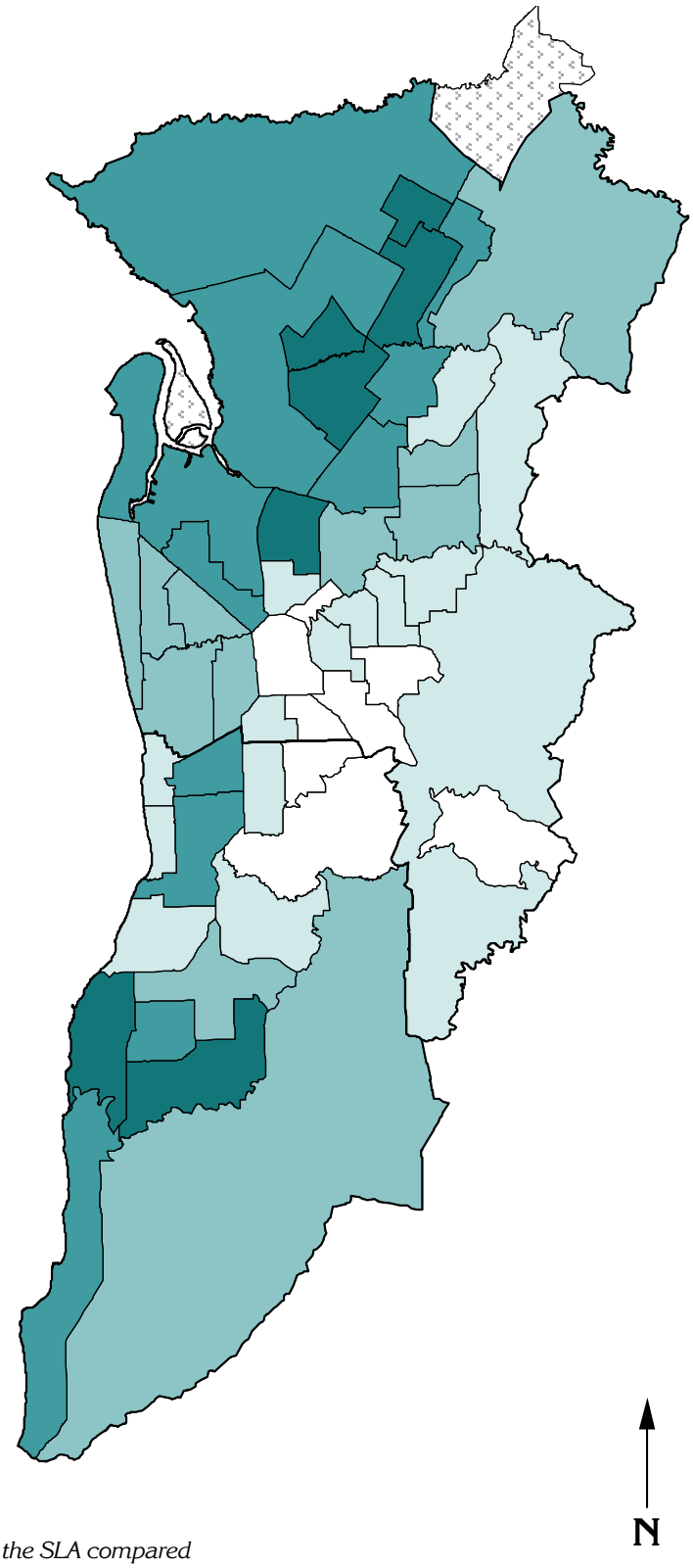
There were fewer than expected smokers in the Mitcham SLAs of - Hills (87**, 3,764 people), - North-East (87**, 2,294) and - West (93**, 3,761). There were also low ratios in Onkaparinga - Reservoir (93**, 4,164) and Holdfast Bay - South (95*, 2,388).

* **indicates statistical significance: see page 24**

Map 6.31
Estimates of current smokers aged 18 years and over, metropolitan regions, 2001



Note: The black vertical lines show the average ratio for this indicator in each region; the horizontal lines show the range of the indicator at the SLA level within the region.



SLA
Health Region

Standardised Ratio (as an index) *, by SLA

- *110 and above*
- *102 to 109*
- *98 to 101*
- *90 to 97*
- *below 90*
- *data not mapped#*

*Index shows the estimated number of current smokers in the SLA compared with the number expected: expected numbers were derived by indirect age standardisation, based on totals for the metropolitan regions

#Data were not mapped for Torrens Island (mapped with Port Adelaide)

Source: See Data sources, Appendix 1.3 ***Details of map boundaries are in Appendix 1.2***

Estimates of physical inactivity, people aged 15 years and over, 2001

Physical inactivity is defined as those aged 15 years and over who did not exercise in the two weeks prior to interview for the 2001 NHS, by participating in sport, recreation or fitness (including walking). Physical inactivity as a risk factor has been estimated to cause the second highest burden of premature death and illness in Australia, after tobacco smoking.

It is estimated that 270,260 people aged 15 years and over did not exercise in the two weeks prior to interview; this is a rate of 317.6 people per 1,000 population (Table 6.35). The rate of physical inactivity in Central Northern was one per cent higher than expected based on the metropolitan regions' rate (a standardised ratio (SR) of 101**), compared to three per cent lower than expected in Southern (an SR of 97**).

Table 6.35: Estimates of physical inactivity, people aged 15 years and over, 2001

Region	No.	Rate[1]	Ratio[2]
Central Northern	192,153	321.2	101**
Southern	78,107	309.1	97**
Metropolitan regions	270,260	317.6	100

[1]**Age-standardised rate per 1,000 population**
[2]**Percentage variation in the region from the ratio of 100 in the metropolitan regions**

Metropolitan regions

The most highly elevated SRs were mapped in the outer north, with marginally elevated SRs in the north, west and outer south. This configuration, and the low ratios in the east and south-east of the city (Map 6.32), repeats the pattern of socioeconomic disadvantage shown in Chapters 4 and 5.

Central Northern Adelaide

In Central Northern, 192,153 people were estimated as being physically inactive (an SR of 101**); however, there were notable variations in ratios across the region. Highly elevated ratios were mapped in the SLAs of Playford - West (an SR of 126**, 2,397 people), Port Adelaide Enfield - Port (121**, 7,810), and Salisbury Balance (122**, 1,548), - Inner North (120**, 6,305) and - Central (119**, 7,647). Other SLAs with elevated SRs included Charles Sturt - North East (113**, 7,311), Playford - West Central (112**, 3,059) and - East Central (112**, 4,523), Salisbury - South-East (111**, 9,077) and - North-East (110**, 5,813), Port Adelaide Enfield - Inner (111**, 5,655) and Charles Sturt - Inner West (110**, 7,046).

There were estimated to be large numbers of physically inactive people in the SLAs of Tea Tree Gully - South (8,047 people, an SR of 97**), Port Adelaide Enfield - East (7,622, 105**) and - Coast (7,467, 104**), West Torrens - West (7,326, 97**), Campbelltown - East (6,776, 100), Playford - Elizabeth (6,759, 108**) and West Torrens - East (6,496, 104**).

Low ratios were estimated for the SLAs of Adelaide (79**, 3,723), Burnside - South-West (82**, 4,519), Norwood Payneham St Peters - West (83**, 3,813), Walkerville (83**, 1,558), Adelaide Hills - Central (84**, 2,536), Unley - East (85**, 4,266) and - West (85**, 3,626), Burnside - North East (86**, 4,675), Adelaide Hills - Ranges (87**, 2,105) and Charles Sturt - Coastal (90**, 7,489).

Southern Adelaide

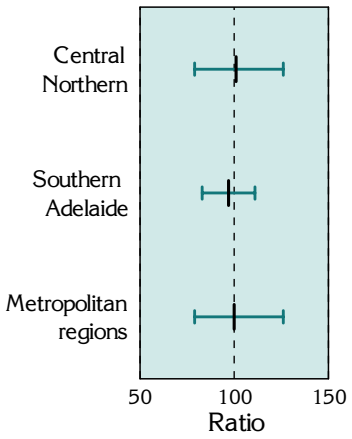
Southern had three per cent fewer people who were estimated to be physically inactive than expected from the metropolitan rates, a standardised ratio of 97** (78,107 people). The Onkaparinga SLAs of - Hackham (111**, 3,546), - Morphett (109**, 6,285), - South Coast (107**, 5,792) and - North Coast (107**, 4,786) all had elevated ratios.

Both Marion - Central (8,835 people, an SR of 101) and - North (6,956, 102), Onkaparinga - Woodcroft (7,803, 99) and - Reservoir (5,240, 93**), and Mitcham - West (5,422, 93**) had large estimated numbers of physically inactive residents.

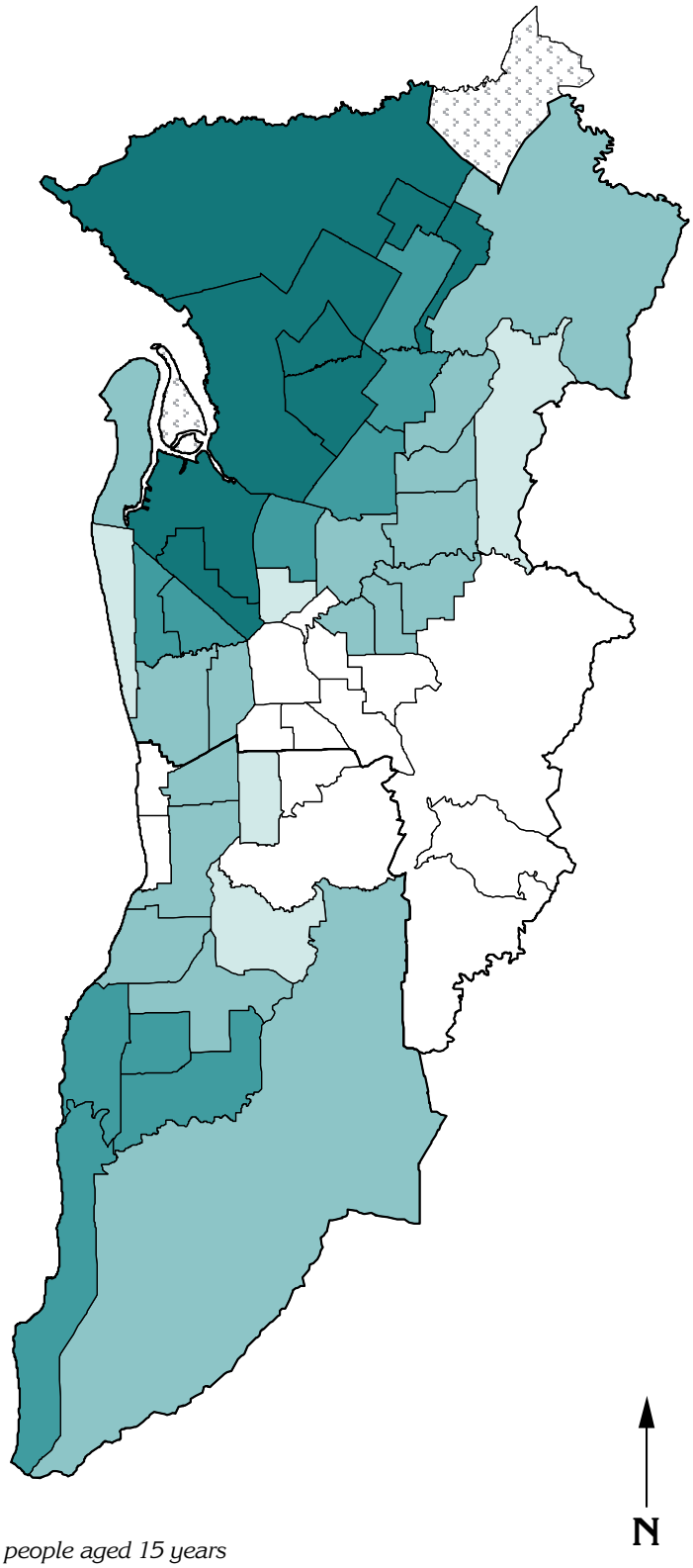
In the Southern region, low ratios were estimated for the Mitcham SLAs of - North-East (83**, 3,355), and - Hills (84**, 5,096), and the Holdfast Bay - North (86**, 4,622) and - South (87**, 3,439).

* **indicates statistical significance: see page 24**

Map 6.32
Estimates of physical inactivity, people aged 15 years and over, metropolitan regions, 2001



Note: The black vertical lines show the average ratio for this indicator in each region; the horizontal lines show the range of the indicator at the SLA level within the region.



SLA
Health Region

Standardised Ratio (as an index) *, by SLA

- *112 and above*
- *106 to 111*
- *94 to 105*
- *88 to 93*
- *below 88*
- *data not mapped#*

* *Index shows the estimated number of physically inactive people aged 15 years and over in the SLA compared with the number expected: expected numbers were derived by indirect age standardisation, based on totals for the metropolitan regions*

#*Data were not mapped for Torrens Island (mapped with Port Adelaide)*

Source: See Data sources, Appendix 1.3 ***Details of map boundaries are in Appendix 1.2***

Estimates of high health risk due to alcohol consumed, people aged 18 years and over, 2001

The 2001 NHS collected information on alcohol consumption, presented here as estimates of those at 'high health risk' due to the amount of alcohol consumed - defined as a daily consumption of more than 75 ml (three standard drinks) for males and 50 ml (two standard drinks) for females. Excessive alcohol consumption is a major risk factor for morbidity and mortality.

The rate of high health risk due to alcohol consumed per 1,000 population aged 18 years and over is estimated to be 39.6 for the metropolitan regions, with a slightly higher rate in Southern (41.3 per 1,000 population) compared to Central Northern (38.9) (Table 6.36Table).

Table 6.36: Estimates of high health risk due to alcohol consumed, 2001

Region	No.	Rate[1]	Ratio[2]
Central Northern	22,151	38.9	98**
Southern	9,780	41.3	104**
Metropolitan regions	31,931	39.6	100

[1]**Age-standardised rate per 1,000 population**
[2]**Percentage variation in the region from the ratio of 100 in the metropolitan regions**

Metropolitan regions

SLAs with the most highly elevated ratios were scattered throughout the regions, with the largest concentration in the outer north; the lowest SRs were largely in a number of the north-western and northern SLAs (Map 6.33).

Central Northern Adelaide

Central Northern had a lower ratio than Southern, with two per cent fewer people estimated as having a high health risk due to alcohol consumed than expected from the metropolitan rates (a standardised ration (SR) of 98**, 22,151 people). Within this region, there were highly elevated ratios in Playford - Elizabeth (119**, 824 people), - West Central (118**, 401) and - Hills (an SR of 113, 93), Norwood Payneham St Peters - West (116**, 632), Unley - West (113**, 576) and - East (109*, 627), Port Adelaide Enfield - Coast (109*, 916), Adelaide Hills - Ranges (107, 332) and - Central (106, 397), Walkerville (106, 213) and Burnside - South-West (106, 637).

Large estimated numbers were calculated for Charles Sturt - Coastal (974 people, an SR of 103), Salisbury - South-East (966, 95), Tea Tree Gully - South (952, 96) and - Central (817, 103), Port Adelaide Enfield - East (816, 95), and West Torrens - West (774, 94) and - East (763, 102).

A number of SLAs in this region had low ratios of health risk due to alcohol consumption. These included Campbelltown - East (80**, 650 people) and - West (83**, 460), Charles Sturt - Inner West (83**, 607) and - North East (84**, 652), Port Adelaide Enfield - Port (85**, 629), Salisbury Balance (an SR of 86, 148) and Charles Sturt - Inner East (88**, 570).

Southern Adelaide

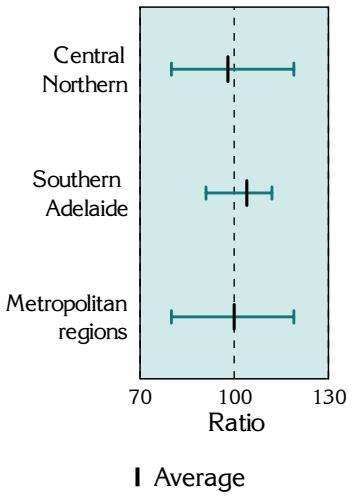
In Southern, there were 9,780 people estimated as having a high health risk due to alcohol consumed (an SR of 104**). Marginally elevated ratios were mapped in Onkaparinga - North Coast (an SR of 112**, 577 people), - Reservoir (111**, 786), - Hackham (107, 436) and - South Coast (107, 701), Holdfast Bay - North (112**, 637), Mitcham - North-East (108, 465) and - Hills (106, 753), and Marion - North (106, 782).

In Southern, there were large numbers of people estimated as having a high health risk due to alcohol consumed in Onkaparinga - Woodcroft (1,043 people, 103) and - Morphett (743, 105), and Marion - Central (981, 102).

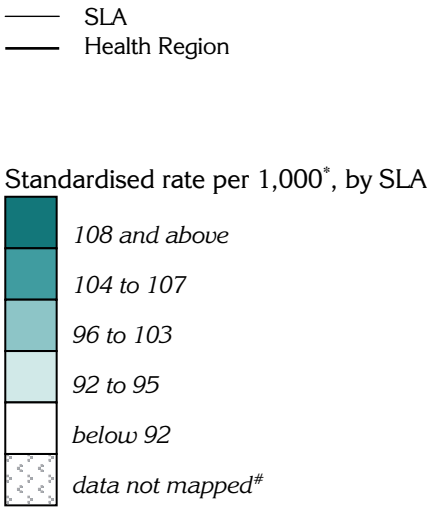
SLAs with fewer than the expected number of people at high health risk due to alcohol consumption included Mitcham - West (91*, 589) and Marion - South (95, 548).

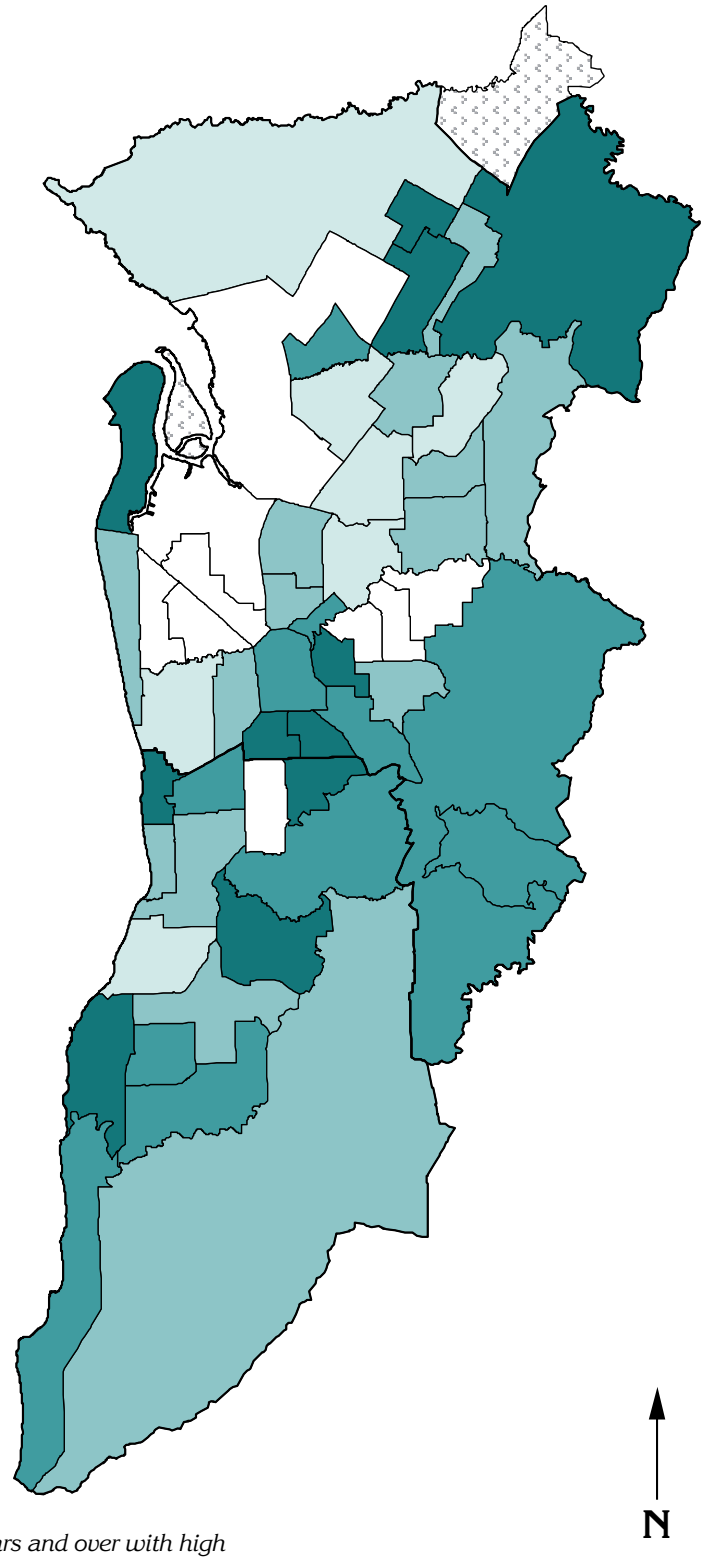
* **indicates statistical significance: see page 24**

Map 6.33
Estimates of high health risk due to alcohol consumed, people aged 18 years and over, metropolitan regions, 2001



Note: The black vertical lines show the average ratio for this indicator in each region; the horizontal lines show the range of the indicator at the SLA level within the region.





*Index shows the estimated number of people aged 18 years and over with high health risk due to alcohol consumed in the SLA compared with the number expected: expected numbers were derived by indirect age standardisation, based on totals for the metropolitan regions

#Data were not mapped for Torrens Island (mapped with Port Adelaide)

Source: See Data sources, Appendix 1.3 ***Details of map boundaries are in Appendix 1.2***

A Social Health Atlas of South Australia, 2006

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Cancer incidence

Cancer is a disease of the body's cells caused by alterations in the genes of the cells that control their growth (CCSA 1999). 'Cancer' is also the name commonly used to describe a malignant disease that may occur in any part of the body. Over one hundred different cancers have been described (CCSA 1999).

Cancer has afflicted human populations since pre-historic times, and the causes are not yet fully understood. Factors in our environment that are cancer-causing or cancer-promoting include tobacco smoke, ultra-violet radiation from sunlight, hazardous substances (e.g. in uranium mines; asbestos; benzene), and certain viruses (e.g. HIV, Hepatitis B) (CCSA 1999).

Cancer incidence is defined as the number of cases first notified for a given population during a specific time period. The data provided here are for malignant neoplasms (confirmed by pathological examination) and were provided from the South Australian Cancer Registry, maintained by the Epidemiology Branch, South Australian Department of Health. A principal function of population-based cancer registries is to monitor the burden of cancer on populations for health service planning and evaluation. Incidence and mortality data show emerging trends and suggest the effectiveness of disease-control initiatives (SA Cancer Registry 2001). In this section of the atlas, the incidence data have been aggregated for the years 1986 to 1993 and 1998 to 2002, to ensure a sufficient number of cases for analysis at the SLA level.

Trend analyses undertaken by the SA Cancer Registry showed that, despite substantial increases in incidence in males, age-standardised cancer mortality rates (all sites) reduced between the periods 1977 to 1981 and 1997 to 1999, largely due to reductions in cancers of the lung, stomach, prostate, colon and testis. The mortality rate for 2000 gave further evidence of a decline for all sites in aggregate (SA Cancer Registry 2001).

By comparison, cancer mortality rates (all sites) increased in females between the periods 1977 to 1981 and 1987 to 1991, but then decreased. The increase was affected by higher mortality rates for lung cancer, whereas the decrease was influenced by declines for cancers of the breast, cervix, stomach and colon. During 2000, the mortality rate (all sites) showed evidence of a further decline (SA Cancer Registry 2001).

During 1997 to 2000, the mortality rate for female-breast cancer increased by three per cent for women aged less than 50 years; decreased by 19% for 50 to 69 year old women; and decreased by 13% for older women. The reductions in mortality for women aged 50 years and over have been attributed to screening effects and advances in adjuvant therapy (SA Cancer Registry 2001).

The incidence of cancer among Indigenous people varies across Australia, but generally lung cancer is the most common cancer among Indigenous males, and lung and cervix cancer the most common among Indigenous females (Coory et al. 2000). Apart from these cancers, the incidence of cancers of the liver and pancreas and smoking-related cancers (including lung cancer) tends to be higher for Indigenous than non-Indigenous people; and that of breast and colorectal cancer and malignant melanoma lower for Indigenous than non-Indigenous people (AIHW 2003). Studies of cancer incidence among Indigenous people in Western Australia, South Australia, Northern Territory and Queensland for the period 1997 to 2001 have also shown higher rates of lung, liver, pancreatic and oesophageal cancers among Indigenous males, and higher rates of cancer of the cervix and myeloid leukaemia among Indigenous females in these jurisdictions (AIHW 2003).

For all cancers, the incidence rates for Indigenous people are generally lower than those for non-Indigenous people or the total population (ABS & AIHW 2001). In contrast, death rates from cancer are higher for Indigenous than non-Indigenous people or the total population (ABS 2002). Some of the difference between the relative incidence and mortality of cancer overall may be due to the more complete identification of Indigenous people for deaths than for cancer incidence. Some of the difference is likely also to be due to the higher proportions of more fatal cancers (such as cancers of the lung, liver and pancreas) in Indigenous than non-Indigenous people (AIHW 2003).

For specific cancers, the greater difference between Indigenous and non-Indigenous people in deaths from cancer could be due to more advanced stages of cancer at the time of diagnosis, or differences in treatment outcomes after adjusting for stage of cancer at diagnosis (AIHW 2003). A study conducted by the South Australian Cancer Registry of 139 cases of cancer diagnosed among Indigenous people from South Australia in the period 1988 to 1994 found a lower survival compared with 417 cases among non-Indigenous people, matched by site, age at diagnosis, sex, diagnostic year, and, where possible, histological type (SAHC 1997). The higher fatality for Indigenous cases was only partly explained by the more advanced stage at diagnosis, raising the prospect of differences in treatment outcomes by stage (AIH 2003).

Cancer incidence, 1998 to 2002

Cancer is a disease of the body's cells caused by alterations in the genes of the cells that control their growth (CCSA 1999). 'Cancer' is the name commonly used to describe a malignant disease that may occur in any part of the body. Cancer has afflicted human populations since pre-historic times, and the causes are not yet fully understood. Factors in our environment that are cancer-causing or cancer-promoting include tobacco smoke, excessive alcohol consumption, ultra-violet radiation from sunlight, hazardous substances (e.g. in uranium mines; asbestos; benzene), and certain viruses (e.g. HIV, Hepatitis B) (CCSA 1999).

The incidence of cancer in South Australia increased by nearly one-quarter (22.4%) between 1986 to 1993, and 1998 to 2002, with similar increases in the rate of new cases of cancer in both Metropolitan Adelaide and country South Australia (Table 6.37). Note that the number of cases counts individuals more than once where any individual had more than one primary cancer in each of these periods.

Table 6.37: Cancer incidence

Age-standardised incidence rate per 100,000

Area	1986-1993	1998-2002	Per cent change[1]
Metropolitan Adelaide (incl. Gawler)	417	511	22.5
Country	414	501	21.0
South Australia	416	509	22.4

[1]**Per cent change over eleven years in the rate of cancer incidence**

Metropolitan regions

There were 27,636 new cases of cancer in the metropolitan regions (excluding Gawler) between 1998 and 2002, one per cent more than expected from the State rates (a standardised incidence ratio (SIR) of 101) (Table 6.38). There was little variation at the regional level, with three per cent more cases than expected in Southern (an SIR of 103**), and the expected number in Central Northern (100).

No consistent relationship was evident between cancer incidence and socioeconomic status in either the map (Map 6.34) or the correlation analysis (Table 8.1).

Central Northern Adelaide

There were 19,112 new cases of cancer in Central Northern over the five years from 1998 to 2002. Salisbury - Inner North had 25% more cases than expected (an SIR of 125**, 425 cases). Elevated standardised incidence ratios were also found in Port Adelaide Enfield - Coast (117**, 871 cases), Adelaide (115**, 367), Tea Tree Gully - Central (111**, 564), West Torrens - East (109*, 731) and Prospect (107*, 512).

Relatively large numbers of new cases were recorded for people in Charles Sturt - Coastal (983 cases, an SIR of 103), West Torrens - West (932, 99), Tea Tree Gully - South (793, 100), Port Adelaide Enfield - East (776, 103), Charles Sturt - Inner West (746, 97), Port Adelaide Enfield - Port (724, 99), Salisbury - South-East (721, 99), Playford - Elizabeth (677, 102), Charles Sturt - North-East (688, 96), Campbelltown - East (669, 103), Burnside - South-West (655, 104) and - North-East (640, 95), and Port Adelaide Enfield - Inner (626, 100).

The lowest ratios were recorded in the SLAs of Playford - Hills (an SIR of 72*, 39), Salisbury Balance (75*, 51) and Salisbury - Central (80**, 431), Playford - West (82*, 124), Campbelltown - West (89*, 571) and Norwood Payneham St Peters - West (89*, 427). Other SLAs with ratios below the State average were Charles Sturt - Inner East (90**, 618), Norwood Payneham St Peters - East (91*, 516), Burnside - North-East (95, 640), Tea Tree Gully - Hills (93, 260) and Walkerville (94, 220).

Southern Adelaide

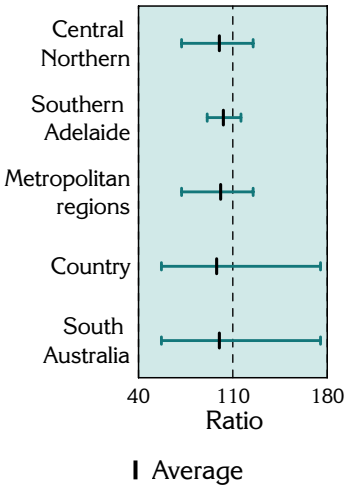
In Southern, there were 8,524 new cases of cancer over the five years from 1998 to 2002. The most highly elevated ratios in the region were in Onkaparinga - Woodcroft (an SIR of 116**, 659 cases), Marion - Central (113**, 1,225), Onkaparinga - North Coast (107, 513) and Onkaparinga - Reservoir (107, 457).

There were large numbers of new cases of cancer in Marion - North (946 cases, SIR of 106), Holdfast Bay - North (721, 103), and Mitcham - West (645, 91*) and - Hills (611, 101).

The lowest numbers of new cases of cancer and lower than expected ratios (though none of which was statistically significant) were recorded in the SLAs of Onkaparinga - Hackham (234 cases, an SIR of 92) and - Hills (262, 97), and Marion - South (279, 94).

* **indicates statistical significance: see page 24**

Map 6.34
Cancer incidence, metropolitan regions, 1998 to 2002

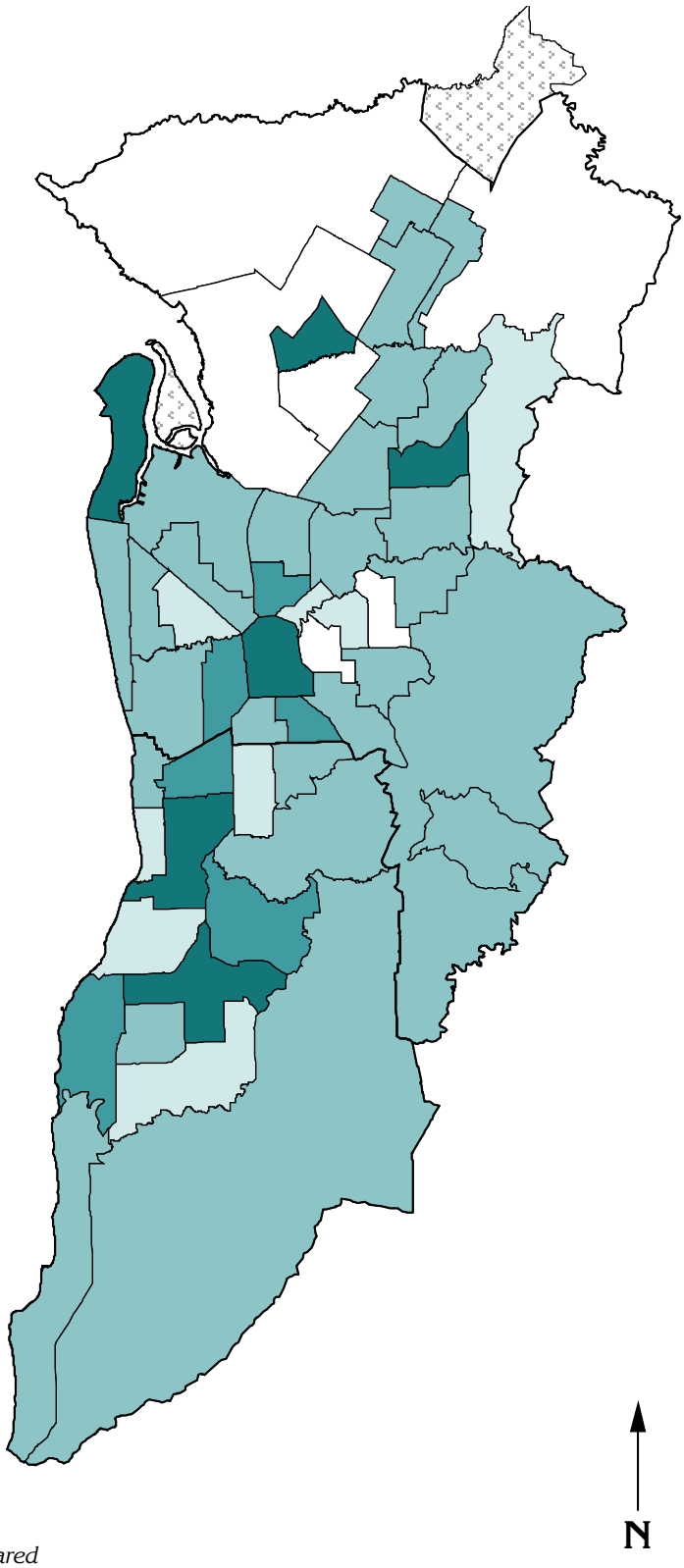


Note: The black vertical lines show the average ratio for this indicator in each region; the horizontal lines show the range of the indicator at the SLA level within the region.

SLA
Health Region

Standardised Incidence Ratio (as an index)*, by SLA

- *110 and above*
- *105 to 109*
- *95 to 104*
- *90 to 94*
- *below 90*
- *data not mapped#*



*Index shows the number of new cancers in the SLA compared with the number expected: expected numbers were derived by indirect age standardisation, based on SA totals

#Data were not mapped for Torrens Island (mapped with Port Adelaide): Gawler has been mapped in the State map

Source: See Data sources, Appendix 1.3 ***Details of map boundaries are in Appendix 1.2***

Country South Australia

There were 10,435 new cases of cancer in country South Australia in the period 1998 to 2002, two per cent fewer than expected from the State rates (a standardised incidence ratio (SIR) of 98).

Across the State, there was notable variation in cancer incidence, with many SLAs with ratios in excess of ten per cent above or below the State ratio of 100 (Map 6.35). At the regional level, there was less variation, with the highest ratio, recorded for residents of **Riverland**, just 102 (874 cases) and the lowest, in **Northern and Far Western**, being 94* (984 cases).

Table 6.38: Regional totals, cancer incidence, 1998 to 2002

Region	No.	SIR
Hills Mallee Southern	2,878	98
Wakefield[1]	2,568	98
South East	1,443	97
Northern & Far Western	984	94*
Eyre	808	99
Mid North	881	100
Riverland	874	102
Country SA	**10,435**	**98**
Central Northern	19,112	100
Southern	8,524	103*
Metropolitan regions	**27,636**	**101**
South Australia	**38,085**	**100**

[1] **Gawler is included in Wakefield region**

Cancer incidence was weakly correlated at the SLA level with a number of the indicators of disadvantage. This result, together with the weak inverse correlation with the Index of Relative Socio-Economic Disadvantage, suggests a weak association at the SLA level between cancer incidence and socioeconomic disadvantage in country South Australia (Table 8.2).

The Regions

The only elevated SIR in country South Australia was in **Riverland**, but with just two per cent more new cases than expected (874 cases). The most highly elevated ratio of statistical significance was in Berri and Barmera - Berri (an SIR of 112, 170 cases). The SIR of 175 in Unincorporated Riverland was not statistically significant, and was based on only five new cases of cancer.

There were 881 new cases of cancer in **Mid North** over the five years from 1998 to 2002 (a standardised incidence ratio (SIR) of 100), with an elevated ratio in Unincorporated Pirie (an SIR of 121, nine cases). Port Pirie City also had an elevated ratio (108, 409). Peterborough (an SIR of 86, 56) and Orroroo/Carrieton (an SIR of 88, 31) both had ratios below the State average. None of the ratios in the region were statistically significant.

In **Eyre**, there were 808 new cases of cancer in the period 1998 to 2002, an SIR of 99. Streaky Bay had 40% more new cases than expected (an SIR of 140**, 64 cases), followed by Unincorporated West Coast (an SIR of 135, 13) and Le Hunte (an SIR of 111, 40). In contrast, Lower Eyre Peninsula had 33% fewer new cases than expected (an SIR of 67**, 67 cases). There were also fewer than expected new cases in Elliston (an SIR of 78, 22), Kimba (an SIR of 87, 33), Cleve (an SIR of 88, 44) and Ceduna (an SIR of 90, 60). There were 333 new cases of cancer in Port Lincoln (an SIR of 107).

Hills Mallee Southern had the largest number of new cases (2,878 cases), although this was two per cent fewer than expected from the State rates (an SIR of 98). The Coorong had nine per cent more cases than expected, an SIR of 109 (163 cases). There were 26% fewer cases than expected in Southern Mallee (an SIR of 74*, 47 cases). Large numbers of new cases were recorded for Victor Harbor (454 cases, an SIR of 102), Murray Bridge (440, 103) and Alexandrina - Coastal (310, 94).

Wakefield also had a large number of new cases (2,568 new cases) and the same SIR of 98. There were elevated ratios in Yorke Peninsula - North (an SIR of 116*, 304 cases) and Wakefield (109, 189). The SLAs of Barossa - Angaston (an SIR of 83*, 168 cases), - Barossa (an SIR of 87, 135) and - Tanunda (an SIR of 89, 115), and Goyder (an SIR of 85, 109) all had fewer than expected new cases of cancer. Gawler (422 cases, an SIR of 92), Copper Coast (394, 108) and Yorke Peninsula - North (304, 116*) had large numbers of new cases.

South East had 1,443 new cases of cancer registered (an SIR of 97), with an elevated ratio in Wattle Range - West (115*, 266), and a low ratio in Grant (an SIR of 88, 156); Mt Gambier had a large number of new cases of cancer (483 cases, an SIR of 92).

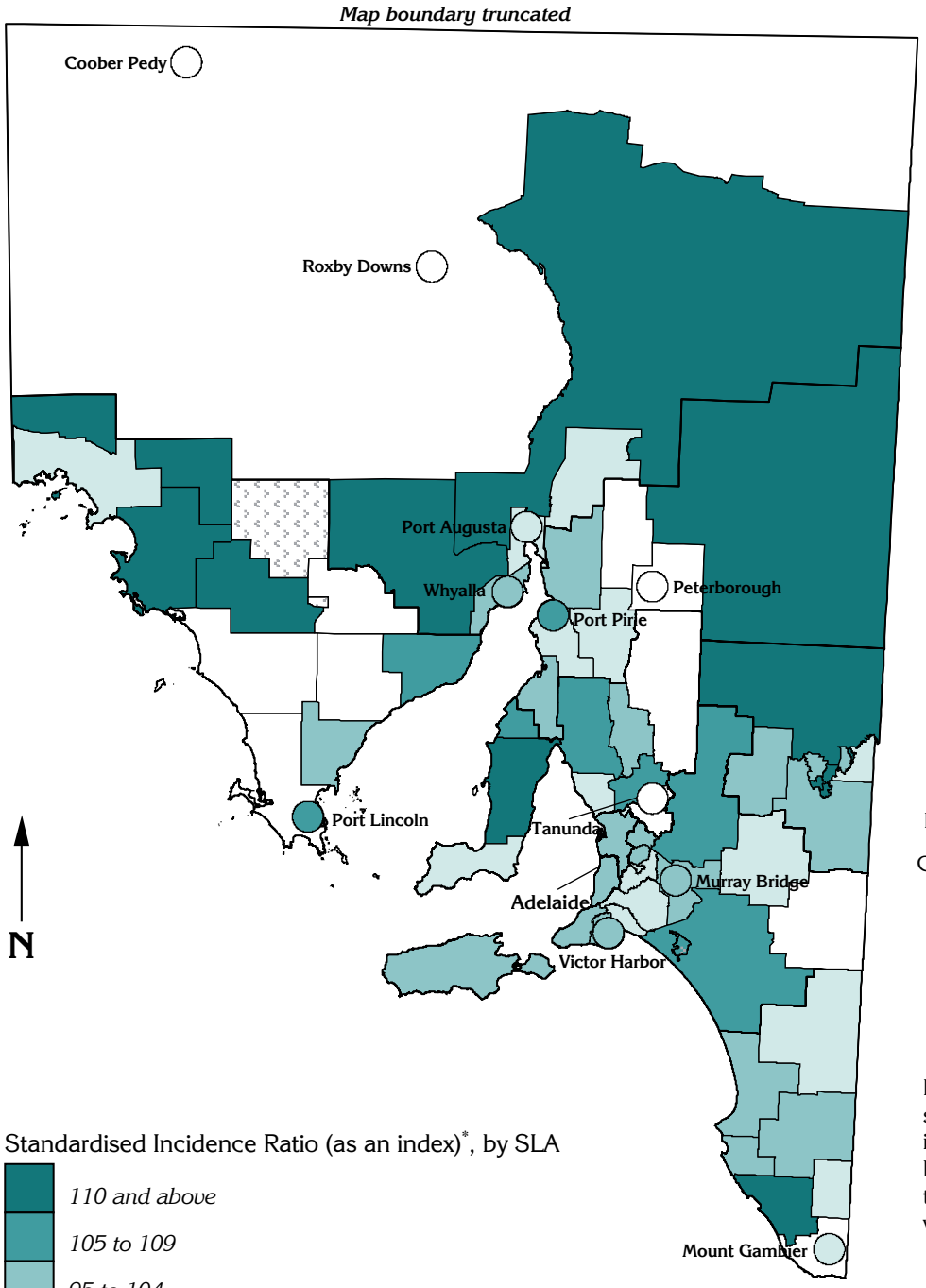
There were six per cent fewer than expected new cases of cancer in **Northern and Far Western** (an SIR of 94*, 984 cases). Unincorporated Far North had 43% fewer cases of cancer than expected (57**, 40), followed by Coober Pedy (72*, 44) and Roxby Downs (84, 25). Unincorporated Flinders Ranges also had a highly elevated SIR of 124 (22 cases). Residents of Whyalla had 512 new cases recorded, an SIR of 100.

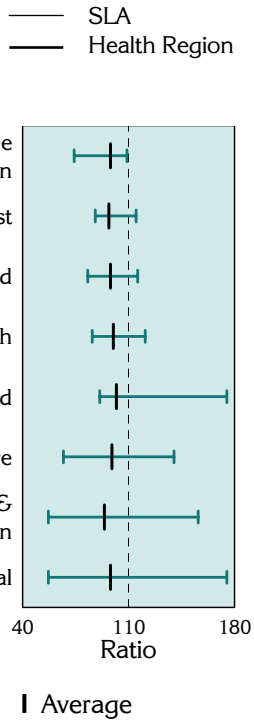
ASGC Remoteness classification

The incidence of cancer was generally lower in more remote areas, with an SIR of 86** in the Very Remote areas, compared with 101 in the Major Cities areas. Outer Regional areas had an SIR of 101.

* **indicates statistical significance: see page 24**

Map 6.35
Cancer incidence, South Australia, 1998 to 2002





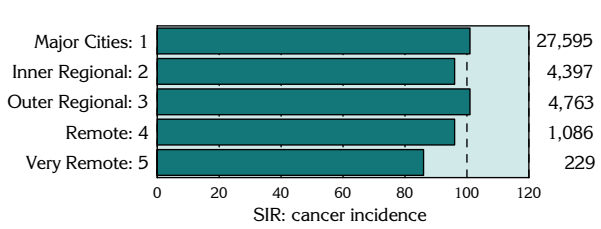
Note: The black vertical lines show the average ratio for this indicator in each region; the horizontal lines show the range of the indicator at the SLA level within the region.

Standardised Incidence Ratio (as an index)*, by SLA

- *110 and above*
- *105 to 109*
- *95 to 104*
- *90 to 94*
- *below 90*
- *data not mapped#*

*Index shows the number of new cancers in the SLA compared with the number expected: expected numbers were derived by indirect age standardisation, based on SA totals

#Data were not mapped because the SLA has a population of less than 100



Source: See Data sources, Appendix 1.3

Details of map boundaries are in Appendix 1.2

Incidence of lung cancer, 1998 to 2002

Tobacco smoking is the commonest cause of lung cancer. Although overall rates of smoking are declining, the rate of lung cancer is still increasing, due to the lag time from the exposure to tobacco to the onset of lung cancer. There has been a decline in lung cancer in males following reduced smoking rates since the 1970s. The same trend has not been observed for females. Other causes of lung cancer include occupational exposures to other hazardous substances such as asbestos and radiation. The survival rate for lung cancer after five years is estimated at 12%; the population groups most at risk include people in low socioeconomic areas, Aboriginal and Torres Strait Islander females, and males born overseas (excluding Asian born), particularly those born in the UK and Southern Europe (SA Cancer Registry 2005).

The incidence of lung cancer was virtually unchanged for South Australia from 1998 to 2002 when compared with the period 1986 to 1993, down from 66 to 64 new cases per 100,000 population. This small decrease in new cases was comprised of a small decrease in Metropolitan Adelaide and a small increase in country South Australia (Table 6.39).

Table 6.39: Incidence of lung cancer

Age-standardised incidence rate per 100,000 population aged 20 years and over

Area	1986-1993	1998-2002	Per cent change[1]
Metropolitan Adelaide (incl. Gawler)	68	64	-5.9
Country	62	63	1.6
South Australia	66	64	-3.0

[1]**Per cent change over eleven years in the rate of lung cancer incidence**

Metropolitan regions

There were 2,556 new cases of lung cancer in Metropolitan Adelaide (excluding Gawler) over the five years from 1998 to 2002, the number expected from the State rates (a standardised incidence ratio (SIR) of 100) (Table 6.40). The SLAs with the most highly elevated ratios of lung cancer (Map 6.36) closely follow the pattern of low socioeconomic status shown in Chapters 4 and 5.

High rates of new cases of lung cancer were strongly correlated with a number of the indicators of disadvantage, as well as with smoking during pregnancy, perinatal risk factors, and high rates of attendance at Accident and Emergency departments, hospital admissions and GP services. These results, together with the strong inverse correlation with the Index of Relative Socio-Economic Disadvantage, indicate a strong association at the SLA level between lung cancer and socioeconomic disadvantage (Table 8.1).

Central Northern Adelaide

There were 1,779 new cases of lung cancer in Central Northern from 1998 to 2002 (an SIR of 100). The most highly elevated ratio, with nearly twice the expected number of cases, was in Salisbury - Inner North (an SIR of 198**, 53 cases). There were also highly elevated ratios in Playford - West Central (an SIR of 138, 27 cases), Adelaide (138*, 39), Port Adelaide Enfield - Coast (126*, 88), Playford - East Central (133, 30), Port Adelaide Enfield - Port (126*, 90), Salisbury - North-East (125, 48), Playford - Elizabeth (121, 78) and Port Adelaide Enfield - Inner (121, 76).

Relatively large numbers of new cases of lung cancer were recorded in West Torrens - West (82 cases, an SIR of 88), Charles Sturt - Coastal (78 cases, 85) and - Inner West (74 cases, 98), Salisbury - South-East (73 cases, 114), West Torrens - East (68 cases, 106) and Tea Tree Gully - South (63 cases, 88).

SLAs with fewer new cases of lung cancer than expected included Playford - West (an SIR of 63, eight cases), Norwood Payneham St Peters - East (64**, 36), Burnside - North-East (66**, 42), Unley - East (67*, 32), Walkerville (70, 16), Adelaide Hills - Ranges (72, 12), Campbelltown - West (73*, 46), Burnside - South-West (74*, 44) and Adelaide Hills - Central (82, 19).

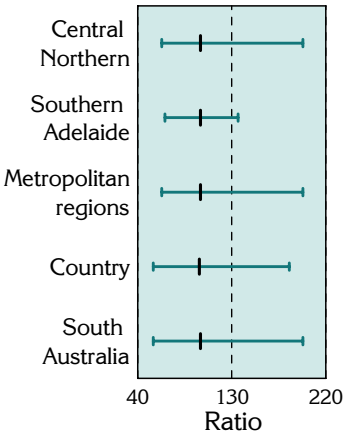
Southern Adelaide

There were 777 new cases of lung cancer in the Southern region over the five years from 1998 to 2002 (an SIR of 100), with elevated ratios in Onkaparinga - Hackham (an SIR of 136, 29 cases) and - South Coast (130*, 58), Marion - Central (120*, 129), and Onkaparinga - North Coast (119, 53) and - Woodcroft (117, 54).

The SLAs of Marion - Central (129 cases, an SIR of 120) and - North (92 cases, 103), Holdfast Bay - North (67 cases, 98) and Mitcham - West (67 cases, 98) all had relatively large numbers of new lung cancer cases. There were low ratios in Onkaparinga - Hills (an SIR of 66, 16 cases), Mitcham - Hills (an SIR of 67*, 36), Mitcham - North-East (an SIR of 70*, 32), Marion - South (an SIR of 79, 18) and Holdfast Bay - South (an SIR of 81, 45).

* **indicates statistical significance: see page 24**

Map 6.36
Incidence of lung cancer, Adelaide, 1998 to 2002

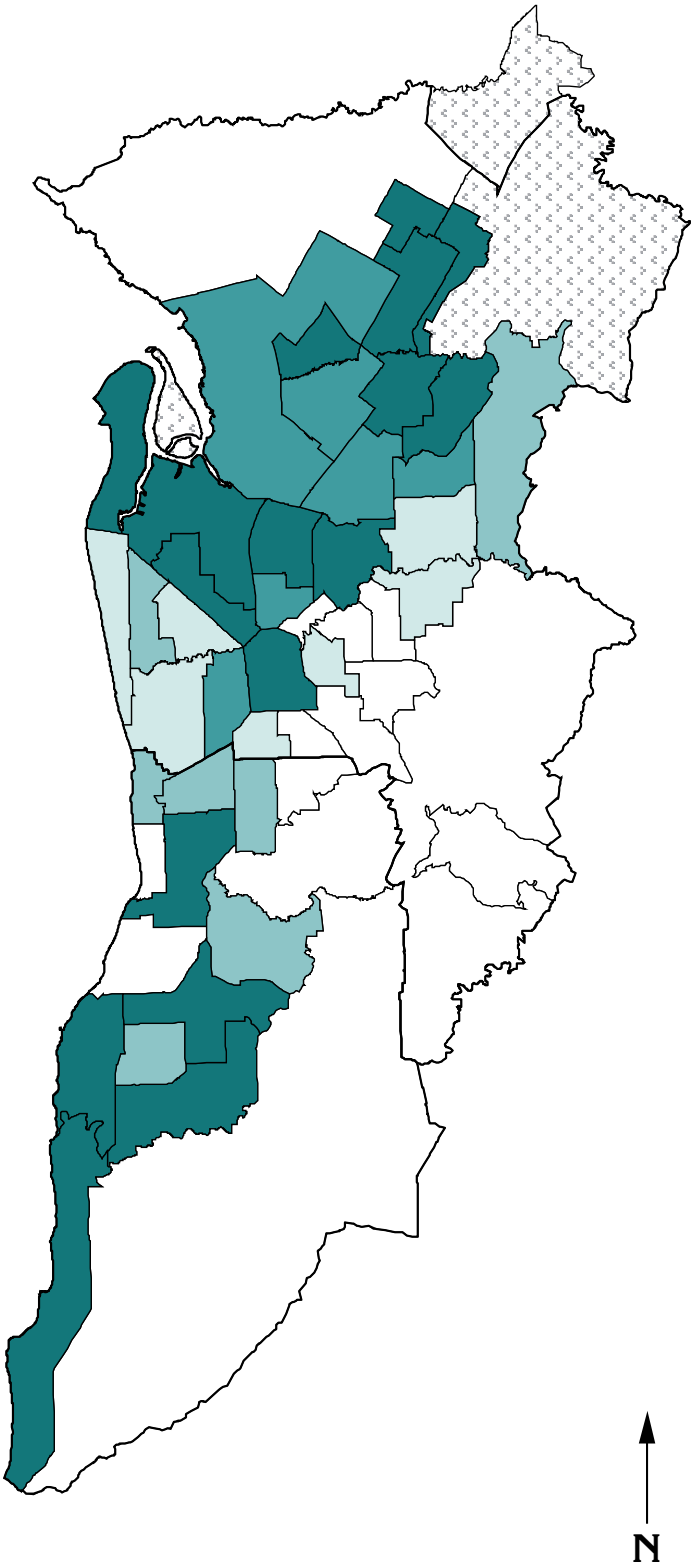


Note: The black vertical lines show the average ratio for this indicator in each region; the horizontal lines show the range of the indicator at the SLA level within the region.

SLA
Health Region

Standardised Incidence Ratio (as an index)*, by SLA

- *115 and above*
- *105 to 114*
- *95 to 104*
- *85 to 94*
- *below 85*
- *data not mapped#*



*Index shows the new cases of lung cancer in the SLA compared with the number expected: expected numbers were derived by indirect age standardisation, based on SA totals

#Data were not mapped for Torrens Island (mapped with Port Adelaide): Gawler has been mapped in the State map

Source: See Data sources, Appendix 1.3 ***Details of map boundaries are in Appendix 1.2***

Country South Australia

In 1998 to 2002, country residents had one per cent fewer new cases of lung cancer than were expected from the State rates (a standardised incidence ratio (SIR) of 99, and 971 cases).

The SLAs with the most highly elevated ratios for lung cancer incidence were predominantly located in the north of the State, including a number of the towns, and in the **Riverland** (Map 6.37); this is also evident in the regional totals (Table 6.40). As many SLAs have small numbers of new cases, relatively few of the ratios are of statistical significance.

Table 6.40: Regional totals, incidence of lung cancer, 1998 to 2002

Region	Number	SIR
Hills Mallee Southern	235	86*
Wakefield[1]	247	101
South East	128	94
Northern & Far Western	127	139**
Eyre	63	84
Mid North	82	99
Riverland	90	114
Country SA	**971**	**99**
Central Northern	1,779	100
Southern	777	100
Metropolitan regions	**2,556**	**100**
South Australia	**3,527**	**100**

[1]**Gawler is included in Wakefield region**

Lung cancer incidence was weakly correlated with a number of the indicators of disadvantage. These results, together with a strong inverse correlation with the Index of Relative Socio-Economic Disadvantage, suggest an association at the SLA level in country South Australia between lung cancer incidence and socioeconomic disadvantage (Table 8.2).

The Regions

The most highly elevated SIR at the regional level for lung cancer was recorded in **Northern and Far Western**, with nearly 40% more cases than expected from the State rates (an SIR of 139**, 127 cases). Within the region, there were highly elevated ratios in Coober Pedy (an SIR of 174, nine cases), Whyalla (143**, 66), Port Augusta (139*, 36) and Unincorporated Far North (118, six).

Riverland had 14% more new cases than expected from the State rates over this period (an SIR of 114, 90 cases). Renmark Paringa - Paringa had 50% more cases than expected (an SIR of 150, six cases), with other high ratios (but none of statistical significance) in Berri and Barmera - Berri (an SIR of 138, 18 cases) and - Barmera (125, 15), and Renmark Paringa - Renmark (112, 21). Loxton Waikerie - West had one quarter fewer cases than expected (an SIR of 74, nine cases).

There were 247 new cases of lung cancer in **Wakefield** (an SIR of 101). Goyder had 40% more cases than expected from the State rates (an SIR of 140, 17 cases), followed by Copper Coast (119, 43), and Yorke Peninsula - South (117, 17) and - North (114, 29). There was a high rate of lung cancer incidence in Gawler (45 cases, an SIR of 103). Low ratios were calculated for Barossa - Barossa (an SIR of 70, ten cases), - Tanunda (73, nine) and - Angaston (77, 15), and Mallala (75, eight) and Light (84, 17).

Mid North had a standardised ratio of 99 (82 cases) with elevated ratios in Peterborough (121, eight cases) and Barunga West (108, nine). Both Port Pirie Balance (60, five) and Mount Remarkable (62, five) had low ratios and small numbers. Port Pirie - City had the largest number of new cases of lung cancer (37 new cases, an SIR of 106).

There were six per cent fewer cases of lung cancer than expected in **South East** (an SIR of 94, 128 cases), with elevated ratios in Wattle Range - West (116, 25) and Grant (110, 17). Both Lacepede (79, five cases) and Tatiara (55, eight) had low ratios. Mount Gambier had the largest number of new cases in the region (48 cases, an SIR of 99).

There were 235 new cases of lung cancer in **Hills Mallee Southern** (an SIR of 86*), with a highly elevated ratio in Mid Murray (152*, 33 cases). Murray Bridge had the largest number of new cases of lung cancer (40 cases, an SIR of 102). A number of SLAs in this region had low ratios, including Adelaide Hills Balance (an SIR of 56, ten cases), Yankalilla (61, seven), Victor Harbor (69, 31), Mount Barker Balance (70, ten), Alexandrina - Strathalbyn (78, 15), Kangaroo Island (78, eight), Alexandrina - Coastal (81, 26) and Adelaide Hills - North (86, 10).

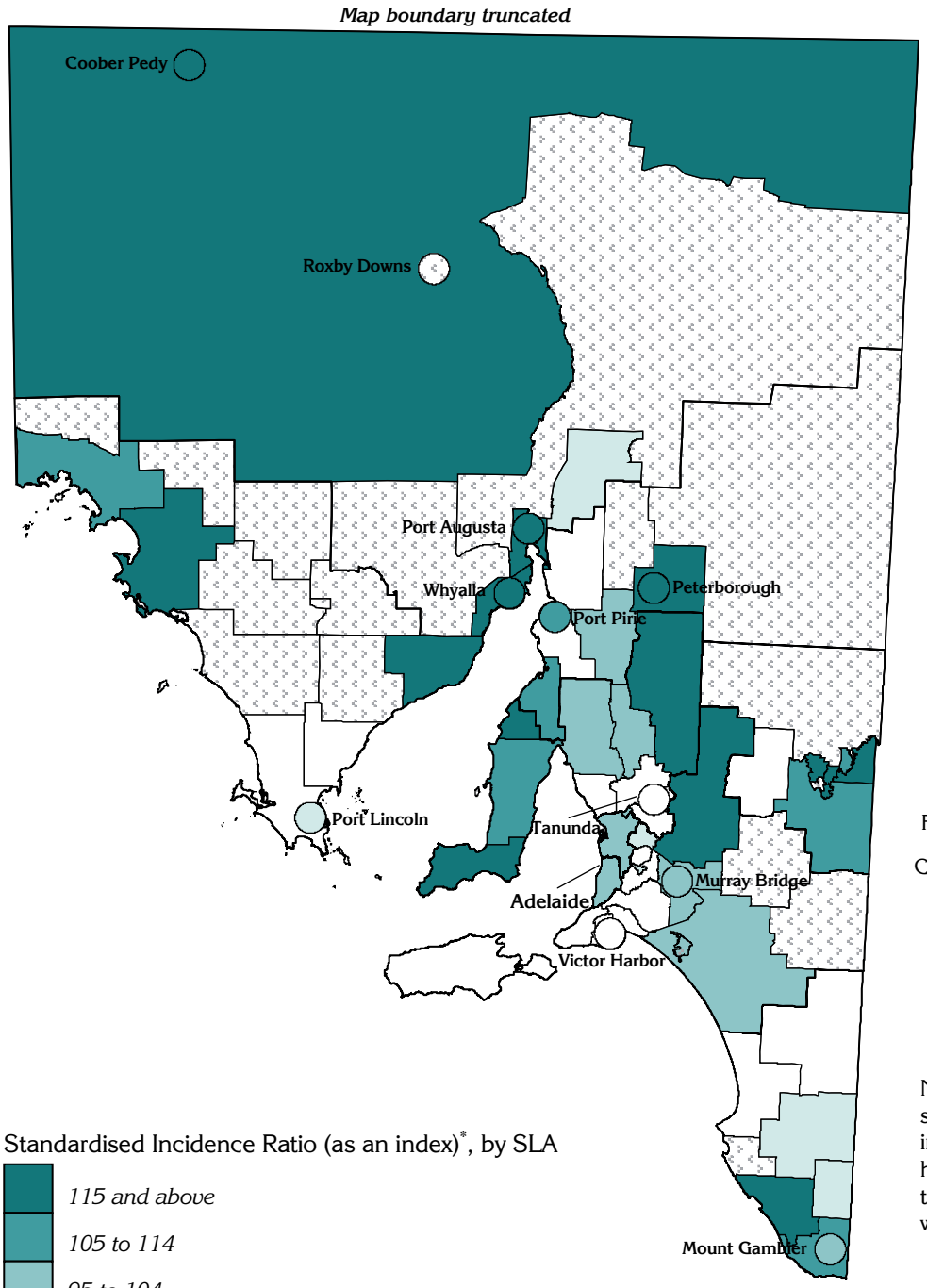
Eyre had the lowest ratio, with 16% fewer cases than expected (an SIR of 84, 63 cases). Although having relatively small numbers, there were elevated ratios (not statistically significant) in Streaky Bay (an SIR of 185, eight cases), Franklin Harbor (128, five) and Ceduna (113, six). Port Lincoln had the largest number of new cases of lung cancer (26 cases, an SIR of 91). Low ratios were recorded in Lower Eyre Peninsula (68, six) and Tumby Bay (72, six).

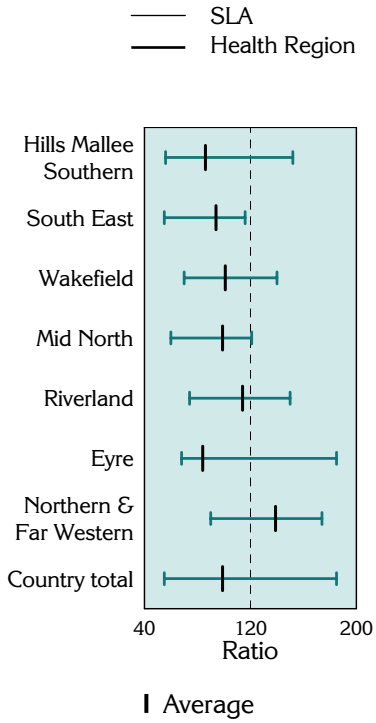
ASGC Remoteness classification

Standardised ratios for new cases of lung cancer were highest in the remoteness classes of Very Remote (an SIR of 122), Outer Regional (111*) and Major Cities (101). Inner Regional (an SIR of 86**) had 14% fewer cases and Remote (88) had 12% fewer cases than expected.

* **indicates statistical significance: see page 24**

Map 6.37
Incidence of lung cancer, South Australia, 1998 to 2002





Note: The black vertical lines show the average ratio for this indicator in each region; the horizontal lines show the range of the indicator at the SLA level within the region.

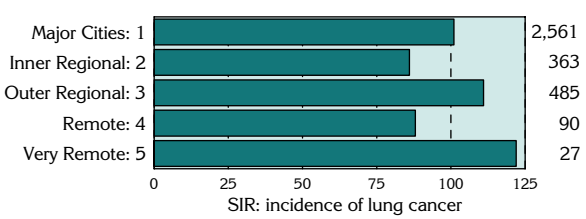
Standardised Incidence Ratio (as an index)*, by SLA

- *115 and above*
- *105 to 114*
- *95 to 104*
- *85 to 94*
- *below 85*
- *data not mapped#*

*Index shows the new cases of lung cancer in the SLA compared with the number expected: expected numbers were derived by indirect age standardisation, based on SA totals

#Data were not mapped because the SLA has a population of less than 100, or there were fewer than five cancers

ASGC Remoteness classification



Source: See Data sources, Appendix 1.3

Details of map boundaries are in Appendix 1.2

Incidence of breast cancer, 1998 to 2002

Breast cancer is the most frequently diagnosed cancer, and is also the commonest cause of cancer death, in women in Australia. The incidence of breast cancer increases with age. Women of high socioeconomic status are at greater risk of breast cancer than women of low socioeconomic status with possible reasons including differences in reproductive and lifestyle factors. Other factors implicated in the development of breast cancer include family history, parity, length of menstrual cycle, breast feeding, diethylstilboestrol use during pregnancy, infertility, miscarriage, termination of pregnancy, radiation exposure, physical activity, stress, height, alcohol consumption, smoking and dietary factors (Kelsey 1993; Coates & Armstrong 1997).

The five-year survival rate for breast cancer is 78% (SA Cancer Registry 2005). The incidence of breast cancer in South Australia increased by 20.5% between the periods 1986 to 1993 (176 new cases per 100,000 women aged 30 years and over), and 1998 to 2002 (212 new cases per 100,000 women). The proportional change across Metropolitan Adelaide (20.7%) and country South Australia (21.1%) is almost identical (Table 6.41).

Table 6.41: Incidence of breast cancer

Age-standardised incidence rate per 100,000 women aged 30 years and over

Area	1986-1993	1998-2002	Per cent change[1]
Metropolitan Adelaide (incl. Gawler)	179	216	20.7
Country	166	201	21.1
South Australia	176	212	20.5

[1]**Per cent change over eleven years in the rate of breast cancer incidence**

Metropolitan regions

There were 3,659 new cases of breast cancer recorded for females in the metropolitan regions (excluding Gawler) from 1998 to 2002, two per cent more than expected from the State rates (a standardised incidence ratio (SIR) of 102). There were nine per cent more cases than expected from the State rates in Southern Adelaide (an SIR of 109**, 1,187 cases), and one per cent fewer cases than expected in Central Northern Adelaide (99, 2,472 cases) (Table 6.42).

The overall pattern is suggestive of higher rates of new cases of breast cancer in areas of higher socioeconomic status (Map 6.38). This contention is supported by the correlation analysis, which shows breast cancer to be weakly correlated with variables reflecting relative advantage, such as female labour force participation; fulltime educational participation at 16 years of age; high income families and the Index of Relative Socio-Economic Disadvantage. Incidence was weakly correlated with rates of participation and cancers detected through screening (Table 8.1).

Central Northern Adelaide

There were 2,472 new cases of breast cancer in Central Northern (an SIR of 99). Unlike other patterns of disease mapped in this atlas, many of the most highly elevated ratios of breast cancer were mapped in the advantaged SLAs.

Walkerville had the highest standardised incidence ratio, with 32% more cases than expected from the State rates (an SIR of 132, 40 cases), followed by Burnside - South-West (120, 98), Unley - West (115, 67) and - East (114, 74), Tea Tree Gully - North (114, 66) and - Central (112, 88), and Port Adelaide Enfield - Inner (112, 80).

There were large numbers of new cases of breast cancer in West Torrens - West (115 cases, 104), Tea Tree Gully - South (113 cases, 104) and Port Adelaide Enfield - Coast (103 cases, 104).

The SLAs with the lowest ratios were Playford - West (an SIR of 36**, eight cases), Salisbury Balance (41*, five), Playford - Hills (56, five), Salisbury - Central (75*, 55), Charles Sturt - North-East (71**, 80), Playford - East Central (an SIR of 82, 34), Charles Sturt - Inner East (an SIR of 83, 66), Norwood Payneham St Peters - West (an SIR of 83, 52), Campbelltown - East (an SIR of 83, 79), Playford - West Central (an SIR of 84, 26) and Norwood Payneham St Peters - East (an SIR of 88, 60).

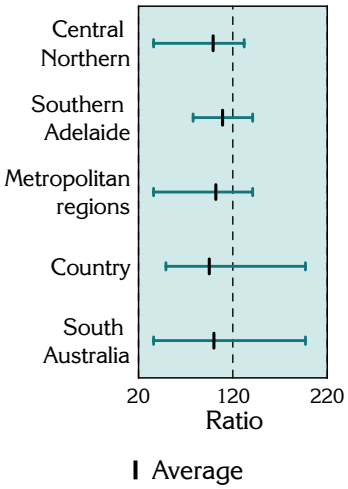
Southern Adelaide

There were 1,187 new cases in Southern over the five years from 1998 to 2002 (an SIR of 109**). The most highly elevated ratio in this region was in Mitcham - North-East, with an SIR of 141** and 84 cases, followed by Marion - North (121*, 120), Onkaparinga - Hills (an SIR of 119, 45 cases), Marion - Central (118*, 159), Onkaparinga - Woodcroft (115, 102) and Onkaparinga - Reservoir (114, 77).

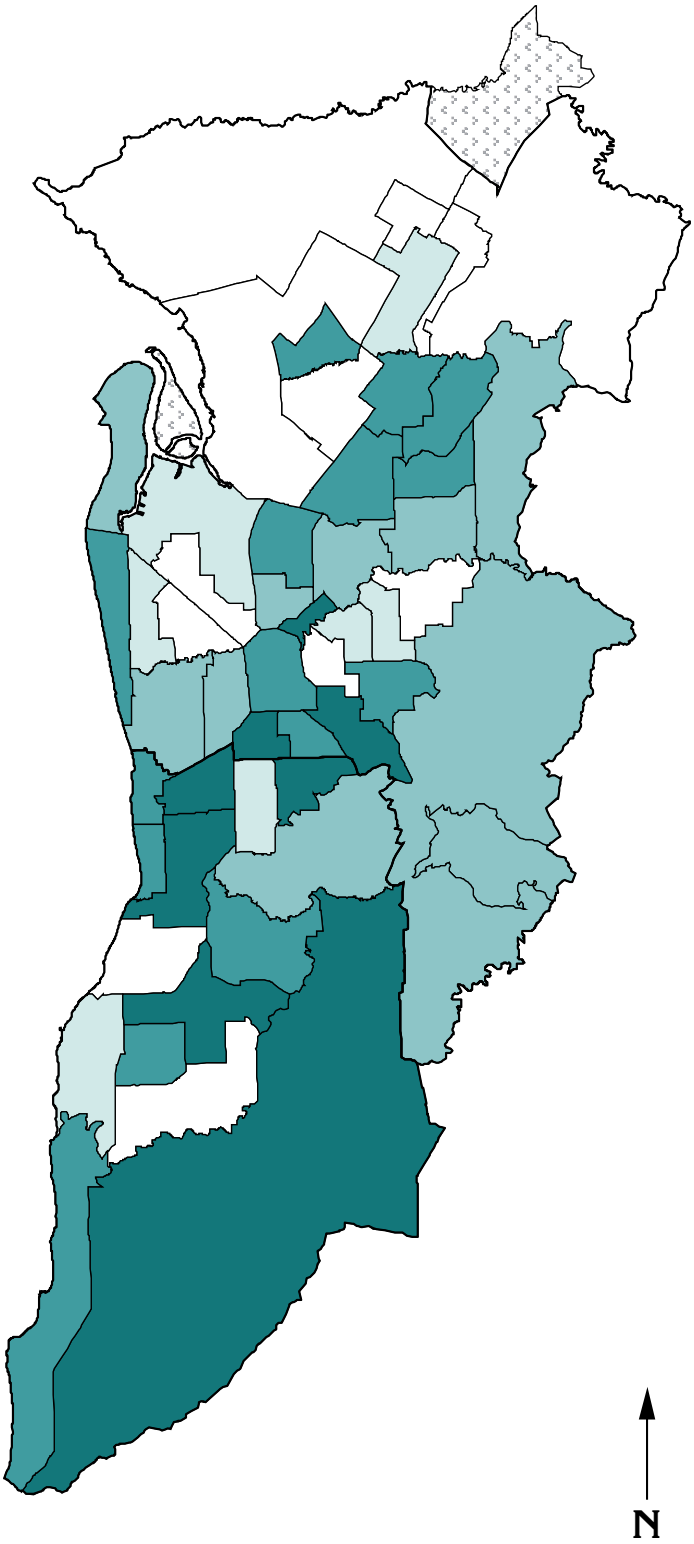
There were below average ratios in Onkaparinga - Hackham (an SIR of 78, 30 cases) and Marion - South (84, 44).

* **indicates statistical significance: see page 24**

Map 6.38
Incidence of breast cancer, metropolitan regions, 1998 to 2002



Note: The black vertical lines show the average ratio for this indicator in each region; the horizontal lines show the range of the indicator at the SLA level within the region.



SLA
Health Region

Standardised Incidence Ratio (as an index)*, by SLA

- *115 and above*
- *105 to 114*
- *95 to 104*
- *85 to 94*
- *below 85*
- *data not mapped#*

*Index shows the new cases of breast cancer in the SLA compared with the number expected: expected numbers were derived by indirect age standardisation, based on SA totals

#Data were not mapped for Torrens Island (mapped with Port Adelaide): Gawler has been mapped in the State map

Source: See Data sources, Appendix 1.3

Details of map boundaries are in Appendix 1.2

Country South Australia

There were 1,279 new cases of breast cancer recorded for females in country South Australia from 1998 to 2002, five per cent fewer than expected from the State rates (a standardised incidence ratio (SIR) of 95).

Most of the regions had fewer cases than expected from the State rates, with all but two ratios below 100. The highest ratio was calculated for **Riverland**, with 16% more cases than expected (an SIR of 116, 123 cases). **Hills Mallee Southern** had one per cent more cases than expected (an SIR of 101, 373 cases).

Table 6.42: Regional totals, incidence of breast cancer, 1998 to 2002

Region	Number	SIR
Hills Mallee Southern	373	101
Wakefield[1]	314	96
South East	160	84*
Northern & Far Western	109	81*
Eyre	92	90
Mid North	109	98
Riverland	123	116
Country SA	**1,279**	**95**
Central Northern	2,472	99
Southern	1,187	109**
Metropolitan regions	**3,659**	**102**
South Australia	**4,938**	**100**

[1]**Gawler is included in Wakefield region**

There was no consistent relationship between socioeconomic status and breast cancer apparent in the correlation analysis. This may, in part, reflect the relatively small numbers of cases at the SLA level in country South Australia (Table 8.2).

The Regions

Riverland had the highest regional ratio for breast cancer, with 16% more new cases than expected (an SIR of 116, 123 cases). There were elevated ratios in Berri and Barmera - Berri (an SIR of 136, 28 cases), Renmark Paringa - Renmark (124, 31) and Loxton Waikerie - East (116, 27).

There were 373 new cases of breast cancer in **Hills Mallee Southern** (an SIR of 101) over the five years from 1998 to 2002. Highly elevated ratios for breast cancer were recorded in Southern Mallee (154, eleven cases), Kangaroo Island (140, 20), Victor Harbor (135*, 66), Yankalilla (130, 20) and The Coorong (120, 23). There were a relatively large number of new cases in Murray Bridge (48 cases, an SIR of 90). There were low ratios in Mid Murray (an SIR of 78, 22), Alexandrina - Strathalbyn (84, 23), Mount Barker - Central (85, 35), Adelaide Hills Balance (89, 23) and Alexandrina - Coastal (89, 35).

In **Mid North**, there were 109 new cases (an SIR of 98) with an elevated ratio in Orroroo/Carrieton (167, seven cases). Low ratios were recorded for Peterborough (an SIR of 85, seven cases) and Port Pirie - City (87, 43).

Wakefield had 314 new cases of breast cancer over this five-year period, four per cent fewer than expected from the State rates (an SIR of 96). There were elevated ratios in Light (an SIR of 127, 37 cases), Barossa - Barossa (119, 25) and Yorke Peninsula - North (110, 34). Copper Coast had 39 new cases (an SIR of 90). There were low ratios in Barossa - Tanunda (an SIR of 58, nine), Goyder (64, ten), Mallala (71, 13), Barossa - Angaston (78, 20) and Clare and Gilbert Valleys (87, 25).

There were ten per cent fewer new cases of breast cancer in **Eyre** than expected from the State rates (an SIR of 90, 92 cases). Elliston (an SIR of 197, seven cases) and Le Hunte (176, seven) both had highly elevated ratios, but neither were statistically significant. There were very low ratios in Lower Eyre Peninsula (and SIR of 49, six cases), Port Lincoln (84, 34), Tumby Bay (85, nine) and Ceduna (87, eight).

South East had 16% fewer incidence than expected (an SIR of 84*, 160). Naracoorte and Lucindale had an elevated ratio of 115 (29 cases) and Wattle Range - West recorded a relatively large number of new cases (31 cases, an SIR of 107). The SLAs of Grant (an SIR of 66, 16 cases), Mount Gambier (71*, 49), Tatiara (78, 16), Lacepede (81, seven), Wattle Range - East (83, eight) and Robe (86, five) all had low ratios.

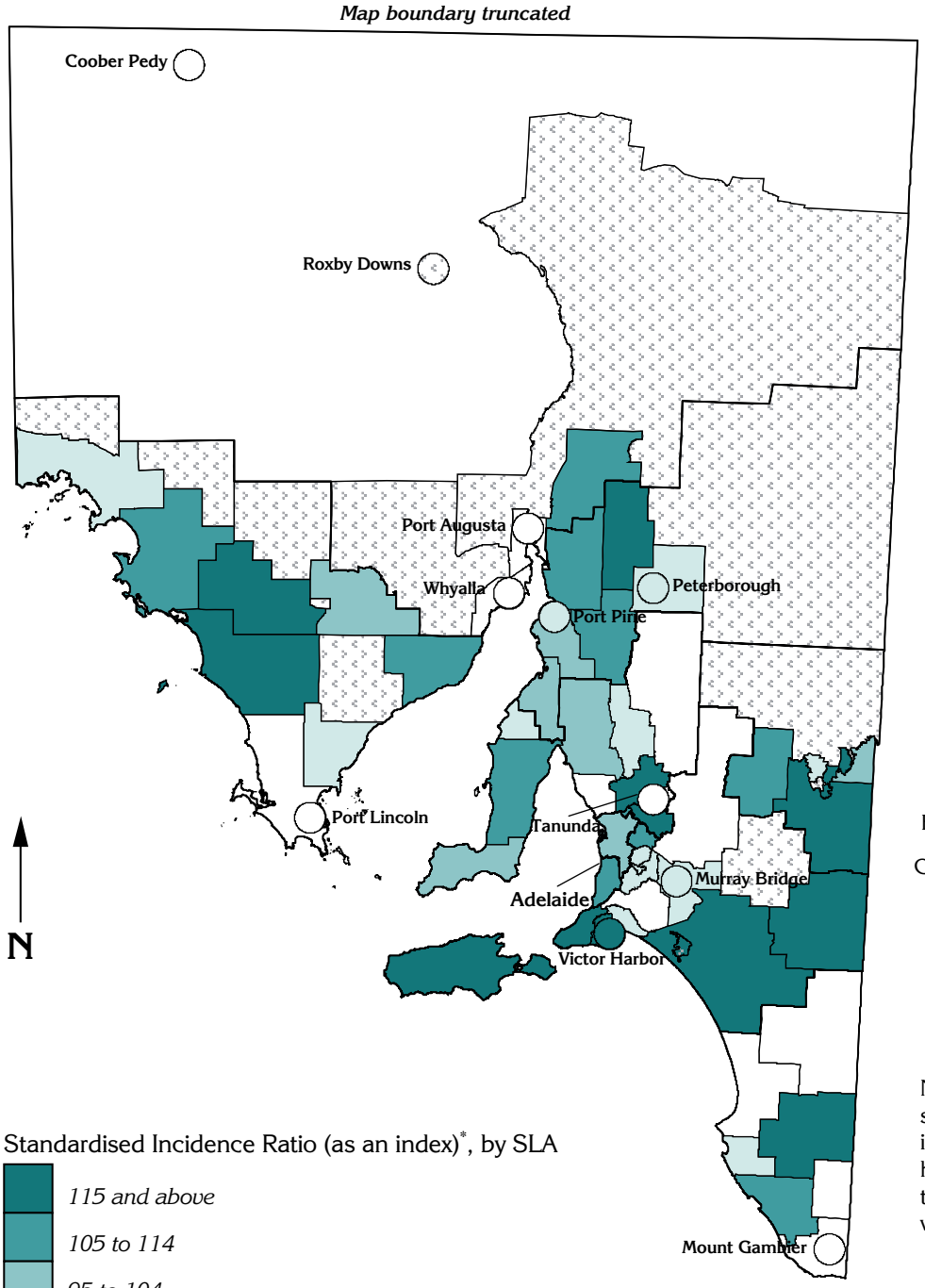
Northern and Far Western had the lowest ratio, with 19% fewer new cases of breast cancer than expected from the State rates (an SIR of 81*, 109 cases). Flinders Ranges (114, seven) had a high ratio (but small number of cases). There were low ratios in Coober Pedy (an SIR of 65, five cases), Unincorporated Far North (73, six), Whyalla (80, 54) and Port Augusta (81, 31).

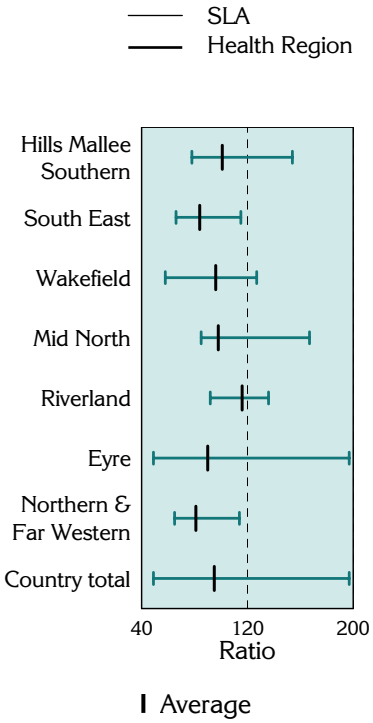
ASGC Remoteness classification

The most highly elevated ratio for the remoteness areas was calculated for Major Cities (an SIR of 102). The other remoteness classes had fairly similar ratios, ranging from 94 in Inner Regional to 99 in Very Remote. None of these standardised ratios were statistically significant.

* **indicates statistical significance: see page 24**

Map 6.39
Incidence of breast cancer, South Australia, 1998 to 2002





Note: The black vertical lines show the average ratio for this indicator in each region; the horizontal lines show the range of the indicator at the SLA level within the region.

Standardised Incidence Ratio (as an index)*, by SLA

- *115 and above*
- *105 to 114*
- *95 to 104*
- *85 to 94*
- *below 85*
- *data not mapped#*

*Index shows the new cases of breast cancer in the SLA compared with the number expected: expected numbers were derived by indirect age standardisation, based on SA totals

#Data were not mapped because the SLA has a population of less than 100, or there were fewer than five cancers

Source: See Data sources, Appendix 1.3

Details of map boundaries are in Appendix 1.2

Incidence of prostate cancer, 1999 to 2002

Apart from non-melanoma skin cancer, cancer of the prostate is the most commonly diagnosed cancer among South Australian males; and it is the second commonest cause of cancer deaths in South Australian men (CCSA 2003). The incidence of prostate cancer increases with age. At the present time, the exact cause of prostate cancer is not known; therefore active prevention is not possible. Prostate cancer has been associated with Western-style high fat diets, alcohol, smoking, occupational exposure to cadmium and rubber, urban residence and a family history of the disease (CCSA 2003).

The incidence of prostate cancer in South Australia increased by 26.7% between the periods 1986 to 1993, and 1998 to 2002, with similar increases in incidence in both Metropolitan Adelaide and country South Australia (Table 6.43).

Table 6.43: Incidence of prostate cancer

Age-standardised incidence rate per 100,000 males aged 50 years and over

Area	1986-1993	1998-2002	Per cent change[1]
Metropolitan Adelaide (incl. Gawler)	377	479	27.1
Country	370	466	25.9
South Australia	375	475	26.7

[1]**Per cent change over eleven years in the rate of prostate cancer incidence**

Metropolitan regions

There were 3,633 new cases of prostate cancer in the metropolitan regions (excluding Gawler) from 1998 to 2002, one per cent more than expected from the State rates (a standardised incidence ratio (SIR) of 101). Central Northern had the expected number of new cases for its population (2,511 cases, an SIR of 100) and Southern had three per cent more than expected (1,122, an SIR of 103) (Table 6.44).

There is no clear pattern in the geographic distribution of standardised incidence ratios across the SLAs (Map 6.40).

Prostate cancer was weakly correlated at the SLA level with a number of the indicators of socioeconomic advantage and with the Index of Relative Socio-Economic Disadvantage (Table 8.1).

Central Northern Adelaide

There were 2,511 new cases of prostate cancer in Central Northern from 1998 to 2002 (an SIR of 100). Highly elevated ratios, with over one third more cases than expected from the State rates, were recorded in Port Adelaide Enfield - Coast (an SIR of 144**, 136 cases), Salisbury - Inner North (138*, 53) and Adelaide Hills - Ranges (131, 32). There were also elevated ratios in Tea Tree Gully - Central (130*, 80), Campbelltown - East (125*, 101), Tea Tree Gully - Hills (122, 40), Adelaide (119, 50), Burnside - South-West (an SIR of117, 93 cases) and - North-East (an SIR of 116, 101), Tea Tree Gully - North (115, 43) and Prospect (113, 66).

There were large numbers of new cases of prostate cancer recorded for men in Charles Sturt - Coastal (134 cases, an SIR of 100), West Torrens - West (119 cases, 89), Tea Tree Gully - South (114, 108), Port Adelaide Enfield - East (109 cases, 107), West Torrens - East (100 cases, 109), and Charles Sturt - Inner West (97 cases, 91), - Inner East (87 cases, 89) and - North-East (87 cases, 89).

The SLAs with ratios below the State average were Unley - West (an SIR of 69*, 34), Salisbury - Central (71*, 50), Norwood Payneham St Peters - East (an SIR of 77, 57), Salisbury - South-East (78*, 75), Port Adelaide Enfield - Inner (an SIR of 81, 73), Norwood Payneham St Peters - West (an SIR of 81, 47), Salisbury Balance (an SIR of 83, six) and Port Adelaide Enfield - Port (an SIR of 84, 87).

Southern Adelaide

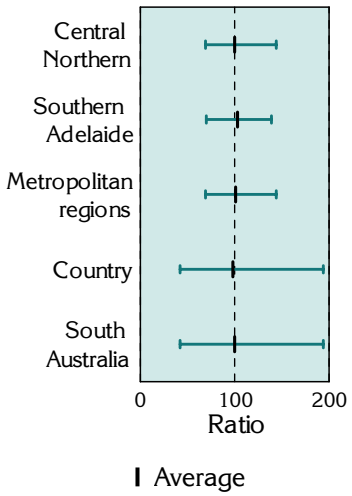
In Southern, there were 1,122 new cases of cancer over the five years from 1998 to 2002 (an SIR of 103). Elevated ratios were recorded for Mitcham - Hills (an SIR of 139**, 101), Onkaparinga - South Coast (136**, 85), Onkaparinga - Reservoir (120, 58), Marion - Central (an SIR of 115, 172) and - South (114, 31), and Onkaparinga - Woodcroft (113, 73).

There were large numbers of new cases of prostate cancer in Marion - North (121 cases, an SIR of 92), Mitcham - West (91, 96) and Holdfast Bay - North (97, 88).

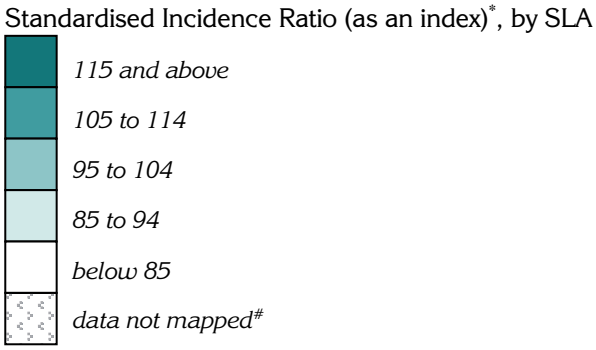
The SLAs of Onkaparinga - Hackham (with an SIR of 70*, 21 cases) and Mitcham - North-East (70**, 48) both had a low incidence of prostate cancer.

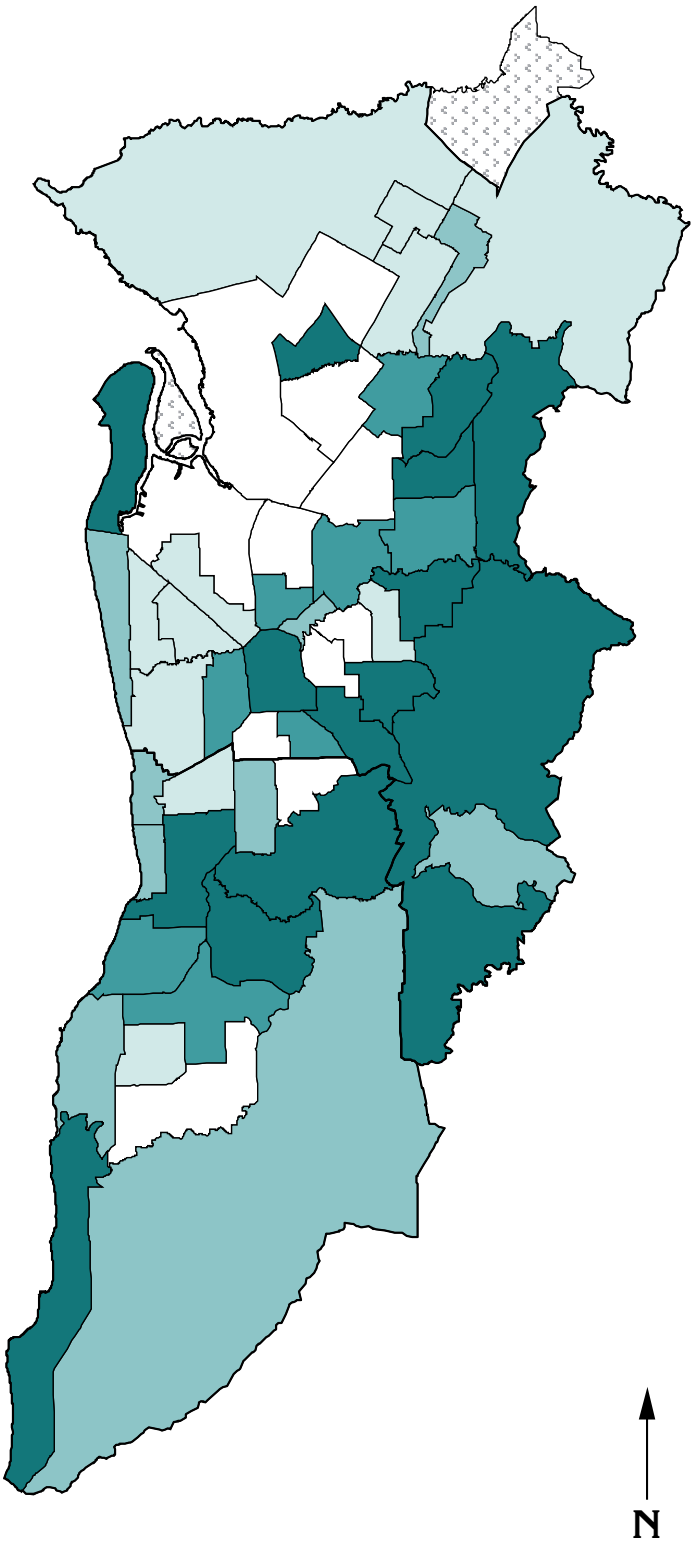
* **indicates statistical significance: see page 24**

Map 6.40
Incidence of prostate cancer, metropolitan regions, 1998 to 2002



Note: The black vertical lines show the average ratio for this indicator in each region; the horizontal lines show the range of the indicator at the SLA level within the region.





*Index shows the new cases of prostate cancer in the SLA compared with the number expected: expected numbers were derived by indirect age standardisation, based on SA totals

#Data were not mapped for Torrens Island (mapped with Port Adelaide): Gawler has been mapped in the State map

Source: See Data sources, Appendix 1.3 ***Details of map boundaries are in Appendix 1.2***

Country South Australia

In country South Australia, there were 1,485 new cases of prostate cancer from 1998 to 2002, two per cent fewer than expected from the State rates (Table).

The highest incidence rates were found in **Wakefield** (an SIR of 109, 410) and **Hills Mallee Southern** (105, 447), with the lowest in **Northern and Far Western** (66**, 95) and **Mid North** (69**, 86). Many SLAs were not mapped because of the relatively small number of these cases at the SLA level in country South Australia; of those mapped, many ratios were not of statistical significance.

Table 6.44: Regional totals, incidence of prostate cancer, 1998 to 2002

Region	Number	SR
Hills Mallee Southern	447	105
Wakefield[1]	410	109
South East	207	101
Northern & Far Western	95	66**
Eyre	118	100
Mid North	86	69**
Riverland	122	99
Country SA	**1,485**	**98**
Central Northern	2,511	100
Southern	1,122	103
Metropolitan regions	**3,633**	**101**
South Australia	**5,118**	**100**

[1]**Gawler is included in Wakefield region**

There was no consistent relationship at the SLA level between prostate cancer and socioeconomic status (Table 8.2).

The Regions

The highest regional ratio was calculated for **Wakefield** (an SIR of 109, 410 cases). Men living in Yorke Peninsula - North had 42% more new cases than expected (an SIR of 142**, 60). There were also elevated ratios in Clare and Gilbert Valleys (an SIR of 122, 40), Copper Coast (114, 64), Barossa - Tanunda (113, 21) and Mallala (112, 20). There were 26% fewer cases than expected in Barossa - Barossa (an SIR of 74, 16 cases). Gawler had 61 new cases of prostate cancer (an SIR of 98) over this five-year period.

In **Hills Mallee Southern**, there were five per cent more new cases of prostate cancer than expected from the State rates (an SIR of 105, 447 cases). Karoonda East Murray had an extremely highly elevated ratio, with nearly twice the expected number of cases (an SIR of 194*), although with relatively small numbers (eleven cases). There were also highly elevated ratios in Adelaide Hills - North (a standardised incidence ratio (SIR) of 167**, 31 cases), The Coorong (142*, 32), Murray Bridge (128**, 78), Mid Murray (126, 45) and Yankalilla (122, 24). Low ratios were recorded for Mount Barker – Central (an SIR of 69*, 29 cases) and Alexandrina - Strathalbyn (an SIR of 75, 21). Relatively large numbers of new cases were recorded for Victor Harbor (60 cases, 86) and Alexandrina - Coastal (42 cases, 79).

There were 207 new cases in the **South East** (an SIR of 101) with elevated ratios in Tatiara (159**, 37), Wattle Range - West (121, 40) and Robe (115, eight). Lacepede (with an SIR of 79, eight cases) and Wattle Range - East (79, nine) both had fewer new cases than expected. Mount Gambier had the largest number of new cases of prostate cancer (58 cases, an SIR of 88).

In **Eyre**, there were 118 new cases of prostate cancer (an SIR of 100). Within this region, there were elevated ratios in Streaky Bay (an SIR of 174*, 12 cases), Franklin Harbor (136, nine), Tumby Bay (123, 17) and Le Hunte (123, seven). There were below average ratios in Cleve (75, five) and Lower Eyre Peninsula (73, eleven). Men living in Port Lincoln had 43 new cases of prostate cancer over the five years (an SIR of 102).

Riverland had a ratio of 99 (122 cases) with elevated ratios in Berri and Barmera - Berri (115, 21 cases) and Renmark Paringa - Renmark (114, 34). The ratio in Berri and Barmera - Barmera was well below average (an SIR of 64, 12).

Mid North had 31% fewer new cases of prostate cancer than expected (an SIR of 69**, 86 cases). A number of SLAs in this region also had fewer new cases than expected, including Northern Areas (an SIR of 42**, eight cases), Peterborough (56, six), Mount Remarkable (67, nine), Port Pirie - City (72*, 36) and Port Pirie Balance (75, ten).

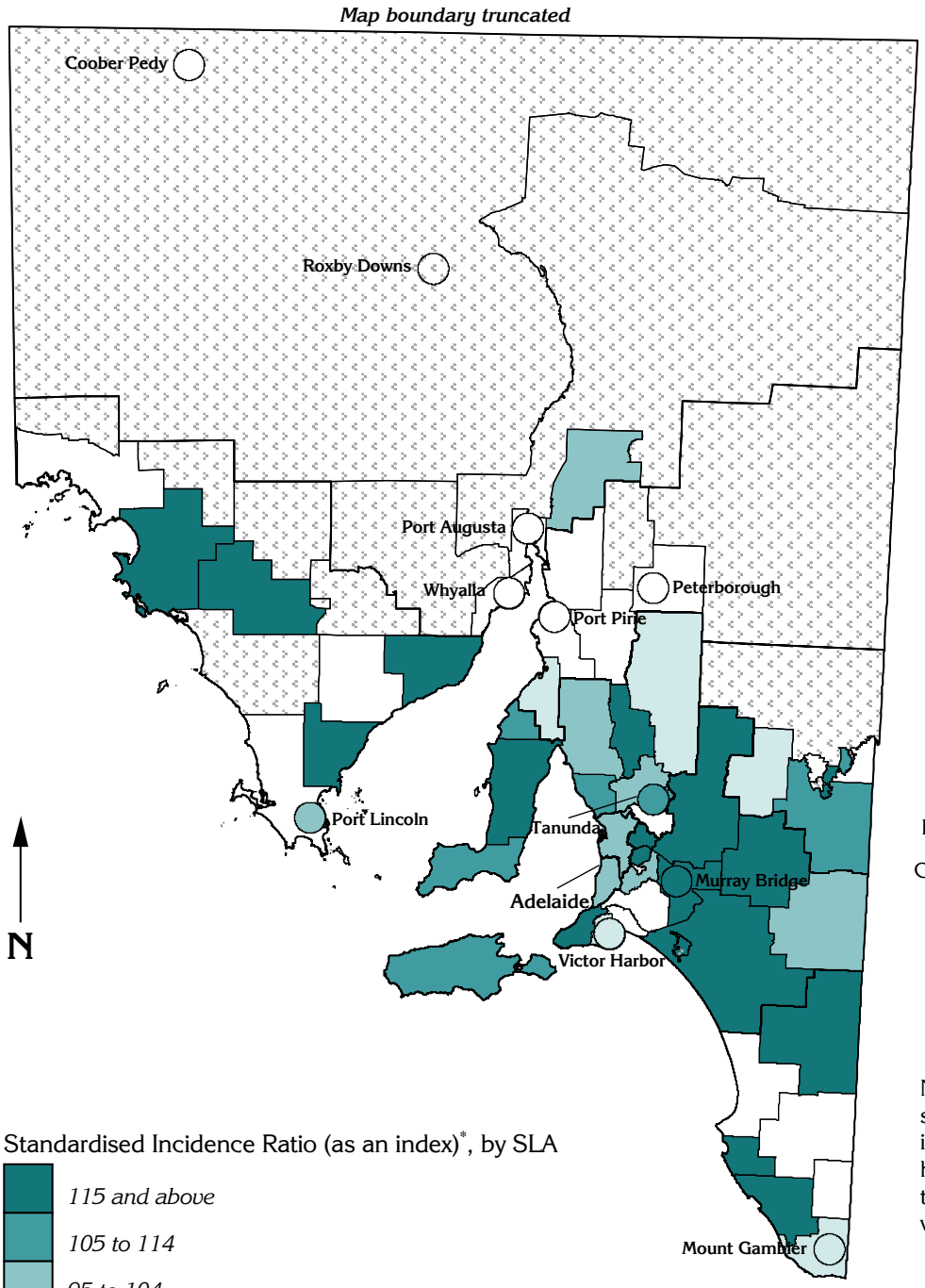
Northern and Far Western also had a particularly low ratio (an SIR of 66**, 95 cases). The largest number of new cases was found for men in Whyalla (53, 78**). Coober Pedy (an SIR of 43, five) and Port Augusta (53**, 21) had fewer new cases than expected.

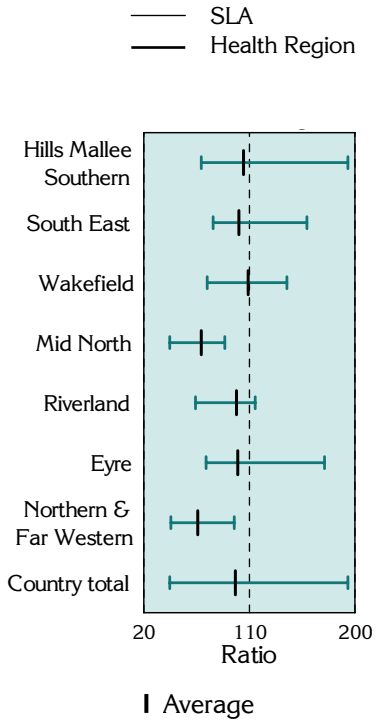
ASGC Remoteness classification

The incidence of new cases of prostate cancer was relatively consistent across the remoteness classes, except for Very Remote which had a low ratio of 66*, compared to ratios of 101 in Major Cities and Inner Regional, 97 in Outer Regional and 103 in Remote.

* **indicates statistical significance: see page 24**

Map 6.41
Incidence of prostate cancer, South Australia, 1998 to 2002





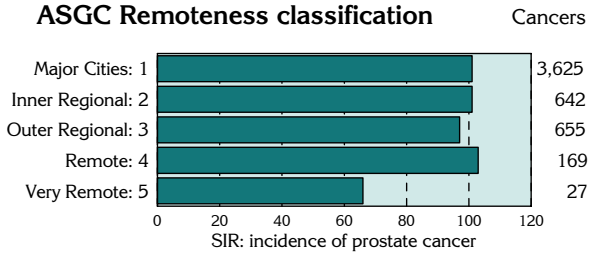
Note: The black vertical lines show the average ratio for this indicator in each region; the horizontal lines show the range of the indicator at the SLA level within the region.

Standardised Incidence Ratio (as an index)*, by SLA

- *115 and above*
- *105 to 114*
- *95 to 104*
- *85 to 94*
- *below 85*
- *data not mapped#*

*Index shows the new cases of prostate cancer in the SLA compared with the number expected: expected numbers were derived by indirect age standardisation, based on SA totals

#Data were not mapped because the SLA has a population of less than 100, or there were fewer than five cancers



Source: See Data sources, Appendix 1.3

Details of map boundaries are in Appendix 1.2

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Introduction

Deaths' data, or mortality data, are a collection of information about people who have died. Primarily, the information identifies factors that caused their death (usually referred to as 'the cause of death'). The collection also contains information about the deceased person, such as their age at death, the place of death, their country of birth, and where applicable, the circumstances of their death. These data are collected in Australia by the Registrars of Births, Deaths and Marriages in each State and Territory. The data are then compiled nationally by the Australian Bureau of Statistics who codes the data according the International Classification of Diseases (ICD).

Deaths' data are important in the measurement of health and disease, and in the planning of public health care. They give a picture of the conditions, diseases, and circumstances causing death in a population and provide an indication of where public health care provision is needed to prevent further deaths. Studying trends in mortality over time provides a picture of how the health status of the population is changing and assists in the implementation of preventative measures (AIHW 2004).

Variations in death rates by social class

Despite improvements in the health of Australians over the last century, large differences or inequalities continue to exist between population sub-groups (Hetzel et al. 2004). Differences in mortality rates can be demonstrated by age, sex, geographic region, area-based socioeconomic disadvantage, occupation, Indigenous status and country of birth.

Socioeconomic disadvantage is a powerful determinant of healthy life and of death (Hetzel et al. 2004). As indicated previously, the Index of Relative Socio-Economic Disadvantage (IRSD) reflects the overall level of socioeconomic disadvantage of an area. For all age groups, males and females in the most disadvantaged areas (using the IRSD) have significantly higher death rates from all causes. Deaths are increasingly more prevalent in areas of low socioeconomic status and in communities characterised by low levels of educational attainment; high levels of unemployment; substantial levels of discrimination, interpersonal violence and exclusion; and poverty. There is a higher prevalence of such factors among Indigenous communities, and other disadvantaged Australians (Glover et al. 2004).

Changes in numbers and rates, 1992 to 2002

Changes in numbers

Over the ten-year period from 1992 to 2002, the number of deaths in South Australia increased by 9.7 per cent, rising from 10,925 deaths in 1992 to 11,987 deaths in 2002 (Table 6.45).

Male deaths increased by 5.0 per cent, while a more substantial increase of 15.1 per cent was recorded for female deaths. However, this trend was a reflection of the increased number of deaths experienced among people aged 75 years and over, which rose by 32.0 per cent over this period.

In line with the increasing life expectancy in South Australia, the number of deaths declined in all other age groups. The most substantial decline was for people aged 15 to 24 years, for whom the number decreased by 29.9 per cent, from 154 deaths in 1992 to 108 deaths in 2002. Large declines were also recorded in the 0 to 14 and 64 to 74 year age groups, decreasing by 26.6 per cent and 23.7 per cent respectively.

Table 6.45: Change in number of deaths by age group, South Australia, 1992 to 2002

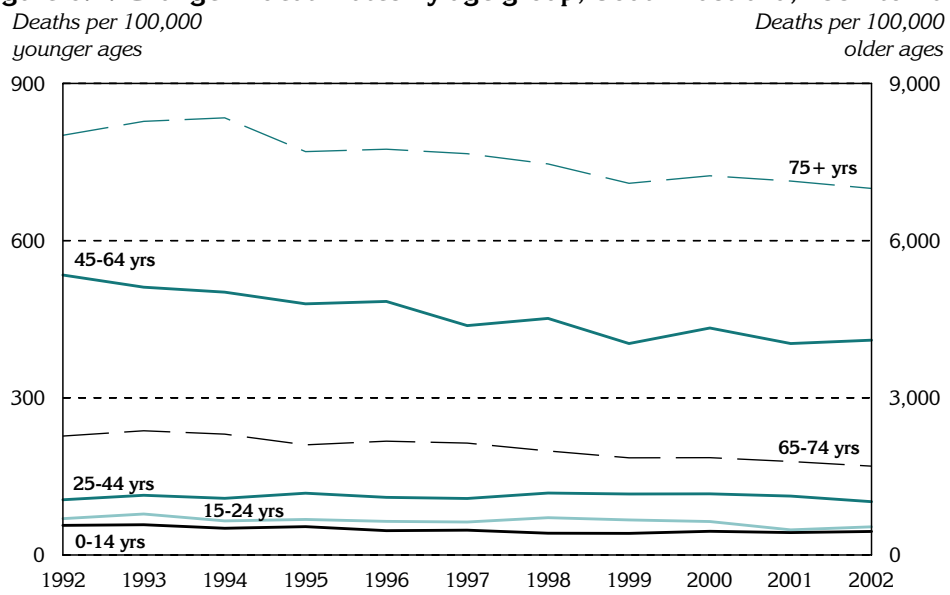
Age group (years)	1992	2002	Per cent change
0-14	173	127	-26.6
15-24	154	108	-29.9
25-44	476	447	-6.1
45-64	1,639	1,538	-6.2
64-74	2,564	1,956	-23.7
75+	5,919	7,811	32.0
Total	**10,925**	**11,987**	**9.7**

Source: ABS Cause of Death bulletins 1992 and 2002

Changes in death rates by age group and sex

Over the period from 1992 to 2002, death rates of people at all ages declined, with the largest decline occurring for people aged 64 to 74 years (down by 25.3%) (see Table 6.46 and Figure 6.2 overleaf). Other large decreases were recorded among people aged 45 to 64 years (down by 23.3%), 15 to 24 years (down by 22.6%) and 0 to 14 years (down by 20.6%). A small decline of 3.7% was recorded for people aged 25 to 44 years.

Figure 6.2: Change in death rates by age group, South Australia, 1992 to 2002



Source: ABS Cause of Death bulletins 1992 and 2002

Table 6.46: Change in death rates by age group and sex, South Australia, 1992 to 2002

Per cent change[1]

Age group (years)	Males	Females	Persons
0-14	-20.8	-20.4	-20.6
15-24	-22.0	-24.1	-22.6
25-44	-4.9	-1.7	-3.7
45-64	-27.2	-15.8	-23.3
64-74	-28.3	-22.3	-25.3
75+	-15.4	-11.8	-12.7
Total	**-20.2**	**-13.8**	**-16.6**

[1]**Per cent change over the ten years from 1992 to 2002**

Source: ABS Cause of Death bulletins 1992 and 2002

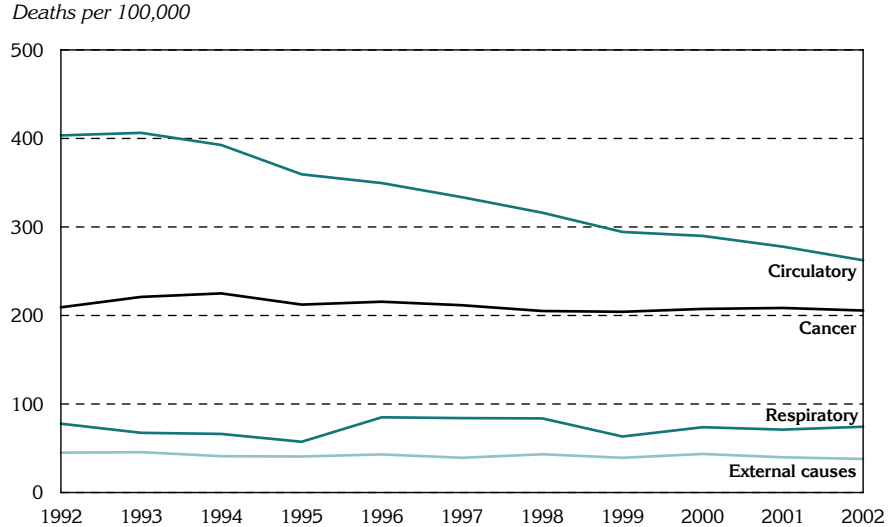
Overall, death rates declined at a greater rate for males (down by 20.2%) than females (down by 13.8%) over the period from 1992 to 2002. The biggest differential in the rates of change recorded for males and females occurred in the 25 to 44 year age group, where male deaths declined by 4.9% and female deaths, by 1.7% (Table 6.46).

Changes in death rates by cause

Over the period from 1992 to 2002, death rates from circulatory system diseases in South Australia have decreased substantially, a decline of 35.0% (Figure 6.3).

A large decrease was also recorded for deaths from external causes (down by 15.8%), with smaller decreases recorded for deaths from respiratory system diseases (down by 4.3%) and cancer (1.7%).

Figure 6.3: Change in death rates by cause, South Australia, 1992 to 2002



Data mapped

Premature deaths

The analysis of death rates is largely based on deaths of persons at ages 15 to 64 years. The main reasons for basing the analysis on this limited age group are:

- that deaths before 65 years of age are, clearly, premature;
- to eliminate, as far as possible, the influence on the results of deaths in nursing homes and other such facilities (see text below);
- that the 15 to 64 year age group has generally been considered to be of 'working' age, and can examined as a group[1]; and
- to allow comparison with earlier editions.

The proportion of the population who die while resident in a nursing home or other aged care facility increases with increasing age. Aged care facilities are unlikely to be located in the same area as the person's previous (domestic) home, and are over-represented in the metropolitan regions, compared with country areas. The higher the age cut-off, the greater the possibility of including deaths in nursing homes, thus increasing death rates for areas in which nursing homes are largely concentrated (traditionally in higher socioeconomic status areas), and reducing the rates in other (lower socioeconomic status) areas. Therefore, using age 65 years as the cut-off reduces this effect.

Despite this limit on ages, the death rates in a number of more affluent SLAs in the metropolitan regions are affected by the location of special-purpose 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. People living in such accommodation are more likely than the population in general to die at ages below 65 years. The location of special-purpose nursing homes and other types of supported accommodation has implications not only for death rates, but for the measures of the burden of disease: this is discussed below at page 301.

Infant deaths are analysed separately as they are recognised internationally as a group with historically high mortality rates, and rates with marked socioeconomic differentials. Table 6.47 shows the number of deaths for the age groups and causes for which data are presented.

Table 6.47: Deaths by selected cause and age, South Australia, 1999 to 2002

Age at death	Cancer	Circulatory system diseases	Respiratory system diseases	External causes	All other causes	Total deaths
Infant (under 1 yr)	3	3	3	17	303	329
Adult:	3,253	1,719	372	1,692	1,320	8,356
- 15 to 64 years:						
males	1,709	1,262	201	1,305	818	5,295
females	1,544	457	171	387	502	3,061
- Other ages:	9,911	16,814	4,310	761	6,531	38,327
All ages:	**13,167**	**18,536**	**4,685**	**2,470**	**8,154**	**47,012**

Source: ABS Causes of Death bulletins, 1999 to 2002

Avoidable mortality

Avoidable mortality is a concept that has been used to evaluate the efficiency and efficacy of health care systems. The term, avoidable mortality, refers to those deaths that are considered to be largely avoidable, given timely and effective health care; that is, those deaths that should not occur, given our current medical knowledge and technology. The idea was originally developed by Rutstein et al. (1976) who created a list of conditions that they considered either treatable or preventable given current medical knowledge and technology. In an ideal situation, these conditions would not result in 'unnecessary, untimely death' (Rutstein et al. 1976). Trends in avoidable mortality over time can be used to estimate the contribution of health care to falling mortality rates; and comparisons of such trends across countries or regions can also indicate relative weaknesses in health care systems requiring further investigation (Nolte & McKee 2004) (also see notes on page 188).

In South Australia, almost three quarters (71.4%) of all deaths at ages 0 to 74 years over the period 1997 to 2001 were considered to be avoidable. Of these, over one quarter (29.4%) were considered to be amenable to health care (Table 6.48). Others were likely to be the result of causes such as road traffic accidents, which health care could not have prevented.

[1] The lower age of the 'working age' population is often set at 20 years; 15 years has been retained in this analysis for consistency with earlier editions.

The age-standardised death rate (ASR) from avoidable mortality was 210.4 deaths per 100,000 population. Within this overall rate, 85.9 deaths per 100,000 population were estimated to be amenable to health care. The death rate from the remaining, or 'unavoidable' deaths, was 83.7 per 100,000 population; and the rate for all deaths at these ages was 294.1 deaths per 100,000 population.

Death rates in all categories were higher for males than for females. For avoidable mortality, the rates were 272.8 deaths per 100,000 population for males and 147.2 for females, with the male rate 89% higher than the female rate (a rate ratio of 1.89).

For amenable mortality, the male rate was 96.0 deaths per 100,000 population, 27% higher than the female rate of 75.7 (a rate ratio of 1.27). Unavoidable death rates for males were almost half as high again as for females (a rate ratio of 1.49).

Table 6.48: Avoidable mortality, 0 to 74 years by sex, South Australia, 1997 to 2001

Mortality category	Number			% of Total	ASR[1] per 100,000			
	Males	Females	Total		Males	Females	Total	Rate ratio M:F[2]
Avoidable mortality	10,326	5,612	15,938	71.4	272.8	147.2	210.4	1.89**
Unavoidable mortality	3,805	2,564	6,369	28.6	100.0	67.2	83.7	1.49**
Total mortality	**14,131**	**8,176**	**22,307**	**100.0**	**372.8**	**214.4**	**294.1**	1.74**
Avoidable mortality - %	**73.1**	**68.6**	**71.4**	**..**	**..**	**..**	**..**	**..**
Avoidable mortality: years of potential life lost ('000)	237,451	144,380	381,831	..	..	..	..	..
Amenable mortality[3]	3,671	2,884	6,556	29.4	96.0	75.7	85.9	1.27**

[1] **ASR is the age-standardised rate**

[2] **Rate ratio is the ratio of male to female death rates; rate ratios differing significantly from 1.0 are shown with * p <0.05; ** p <0.01**

[3] **Amenable mortality: avoidable deaths that were amenable to health care intervention**

Measure mapped

Age standardised ratios (Standardised Death Ratios, SDRs) have been calculated and mapped 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 measure is the infant mortality rate (infant deaths per 1,000 live births).

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Infant deaths, 1999 to 2002

Death in infancy represents the earliest indicator of premature mortality. Most infant deaths occur in the first four weeks of life, from conditions originating in the perinatal period. These conditions include spontaneous preterm labour, infections, hypertension, haemorrhage and maternal conditions affecting the newborn. Congenital abnormalities and Sudden Infant Death Syndrome (SIDS) account for many of the remaining deaths. Following a national 'Reducing the Risks' Campaign, which commenced in 1991, there has been a dramatic fall in the overall number of SIDS deaths, but a less substantial decline for Indigenous SIDS deaths.

In 1982 to 1986, the infant mortality rate (IMR) for Metropolitan Adelaide was 8.1 infant deaths per 1,000 live births (infant deaths are those deaths that occur before 12 months of age); by 1989 to 1993, it had declined to 4.8, and there was a further decline to 4.5 in 1999 to 2002, representing a reduction of 44.6% since the earliest period (Table 6.49). On an international scale, an IMR of 4.7 is low, reflecting South Australia's relatively high living standards and quality of health care. However, significant inequalities exist within the State, particularly for the Indigenous population which had a much higher IMR of 9.4 for the period 2002 to 2004 (ABS 2005).

Although it remains higher than in Metropolitan Adelaide, the IMR for country South Australia has declined by 66.2% since the period 1982 to 1986, when the rate was very high, at 15.1 infant deaths per 1,000 live births. The largest decline occurred from the period 1982 to 1985, to 1989 to 1993, when the rate had dropped to 6.0 infant deaths per 1,000 live births. There was a further decline to a rate of 5.1 over the period, 1999 to 2002.

Table 6.49: Infant deaths, selected periods

Infant deaths per 1,000 live births

Area	1982-1986	1989-1993	1999-2002	Per cent change[1]
Metropolitan Adelaide (incl. Gawler)	8.1	4.8	4.5	-44.6
Country	15.1	6.0	5.1	-66.2
South Australia	8.9	5.1	4.7	-47.4

[1]**Per cent change over the 16 year period in the rate of infant deaths**

Due to the small numbers of deaths at the SLA level over this four-year period, SLAs have been aggregated to the larger areas (as used for the Burden of Disease (BoD) estimates presented later in this chapter): they are referred to as BoD areas (Map 6.42).

Metropolitan regions

The infant mortality rate (IMR) of 4.5 infant deaths per 1,000 live births in 1999 to 2002 in the metropolitan regions (excluding Gawler) represented 226 infant deaths (Table 6.50). This death rate was consistent across the metropolitan regions with an IMR of 4.5 in both regions.

The correlation analysis showed consistently weak correlations between high infant death rates and indicators of socioeconomic disadvantage at the BoD area level (Table A12).

Central Northern Adelaide

In Central Northern, there were 161 infant deaths over the four years, 1999 to 2002, 4.5 infant deaths per 1,000 live births. There was considerable variation in IMRs within the region, with the highest IMR recorded for Salisbury - Central, Inner North, Balance (an IMR of 7.1, 24 infant deaths). This was in contrast to Salisbury - North-East, South-East, which had a much lower IMR of 3.5 (ten infant deaths).

The other BoD areas mapped in the highest range were Tea Tree Gully - South and Unley, with rates of 6.9 and 6.5, respectively, and both with ten infant deaths.

Of areas with at least four infant deaths, Tea Tree Gully - Central, Hills, North had a relatively low IMR, of 2.7 (nine deaths).

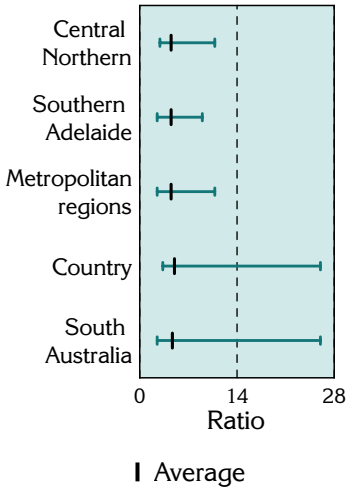
Southern Adelaide

As in Central Northern, the IMR in Southern was 4.5 infant deaths per 1,000 live births (64 deaths).

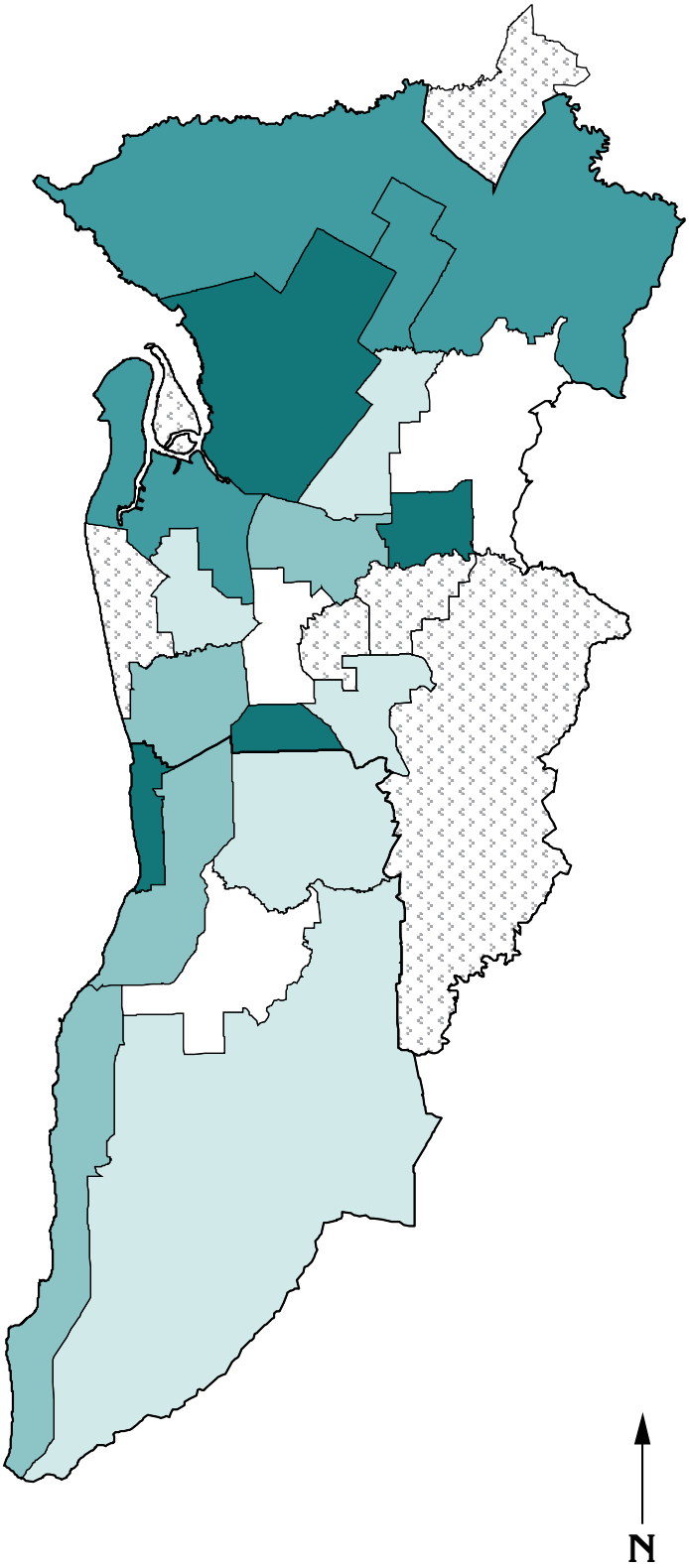
The areas in the region with above-average rates were Holdfast (an IMR of 9.0, nine deaths), Marion (5.3, 17 deaths), Port Adelaide Enfield - East, Inner (5.0, 12 deaths), and Onkaparinga - North Coast, South Coast (4.6, nine).

In contrast, the BoD area of Onkaparinga – Reservoir, Woodcroft had a low IMR of 3.2 (ten deaths).

Map 6.42
Infant deaths, metropolitan regions, 1999 to 2002



Note: The black vertical lines show the average rate for this indicator in each region; the horizontal lines show the range of the indicator at the BoD area level within the region.



BoD area
Health Region

Infant deaths per 1,000 live births

- *6.5 and above*
- *5.5 to 6.4*
- *4.5 to 5.4*
- *3.5 to 4.4*
- *below 3.5*
- *data not mapped*[#]

[#] *Data were not mapped for Torrens Island (mapped with Port Adelaide) or in areas with fewer than five deaths: Gawler has been mapped in the State map*

Source: See data sources, Appendix 1.3

Details of map boundaries are in Appendix 1.2

Country South Australia

In country South Australia, there were 103 deaths before 12 months of age over the period 1999 to 2002, an infant mortality rate (IMR) of 5.0 deaths per 1,000 live births.

The regions with the highest IMRs in country South Australia were the **South East** (7.1 infant deaths per 1,000 live births, 23 deaths) and **Northern and Far Western** (6.4, 18 deaths).

Table 6.50: Regional totals[1], infant deaths, 1999 to 2002

Region	No.	IMR[2]
Hills Mallee Southern	21	4.2
Hills	7	3.4
Southern	6	4.6
Mallee	8	4.8
Wakefield[3]	20	4.8
Gawler & Barossa	6	3.4
Balance of Wakefield	14	5.7
South East	23	7.1
Mount Gambier & Grant	16	9.8
Upper South East	7	4.4
Northern & Far Western	18	6.4
Eyre	7	3.8
Mid North	5	3.3
Riverland	9	5.2
Country SA	**103**	**5.0**
Central Northern	161	4.5
Southern	64	4.5
Metropolitan regions	**226**	**4.5**
South Australia	**329**	**4.7**

[1]**Region and Burden of Disease areas**
[2]**Infant mortality rate**
[3]**Gawler is included in Wakefield region**

The infant mortality rate was consistently weakly correlated with a number of the indicators of disadvantage, suggesting an association between infant mortality and disadvantage at the Burden of Disease (BoD) area level (Table A13).

The Regions

The highest regional IMR was recorded for the **South East** (an IMR of 7.1), where there were 23 infant deaths. The BoD area of Mount Gambier and Grant had a very high IMR of 9.8 (16 deaths). This rate was largely influenced by the extremely high IMR in Grant (26.0, eight deaths). Mount Gambier also had a relatively high IMR (6.0, eight deaths).

Northern and Far Western also had a high IMR of 6.4, with 18 infant deaths. Within the region, the SLAs of Port Augusta (9.5, seven deaths) and Whyalla (6.0, seven deaths) both recorded high IMRs. Both of these SLAs have relatively large Indigenous populations (a population group with higher rates of infant mortality than the rest of the State's population).

Riverland had an IMR of 5.2 (nine deaths) and very small numbers of deaths at the SLA level.

There were 20 deaths of infants in **Wakefield** (an IMR of 4.8). In the BoD areas mapped, there was an IMR in the combined Gawler and Barossa area of 3.4 (six deaths) and a higher IMR of 5.7 in the Balance of Wakefield (14 deaths). There were small numbers of deaths at the SLA level within this region.

Hills Mallee Southern had a relatively large number of deaths (21) with an IMR of 4.2. The IMRs for the BoD areas were relatively low: Mallee (an IMR of 4.8, eight deaths), Southern (4.6, six deaths), and Hills (3.4, seven deaths). The number of deaths in each of the SLAs was small, with Murray Bridge being the only SLA to record five deaths (with an IMR of 5.5).

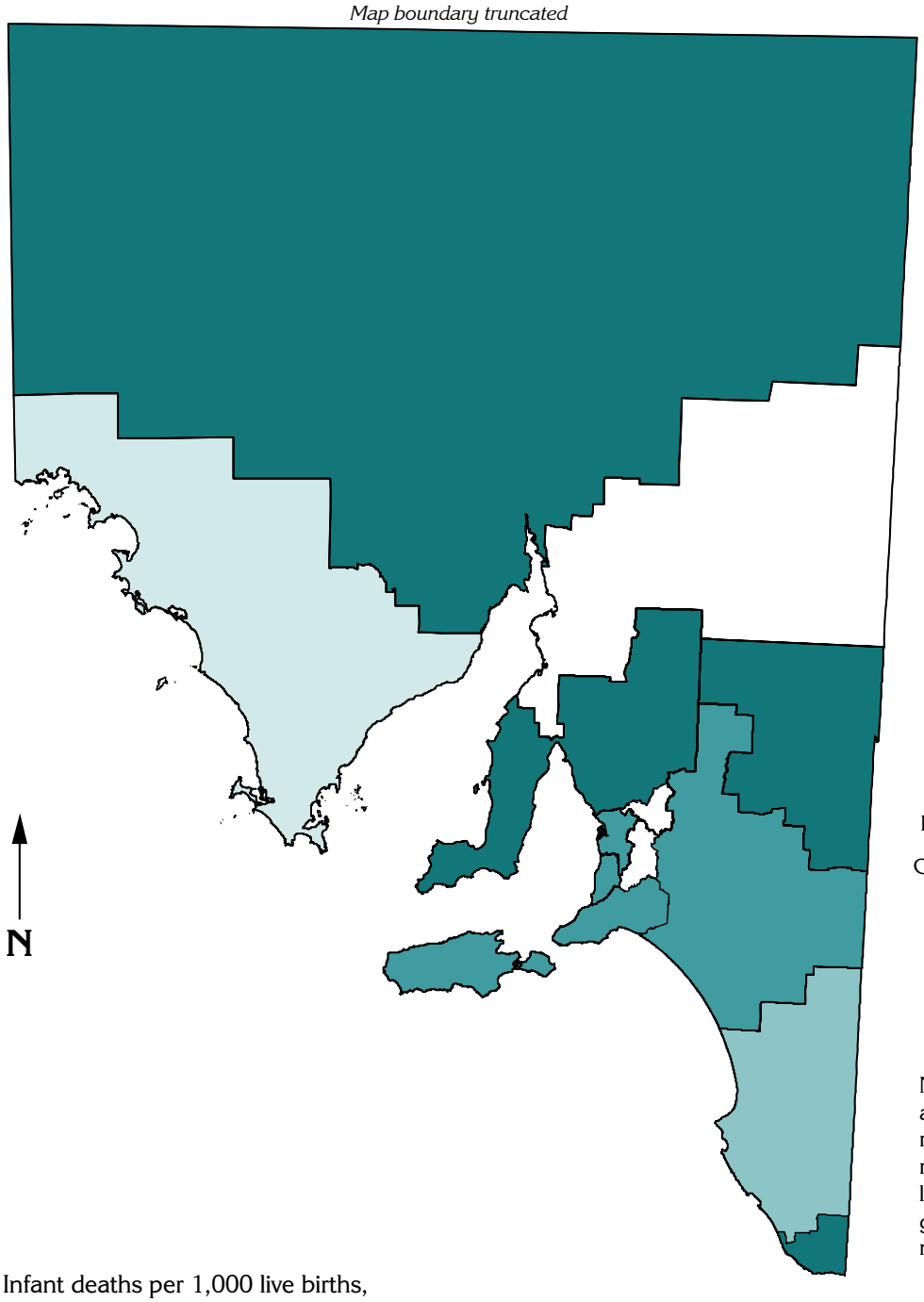
In **Eyre**, the IMR was 3.8 (seven deaths). Within the region, there were very small numbers of infant deaths, with many SLAs recording no deaths over the period from 1999 to 2002.

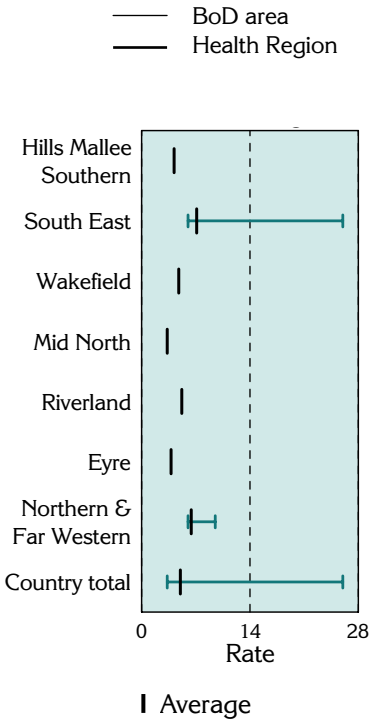
Mid North recorded the lowest IMR in country South Australia, and a small number of deaths (3.3, five deaths). There were also small numbers of deaths at the SLA level in this region, with many recording no deaths.

ASGC Remoteness classification

Infant death rates were highest in the Very Remote areas (6.3 infant deaths per 1,000 live births), although there were just five deaths in this four year period. Rates in the other remoteness classes ranged from 3.4 infant deaths per 1,000 live births in Remote to 6.0 in the Outer Regional areas.

Map 6.43
Infant deaths, South Australia, 1999 to 2002



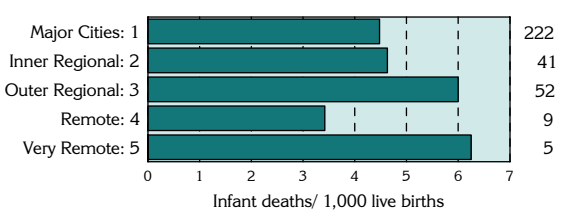


Note: The black vertical lines show the average rate for this indicator in each region; the horizontal lines show the range of the indicator at the BoD area level within the region. The lines not graphed had fewer than five deaths or no BoD areas within the regions.

Infant deaths per 1,000 live births, by BoD area

- *6.5 and above*
- *5.5 to 6.4*
- *4.5 to 5.4*
- *3.5 to 4.4*
- *below 3.5*

ASGC Remoteness classification



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, 1999 to 2002

Deaths before 65 years of age are premature, given the life expectancy of South Australian males of 77.5 years over this period. Malignant neoplasms (cancer), circulatory system diseases, and accidents, poisonings and violence, were the main causes of premature death for males (Table 6.47). Males most likely to die prematurely include Indigenous men; those who are homeless, or who live in sheltered accommodation or low cost boarding houses; those earning low incomes; and those who are unemployed (Draper et al. 2004).

There were 6,021 deaths of males, on average, per year in South Australia in 1999 to 2002, of which 87.9% were aged from 15 to 64 years. In stark contrast, only 53.4% of female deaths occurred between the ages of 15 to 64 years. In Metropolitan Adelaide, the death rate per 100,000 for males aged 15 to 64 years declined from 345.4 in 1985 to 1989, down to 255.3 in 1999 to 2002, a decrease of 26.1% (Table 6.51). This decline was slightly higher than in country South Australia, where the rate declined from 409.7 per 100,000 to 295.0 (a decrease of 28.0%).

Table 6.51: Deaths of males aged 15 to 64 years from all causes

Age-standardised rate per 100,000 males aged 15 to 64 years

Area	1985-1989	1992-1995	1999-2002	Per cent change[1]
Metropolitan Adelaide (incl. Gawler)	345.4	292.4	255.3	-26.1
Country	409.7	346.6	295.0	-28.0
South Australia	363.2	307.6	266.4	-26.7

[1]**Per cent change over the 13 year period in the rate of male deaths**

Metropolitan regions

The Standardised Death Ratio (SDR) for males aged 15 to 64 years in the metropolitan regions (excluding Gawler) from 1999 to 2002 was 96*, with four per cent fewer deaths than expected from the State rates (3,609 deaths) (Table 6.52).

The pattern of SDRs at the SLA level (Map 6.44) is consistent with the pattern of socioeconomic disadvantage seen in Chapters 4 and 5.

There were very strong correlations between high rates of premature male deaths and jobless families; unemployment; low income and single parent families; Indigenous status; SA Housing Trust rented dwellings; and clients of community mental health services. There were strong correlations with admissions to public acute hospitals; dwellings without a motor vehicle; unskilled and semi-skilled workers; GP services to males; and poor proficiency in English. These results, together with the very strong inverse correlation with the Index of Relative Socio-Economic Disadvantage, indicate a strong association at the SLA level between high premature death rates for males and socioeconomic disadvantage (Table 8.1).

Central Northern Adelaide

The SDR for 15 to 64 year old males was higher in the Central Northern region than in Southern, with an SDR of 98 (2,611 deaths). A large number of SLAs had ratios elevated by more than 30 per cent, including Playford - West Central (an SDR of 187**, 76 deaths) and - Elizabeth (158**, 131); Port Adelaide Enfield - Port (169**, 143), - Coast (139**, 135) and - Inner (135**, 82); Salisbury Balance (165*, 22); Adelaide (135**, 76); and Charles Sturt - North-East (130**, 107).

Large numbers of deaths were recorded for males in Salisbury - South-East (118 deaths, 91) and - Central (107, 116), Port Adelaide Enfield - East (111 deaths, 114), and Tea Tree Gully - South (103, 80*).

There was greater variation in SDRs in Central Northern compared with Southern (see graph opposite), with a number of SLAs mapping in the lowest range. These included Tea Tree Gully - Hills (41**, 22 deaths); Adelaide Hills - Ranges (43**, 17) and - Central (50**, 26); Burnside - North East (61**, 50); Playford - East Central (61**, 35); Tea Tree Gully - North (66**, 54) and - Central (68**, 67); Walkerville (an SDR of 73, 20); Unley - West (75, 43); Charles Sturt - Coastal (76**, 90); and Campbelltown - East (77*, 81).

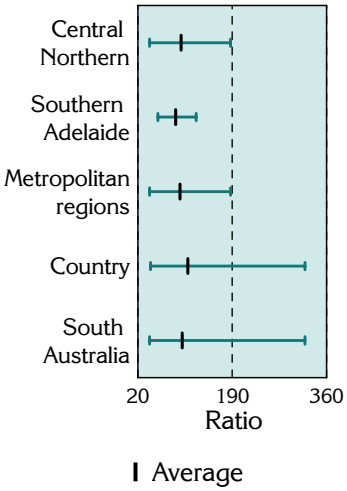
Southern Adelaide

There were few SDRs of greater than 100 in Southern, with an overall SDR of 88** (977 deaths). The highest SDR in this region, with 25 per cent more deaths than expected from the State rates, was in Marion - North (125*, 100 deaths). This was followed by elevated, but not statistically significant SDRs in Onkaparinga - North Coast (an SDR of 114, 74 deaths) and - Hackham (112, 53), Holdfast Bay - South (111, 58) and - North (103, 66), and Marion - Central (107, 130).

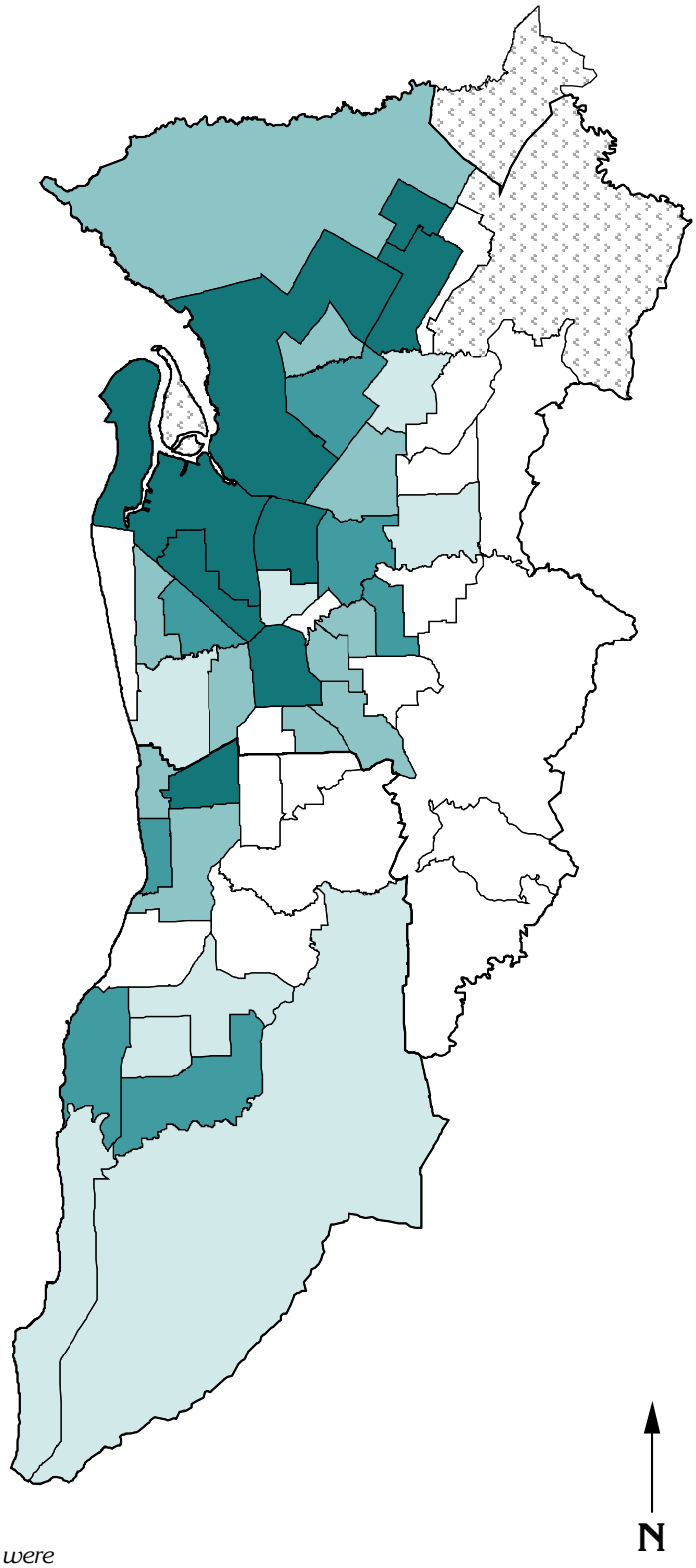
The Onkaparinga SLAs of - Woodcroft (90 deaths, 82) and - Morphett (71 deaths, 82) both had large numbers of male deaths. The SLA with the lowest SDR in the south was Mitcham - Hills (56**, 53 deaths), followed by Mitcham - North-East (59**, 32), Onkaparinga - Reservoir (65**, 54), Marion - South (75, 44) and Mitcham - West (76*, 57).

* **indicates statistical significance: see page 24**

Map 6.44
Deaths of males aged 15 to 64 years from all causes, metropolitan regions, 1999 to 2002



Note: The black vertical lines show the average ratio for this indicator in each region; the horizontal lines show the range of the indicator at the SLA level within the region.



SLA
Health Region

Standardised Death Ratio (as an index)*, by SLA

- *120 and above*
- *110 to 119*
- *90 to 109*
- *80 to 89*
- *below 80*
- *data not mapped*#

*Index shows the number of deaths of people in the SLA compared with the number expected: expected numbers were derived by indirect age standardisation, based on SA totals

Data were not mapped for Torrens Island (mapped with Port Adelaide) or in areas with fewer than five deaths: Gawler has been mapped in the State map

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, 1999 to 2002

Country South Australia

There were 1,686 deaths of males aged 15 to 64 years and resident in country South Australia, ten per cent more than expected from the State rates (Table 6.52).

The SLAs with the highest Standardised Death Ratios (SDRs) were located in the north of the State (Map 6.45) which is, in part, a reflection of the higher proportions of Aboriginal people living in these areas, and their higher premature death rates. Data for a number of SLAs have not been mapped, as there were too few cases from which to calculate reliable rates.

Table 6.52: Regional totals, deaths of males aged 15 to 64 years, 1999 to 2002

Region	Number	SDR
Hills Mallee Southern	388	96
Wakefield[1]	370	106
South East	215	97
Northern & Far Western	280	145**
Eyre	137	113
Mid North	136	115
Riverland	138	113
Country SA	**1,686**	**110****
Central Northern	2,611	98
Southern	977	88**
Metropolitan regions	**3,609**	**96***
South Australia	**5,295**	**100**

[1] **Gawler is included in Wakefield region**

Premature male deaths in country South Australia were strongly correlated with unemployment at the SLA level. There was a weak inverse correlation with the Index of Relative Socio-Economic Disadvantage, and weak correlations with Indigenous status, dwellings without a motor vehicle, admissions to public acute hospitals and low income and jobless families (Table 8.2).

The Regions

Northern and Far Western had 45% more premature deaths than expected from the State rates, an SDR of 145** (280 deaths). Within the region, there was a highly elevated SDR in Unincorporated Far North, with nearly two and a half times the expected number of deaths (244**, 47 deaths); this SLA has a relatively large Indigenous population (41.4% of the total population for the area). There were also highly elevated SDRs in Flinders Ranges (186*, 12 deaths), Port Augusta (151**, 75), Coober Pedy (an SDR of 138, 20) and Whyalla (131**, 110).

Mid North had an SDR of 115 (136 deaths). Orroroo/Carrieton had the highest SDR in country South Australia, with over three times the expected number of deaths (an SDR of 321**, 12 deaths). Port Pirie - City also had an elevated SDR (124, 63).

Eyre had an SDR of 113 (137 deaths). There were highly elevated SDRs in Ceduna (223**, 28 deaths), Unincorporated West Coast (189, four), Franklin Harbor (140, seven), Elliston (138, seven) and Le Hunte (120, six). There were 57% fewer deaths than expected in Lower Eyre Peninsula (43*, seven). Port Lincoln had 49 deaths (an SDR of 111).

In **Riverland**, the SDR was 113 (138 deaths). There were elevated ratios in the SLAs of Renmark Paringa - Renmark (137, 37) and - Paringa (136, eleven), and Loxton Waikerie - West (126, 23); and a low ratio in Loxton Waikerie - East (74, 20 deaths). Berri and Barmera - Berri had 30 deaths (117).

There were 370 premature deaths in **Wakefield** (an SDR of 106), with 73% more deaths than expected in the SLA of Wakefield (an SDR of 173**, 39 deaths) and elevated ratios in Copper Coast (148**, 60), Yorke Peninsula - South (139, 22) and Mallala (136, 35). There were fewer premature deaths than expected in Barossa - Tanunda (66, ten) and - Barossa (71, 19), Light (66, 25), and Clare and Gilbert Valleys (74, 23). Large numbers of deaths were recorded in the SLAs of Gawler (54 deaths, an SDR of 93) and Yorke Peninsula - North (39, 118).

There were three per cent fewer deaths than expected in **South East** (an SDR of 97, 215 deaths). The only SLA with an elevated SDR was Mount Gambier (124*, 94). There were fewer deaths than expected in Lacepede (53, five deaths) and Grant (75, 24 deaths). Wattle Range - West recorded 33 deaths (an SDR of 100).

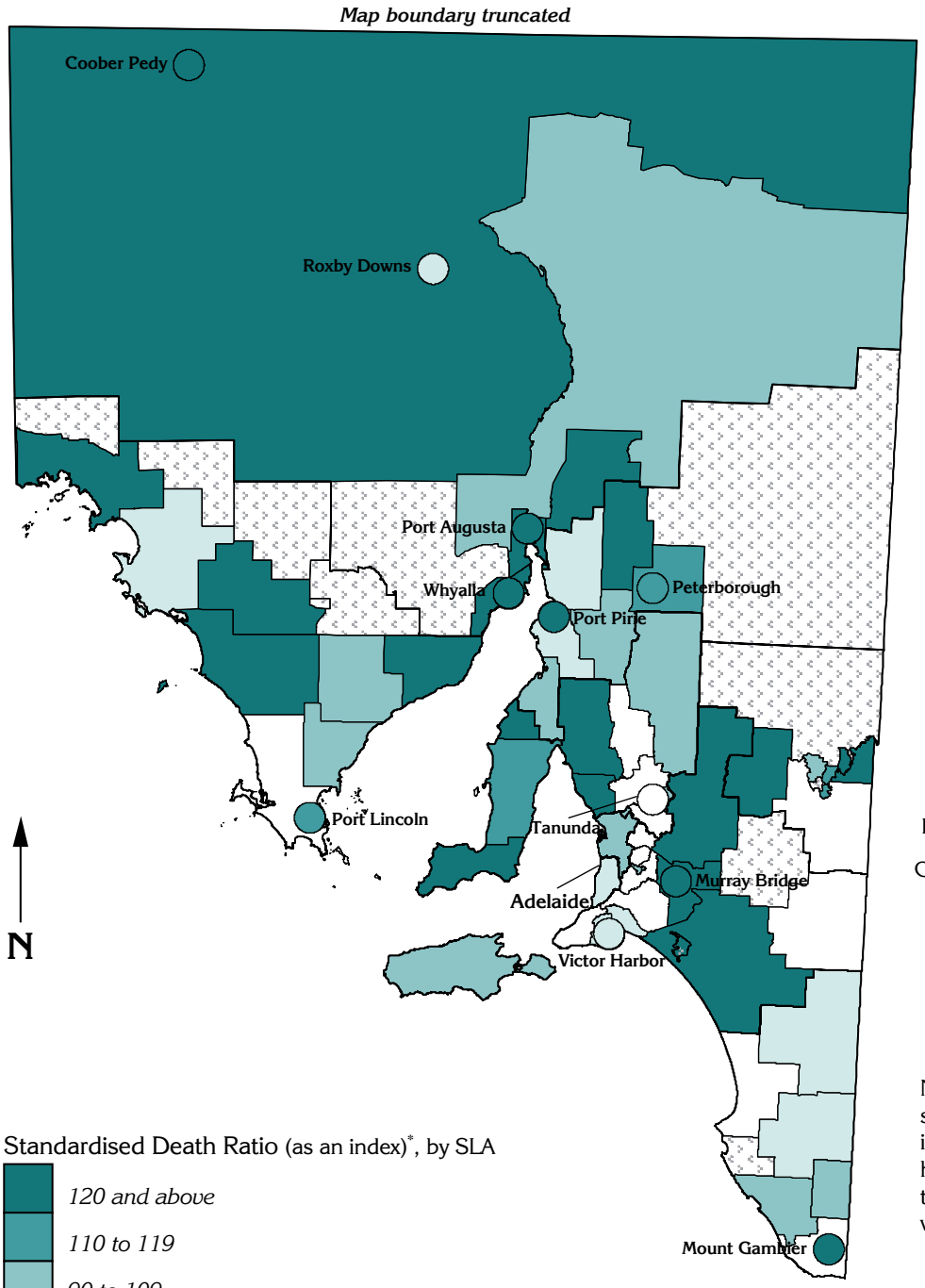
There were 388 deaths in **Hills Mallee Southern**, four per cent fewer than expected (an SDR of 96). The SLAs of Mid Murray (an SDR of 151**, 54), The Coorong (146*, 35) and Murray Bridge (127*, 78) all had elevated SDRs. A number of SLAs in this region had low SDRs including Adelaide Hills - North (49**, 13), Southern Mallee (58, five deaths), Adelaide Hills Balance (62*, 19), Mount Barker Balance (an SDR of 74, 21), Alexandrina - Strathalbyn (75, 22) and Yankalilla (76, 12).

ASGC Remoteness classification

The lowest SDRs for premature deaths of males were recorded in the Major Cities (an SDR of 96**) and Inner Regional (95) areas. The highly elevated SDR in the Very Remote areas (183**, almost twice the number of deaths of males at these ages expected from the State rates) reflects the very high premature death rates of Indigenous males.

* **indicates statistical significance: see page 24**

Map 6.45
Deaths of males aged 15 to 64 years from all causes, South Australia, 1999 to 2002



Note: The black vertical lines show the average ratio for this indicator in each region; the horizontal lines show the range of the indicator at the SLA level within the region.

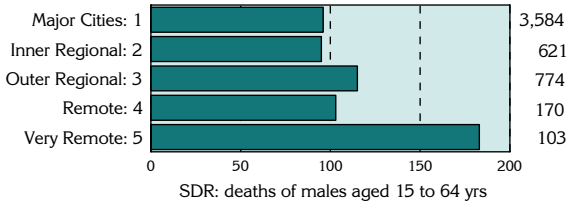
Standardised Death Ratio (as an index)*, by SLA

- *120 and above*
- *110 to 119*
- *90 to 109*
- *80 to 89*
- *below 80*
- *data not mapped#*

*Index shows the number of deaths of people in the SLA compared with the number expected: expected numbers were derived by indirect age standardisation, based on SA totals

#Data were not mapped because the SLA has a population of less than 100, or there were fewer than five deaths

ASGC Remoteness classification



Source: See data sources, Appendix 1.3

Details of map boundaries are in Appendix 1.2

Deaths of females aged 15 to 64 years from all causes, 1999 to 2002

Deaths before 65 years of age are premature, given the life expectancy of South Australian females of 82.7 years over this period. As for males, cancer was the main cause of premature death for females, followed by diseases of the circulatory system and the combined causes of accidents, poisonings and violence (Table 6.47). Females most likely to die prematurely include Aboriginal and Torres Strait Islander women; single mothers; those earning low incomes; and those who were unemployed (Dunn et al. 2002).

Overall, there were 5,733 deaths of female residents in South Australia, of whom 3,061 were aged from 15 to 64 years. The data mapped for this variable therefore represent 53.4% of all female deaths. The premature female death rate in Metropolitan Adelaide has declined from 179.9 deaths per 100,000 in 1985 to 1989, down to 150.2 in 1999 to 2002, a decrease of 16.5%, compared with a smaller decrease (and higher rates) in country South Australia (Table 6.53).

Table 6.53: Deaths of females aged 15 to 64 years from all causes

Age-standardised rate per 100,000 females aged 15 to 64 years

Area	1985-1989	1992-1995	1999-2002	Per cent change[1]
Metropolitan Adelaide (incl. Gawler)	179.9	162.9	150.2	-16.5
Country	189.3	183.0	169.9	-10.2
South Australia	182.3	168.2	155.4	-14.8

[1]**Per cent change over the 13 year period in the rate of female deaths**

Metropolitan regions

Over the period 1999 to 2002, there were 2,137 premature deaths of females in the metropolitan regions (excluding Gawler), a Standardised Death Ratio (SDR) of 96.

The pattern of SDRs at the SLA level (Map 6.46) is generally consistent with the pattern of socioeconomic disadvantage seen in Chapters 4 and 5.

Premature female deaths were very strongly correlated at the SLA level with the variables for low income and jobless families; unemployment; Indigenous status; and community mental health service clients. There were strong correlations with single parent families; smoking during pregnancy; unskilled and semi-skilled workers; and dwellings without a motor vehicle. These results, together with the strong inverse correlation with the Index of Relative Socio-Economic Disadvantage, indicate a strong association at the SLA level between high premature death rates for females and socioeconomic disadvantage (Table 8.1).

Central Northern Adelaide

There were 1,541 premature female deaths in the Central Northern region, one per cent fewer deaths than expected from the State rates. There is, however, considerable variation throughout the region, from 70% more premature deaths than expected from the State rates in Playford - West Central (an SDR of 170**, 39 deaths), to 56% fewer in Adelaide Hills Ranges (44**, ten deaths).

There were also elevated ratios in the SLAs of Playford - Elizabeth (an SDR of 146**, 75 deaths), Unley - East (140*, 53), Port Adelaide Enfield - Inner (138*, 51), - Port (119, 57) and - East (124, 71), Salisbury - South-East (124*, 88), Campbelltown - West (122, 47), Salisbury - Central (120, 63) and Charles Sturt - Inner East (118, 50).

There were large numbers of premature female deaths in the SLAs of Tea Tree Gully - South (72 deaths, an SDR of 96), Charles Sturt - Coastal (68 deaths, 92), Port Adelaide Enfield - Coast (63 deaths, 107) and - Port (57 deaths, 119), and Campbelltown - East (55 deaths, 82).

SLAs with the lowest ratios in the region included Burnside - North-East (an SDR of 48**, 24 deaths), Tea Tree Gully - North (63*, 29), Burnside - South-West (71*, 32), West Torrens - West (73*, 43), Tea Tree Gully - Central (74*, 43), Adelaide Hills - Central (74, 21), Norwood Payneham St Peters - East (77, 26) and Salisbury Balance (79, seven).

Southern Adelaide

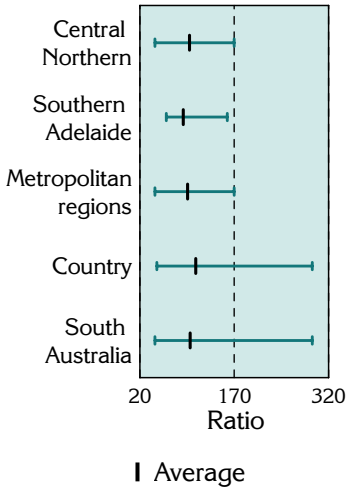
The SDR for premature female deaths was lower in Southern than in Central Northern region, with eleven per cent fewer deaths than expected from the State rates (89**, 586 deaths). The highest SDR in the south was recorded for Onkaparinga - North Coast, with 59% more premature deaths than expected (159**, 57 deaths). There was also an elevated ratio in Holdfast Bay - South (122, 38).

Marion - Central (70 deaths, an SDR of 93), Onkaparinga - Morphett (49 deaths, 101), Marion - North (49 deaths, 104) and Onkaparinga - Woodcroft (48 deaths, 73*) all had large numbers of premature female deaths.

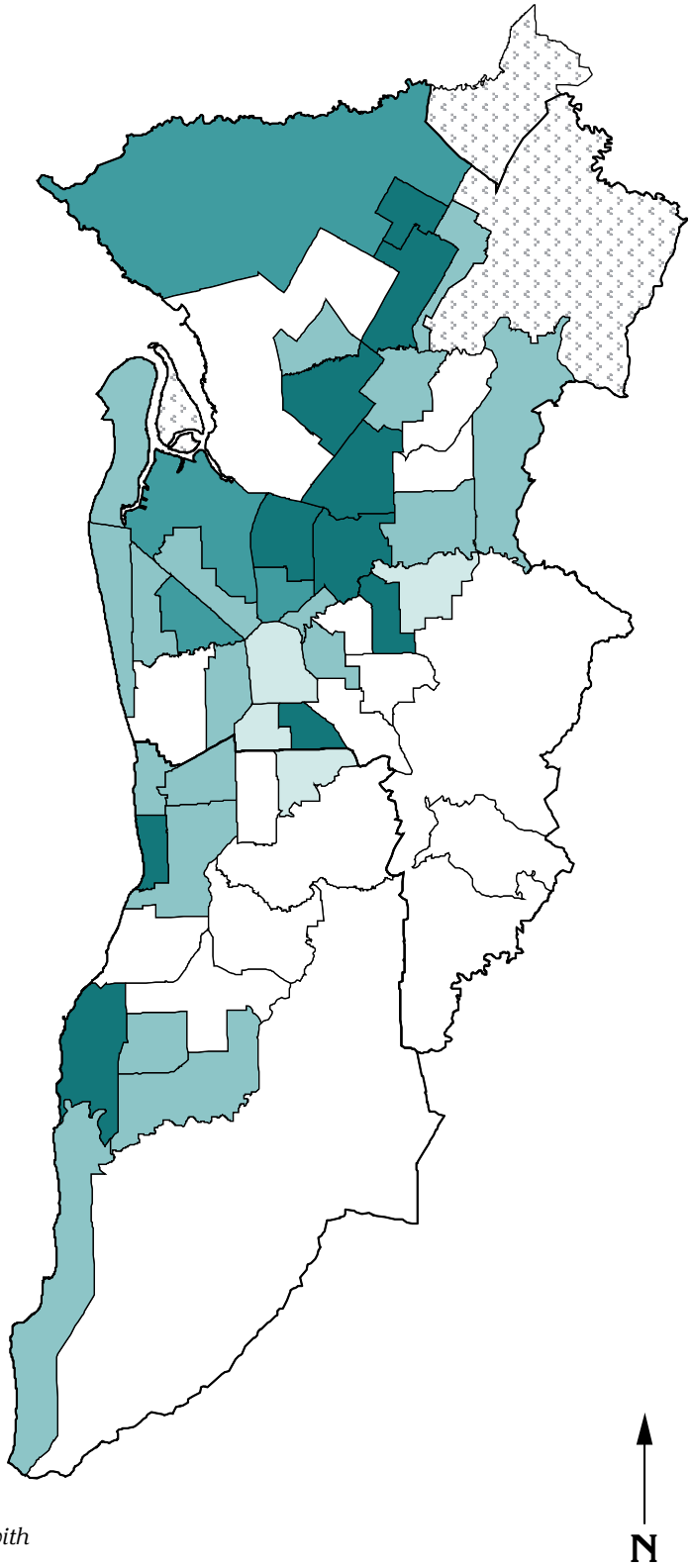
Low ratios were recorded for the SLAs of Marion - South (an SDR of 62*, 24 deaths), Onkaparinga - Reservoir (63**, 31), - Woodcroft (73*, 48) and - Hills (66, 16), and Mitcham - Hills (69*, 41), - West (72, 32), and - North-East (82, 26).

* **indicates statistical significance: see page 24**

Map 6.46
Deaths of females aged 15 to 64 years from all causes, metropolitan regions, 1999 to 2002



Note: The black vertical lines show the average ratio for this indicator in each region; the horizontal lines show the range of the indicator at the SLA level within the region.



SLA
Health Region

Standardised Death Ratio (as an index)*, by SLA

- *115 and above*
- *105 to 114*
- *95 to 104*
- *85 to 94*
- *below 85*
- *data not mapped#*

*Index shows the number of deaths in the SLA compared with the number expected: expected numbers were derived by indirect age standardisation, based on SA totals

#Data were not mapped for Torrens Island (mapped with Port Adelaide) or in areas with fewer than five deaths: Gawler has been mapped in the State map

Source: See data sources, Appendix 1.3 ***Details of map boundaries are in Appendix 1.2***

Deaths of females aged 15 to 64 years from all causes, 1999 to 2002

Country South Australia

Females aged from 15 to 64 years living in country South Australia recorded nine per cent more deaths than expected from the State rates (an SDR of 109**, 924 deaths). Data for a number of SLAs have not been mapped, as there were considered to be too few cases from which to calculate reliable rates.

As for males, the most highly elevated Standardised Death Ratios (SDRs) at the regional level were in areas with relatively large Indigenous populations (Table 6.54). High SDRs were mapped throughout the State (Map 6.47).

Table 6.54: Regional totals, deaths of females aged 15 to 64 years, 1999 to 2002

Region	Number	SDR
Hills Mallee Southern	229	99
Wakefield[1]	208	104
South East	118	98
Northern & Far Western	124	131**
Eyre	79	121
Mid North	75	112
Riverland	88	135**
Country SA	**924**	**109****
Central Northern	1,541	99
Southern	586	89**
Metropolitan regions	**2,137**	**96**
South Australia	**3,061**	**100**

[1]**Gawler is included in Wakefield region**

There were strong correlations between premature female deaths, Indigenous status and unemployment; and weaker correlations with the other indicators of socioeconomic disadvantage. These results, together with the weak inverse correlation with the Index of Relative Socio-Economic Disadvantage, suggest an association at the SLA level between high premature death rates for females and socioeconomic disadvantage (Table 8.2).

The Regions

Riverland had the most highly elevated regional standardised death ratio in country South Australia, with 35% more deaths than expected from the State rates (135**, 88 deaths). Within this region, there were highly elevated ratios in the SLAs of Berri and Barmera - Berri (an SDR of 159*, 21 deaths); Loxton Waikerie - West (153, 14) and - East (144, 21); and an elevated ratio in Renmark Paringa - Renmark (an SDR of 116, 18).

Northern and Far Western had an elevated SDR of 131** (124 deaths). Unincorporated Far North, an SLA with a large Indigenous population, had the most highly elevated SDR, at nearly three times the expected rate (294**, 21 deaths). There were also elevated ratios in Flinders Ranges (175, seven deaths) and Port Augusta (131, 34). Fifty deaths were recorded in Whyalla (with an SDR of 110).

In **Eyre**, there were 21% more premature female deaths than expected (and SDR of 121, 79 deaths), with a highly elevated SDR of 268** in Ceduna (17 deaths). Port Lincoln had an SDR of 128 (32 deaths); Cleve (166, six), Streaky Bay (158, six) and Tumby Bay (118, seven deaths) all had elevated SDRs, but with small numbers of deaths.

Mid North had an SDR of 112 (75 deaths). There were highly elevated SDRs in the SLAs of Peterborough (192*, ten deaths), Mount Remarkable (147, ten), Northern Areas (141, 13) and Barunga West (119, seven). Port Pirie Balance had a low SDR of 65 (five deaths).

There were 208 premature deaths of females in **Wakefield** (an SDR of 104); with elevated SDRs in Goyder (137, 13 deaths), Barossa - Tanunda (127, eleven) and Copper Coast (125, 32). Forty deaths were recorded in Gawler (an SDR of 111). There were lower than expected SDRs in Barossa - Barossa (61, nine deaths) and Light (78, 16).

Hills Mallee Southern had an SDR of 99, and 229 deaths. Yankalilla (179*, 17) and Murray Bridge (126, 42) both had elevated SDRs. There were relatively large numbers of deaths in the SLAs of Mount Barker - Central (30 deaths, 112), Victor Harbor (27, 112) and Alexandrina - Coastal (20, 86). Mid Murray (an SDR of 70, 13 deaths) and Mount Barker Balance (73, 13) both had low SDRs.

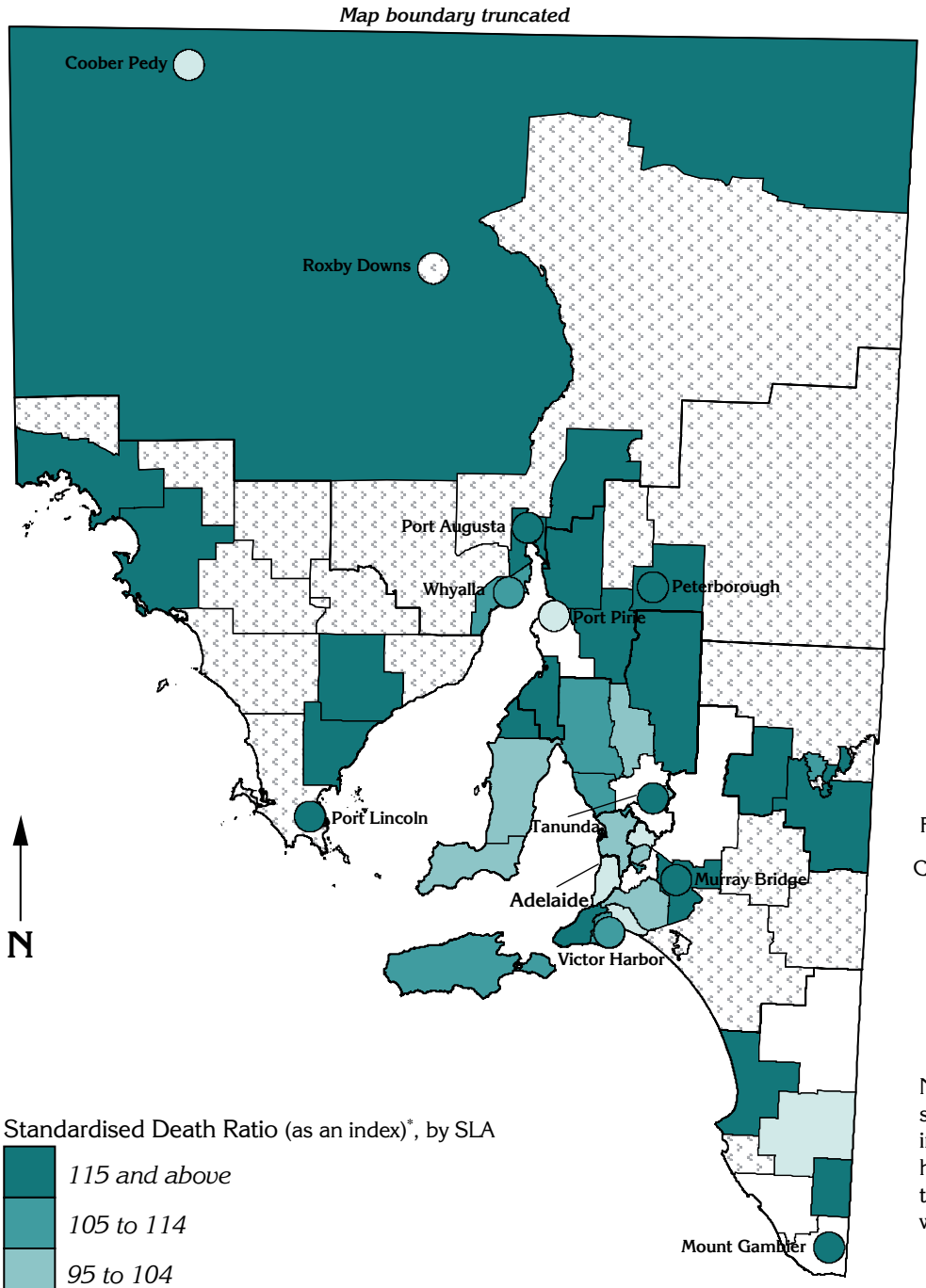
South East had the lowest SDR in country South Australia, with two per cent fewer premature deaths than expected from the State rates (98, 118 deaths). There was a highly elevated SDR in Wattle Range - East (275**, 17) and elevated SDRs in Lacepede (123, seven deaths) and Mount Gambier (116, 50). Some of the lowest SDRs in country South Australia were recorded in this region, including in the SLAs of Tatiara (47, six deaths), Wattle Range - West (51*, nine) and Grant (77, 13).

ASGC Remoteness classification

Standardised death ratios for females show a similar pattern to those for males, but with a higher ratio in the Very Remote areas. The ratios range from a low of 97 in the Major Cities areas to a highly elevated 198** in the Very Remote areas. As noted for males, the elevated SDR in the Very Remote areas is likely to reflect the very high premature death rates experienced by Aboriginal females.

* **indicates statistical significance: see page 24**

Map 6.47
Deaths of females aged 15 to 64 years from all causes, South Australia, 1999 to 2002



Note: The black vertical lines show the average ratio for this indicator in each region; the horizontal lines show the range of the indicator at the SLA level within the region.

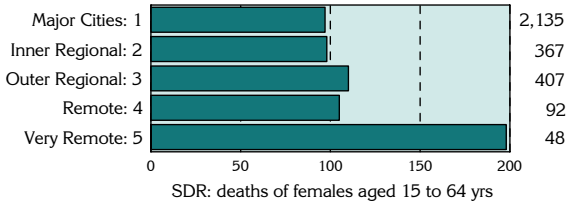
Standardised Death Ratio (as an index)*, by SLA

- *115 and above*
- *105 to 114*
- *95 to 104*
- *85 to 94*
- *below 85*
- *data not mapped#*

*Index shows the number of deaths in the SLA compared with the number expected: expected numbers were derived by indirect age standardisation, based on SA totals

#Data were not mapped because the SLA has a population of less than 100, or there were fewer than five deaths

ASGC Remoteness classification



Source: See data sources, Appendix 1.3

Details of map boundaries are in Appendix 1.2

Avoidable mortality, 1999 to 2002
Deaths at ages 0 to 74 years from potentially avoidable causes

One approach to assessing the quality of health care, in terms of clinical outcomes, has been to identify deaths that should not have occurred, given the availability of health care interventions. The largest contributors to these deaths are cancers and cardiovascular diseases (around one third each), unintentional and intentional injuries (15% each) and respiratory diseases (six per cent). A more detailed description of the concept of 'avoidable mortality' is at the beginning of this section (page 281); only deaths before the age of 75 years have been included in this analysis.

In 1999 to 2002, there were 11,345 avoidable deaths in South Australia, a rate of 812 deaths per 100,000 population. In Metropolitan Adelaide, the rate was 776 deaths per 100,000 population, representing 7,893 deaths; a higher rate, of 909 deaths per 100,000 population (3,448 deaths) was recorded for residents of country South Australia (Table 6.55).

Table 6.55: Avoidable mortality, 1999 to 2002

Age standardised rate per 100,000 persons aged 0 to 74 years

Area	No.	Rate
Metropolitan Adelaide (incl. Gawler)	7,893	776
Country	3,448	909
South Australia	11,345	812

Metropolitan regions

There were 7,765 avoidable deaths in 1999 to 2002 in the metropolitan regions (excluding Gawler), four per cent fewer than expected from the State rates, and a standardised ratio (SR) of 96** (Table 6.56).

The pattern of SRs at the SLA level (Map 6.48) is consistent with the pattern of socioeconomic disadvantage seen in Chapters 4 and 5.

Avoidable mortality was very strongly correlated with high rates of jobless families; community mental health clients; being Indigenous; unemployment; single parent families; low income families; Disability Support Pensioners; Housing Trust rented dwellings; dwellings without a motor vehicle; and outpatient attendances and admissions to public acute hospitals. These results, together with the very strong inverse correlation with the Index of Relative Socio-Economic Status, indicate an association at the SLA level between avoidable mortality and socioeconomic disadvantage (Table 8.1).

Central Northern Adelaide

Residents of Central Northern had 5,644 deaths from avoidable causes, one per cent fewer than expected from the State rates.

A number of SLAs in the region had highly elevated ratios, with the highest being in Playford - West Central, where there were 64% more avoidable deaths than expected (an SR of 164**, 133 deaths). Playford - Elizabeth had 44% more avoidable deaths than expected (an SR of 144**, 307 deaths), with other high ratios in Port Adelaide Enfield - Port (132**, 275) and - Inner (130**, 214); Charles Sturt - North-East (127**, 250); Adelaide (122*, 114); Salisbury - Central (121**, 213) and Balance (121, 32); and Port Adelaide Enfield - Coast (120**, 261).

There were large numbers of avoidable deaths in Salisbury - South-East (276 deaths, an SR of 114*), Port Adelaide Enfield - East (247 deaths, 105), Tea Tree Gully - South (227, 92), Charles Sturt - Inner West (206, 92), Charles Sturt - Inner East (201, 104), West Torrens - East (195, 104), and Campbelltown - West (171, 96).

A number of SLAs in Central Northern had fewer avoidable deaths than expected from the State rates. These included Playford Hills (an SR of 37**, seven deaths), Adelaide Hills - Ranges (55**, 37), Tea Tree Gully - Hills (61**, 58), Burnside - North-East (65**, 121), Walkerville (66**, 42), Adelaide Hills - Central (67**, 58), Tea Tree Gully - North (70**, 97) and - Central (72**, 128), West Torrens - West (78**, 202), Unley - West (79**, 93), Campbelltown - East (79**, 169) and Charles Sturt - Coastal (79**, 214).

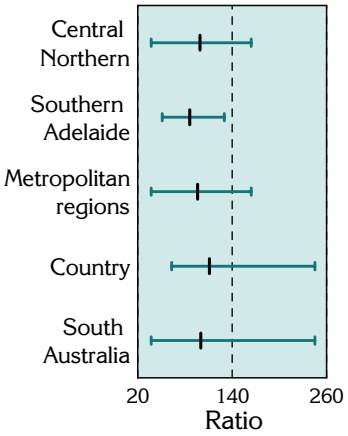
Southern Adelaide

There were 14% fewer avoidable deaths than expected in Southern (an SR of 86**, 2,088 deaths), but 30% more avoidable deaths than expected in Onkaparinga - North Coast (an SR of 130**, 184 deaths). There were large numbers of avoidable deaths in Marion - Central (314 deaths, an SR of 97) and - North (232, 105), and Onkaparinga - Morphett (162 deaths, 100) and - Woodcroft (157, 80**).

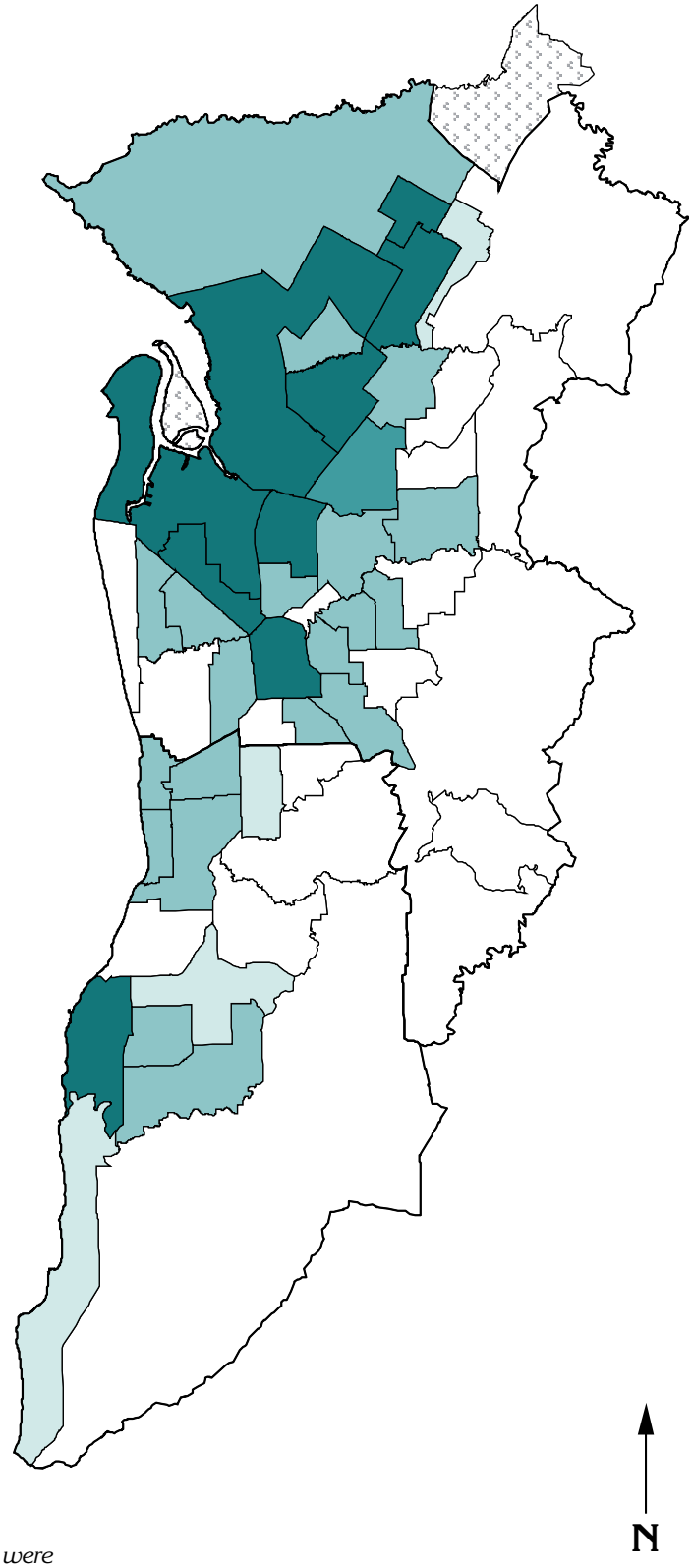
There were lower than expected ratios of avoidable death in Mitcham - North-East (an SR of 51**, 63 deaths), Onkaparinga - Reservoir (55**, 80), Mitcham - Hills (59**, 112), Onkaparinga - Hills (62**, 51) and Marion South (68**, 76).

* **indicates statistical significance: see page 24**

Map 6.48
Avoidable mortality, metropolitan regions, 1999 to 2002
Deaths at ages 0 to 74 years from potentially avoidable causes



Note: The black vertical lines show the average ratio for this indicator in each region; the horizontal lines show the range of the indicator at the SLA level within the region.



SLA
Health Region

Standardised Ratio (as an index) *, by SLA

- *120 and above*
- *110 to 119*
- *90 to 109*
- *80 to 89*
- *below 80*
- *data not mapped#*

*Index shows the number of avoidable deaths in the SLA compared with the number expected: expected numbers were derived by indirect age standardisation, based on SA totals

#Data were not mapped for Torrens Island (mapped with Port Adelaide) or in areas with fewer than five deaths: Gawler has been mapped in the State map

Source: See data sources, Appendix 1.3 ***Details of map boundaries are in Appendix 1.2***

Avoidable mortality, 1999 to 2002
Deaths at ages 0 to 74 years from potentially avoidable causes

Country South Australia

There were 3,580 avoidable deaths in country South Australia in 1999 to 2002, eleven per cent more than expected from the State rates (a standardised death ratio (SR) of 111**); this compares with four per cent fewer deaths in the metropolitan regions.

All of the regions in the country had ratios of 100 or more (Table 6.56). **Northern and Far Western** had the most highly elevated ratio, with 42% more avoidable deaths than expected (an SR of 142**, 492 deaths) (see graph opposite). Given these high rates at the regional level, many SLAs across the State also had high rates (Map 6.49).

Table 6.56: Regional totals, avoidable mortality, 1999 to 2002

Region	Number	SR
Hills Mallee Southern	875	100
Wakefield[1]	802	102
South East	489	108
Northern & Far Western	492	142**
Eyre	265	108
Mid North	324	124**
Riverland	309	122**
Country SA	**3,580**	**111****
Central Northern	5,644	99
Southern	2,088	86**
Metropolitan regions	**7,765**	96**
South Australia	**11,345**	**100**

[1]**Gawler is included in Wakefield region**

Avoidable mortality was very strongly correlated with being Indigenous and with dwellings without a motor vehicle. There were also strong correlations with jobless families, single parent families, unemployment and admissions to public acute hospitals. These results, together with a very strong inverse correlation with the Index of Relative Socio-Economic Disadvantage, indicate a strong association at the SLA level between avoidable mortality and socioeconomic disadvantage (Table 8.2).

The Regions

There were 492 avoidable deaths in **Northern and Far Western** in 1999 to 2002, 42% more than expected (an SR of 142**). There was a very highly elevated ratio in Unincorporated Far North, with nearly two and a half times the expected number of avoidable deaths (245**, 66 deaths), with other highly elevated ratios in Unincorporated Flinders Ranges (an SR of 163 but not statistically significant, and eleven deaths), Port Augusta (150**, 141), Coober Pedy (132, 28) and Whyalla (129**, 214).

Mid North had 24% more avoidable deaths than expected from the State rates (324 deaths), with elevated ratios in Peterborough (an SR of 158**, 32 deaths), Barunga West (144*, 34), Port Pirie - City (135**, 152) and Orroroo/Carrieton (129, 13).

In **Riverland**, there were 22% more avoidable deaths than expected (an SR of 122**, 309 deaths). SLAs with highly elevated ratios were Renmark Paringa - Paringa (an SR of 146, 22 deaths), Loxton Waikerie - West (131, 50), Renmark Paringa - Renmark (125, 75), and Berri and Barmera - Berri (120, 56) and - Barmera (115, 43).

There were 489 avoidable deaths in **South East** (an SR of 108), with elevated ratios in Wattle Range - East (152*, 37) and Mount Gambier (126**, 203). Large numbers of avoidable deaths occurred in Wattle Range - West (78 deaths, an SR of 112) and Naracoorte and Lucindale (56 deaths, 98). There were low ratios of avoidable deaths in Grant (71*, 41) and Tatiara (an SR of 81, 40).

Eyre also had an elevated ratio of 108 (265 avoidable deaths). The SLAs of Unincorporated West Coast (an SR of 214*, seven deaths), Ceduna (157**, 33), Tumby Bay (140*, 34), Kimba (116, 13), Streaky Bay (116, 16) and Elliston (116, eleven) all had elevated ratios. Low ratios were recorded in Lower Eyre Peninsula (an SR of 71, 22 deaths) and Cleve (an SR of 79, 12 deaths).

There were 802 avoidable deaths in **Wakefield** (an SR of 102), with elevated ratios in Copper Coast (142**, 150 deaths), Yorke Peninsula - South (125, 53) and - North (123*, 96), and Goyder (121, 45). Gawler had 128 avoidable deaths (an SR of 91). There were low ratios of avoidable deaths in Light (an SR of 63*, 45 deaths), Barossa - Barossa (68*, 34) and Clare and Gilbert Valleys (84, 56).

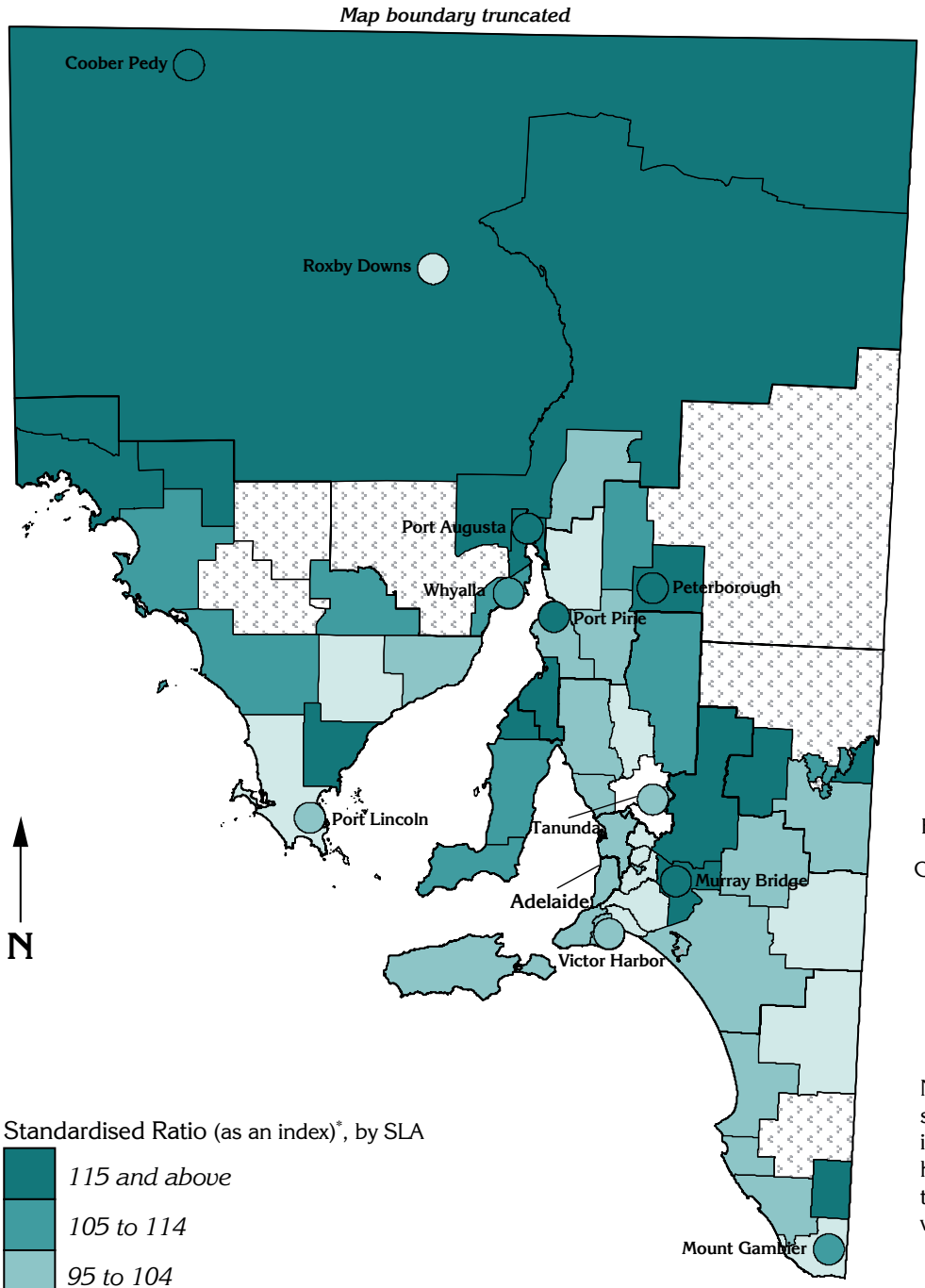
Hills Mallee Southern had 875 avoidable deaths in 1999 to 2002 (an SR of 100). Within this region, there were elevated ratios in Mid Murray (an SR of 145**, 102 deaths) and Murray Bridge (136**, 171). A number of SLAs had low ratios, including Adelaide Hills - North (an SR of 70*, 31 deaths), Mount Barker Balance (73*, 39) and Southern Mallee (an SR of 79, 14).

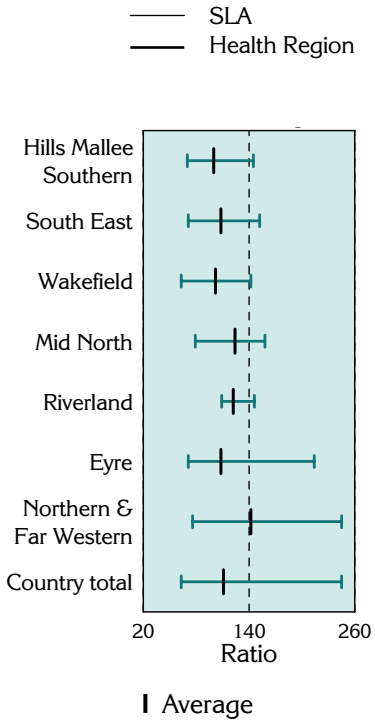
ASGC Remoteness Classification

The SR for Very Remote areas was very highly elevated (157**, 141 deaths) compared to the other remoteness classes. The Outer Regional areas and Remote areas had elevated ratios, of 120** (1,705 deaths) and 108 (364 deaths), respectively. Major Cities and Inner Regional areas both recorded four per cent fewer avoidable deaths than expected.

* **indicates statistical significance: see page 24**

Map 6.49
Avoidable mortality, South Australia, 1999 to 2002
Deaths at ages 0 to 74 years from potentially avoidable causes





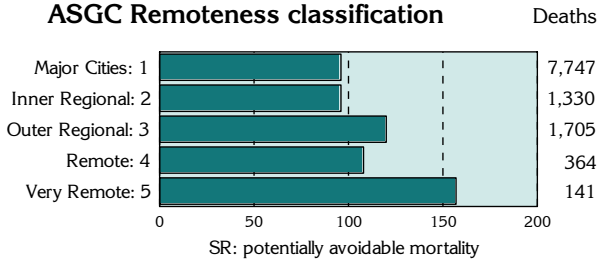
Note: The black vertical lines show the average ratio for this indicator in each region; the horizontal lines show the range of the indicator at the SLA level within the region.

Standardised Ratio (as an index)*, by SLA

- *115 and above*
- *105 to 114*
- *95 to 104*
- *85 to 94*
- *below 85*
- *data not mapped#*

*Index shows the number of avoidable deaths in the SLA compared with the number expected: expected numbers were derived by indirect age standardisation, based on SA totals

#Data were not mapped because the SLA has a population of less than 100, or there were fewer than five deaths



Source: See data sources, Appendix 1.3

Details of map boundaries are in Appendix 1.2

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Burden of disease

Introduction

The methods to estimate the burden of disease on the population combine information on deaths and non-fatal (disease and injury) outcomes, to provide two broad summary measures of population health, namely health expectancies and health gaps (DH 2004).

Health expectancies are expressed as Health-Adjusted Life Expectancy (HALE). This is calculated as the number of years expected to be lived in what might be termed the equivalent of 'full health' (Mathers et al. 2000).

Disability-Adjusted Life Years (DALYs) are the most frequently used measure for calculating health gaps. DALYs reflect life years lost from a range of diseases and injuries, using a number of assumptions about the severity and duration of mental or physical disability. DALYs comprise two components: mortality is the amount of years of life lost (YLL) and morbidity is the amount of years lost to disability (YLD). Thus, one DALY represents one full year of healthy life lost from the disease and disability free ideal (DH 2004).

The South Australian Burden of Disease Study applied these techniques to describe the average amount of ill health and premature death occurring in the South Australian population during the period 1999 to 2001. A selection of these data has been included in this section.

Data limitations

The impact on local area rates of the location of special-purpose nursing homes and other types of supported accommodation[1], as discussed earlier in relation to death rates (page 281), is of particular relevance for the burden of disease estimates, which are not limited by age.

This is no more evident than in the City of Unley. In Unley, the unexpectedly low estimates of Health-Adjusted Life Expectancy and relatively high rate of Years of Life Lost (see below) are likely to reflect the location of such facilities, in particular the Julia Farr Centre, which provides accommodation for people with a disability, including people with acquired brain injury, or a degenerative neurological or physical disorder: this increases the mortality rate.

Areas mapped

The areas mapped for the estimates in this section, referred to as Burden of Disease (BoD) areas, are groupings of SLAs – some grouped to LGAs – as the number of cases at the SLA level is often too small to be reliable.

Summary of results

Premature death was estimated to be responsible for 68.1 YLL per 1,000 population over the period 1999 to 2001; the equivalent figures for males and females were 77.2 and 59.1, respectively. Years of life lost to disability (non-fatal diseases and injuries) were estimated to be responsible for 64.0 years per 1,000 population. Table 6.57 shows the leading causes of the mortality and morbidity burden in South Australia.

Table 6.57: Burden of disease from mortality and disability, 1999 to 2001

Category	YLL		YLD	
	Rate[1]	%	Rate[1]	%
Malignant neoplasms	21.1	30.9	4.7	7.3
Mental disorders	1.3	1.9	16.8	26.3
Nervous system disorders	2.5	3.7	12.0	18.7
Cardiovascular disease	20.8	30.5	6.2	9.7
Chronic respiratory disease	3.5	5.2	5.5	8.7
Musculoskeletal diseases	0.4	0.6	4.7	7.4
Unintentional injuries	4.2	6.2	1.7	2.7
Other	14.3	21.0	12.4	19.2
Total	**68.1**	**100.0**	**64.0**	**100.0**

[1]Rate is the number of Years of Life Lost (YLL) or Years of Life Lost to Disability (YLD) per 1,000 population; rates are directly age standardised to the Australian population in 2000

Source: DH 2004

Table 6.58 shows life expectancy by age and sex, for selected ages. It also shows the number of years expected to be lived in 'full health' (HALE) and the proportion of years of healthy life lost to disability at each of the ages. The proportion of years of life lost to disability by males was greater than for females, from the age of 30 to 45 years onwards.

[1] For example, accommodation used by people with psychiatric conditions (hostels, boarding houses, shelters); or community houses for those with an intellectual disability.

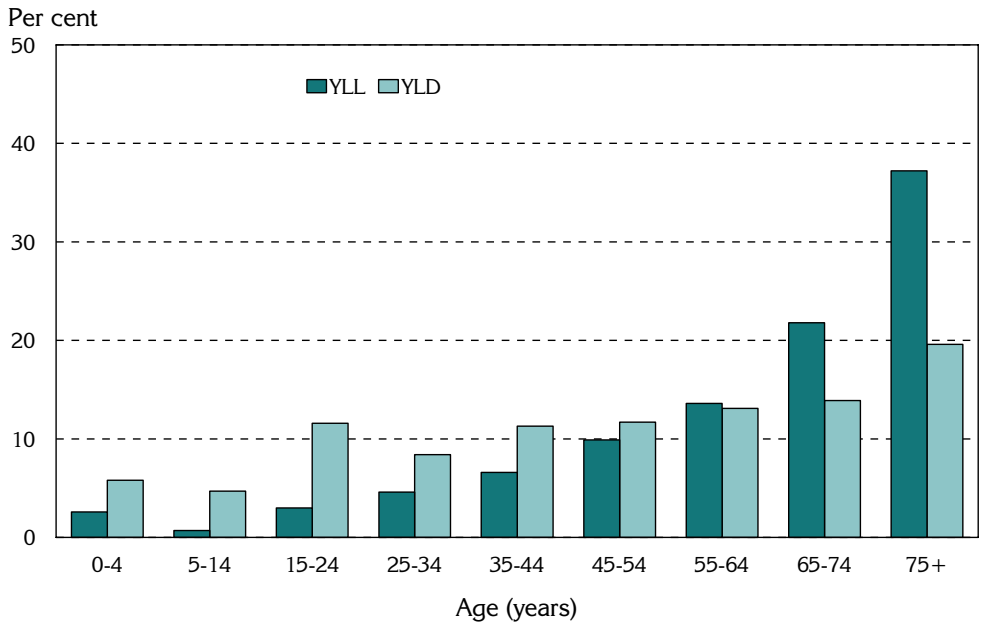
Table 6.58: Total life expectancy, health adjusted life expectancy and expected years lost to disability, by age and sex, South Australia, 1999 to 2001

Age (years)	Males			Females		
	LE (years)	HALE (years)	ELD/LE (%)	LE (years)	HALE (years)	ELD/LE (%)
0	77.3	69.8	9.8	83.0	74.9	9.8
15	62.9	55.7	11.4	68.4	60.6	11.4
30	48.7	42.1	13.5	53.7	46.7	13.0
45	34.7	28.8	17.2	39.3	33.0	15.9
60	21.4	16.3	23.6	25.5	20.2	20.9
75	10.6	7.2	31.6	13.4	9.7	27.3

Note: LE - Life expectancy; HALE – Health-adjusted life expectancy; ELD - Expected years lost to disability
Source: DH 2004

The estimated proportion of years of life lost to mortality and to morbidity varies by age, with the latter estimated to have a greater impact at younger and middle ages, and mortality to have the greater impact at older ages (Figure 6.4).

Figure 6.4: Estimated years of life lost to mortality (YLL) and disability (YLD), by age and sex, South Australia, 1999 to 2001



Source: DH 2004

Conditions responsible for premature mortality

The Department of Health's Burden of Disease study provides details of the conditions contributing most to premature mortality in South Australian males and females aged 0 to 4, 5 to 14 and 15 to 24 years:

"Death in very young ages is relatively rare in South Australia and often due to quite uncommon causes compared to the population overall. Over one-third of premature mortality in 0 to 4 year old children results from the conditions of Low birth weight, Other neonatal causes (for example newborns affected by maternal hypertension) and Other congenital anomalies (such as multiple congenital malformations).

Among the 5 to 14 year group, road traffic accidents emerged as the greatest cause of premature life loss. Road traffic accidents were also the leading cause of death in the 15 to 24 year group, accounting for over one-third of loss. Premature death associated with risk taking behaviour and potentially avoidable causes becomes increasingly apparent in this age group. Deaths by suicide, violence and illicit drug use accounted for over three quarters of premature death among males and almost 60% in females" (DH 2004).

Conditions responsible for loss of healthy years of life due to disability caused by illness or injury

The study also provides details of the conditions contributing most to the loss of healthy years of life due to disability caused by illness or injury in young South Australian males and females aged 0 to 4, 5 to 14 and 15 to 24 years.

"Asthma is the leading cause of morbidity for both the 0 to 4 and 5 to 14 year age groupings and for both sexes, responsible for over 25% of life lived with illness. Mental disorders become prominent as leading causes of morbidity in the youngest age group, initially in the form of Attention-deficit hyperactivity disorder and disorders within the Autistic spectrum, with markedly higher rates among males.

Depression emerges as a leading condition for both sexes in the 5 to 14 year age group. Rates increase further in the 15 to 24 age group with depression being the leading cause of life lived with disability among young women, and at a rate almost 3.5 times that of males. Mental health conditions, including substance use, dominate the Top 10 causes of loss and are responsible for over 70% of the loss borne by the 15 to 24 year age group" (DH 2004).

Variables mapped

The variables mapped in this section include Years of Life Lost (YLL) among people aged 0 to 74 years, Years of Life Lost to Disability (YLD) among people aged 0 to 74 years and Health-Adjusted Life Expectancy (HALE) at birth for males and females (Table 6.59).

Table 6.59: Variables mapped by region, South Australia, 1999 to 2001

Region	YLL (0 to 74 yrs)	YLD (0 to 74 yrs)	DALY[2] (0 to 74 yrs)	HALE – males (at birth)	HALE – females (at birth)
Central Northern	35,028	40,636	75,664	69.7	74.7
Southern	13,300	16,444	29,744	70.4	75.6
Metropolitan regions	**48,328**	**57,080**	**105,408**	**69.9**	**75.0**
Hills Mallee Southern	5,094	5,645	10,739	70.8	76.1
Wakefield[1]	4,822	5,135	9,957	69.9	74.7
South East	2,955	3,234	6,189	69.5	75.0
Northern & Far Western	3,110	3,478	6,588	66.3	71.1
Eyre	1,797	1,942	3,739	68.8	74.4
Mid North	1,787	1,909	3,696	68.6	73.6
Riverland	2,007	1,777	3,784	68.2	74.0
Country SA	**21,570**	**23,121**	**44,692**	**69.2**	**74.5**
South Australia	**69,898**	**80,201**	**150,100**	**69.8**	**74.9**

[1] **Gawler is included in Wakefield region**

[2] **DALYs have not been mapped**

Health-Adjusted Life Expectancy, males, 1999 to 2001

Health-Adjusted Life Expectancy (HALE) is an indicator of the number of years a newborn can expect to live in good health, if current population trends of disease and disability persist. HALE is useful in making comparisons over time, as it takes into account changes in the extent of disability within the population (Manuel et al. 2000).

HALE was lower for males than for females in both metropolitan regions and country South Australia, although there were only minimal differences, by sex, within the metropolitan regions and country South Australia (Table 6.60).

Table 6.60: Health-Adjusted Life Expectancy, 1999 to 2001

Years

Area	Males	Females
Metropolitan regions (excl. Gawler)	69.9	75.0
Country	69.2	74.5
South Australia	69.8	74.9

Readers should note the caution on page 301 regarding limitations of these area-level estimates.

Metropolitan regions

The HALE of males who were usual residents of the metropolitan regions in 1999 to 2001 was 69.9 years, 5.1 years lower than for females. There was little variation between regions, with a HALE of 70.4 years calculated for Southern and 69.7 years for Central Northern.

Health-Adjusted Life Expectancy for males was strongly correlated with female labour force participation, using the Internet at home, participating in fulltime education at 16 years of age and high income families. These results, together with a very strong correlation with the Index of Relative Socio-Economic Disadvantage, suggest an association at the Burden of Disease area level between high HALE of males and socioeconomic advantage (Table A12).

Central Northern Adelaide

The HALE for males in Central Northern was 69.7 years, with a variation of 7.4 years between Burden of Disease areas within the region.

The Burden of Disease areas with the highest HALEs in the region were in Tea Tree Gully - Central/ Hills/ North (73.1 years), Tea Tree Gully - South (71.7 years), Campbelltown (71.3 years) and Burnside (71.0 years).

Males living in Playford - West Central/ Elizabeth had the lowest HALEs in the region (and in South Australia) being four years lower than the regional average (65.7 years). There were also low HALEs in Port Adelaide Enfield - Coast/ Port (66.9 years) and Port Adelaide Enfield - East/ Inner (67.1 years).

Southern Adelaide

Overall, in 1999 to 2001, there was a HALE of 70.4 years for males in the Southern region and less variation in HALEs within the region, with a difference of 4.1 years between the highest and lowest HALE (see graph opposite).

The highest HALE in the south was calculated for Mitcham (72.6 years), followed by Onkaparinga - Hackham/ Morphett/ Hills (71.1 years).

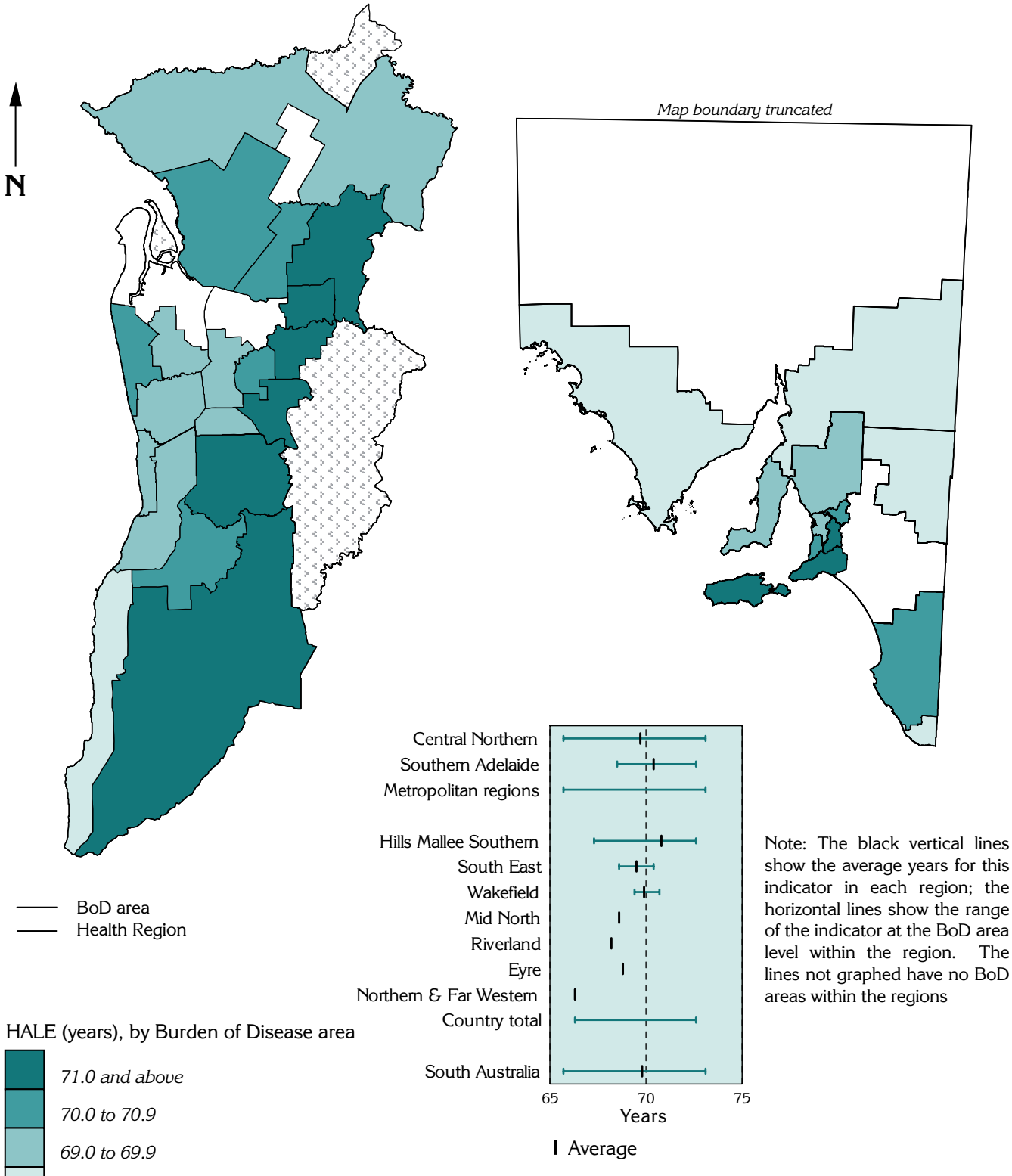
Males living in Onkaparinga - North Coast/ South Coast had the lowest HALE of 68.5 years, with 69.1 years for males in Marion and 69.7 years in Holdfast Bay.

Country South Australia

The HALE for males living in country South Australia was 0.7 years lower than for their counterparts in the metropolitan regions. Across the State, there were large regions with particularly low HALEs (Map 6.50). However, the Burden of Disease areas with the lowest scores are less densely populated than other areas, and contain relatively large Indigenous populations.

The lowest HALE in country South Australia was calculated for **Northern and Far Western** region (66.3 years), being 2.9 years lower than that for country South Australia overall (Table 6.61). This was followed by **Riverland** (68.2 years), **Mid North** (68.6 years), **Eyre** (68.8 years), **South East** (69.5 years), **Wakefield** (69.9 years) and **Hills Mallee Southern** (70.8 years).

Map 6.50
Health-Adjusted Life Expectancy, males, 1999 to 2001



Note: The black vertical lines show the average years for this indicator in each region; the horizontal lines show the range of the indicator at the BoD area level within the region. The lines not graphed have no BoD areas within the regions

#*Data were not mapped for Torrens Island, or because the population was of insufficient size: Gawler has been mapped in the State map*

Source: See data sources, Appendix 1.3 ***Details of map boundaries are in Appendix 1.2***

Health-Adjusted Life Expectancy, females, 1999 to 2001

Health-Adjusted Life Expectancy (HALE) is an indicator of the number of years a newborn can expect to live in good health, if current population trends of disease and disability persist. HALE is useful in making comparisons over time, as it takes into account changes in the extent of disability within the population (Manuel et al. 2000).

Readers should note the caution on page 301 regarding limitations of these area-level estimates.

Metropolitan regions

The HALE for metropolitan females was 75.0 years, 5.1 years higher than that for males in the metropolitan regions (Table 6.61).

Health-Adjusted Life Expectancy for females was strongly correlated with female labour force participation, with strong inverse correlations with a number of the indicators of disadvantage. These results, together with a strong correlation with the Index of Relative Socio-Economic Disadvantage, suggest an association at the Burden of Disease area level between high HALE of females and socioeconomic advantage (Table A12).

Central Northern Adelaide

There was considerable variation between Burden of Disease areas in this region for females (as there was for males), with 6.5 years difference between the highest and lowest HALE calculations. Overall, HALE for Central Northern was 74.7 years. This was slightly lower than for females in Southern region (75.6 years), where there was also less variation (see graph opposite).

The highest HALEs for females in South Australia was calculated for Tea Tree Gully - Central/ Hills/ North (78.2 years), Burnside (77.2 years), West Torrens (76.8 years), Playford - East Central/ Hills/ West (76.1 years) and Campbelltown (76.1 years).

As was the case for males, the lowest HALEs in this region were for females living in Playford - West Central/ Elizabeth (71.7 years). Other low HALEs were found in Unley (72.2 years), Port Adelaide Enfield - East/ Inner (72.7 years) and Port Adelaide Enfield - Coast/ Port (73.2 years).

Southern Adelaide

The highest HALE calculated for the Southern region was 76.2 years, in both Onkaparinga - Hackham/ Morphett/ Hills and in Marion. There was a variation of two and a half years in this region, with Onkaparinga - North Coast/ South Coast recording the lowest HALE of 73.7 years.

Country South Australia

HALE scores were consistently higher for females than males throughout the Burden of Disease areas (Table 6.61). The highest HALE for females in country regions was calculated for **Hills Mallee Southern** (76.1 years). Within this region, Hills had a HALE of 76.6 years, followed by Southern (76.1) and Mallee (75.2).

South East had the second highest HALE of 75.0 years. Upper South East had a HALE of 75.1 years and Mount Gambier and Grant had a HALE of 74.9 years.

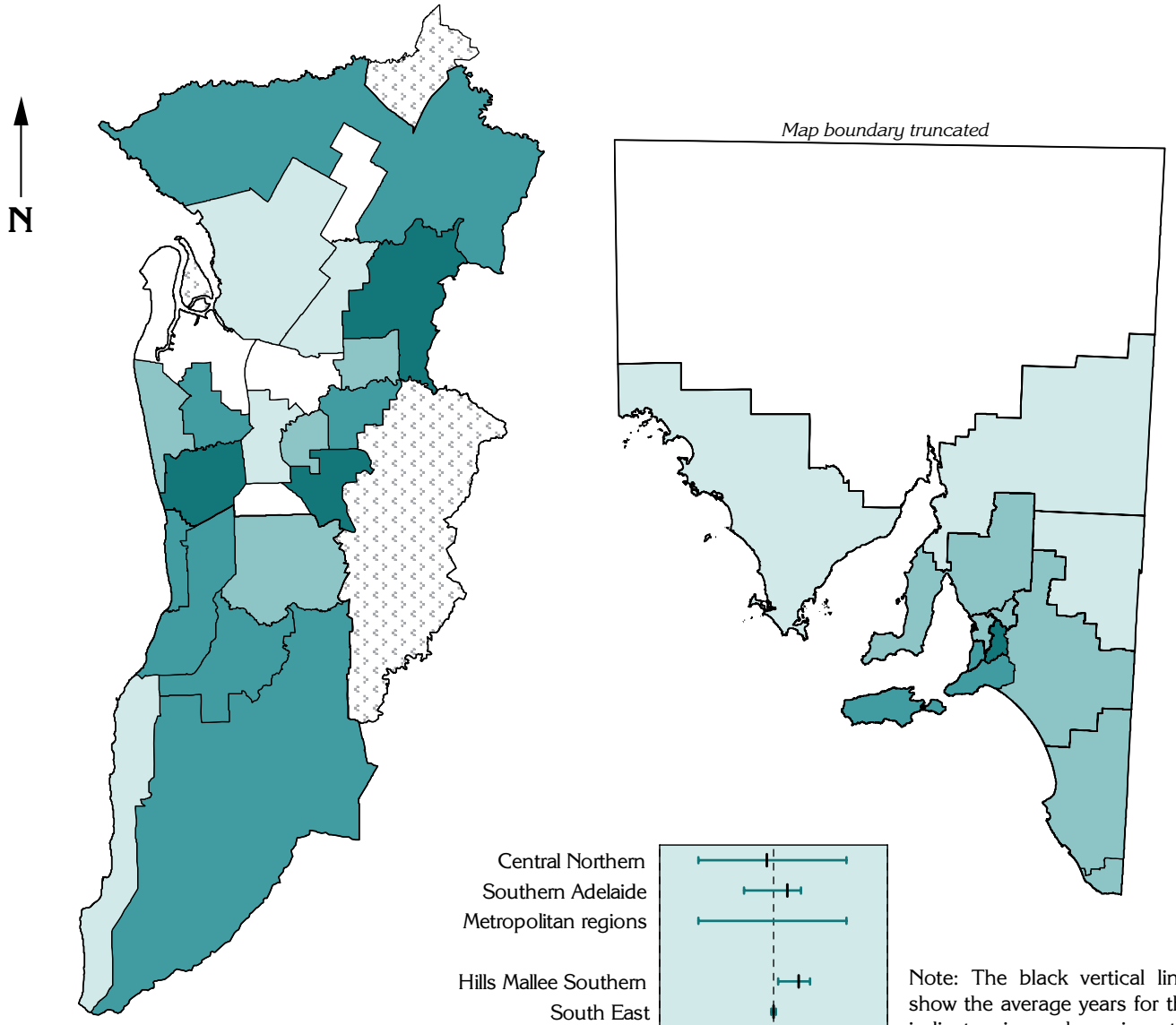
There was a variation of five years in the country, with the lowest HALE for females being 71.1 years in **Northern and Far Western** (compared to **Hills Mallee Southern**, 76.1 years) (see graph opposite).

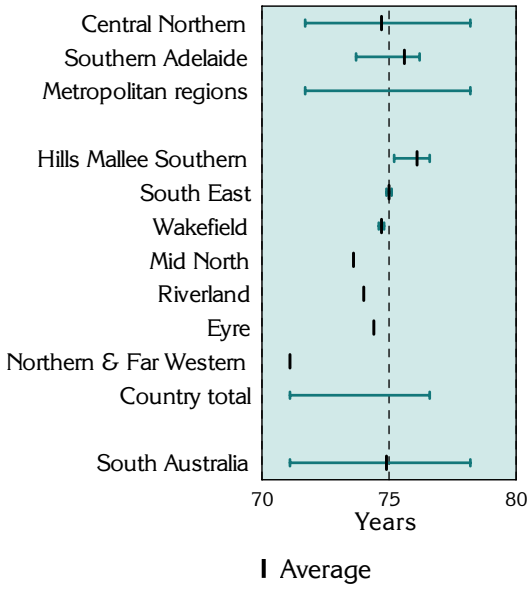
Table 6.61: Regional totals, HALE, 1999 to 2001

Region	HALE	
	Males	Females
Hills Mallee Southern	70.8	76.1
Hills	72.6	76.6
Southern	72.5	76.1
Mallee	67.3	75.2
Wakefield[1]	69.9	74.7
Gawler & Barossa	70.7	74.8
Balance of Wakefield	69.4	74.6
South East	69.5	75.0
Mount Gambier & Grant	68.6	74.9
Upper South East	70.4	75.1
Northern & Far Western	66.3	71.1
Eyre	68.8	74.4
Mid North	68.6	73.6
Riverland	68.2	74.0
Country SA	**69.2**	**74.5**
Central Northern	69.7	74.7
Southern	70.4	75.6
Metropolitan regions	**69.9**	**75.0**
South Australia	**69.8**	**74.9**

[1] **Gawler is included in Wakefield region**

Map 6.51
Health-Adjusted Life Expectancy, females, 1999 to 2001





Note: The black vertical lines show the average years for this indicator in each region; the horizontal lines show the range of the indicator at the BoD area level within the region. The lines not graphed have no BoD areas within the region.

#Data were not mapped for Torrens Island, or because the population was of insufficient size: Gawler has been mapped in the State map

Source: See data sources, Appendix 1.3 ***Details of map boundaries are in Appendix 1.2***

Years of Life Lost, 0 to 74 years, 1999 to 2001

One measure of the impact of premature death is the number of potential years of life lost as a result of death before a certain age, in this case, 75 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 75 years. The total number of years of life lost (YLL) is calculated by assuming that people who died at 17 years of age would have otherwise lived to the age of 75 years (i.e. 75 minus 17 years), and that 58 years of life were lost.

In this analysis, deaths included were of people aged from 0 to 74 years. The rates per 100,000 population, age standardised to the Australian population, are expressed as an index with a base of 100.

Table 6.62: Years of Life Lost, 0 to 74 years, 1999 to 2001

Age-standardised rate per 100,000

Area	Years	Rate
Metropolitan regions (excl. Gawler)	48,328	4,832
Country	21,570	5,430
South Australia	69,898	4,982

Metropolitan regions

There were 48,328 years of life lost for residents of the metropolitan regions in 1999 to 2001, three per cent fewer than expected from the State rates (Table 6.62). The Central Northern region had the expected number of 35,028 YLL (a standardised ratio (SR) of 100). Southern had eleven per cent fewer years of life lost than expected (an SR of 89**, 13,300 YLL) (Table 6.63).

The Burden of Disease areas with the most highly elevated ratios of years of life lost were located in the typically disadvantaged areas in the north-west and outer north (Map 6.52).

This variable was very strongly correlated with unemployment; Housing Trust rented dwellings; the Indigenous population; jobless, low income and single parent families; and dwellings without a motor vehicle. It was also strongly correlated with unskilled and semi-skilled workers. These results, together with a very strong inverse correlation with the Index of Relative Socio-Economic Disadvantage, indicate a strong association at the Burden of Disease area level between YLL and socioeconomic disadvantage (Table A12).

Central Northern Adelaide

Playford - West Central/ Elizabeth had the most highly elevated ratio in the metropolitan regions with nearly 60% more years of life lost than expected (an SR of 157**, 2,818 YLL). There were also highly elevated ratios in Port Adelaide Enfield - Coast/ Port (128**, 3,280), Port Adelaide Enfield - East/ Inner (124**, 2,912), Charles Sturt - Inner East/ North-East (110**, 2,486) and Salisbury - Central/ Inner North/ Balance (109**, 2,408).

There were also large numbers of years of life lost in Salisbury - North-East/ South-East (2,592 YLL, an SR of 101) and West Torrens (2,378 YLL, 91). Tea Tree Gully - Central/ Hills/ North had the lowest ratio of all the Burden of Disease areas in South Australia, with 32% fewer years of life lost than expected (an SR of 68**, 1,857 YLL). There were also lower than expected ratios in Burnside (an SR of 82**, 1,695 YLL), Tea Tree Gully - South (85**, 1,330), Charles Sturt - Coastal/ Inner West (86**, 2,508), Campbelltown (88**, 2,066) and Playford - East Central/ Hills/ West (89**, 1,048).

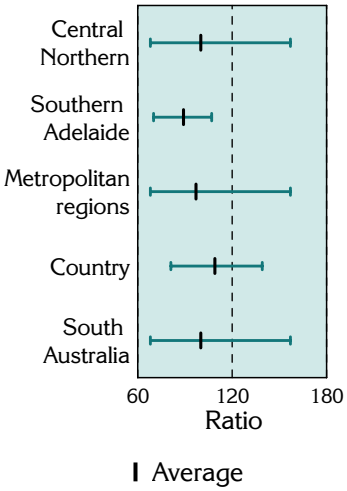
Southern Adelaide

The standardised ratios for years of life lost in Southern were lower than in Central Northern, with the highest ratio of 107** calculated for Onkaparinga - North Coast/ South Coast (2,018 YLL). There were 3,834 years of life lost in Marion (an SR of 99).

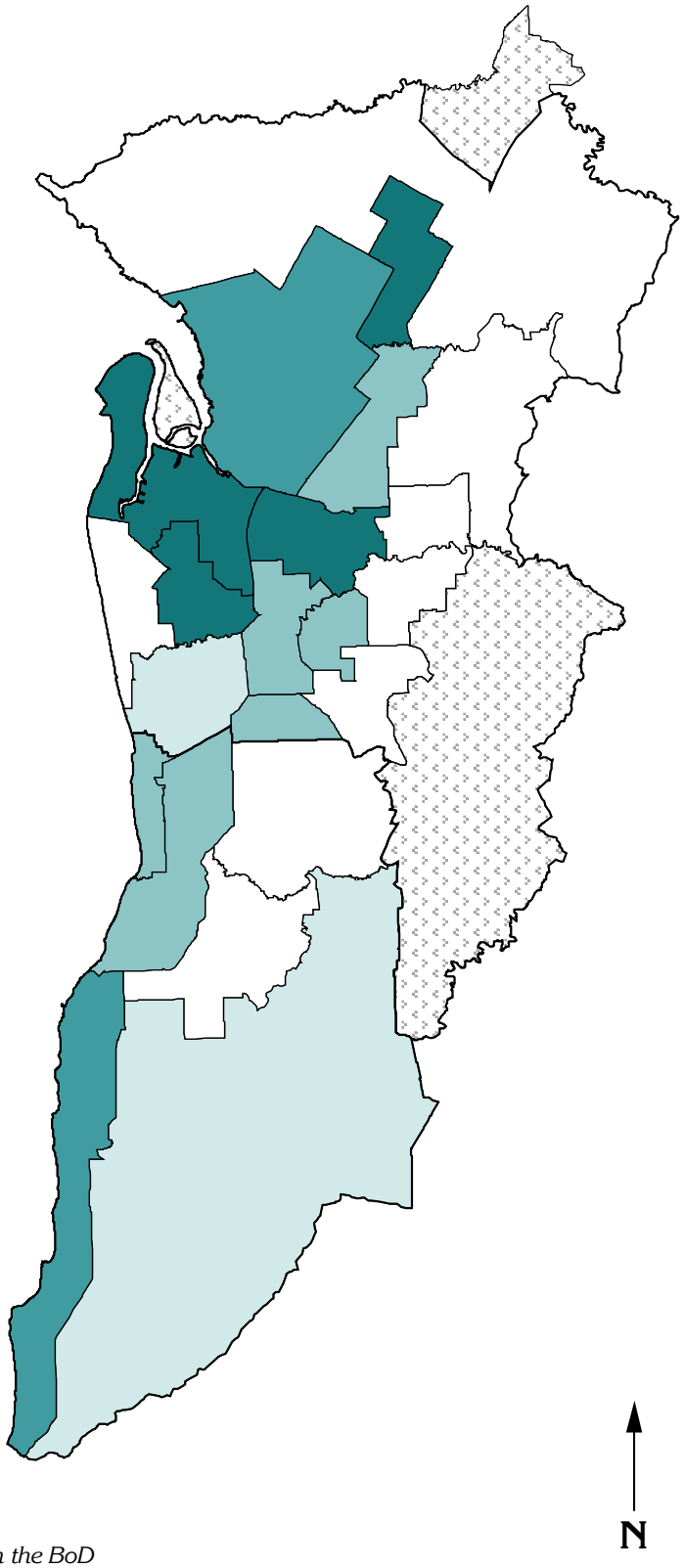
There were also areas with low ratios, with 30% fewer than expected YLL in Onkaparinga – Reservoir/ Woodcroft (70**, 1,628) and Mitcham (71**, 2,090).

* **indicates statistical significance: see page 24**

Map 6.52
Years of Life Lost, 0 to 74 years, metropolitan regions, 1999 to 2001



Note: The black vertical lines show the average ratio for this indicator in each region; the horizontal lines show the range of the indicator at the BoD area level within the region.



BoD area
Health Region

Standardised Ratio (as an index)*, by BoD area

- *110 and above*
- *105 to 109*
- *95 to 104*
- *90 to 94*
- *below 90*
- *data not mapped#*

*Index shows the Years of Life Lost from deaths of people in the BoD area, compared with the number expected: expected numbers were derived by indirect age standardisation, based on SA totals

#Data were not mapped for Torrens Island, or because the population was of insufficient size: Gawler has been mapped in the State map

Source: See data sources, Appendix 1.3 ***Details of map boundaries are in Appendix 1.2***

Country South Australia

There were 21,570 years of life lost in country South Australia, nine per cent more than expected from the State rates (a standardised ratio (SR) of 109**).

Table 6.63: Regional totals, Years of Life Lost, 0 to 74 years, 1999 to 2001

Region	Years	SR
Hills Mallee Southern	5,094	95**
Hills	1,316	81**
Southern	1,791	87**
Mallee	1,986	117**
Wakefield[1]	4,822	102
Gawler & Barossa	1,605	92**
Balance of Wakefield	3,217	107**
South East	2,955	105*
Mount Gambier & Grant	1,529	111**
Upper South East	1,426	98
Northern & Far Western	3,110	139**
Eyre	1,797	117**
Mid North	1,787	113**
Riverland	2,007	128**
Country SA	**21,570**	**109****
Central Northern	35,028	100
Southern	13,300	89**
Metropolitan regions	**48,328**	**97****
South Australia	**69,898**	**100**

[1]**Gawler is included in Wakefield region**

This variable was very strongly correlated with dwellings rented from the SA Housing Trust, unemployment, dwellings without a motor vehicle, and the Indigenous population. There were strong correlations with jobless families, poor proficiency in English and single parent families. These results, together with a very strong inverse correlation with the Index of Relative Socio-Economic Disadvantage, indicate a strong association at the Burden of Disease (BoD) area level between YLL and socioeconomic disadvantage (Table A13).

The Regions

Northern and Far Western had the most highly elevated ratio, with 39% more years of life lost than expected (an SR of 139**, 3,110 YLL).

Riverland also had a highly elevated ratio with 28% more years of life lost than expected from the State rates (an SR of 128**, 2,007 YLL).

An elevated ratio was also evident for **Eyre** with 17% more YLL than expected from the State rates (an SR of 117**), representing 1,797 years of life lost.

Similarly, there were 1,787 years of life lost in **Mid North**, representing 13% more YLL than expected (an SR of 113**).

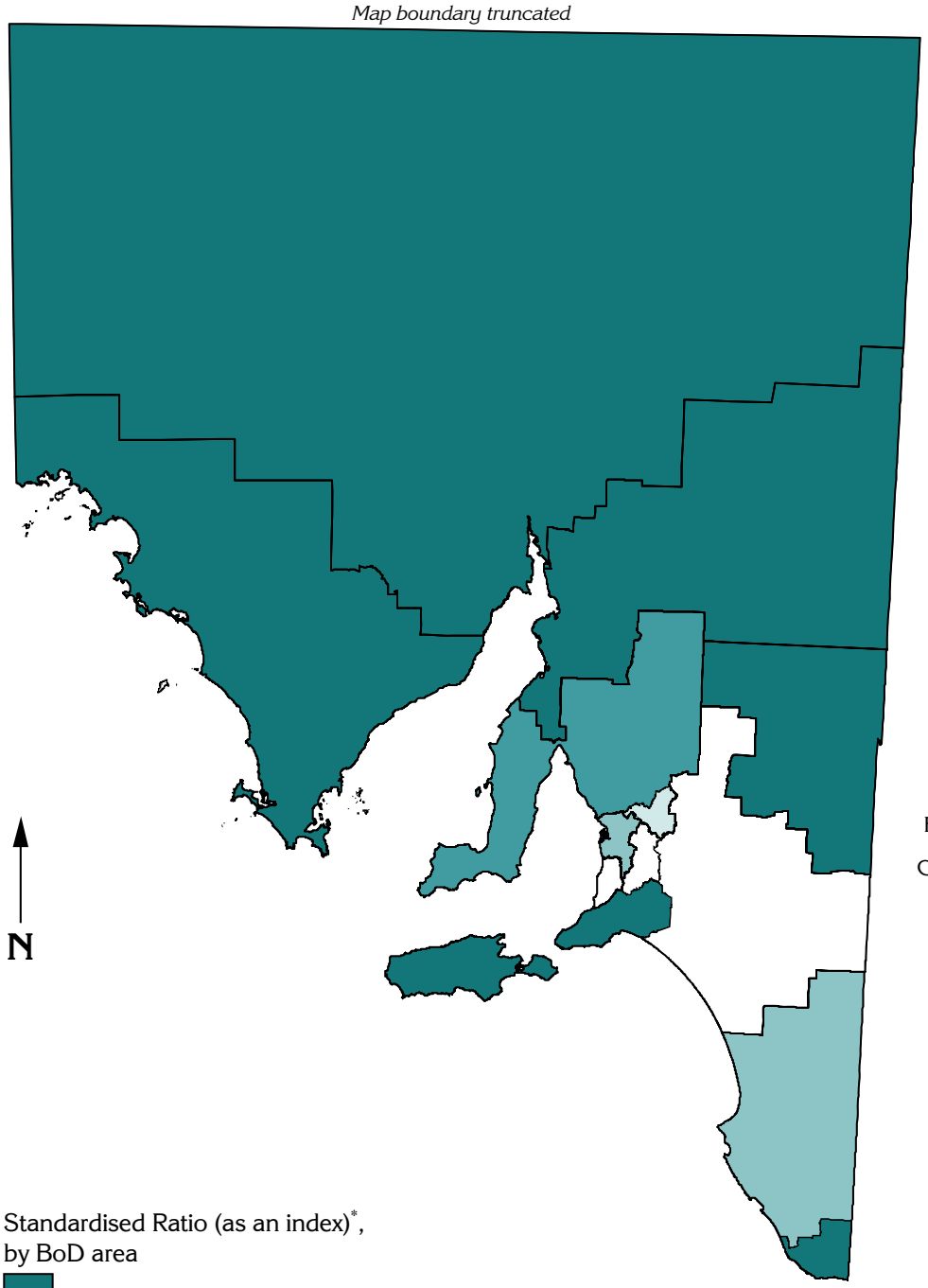
South East also had an elevated ratio (an SR of 105**) with five per cent more years of life lost than expected, comprising 2,955 years. Within this region, Mount Gambier and Grant had a higher SR of 111** (1,529 YLL), and the ratio for Upper South East was lower than expected (an SR of 98, 1,426 YLL).

Wakefield had a slightly elevated ratio of 102, representing two per cent more YLL than expected (4,822 YLL). Within this region, Balance of Wakefield had seven per cent more YLL than expected (an SR of 107**, 3,217 years); and Gawler and Barossa had eight per cent fewer YLL than expected (with an SR of 92**, 1,605 YLL).

There were 5,094 years of life lost in **Hills Mallee Southern**. However, this represented five per cent fewer years of life lost than expected from the State rates (an SR of 95**). Within this region, there was an elevated ratio in the Burden of Disease areas of Mallee (an SR of 117**, 1,986 YLL). Both Hills (with an SR of 81**, 1,316 YLL) and Southern (87**, 1,791) had low ratios, of 19% and 13% lower than expected, respectively.

* **indicates statistical significance: see page 24**

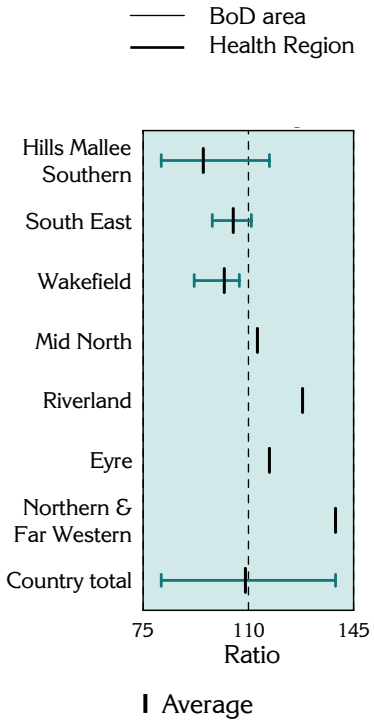
Map 6.53
Years of Life Lost, 0 to 74 years, South Australia, 1999 to 2001



Standardised Ratio (as an index)*, by BoD area

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

*Index shows the Years of Life Lost from deaths of people in the BoD area compared with the number expected: expected numbers were derived by indirect age standardisation, based on SA totals



Note: The black vertical lines show the average ratio for this indicator in each region; the horizontal lines show the range of the indicator at the BoD area level within the region. The lines not graphed have no BoD areas within the region.

Source: See data sources, Appendix 1.3 ***Details of map boundaries are in Appendix 1.2***

Years of Life Lost to Disability, 0 to 74 years, 1999 to 2001

The determination of years of life lost due to a disability are based on calculations of time lived in less than full health, and the severity of the condition. The cause of the reduced level of health is used as a weighting so that, for example, poor health due to cancer contributes more to a year lost due to disability than does poor health due to a cold. The greatest proportion of years of life lost to disability (YLD) across all age groups in South Australia is due to mental disorders (26%). This is followed by nervous system and sense organ disorders (20%) (DH 2004). The rates per 100,000 population, age standardised to the South Australian population, are expressed as an index with a base of 100.

The rate of YLD was higher in country South Australia, at 5,887 per 100,000 compared to a rate of 5,657 in the metropolitan regions. The total number of years of life lost to disability in South Australia in 1999 to 2001 in 0 to 74 year old people was 80,201 (Table 6.64).

Table 6.64: Years of Life Lost to Disability, 0 to 74 years, 1999 to 2001

Age-standardised rate per 100,000

Area	Years	Rate
Metropolitan regions (excl. Gawler)	57,080	5,657
Country	23,121	5,887
South Australia	80,201	5,716

Metropolitan regions

There were 57,080 years of life lost to disability in the metropolitan regions, one per cent fewer than expected from the State rates (a standardised ratio (SR) of 99*). The ratio in Southern was four per cent lower than expected, with 16,444 years of life lost, while Central Northern had 40,636 years of life lost to disability, a ratio of 100 (Table 6.65).

YLD were very strongly correlated with the Indigenous population, low income families, dwellings rented from the Housing Trust, jobless families, single parent families and unemployment. YLD was also strongly correlated with unskilled and semi-skilled workers. These results, together with a very strong inverse correlation with the Index of Relative Socio-Economic Disadvantage, suggest an association at the Burden of Disease area level between YLD and socioeconomic disadvantage (Table A12).

Central Northern Adelaide

Port Adelaide Enfield - East/ Inner had the most highly elevated ratio, with 25% more years of life lost to disability than expected from the State rates (an SR of 125**, 3,196 YLD). There were also highly elevated rates in Playford - West Central/ Elizabeth (116**, 2,406), and Port Adelaide Enfield - Coast/ Port (115**, 3,323). Salisbury - Central/ Inner North/ Balance (105**, 3,088), Salisbury - North-East/ South-East (105**, 3,190), West Torrens (104*, 2,941), Charles Sturt - Coastal/ Inner West (103, 3,174) and Charles Sturt - Inner East/ North-East (102, 2,551) all had slightly elevated ratios.

There were a large number of years of life lost to disability in Tea Tree Gully - Central, Hills, North (3,103 YLD, an SR of 90**).

The lowest ratios, with fewer years lost to disability than expected from the State rates, were calculated for Tea Tree Gully - South (an SR of 82**, 1,478 YLD), Norwood Payneham St Peters (86**, 1,539) and Burnside (87**, 1,962).

Southern Adelaide

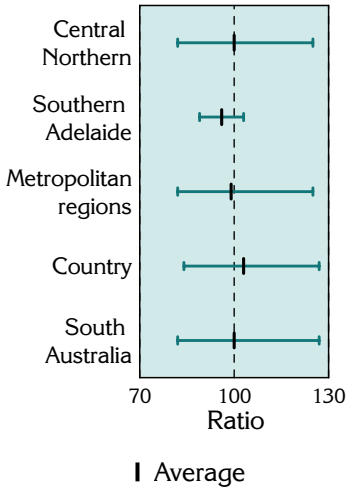
Onkaparinga - North Coast/ South Coast had a slightly elevated ratio of 103 (2,231 YLD).

Marion had the largest number of years of life lost to a disability with 4,165; however, this was two per cent fewer than expected and not statistically significant (an SR of 98).

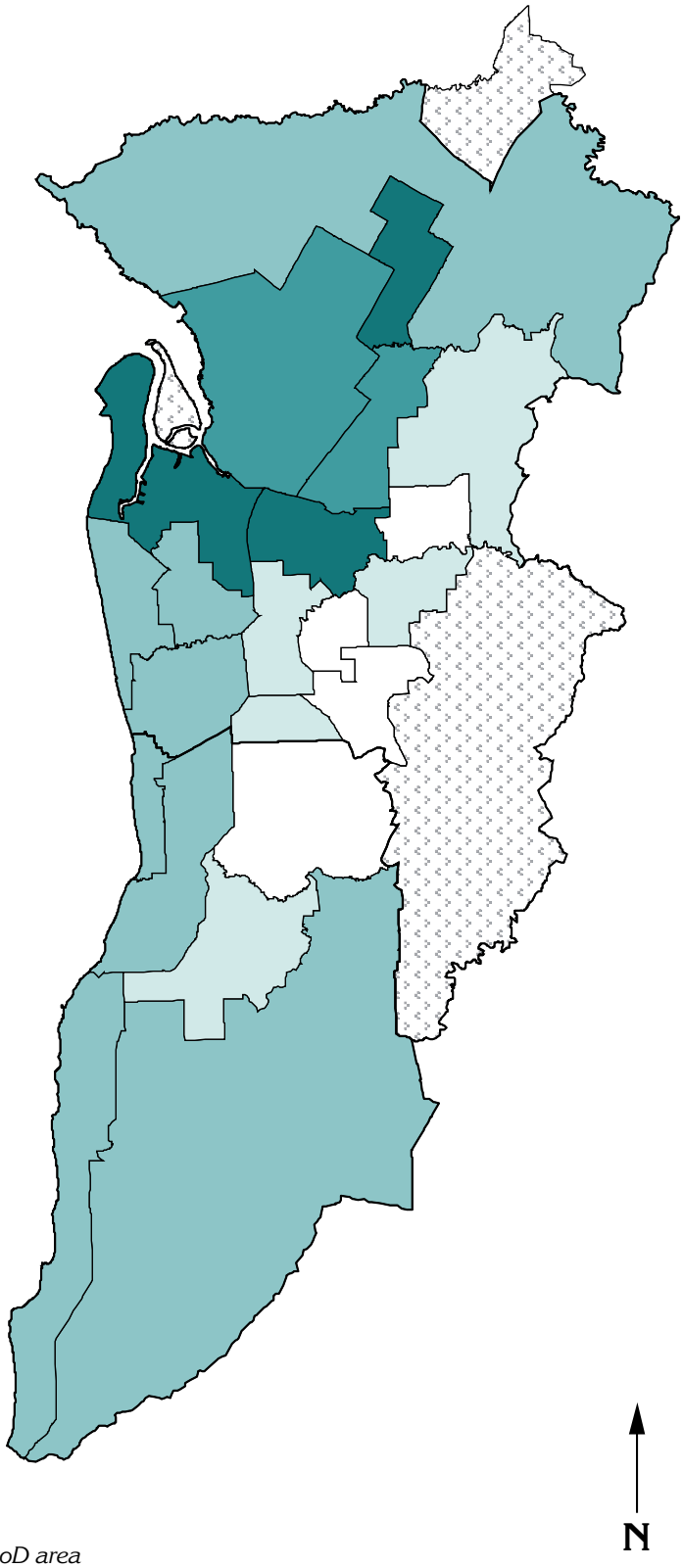
There were lower than expected ratios in Mitcham (an SR of 89**, 2,955 YLD) and Onkaparinga - Reservoir/ Woodcroft (91**, 2,742).

* **indicates statistical significance: see page 24**

Map 6.54
Years of Life Lost to Disability, 0 to 74 years, metropolitan regions, 1999 to 2001



Note: The black vertical lines show the average ratio for this indicator in each region; the horizontal lines show the range of the indicator at the BoD area level within the region.



BoD area
Health Region

Standardised Ratio (as an index)*, by BoD area

- *110 and above*
- *105 to 109*
- *95 to 104*
- *90 to 94*
- *below 90*
- *data not mapped#*

*Index shows the Years Lost to Disability of people in the BoD area compared with the number expected: expected numbers were derived by indirect age standardisation, based on SA totals

#Data were not mapped for Torrens Island, or because the population was of insufficient size: Gawler has been mapped in the State map

Source: See data sources, Appendix 1.3 ***Details of map boundaries are in Appendix 1.2***

Years of Life Lost to Disability, 0 to 74 years, 1999 to 2001

Country South Australia

There were 23,121 years of life lost to disability in country regions, three per cent more than expected from the State rates (a standardised ratio (SR) of 103**). The regional totals ranged from an SR of 127** in **Northern and Far Western** (3,478 YLD) to 95** in **Hills Mallee Southern** (5,645 YLD).

Table 6.65: Years of Life Lost to Disability, 0 to 74 years, 1999 to 2001

Region	Years	SR
Hills Mallee Southern	5,645	95**
Hills	1,680	84**
Southern	1,876	91**
Mallee	2,090	111**
Wakefield[1]	5,135	98
Gawler & Barossa	1,928	98
Balance of Wakefield	3,207	99
South East	3,234	97
Mount Gambier & Grant	1,609	98
Upper South East	1,625	97
Northern & Far Western	3,478	127**
Eyre	1,942	109**
Mid North	1,909	111**
Riverland	1,777	99
Country SA	**23,121**	**103****
Central Northern	40,636	100
Southern	16,444	96**
Metropolitan regions	**57,080**	**99***
South Australia	**80,201**	**100**

[1]**Gawler is included in Wakefield region**

YLD were very strongly correlated with unemployment, dwellings without a motor vehicle, the Indigenous population, dwellings rented from the Housing Trust and jobless families. It was also strongly correlated with the variable for single parent families. These results, together with a very strong inverse correlation with the Index of Relative Socio-Economic Disadvantage, indicate a strong association at the Burden of Disease (BoD) area level between YLD and socioeconomic disadvantage (Table A13).

The Regions

Northern and Far Western had the most highly elevated ratio with 27% more years lost to disability than expected (an SR of 127**, 3,478 YLD).

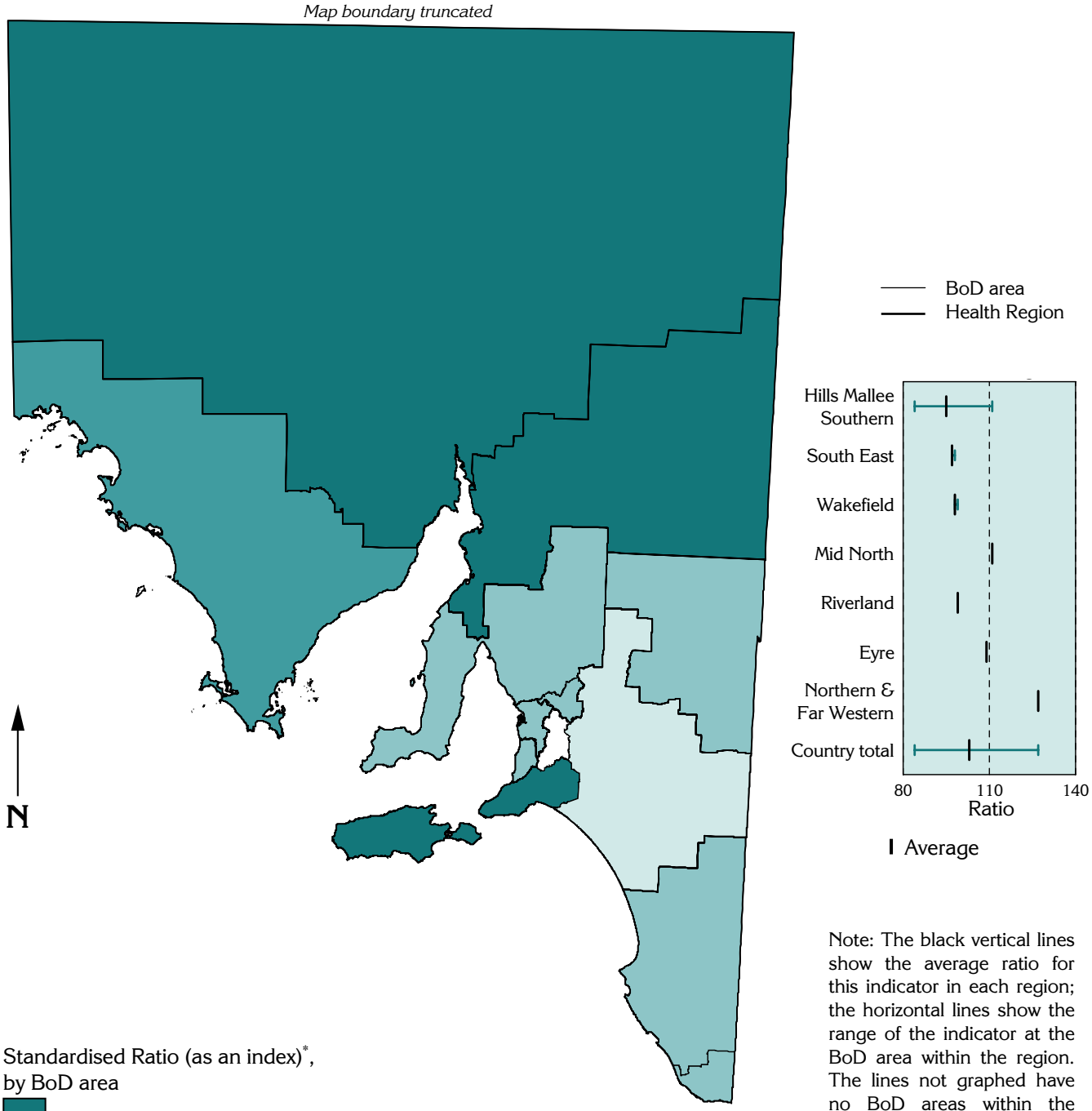
Mid North had an elevated ratio of 111** (1,909 YLD), indicating eleven per cent more years of life lost to disability than expected from the State rates. The next highest regional ratio was in **Eyre** (109**, 1,942).

Hills Mallee Southern had the lowest regional ratio of 95**, although a large number of years (5,645) lost to disability. Within this region, there was an elevated ratio in Mallee (an SR of 111**, 2,090 YLD), and lower than expected ratios in Hills (84**, 1,680) and Southern (91**, 1,876).

The remaining regions of **Wakefield, Riverland** and **South East** had lower than expected ratios, of 98 (5,135 YLD), 99 (1,777 YLD) and 97 (3,234 YLD) respectively, all of which were not statistically significant.

* **indicates statistical significance: see page 24**

Map 6.55
Years of Life Lost to Disability, 0 to 74 years, South Australia, 1999 to 2001



Note: The black vertical lines show the average ratio for this indicator in each region; the horizontal lines show the range of the indicator at the BoD area within the region. The lines not graphed have no BoD areas within the region.

*Index shows the Years of Life Lost from Disability of people in the BoD area compared with the number expected: expected numbers were derived by indirect age standardisation, based on SA totals

Source: See data sources, Appendix 1.3 ***Details of map boundaries are in Appendix 1.2***

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