4 Health status

Introduction

Differences in social and economic circumstances across Adelaide and the non-metropolitan areas of South Australia have been illustrated in the previous chapters. The maps and analyses in this chapter illustrate differences in the health status of children and young people living in these areas.

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

Background

Health status "refers to the level of health experienced by an individual or a community by placing them/it along a continuum, from health through distress, disease and disability, to death" (SAHC 1988). Health has been defined by the World Health Organization as "a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity" (WHO 1948).

Despite a strong trend toward improvement in the health status of Australians as a whole over the last century, "overwhelming inequalities in the health of Australians" have been reported over a number of years, with the most disadvantaged groups having the poorest health and the lowest use of preventative services (National Health Strategy 1992).

Mathers (1995; 1996) reviewed in depth the link between the socioeconomic status of young Australians and their health. Generally speaking, he found children and youth of lower socioeconomic status face greater exposure to the risk of contracting disease, or to death: this was evident across a wide range of morbidity conditions and causes of mortality. For example, all cause mortality rates are, on average, around 50% higher for people aged 15 to 24 years who live in the lowest socioeconomic areas when compared with people of the same age and sex who live in the highest socioeconomic status areas (**Table 4.1**).

Young people from the lowest socioeconomic status areas are also more likely to report their health as being 'fair' or 'poor' (in comparison with 'excellent' or 'good') than those living in the areas of highest socioeconomic status. Most risk factors, for example smoking, are also highly elevated for both men and women in the 'young' age groups living in the most disadvantaged areas (by 24% for males and 22% for females).

Table 4.1: Health status indicators by socioeconomic disadvantage of area and sex, Australia, late 1980s
Note: First quintile is high socioeconomic status and fifth quintile is low socioeconomic status

Age group (years)		Rate ratio for quintile of socioeconomic disadvantage of area			
		Males		Females	
		1st quintile	5th quintile	1st quintile	5th quintile
Children (0 to 14 years):	Mortality	1.00	1.46***	1.00	1.63***
	Serious chronic illness	1.00	1.25	1.00	1.18
	Reduced activity	1.00	1.36***	1.00	1.03
	Not breastfed: 0 to 4 yrs	1.00	1.46*	1.00	1.09
Youth (15 to 24 years):	Mortality	1.00	1.46***	1.00	1.49***
	Serious chronic illness	1.00	1.03	1.00	1.03
	Reduced activity	1.00	0.74***	1.00	0.95
	Fair/poor health	1.00	1.33	1.00	1.40
	Inactivity	1.00	1.07	1.00	1.34**
	Smoking: 18 yrs & over	1.00	1.24*	1.00	1.22

Statistical significance: the greater the number of * the higher the level of significance :
*** p < 0.05: ** p < 0.01: *** p < 0.001**

Source: Mathers, C. Health Monitoring Series Nos. 3 and 4, Australian Institute of Health & Welfare, Canberra, 1995 & 1996

Despite an overall decline in mortality rates between 1985-87 and 1995-97 for the majority of conditions, the differentials observed in the earlier period are still evident a decade later (Turrell & Mathers 2000). For example, during 1995-97 infants and children living in the most disadvantaged areas experienced the highest mortality rates for perinatal conditions and Sudden Infant Death Syndrome, and for injury and poisoning (**Table 4.2**). Although data for the individual quintiles are not presented in the table, almost without exception, death rates for these quintiles exhibited a continuous gradient from high to low socioeconomic status.

For some conditions, the authors found an actual increase in the mortality rates over the decade. Among those aged 15 to 24 years, there was an increase in the rate of male suicide in the middle (third) and low (fifth) socioeconomic status quintiles, and a corresponding increase for females in the high (first) and middle socioeconomic status quintiles (and also in the rate ratio). These widening differentials give cause for concern.

There are large reductions in rate ratios for deaths of 15 to 24 year old males and females from causes of drug dependence, although these are not statistically significant. They may reflect an increase in deaths of residents of higher socioeconomic status areas from these causes, rather than a reduction in deaths in lower socioeconomic status areas.

Table 4.2: Rate ratio of mortality inequality by socioeconomic disadvantage of area, 1985-87 & 1995-97

Age group/Mortality type	Rate ratio [1]			
	Males		Females	
	1985-87	1995-97	1985-87	1995-97
0 to 14 years				
All Cause	1.50	1.62***	1.67	1.45***
Perinatal conditions	1.54	1.39***	1.90	1.41***
Sudden infant death syndrome	1.20	2.73***	1.69	3.24***
Injury and Poisoning	2.02	2.21**	1.84	1.75
MV Traffic Accident	1.53	2.49***	1.95	1.40***
15 to 24 years				
All Cause	1.49	1.78***	1.54	1.40***
Drug dependence	1.91	0.98	1.52	0.94
Injury and Poisoning	1.47	1.98***	1.66	1.49**
MV Traffic Accident	1.40	2.26***	1.56	1.83***
Suicide	1.35	1.75***	1.30	0.95***

[1]Ratio of Standardised Mortality Ratio for fifth quintile (low socioeconomic status) to first quintile (high socioeconomic status)

Note: Rate ratios of mortality inequality differ significantly from no inequality at significance level p<0.001

Asterisks indicate level of significance of the difference from the corresponding 1985-87 value:

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

Source: Turrell G. and Mathers C., Socioeconomic inequalities in all-cause and specific-cause mortality in Australia: 1985-87 and 1995-97, International Journal of Epidemiology 2000;29

Measurement of health status

Current situation

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

The deaths' data collections, undertaken by the registration authorities in the States and the Northern Territory and compiled by the Australian Bureau of Statistics (ABS), have provided one of the few datasets to include such detail at a local area level. Therefore, mortality data have been the major indicator of health status used over the years in small area analyses. Data as to the extent in the community of morbidity (illness or disease) are not available at the local area level. However, an approximation of the variations in morbidity can in some instances be obtained from data relating to admissions to hospital for different causes. Some

of this information has been included in the maps in Chapter 5.

Data mapped

In this chapter, data have been mapped for a number of measures of health status. These include deaths (infant deaths and deaths of people aged from 15 to 24 years, for all causes and from the combined external causes of injury and poisoning); overweight and obese four year old children; perinatal risk factors and substantiated cases of child abuse and neglect. These variables are discussed in more detail in the introduction to the maps on each topic.

A comparison of the mapped distribution of these measures of health status with the distributions in other chapters indicates the possible extent of association at the local area level between health status, and socioeconomic status (Chapter 3) and use of health and welfare services (Chapter 5). The extent of association is supported by the results of the correlation analysis (Chapter 6).

Gaps and deficiencies in the data

Health status of Aboriginal people and Torres Strait Islanders

Aboriginal people and Torres Strait Islanders (also referred to as Indigenous people) have the poorest health of any group in Australia: they are also the group least well identified in statistical collections. **Table 3.2** and the accompanying text in Chapter 3 document problems in the counts of Indigenous Australians at recent population censuses. Data for the birth and death records for Indigenous people used in this chapter are similarly affected by undercounting, the full extent of which is not known.

Despite the inclusion of a question to identify Indigenous people on the death information statements and medical certificates of cause of death, they are under-reported in death records[1]. Over the past few years only the Northern Territory, Western Australia, South Australia and the Australian Capital Territory are considered to have had reasonably complete coverage. The coverage in other States has not improved since the early 1990s, with the exception of Queensland, for which it is estimated that it has moved close to complete coverage since 1996. However, between the 1991 and 1996 Censuses, there has been a largely unexplained increase in the population of Indigenous people: see pages 23 and 24 for further details.

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

Health status and socioeconomic status

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

In the absence of any direct measure, the area of usual residence of children and young people about whom the event (eg. death) is recorded is therefore used as a proxy measure of socioeconomic status. The validity of using the area of usual residence in this way is discussed in Chapter 2, *Methods* under the heading *Usual residence*.

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

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Deaths

Introduction

Variations in death rates attributable to measures of equity (such as social class) are perhaps the most telling of all the indicators relevant to a social health analysis. An analysis of mortality by area can provide an insight into variations in socioeconomic status, health status and levels of exposure to high risk factors among the population that may contribute to an increased likelihood of premature death.

Variations in death rates by social class

Variations in death rates related to social class have been shown in a wide range of studies in overseas countries, and in some studies in Australia. The most detailed Australian work in this area is an analysis of deaths occurring in 1985, 1986 and 1987, undertaken for the National Health Strategy (1992) and published in more detail by the Australian Institute of Health and Welfare as part of their Health Monitoring Series (Mathers 1995) (**Table 4.1**). As noted above, this work has been updated by adding the period 1995-97 (**Table 4.2**) to show that the differentials in mortality rates that were evident in 1985-87 have persisted over the decade. As noted below these differentials have, in some cases, increased.

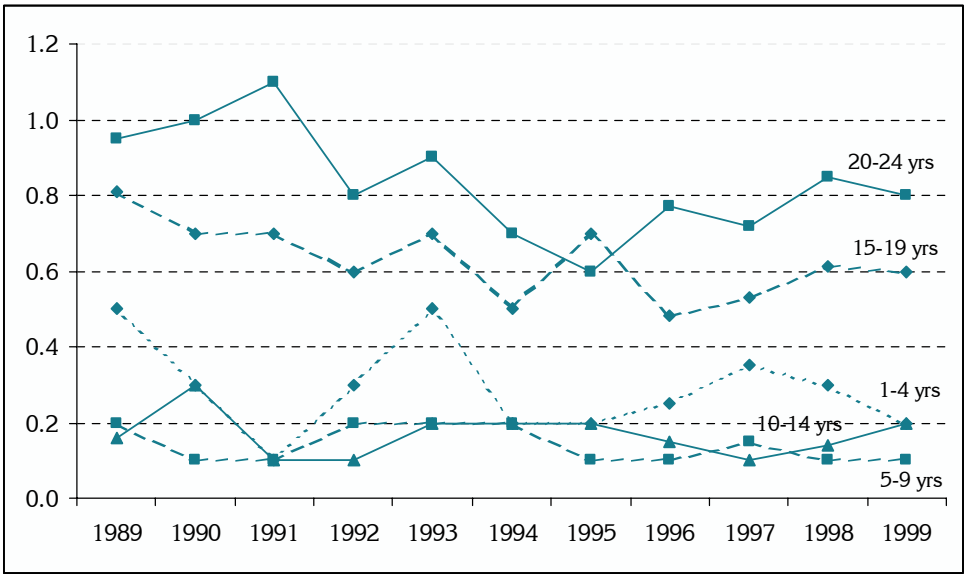
Changes in numbers and rates, 1989 to 1999

The number of deaths in South Australia of people at ages 0 to 24 years decreased by 37.7% over the eleven year period from 1989 to 1999, dropping from 411 in 1989 to 256 in 1999. However the number of deaths varies, often markedly, between years. Male deaths decreased by 34.4%, while there was a more substantial decrease of 43.4% for female deaths. The largest decreases were evident for children aged from 0 to 4 years and 5 to 9 years, while the smallest decrease was recorded at ages 20 to 24 years.

Over the period from 1989 to 1999, death rates also declined in the five year age groups from 0 to 24 years. The marked variation noted in the number of deaths between years is also evident in death rates per 100,000 population (**Figure 4.1**).

Figure 4.1: Death rates, by age, South Australia, 1989 to 1999

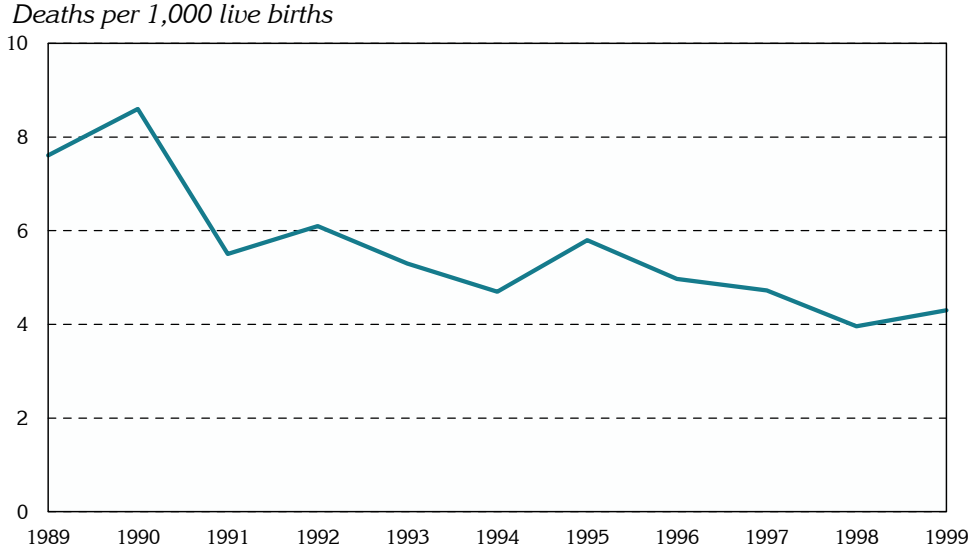
Deaths per 1,000



Source: ABS Deaths bulletins, ABS Catalogue No. 3312.4, 1989 to 1999

In 1999, there were 78 infant deaths (50 males and 28 females) recorded in South Australia, almost half (53.4%) the number in 1989 (146 infant deaths). The infant death rate has also decreased dramatically (**Figure 4.2**), from 7.6 infant deaths per 1,000 live births in 1989 to 4.3 in 1999 (a decrease of 43.5%). Much of the decline can be attributed to the substantial fall in deaths due to Sudden Infant Death Syndrome (SIDS) following the introduction of the educational campaign in 1990 aimed at reducing the prevalence of risk factors for SIDS, including prone sleeping (lying face downwards) (DHS 2001a). In 2000, there were only five post-neonatal SIDS deaths compared with an annual average of 38 in the period 1986-1990 (DHS 2001a).

Figure 4.2: Infant death rate, South Australia, 1989 to 1999



Source: ABS Deaths bulletins, ABS Catalogue No. 3312.4, 1989 to 1999

Data mapped

Age range

The data mapped in this section include infant deaths and deaths of people aged 15 to 24 years. Infant deaths (deaths at ages under 12 months) are analysed separately as they are recognised internationally as a group with historically high mortality rates, and rates with marked socioeconomic differentials. Deaths of people aged 15 to 24 years have been chosen as they provide a sufficient number of deaths (by aggregating four years of data, from 1996 to 1999) to be analysed at the SLA level (**Table 4.3**).

Table 4.3: Deaths by age, South Australia, 1996-99

Age	Deaths
<1 yr[1]	**320**
1-4 yrs	99
5-9 yrs	46
10-14 yrs	57
1-14 yrs	**202**
15-19 yrs	122
20-24 yrs	309
15-24 yrs	**431**

[1]Infant deaths

Source: Compiled in HealthWIZ from data supplied by the ABS

Measure mapped

Age-sex standardised ratios (Standardised Mortality Ratios, SMRs) have been calculated and mapped for the majority of variables in this section, 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, infant death rate (infant deaths per 1,000 live births) has been mapped.

Area mapped

Due to the small numbers of deaths, the mortality data have been mapped by Statistical Local Area (SLA) for metropolitan deaths and by South Australian Health Region for non-metropolitan deaths, rather than by postcode as is used elsewhere in this atlas for Adelaide or SLA as used for the non-metropolitan areas. This larger scale of area was chosen in order to ensure the validity and reliability of the data.

Variables mapped

Due to the small numbers involved, only a selection of all causes of death has been mapped for the population aged from 15 to 24 years. These include deaths from all causes and from the external causes of injury and poisoning. **Table 4.4** shows the number of deaths for the age groups and causes for which data were analysed and mapped.

Some other important causes of death, which are of public concern and/or are important causes of death for the most disadvantaged in the population, have insufficient numbers for the production of meaningful statistics at the local level. Deaths from suicide are one example: these are discussed on pages 164 and 165.

Table 4.4: Deaths by selected causes and area, South Australia, 1996-99

Cause of death	Adelaide	Rest of State	South Australia
Infant: all causes	209	111	320
15 to 24 yrs			
All causes	389	140	529
Injury and poisoning	261	104	365

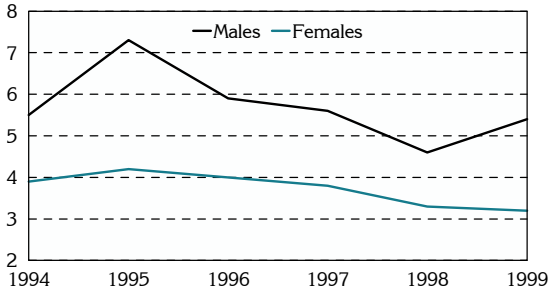
Source: Compiled in HealthWIZ from data supplied by the ABS

Infant deaths, 1996-99

There has been a general downward trend in the infant death rate over the period from 1994 to 1999 in South Australia for both males and females (**Figure 4.3**). However, there are considerable fluctuations from year to year for males, and care must be taken when considering only short periods of time. Additionally, the death rates for the whole of South Australia mask important regional variations in rates that are demonstrated in the maps relating to this variable.

Figure 4.3: Infant deaths, South Australia, 1994 to 1999

Rate per 1,000 live births



Source: Issues of ABS deaths bulletins, 1994 to 1999

Adelaide

There were only 207 deaths of infants resident in Adelaide over the four years from 1996 to 1999, resulting in a relatively small number of deaths in this cause group for several SLAs (more than one third had fewer than five deaths). Overall there were 4.0 infant deaths per 1,000 live births.

The highest infant death rates were recorded in the areas to the north and south of the city centre (**Map 4.1**). A number of inner city suburbs and outer eastern and western areas were not mapped for this indicator as there were fewer than five infant deaths.

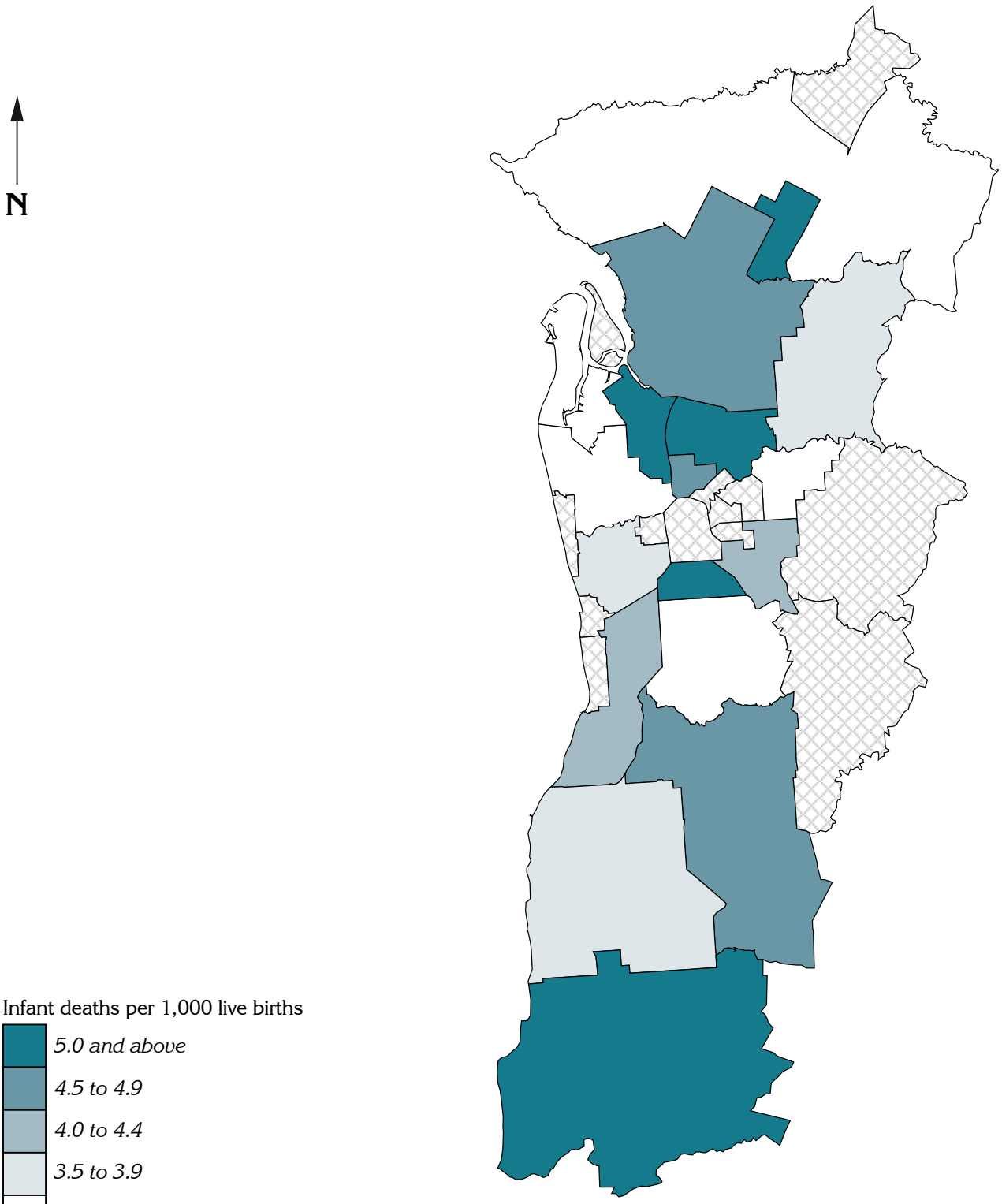
By far the highest infant death rate was recorded in Willunga, with 11.9 infant deaths per 1,000 live births. Rates of 5.0 infant deaths per 1,000 live births and above were also recorded in the north and north-western SLAs of Elizabeth (with 7.4 infant deaths per 1,000 live births), Enfield [Part A] (6.5) and Enfield [Part B] (5.1); and in the inner area of Unley (5.0).

Areas with the lowest infant death rates were situated to the south of the city in Mitcham (with 2.1 infant deaths per 1,000 live births); in the north-eastern SLA of Campbelltown (2.5); and in the north-western areas of Port Adelaide and Hindmarsh and Woodville (both 2.8).

The largest numbers of infant deaths were recorded in the outer northern and southern suburbs: SLAs recording more than 15 infant deaths over this four year period included Salisbury (with 34 deaths), Noarlunga (20 deaths) and Tea Tree Gully (18 deaths).

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

Map 4.1
Infant deaths, Adelaide, 1996-99
deaths per 1,000 live births in each Statistical Local Area



Data were not mapped because there were fewer than five deaths.

Source: Compiled in HealthWIZ from data supplied by the ABS ***Details of map boundaries are in Appendix 1.2***

Infant deaths, 1996-99

Non-metropolitan South Australia

There were 111 deaths of infants resident in the non-metropolitan areas of South Australia over the four years from 1996 to 1999, a rate of 5.3 infant deaths per 1,000 live births.

The most highly elevated infant death rate was recorded in the ***Whyalla, Flinders and Far North*** Health Region, an infant death rate of 10.1. Relatively high rates were also recorded in the Country Health Regions of ***Yorke, Lower North and Barossa*** (with 6.1 infant deaths per 1,000 live births), ***Eyre Peninsula*** (5.3) and ***Mid North*** (4.8).

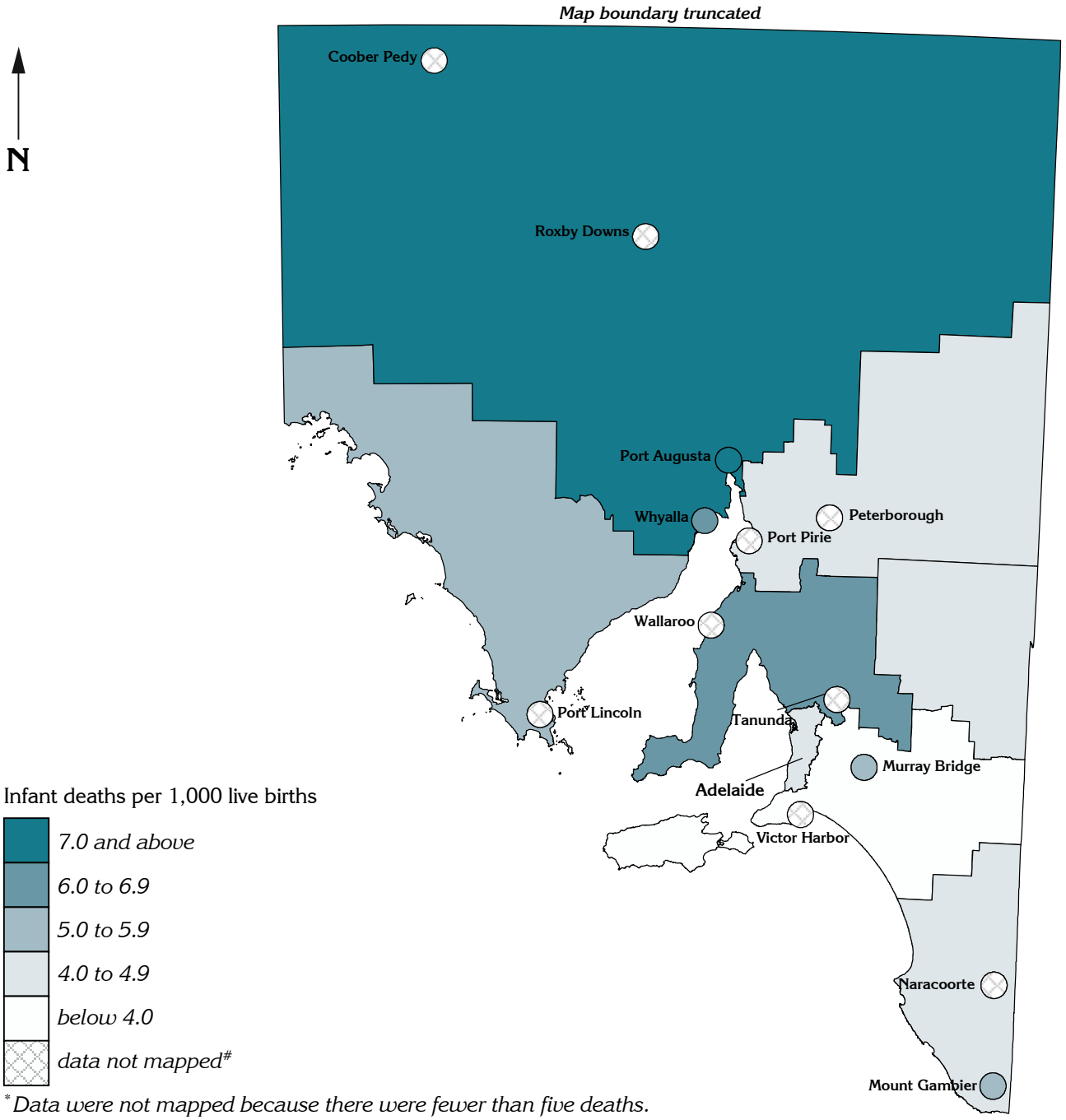
The ***Hills, Mallee and Southern*** Health Region had the lowest rate for this variable, with 2.9 infant deaths per 1,000 live births: infant death rates below 4.5 were recorded in the ***South-East*** and ***Riverland*** regions, with rates of 4.1 and 4.3 respectively.

Of the towns where there were 5 or more infant deaths, by far the highest rate was recorded in Port Augusta, with 15.3 infant deaths per 1,000 live births. Rates of 6.4, 5.8 and 5.2 were recorded in Whyalla, Mount Gambier and Murray Bridge, respectively.

The only two regions to record more than 20 infant deaths over this period were ***Whyalla, Flinders and Far North*** (with 31 infant deaths) and ***Yorke, Lower North and Barossa*** (23 infant deaths).

The correlation analysis was not undertaken as there were too few areas with sufficient cases on which to base reliable results.

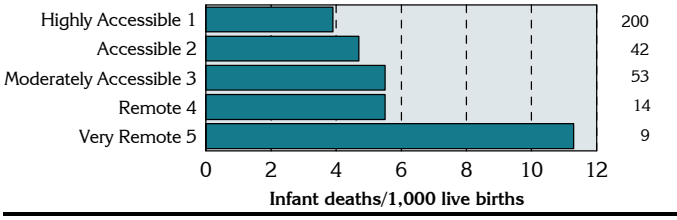
Map 4.2
Infant deaths, South Australia, 1996-99
deaths per 1,000 live births in each Country Health Region



*Data were not mapped because there were fewer than five deaths.

Source: Compiled in HealthWIZ from data supplied by the ABS ***Details of map boundaries are in Appendix 1.2***

Accessibility/Remoteness Index of Australia (ARIA+)



Infant death rates were highest in the Very Remote ARIA+ class (11.3 infant deaths per 1,000 live births), although there were just nine deaths in this four year period. Other rates ranged from 3.9 infant deaths per 1,000 live births in the Highly Accessible areas to 5.5 in both the Moderately Accessible and Remote areas.

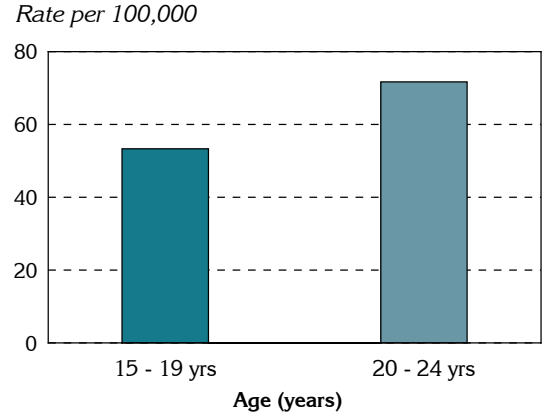
Source: Calculated on ARIA+ classification

Deaths of people aged 15 to 24 years from all causes, 1996-99

Adelaide

There is a considerable variation in death rates between the 15 to 19 and 20 to 24 year ages for deaths in Adelaide from all causes (**Figure 4.4**). Young people aged from 15 to 19 years have a death rate of 53.3 deaths per 100,000 population, with a higher rate of 71.7 per 100,000 in the 20 to 24 year age group.

Figure 4.4: Deaths from all causes, by age, Adelaide, 1996-99



Source: HealthWIZ 2002 deaths dataset, DoHA

There were five per cent fewer deaths of 15 to 24 year olds resident in Adelaide over the period from 1996 to 1999 than were expected from the State rates: this is a Standardised Mortality Ratio (SMR) of 95**. Males accounted for almost three quarters (72.5%) of the 389 deaths. The major causes of death in this age group were the external causes of injury and poisoning, a total of 261 deaths (67.1% of people at these ages).

The lowest SMRs were in the more affluent SLAs located in the eastern and southern areas of the city, and the highest were in the north-western and outer northern regions (**Map 4.3**).

The SLA of Elizabeth had the highest SMR for this variable, with 74% more deaths than were expected from the State rates (an SMR of 174*). Highly elevated ratios were also recorded in the outer northern SLAs of Gawler (with an SMR of 149) and Munno Para (138); and the north-western SLAs of Port Adelaide (136), Enfield [Part B] (123) and Hindmarsh and Woodville (120).

Marion (with an SMR of 42**), Payneham (49) and Brighton (54) all recorded SMRs substantially lower than expected; however these areas had only eleven, three and three deaths respectively.

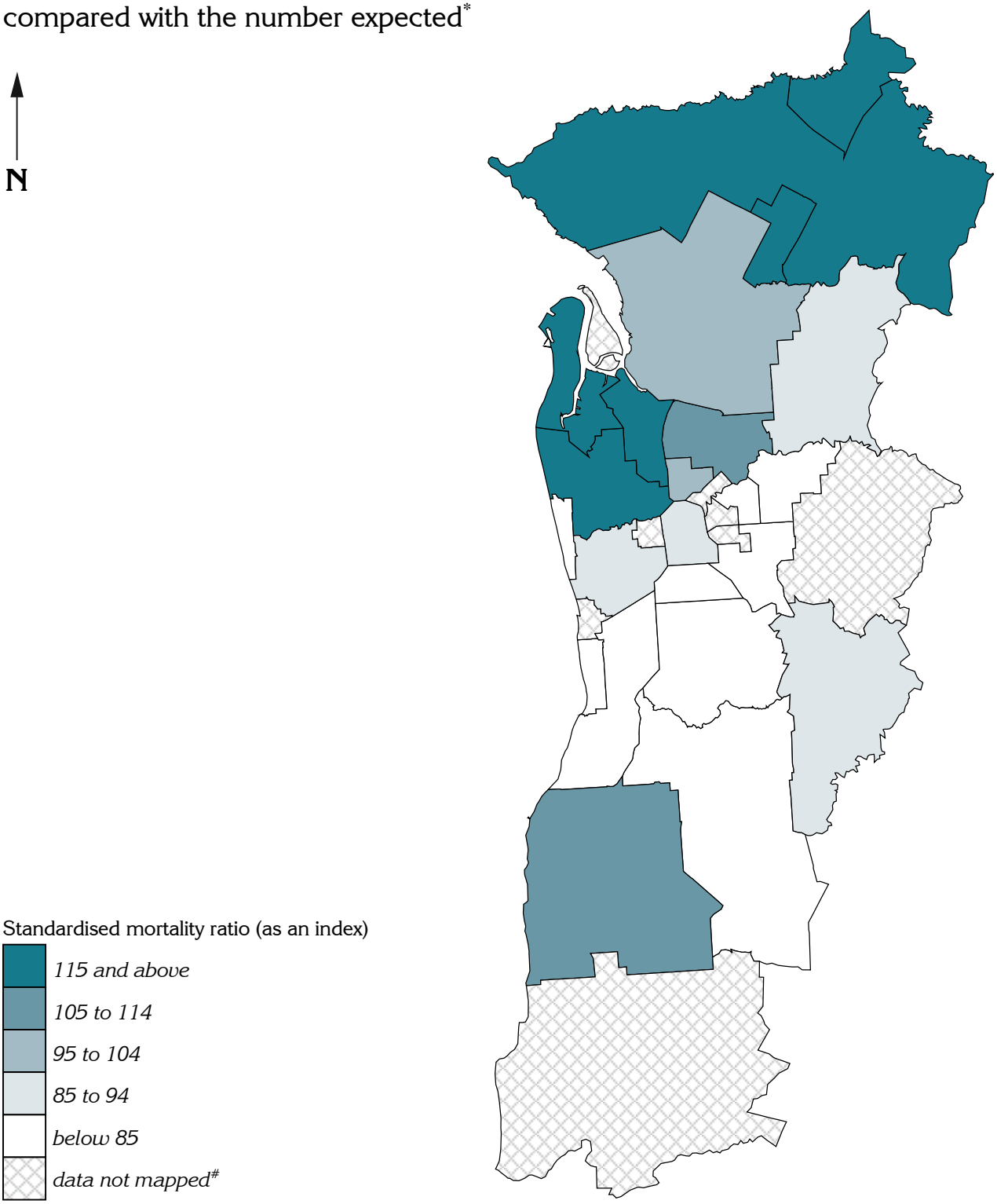
Relatively low ratios were also recorded for young people in Henley and Grange (with an SMR of 56; and three deaths), Happy Valley (an SMR of 58; and nine deaths) and Mitcham (an SMR of 77; and 18 deaths).

The SLA of Salisbury had the largest number of deaths at ages 15 to 24 years, with 44 deaths. More than 30 deaths were also recorded in the SLAs of Noarlunga (with 40 deaths), Hindmarsh and Woodville (37 deaths) and Tea Tree Gully (35 deaths).

There were correlations of meaningful significance with the variables for children aged 0 to 14 years living in dwellings rented from the State housing trust (0.60), people who left school at age 15 years or earlier (0.59), Indigenous people (a correlation of 0.58 for young people aged 15 to 24 years and 0.53 for children aged 0 to 14 years), dependent children in low income families) and the Total Fertility rate and unemployed females aged 15 to 24 years (both 0.52). These results, together with the inverse correlation with the IRSD (-0.54), indicate an association at the SLA level between high death rates at ages 15 to 24 years and socioeconomic disadvantage.

Map 4.3
Deaths of people aged 15 to 24 years from all causes, Adelaide, 1996-99

Standardised mortality ratio: number of deaths in each Statistical Local Area compared with the number expected*



* *Expected numbers were derived by indirect age-sex standardisation*

Data were not mapped because there were fewer than five expected deaths.

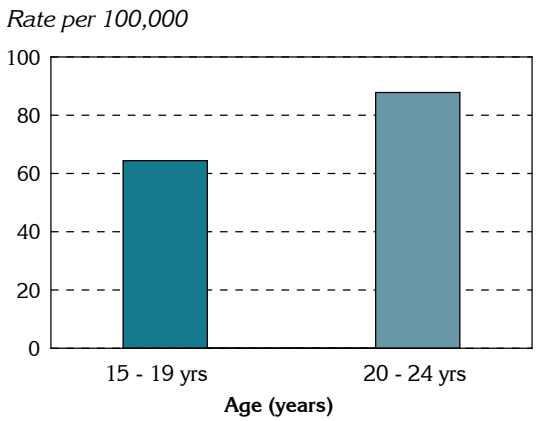
Source: Compiled in HealthWIZ from data supplied by the ABS ***Details of map boundaries are in Appendix 1.2***

Deaths of people aged 15 to 24 years from all causes, 1996-99

Non-metropolitan South Australia

People in the 15 to 19 year age group had a death rate of 64.4 deaths per 100,000 population, with a higher rate of 87.8 deaths per 100,000 in the 20 to 24 year age group (**Figure 4.5**).

Figure 4.5: Deaths from all causes, by age, non-metropolitan areas, 1996-99



Source: HealthWIZ 2002 deaths dataset, DoHA

People aged 15 to 24 years living in the non-metropolitan areas of South Australia recorded 15% more deaths than expected from the State rates (an SMR of 115). This was based on 140 deaths over the period from 1996 to 1999, of which more than three quarters (114 deaths) were of males. The major causes of death in this age group were the external causes of injury and poisoning, with a total of 104 deaths (74.3%).

The most highly elevated ratio was recorded in the ***Whyalla, Flinders and Far North*** Health Region, with an SMR of 139, indicating that there were 39% more deaths than were expected from the State rates. Ratios above the level expected were also recorded in ***Yorke, Lower North and Barossa*** (with an SMR of 134), ***Hills, Mallee and Southern*** (127), ***Eyre Peninsula*** (110) and ***Mid North*** (102).

The ***South East*** Health Region had the lowest death ratio, an SMR of 76.

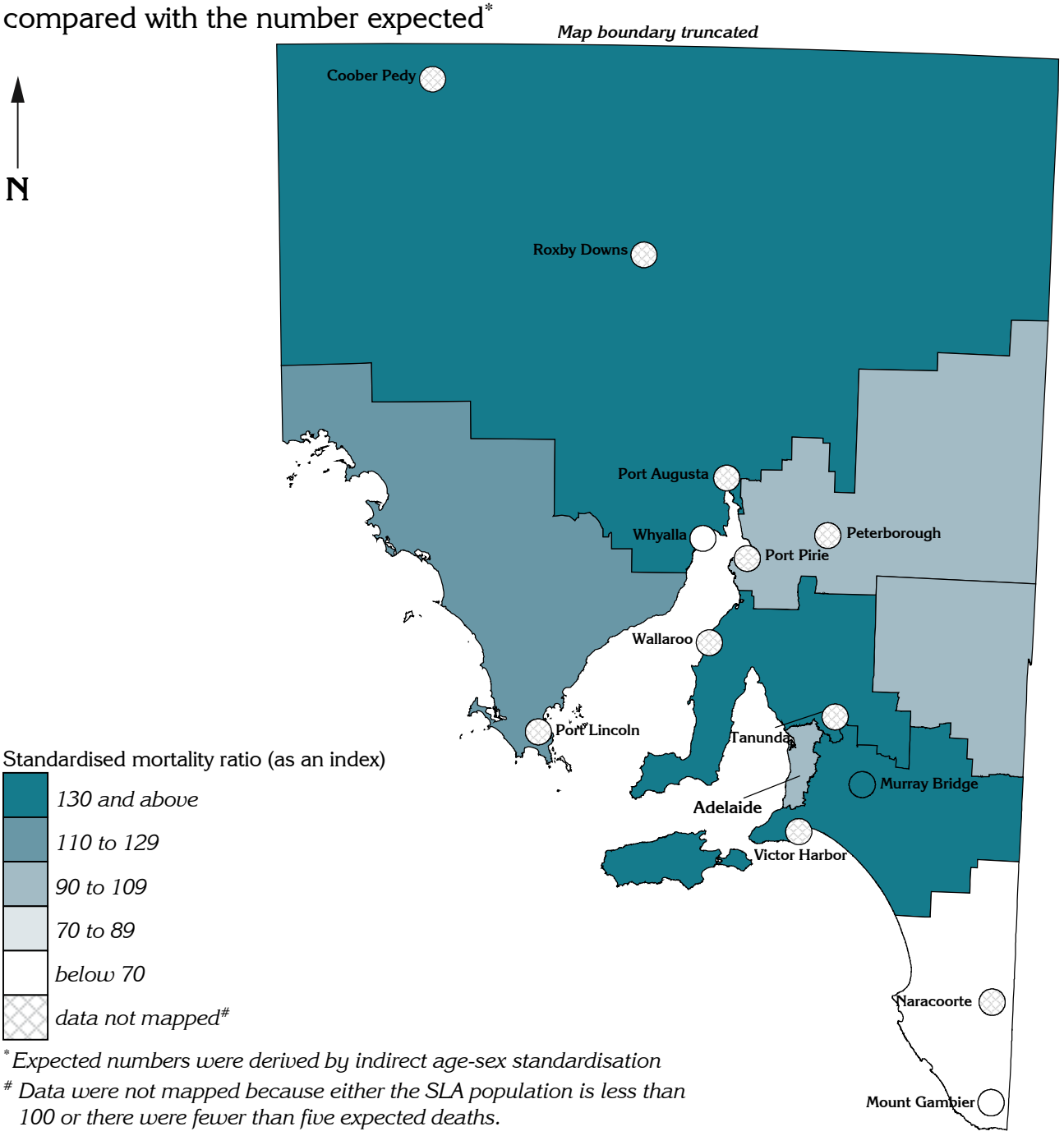
Of the towns mapped, only Murray Bridge had an elevated SMR, with more than twice the expected number of deaths at these ages (an SMR of 222** and 12 deaths). Mount Gambier and Whyalla had fewer deaths than expected, with ratios of 82 and 84 respectively.

The largest numbers of deaths among people aged 15 to 24 years in the non-metropolitan areas of South Australia were in the ***Hills, Mallee and Southern*** (37 deaths), ***Yorke, Lower North and Barossa*** (29 deaths) and ***Whyalla, Flinders and Far North*** (26 deaths) Health Regions.

The correlation analysis was not undertaken as there were too few areas with sufficient cases on which to base reliable results.

Map 4.4
Deaths of people aged 15 to 24 years from all causes, South Australia, 1996-99

Standardised mortality ratio: number of deaths in each Country Health Region compared with the number expected*

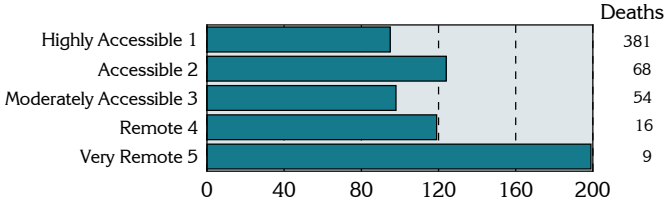


* *Expected numbers were derived by indirect age-sex standardisation*

\# *Data were not mapped because either the SLA population is less than 100 or there were fewer than five expected deaths.*

Source: Compiled in HealthWIZ from data supplied by the ABS ***Details of map boundaries are in Appendix 1.2***

Accessibility/Remoteness Index of Australia (ARIA+)



The lowest Standardised Mortality Ratio for deaths at ages 15 to 24 years was recorded in the Highly Accessible (95) areas, with higher ratios in the Accessible (124) and Remote (119) areas. The highly elevated SMR in the Very Remote areas shows there to be almost twice the number of deaths expected for a population of this age (199).

Source: Calculated on ARIA+ classification

Deaths of people aged 15 to 24 years from injury and poisoning, 1996-99

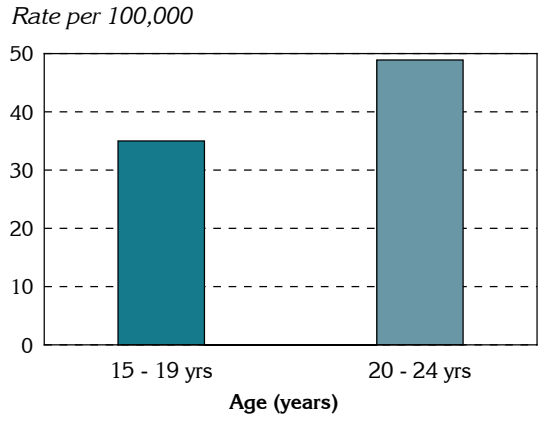
Accidental and violent deaths are classified according to the external cause of death; that is, to the circumstances of the accident or poisoning which produced the fatal injury, rather than the nature of the injury. This differs from other causes of death, which are classified according to the underlying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

Death resulting from injury and poisoning is the leading cause of death amongst young adults in South Australia. This category includes accidents, adverse effects of drugs, suicide, homicide and other external causes. Over the period from 1996 to 1999, motor vehicle accidents accounted for almost half (44.1%) of all accidental deaths of males aged 15 to 24 years in South Australia, with deaths from intentional self harm responsible for a further one third (34.3%). The corresponding figures for South Australian females were a higher 49.3% (motor vehicle accidents) and a lower 24.6% (intentional self harm).

Adelaide

There is a considerable variation in death rates between the 15 to 19 and 20 to 24 year age groups for deaths from the external causes of injury and poisoning in Adelaide (**Figure 4.6**). People in the 15 to 19 year age group have a death rate of 35.0 deaths per 100,000 population compared with 48.9 per 100,000 in the 20 to 24 year age group.

Figure 4.6: Deaths from injury and poisoning, by age, Adelaide, 1996-99



Source: HealthWIZ 2002 deaths dataset, DoHA

There were 261 deaths from injury and poisoning, eight per cent fewer than expected from the State rates for young people in Adelaide over the period from 1996 to 1999, an SMR of 92. Over three quarters of the deaths were of were males (78.9%, 206 deaths) 21.1% (55 deaths) were females.

As would be expected (given that deaths from these causes represent a high proportion of all deaths), the spatial distribution of deaths from injury and poisoning (**Map 4.5**) is similar to that of deaths from all causes. A number of areas were not mapped for this variable as they had too few cases.

The northern SLAs of Elizabeth (with an SMR of 222**; and 14 deaths) and Munno Para (158; 15 deaths) had the most highly elevated ratios. Other elevated (although not statistically significant) ratios were recorded for young people in Port Adelaide (with an SMR of 140; and 12 deaths), Burnside (106; 11 deaths), Hindmarsh and Woodville (103; 22 deaths) and Enfield [Part A] (101; 12 deaths).

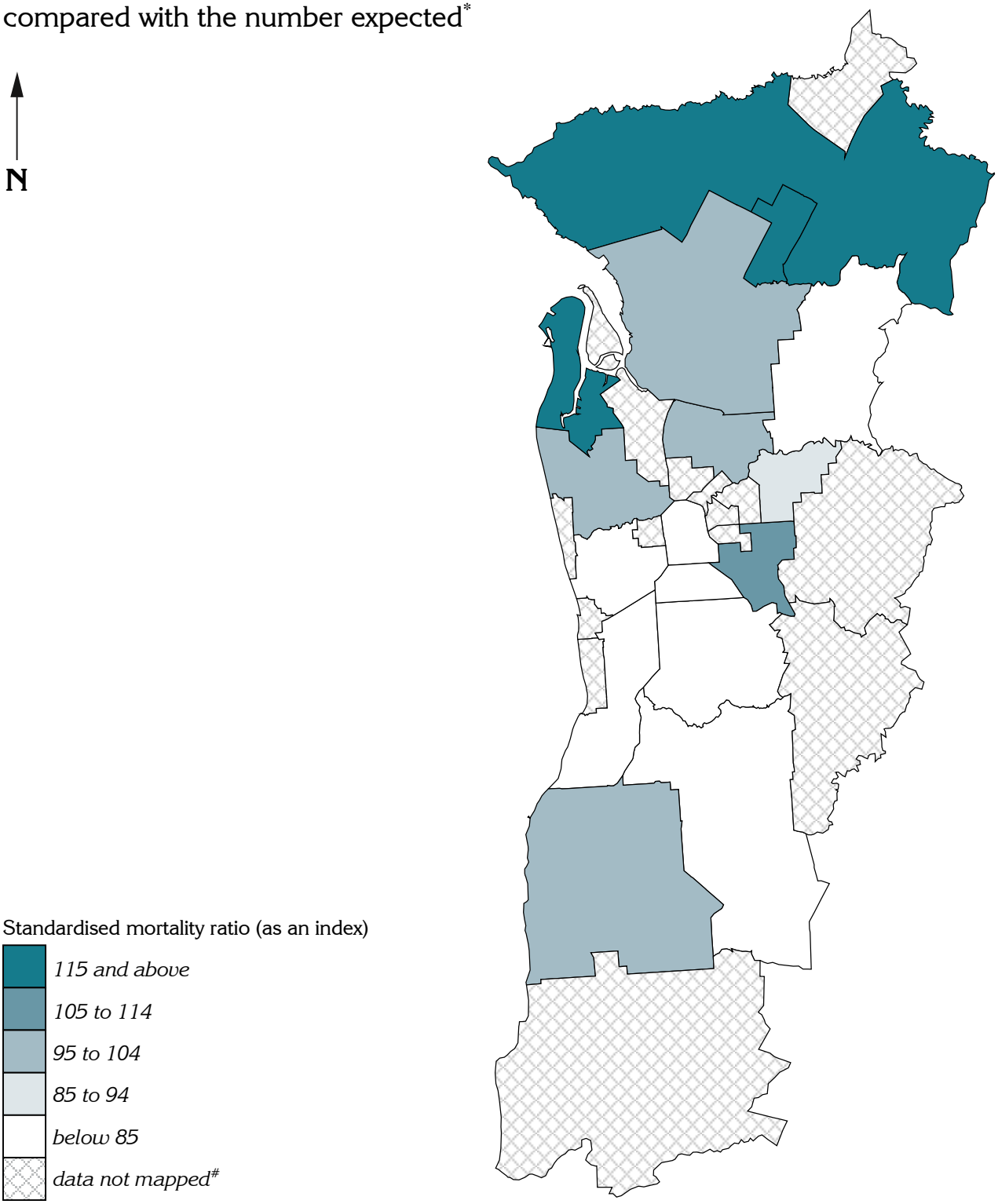
The lowest ratios were generally recorded in SLAs in inner suburban areas and to the south of the city, including Marion (with an SMR of 44*; and 8 deaths), Happy Valley (50; 5 deaths), Unley (69; 7 deaths) and Mitcham (69; 11 deaths).

The SLA of Salisbury had the largest number of deaths from these external causes, a total of 31 deaths. Twenty or more deaths were also recorded in Noarlunga (with 25 deaths), Hindmarsh and Woodville (22 deaths) and Tea Tree Gully (20 deaths).

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

Map 4.5
Deaths of people aged 15 to 24 years from injury and poisoning, Adelaide, 1996-99

Standardised mortality ratio: number of deaths in each Statistical Local Area compared with the number expected*



* *Expected numbers were derived by indirect age-sex standardisation*

Data were not mapped because either the SLA population is less than 100 or there were fewer than five expected deaths.

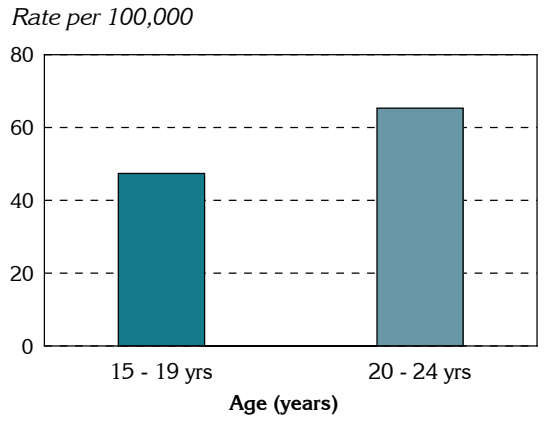
Source: Compiled in HealthWIZ from data supplied by the ABS ***Details of map boundaries are in Appendix 1.2***

Deaths of people aged 15 to 24 years from injury and poisoning, 1996-99

Non-metropolitan South Australia

There is a considerable variation in death rates between the 15 to 19 and 20 to 24 year age groups for deaths from the external causes of injury and poisoning in non-metropolitan South Australia (**Figure 4.7**). People in the 15 to 19 year age group have the lowest death rates (an average rate of 47.4 deaths per 100,000 population), compared with 65.3 deaths per 100,000 population in the 20 to 24 year age group.

Figure 4.7: Deaths from injury and poisoning, by age, non-metropolitan areas, 1996-99



Source: HealthWIZ 2002 deaths dataset, DoHA

There were 24% more deaths of 15 to 24 year old non-metropolitan residents from the external causes of injury and poisoning than were expected from the State rates, a Standardised Mortality Ratio (SMR) of 124*. In total, there were 104 deaths from these external causes, with males accounting for the majority (86.5%, 90 deaths).

The ***Hills, Mallee and Southern*** Health Region had the most highly elevated ratio for this variable, an SMR of 150*. Elevated (but not statistically significant) ratios were also recorded in the ***Whyalla, Flinders and Far North*** (an SMR of 147), ***Eyre Peninsula*** (144), ***Yorke, Lower North and Barossa*** (108) and ***Riverland*** (104) Health Regions.

The ***South East*** and ***Mid North*** Health Regions had the lowest ratios, with SMRs of 96 and 99 respectively.

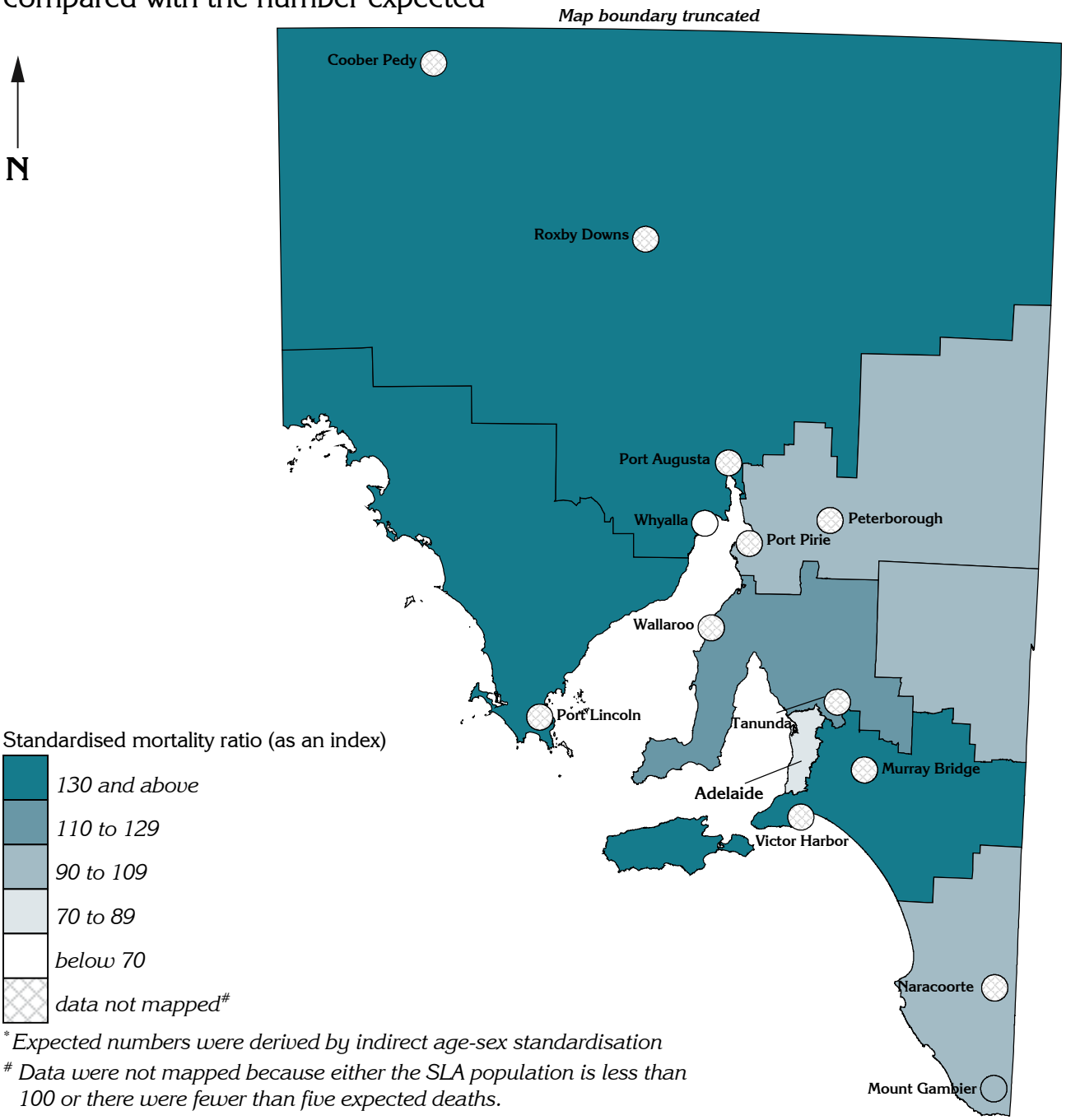
The towns of Mount Gambier (with an elevated SMR of 103) and Whyalla (with an SMR of 70) were the only towns to be mapped for this variable, as there were too few cases in the other towns from which to calculate reliable results.

The largest numbers of deaths of people aged 15 to 24 years from the external causes of injury and poisoning were recorded in the Health Regions of ***Hills, Mallee and Southern*** (with 30 deaths), ***Whyalla, Flinders and Far North*** (19 deaths) and ***Yorke, Lower North and Barossa*** (16 deaths).

The correlation analysis was not undertaken as there were too few areas with sufficient cases on which to base reliable results.

Map 4.6
Deaths of people aged 15 to 24 years from injury and poisoning, South Australia, 1996-99

Standardised mortality ratio: number of deaths in each Country Health Region compared with the number expected*

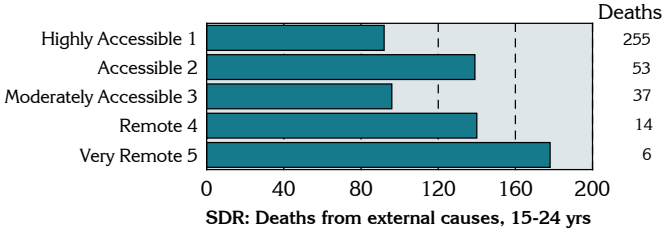


* *Expected numbers were derived by indirect age-sex standardisation*

\# *Data were not mapped because either the SLA population is less than 100 or there were fewer than five expected deaths.*

Source: Compiled in HealthWIZ from data supplied by the ABS ***Details of map boundaries are in Appendix 1.2***

Accessibility/Remoteness Index of Australia (ARIA+)



Standardised Mortality Ratios (SMRs) for injury and poisoning show a similar pattern to those for all causes of death. SMRs range from a low 92 in the Highly Accessible areas to 140 in the Remote ARIA+ class and then to a highly elevated 178 in the Very Remote class.

Source: Calculated on ARIA+ classification

Deaths due to suicide, people aged 15 to 24 years

Despite being the leading cause of death amongst young people, deaths from suicide have not been mapped in this chapter. The number of recorded suicides is quite small at the SLA level, with many having no such deaths, with the possibility that mapping them will lead to misinterpretation of results. This page and the following one provide an overview of deaths recorded for suicides in the period from 1990 to 1999 in South Australia.

In Australia, deaths are classified as self-inflicted by the Coroner or a Government Medical Officer upon consideration of the evidence, but it is likely that the number of suicides is under-reported. A death intended as suicide may appear as the result of an unrelated cause, ie. a motor vehicle accident, and thus is not recorded as such by the Coroner. For example, young male residents of country areas are over represented in single motor vehicle accidents; although suicide may have been the intention in some of these cases, if there is no evidence to this effect, then they are not recorded as such.

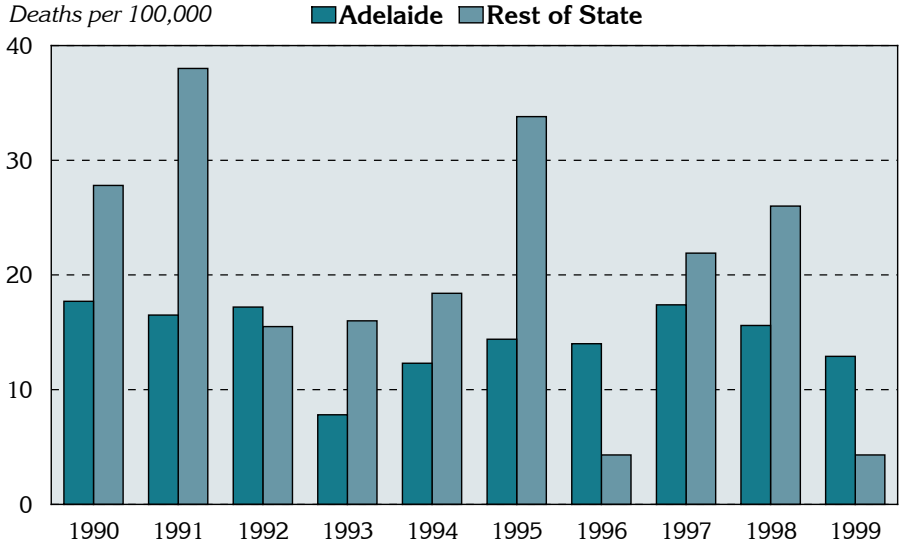
There were 338 deaths from suicide at ages 15 to 24 years in South Australia over the ten years 1990 to 1999. There has been a substantial decrease in the number of deaths recorded from suicide over this period, down by 51.1% from 45 deaths in 1990 to 22 deaths in 1999.

Males predominate in these deaths, accounting for the large majority (87.0%) of suicides between the ages of 15 and 24 years. However, research has suggested that females attempt suicide more often, but that males use more violent, and therefore more successful, means, such as firearms (Serafino et al, 1996).

Numbers of suicides not only vary by age and sex, but also by place of residence. While there were more deaths from suicide of young people in Adelaide (236 deaths) than in the non-metropolitan areas of South Australia (102) over the ten years from 1990 to 1999, Adelaide comprises almost three quarters of the State's population and so it is more informative to consider death rates, rather than absolute numbers.

The following chart shows suicide rates per 100,000 population for the years from 1990 to 1999 (**Figure 4.8**). Rates were higher in the non-metropolitan areas of South Australia in seven of the ten years of data analysed. Only in 1993, 1996 and 1999 were the rates higher in the metropolitan area. It is likely that the rates in country areas relate to factors such as a relative lack of job and training opportunities, the decline of many rural communities and the relatively larger numbers of Aboriginal and Torres Strait Islander people in the population, a group which has higher suicide rates than the non-Indigenous population.

Figure 4.8: Suicide rates of people aged 15 to 24 years, 1990 to 1999, Adelaide and Rest of State



Source: Various issues, ABS deaths bulletins

Deaths due to suicide, people aged 15 to 24 years, 1996-99

Adelaide

Over the years from 1996 to 1999, there were 14.9 deaths from suicide per 100,000 population in Adelaide at ages 15 to 24 years. However, rates vary considerably across the metropolitan area, as well as by age and sex. Both the highest rate (33.9 deaths per 100,000 population) and the largest number (56) of deaths from suicide were recorded for males aged 20 to 24 years. The next highest rates were recorded for males aged 15 to 19 years, females aged 20 to 24 years and females aged 15 to 19 years.

The highest death rate from suicide among males aged 15 to 19 years was recorded in the **Central (Western) Region** (27.8 deaths per 100,000 population, a total of seven deaths in the four years): this is more than twice the metropolitan rate for this age and sex group. The **Northern Region** had the highest death rate for males aged 20 to 24 years (41.3 deaths per 100,000 population), followed by **Central (Eastern)** (32.6) and **Central (Southern)** (31.8) **Regions**. For females in both age groups, rates were highest in the **Central (Eastern) Region**, although the absolute numbers are small and care should be taken in interpreting the results.

Non-metropolitan South Australia

The majority of deaths recorded as being the result of suicide in the non-metropolitan areas of South Australia were of males aged 20 to 24 years (19 deaths, a rate of 42.8 deaths per 100,000 population). In comparison, there were seven deaths of males aged 15 to 19 from suicide (a rate of 13.4 per 100,000) and no deaths of females from suicide.

Whyalla, Flinders & Far North Health Region recorded the largest number and highest rate of suicides at ages 15 to 24 years, with eight deaths, a rate of 28.1 deaths per 100,000 population. In the 20 to 24 year old male group, the highest rate (of any of the ages or areas shown in the table) was recorded in **Eyre Peninsula**, with 107.5 deaths per 100,000 population (four deaths over the four years). The next highest rates were recorded for residents of **Yorke, Lower North & Barossa** (54.3 deaths per 100,000 population) and **Whyalla, Flinders & Far North** (53.6 deaths per 100,000 population) Health Regions.

Table 4.5: Deaths due to suicide, people aged 15 to 24 years, 1996-99, South Australia

Health Region	15 to 19 years				20 to 24 years				Total	
	Males		Females		Males		Females			
	No.	Rate[1]	No.	Rate[1]	No.	Rate[1]	No.	Rate[1]	No.	Rate[1]
Metropolitan										
Northern	5	11.4	2	4.8	18	41.3	0	0.0	25	14.8
Central (Eastern)	7	20.2	3	8.6	15	32.6	6	13.3	31	18.6
Central (Western)	7	27.8	0	0.0	9	28.5	2	6.5	18	15.5
Southern	1	2.2	0	0.0	14	31.8	4	9.4	19	11.0
Total Metropolitan	**20**	**13.4**	**5**	**3.4**	**56**	**33.9**	**12**	**7.5**	**93**	**14.9**
Non-metropolitan										
Eyre Peninsula	0	0.0	0	0.0	4	107.5	0	0.0	4	26.9
Hills, Mallee & Southern	0	0.0	0	0.0	3	28.1	0	0.0	3	6.9
Mid North	0	0.0	0	0.0	1	32.7	0	0.0	1	7.8
Riverland	1	20.4	0	0.0	1	23.9	0	0.0	2	11.9
South East	1	11.5	0	0.0	2	25.1	0	0.0	3	9.6
Whyalla, Flinders & Far North	4	55.4	0	0.0	4	53.6	0	0.0	8	28.1
Yorke, Lower North & Barossa	1	9.5	0	0.0	4	54.3	0	0.0	5	15.9
Total non-metropolitan	**7**	**13.4**	**0**	**0.0**	**19**	**42.8**	**0**	**0.0**	**26**	**14.5**
Total	**27**	**13.4**	**5**	**2.6**	**75**	**35.8**	**12**	**6.0**	**119**	**14.8**

[1]**Age standardised rates per 100,000 by region,**

Source: Compiled in HealthWIZ from data supplied by the ABS

Perinatal risk factors, 1995 to 1997

The Pregnancy Outcome Unit, Epidemiology Branch, South Australian Department of Human Services, obtains data for births 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 the early 1980s on data in the Perinatal Statistics Collection identified a number of 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 stillbirth; 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.

Risk factor analyses are useful for a number of reasons. Not only do they provide a range of variables for examination, but they also suggest reasons for any observed elevations in adverse perinatal outcomes. A number of these risk factors directly or indirectly reflect the socioeconomic status of the women for whom these events are recorded: for example, direct association with single, teenage and Aboriginal and Torres Strait Islander women; and indirectly with low birthweight babies, occurring more frequently among 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 this atlas.

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

Adelaide

Postcode areas considered to be most at risk for adverse perinatal outcomes have been mapped for each of the three periods for which the analysis has been undertaken – 1981-86, 1990-92 and 1995-97 (**Map 4.7**). Two main features are evident from a comparison of the three maps: that the number of postcode areas with ten or more elevated scores declines over the three periods of the analysis; and that some areas are present in each of the maps.

The reduction in the number of high risk postcodes over time points to an improvement in outcomes for mothers and babies in these areas. The presence of some areas in all three of the analyses indicates that women in these areas are not experiencing the quality of outcomes achieved in the State as a whole, nor are they experiencing significant improvement in maternal or perinatal outcomes. The areas are the postcodes of *Blair Athol, Darlington, Elizabeth, Elizabeth North, Ferryden Park, Greenacres* and *Woodville North*. Also of concern are the postcodes of *Christies Beach, Klemzig, O'Sullivan Beach, Rosewater, Salisbury* and *Semaphore* that were classified as at being high risk for adverse perinatal outcomes in 1990-92 and 1995-97, although not in 1981-86.

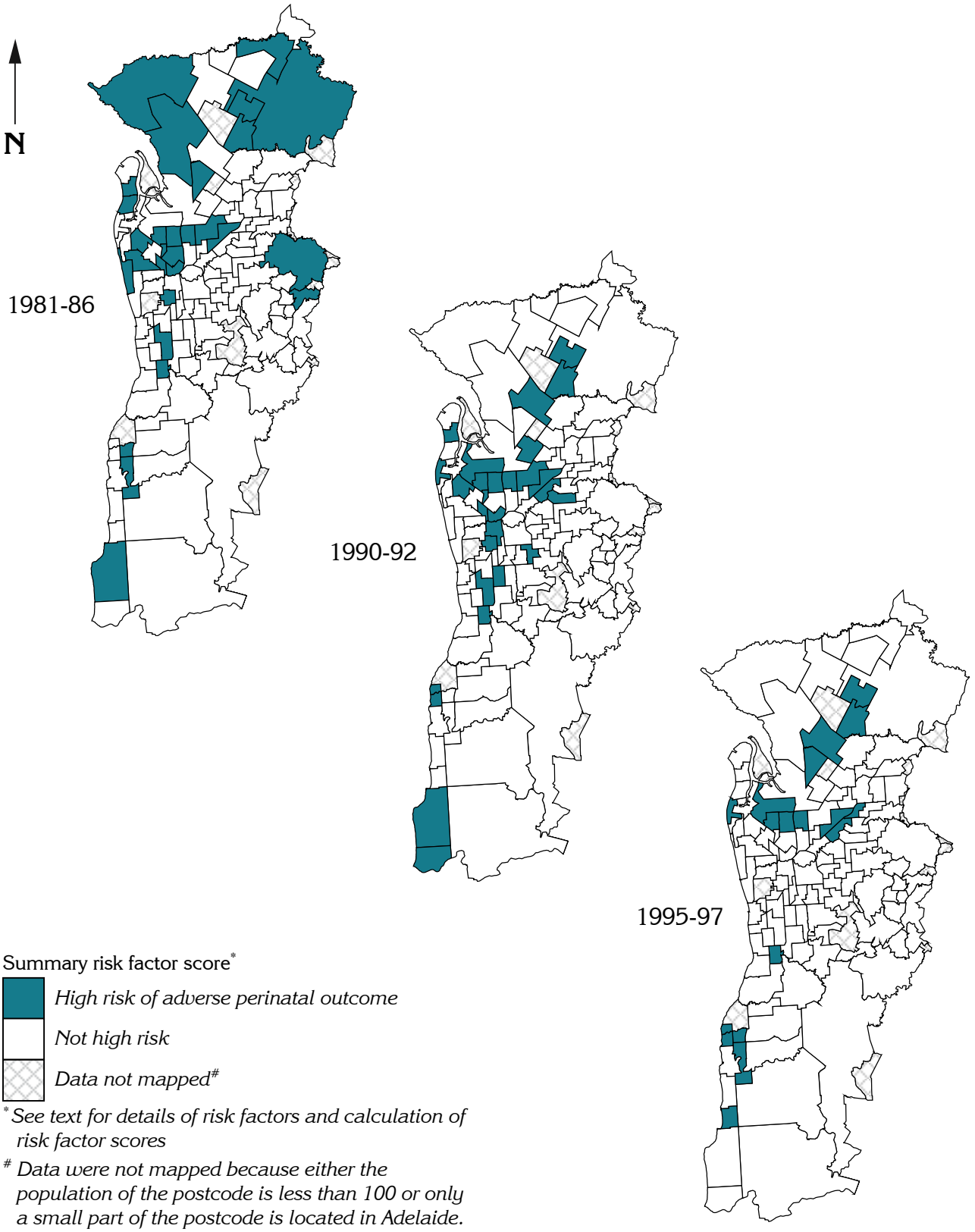
Areas which have seen an improvement in the quality of outcomes include *Alberton, Aldinga, Cowandilla, Enfield, Hindmarsh, Kilkenny, Osborne* and *Park Holme*.

There were weak correlations at the postcode level in the metropolitan area with the indicators of socioeconomic disadvantage. These results, together with the weak inverse correlation with the IRSD (-0.46), suggest the existence at the postcode level of an association between perinatal risk factors and socioeconomic disadvantage.

Details of the number of risk factors with elevated scores in each postcode area are in Table A15 in Appendix 1.6.

Notes on this variable in non-metropolitan areas are on the following text page.

Map 4.7
Perinatal risk factors, Adelaide
Summary perinatal risk factor* score by postcode of residence of mother



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

\# *Data were not mapped because either the population of the postcode is less than 100 or only a small part of the postcode is located in Adelaide.*

Source: Compiled from data supplied by DHS ***Details of map boundaries are in Appendix 1.2***

Low birthweight babies, 1995 to 1997

Low birthweight[2], calculated from data in the Perinatal Statistics Collection and included in calculations of the perinatal risk rating (described above), is a widely used indicator of mortality and of morbidity among newborn babies.

The significance of the relationship between low birthweight and mortality (of low birthweight babies) is striking. Research has shown that 14.6% of South Australian births of birthweight below 2,500 grams in 1994 were perinatal deaths, compared with a perinatal death rate of 0.99% in those with normal birthweight (2500 grams or more) (Taylor et al. 1995).

Adelaide

Of all births from 1995 to 1997 to women living in Adelaide, 6.9% were of babies weighing less than 2500 grams.

Postcodes with the highest proportions of babies born with a low birthweight are located in the inner north and north-western suburbs, as well as the outer northern and some southern areas (**Map 4.8**). Areas with fewer than five births over this period have been excluded from the analysis.

The highest proportions of low birthweight babies are recorded in the inner north and north-western postcode areas of *Ferryden Park* (with 12.8% of babies in this group), *Hindmarsh*, *Croydon* and *Nailsworth* (each 9.9%) and *Blair Athol* (9.7%); in the south at *Maslin Beach* (12.8%), *Christie Downs* (12.4%) and *O'Sullivan Beach* (10.7%); in the outer north at *Evanston* (11.6%) and *Elizabeth North* (10.7%); and in the Hills at *Blackwood Forward* (11.0%).

In contrast, relatively low proportions were recorded in postcodes scattered throughout the metropolitan area. The lowest proportions were in *Highbury* (with 2.3% of babies in this category), *Walkerville* (2.6%), *Oaklands Park* (3.6%), *Bridgewater* (3.8%), *Daw Park* (3.9%) and *St Marys* (4.0%). The Hills postcode areas of *Piccadilly*, *Carey Gully*, *Greenhill*, *Basket Range* and *Montacute* all had no babies in this category.

The largest numbers of low birthweight babies were generally in postcode areas in the outer northern and southern suburbs. Areas with more than 70 babies born with low birthweight over this period included *Salisbury* (with 198 babies), *Morphett Vale* (121 babies), *Elizabeth North* (115 babies), *Smithfield* (80 babies), *Happy Valley* (79 babies), *Elizabeth* and *Salisbury East* (both 72 babies).

There were weak correlations with a number of the indicators of socioeconomic disadvantage and weak inverse correlations with indicators of high socioeconomic status. These results, together with the weak inverse correlation with the IRSD (-0.49), suggest the existence of an association at the postcode level between high proportions of low birthweight babies and socioeconomic disadvantage.

Perinatal risk factors ...*cont*

Non-metropolitan South Australia

Data in the non-metropolitan areas of South Australia were only available at the postcode level for the periods 1981-86 and 1995-97. In both these periods the following postcode areas were classified as being high risk areas for adverse perinatal outcomes: Moonta (14 of the 17 risk factors had elevated scores), Whyalla, Tailem Bend and Oodnadatta (each 12), Port Augusta (11) and Leigh Creek (10).

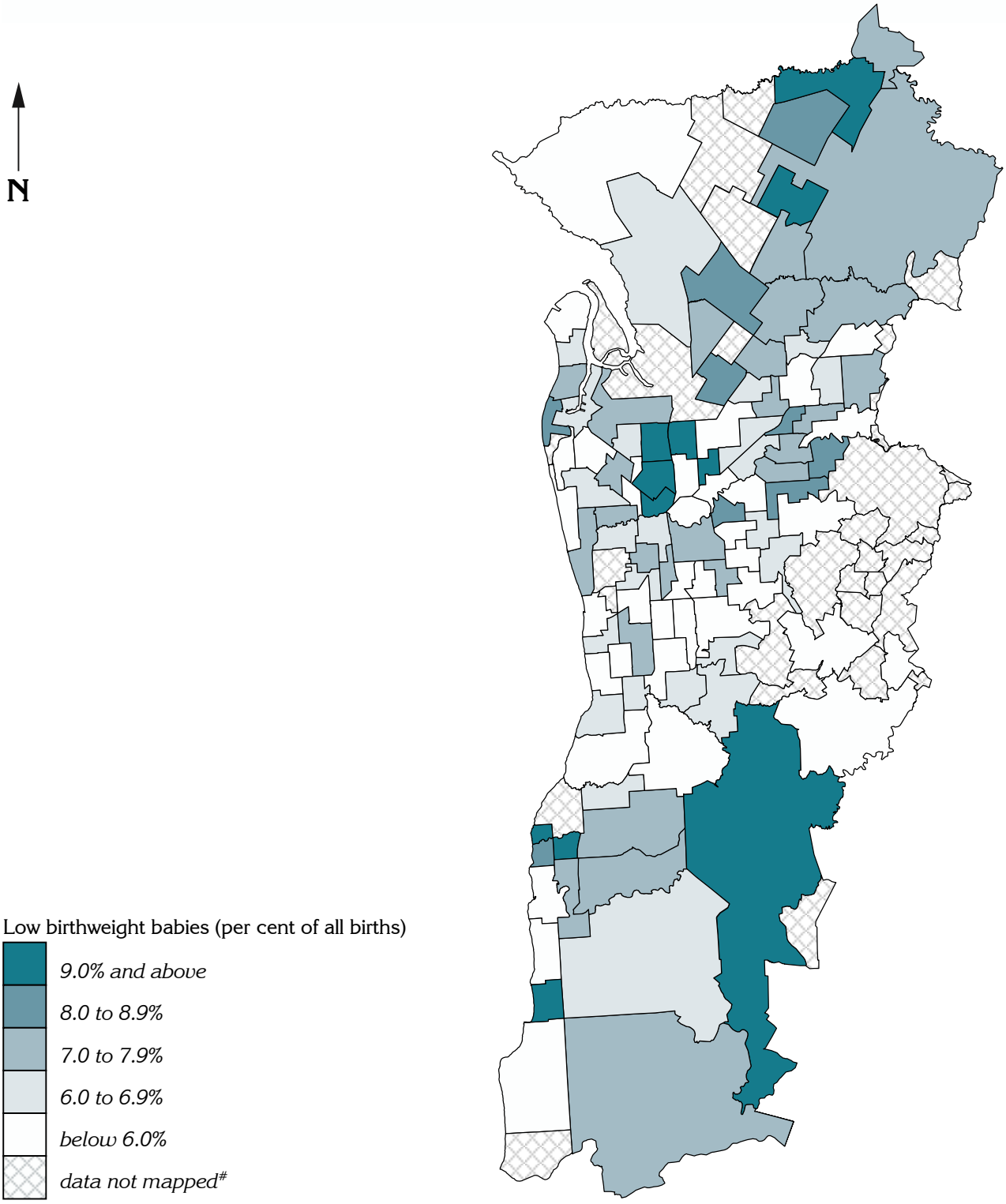
In 1995-97 only fifteen postcode areas were classified as high risk compared with 46 in 1981-86: in addition to those mentioned above, these were Cowell (12 of the 17 risk factors had elevated scores), Glossop (12), Coober Pedy, Port Lincoln and Wallaroo (each 11), Ceduna, Kimba and Two Wells (each 10).

Details of the number of risk factors with elevated scores in each postcode area in non-metropolitan South Australia are in Table A16 in Appendix 1.6.

[2] Low birthweight babies are babies (both live-born and stillborn) weighing less than 2500 grams at birth.

Map 4.8
Low birthweight babies*, Adelaide, 1995 to 1997

Low birthweight babies*, as a percentage of all birth by area of postcode of mother



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

Data were not mapped because either, there were fewer than five births, the postcode population is less than 100 or only a small part of the postcode is located in Adelaide.

Source: Compiled from data supplied by DHS ***Details of map boundaries are in Appendix 1.2***

Low birthweight babies, 1995 to 1997

Low birthweight babies are those with a birthweight below 2,500 grams. Further information about low birthweight births is on the previous text page.

Non-metropolitan South Australia

Of all births over the four years from 1996 to 1999 to women with a postcode of usual address in the non-metropolitan areas of South Australia, 6.9% were of babies weighing less than 2500 grams.

Yorke, Lower North and Barossa and ***Whyalla, Flinders and Far North*** Health Regions (both with 7.6%) recorded the highest proportions of low birthweight babies. The ***Eyre Peninsula*** Health Region also had an above average proportion, with 7.2%.

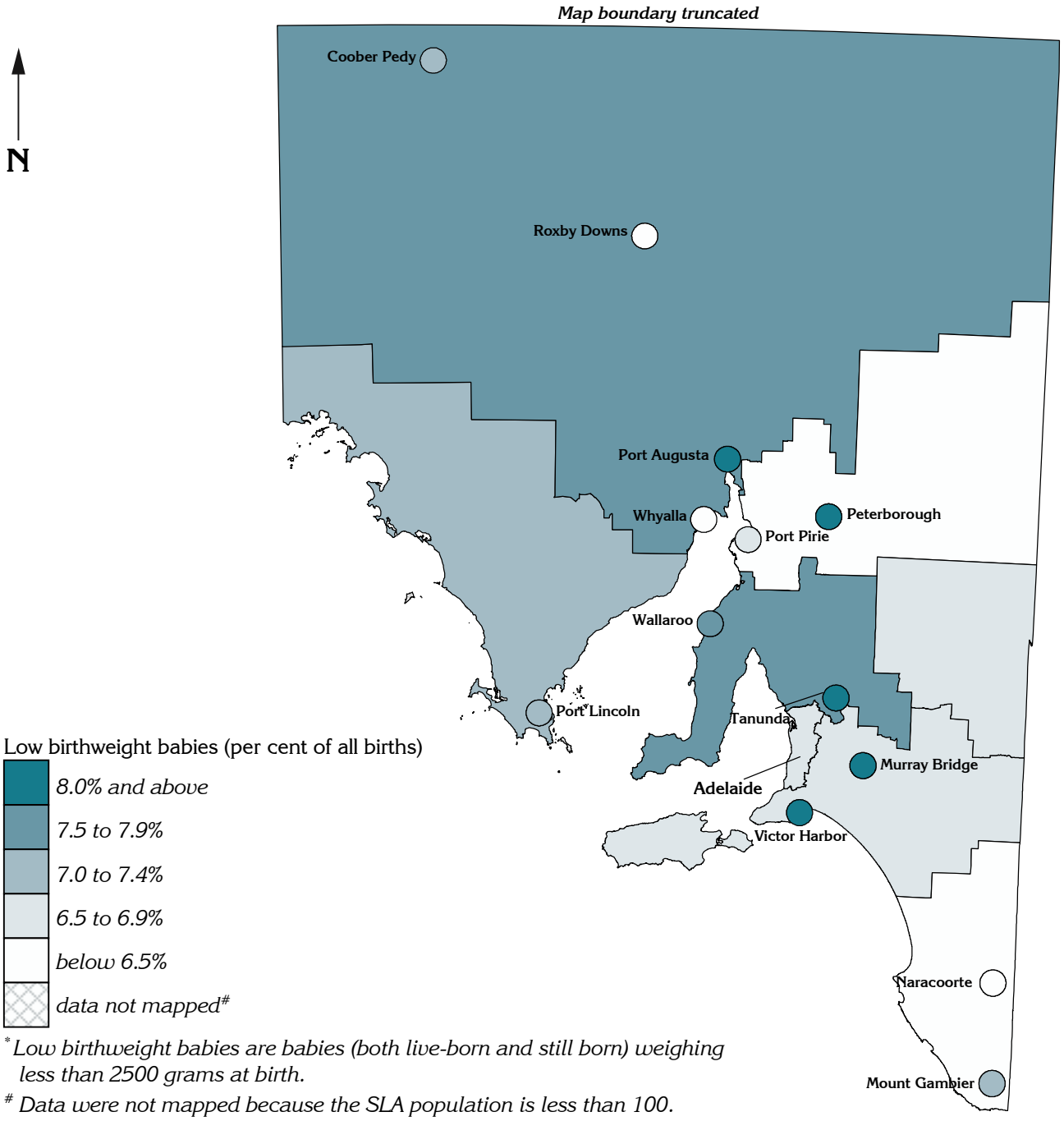
The lowest proportion of low birthweight babies, 6.2%, was recorded in the ***Mid North*** Health Region, followed by the ***South East*** (with 6.3%), ***Hills, Mallee and Southern*** (6.7%) and ***Riverland*** (6.8%) Health Regions.

Of the towns mapped, Wallaroo recorded the highest proportion of low birthweight babies, with 17.7% of babies in this category. Relatively high proportions were also recorded in the towns of Peterborough (with 9.3%), Murray Bridge (9.2%), Port Augusta (8.9%), Tanunda (8.8%) and Victor Harbor (8.3%). In contrast, Roxby Downs (3.1%), Naracoorte (5.2%), Whyalla (6.4%) and Port Pirie (6.7%) all had proportions below the non-metropolitan average.

More than 150 babies were born with low birthweight in the ***Hills, Mallee and Southern*** (with 247 babies), ***Yorke, Lower North and Barossa*** (218 babies), ***Whyalla, Flinders and Far North*** (189 babies) and ***South East*** (168 babies) Health Regions.

The correlation analysis was not undertaken as there were too few areas with sufficient cases on which to base reliable results.

Map 4.9
Low birthweight babies*, South Australia, 1995 to 1997
Low birthweight babies* as a percentage of all births by area of residence of mother

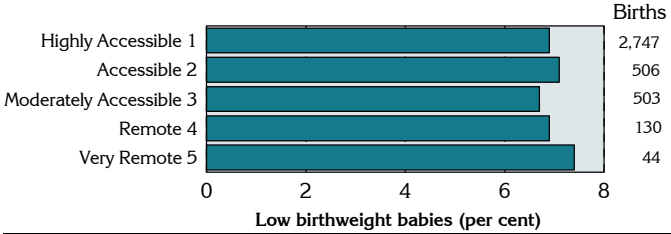


* *Low birthweight babies are babies (both live-born and still born) weighing less than 2500 grams at birth.*

\# *Data were not mapped because the SLA population is less than 100.*

Source: Compiled from data supplied by DHS ***Details of map boundaries are in Appendix 1.2***

Accessibility/Remoteness Index of Australia (ARIA+)



There are two separate gradients evident in the graph of low birthweight babies. The first is between the Highly Accessible (6.9%) and Accessible (7.1%) areas; and the second is from the Moderately Accessible (6.7%, the lowest proportion) to the Very Remote (7.4%) areas.

Source: Calculated on ARIA+ classification

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Body Mass Index

Significant physical and psychosocial health problems are associated with overweight and obesity in childhood and adolescence (Booth et al. 2001). Furthermore, obesity in childhood causes a wide range of serious complications, and increases the risk of premature illness and death later in life (Ebbeling et al. 2002).

A new definition of overweight and obesity in childhood, based on pooled international data for the Body Mass Index (BMI) has been proposed (Cole et al. 2000). The BMI is a measure of body fat, based on height and weight: it is defined as weight in kilograms divided by the square of height in metres (kg/m^2). Its value for individual children, especially at young ages, may be limited. However, when calculated for a population group (eg. four year old children), it becomes a useful indicator for monitoring change over time, as well as for monitoring variations between groups within the population.

Information on which to calculate the BMI is not available for the whole population. However, from 1995 onwards, Child and Youth Health (CYH) have 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, achieving a coverage of 82.1% over 2000-01: coverage is calculated as the number of children measured, as a proportion of children aged from four years three months to five years. In more recent years, these data have been matched with records of birth registrations held by CYH, to improve accuracy (e.g., by removing possible duplications).

Table 4.6: Proportion of four year old children categorised as overweight and obese, by sex, South Australia, 2000-01
Per cent

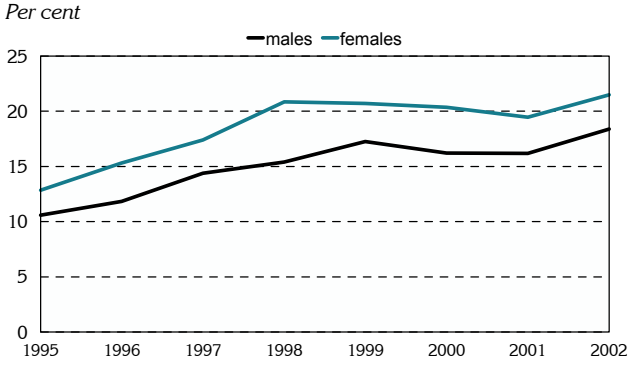
BMI category[1]	Male	Female
Overweight	11.8	14.5
Obese	4.4	5.4
Overweight & obese	16.2	19.9
Other	67.6	60.2
Total	100.0	100.0

[1]Based on the international standard definitions for overweight and obesity proposed by Cole et al. (2000). Using 4.5 years of age, the cut off point for BMI for overweight is 17.47 for males and 17.19 for females. For obesity, it is 19.26 and 19.12, respectively.
Source: Data provided by Child and Youth Health

The percentages in **Table 4.6** indicate a significant proportion of four year old children in South Australia are obese and overweight. Similar proportions of overweight and obese children in this age group have also been noted in the Health of Young Victorians Study 1997 (Booth et al. 2001).

There has been an increase in the proportion of overweight and obese four year old children from 1995 to 2002, from 12.9% to 21.5% for females; and from 10.6% to 18.4% for males (**Figure 4.9**). Similar trends have been noted in other Australian studies (Booth et al. 2001), where the prevalence of overweight and obesity among children and adolescents has been estimated to be between 19% and 23%. The prevalence of obesity in children has also risen greatly over the past two decades worldwide (Ebbeling et al. 2002). However, the Australian prevalence rates are high by international standards (Magarey et al. 2001) and, therefore, represent a significant public health concern.

Figure 4.9: Overweight and obese four year old children by sex, South Australia, 1995 to 2002



Source: Data provided by Child and Youth Health

There is a paucity of information about the BMI for particular groups of children and young people in South Australia. However, a recent study in one region of Sydney showed a significant association between BMI and ethnicity, with school students aged 5-12 years from Mediterranean cultural backgrounds having the highest BMI and those from Asian backgrounds, the lowest BMI (Lynch et al. 2000).

For Indigenous children, considerable variation exists. In the 1994 National Aboriginal and Torres Strait Islander Survey (NATSIS), both underweight and overweight were found to be more common than expected in Indigenous children, and there was greater than expected variability for all geographic locations studied (Cunningham & Mackerras 1998).

Body Mass Index for four year old children, 2000-01

The Body Mass Index (BMI) and associated measures are described on the previous page.

Over the two years 2000 and 2001, the average BMI for four year old children in Adelaide was 16.1. This figure was slightly higher for males (16.2) than for females (16.0).

More female children are overweight and obese than male children in Adelaide (19.2% for females and 15.4% for males, a difference of 24.7%) (**Table 4.7**). These levels are lower than the State average for both males and females.

Table 4.7: Proportion of four year old children categorised as overweight and obese, by sex, Adelaide, 2000-01
Per cent

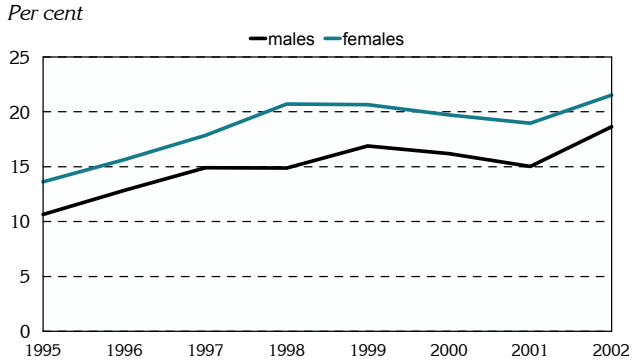
BMI category[1]	Adelaide		State	
	male	female	male	female
Overweight	10.9	13.7	11.8	14.5
Obese	4.5	5.5	4.4	5.4
Overweight & obese	15.4	19.2	16.2	19.9
Other	69.2	61.7	67.6	60.2
Total	100.0	100.0	100.0	100.0

[1]**See footnote to Table 4.6.**
Source: Data provided by Child and Youth Health

Adelaide

There has been an increase in the proportion of overweight and obese four year old children over the period 1995 to 2002, from 13.6% to 21.5% for females and from 10.7% to 18.7% for males (**Figure 4.10**).

Figure 4.10: Overweight and obese four year old children by sex, Adelaide, 1995 to 2002



Source: Data provided by Child and Youth Health

The sharp increase from 2001 to 2002 may, in part, reflect a change in collection practices. In 2002, staff resources were limited and those available were directed to ensuring that coverage in lower socioeconomic status areas was maintained. The effect of this was a reduction in coverage in higher socioeconomic status areas. It is not clear what impact, if any, this has had on the BMI or the proportions of overweight and obese children.

The distribution of overweight and obese children is different for males and females, with higher rates for females more heavily concentrated in the north and north-western suburbs (**Map 4.10**). Areas with low proportions were distributed throughout Adelaide, with the largest concentration for both males and females in the eastern, southern and some south-western suburbs.

Excluding areas with fewer than five four year olds, the highest proportion of overweight and obese males were recorded in *Klemzig* (with 34.5% of children in this category), *Adelaide* (28.6%), *Port Adelaide* (26.9%), *Kilkenny* (25.9%), and *Alberton, Greenacres* and *Summertown* (each with 25.0%); for females the highest proportions were recorded in *Ashton* (42.9%), *Osborne* (41.9%), *Novar Gardens* (35.7%), *Enfield* (35.3%), *Virginia* (34.6%), *Macdonald Park* and *Uraidla* (both 33.3%), *Rosewater East* (31.5%), *Prospect* (30.4%) and *Semaphore* (30.2%).

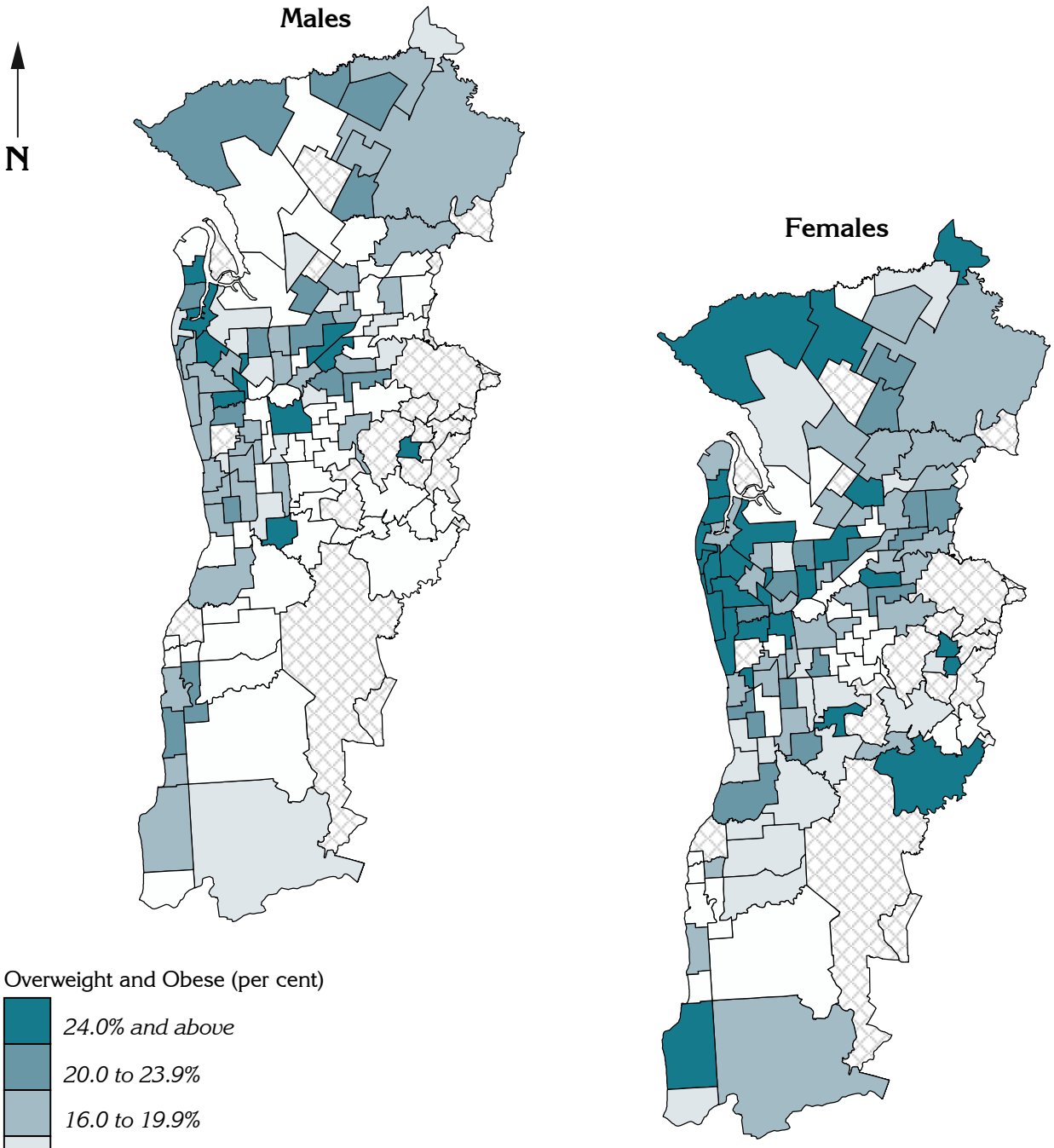
Proportions of 5.0% or below were recorded for four year old male children in *Upper Sturt* and *Gepps Cross* (both with no children in this category), *Bridgewater* (3.3%), *Christies Beach* (4.3%) and *Glenside* (5.0%); and four year old female children in *Maslin Beach* and *Gepps Cross* (both with no children in this category), *O'Sullivan Beach* (3.0%) and *Christies Beach* (4.5%).

The largest numbers of overweight and obese children, for both males and females, were recorded for four year old residents of *Smithfield* (with 63 males and 69 females), *Salisbury* (57 and 82), *Elizabeth* (49 and 49), *Elizabeth North* (46 and 51) and *Morphett Vale* (40 and 59).

There were weak correlations at the postcode level with a number of the indicators of socioeconomic disadvantage.

When the data were aggregated to the SLA level, correlations of meaningful significance were found with the variables for Indigenous people aged 0 to 14 years (0.55 for males) and 15 to 24 years (0.52 for males and 0.51 females). These results, together with the weak inverse correlation with the IRSD (-0.44 for males and -0.45 for females), suggest the existence of an association at the SLA level between overweight and obese children and socioeconomic disadvantage.

Map 4.10
Body Mass Index for four year old children, Adelaide, 2000-01
Body Mass Index by postcode of residence of child



[*] Data were not mapped because, either there were fewer than five children, the postcode population is less than 100 or only a small part of the postcode is located in Adelaide.

Source: Compiled from data supplied by Child and Youth Health ***Details of map boundaries are in Appendix 1.2***

Body Mass Index for four year old children, 2000-01

The Body Mass Index (BMI) and associated measures are described on page 173.

Over the two years 2000 and 2001, the average BMI for four year old children in the non-metropolitan areas of South Australia was 16.2. This figure was slightly higher for males (a BMI of 16.4) than for females (16.0).

The proportion of overweight and obese children in the non-metropolitan areas of the State (21.5% for females and 18.0% for males) is higher than in Adelaide (19.2% for females and 15.4% for males). The difference is greater for males (16.9% higher in non-metropolitan areas) than for females (12.0% higher).

Table 4.8: Proportion of four year old children categorised as overweight and obese, by sex, Rest of State, 2000-01
Per cent

BMI category[1]	Rest of State		State	
	male	female	male	female
Overweight	13.6	16.3	11.8	14.5
Obese	4.3	5.3	4.4	5.4
Overweight & obese	18.0	21.5	16.2	19.9
Other	64.1	56.9	67.6	60.2
Total	100.0	100.0	100.0	100.0

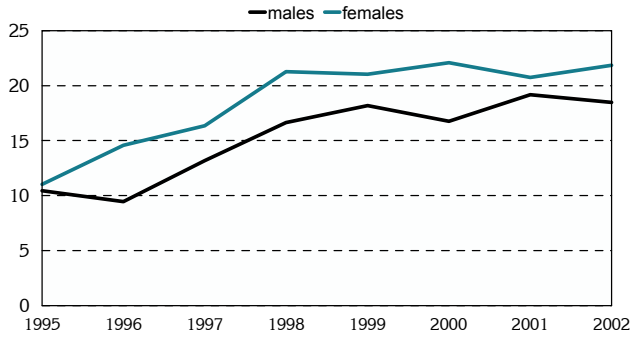
[1]**See footnote to Table 4.6.**
Source: Data provided by Child and Youth Health

Non-metropolitan South Australia

There has been an increase in the proportion of overweight and obese four year old children from 1995 to 2002, from 11.0% to 21.9% for females and from 10.4% to 18.5% for males (**Figure 4.11**). The overall level is higher than in the metropolitan area.

Figure 4.11: Overweight and obese four year old children, Rest of State, 1995 to 2002

Per cent



Source: Data provided by Child and Youth Health

There is no clear pattern in the distribution of overweight and obese children in the non-metropolitan areas, although rates for females are generally higher in the towns (**Map 4.11**).

The Unincorporated area of Flinders Ranges recorded the highest proportion of overweight and obese males (at 57.8%), while the highest proportion for females was recorded in the SLA of Lacepede (50.7%). The SLAs of Elliston (with 42.3% of males in this category), Lacepede (36.1%), Tumby Bay (34.4%) and Le Hunte (30.8%) recorded the next highest proportions among four year old males, while similarly high proportions among four year old females were recorded in Copper Coast (34.8%), Wattle Range – West (32.4%), Port Lincoln (32.0%), Lower Eyre Peninsula (31.6%), Port Pirie City (31.1%) and Loxton Waikerie – West (30.9%).

Residents of Yankalilla, Mount Barker Balance and Cleve had the lowest proportions for males, of 4.6%, 5.1% and 6.7% respectively. Relatively low proportions for females were recorded in Cooper Pedy (with no children in this category), Elliston (4.4%), Kangaroo Island (8.7%), Berri and Barmera - Barmera (9.3%) and Unincorporated Far North (11.1%).

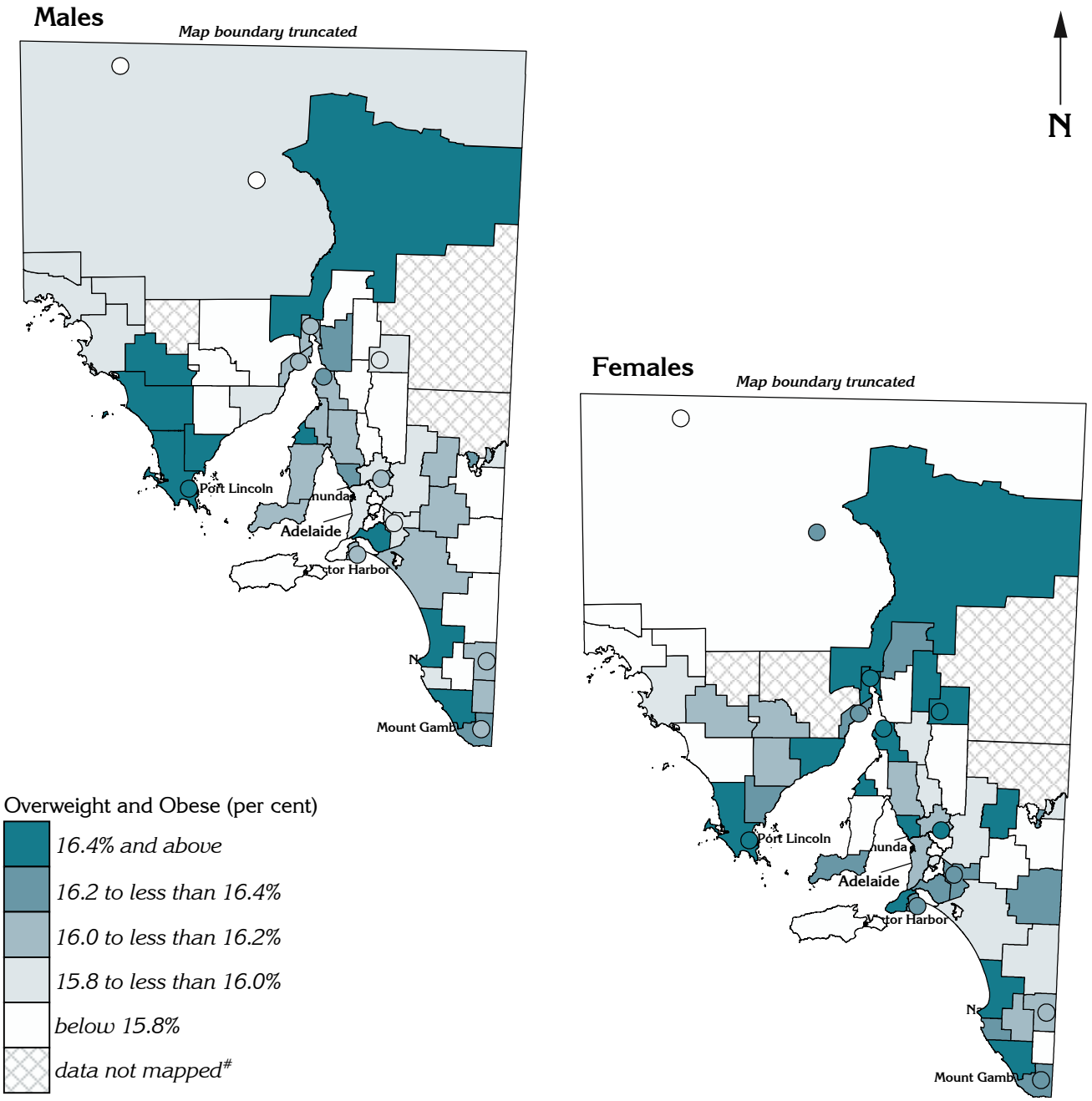
The low BMIs in Coober Pedy and Unincorporated Far North may reflect the high prevalence of underweight in Indigenous children living in these remote areas, as reported in numerous studies over recent decades (e.g., Kirke 1969; Rousham & Gracey 1997). However, as access by Indigenous children in some remote communities to Child and Youth Health staff has been limited in the past, particularly in the remote north-west of the State, this may also reflect a lack of data. Coverage of CYH services to these remote areas is now being improved.

The largest number of overweight and obese children, for both males and females, were recorded for four year old residents of Mount Gambier (66 males and 69 females), Port Pirie City (57 and 61) and Whyalla (54 and 60).

There was no consistent evidence in the correlation analysis at the SLA level in the non-metropolitan area of South Australia of an association between BMI and socioeconomic status.

Map 4.11
Body Mass Index for four year old children, South Australia, 2000-01

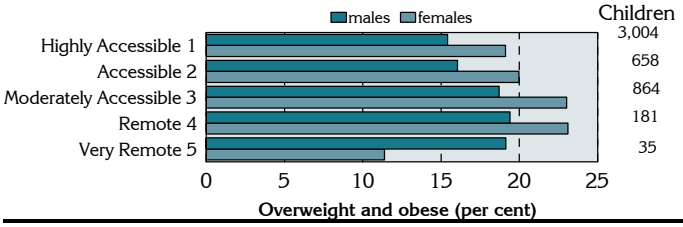
Body Mass Index by Statistical Local Area of residence of child



*Data were not mapped because there were fewer than five children or the SLA population is less than 100.

Source: Compiled from data supplied by Child and Youth Health ***Details of map boundaries are in Appendix 1.2***

Accessibility/Remoteness Index of Australia (ARIA+)



The proportion of overweight and obese four year olds increases steadily over the first four ARIA+ categories, from 15.4% to 19.4% for males and from 19.1% to 23.1% for females. The proportions decreased in the Very Remote areas, to 19.1% for males and to a very low 11.4% for females.

Source: Calculated on ARIA+ classification

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Child abuse and neglect

Child abuse and neglect is a significant issue in South Australia. Information regarding cases of child abuse and neglect was obtained from Family and Youth Services (FAYS) in the Department of Human Services. Reports of concern about a child may be made to FAYS by someone in the community, by a professional mandated by law to report suspected abuse and neglect, or by an organisation that has contact with the family or child. These reports may relate to abuse and neglect or to broader family concerns such as economic problems or social isolation. In South Australia, the mandatory reporting of suspected child abuse and neglect to FAYS is governed by the *Children's Protection Act, 1993*.

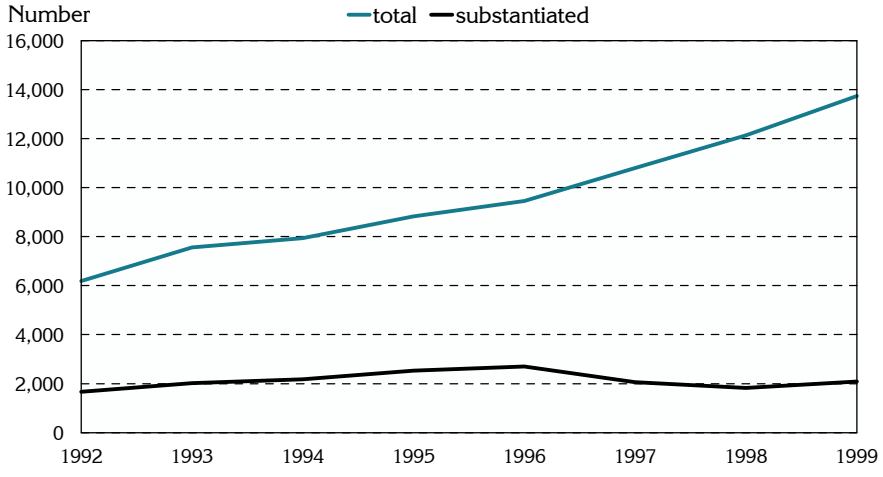
Workers in FAYS screen reports and may refer some to other agencies. Those reports that are deemed appropriate for FAYS are further assessed to determine if action is required. Such reports are generally classified as either a family support issue or a child protection 'notification'. A child protection notification is assessed by FAYS to determine whether it requires an investigation; whether it should be dealt with by other means, such as referral to other organisations or to family support services; or whether no further protective action is necessary or possible. An investigation is the process whereby FAYS obtains more detailed information about a child who is the subject of a notification, and makes an assessment of the degree of harm, or risk of harm, to the child.

After an investigation has been finalised, a notification is classified as a 'substantiated case', or as 'not substantiated'. The numbers of notified (total cases) and of substantiated cases are shown in **Figure 4.12**. Cases remained relatively stable, dropping to 2,082 cases in 1999 after a relatively small increase up to 1996. Note that trends should be interpreted carefully, as changes in policies and practices over the period may have impacted on the numbers; for example, the introduction of structured risk assessment tools to help workers identify children in high-risk circumstances (Cashmore 2001) and a centralised intake system to improve the consistency of response by FAYS. The increase in the number of notifications may also reflect an increase in the number of child protection matters that are notified (for example, an increased awareness about child abuse and neglect in the community); and an increase in the number of children who require a child protection response (for example, through an increase in the incidence of child abuse and neglect, or inadequate parenting causing harm to a child).

However, while the notification rates have risen, the rates of re-notification have also increased, indicating that many children and young people are being 'recycled' through the child protection system (Layton 2003). This highlights the ineffectiveness of the current intervention system for many children and young people, and the urgent need for more comprehensive, sustained and alternative solutions.

It is likely that there is still significant under-reporting of child abuse and neglect. However, Indigenous children are clearly over-represented in the child protection system (see page 182). The rate of Indigenous children who were the subjects of substantiations, for example, was more than seven times the rate for other children in South Australia in 2000/01 (AIHW 2002).

Figure 4.12: Total and substantiated cases of child abuse and neglect, South Australia, 1992 to 1999



Source: Compiled from data supplied by DHS

Substantiated cases of child abuse and neglect, children aged 0 to 19 years, 1996-1999

The data presented are of numbers of substantiated cases of child abuse and neglect, not of individual children. Thus, if a child is the subject of more than one substantiated notification, then they will appear in the statistics more than once. Data not coded by age or by area were excluded from the analysis.

In assessing variations between areas, readers should also bear in mind that there is likely to be an overall under-reporting of child abuse and neglect in these data.

Adelaide

There were 5,790 substantiated cases of child abuse and neglect of children aged 0 to 19 years in Adelaide over the period from 1996 to 1999, three per cent fewer than were expected from the State rates (a Standardised Ratio (SR) of 97*). Just over half of these cases were of females (52.7%).

In general, the distribution of standardised ratios for substantiated cases of child abuse and neglect across Adelaide closely follow the pattern of socioeconomic disadvantage displayed in a number of the maps in Chapter 3. Postcode areas with the highest ratios were primarily those in the north-western and northern suburbs of the city (**Map 4.12**).

Postcode areas with more than twice the number of cases expected were *Woodville North* (with an SR of 410**, more than four times the State rate), *Adelaide* (409**), *Ferryden Park* (404**), *Elizabeth North* (365**), *Blair Athol* (360**), *Old Noarlunga* (299**), *O'Sullivan Beach* (286**), *Christies Downs* (281**), *Enfield* (228**), *Darlington* (226**), *Elizabeth* (218**), *Port Adelaide* (210**), *Rosewater East* (206**) and *Osborne* (203**). Highly elevated ratios were also recorded for children and young people in *Hackham* (200**), *Klemzig* (179**), *Greenacres* (166**), *Park Holme* and *Seaton* (both 165**) and *Woodville* (163**).

While many postcode areas were not included in the analysis due to the small number of substantiated cases, there remains a distinctive pattern of low-rating areas concentrated in a band extending from the north-eastern suburbs to the outer southern suburbs. In areas with more than 20 substantiated cases of child abuse and neglect, the lowest ratios were recorded in *St Agnes* (with a standardised ratio of 32**; and 29 cases), *Happy Valley* (32**; and 72 cases), *Reynella* (32**; and 22 cases), *O'Halloran Hill* (34**; and 55 cases), *Daw Park* (34**; and 23 cases), *Golden Grove* (43**; and 43 cases), *Glenelg* (43**; and 22 cases), *Athelstone* (48**; and 26 cases), *Fairview Park* (48**; and 23 cases) and *Wynn Vale* (50**; 32 cases).

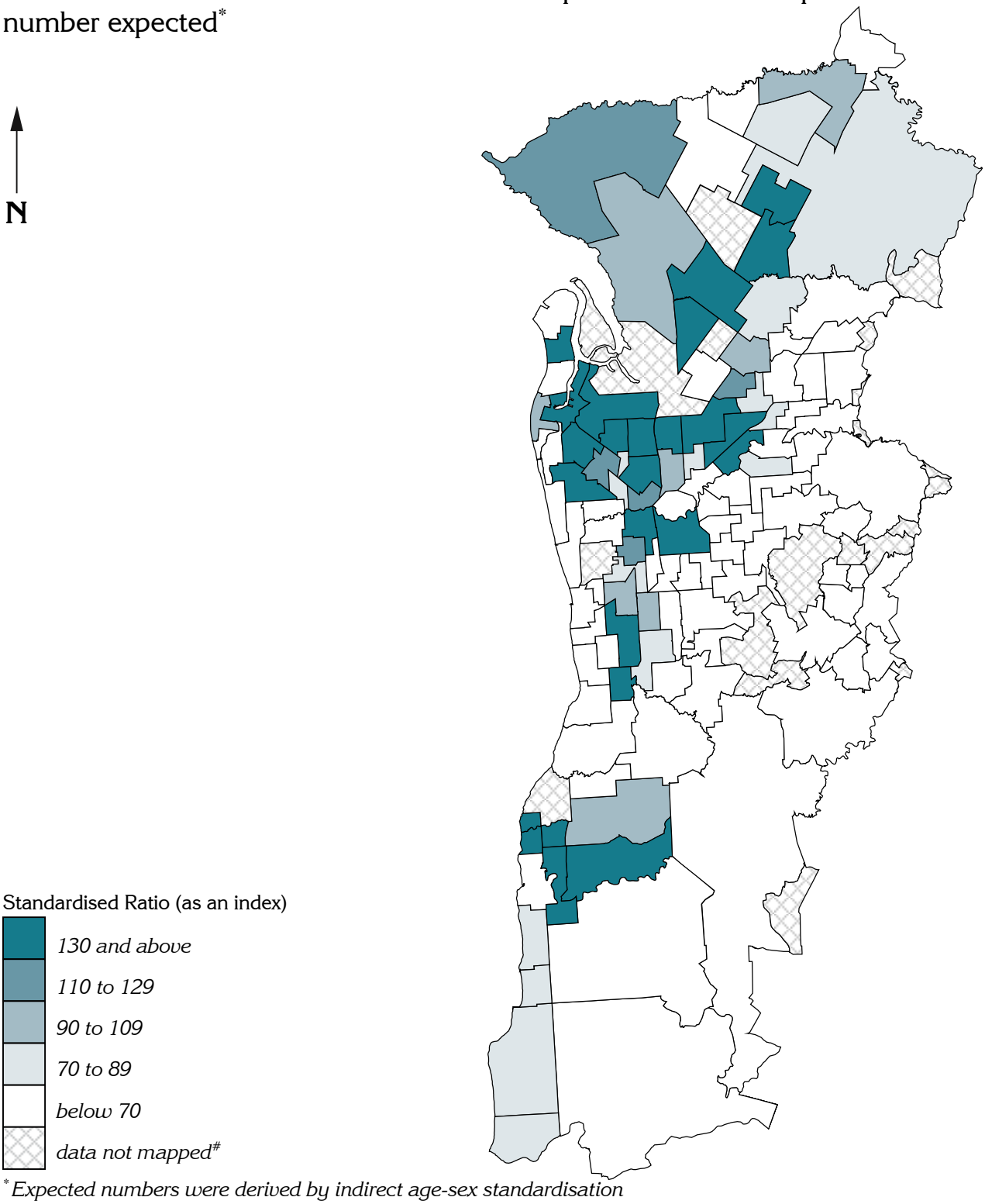
The largest numbers of substantiated cases of child abuse and neglect over this period were recorded in the outer northern suburbs of *Elizabeth North* (with 492 cases), *Salisbury* (400 cases) and *Elizabeth* (271 cases), and in the outer southern postcode areas of *Morphett Vale* (222 cases) and *Hackham* (212 cases).

There were correlations of substantial significance with the variables for children aged 0 to 14 years living in dwellings with no motor vehicles (0.86), dwellings rented from the SA Housing Trust (0.82), low income families (0.78) and single parent families (0.76). Inverse correlations of meaningful significance were recorded with the variables for publicly assessed (-0.61) and school assessed (-0.58) subject achievement scores. These results, together with the inverse correlation of substantial significance with the IRSD (-0.81), indicate an association at the postcode level between substantiated cases of child abuse and neglect, and socioeconomic disadvantage.

The correlation analysis also revealed a negative association with indicators of high socioeconomic status, with inverse correlations recorded with the variables for female labour force participation (-0.76), high income families (-0.63) and managers and administrators, and professionals (-0.56).

Map 4.12
Substantiated cases of child abuse and neglect, children aged 0 to 19 years, Adelaide, 1996-1999

Standardised Ratio: number of cases in each postcode area compared with the number expected*



* *Expected numbers were derived by indirect age-sex standardisation*

Data were not mapped because either the SLA population is less than 100, only a small part of the postcode is located in Adelaide or there were fewer than five expected cases.

Source: Compiled from data supplied by DHS ***Details of map boundaries are in Appendix 1.2***

Substantiated cases of child abuse and neglect, children aged 0 to 19 years, 1996-1999

Non-metropolitan South Australia

The data presented are of numbers of substantiated cases of child abuse and neglect, not of individual children. Thus, if a child is the subject of more than one substantiated notification, then they will appear in the statistics more than once. Data not coded by age or by area were excluded from the analysis.

There were 2,751 substantiated cases of child abuse and neglect in the non-metropolitan areas of South Australia over the four years from 1996 to 1999. The number of substantiated cases was ten per cent higher than expected from the State rates, an SR of 110**. Thus the non-metropolitan areas of the State have a higher rate of substantiated cases of child abuse and neglect than in Adelaide.

The areas with the highest rates of substantiated cases of child abuse and neglect were largely in the urban centres, or in the State's far north and west (**Map 4.13**). SLAs with more than twice the number of cases expected from the State rates were Coober Pedy (with an SR of 448**, almost four and a half times the State rate), Unincorporated West Coast (372**), Ceduna (333**), Port Augusta (296**), Berri (281**), Unincorporated Far North (243**), Mount Gambier (C) (239**), Unincorporated Far North (236**), Port Pirie (227**) and Murray Bridge (207**). Ratios elevated by 50% or more were recorded in the mid northern SLA of Pirie (196**); to the south-east of the city in Meningie (191**) and Robe (154**); in the Riverland SLAs of Paringa (183**) and Renmark (156**); and on the Eyre Peninsula in Port Lincoln (151**).

Excluding areas with fewer than 20 substantiated cases, the lowest ratio was recorded in Mount Barker, with 54% fewer cases than were expected from the State rates (an SR of 46**). The next lowest ratios were recorded in Barossa (51**), Loxton (58**), Naracoorte (61*), Millicent (69*), Onkaparinga (71*), Port Elliott and Goolwa (81) and Victor Harbor (85).

The largest numbers of substantiated cases of child abuse and neglect in the non-metropolitan areas of the State were recorded in the towns of Port Augusta (with 288 cases), Mount Gambier (270 cases), Murray Bridge (221 cases), Whyalla (208 cases), Port Pirie (198 cases) and Port Lincoln (125 cases).

Correlations of statistical significance were recorded with the variables for people aged 0 to 14 years living in dwellings with no motor vehicles (0.78) and dwellings rented from the SA Housing Trust (0.62); Indigenous children aged 0 to 14 years (0.54); and people who left school at age 15 years or earlier (0.50). These results, together with the inverse correlation with the IRSD (-0.72), indicate an association at the SLA level between high rates of substantiated child abuse and neglect and socioeconomic disadvantage.

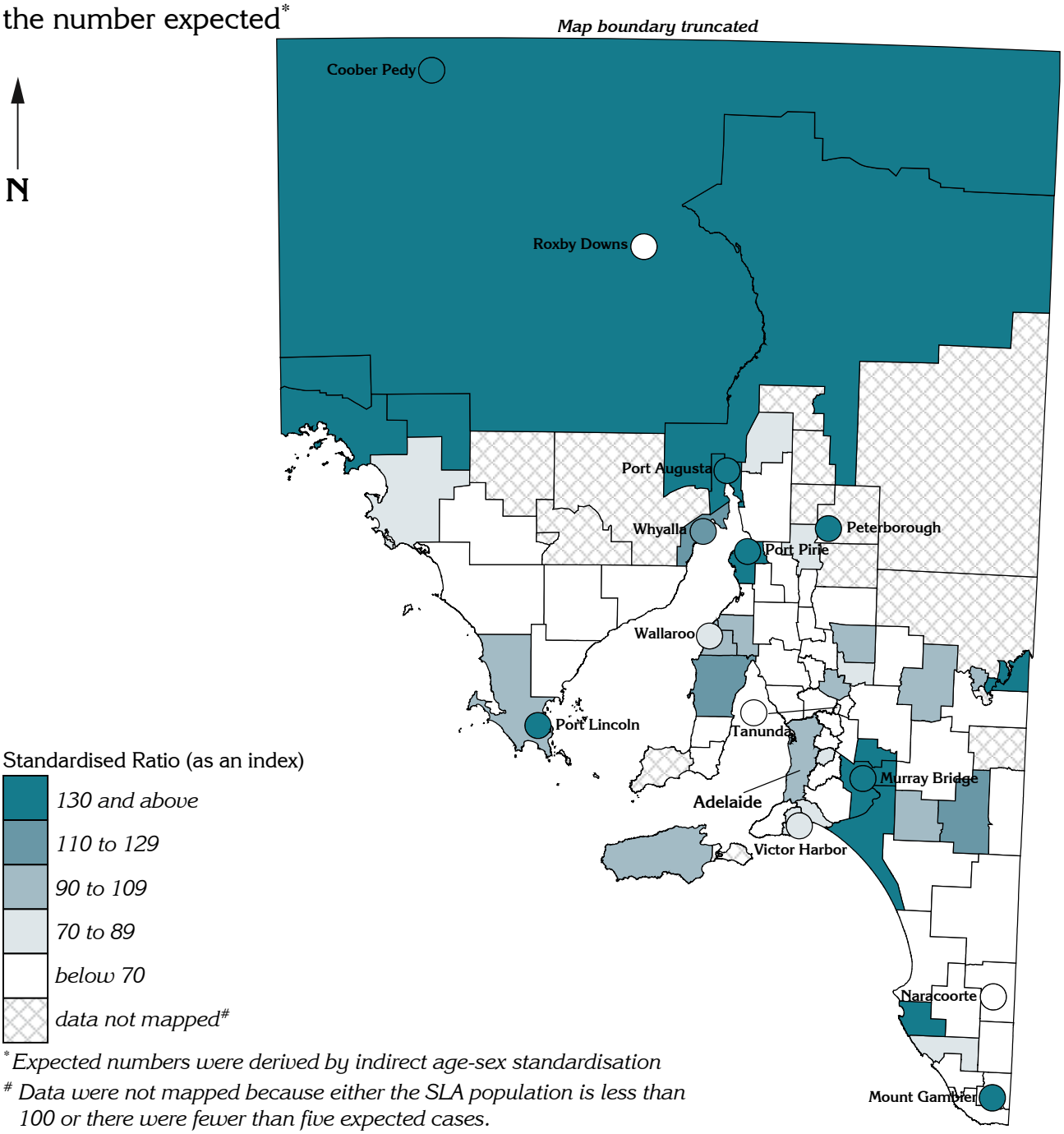
The areas with the highest rates of substantiated cases of child abuse and neglect are also the areas where there are higher proportions of Indigenous residents. While the quality of the data on Indigenous status varies between States and Territories, Aboriginal and Torres Strait Islander children are clearly over-represented in the child protection system (AIHW 2002). The rate of Indigenous children who were the subjects of substantiations, for example, was more than seven times the rate for other children in South Australia in 2000/01 (AIHW 2002). Aboriginal and Torres Strait Islander children are also much more likely to be the subject of a substantiation for neglect than other children (AIHW 2002). For example, in South Australia, 52% of substantiated cases concerning Indigenous children were for neglect, compared with 31% of other children in 2000/01.

The reasons for the over-representation of Aboriginal and Torres Strait Islander children in child protection substantiations are complex (AIHW 2002). The report, *Bringing Them Home* (National Inquiry into the Separation of Aboriginal and Torres Strait Islander Children from their Families: HREOC 1997), examined the effects of child welfare policies on Indigenous people. It noted that some of the underlying causes of the over-representation of Aboriginal and Torres Strait Islander children in the child welfare system included the intergenerational effects of previous separations from family and culture, the poor socioeconomic status of Indigenous families, and cultural differences in child-rearing practices (HREOC 1997).

It is, therefore, likely that the greater proportions of Indigenous people resident in the areas represented as Moderately Accessible and Very Remote in ARIA+ contributed significantly to the resulting highly elevated Standardised Ratios (see graph opposite).

Map 4.13
Substantiated cases of child abuse and neglect, children aged 0 to 19 years, South Australia, 1996-1999

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

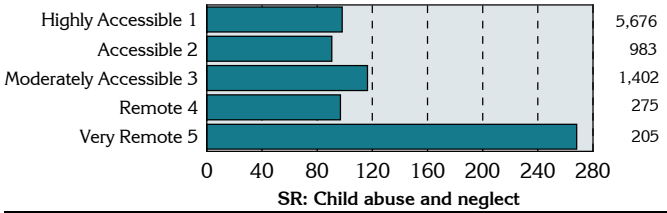


* *Expected numbers were derived by indirect age-sex standardisation*

\# *Data were not mapped because either the SLA population is less than 100 or there were fewer than five expected cases.*

Source: Compiled from data supplied by DHS ***Details of map boundaries are in Appendix 1.2***

Accessibility/Remoteness Index of Australia (ARIA+)



The lowest rates of substantiated cases of child abuse and neglect were recorded in the Accessible (with a Standardised Ratio of 91) and Remote (97) areas, with a higher ratio in the Moderately Accessible (116) areas. The highly elevated SR in the Very Remote areas represents more than two and a half times the number of cases expected from the State rates (an SR of 268).

Source: Calculated on ARIA+ classification

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