Australia's children: their health and wellbeing 2002

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Preface

Children are a most important part of Australia's future. In June 2000, there were 3.9 million children in Australia, approximately 21% of the population. This proportion has decreased by 7% since 1990, reflecting the decline in fertility and the ageing of the population. The health of Australians in 25 years will be influenced, in many ways, by the health of the children of today. Many childhood diseases that were once common have been overcome by improved vaccinations, and other conditions have been ameliorated by advanced medical techniques. However, asthma, diabetes, obesity, motor vehicle accidents and drug abuse have become risks to childhood health. Furthermore, the health status of Indigenous children remains poor. There are also regional disparities in health status. It is critical that we continue to monitor and report on trends in child health in order to improve and maintain the health of Australia's children.

It is becoming increasingly accepted that health is determined by more than just the existence of disease or the lack of it. Social and environmental conditions are also important determinants of health, especially in children. This report attempts to integrate the social and environmental determinants of health, with the outcomes in terms of health status.

Australia's Children: Their Health and Wellbeing 2002 is the second national report on the health and wellbeing of Australian children. This report brings together information from a wide range of State/Territory and Commonwealth sources to reveal a national picture of the health status of Australian children. Some of the information in the report has never been previously published in this form. The cooperation of information providers is gratefully acknowledged.

The structure of *Australia's Children: Their Health and Wellbeing 2002* closely follows the National Child Health Information Framework which was established in March 1998 and subsequently endorsed by the Australian Health Ministers' Advisory Council. At the centre of the framework is a set of indicators designed to facilitate concise, comprehensive and balanced judgments about health conditions, determinants of health and progress towards a healthier society.

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Richard Madden
Director

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Staff from the following units at AIHW provided special data for the report: Cardiovascular Disease and Diabetes Monitoring Unit, Disability Services Unit, Health Monitoring and Development Unit, Health Registers and Cancer Monitoring Unit, Population Health Unit and Population Health Data and Information Services Unit. Staff at AIHW collaborating units—Knute Carter (AIHW Dental Statistics and Research Unit) and Ying Pan (AIHW General Practice Statistics and Classification Unit)—also provided data for the report. Data were also provided by the following organisations: the Victorian Department of Human Services (Maureen Tessier), Centre for Behavioural Research in Cancer, Anti-Cancer Council of Victoria (Vicki White), Department of Health and Ageing (Alison Milton), Health Insurance Commission (Korina Measham) and University of Adelaide (Brian Graetz).

Staff from various branches of the then Commonwealth Department of Health and Aged Care also provided valuable comments on different sections of the report. The branches were the Primary Prevention and Early Detection Branch, Drug Strategy and Population Health Social Marketing Branch, Communicable Diseases and Environmental Health Branch (all from the Population Health Division), Mental Health and Special Programs Branch (Health Services Division), Health Capacity Development Branch, Private Health Industry Branch, Priorities and Quality Branch (all from the Health Industry and Investment Division), Health and Community Strategies Branch and Workforce Information and Policy Branch (Office of Aboriginal and Torres Strait Islander Health).

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We also wish to thank Ching Choi, Helen Moyle, Jenny Hargreaves, Carol Bower and Richard Madden, who read and provided valuable comments on the entire report.

Summary

This report presents data on national indicators of child health and wellbeing and is based on the structure of the National Child Health Information Framework. Although the report focuses on aspects of poor health in Australian children, most Australian children enjoy good health.

- In 2000, while children accounted for approximately 21% of the total Australian population, child deaths represented only 1.5% of all deaths. The main causes in infants were conditions originating in the perinatal period, congenital malformations and sudden infant death syndrome (SIDS). The main causes in children aged 1–14 years were injury and poisoning, neoplasms (including cancer) and diseases of the nervous system (Chapter 3).
- Infant death rates fell during the decade 1991–00, with rates for boys decreasing by 26%, and rates for girls by 23% (Chapter 3). Foetal, neonatal and perinatal death rates all decreased over the same period (Chapter 7). Death rates for children aged 1–14 years also fell, by 22% (Chapter 3).
- In 1999–00, there were over 500,000 hospitalisations of children aged 0–14 years. Of these, 26% were infants. The main reasons for hospitalisation of infants were conditions originating in the perinatal period and diseases of the respiratory system. The main reasons in children aged 1–14 years were diseases of the respiratory system (including asthma) and injury (Chapter 4).
- In 1998, an estimated 296,000 Australian children were reported to have a disability. Of these, 144,000 had a profound/severe core activity restriction where they needed help with self-care, mobility, communication and schooling. The most common disabling conditions were intellectual and other mental disorders and respiratory diseases. The majority of children with a disability attended school (97%), with most of these being enrolled in a mainstream school (Chapter 5).
- The highest burden of disease (a measure of life years lost due to premature mortality and years of healthy life lost due to disability) for Australian children is caused by acute and chronic respiratory diseases and mental disorders (Chapter 6).
- Respiratory problems were also the most common problems managed by general practitioners in 2000–01 (Chapter 4). In the 1995 ABS National Health Survey, the most commonly reported recent condition was the common cold, while the most commonly reported long-term condition was asthma.
- Sudden infant death syndrome (SIDS) is a leading cause of death of Australian infants. However, between 1991 and 2000, SIDS death rates for boys decreased by 65%, and for girls by 63% (Chapter 8).
- Notification rates for congenital malformations have also been declining, especially for neural tube defects. The rate for neural tube defects including spina bifida almost halved between 1987 and 1997 (Chapter 9).
- Notification rates for many vaccine-preventable diseases decreased over the decade (Chapter 10). This was associated with an increase in the proportion of children immunised against these diseases. In 2001, 90.4% of children aged 1 year and 88.0% of children aged 2 years were fully immunised (Chapter 20). However, children continue to contract these diseases. The most commonly notified vaccine-preventable disease in children is pertussis (whooping cough) (Chapter 10).

- Asthma and Type 1 diabetes are now serious childhood illnesses. The prevalence of asthma in children is estimated to be around 16%, while the incidence of Type 1 diabetes is 18.6 per 100,000 children. Both diseases increased over the decade 1991–00 (Chapters 12 and 13).
- Among children aged 4–12 years, 15.0% of boys and 14.4% of girls have a number of emotional and/or behavioural problems. Some children also experience more serious mental disorders; for example, among children aged 6–12 years, 19.3% of boys and 8.8% of girls are reported to have attention-deficit hyperactivity disorder (Chapter 16).
- Injuries continue to be the leading causes of death among children, and one of the main causes of illness. The most common reason for injury hospitalisations is falls, followed by pedal cyclist injuries and accidental poisoning. Deaths from injuries, including motor vehicle accidents and accidental drowning, declined over the decade (Chapter 18).
- Most Australian children have good dental health. In recent years, the mean number of decayed teeth in children has been decreasing, while the proportion of children free from tooth decay has been increasing. Most Australian children have visited a dentist in the previous 12 months, many of them using school dental services (Chapter 17).
- A small proportion of Australian babies (6.7%) weigh less than 2,500 grams at birth. Low birthweight is more common in babies born to families with low socioeconomic status and to Aboriginal and Torres Strait Islander mothers (Chapter 20).
- At discharge from hospital, 81.8% of babies are exclusively breastfed, but this declines to 57.1% at 3 months of age and to 18.6% at 6 months of age (Chapter 20).
- The majority of Australian children are of an acceptable weight, although 18.0% of boys and 22.0% of girls are overweight or obese. These proportions increased over the last decade (Chapter 20).
- Most Australian children do not consume alcohol, smoke tobacco or take illicit drugs. However, in the 1999 Australian Secondary Students Alcohol and Drug Survey, 13% of children aged 12–14 years reported smoking tobacco and 24% reported consuming alcohol in the week prior to the survey. Of children aged 12–15 years, 29% of boys and 23% of girls reported having taken an illicit drug at least once (Chapter 20).
- The majority of Australian children use sun protection when in the sun. However, the proportion always doing so decreases with age, with only 46% of children aged 10–14 years always using sun protection, compared with 81% of those aged less than 2 years (Chapter 20).
- In 2000, death rates for Aboriginal and Torres Strait Islander infants were 3 times higher than those for other Australian infants. Deaths among Indigenous children aged 1–14 years were 2.5 times those for other Australian children. Death rates were also higher among children living in remote and rural areas than for those in metropolitan areas (Chapter 3).
- On most measures of health covered in this report, Aboriginal and Torres Strait Islander children were worse off than other Australian children, and children living in rural and remote areas were worse off than those living in metropolitan areas.

Part I: Background information

Chapter 1: Introduction and data issues

Chapter 2: Population characteristics

1. Introduction and data issues

This is the second national statistical report on the health and wellbeing of Australian children, and follows an initial report published in 1998. This second report reflects the structure of the National Child Health Information Framework (Figure 1.1), a conceptual framework for the organisation of national child health information, which was developed at a workshop convened by the AIHW in 1998 and was subsequently endorsed by the Australian Health Ministers' Advisory Council (AHMAC).

At the core of the information framework is a set of indicators measuring the health and wellbeing of children. An indicator is a summary statistic which facilitates concise, comprehensive and balanced judgments about a health condition, a determinant of health or progress towards a healthier society.

The AIHW has developed a set of criteria that can be used to guide the definition and development of indicators (AIHW: Moon et al. 1998). Indicators should:

- be national in scope, or applicable to a regional or subpopulation scope of national importance;
- be as aggregated as possible;
- have clear links with improvements in health outcomes;
- be reliable and valid, with values that are meaningful to child health and wellbeing;
- be consistent and comparable with other indicators used in the States and Territories;
- be easy to understand;
- be capable of being monitored easily, and in a way that will provide a statistically verifiable time series; and
- be responsive to change.

The National Child Health Information Framework consists of three broad groups of indicators of child health: health status; risk and protective factors; and delivery of health services and interventions. Within these three groups, a number of broad subgroups have been identified. Health status has four subgroups: health and wellbeing; growth and development; mortality, morbidity and disability; and safety and security. The risk and protective factors group has three subgroups: biological and behavioural factors; social, cultural and environmental factors; and health knowledge and skills. While the delivery of services and interventions group is not divided into any subgroups in the current framework, some of the areas covered within this group include health programs and health promotion and intervention.

This report presents national data that measure indicators of child health and wellbeing developed within the different subgroups of the National Child Health Information Framework. It will be apparent to the reader that some of the subgroups outlined above have more indicators (and national data to measure these indicators) than others. Many of the indicators reported on here are in the 'mortality, morbidity and disability' subgroup. National indicators of these 'health outcomes' are highly developed and good quality national data to measure them have been available for some years. In contrast, indicators in the 'risk and protective factors group' are in the early stages of development and even where indicators exist, national data to measure them are not always available.

While the National Child Health Information Framework is used as a guideline for the report, the following need to be taken account when reading the report:

- The report presents data on 'other communicable diseases' and 'other chronic diseases' (mortality, morbidity and disability subgroup) for which indicators have not yet been developed but which are important in determining the health status of children.

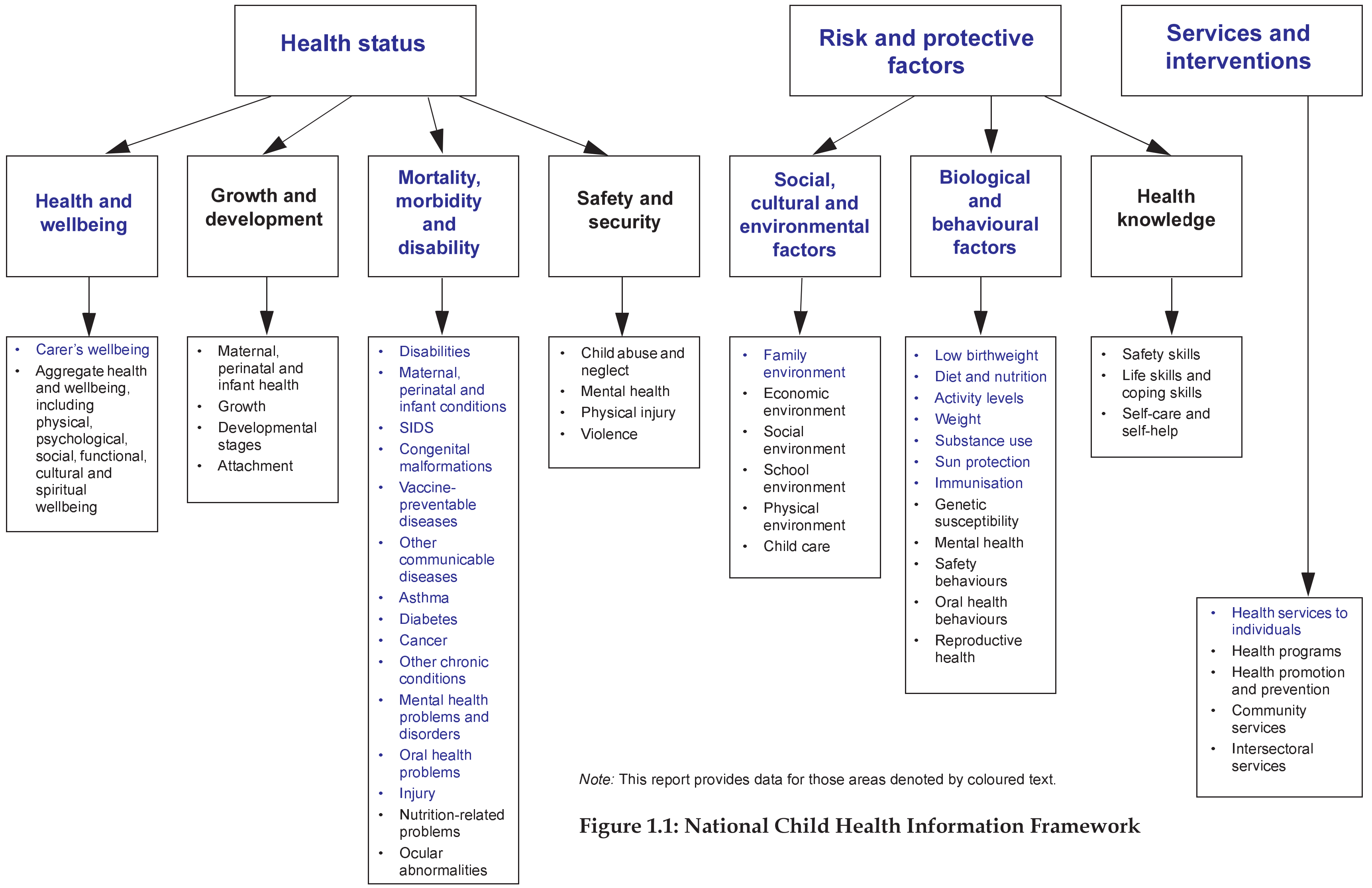
- No indicators of child abuse and neglect ('safety and security' subgroup) have yet been developed. Data on children who come to the attention of community services departments as in need of protection from abuse, neglect or harm are examined in the section on 'social, cultural, and environmental risk and protective factors'. This is because they are a population having multiple family and social risk factors.
- 'Carer's wellbeing' (health and wellbeing subgroup) has also been included in the section on 'social, cultural and environmental risk and protective factors'. This is because research has shown that carer's wellbeing is an important risk/protective factor for children.

The indicator data examined in this report enable specific child health and health-related conditions to be monitored. An overview of mortality, morbidity (consultations with general practitioners and hospitalisations), disability and burden of disease in children is also included to provide a more comprehensive picture of the health status of children.

Throughout this report and for every indicator, data are presented for children under 15 years in the population. The population of children aged 0–14 years is further subdivided into infants (children aged less than 1 year), and children aged 1–4, 5–9 and 10–14 years. Wherever possible, boys are distinguished from girls, and Aboriginal and Torres Strait Islander children from other Australian children, and distinctions are made between children who live in metropolitan, rural and remote areas.

The first part of the report contains demographic information about children aged 0–14 years. Part 2 provides an overview of mortality, morbidity, disability and burden of disease for children aged 0–14 years. Parts 3, 4, 5, 6 and 7 have information on various aspects of 'health status'—maternal, perinatal and infant conditions; vaccine-preventable and other communicable diseases; chronic diseases; oral health; and injury. 'Risk and protective factors' in the areas of 'family environment' and 'biological and behavioural factors' are examined in Part 8. The report concludes with an examination of 'health services' in Part 9.

All data presented graphically are sourced to tables within this report or to appendix tables. The latter are available on the AIHW website.



Note: This report provides data for those areas denoted by coloured text.

Figure 1.1: National Child Health Information Framework

Data issues

With any report it is important to be aware of the need for caution in interpreting the findings, due to limitations of the data. This section explores some of the issues the reader should be aware of while interpreting the data presented in this report. Some of these issues relate to data sources, while others relate to population groups.

AIHW Mortality Database

The AIHW Mortality Database was used to extract data on the number and causes of deaths of children. Death certificates contain information on conditions which initiate the sequence of events that leads to death (underlying causes of death), as well as other information on conditions that contribute to death, but do not lead to it directly. Causes of death data presented in this report refer to the underlying causes of death only. In addition, when extracting causes of death data for particular years, the year in which the death was registered was used rather than the year in which it occurred. Approximately 6% of deaths in a particular calendar year are registered in subsequent years, most being deaths that occur in December of the preceding year.

When extracting causes of death for deaths occurring between 1991 and 1996, the International Classification of Diseases, 9th Revision (ICD-9) was used, while for deaths occurring from 1997 onwards, the 10th Revision (ICD-10) was used. To account for any artificial increase or decrease in mortality data as a result of changes in coding systems, the Australian Bureau of Statistics recommends the application of factors or weights which have a smoothing effect, making time series analysis more accurate. However, it is not appropriate to use comparability factors with population sub-groups, such as age- and sex-breakdowns, and thus comparability factors were not applied to the data in this report. Throughout this report, when records were missing relevant variables, such as sex, age or Indigenous status, mortality rates were calculated minus the missing cases.

AIHW National Hospital Morbidity Database

The AIHW National Hospital Morbidity Database was used to obtain information on the extent of and reason for hospitalisations of children. In this report, only information on the principal diagnosis —the diagnosis established to be the problem that was chiefly responsible for the patient’s episode of care in hospital—is presented. Four main types of information are presented: ICD-10-AM chapters, diagnosis blocks, ‘diagnosis groups’ (equivalent to ICD-10-AM ‘categories’) and ‘specific diagnoses’ (ICD-10-AM ‘subcategories’). While other associated diagnoses may also be recorded for each hospital episode, these data are not presented in this report.

Hospital records are for ‘separations’ and not individuals, and as there can be multiple admissions for the same individuals, hospitalisation rates do not usually reflect the incidence or prevalence of the disease or condition in question. Hospitalisation numbers can also be affected by admission practices and access, as well as the incidence or prevalence of the disease or condition.

For hospitalisation data for 1993–94 to 1997–98, the clinical modification of the International Classification of Diseases, 9th Revision (ICD-9-CM), was used. For hospitalisations occurring from 1998–99 onwards, the 10th Revision, Australian modification (ICD-10-AM), was used. Throughout this report, when records were missing relevant variables, such as sex, age or Indigenous status, hospitalisation rates were calculated minus the missing cases.

Health status of Aboriginal and Torres Strait Islander children

The availability and quality of data about the Aboriginal and Torres Strait Islander child population are significantly limited by a number of factors.

First, the precision of population estimates, which form the denominator for all Indigenous rates, is not high. Estimating the size and composition of the Aboriginal and Torres Strait Islander populations is difficult for a number of reasons. One of the main reasons is the uncertainty about Indigenous population counts from the 5-yearly ABS Census of Population and Housing, which provides the basis for estimating the total population. Indigenous status is defined by the person completing the census form and it is not possible to estimate how this status may change over time. In addition, accurate births and deaths data, required to estimate the natural growth in the Indigenous population between censuses, are not available nationally. These uncertainties affect the comparison of rates from year to year and severely limit the assessment of trends over time.

Second, there is under-identification of Aboriginal and Torres Strait Islander people in routinely collected data, such as hospitalisations and births and deaths registrations. Therefore, the accuracy of current data is questionable, although significant work on improving the quality of data on the Indigenous population is underway (ABS & AIHW 2001).

As a result, some of the national Aboriginal and Torres Strait Islander statistics are derived from a limited number of jurisdictions. Data on causes of death, for example, are drawn from only four jurisdictions (Queensland, Western Australia, South Australia and Northern Territory). In these jurisdictions the extent to which the identification of Indigenous people occurs is sufficiently high to produce reliable statistics on deaths (ABS & AIHW 2001).

Children in metropolitan, rural and remote areas

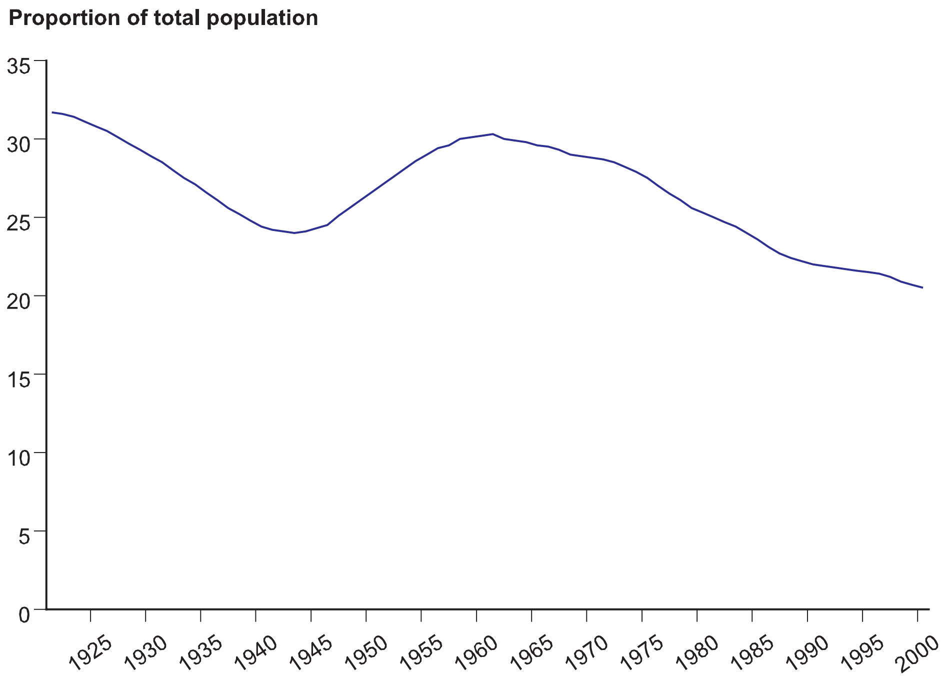
‘Area of residence’ is used throughout this report to compare children living in rural and remote areas with children living in metropolitan areas. Information about area of residence presented here relates to children’s usual area of residence. The substantially higher proportion of Aboriginal and Torres Strait Islander children who reside in remote zones and their generally lower health status mean that the health status of children in remote zones is affected by the health of Indigenous children.

2. Population characteristics

This chapter presents demographic information about children aged 0–14 years using a number of key measures: children as a proportion of the total population, the total number of children, the ratio of children to persons of working age (15–64 years), the age structure of the child population, children in the Aboriginal and Torres Strait Islander population, where children reside, and children by country of birth. Many of these factors are related to health differentials and are consequently examined throughout this report in conjunction with health status measures.

Overall, there has been a decline over time in the proportion of children in the population since 1962. The data also show that children form a higher than average proportion of the Aboriginal and Torres Strait Islander population and of the populations in rural and remote areas.

Proportion of population

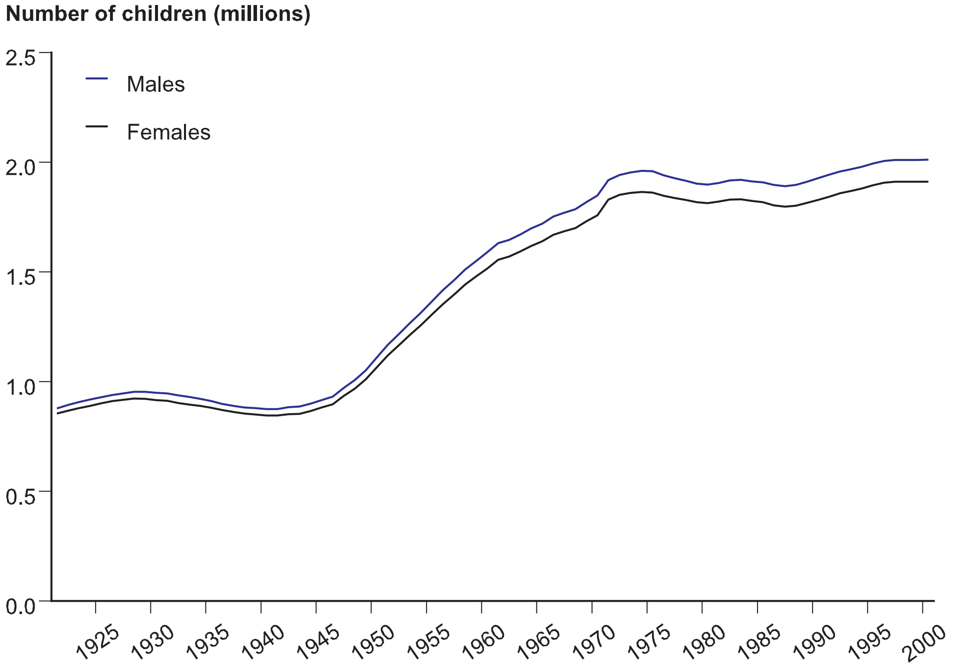


Source: ABS, various years (a) [Table A2.1].

Figure 2.1: Children aged 0–14 years as a proportion of the Australian population, 1921–00

- At 30 June 2000, the total Australian population was 19,386,663, with children accounting for 21% of this total. This is the lowest proportion of the population ever.

Number of children

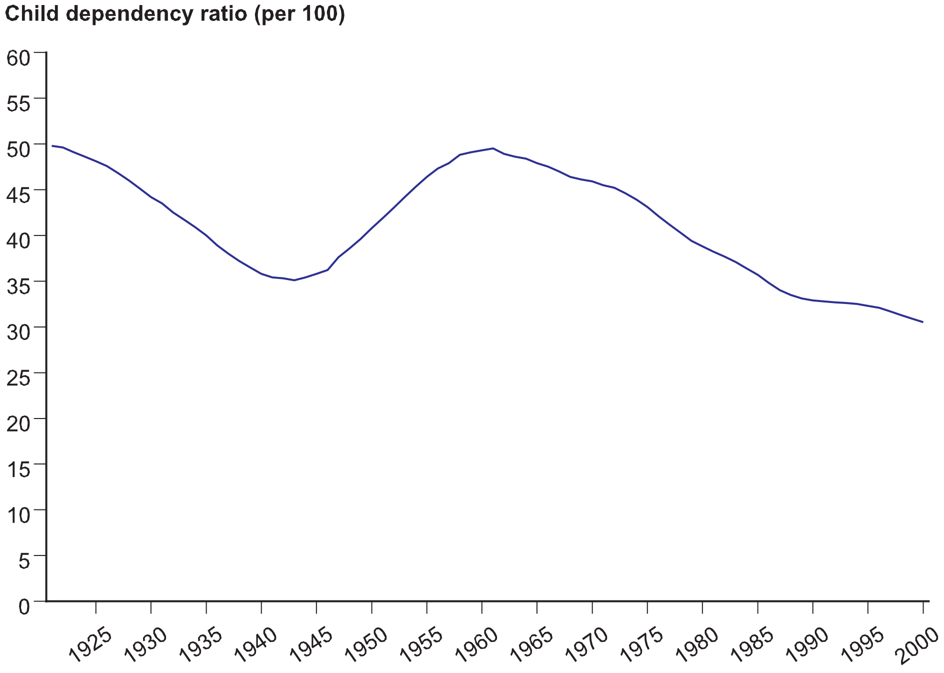


Source: ABS, various years (a) [Table A2.2].

Figure 2.2: Australian children aged 0–14 years, 1921–00

- At 30 June 2000, there were around 3.9 million children aged 0–14 years—2.0 million boys and 1.9 million girls—living in Australia.
- The total number of children has more than doubled since 1921. Most of this increase occurred during the 'baby boom' between 1946 and 1964. In the last three decades, there has been a relatively small increase in the number of children aged 0–14 years.
- In 2000, the ratio of boys to girls was 1.05. Throughout the century there were more boys than girls aged 0–14 years, reflecting the higher number of male births. The ratio of boys to girls was 1.03 in 1921 and increased steadily to reach 1.05 in the mid- to late 1950s, and has remained relatively stable since then.

Child dependency ratio

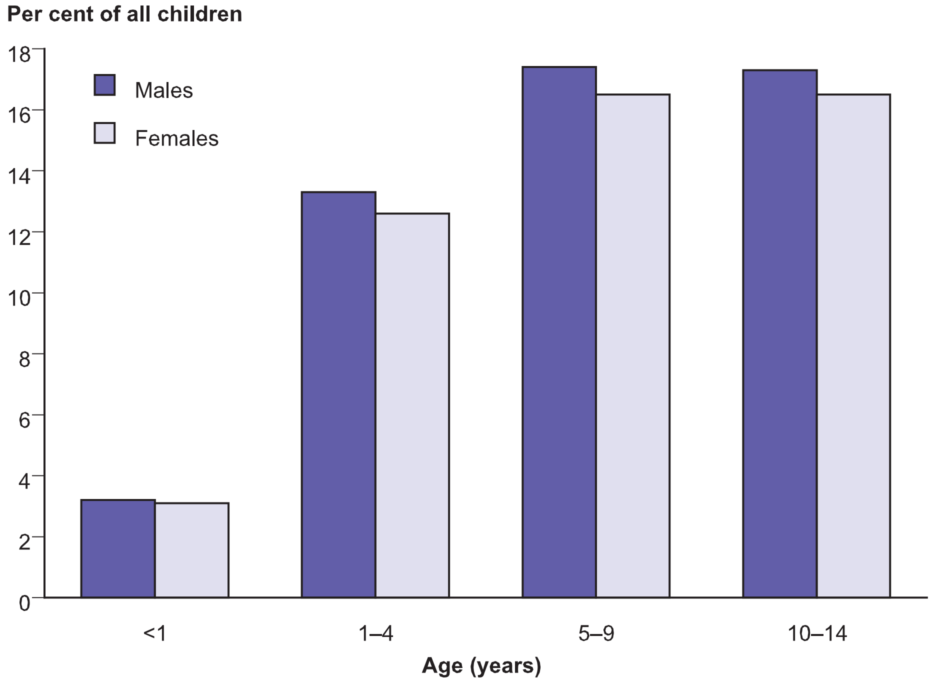


Source: ABS, various years (a) [Table A2.1].

Figure 2.3: Child dependency ratio, 1921–00

- The child dependency ratio—the ratio of children aged 0–14 years to the working age population (15–64 years)—was 30.5 per 100 in 2000, compared with 49.8 per 100 in 1921. A more appropriate working age category may be 20–64 years, rather than 15–64 years, as children aged 15 years are usually still in school, and not working full-time. However, for the sake of comparison with previous years, the 15–64 years age group continues to be used when determining the child dependency ratio.

Age structure



Source: ABS 2000a [Table A2.3].

Figure 2.4: Australian children aged 0–14 years, 2000

- At 30 June 2000, the child population aged 0–14 years was approximately evenly divided between the three 5-year age groups: 0–4 years, 5–9 years and 10–14 years. Of children aged 0–4 years, 6% were aged under 1 year, and 26% aged 1–4 years.
- The uniform age structure of the child population also applied to both sexes.
- There has been a steady decline in the number of children aged 0–4 years in the last few years: from 1.30 million in 1994, to 1.26 million in 2000, due to lower birth rates.

Aboriginal and Torres Strait Islander children

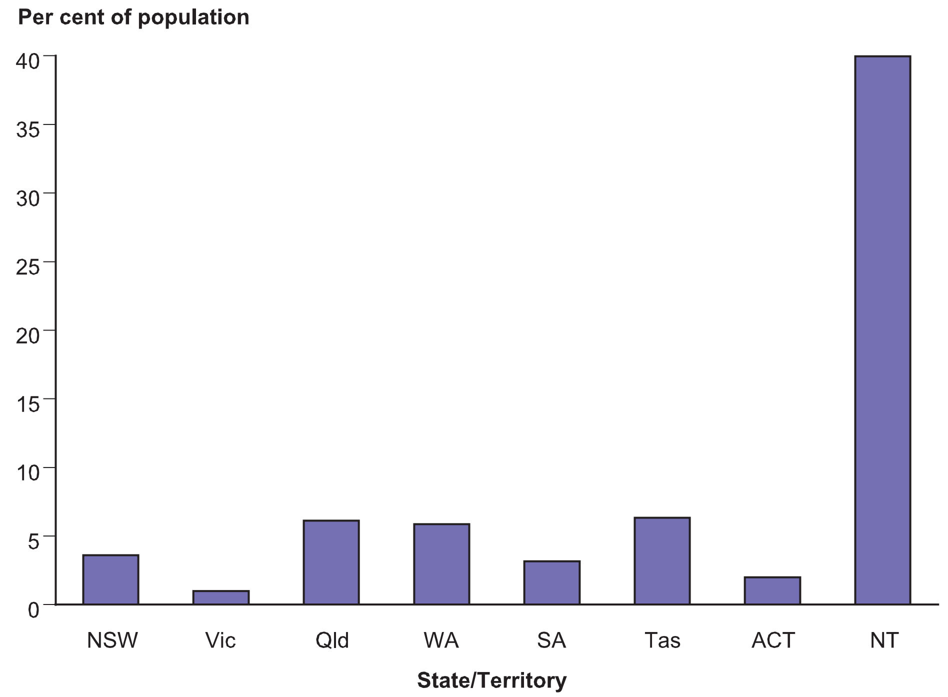
Table 2.1: Aboriginal and Torres Strait Islander children aged 0–14 years, 2000

	Age (years)			
	0–4	**5–9**	**10–14**	**0–14**
Number of Indigenous Australian children[(a)]	57,074	55,245	50,852	163,171
Indigenous Australian children as a proportion of total Indigenous Australian population (%)	13.6	13.2	12.1	39.0
Indigenous Australian children as a proportion of the total Australian child population in each age group (%)	4.5	4.1	3.8	4.2
Child dependency ratio (per 100)	23.3	22.5	20.8	66.6

(a) These data are based on projected populations.

Source: ABS 1998a.

- At 30 June 2000, the number of Aboriginal and Torres Strait Islander children aged 0–14 years was estimated to be around 163,000—4.2% of the total child population.
- Aboriginal and Torres Strait Islander children accounted for 39.0% of the total estimated Indigenous population of 418,841, almost double the proportion of children in the total Australian population.
- The child dependency ratio for the Aboriginal and Torres Strait Islander population was 66.6 per 100 in 2000, more than double the child dependency ratio for the total population, reflecting both the higher birth rates and higher mortality of Indigenous people.



Source: ABS 1998a [Table A2.4].

Figure 2.5: Aboriginal and Torres Strait Islander children aged 0–14 years, as a proportion of the child population of each State/Territory, 2000

- Aboriginal and Torres Strait Islander children as a proportion of all children within each State or Territory is highest in the Northern Territory (40%). However, New South Wales has the largest number of Indigenous children (over 47,000), followed by Queensland (over 46,000) and Western Australia (over 23,000).
- Only data from Queensland, Western Australia, South Australia and the Northern Territory are used in this report when examining mortality among Aboriginal and Torres Strait Islander children. Indigenous children from these States and Territories make up 61% of the total Indigenous child population.

Area of residence

State and Territory

Table 2.2: Residence area of Australian children aged 0–14 years, 2000

	Number of children	% of Australian child population	% of State/Territory population
New South Wales	1,315,566	33.5	20.4
Victoria	948,914	24.2	19.9
Queensland	753,960	19.2	21.1
Western Australia	397,705	10.1	21.1
South Australia	291,340	7.4	19.5
Tasmania	98,724	2.5	21.0
Australian Capital Territory	64,218	1.6	20.6
Northern Territory	50,850	1.3	26.0
Australia	**3,922,183**	**100.0**	**20.5**

Note: These data include other Australian Territories.

Source: ABS 2000a.

- At 30 June 2000, well over half of Australian children (57.7%) aged 0–14 years lived in the two largest States—New South Wales and Victoria. A third of all children lived in New South Wales. This reflects the geographic distribution of the total population.
- In all jurisdictions except the Northern Territory, children aged 0–14 years accounted for between 19.5% and 21.1% of the population. South Australia had the lowest proportion—19.5%. In contrast, 26.0% of Northern Territory residents were under 15 years, markedly higher than for other States and Territories. This is related to the large Aboriginal and Torres Strait Islander population in the Northern Territory, as the Indigenous population has a younger age structure than the total population.

Rural, remote and metropolitan areas

The RRMA classification divides Australia into areas based primarily on population size and an index of remoteness (DPIE & DHSH 1994). Within this classification, there are two metropolitan areas, three rural areas and two remote areas. The subcategories within these areas are differentiated by population size. Population information on children for each of the seven 'Rural, Remote and Metropolitan Areas' (the RRMA classification) is presented in Table 2.3.

Table 2.3: Residence area of Australian children aged 0–14 years, 2000

RRMA area	RRMA classification	Total children (number)	Proportion of total child population	Proportion of RRMA population	Child dependency ratio per 100
Metropolitan	Capital cities	2,401,898	61.3	19.6	28.6
	Other metropolitan centres	293,212	7.5	19.9	30.1
Rural	Large rural centres	246,017	6.3	21.6	32.9
	Small rural centres	269,257	6.9	21.8	34.5
	Other rural areas	564,608	14.4	22.6	35.6
Remote	Remote centres	57,583	1.5	25.6	37.1
	Other remote areas	87,793	2.2	26.1	39.8
Total		**3,920,368**	**100.0**	**20.5**	**30.5**

Note: These data are preliminary and total excludes other Australian Territories.

Source: AIHW, derived from ABS Statistical Local Area population estimates.

- In 2000, over two-thirds of children aged 0–14 years (68.8%) lived in metropolitan areas of Australia, the vast majority (61.3% of the total) in capital cities.
- Another 27.6% of children lived in rural areas, the largest proportion being the 'other rural areas' group (urban centres with a population <10,000).
- Less than 4% of children lived in remote areas of Australia.
- 'Other remote areas' and 'remote centres' had higher proportions of their population aged 0–14 years than rural or metropolitan centres or capital cities. This is partly due to higher proportions of Aboriginal and Torres Strait Islander people living in more remote areas (higher proportions of the Indigenous population are aged 0–14 years; see Table 2.1).
- The child dependency ratio was highest in the most remote areas.
- The substantially higher proportion of Aboriginal and Torres Strait Islander people living in remote areas means that the overall health status in these areas is closely linked to the health status of the Indigenous population (AIHW: Strong et al. 1998).

Place of birth

Table 2.4: Birthplace of children aged 0–14 years, 2000

Place of birth	Number	Proportion of child population
Australia	3,706,217	94.5
Asia	70,972	1.8
New Zealand and Oceania	45,408	1.2
UK/Ireland	29,138	0.7
Other Europe	25,656	0.7
Americas	14,763	0.4
North Africa and the Middle East	14,557	0.4
Other Africa	14,552	0.4
Total	**3,921,263**	**100.00**

Note: These data are preliminary.

Source: ABS 2000b.

- At 30 June 2000, 3.7 million or 94.5% of all children aged 0–14 years resident in Australia were born in Australia.
- Of the 215,046 children born overseas, the majority were born in Asia, followed by New Zealand and Oceania, and Europe (including the UK and Ireland).

Part II: Mortality, morbidity, disability and burden of disease

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Chapter 3: Mortality

Chapter 4: Morbidity

Chapter 5: Disability

Chapter 6: Burden of disease

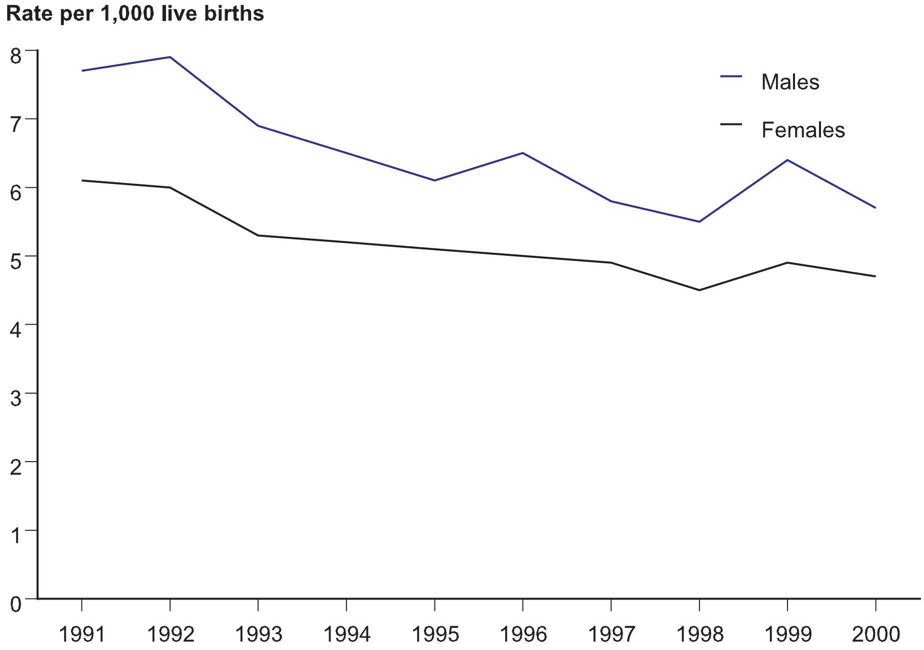
3. Mortality

Death rates are one of the most widely used measures of health in a population. For children, the death rate of those under 5 years, and in particular the infant mortality rate, has been widely used in monitoring the health of populations over time, and as a means of comparing the health of different populations. Identifying the causes of mortality provides a basis for setting priorities for public health action, for providing health services and for research.

This chapter provides an overview of child mortality, covering mortality over the last decade, age distribution and the underlying causes of death by age groups based on the 10th Revision of the International Classification of Diseases for mortality (ICD-10). Selected specific causes of death by age group are also covered in this chapter.

Infant mortality

The indicator for infant mortality is the number of deaths of infants in a given year, as a rate per 1,000 live births.



Source: AIHW Mortality Database [Table A3.1].

Figure 3.1: Infant mortality rates, 1991–00

- In Australia in 2000, 1,931 children aged 0–14 years died, representing 2% of all deaths in that year. Of these, 1,290 were infants. This represented 67% of all deaths of children aged 0–14 years. Among infants, 56% of the deaths were boys.

- The infant mortality rate declined for both boys and girls between 1991 and 2000. In 1991, the male rate was 7.7 deaths per 1,000 live births. By 2000, the rate had fallen to 5.7 per 1,000 live births (a 26% decrease). Similarly, the female rate decreased from 6.1 to 4.7 (a 23% decrease).
- Male infants had higher death rates than female infants in all years.

In 1999, Australia’s infant mortality rate (5.7 deaths per 1,000 live births) was high compared with other developed countries, ranking 19th among OECD countries. In the same year, Iceland ranked number one, with a rate of 2.4 per 1,000 live births. The high infant mortality rate among Aboriginal and Torres Strait Islander infants is a contributor to the relatively high Australian rate.

Causes of infant mortality

A summary of the underlying causes of deaths reported for infants in 2000, according to ICD-10 chapter, is presented in Table 3.1.

Table 3.1: Causes of deaths of infants, 2000

	Number			Rate per 100,000 infants		
Cause of death	**Males**	**Females**	**Persons**	**Males**	**Females**	**Persons**
Conditions originating in the perinatal period	355	281	636	279.1	231.6	255.9
Congenital malformations	181	142	323	142.3	117.0	130.0
Other symptoms, signs and abnormal findings	94	55	149	73.9	45.3	60.0
Injury and poisoning	24	23	47	18.9	19.0	18.9
Nervous system	25	20	45	19.7	16.5	18.1
Respiratory system	12	9	21	9.4	7.4	8.4
Infectious and parasitic	8	11	19	6.3	9.1	7.6
Endocrine, nutritional and metabolic diseases	8	8	16	6.3	6.6	6.4
Circulatory system	6	7	13	4.7	5.8	5.2
Neoplasms	3	5	8	2.4	4.1	3.2
Other conditions(a)	9	4	11	7.1	3.3	5.2
Total	**725**	**565**	**1,290**	**570.0**	**465.7**	**519.1**

(a) ‘Other conditions’ include: diseases of the digestive system, diseases of the blood and blood-forming organs, mental and behavioural disorders, and diseases of the musculoskeletal system and connective tissue.

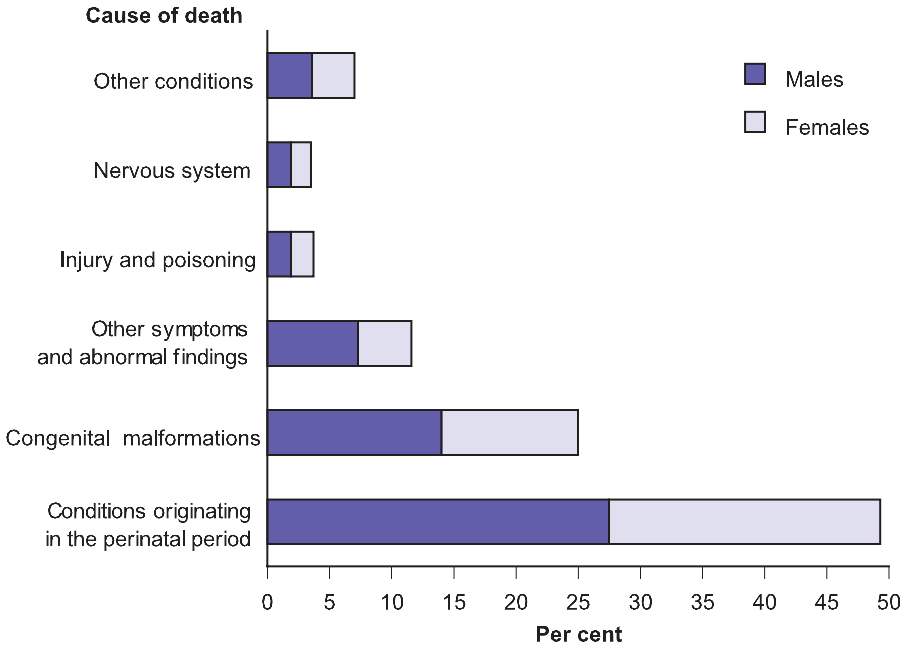
Notes

1. ICD-10 codes used: P00–P96, Q00–Q99, R00–R99, S00–T98, G00–G99, J00–J99, A00–B99, E00–E90, I00–I99, C00–D48 and remainder of codes for ‘other conditions’.
2. For comparability, all rates in this table are per 100,000 infants. The infant mortality rate and rates for congenital malformations and conditions originating in the perinatal period discussed elsewhere in this report are based on live births.

Source: AIHW Mortality Database.

- In 2000, more infants died from conditions originating in the perinatal period than from any other condition (636 deaths, or 255.9 per 100,000 infants).
- Another common cause of death was congenital malformations, from which 323 infants died (130.0 per 100,000 infants).
- Other symptoms, signs and abnormal findings, which include sudden infant death syndrome (SIDS), accounted for 149 deaths (60.0 per 100,000 infants).

Deaths of male and female infants as a proportion of all infant deaths are presented in Figure 3.2.



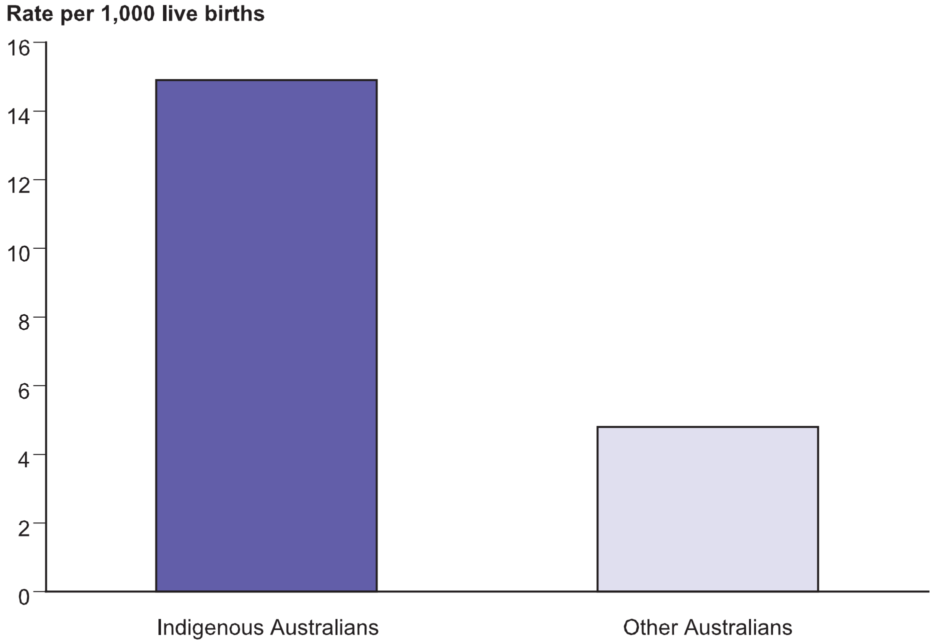
Note: 'Other conditions' include: diseases of the respiratory, circulatory, digestive and musculoskeletal systems, neoplasms, infectious and parasitic diseases, endocrine, nutritional and metabolic diseases, blood and blood-forming organs diseases, and mental and behavioural disorders.

Source: AIHW Mortality Database [Table A3.2].

Figure 3.2: Causes of deaths of infants, 2000

- Conditions originating in the perinatal period were responsible for 49% of all infant deaths in 2000.
- Congenital malformations accounted for 25% of deaths. Other symptoms, signs and abnormal findings (the majority of deaths in this group of conditions are due to SIDS) were responsible for 12%, and injuries and poisoning 4%.
- For most conditions, a higher number of deaths occurred of male than of female infants.

Aboriginal and Torres Strait Islander infants



Note: Includes Qld, WA, SA and NT only.

Source: AIHW Mortality Database [Table A3.3].

Figure 3.3: Average infant mortality rates for Aboriginal and Torres Strait Islander and other Australian infants, 1998–00

- Between 1998 and 2000 in Queensland, Western Australia, South Australia and the Northern Territory, 300 Aboriginal and Torres Strait Islander infants died. This represented 71% of all deaths of Indigenous children aged 0–14 years in these States/Territories. Of these deaths, 172 (57%) were male infants and 128 (43%) were female infants.

The causes of death of Aboriginal and Torres Strait Islander and other Australian infants, according to ICD-10 chapter, are presented in Table 3.2.

Table 3.2: Causes of death for Aboriginal and Torres Strait Islander and other Australian infants, 1998–00

	Total number		Average rate per 100,000 infants		
Cause of death	Indigenous Australians	Other Australians	Indigenous Australians	Other Australians	Rate ratio
Conditions originating in the perinatal period	126	567	608.4	217.8	2.8
Other symptoms, signs and abnormal findings	61	167	294.5	64.2	4.6
Congenital malformations	55	360	265.6	138.3	1.9
Respiratory system	15	20	72.4	7.7	9.4
Injury and poisoning	12	50	57.9	19.2	3.0
Infectious and parasitic	11	11	53.1	4.2	12.6
Nervous system	10	33	48.3	12.7	3.8
Other conditions[(a)]	10	54	48.3	20.7	2.3
Total	**300**	**1,262**	**1,448.5**	**484.8**	**3.0**

(a) 'Other conditions' include: endocrine, nutritional and metabolic diseases, diseases of the circulatory system, neoplasms, diseases of the digestive system, diseases of blood and blood-forming organs, and diseases of the genitourinary system.

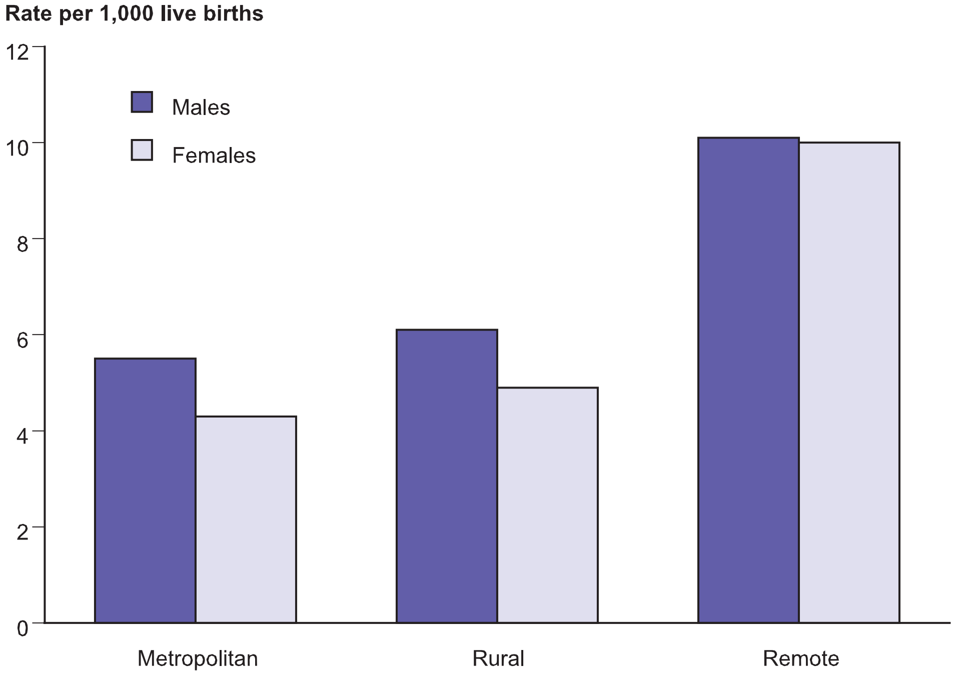
Notes

1. For comparability, all rates in this table are per 100,000 infants. The infant mortality rate and rates for congenital malformations and conditions originating in the perinatal period discussed elsewhere in this report are based on live births.
2. Includes Qld, WA, SA and NT only.
3. This total excludes 12 infants for whom Aboriginal and Torres Strait Islander status was unknown or missing.

Source: AIHW Mortality Database.

- Rate ratios (Table 3.2) provide a means for comparing the death rates of Indigenous and other Australian infants. For 1998–00, the average rate for Indigenous infants was 3 times higher than for other Australian infants (1,448.5 compared with 484.8 per 100,000).
- The conditions responsible for the greatest numbers of Indigenous infant deaths were similar to those reported for other Australian infants. These were conditions originating in the perinatal period (126 deaths, or 608.4 per 100,000 infants), other symptoms, signs and abnormal findings including SIDS (61, or 294.5) and congenital malformations (55, or 265.6). These conditions accounted for 81% of all deaths of Indigenous infants.

Infants in metropolitan, rural and remote areas



Source: AIHW Mortality Database [Table A3.4].

Figure 3.4: Average infant mortality rates in metropolitan, rural and remote areas, 1998–00

- Between 1998 and 2000, there were 2,607 deaths of infants in metropolitan areas, 1,026 in rural areas and 294 in remote areas.
- The average mortality rate for infants living in remote areas was higher than for those in rural and metropolitan areas (10.0 deaths per 1,000 live births compared with 5.5 and 4.9, respectively).
- The rate was higher for male than for female infants.

Table 3.3: Causes of deaths of infants in metropolitan, rural and remote areas, 1998–00

	Total number			Average rate per 100,000 infants		
Cause of death	**Metropolitan**	**Rural**	**Remote**	**Metropolitan**	**Rural**	**Remote**
Conditions originating in the perinatal period	1,280	439	123	242.1	234.2	417.6
Congenital malformations	709	283	68	134.1	151.0	230.9
Other symptoms, signs and abnormal findings	282	142	53	53.3	75.7	179.9
Injury and poisoning	79	51	9	14.9	27.2	30.6
Nervous system	72	38	9	13.6	20.3	30.6
Respiratory system	43	16	14	8.1	8.5	47.5
Endocrine, nutritional and metabolic diseases	37	11	5	7.0	5.9	17.0
Infectious and parasitic	29	15	7	5.5	8.0	23.8
Circulatory system	31	10	2	5.9	5.3	6.8
Neoplasms	20	14	2	3.8	7.5	6.8
Other conditions(a)	25	7	2	4.7	3.7	6.8
Total	**2,607**	**1,026**	**294**	**493.1**	**547.3**	**998.1**

(a) 'Other conditions' include: diseases of the digestive system, diseases of blood and blood-forming organs, diseases of the genitourinary system, and mental and behavioural disorders.

Notes

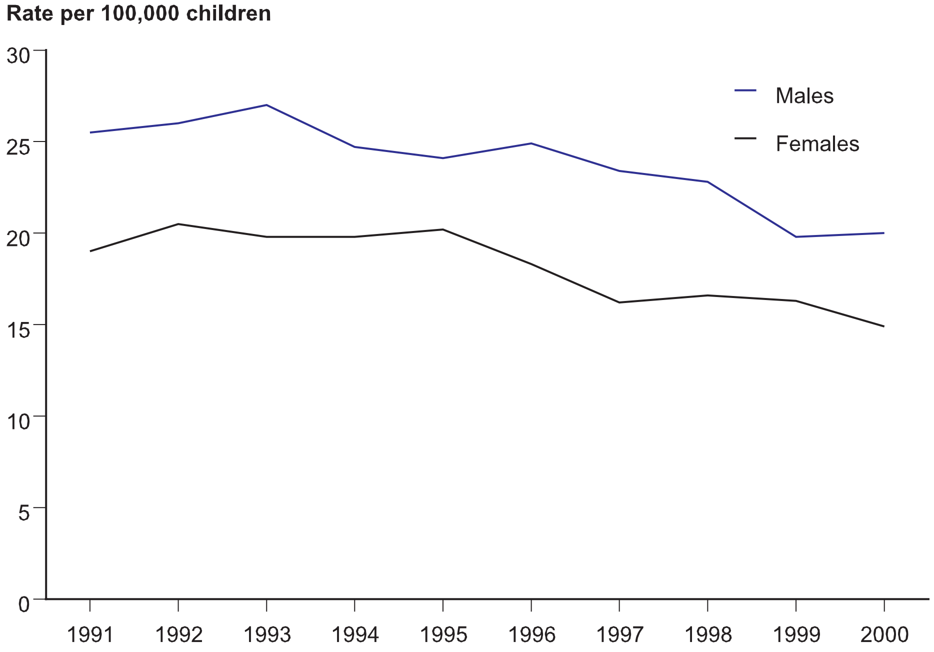
1. For comparability, all rates in this table are per 100,000 infants. The infant mortality rate and rates for congenital malformations and conditions originating in the perinatal period discussed elsewhere in this report are based on live births.
2. This total excludes 23 infants for whom area of residence was unknown or missing.

Source: AIHW Mortality Database.

- For most causes of death, the average death rate for infants living in remote areas was higher than for those living in rural or metropolitan areas.

Mortality among children aged 1–14 years

The indicator for deaths among children aged 1–14 years is the number of deaths of children aged 1–14 years in a given year as a rate per 100,000 children.



Source: AIHW Mortality Database [Table A3.5].

Figure 3.5: Death rates for children aged 1–14 years, 1991–00

- In 2000, a total of 641 children aged 1–14 years died in Australia. Of these, 59% were boys and 41% were girls. This represents 33% of all deaths of children aged 0–14 years.
- Between 1991 and 2000, there was a downward trend in rates for both boys and girls. In 2000, there were 20.1 deaths per 100,000 boys, compared with 25.5 in 1991. In 2000, there were 14.9 deaths per 100,000 girls, while in 1991 there were 19.0.
- Death rates for boys have remained consistently higher than death rates for girls.

Causes of death in children aged 1–14 years

Table 3.4: Causes of deaths of children aged 1–14 years, 2000

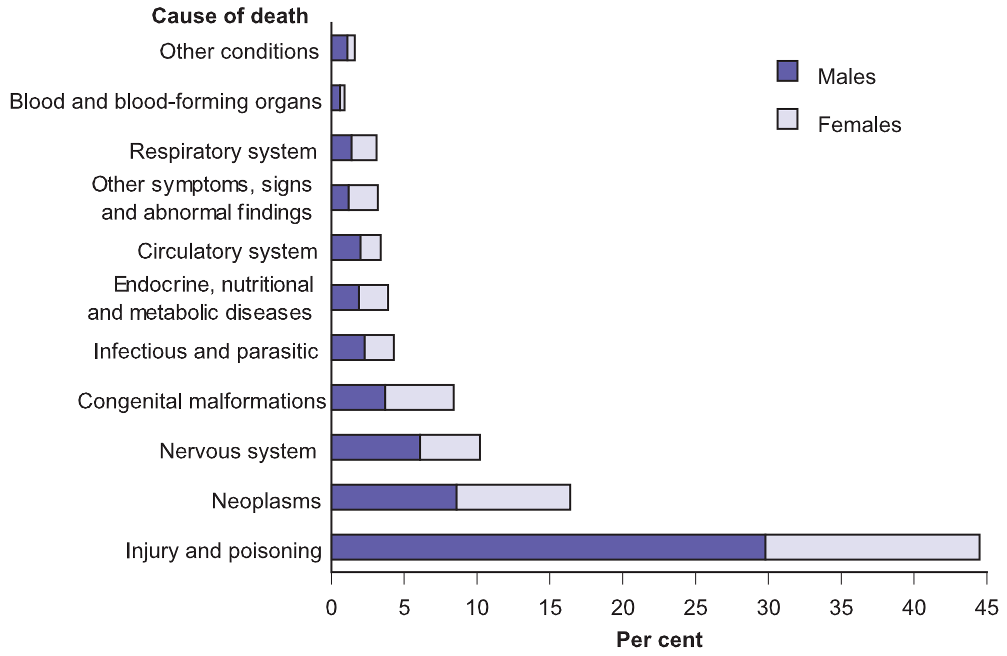
	Number			Rate per 100,000 children		
Cause of death	**Males**	**Females**	**Persons**	**Males**	**Females**	**Persons**
Injury and poisoning	191	94	285	10.2	5.3	7.8
Neoplasms	55	50	105	2.9	2.8	2.9
Nervous system	39	26	65	2.1	1.5	1.8
Congenital malformations	24	30	54	1.3	1.7	1.5
Infectious and parasitic diseases	15	13	28	0.8	0.7	0.8
Endocrine, nutritional and metabolic diseases	12	13	25	0.6	0.7	0.7
Circulatory system	13	9	22	0.7	0.5	0.6
Other symptoms, signs and abnormal findings	8	13	21	0.4	0.7	0.6
Respiratory system	9	11	20	0.5	0.6	0.5
Other conditions(a)	11	5	16	0.6	0.3	0.4
Total	**377**	**264**	**641**	**20.1**	**14.9**	**17.6**

(a) 'Other conditions' include: conditions originating in the perinatal period, diseases of the musculoskeletal system, mental and behavioural disorders, diseases of the digestive system and diseases of the genitourinary system.

Source: AIHW Mortality Database.

- Among children aged 1–14 years, injury and poisoning were the most common causes of death in 2000, responsible for 285 deaths (7.8 per 100,000 children).
- Other common causes were neoplasms including cancers (105 deaths, or 2.9), diseases of the nervous system including cerebral palsy and epilepsy (65 deaths, or 1.8) and congenital malformations (54 deaths, or 1.5).

Deaths of children aged 1–14 years as a proportion of all deaths of children aged 1–14 years, by cause of death according to ICD-10 chapters, are presented in Figure 3.6.



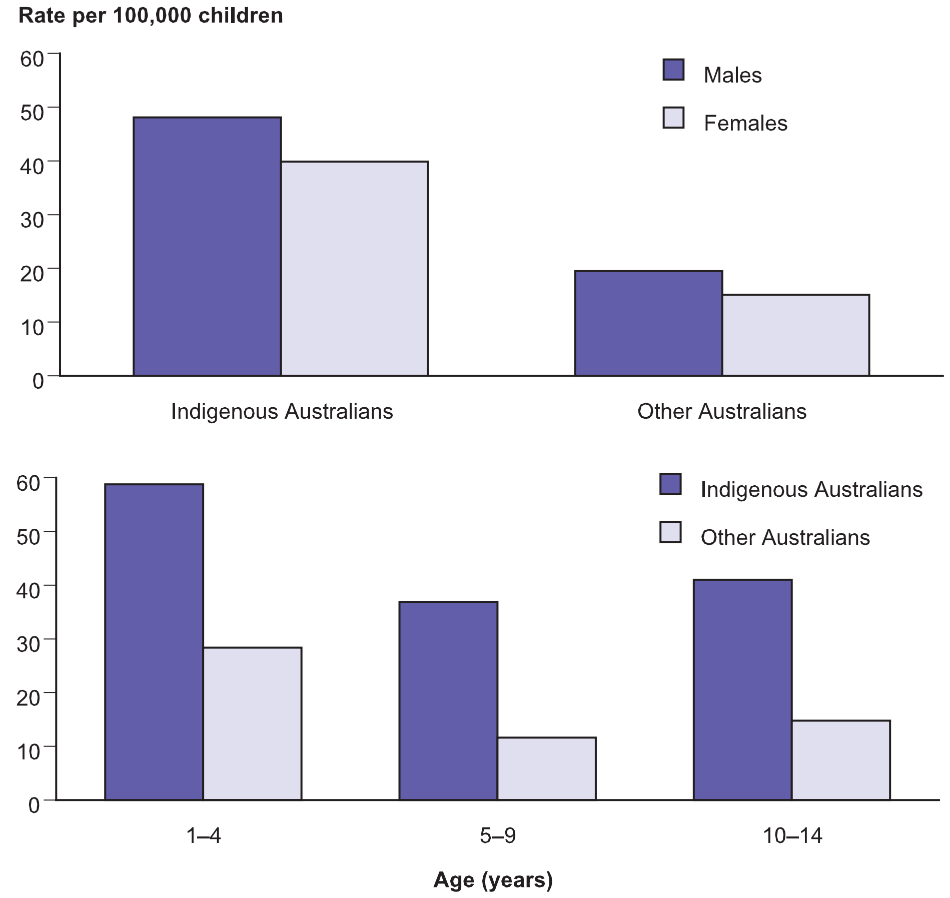
Note: 'Other conditions' include: conditions originating in the perinatal period, diseases of the musculoskeletal system, mental and behavioural disorders, diseases of the digestive system and diseases of the genitourinary system.

Source: AIHW Mortality Database [Table A3.6].

Figure 3.6: Causes of deaths of children aged 1–14 years, 2000

- In 2000, the highest proportion of deaths among children aged 1–14 years was caused by injury or poisoning, which accounted for 45%.
- Neoplasms including cancers were responsible for 16%. Diseases of the nervous system, including cerebral palsy and epilepsy, accounted for 10% of deaths, while congenital malformations accounted for 8%.

Aboriginal and Torres Strait Islander children



Note: Includes Qld, WA, SA and NT only.
Source: AIHW Mortality Database [Tables A3.7 and A3.8].

Figure 3.7: Average death rates for Aboriginal and Torres Strait Islander and other Australian children, 1998–00

- Between 1998 and 2000 in Queensland, Western Australia, South Australia and the Northern Territory, 122 Aboriginal and Torres Strait Islander children aged 1–14 years died. Of these deaths, 68 (56%) were of boys and 54 (46%) were of girls. This represents 29% of all deaths of Indigenous children aged 0–14 years in these States/ Territories.
- The average rate for Aboriginal and Torres Strait Islander children was 2.5 times that for other Australian children. Indigenous boys died at a rate of 48.1 per 100,000, compared with 19.5 per 100,000 other Australian boys. Indigenous girls died at a rate of 39.9 per 100,000, while the rate for other Australian girls was 15.1.
- Aboriginal and Torres Strait Islander children aged 1–4 years had a death rate 2.1 times that of other Australian children aged 1–4 years. Among children aged 5–9 years, the difference increased to 3.2 times. Indigenous children aged 10–14 years had a death rate 2.8 times that of other Australian children.

Table 3.5: Causes of deaths of Aboriginal and Torres Strait Islander children aged 1–14 years, 1998–00

	Total number		Average rate per 100,000 children		
Cause of death	**Indigenous Australians**	**Other Australians**	**Indigenous Australians**	**Other Australians**	**Rate ratio**
Injury and poisoning	59	298	21.3	7.6	2.8
Infectious and parasitic	10	23	3.5	0.6	6.0
Nervous system	9	66	3.2	1.7	1.9
Congenital malformations	9	54	3.2	1.4	2.3
Neoplasms	7	119	2.6	3.0	0.8
Endocrine, nutritional and metabolic diseases	5	29	1.9	0.7	2.5
Other conditions[(a)]	23	92	8.3	2.3	3.6
Total	**122**	**681**	**44.1**	**17.4**	**2.5**

(a) 'Other conditions' include: diseases of the respiratory system, diseases of the circulatory system, symptoms, signs and abnormal findings, diseases of blood and blood-forming organs, diseases of the digestive system, mental and behavioural disorders, conditions originating in the perinatal period, diseases of the ear and diseases of the musculoskeletal system.

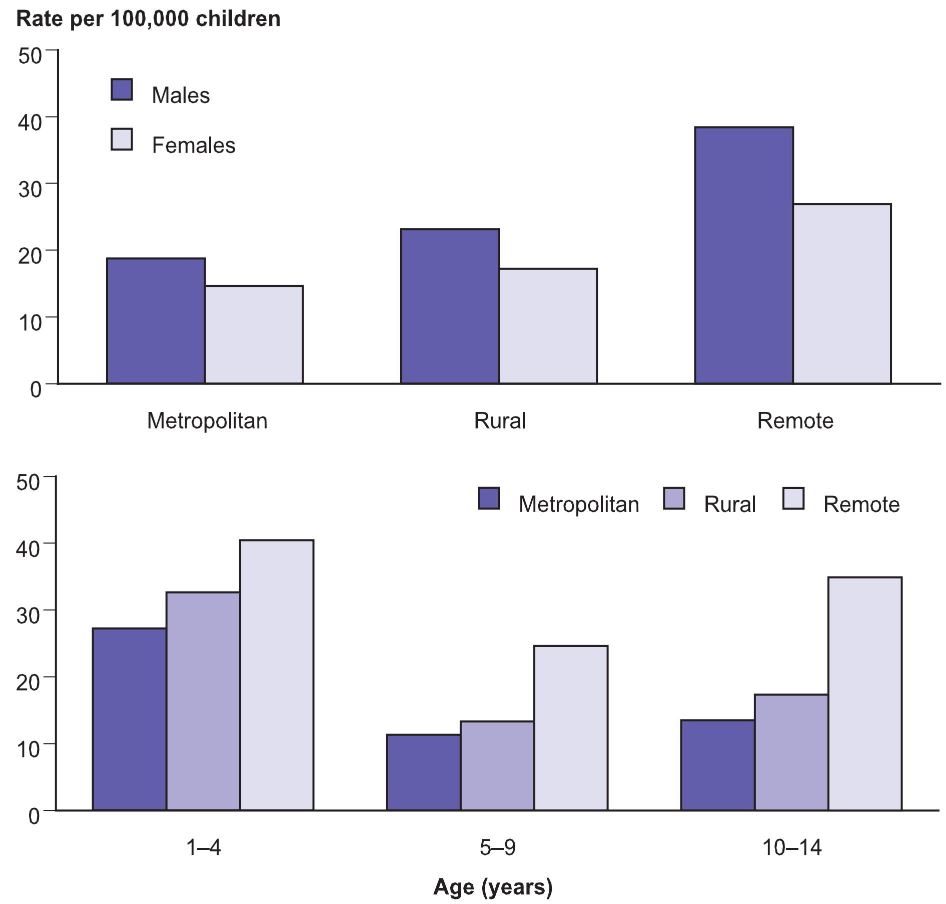
Notes

1. Includes Qld, WA, SA and NT only.
2. This total excludes 15 children aged 1–14 years for whom Aboriginal and Torres Strait Islander status was unknown or missing.

Source: AIHW Mortality Database.

- Among Aboriginal and Torres Strait Islander children aged 1–14 years in Queensland, Western Australia, South Australia and the Northern Territory, injury and poisoning were the most common causes of death in 2000, responsible for 59 deaths (21.3 per 100,000 children).
- Other causes were infectious and other parasitic diseases (10 deaths, or 3.5 per 100,000 children), nervous system conditions (9 deaths, or 3.2), congenital malformations (9 deaths, or 3.2), and neoplasms (7 deaths, or 2.6 deaths).

Children in metropolitan, rural and remote areas



Source: AIHW Mortality Database [Tables A3.9 and A3.10].

Figure 3.8: Average death rates for children aged 1–14 years in metropolitan, rural and remote areas, 1998–00

- Between 1998 and 2000, there were 1,250 deaths of children in metropolitan areas, 614 in rural areas and 134 in remote areas.
- The average death rate was higher in remote areas than in rural or metropolitan areas (32.8 deaths per 100,000 children compared with 20.2 and 16.7, respectively).
- Among boys, the death rate in remote areas was twice that in metropolitan areas, and almost twice that in rural areas (38.4, compared with 18.7 and 23.1, respectively).

Table 3.6: Causes of deaths of children aged 1–14 years in metropolitan, rural and remote areas, 1998–00

	Total number			Average rate per 100,000 children		
Cause of death	**Metropolitan**	**Rural**	**Remote**	**Metropolitan**	**Rural**	**Remote**
Injury and poisoning	458	283	75	6.1	9.4	18.4
Neoplasms	269	86	8	3.6	2.8	2.0
Nervous system	132	51	11	1.8	1.7	2.7
Congenital malformations	95	60	11	1.3	2.0	2.7
Endocrine, metabolic and nutritional diseases	57	32	3	0.8	1.0	0.7
Infectious and parasitic	51	20	10	0.7	0.8	0.5
Respiratory system	54	24	2	0.7	0.7	2.4
Circulatory system	50	19	6	0.7	0.6	1.5
Other symptoms, signs and abnormal findings	42	14	5	0.6	0.5	1.3
Other conditions[(a)]	42	25	3	0.6	0.8	0.7
Total	**1,250**	**614**	**134**	**16.7**	**20.2**	**32.8**

(a) 'Other conditions' include: conditions originating in the perinatal period, mental and behavioural disorders, diseases of the musculoskeletal system, diseases of the ear, diseases of the genitourinary system, diseases of the skin, diseases of the digestive system and diseases of the blood and blood-forming cells.

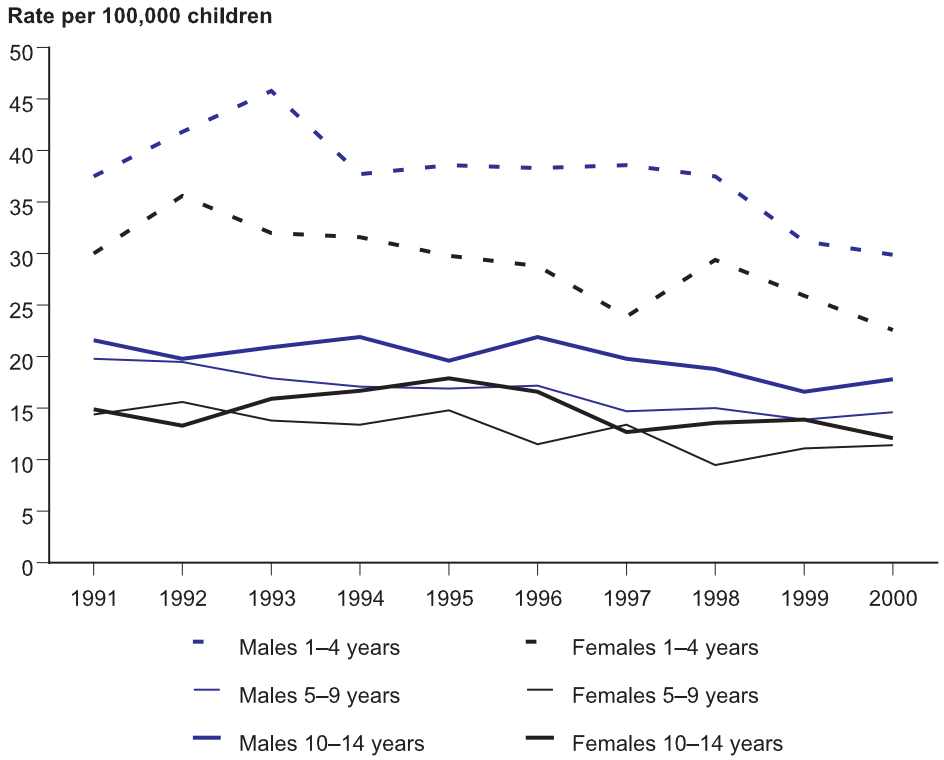
Note: This total excludes 27 children aged 1–14 years for whom area of residence was unknown or missing.

Source: AIHW Mortality Database.

- Overall, the death rate for children living in remote areas was 1.6 times higher than the rate for children in rural areas and almost twice the rate observed in metropolitan areas. For most causes of death, the rate for children in remote areas was higher than that for children in rural and metropolitan areas.

Age-specific death rates for children aged 1–14 years

The indicator for age-specific death rates is the number of deaths of children aged 1–4, 5–9 or 10–14 years in a given year as a rate per 100,000 children in each age group.



Source: AIHW Mortality Database [Table A3.11].

Figure 3.9: Death rates for children aged 1–14 years, 1991–00

- Between 1991 and 2000, death rates for children aged 1–4 years were considerably higher than for any other age group.
- Rates declined over this period for all age groups. The greatest decrease occurred among boys aged 5–9 years, where rates decreased by 1.4 times.
- In 2000, death rates were highest for children aged 1–4 years (29.9 per 100,000 boys and 22.6 per 100,000 girls) and were lowest for children aged 5–9 (14.6 for boys and 11.4 for girls).
- In all age groups, boys had higher death rates than girls.

Specific causes of death of children aged 0–14 years are presented in Table 3.7.

Table 3.7: Selected specific causes of death of children aged 0–14 years, 2000

Age (years)	Cause of death	Number	Rate per 100,000 children
<1	Sudden infant death syndrome (SIDS)	129	51.9
	Foetus and newborn affected by complications of placental separation and haemorrhage	60	24.1
	Foetus and newborn affected by chorioamnionitis	53	21.3
	Foetus and newborn affected by multiple pregnancy	43	17.3
	Respiratory distress syndrome of newborn	39	15.7
1–4	Pedestrian injured in collision with a car, pick-up truck or van (traffic accident)	16	6.4
	Drowning and submersion following fall into swimming-pool	13	5.2
	Instantaneous death	9	3.6
	Unspecified drowning and submersion	9	3.6
	Drowning and submersion following fall into natural water	8	3.2
5–9	Pedestrian injured in collision with a car, pick-up truck or van (traffic accident)	11	0.8
	Predominantly allergic asthma	8	0.6
	Acute lymphoblastic leukaemia	7	0.5
	Epilepsy, unspecified	7	0.5
	Brain cancer, unspecified	7	0.5
10–14	Pedestrian injured in collision with a car, pick-up truck or van (traffic accident)	9	0.7
	Acute lymphoblastic leukaemia	8	0.6
	Car occupant injured in collision with car, pick-up truck or van (passenger)	7	0.5
	Intentional self-harm by hanging, strangulation and suffocation	7	0.5
	Car occupant injured in non-collision transport accident (passenger)	6	0.5

Note: ICD-10 codes R95, P02.1, P02.7, P01.5, P22.0, V03.1, W68, R96.0, W74, W70, V03.1, J45.0, C91.0, G40.9, C71.9, V03.1, C91.0, V43.6, X70, V48.6.

Source: AIHW Mortality Database.

- In 2000 among infants, sudden infant death syndrome (SIDS) was the most frequent specific cause of death. Deaths from SIDS continued to decline over the last decade (see Chapter 8). Conditions originating in the perinatal period were also common causes of death in this age group.
- For children aged 1–4 years, traffic accidents where a pedestrian was injured were the most frequent specific cause of death. Drowning deaths were also common in this age group.
- For children aged 5–9 years, traffic accidents where a pedestrian was injured were also the most common specific cause of death. Other frequent causes were allergic asthma, acute lymphoblastic leukaemia, epilepsy (unspecified) and brain cancer (unspecified).
- For children aged 10–14 years, traffic accidents where a pedestrian was injured were again the most common specific cause of death. Other types of injuries also featured in the most common causes of death in this age group.

4. Morbidity

Most childhood sickness takes the form of mild illnesses that are usually treated by parents themselves or a general practitioner. Hospital utilisation accounts for a small part of health services provided to children and is usually for more severe types of conditions. Children's use of health services depends not only on the state of their health but also on their carer's knowledge and attitudes and the availability and affordability of the services.

This chapter provides an overview of illness in children. Data on the extent and main causes of morbidity in children are derived from three sources: the 1995 ABS National Health Survey (NHS) prevalence of illness data; the Bettering the Evaluation and Care of Health (BEACH) Program which provides information on children's visits to general practitioners; and the AIHW National Hospital Morbidity Database which provides information on hospital admissions for children.

Prevalence of illnesses

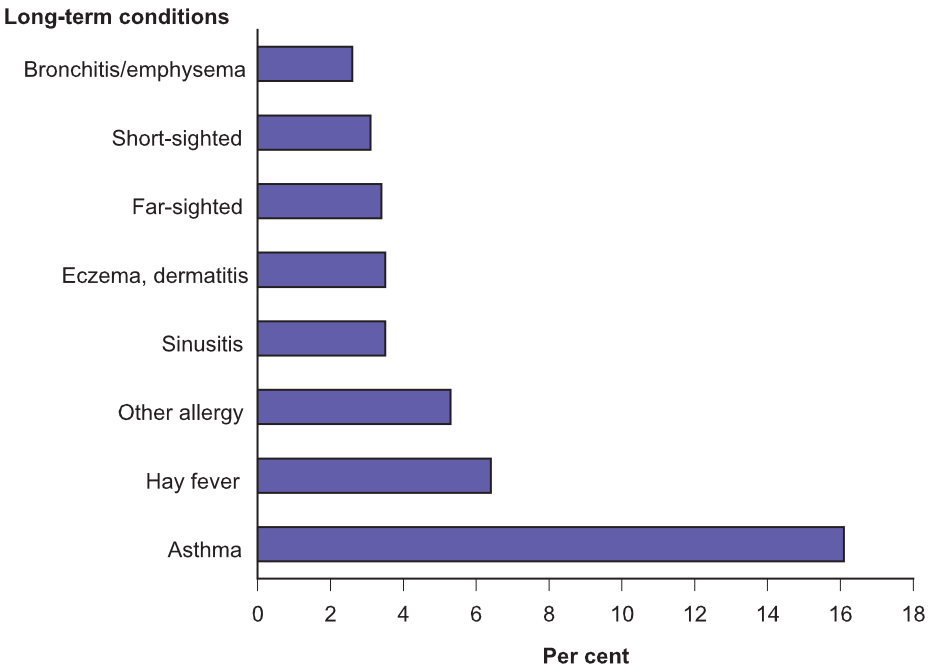
Information was gathered from the 1995 ABS NHS on current conditions at the time of the survey, including recent and long-term, minor and more serious conditions. Recent conditions were defined as those experienced in the 2 weeks prior to interview, while long-term conditions were defined as having lasted, or being expected to last, for 6 months or more.

Table 4.1: Proportion of children aged 0–14 years with reported recent and long-term conditions, 1995 (per cent)

	Recent conditions		Long-term conditions		Recent or long-term conditions	
Age (years)	**Males**	**Females**	**Males**	**Females**	**Males**	**Females**
<1	69	68	17	16	71	71
1–4	57	54	39	29	66	61
5–9	53	55	48	47	67	67
10–14	53	56	52	53	70	72
0–14	**55**	**56**	**45**	**42**	**68**	**67**

Source: AIHW analysis of ABS NHS data, 1995.

- Approximately two-thirds of children aged 0–14 years were reported to have a recent or long-term condition.
- Recent conditions were more prevalent than long-term conditions in all age groups and in both sexes.
- The proportion of children with recent conditions tended to decline with age. In contrast, the proportion of children with long-term conditions tended to increase with age.
- Slightly more girls than boys were reported to have a recent condition, while the opposite was true for long-term conditions.



Source: AIHW analysis of ABS NHS data, 1995 [Table A4.1].

Figure 4.1: Most frequently reported long-term conditions in children aged 0–14 years, 1995

- Asthma was the most frequently reported long-term condition, reported for 16% of all children. Asthma was most prevalent among children aged 5–14 years.
- Hay fever was the second most frequently reported long-term condition. Prevalence of hay fever was also higher among children aged 5–14 years.
- Asthma, hay fever, other allergies and eczema, all of which are related to allergic reactions, made up nearly one-third of all reported long-term conditions.
- Far- and short-sightedness were reported for approximately 7% of children. These conditions were most common in children aged 10–14 years.

The most commonly reported recent condition was the common cold, reported for 10% of children. Younger children were more likely to have suffered from a cold (13% of those under 1 year and 14% of those aged 1–4 years). Asthma was the second most frequently reported condition (9% of children), with other common conditions being dental problems (7%) and cough or sore throat (5%).

Consultations with general practitioners

This section examines illness in children aged 0–14 years managed by general practitioners (GPs). The data source is the BEACH Program which, in a rolling survey, samples around 1,000 general practitioners each year on the details of 100 consecutive consultations per GP. It includes information on the reasons patients present, as well as the problems managed, referrals, treatments, tests and investigations ordered and procedures carried out.

Profile of patients

Table 4.2: Summary of characteristics of children aged 0–14 years seen by general practitioners, April 2000–March 2001

Patient characteristics	Number	Per cent
Sex		
Males	7,219	51.7
Females	6,751	48.3
Age		
<1 year	2,098	14.9
1–4 years	5,310	37.7
5–14 years	6,695	47.5
Health card status		
Holds a Health Care Card	3,921	27.8
Holds a Department of Veterans' Affairs card	11	0.1
Background		
Non-English-speaking background	882	6.3
Aboriginal	205	1.5
Torres Strait Islander	21	0.2
Consultation history		
Seen previously	12,600	89.3
New to practice	1,504	10.7
Total consultations	**14,103**	. .

. . Not applicable.

Note: 134 consultations were missing information on sex.

Source: BEACH Survey, April 2000–March 2001.

- Between April 2000 and March 2001, of the 99,307 consultations in general practice surveyed, there were 14,103 (14%) consultations with children aged less than 15 years in the sample. This extrapolates to a total of about 15 million consultations per year nationally. GP consultations with children were divided almost equally between girls and boys. Just under half were for those aged 5–14 years, while children aged under 1 and 1–4 years accounted for 14.9% and 37.7% of the consultations, respectively.
- Just over 6% of these consultations were with children from a non-English-speaking background, while 1.5% were with children who were identified as Aboriginal or Torres Strait Islander. Indigenous children in the BEACH survey are subject to under-identification, either through some GPs not asking about Indigenous status, by not recording the response or non-identification by the patients (AIHW 2001).

- Just over a quarter of the consultations (27.8%) were for children in families that held a Health Care Card.
- Around 90% of consultations were with children who had been seen at the practice before.

Nature of consultation

Table 4.3: Type of consultation by general practitioners for children aged 0–14 years, April 2000–March 2001

Type of consultation	Number	Rate per 100 consultations
Medicare claimable	12,167	98.0
Standard surgery consultation	11,248	90.6
Long surgery consultation	330	2.7
Short surgery consultation	283	2.3
Prolonged surgery consultation	9.0	0.07
Home visits	132	1.1
Other items	153	1.23
Hospital	9	0.07
Nursing home	3	0.02
Non-Medicare claimable	245	2.0
Total consultations	**14,103**	. .

. . Not applicable.

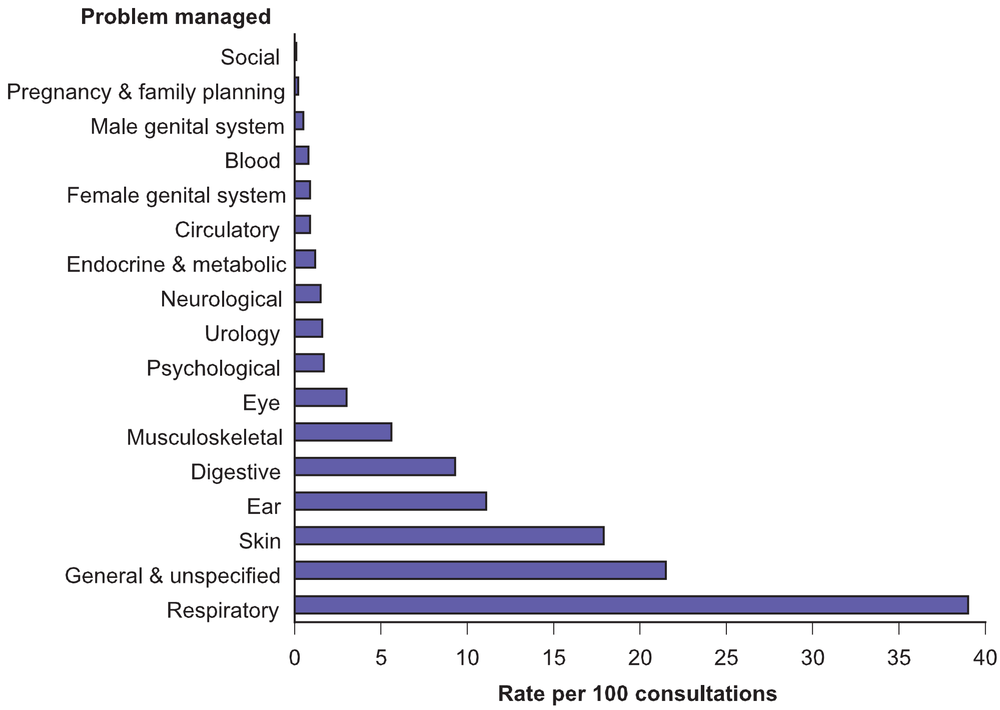
Note: There were 1,692 encounters for which data was missing which are included in total consultations.

Source: BEACH Survey, April 2000–March 2001.

- Almost all consultations (98 per 100 consultations) were claimable through Medicare and most were surgery consultations. Less than 2 per 100 consultations were home visits.

Problems managed

There were a total of 16,468 problems managed in these children's consultations. Of these, just over half (8,443 or 51%) were new problems. The types of problems managed during general practice consultations according to main problem groups (ICPC-2 classification chapters) are shown in Figure 4.2.



Note: Problems which cross multiple body systems are classified together as 'general & unspecified'.
Source: BEACH Survey, April 2000–March 2001 [Table A4.2].

Figure 4.2: Problems managed by general practitioners for children aged 0–14 years, April 2000–March 2001

- Problems related to the respiratory system were the most common problems managed by GPs, at a rate of 39.0 per 100 consultations.
- The second most frequent problem group was skin problems (17.9 per 100 consultations), followed by those related to the ear (11.1), the digestive (9.3) and musculoskeletal systems (5.6), and the eye (3.0). Psychological (1.7) and urological problems (1.6) were also relatively common. All remaining types of problems were managed at a rate of less than 1.5 per 100 consultations each.

The most frequent specific conditions managed by general practitioners are shown in Table 4.4.

Table 4.4: Top 10 problems managed by general practitioners for children aged 0–14 years, April 2000–March 2001

Problem managed	Number	Per cent of total problems managed
Acute upper respiratory tract infection	2,545	15.5
Immunisation—all[(a)]	1,494	9.1
Acute otitis media/myringitis	1,065	6.5
Asthma	819	5.0
Viral disease, other/NOS[(b)]	620	3.8
Tonsillitis[(a)]	610	3.7
Acute bronchitis/bronchiolitis	519	3.2
Dermatitis, contact/allergic	474	2.9
Conjunctivitis, infectious	256	1.6
Fracture[(a)]	242	1.5
Top 10 problems managed	*8,643*	*52.5*
Total managed	**16,468**	**100.0**

(a) Includes multiple ICPC-2 codes.

(b) NOS: not otherwise specified.

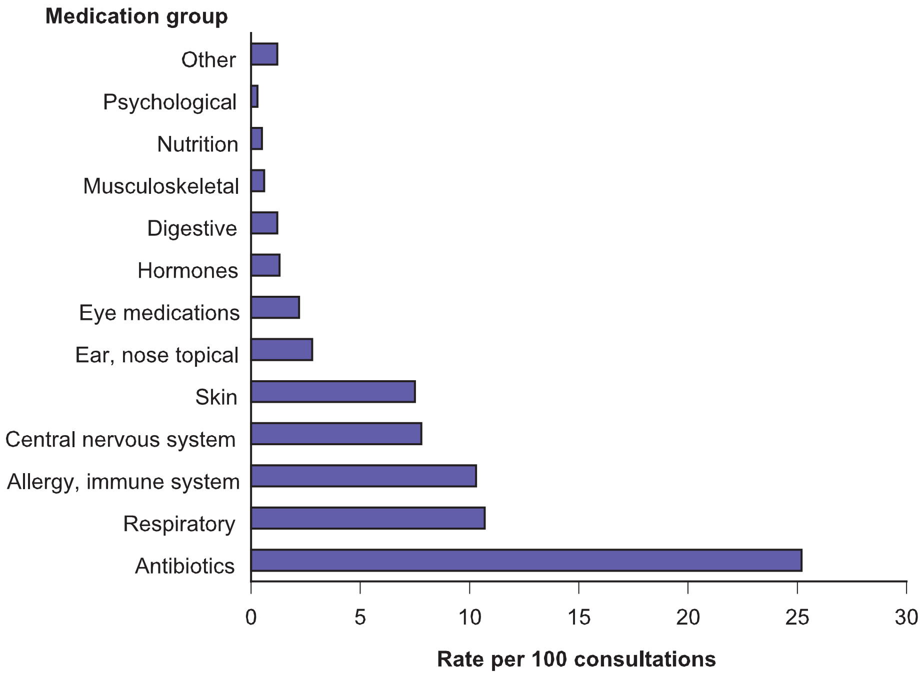
Note: Total problems managed are more than total consultations because more than one problem can be dealt with per consultation.

Source: BEACH Survey, April 2000–March 2001.

- Acute upper respiratory tract infections made up 15.5% of all problems managed by GPs.
- Immunisations were also common, accounting for 9.1% of all problems managed.
- Acute ear infections (6.5%), and respiratory conditions such as asthma and bronchiolitis were also commonly managed problems (5.0% and 3.2%, respectively).

Medications

The medications prescribed, advised or supplied by GPs for children provide another view of childhood illness in Australia. Medications were prescribed at a rate of 99.3 per 100 consultations. The total number of medications for children over the 12-month period in the survey was 14,007. This extrapolates to an estimated 15 million medications prescribed, advised or supplied for children by GPs each year. Of these medications in the BEACH Survey, 10,094 were prescribed (at a rate of 71.6 per 100 consultations), 2,559 were advised for over-the-counter purchase (18.2 per 100) and 1,352 were supplied by the GP (9.6 per 100). The distribution of prescribed medications (per cent) by group is presented in Figure 4.3.



Note: 'Other' includes cardiovascular, blood, urogenital, contraceptives, surgical preparations, anti-neoplastics and miscellaneous medications.

Source: BEACH Survey, April 2000–March 2001 [Table A4.3].

Figure 4.3: Medications prescribed to children aged 0–14 years during consultations with general practitioners, April 2000–March 2001

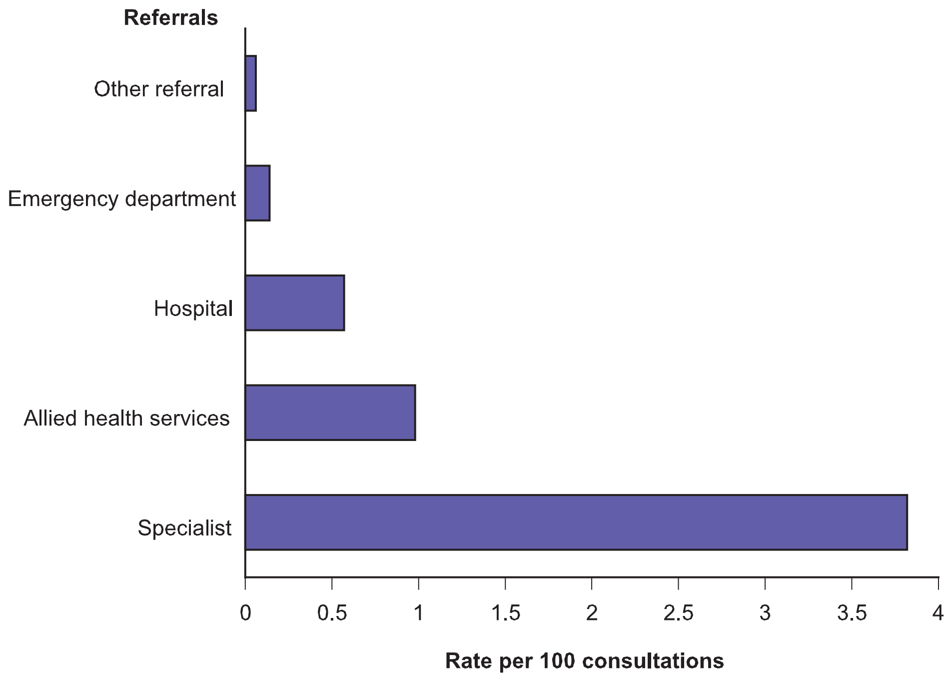
- Antibiotics were the most commonly prescribed medication (25.2 per 100 consultations), representing 35% of all prescriptions. Broad-spectrum penicillin was the antibiotic most commonly prescribed, representing almost a half of all prescribed antibiotics (45%).
- Medications for the treatment of respiratory illness including asthma and bronchitis were the second most common group prescribed, representing 15% of all prescriptions.
- Vaccines made up 13% of total medications, while medications for problems of the central nervous system and the skin each made up 11%. The remaining groups each represented less than 5% of medications prescribed.

Clinical and procedural treatments

In about one-third of the visits to a GP by children (30%), 'other clinical treatment', including advice, education or counselling, was offered. In just over 7% of the visits, a minor surgical procedure or the application of a dressing was performed.

Referrals and admissions

During the 12-month survey period, there were 785 referrals to other health professionals, including hospitals and emergency departments, representing a referral rate of just under 6 per 100 consultations. The health professionals to whom children were referred are shown in Figure 4.4.

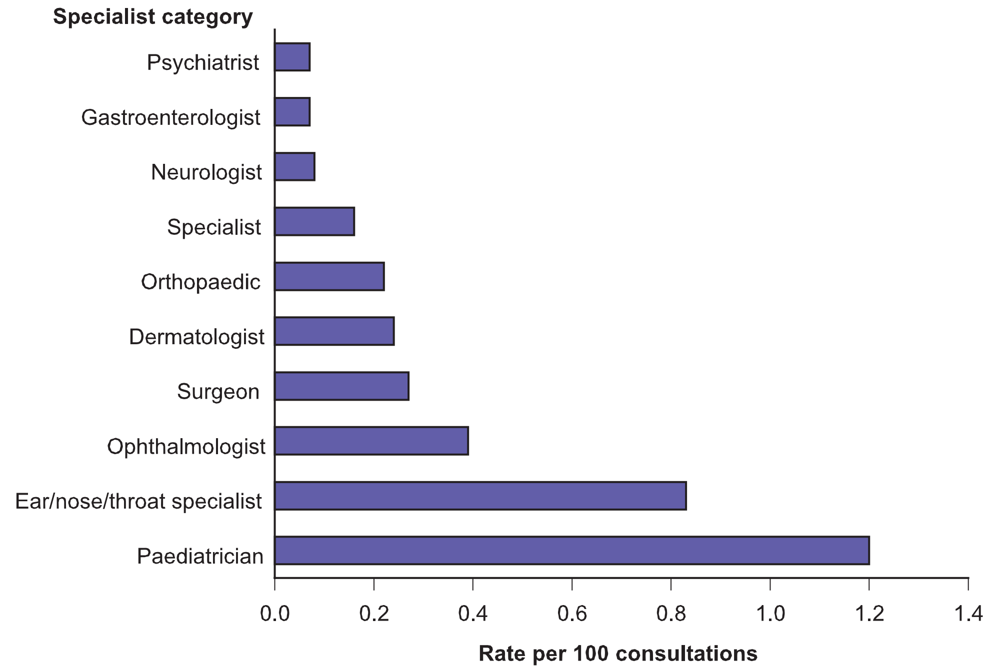


Source: BEACH Survey, April 2000–March 2001 [Table A4.4].

Figure 4.4: Referrals to other health professionals of children aged 0–14 years, April 2000–March 2001

- In about 4 per 100 consultations, children were referred by the GP to a medical specialist. These referrals made up 69% of all referrals.
- Other referrals included those to allied health services (1.0 per 100 consultations), hospitals (0.6), and emergency departments (0.1).

Medical specialists



Source: BEACH Survey, April 2000–March 2001 [Table A4.5].

Figure 4.5: Top 10 referrals to medical specialists of children aged 0–14 years, April 2000–March 2001

- Referrals to medical specialists were most frequently to a paediatrician.
- Almost half of all referrals were to a specialist in child health or to an ear, nose and throat specialist. Just over 10% of specialist referrals were to an eye specialist.

Allied health services

General practitioners referred child patients to an allied health specialist at a rate of 1.0 per 100 consultations. Just under half of these referrals were for hearing tests or physiotherapy. Referrals to dentists, optometrists, speech therapists, podiatrists were made in about equal numbers, each representing less than 2% of total referrals.

Pathology and imaging investigations

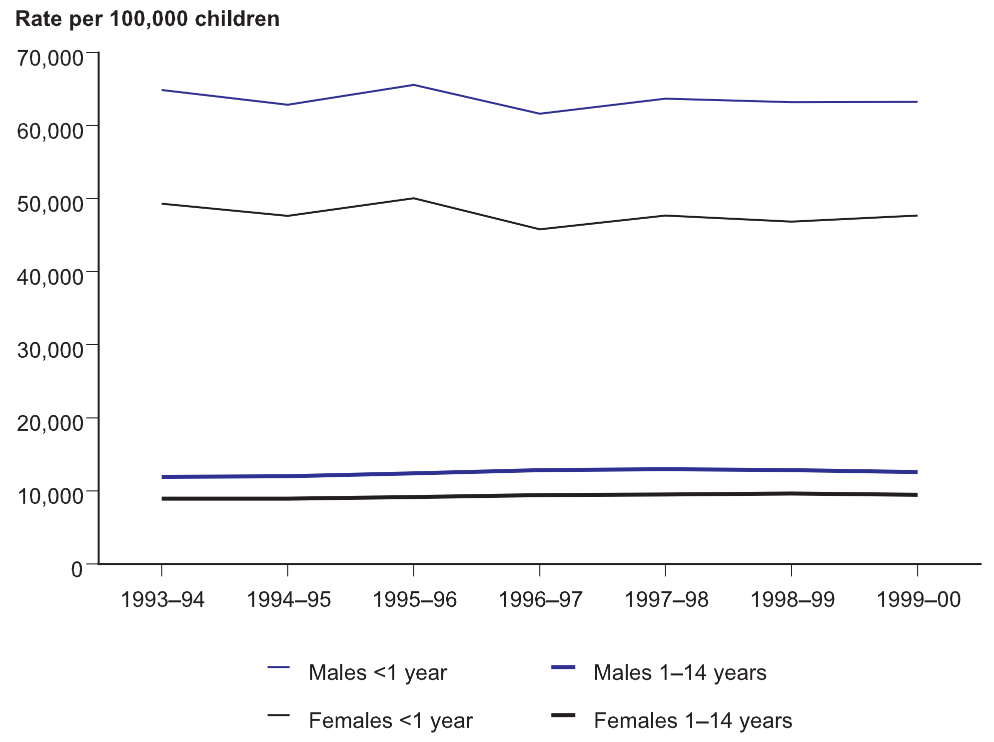
The ordering rates of pathology and imaging tests by GPs were fairly low. Imaging tests were ordered at a rate of 3.8 per 100 encounters and included x-ray, ultrasound and CT scans. Among tests ordered for which the type of imaging test was known, x-rays represented the highest proportion (90%) and were most often ordered for wrist, ankle, knee, finger(s)/thumb, forearm and hand.

Pathology tests were ordered at a rate of 7.2 per 100 consultations and were most commonly for urine, full blood count or liver function tests.

Hospitalisations

Hospitalisation rates can be used as a proxy indicator of the level of serious illness in the community, although they can be affected by access and admission practices. The following hospitalisation data do not include hospitalisations for healthy newborns. In 1999–00, 190,335 or 77% of newborn babies in hospital were healthy and did not require any treatment.

The indicator for hospitalisation rates for children aged 1–14 years is the number of hospitalisations for children aged 1–14 years in a given year as a rate per 100,000 children (Figure 4.6).

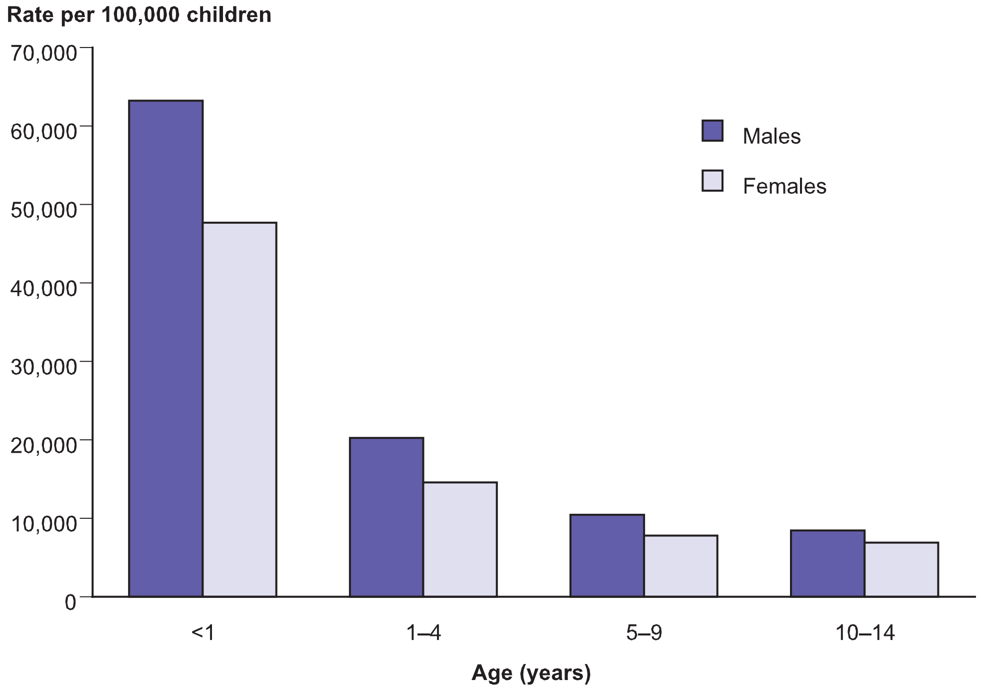


Source: AIHW National Hospital Morbidity Database [Table A4.6].

Figure 4.6: Hospitalisation rates for infants and for children aged 1–14 years, 1993–94 to 1999–00

- Among infants and children aged 1–14 years, hospitalisation rates remained relatively constant over the period 1993–94 to 1999–00.
- Rates were higher for infants than for children aged 1–14 years. In 1999–00, infants were hospitalised at a rate of 55,667.3 per 100,000 children, while children aged 1–14 were hospitalised at a rate of 11,043.1.
- In 1999–00, male infants were hospitalised at a rate of 63,235.5 per 100,000 infants, while for female infants the rate was 47,693.2. Multiple admissions of individual infants may be the reason for the high infant hospitalisation rates.
- Among children aged 1–14 years, boys were hospitalised at a rate of 12,559 per 100,000 children, while the rate for girls was 9,446.4.

Hospitalisation rates by age group in 1999–00 are presented in Figure 4.7.

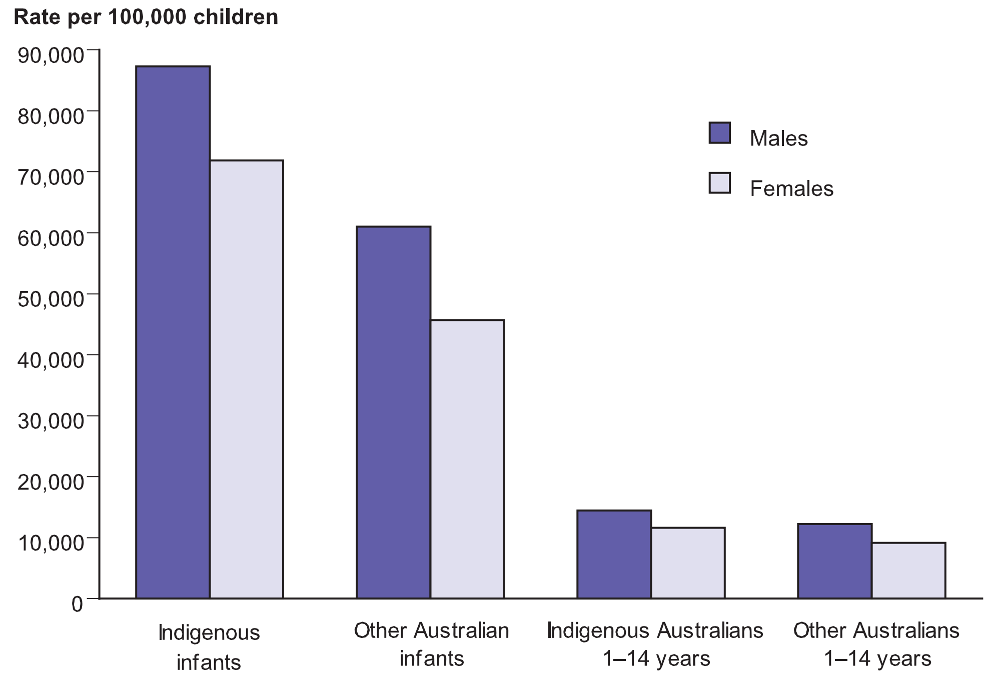


Source: AIHW National Hospital Morbidity Database [Table A4.6].

Figure 4.7: Hospitalisation rates for children aged 0–14 years, 1999–00

- In 1999–00, there was a total of 5,897,797 hospitalisations in Australia. Of these, 542,245 (9%) were for children aged 0–14 years, with 316,133 (58%) being for boys and 226,112 (42%) for girls. A high proportion of these hospitalisations (139,486 or 26%) was for infants.
- Rates were higher for boys than for girls in all age groups. The greatest difference was among children aged 1–4 years (boys being hospitalised at a rate 1.4 times that of girls), and the lowest among children aged 10–14 years (boys being hospitalised at a rate 1.2 that of girls).
- The highest rates were for infants, with rates being 1.3 times higher for male infants than female infants.
- Hospitalisation rates decreased with age. Infants were hospitalised at a rate 3 times that of children aged 1–4 years, 6 times that of children aged 5–9 years, and 7 times the rate of those aged 10–14 years.

Aboriginal and Torres Strait Islander children

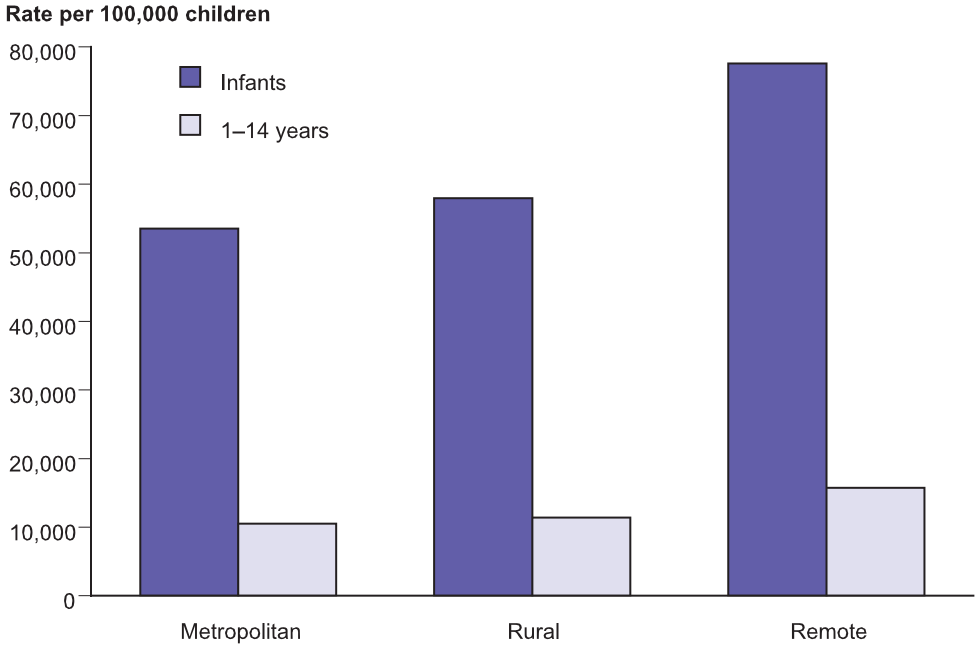


Source: AIHW National Hospital Morbidity Database [Table A4.7].

Figure 4.8: Hospitalisation rates for Aboriginal and Torres Strait Islander and other Australian children aged 0–14 years, 1999–00

- In 1999–00, there were 29,065 hospitalisations of Aboriginal and Torres Strait Islander children aged 0–14 years. Of these hospitalisations, 16,378 (56%) were of boys, and 12,687 (44%) were of girls—32% of these hospitalisations were of infants.
- For children aged less than 1 and 1–14 years, and for both boys and girls, Aboriginal and Torres Strait Islander children were hospitalised at higher rates than other Australian children. However, the difference was greater among infants.
- Among male infants, Aboriginal and Torres Strait Islander infants were hospitalised at a rate 1.5 times that of other Australian infants (87,309.4 compared with 60,995.1 per 100,000 infants). Among female infants, the hospitalisation rate for Indigenous infants was 1.6 times that of other Australian female infants (71,866.6 compared with 45,665.9).
- Aboriginal and Torres Strait Islander boys were hospitalised at a rate 1.2 times that of other Australian boys (14,448.0 compared with 12,236.6). Indigenous girls were hospitalised at a rate 1.3 times that of other Australian girls (11,637.0 compared with 9,172.4).
- Hospitalisation rates for Aboriginal and Torres Strait Islander children are affected by the under-identification of Indigenous children in hospital data (AIHW 2001a). Therefore, true hospitalisation rates for Indigenous children are likely to be greater than those presented throughout this report.

Children in metropolitan, rural and remote areas



Source: AIHW National Hospital Morbidity Database [Table A4.8].

Figure 4.9: Hospitalisation rates for children aged 0–14 years in metropolitan, rural and remote areas, 1999–00

- In 1999–00, there were 94,329 hospitalisations of infants in metropolitan areas, 36,391 in rural areas and 7,620 in remote areas. Among children aged 1–14 years, there were 263,235 hospitalisations in metropolitan areas, 114,917 in rural areas and 21,744 in remote areas.
- For boys and girls in both age groups, hospitalisation rates were greatest in remote areas.
- The difference was not as great between children in rural and metropolitan areas as between these children and those in remote areas, although children in rural areas were hospitalised at a rate slightly higher than that of children in metropolitan areas.
- The higher hospitalisation rates for infants in remote areas probably reflect the high number of Aboriginal and Torres Strait Islander infants living in remote Australia, and their higher hospitalisation rates.

Reasons for hospitalisation of infants

A summary of reasons for hospitalisations of infants in 1999–00 is presented in Table 4.5. The data presented here are classified according to the chapters of the International Classification of Diseases, 10th Revision, Australian Modification (ICD-10-AM) and to specific diagnoses.

Table 4.5: Reasons for hospitalisations of infants, 1999–00

	Number			Rate per 100,000 infants		
Diagnosis	**Males**	**Females**	**Persons**	**Males**	**Females**	**Persons**
Conditions originating in the perinatal period	27,390	21,915	49,305	21,314.01	17,968.27	19,684.84
Respiratory system	12,856	8,535	21,391	10,004.12	6,997.91	8,540.28
Contact with health services	10,233	5,438	15,671	7,962.99	4,458.66	6,256.59
Other symptoms, signs and abnormal findings	5,536	4,730	10,266	4,307.94	3,878.16	4,098.66
Congenital abnormalities	5,424	3,418	8,842	4,220.78	2,802.44	3,530.14
Infectious and parasitic	4,579	3,751	8,330	3,563.23	3,075.47	3,325.72
Nervous system	3,537	2,721	6,258	2,752.38	2,230.97	2,498.48
Digestive system	3,808	1,888	5,696	2,963.26	1,547.99	2,274.11
Genitourinary system	1,868	1,010	2,878	1,453.62	828.11	1,149.03
Injury and poisoning	1,607	1,269	2,876	1,250.52	1,040.46	1,148.23
Ear diseases	1,093	659	1,752	850.54	540.32	699.48
Mental and behavioural disorders	798	664	1,462	620.98	544.42	583.70
Skin diseases	762	625	1,387	592.96	512.44	553.75
Neoplasms	433	463	896	336.95	379.62	357.72
Eye diseases	381	339	720	296.48	277.95	287.46
Endocrine, nutritional and metabolic diseases	373	331	704	290.26	271.39	281.07
Circulatory system	225	158	383	175.09	129.55	152.91
Blood and blood-forming organs	224	139	363	174.31	113.97	144.93
Musculoskeletal system	134	116	250	104.27	95.11	99.81
Total	**81,262**	**58,169**	**139,431**	**63,235.5**	**47,693.2**	**55,667.3**

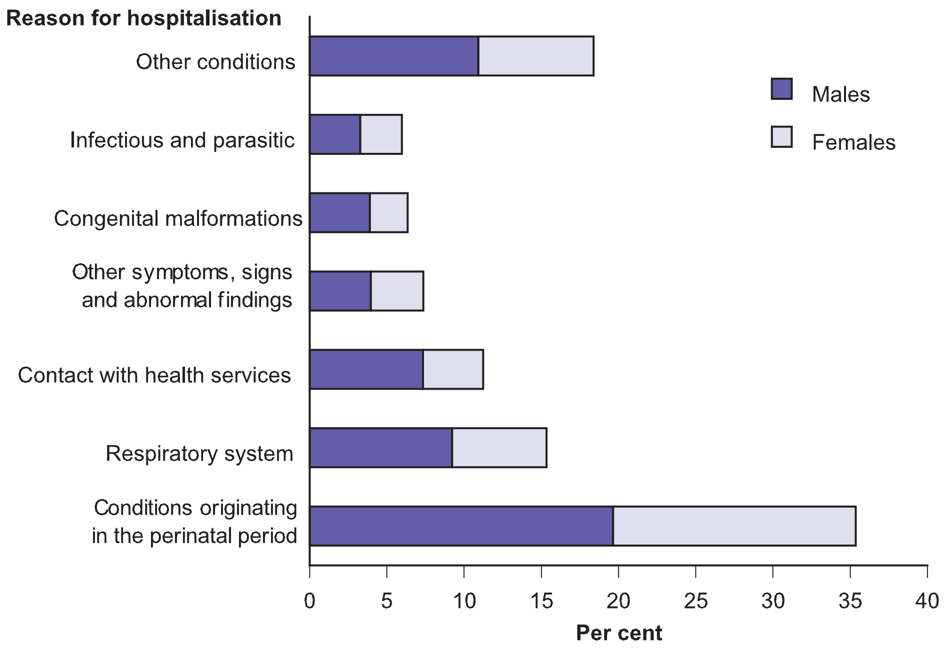
Notes

1. ICD-10-AM codes P00–P99, J00–J99, Z00–Z99, ROO–R99, Q00–Q99, A00–B99, G00–G99, K00–K93, N00–N99, S00–T98, H60–H95, F00–F99, L00–L99, C00–D48, H00–H59, E00–E90, I00–I99, D50–D89 and M00–M99.
2. This total excludes 82 infants for whom there was no principal diagnosis, sex or external cause of injury recorded.

Source: AIHW National Hospital Morbidity Database.

- In 1999–00, conditions originating in the perinatal period were responsible for a high rate of hospitalisations of both male and female infants.
- Diseases of the respiratory system, which include asthma and respiratory diseases caused by infectious agents, were also responsible for a high level of infant hospitalisations.

Hospitalisation of infants by diagnosis according to the ICD-10-AM chapters as a proportion of all hospitalisations of infants is presented in Figure 4.10.



Note: 'Other conditions' include: nervous system, digestive system, genitourinary system, injury and poisoning, diseases of the ear, mental and behavioural disorders, diseases of the skin, neoplasms, diseases of the eye, endocrine, nutritional and metabolic diseases, diseases of the circulatory system, diseases of blood and blood-forming organs and diseases of the musculoskeletal system.

Source: AIHW National Hospital Morbidity Database [Table A4.9].

Figure 4.10: Reasons for hospitalisations of infants, 1999–00

- Conditions originating in the perinatal period were the most common reason for the hospitalisation of infants in 1999–00 (19,684.8 hospitalisations per 100,000 infants). These conditions accounted for 35% of all hospitalisations of infants.
- Hospitalisations for respiratory diseases, which include asthma and respiratory diseases caused by infectious agents, accounted for 15%.
- Hospitalisations for congenital malformations and for infectious and parasitic diseases each accounted for 6%.

Aboriginal and Torres Strait Islander infants

Hospitalisation rates for Aboriginal and Torres Strait Islander infants are presented by diagnosis according to ICD-10-AM chapter (Table 4.6).

Table 4.6: Reasons for hospitalisations of Aboriginal and Torres Strait Islander and other Australian infants, 1999–00

	Number		Rate per 100,000 infants		
Diagnosis	**Indigenous Australians**	**Other Australians**	**Indigenous Australians**	**Other Australians**	**Rate ratio**
Conditions originating in the perinatal period	2,221	46,058	19,294.6	19,274.3	1.0
Respiratory system	3,032	18,083	26,340.0	7,567.3	3.5
Contact with health services	609	14,837	5,290.6	6,209.0	0.9
Other symptoms, signs and abnormal findings	514	9,623	4,465.3	4,027.0	1.1
Congenital malformations	304	8,374	2,641.0	3,504.3	0.8
Infectious and parasitic	1,223	7,017	10,624.6	2,936.5	3.6
Nervous system	86	6,137	747.1	2,568.2	0.3
Digestive system	199	5,384	1,728.8	2,253.1	0.8
Genitourinary system	139	2,703	1,207.5	1,131.1	1.1
Injury and poisoning	225	2,597	1,954.7	1,086.8	1.8
Ear diseases	141	1,552	1,224.9	649.5	1.9
Mental and behavioural disorders	11	1,447	95.6	605.5	0.2
Skin diseases	240	1,131	2,085.0	473.3	4.4
Neoplasms	33	837	286.7	350.3	0.8
Eye diseases	21	676	182.4	282.9	0.6
Endocrine, nutritional and metabolic	111	580	964.3	242.7	4.0
Circulatory system	25	346	217.2	144.8	1.5
Blood and blood-forming organs	24	316	208.5	132.2	1.6
Musculoskeletal system	26	220	225.9	92.1	2.5
Total	**9,184**	**127,918**	**79,784.6**	**53,530.9**	**1.5**

Note: This total excludes 2,410 infants for whom there was no principal diagnosis, sex, external cause of injury or Indigenous status recorded.

Source: AIHW National Hospital Morbidity Database.

- Rate ratios (Table 4.6) provide a means for comparing the hospitalisation rates of Aboriginal and Torres Strait Islander and other Australian infants.
- In 1999–00, Aboriginal and Torres Strait Islander infants were hospitalised most often for respiratory conditions, at a rate 3.5 times that of other Australian infants.
- Other conditions for which Indigenous infants were hospitalised at a higher rate than other Australian infants include skin diseases, endocrine, nutritional and metabolic diseases, infectious and parasitic diseases and diseases of the musculoskeletal system.

Infants in metropolitan, rural and remote areas

Table 4.7: Reasons for hospitalisations of infants in metropolitan, rural and remote areas, 1999–00

	Number			Rate per 100,000 infants		
Diagnosis	**Metropolitan**	**Rural**	**Remote**	**Metropolitan**	**Rural**	**Remote**
Conditions originating in the perinatal period	35,007	12,239	1,883	19,855.3	19,494.8	19,171.2
Respiratory system	12,413	6,682	2,185	7,040.4	10,643.3	22,246.0
Contact with health services	9,739	4,872	598	5,523.8	7,760.3	6,088.4
Other symptoms, signs and abnormal findings	7,295	2,457	475	4,137.6	3,913.6	4,836.1
Congenital abnormalities	6,171	2,264	292	3,500.1	3,606.2	2,972.9
Infectious and parasitic	4,963	2,309	991	2,814.9	3,677.9	10,089.6
Nervous system	5,355	791	99	3,037.2	1,259.9	1,007.9
Digestive system	3,953	1,507	207	2,242.1	2,400.4	2,107.5
Genitourinary system	2,001	720	142	1,134.9	1,146.8	1,445.7
Injury and poisoning	1,792	856	212	1,016.4	1,363.5	2,158.4
Ear diseases	1,145	488	117	649.4	777.3	1,191.2
Mental and behavioural disorders	1,341	113	7	760.6	180.0	71.3
Skin diseases	883	306	190	500.8	487.4	1,934.4
Neoplasms	714	157	17	405.0	250.1	173.1
Eye diseases	488	187	38	276.8	297.9	386.9
Endocrine, nutritional and metabolic diseases	390	192	112	221.2	305.8	1,140.3
Circulatory system	250	118	13	141.8	188.0	132.4
Blood and blood-forming organs	266	73	16	150.9	116.3	162.9
Musculoskeletal system	162	60	26	91.9	95.6	264.7
Total	**94,328**	**36,391**	**7,620**	**53,500.9**	**57,965.0**	**77,580.9**

Note: This total excludes 1,173 infants for whom there was no principal diagnosis, sex, external cause of injury or area of residence recorded.

Source: AIHW National Hospital Morbidity Database.

- In 1999–00, hospitalisation rates for some diagnosis chapters differed by area of residence. Rates for respiratory conditions, injury, infectious diseases (which include vaccine-preventable and other communicable diseases), endocrine, nutritional and metabolic disorders (which include diabetes and cystic fibrosis), and musculoskeletal conditions were far greater for infants in remote areas than for those in rural or metropolitan areas. Rates for nervous system problems (which include epilepsy and cerebral palsy), eye and ear disorders, and cancers were greater for those living in metropolitan areas than for those in rural or remote areas.
- Hospitalisation rates for children in remote areas are largely affected by the health status of Aboriginal and Torres Strait Islander children living in these areas.

Reasons for hospitalisation of children aged 1–14 years

A summary of the reasons for hospitalisations of children aged 1–14 years, by diagnosis according to the ICD-10-AM chapter, is presented in Table 4.8.

Table 4.8: Reasons for hospitalisations of children aged 1–14 years, 1999–00

	Number			Rate per 100,000 children		
Diagnosis	**Males**	**Females**	**Persons**	**Males**	**Females**	**Persons**
Respiratory system	48,433	34,626	83,059	2,611.5	1,959.7	2,294.2
Injury and poisoning	41,027	24,247	65,274	2,178.3	1,360.8	1,779.9
Digestive system	23,760	19,862	43,622	1,266.9	1,111.8	1,191.4
Ear diseases	19,204	13,369	32,573	1,033.9	757.3	899.2
Infectious and parasitic	16,164	14,599	30,763	873.8	831.3	853.1
Other symptoms, signs and abnormal findings	12,678	11,267	23,945	679.9	634.7	657.9
Contact with health services	14,711	8,074	22,785	786.7	453.5	624.4
Congenital abnormalities	9,358	5,289	14,647	503.0	298.7	403.5
Genitourinary system	9,002	4,001	13,003	481.0	224.9	356.3
Neoplasms	5,980	5,432	11,412	319.0	304.7	312.1
Skin diseases	6,346	5,020	11,366	337.5	281.1	310.0
Nervous system	5,784	4,519	10,303	310.3	254.7	283.2
Musculoskeletal system	5,008	4,368	9,376	265.0	242.4	254.0
Mental and behavioural disorders	5,689	3,401	9,090	300.1	187.6	245.3
Blood and blood-forming organs	4,275	2,421	6,696	227.9	135.4	182.8
Eye diseases	2,975	2,881	5,856	160.0	163.1	161.5
Endocrine, nutritional and metabolic diseases	2,483	2,811	5,294	132.0	156.7	144.0
Circulatory system	1,413	1,171	2,584	74.7	65.1	70.0
Pregnancy and childbirth	. .	341	341	. .	18.6	9.1
Conditions originating in the perinatal period	284	44	328	15.4	2.5	9.1
Total	**234,574**	**167,743**	**402,317**	**12,556.7**	**9,444.7**	**11,041.1**

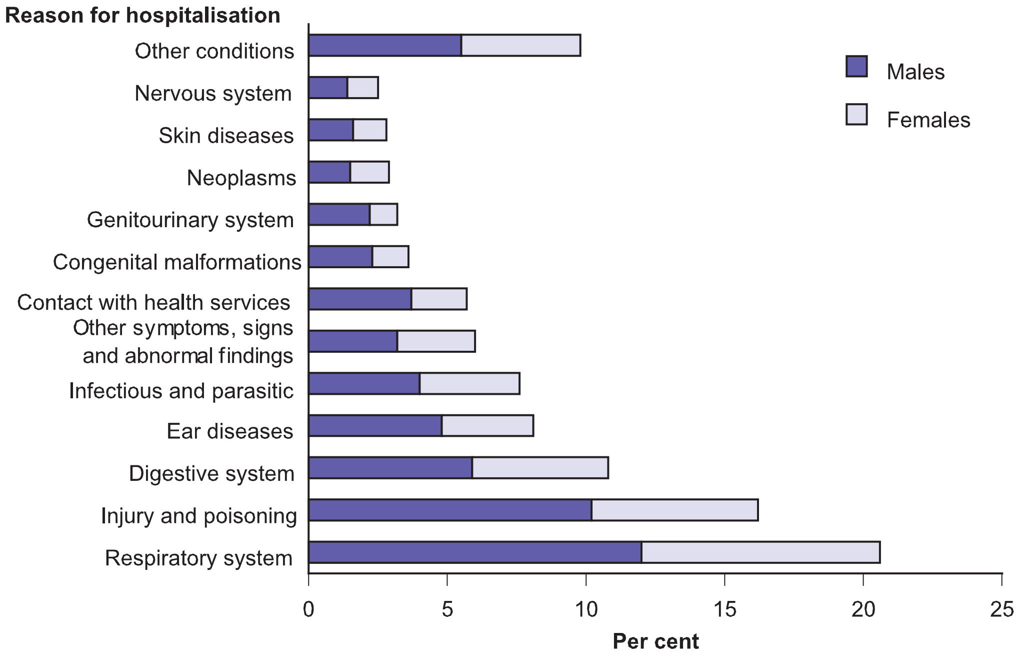
. . Not applicable

Note: This total excludes 443 children aged 1–14 years for whom there was no principal diagnosis, sex or external cause of injury recorded.

Source: AIHW National Hospital Morbidity Database.

- Hospitalisation rates for respiratory conditions (including asthma), injury and poisoning, diseases of the digestive system and ear diseases were high in 1999–00, ranging between 2,294.2 and 1,194.4 per 100,000 children.

Hospitalisations of children aged 1–14 years by diagnosis according to ICD-10-AM chapter as a proportion of all hospitalisations of children aged 1–14 years are shown in Figure 4.11.



Note: 'Other conditions' include: musculoskeletal system, mental and behavioural disorders, blood and blood-forming organs, eye diseases, endocrine, nutritional and metabolic diseases, circulatory system, pregnancy and childbirth, and conditions originating in the perinatal period.

Source: AIHW National Hospital Morbidity Database [Table A4.10].

Figure 4.11: Reasons for hospitalisations of children aged 1–14 years, 1999–00

- The highest proportion of all hospitalisations of children aged 1–14 years in 1999–00 was for diseases of the respiratory system, accounting for 21% of all hospitalisations in that age group. Injury and poisoning were also common causes of hospitalisation, accounting for 16%. Hospitalisations for diseases of the digestive system accounted for 11%.

Aboriginal and Torres Strait Islander children

Hospitalisation rates for Aboriginal and Torres Strait Islander children aged 1–14 years are presented by diagnosis according to ICD-10-AM chapter in Table 4.9.

Table 4.9: Reasons for hospitalisations of Aboriginal and Torres Strait Islander and other Australian children aged 1–14 years, 1999–00

	Number		Rate per 100,000 children		
Diagnosis	Indigenous Australians	Other Australians	Indigenous Australians	Other Australians	Rate ratio
Respiratory system	4,908	76,602	3,177.9	2,209.0	1.4
Injury and poisoning	3,132	61,153	2,084.3	1,738.4	1.2
Digestive system	1,658	40,969	1,091.9	1,166.7	0.9
Ear diseases	1,317	30,168	866.1	870.1	1.0
Infectious and parasitic	2,039	28,306	1,315.5	820.0	1.6
Other, symptoms, signs and abnormal findings	1,205	22,382	790.8	641.7	1.2
Contact with health services	886	21,521	590.0	615.4	1.0
Congenital malformations	337	14,099	220.3	405.5	0.5
Genitourinary system	633	12,177	417.5	348.0	1.2
Neoplasms	187	10,971	122.6	313.0	0.4
Nervous system	404	9,780	268.0	280.7	1.0
Skin diseases	1,460	9,728	963.1	276.3	3.5
Musculoskeletal system	444	8,755	302.1	247.1	1.2
Mental and behavioural disorders	406	8,622	281.7	242.3	1.2
Blood and blood-forming organs	103	6,528	67.6	185.9	0.4
Eye diseases	181	5,551	119.2	159.9	0.7
Endocrine, nutritional and metabolic diseases	262	4,983	171.8	141.1	1.2
Circulatory system	188	2,352	127.9	66.4	1.9
Conditions originating in the perinatal period	7	320	4.4	9.3	0.5
Pregnancy, childbirth and the puerperium	124	214	88.9	5.9	15.0
Total	**19,881**	**375,181**	**13,071.9**	**10,742.5**	**1.2**

Note: This total excludes 7,698 children aged 1–14 years for whom there was no principal diagnosis, sex, external cause of injury or Indigenous status recorded.

Source: AIHW National Hospital Morbidity Database.

- Overall, Aboriginal and Torres Strait Islander children aged 1–14 years were hospitalised in 1999–00 at a rate 1.2 times higher than that of other Australian children of the same age.
- For skin diseases, diseases of the circulatory and respiratory systems and infectious and parasitic diseases, Aboriginal and Torres Strait Islander children had higher hospitalisation rates than other Australian children.
- The greatest difference in rates was seen in the pregnancy and childbirth chapter. Aboriginal and Torres Strait Islander girls were hospitalised for conditions associated with pregnancy and childbirth at a rate 15.0 times that of other Australian girls.

Children in metropolitan, rural and remote areas

Table 4.10: Reasons for hospitalisations of children aged 1–14 years in metropolitan, rural and remote areas, 1999–00

	Number			Rate per 100,000 children		
Diagnosis	**Metropolitan**	**Rural**	**Remote**	**Metropolitan**	**Rural**	**Remote**
Respiratory system	52,274	25,353	5,028	2,095.5	2,556.8	3,603.0
Injury and poisoning	40,195	20,454	4,282	1,603.7	1,998.8	3,136.6
Digestive system	27,347	13,951	2,065	1,091.2	1,376.1	1,495.1
Ear diseases	23,012	8,166	1,289	922.8	820.5	925.9
Infectious and parasitic	19,296	9,163	2,075	774.7	931.1	1,488.5
Other symptoms, signs and abnormal findings	15,428	7,028	1,363	617.1	700.0	985.3
Contact with health services	15,450	6,131	998	617.4	608.0	726.2
Congenital abnormalities	10,592	3,506	353	424.1	351.5	253.7
Genitourinary system	8,368	3,837	710	334.3	380.7	514.1
Neoplasms	7,021	3,020	1,256	280.0	295.4	913.8
Skin diseases	8,223	2,752	258	328.3	271.8	189.3
Nervous system	7,314	2,550	390	292.7	253.4	282.1
Musculoskeletal system	6,063	2,766	484	241.2	266.4	360.8
Mental and behavioural disorders	7,844	1,038	184	311.6	99.0	141.5
Diseases of blood and blood-forming organs	5,219	1,274	167	208.2	125.9	121.2
Diseases of the eye	4,065	1,489	255	162.9	150.0	185.0
Endocrine, nutritional and metabolic diseases	3,456	1,486	319	137.7	144.3	230.4
Circulatory system	1,590	772	184	63.3	74.2	137.0
Pregnancy and childbirth	165	95	80	6.5	8.8	63.1
Conditions originating in the perinatal period	267	58	3	0.4	27.3	41.1
Total	**263,189**	**114,889**	**21,743**	**10,523.9**	**11,418.6**	**15,754.6**

Note: This total excludes 2,939 children aged 1–14 years for whom there was either no principal diagnosis, sex, external cause of injury or area of residence recorded.

Source: AIHW National Hospital Morbidity Database.

- In 1999–00, hospitalisation rates for some diagnosis chapters differed by area of residence. Rates for respiratory conditions and injury and poisoning were greater for children aged 1–14 years in remote areas than for those in rural or metropolitan areas. Rates for infectious diseases (which include vaccine-preventable and other communicable disease) were also greater for those in remote areas.
- The highest difference among geographical areas was for girls, in the chapter of diagnoses associated with pregnancy and childbirth. Hospitalisation rates for girls in remote areas were 10 times those for girls in metropolitan areas, and 7 times those for girls in rural areas.
- Hospitalisation rates for children in remote areas are largely affected by the health status of Aboriginal and Torres Strait Islander children living in these areas.

Age-specific reasons for hospitalisation

The most frequent diagnoses for hospitalisation differed between age groups (Table 4.11).

Table 4.11: Most frequent diagnoses for hospitalisation of children aged 0–14 years, 1999–00

		Number			Rate per 100,000 children		
Age (years)	Diagnosis	Males	Females	Persons	Males	Females	Persons
<1	Other pre-term infants	7,608	6,530	14,138	5,920.3	5,354.0	5,644.5
	Acute bronchiolitis, unspecified	4,290	2,855	7,145	3,338.3	2,340.8	2,852.6
	Transient tachypnoea of newborn	2,625	1,519	4,144	2,042.7	1,245.4	1,654.5
	Neonatal jaundice, unspecified	2,386	1,748	4,134	1,856.7	1,433.2	1,650.5
	Acute bronchiolitis due to respiratory syncytial virus	2,383	1,654	4,037	1,854.4	1,356.1	1,611.8
1–4	Asthma, unspecified	4,685	2,505	7,190	894.5	504.2	704.5
	Diarrhoea and gastroenteritis of presumed infectious origin	3,568	3,211	6,779	681.2	646.3	664.2
	Chronic mucoid otitis media	3,977	2,547	6,524	759.3	512.6	639.2
	Acute obstructive laryngitis [croup]	4,576	1,908	6,484	873.7	384.0	635.3
	Dental caries, unspecified	3,394	2,954	6,348	648.0	594.5	622.0
5–9	Chronic tonsillitis	3,597	3,697	7,294	526.6	570.2	547.8
	Dental caries	2,649	2,441	5,090	387.8	376.5	382.3
	Chronic mucoid otitis media	2,650	1,881	4,531	388.0	290.1	340.3
	Asthma, unspecified	2,112	1,338	3,450	309.2	206.4	259.1
	Fracture of lower end of both ulna and radius	1,523	977	2,500	223.0	150.7	187.8
10–14	Chronic tonsillitis	1,219	2,167	3,386	180.1	336.3	256.3
	Impacted teeth	1,120	1,860	2,980	165.5	288.6	225.5
	Acute appendicitis, unspecified	1,553	946	2,499	229.5	146.8	189.1
	Asthma, unspecified	1,158	890	2,048	171.1	138.1	155.0
	Fracture of lower end of both ulna and radius	1,500	502	2,002	221.6	77.9	151.5

Notes

1. Z38.0 'Singleton, born in hospital' was excluded from this analysis.
2. Z41.2 'Routine and ritual circumcision' was excluded from this analysis because, although it is a reason for hospitalisation, it is not a disease or condition.
3. ICD-10-AM codes P07.3, J21.9, P22.1, P59.9, J21.0, J45.9, A09, H65.3, J05.0, K02.9, J35.0, K02.9, H65.3, J45.9, S52.6, J35.0, K01.1, K35.9, J45.9, S52.6.

Source: AIHW National Hospital Morbidity Database.

- Among infants, the most common diagnosis for hospitalisation in 1999–00 was 'other pre-term infants' (babies born between 28 and 37 weeks gestation).
- For children aged 1–4 years, asthma (unspecified) was the most common reason for hospitalisation. Infectious diseases, such as diarrhoea and gastroenteritis, and otitis media, were also common diagnoses.
- Among children aged 5–9 years and 10–14 years, chronic tonsillitis was associated with the highest hospitalisation rates. Problems with oral health (dental caries and impacted teeth) were also common diagnoses. Asthma continued to be a frequent reason for hospitalisation in these age groups. Also, fracture of the arm featured in both age groups as a common diagnosis.

Procedures

Once admitted to hospital, children may undergo specific procedures. These can be performed to treat the principal diagnosis for hospitalisation or additional diagnoses, or for exploratory or diagnosis purposes, which may be related to the principal diagnosis or an additional diagnosis (AIHW 1999a). Procedure chapters are shown in Table 4.12.

Table 4.12: Procedures undertaken during hospitalisations of children aged 0–14 years, 1999–00

	Males			Females		
Procedure	Number	Rate	Per cent of procedures	Number	Rate	Per cent of procedures
Miscellaneous	27,672	1,428.8	14.4	21,311	1,158.7	16.1
Musculoskeletal	22,724	1,118.7	11.9	14,589	759.0	11.1
Dermatological and plastic	18,354	929.6	9.6	14,254	760.2	10.8
Nose, mouth and pharynx	17,349	865.7	9.0	14,623	764.5	11.1
Ear and mastoid process	18,529	930.5	9.7	12,687	670.1	9.6
Digestive	15,450	778.4	8.1	8,750	459.9	6.6
Dental	11,236	559.8	5.9	11,183	584.3	8.5
Allied health interventions	10,820	550.5	5.6	9,009	481.0	6.8
Male genital organs	18,207	928.6	9.5	. .	. .	0.0
Imaging	8,360	422.2	4.4	6,247	333.1	4.7
Eye and adnexa	4,043	204.4	2.1	3,676	195.8	2.8
Chemotherapeutic and radiation oncology	3,788	188.6	2.0	3,087	162.0	2.3
Cardiovascular	3,545	180.5	1.8	3,271	174.9	2.5
Respiratory	4,083	213.4	2.1	2,718	149.8	2.1
Nervous	3,210	163.7	1.7	2,464	132.0	1.9
Urinary	3,205	161.2	1.7	2,125	111.9	1.6
Blood, blood-forming organs	913	45.6	0.5	696	36.7	0.5
Gynaecological	. .	. .	. .	926	48.0	0.7
Endocrine	157	7.9	0.1	155	8.1	0.1
Breast	97	4.8	0.1	107	5.6	0.1
Obstetric	. .	0.0	0.0	114	5.8	0.1

. . Not applicable.

Note: ICD-10-AM code blocks 1820–1899, 1360–1579, 1600–1718, 370–422, 300–333, 850–1011, 450–490, 2050–2140, 1160–1203, 1940–2016, 160–256, 1780–1799, 600–767, 520–569, 1–86, 1040–1128, 800–817, 1230–1299, 110–129, 1740–1759, 1330–1347.

Source: AIHW National Hospital Morbidity Database.

- The most common group of procedures which affected children in 1999–00 were 'miscellaneous procedures'. Within this chapter, the most common procedures were other oxygen enrichment, injection of antibiotics, and gastric gavage.
- The next most common group was musculoskeletal procedures. Within this chapter, the most common procedures were closed reduction of fractures of the radius or ulna (arm).
- Dermatological and plastic procedures were also common, with the most common procedures within this chapter being other phototherapy and repair of wound or skin.

'Miscellaneous procedures' were also the most common procedures among Aboriginal and Torres Strait Islander children. The next most common were allied health interventions, which include interventions such as physiotherapy and social work. Rates for these interventions for Indigenous children were over twice those for other Australian children.

The greatest difference between Aboriginal and Torres Strait Islander children and other Australian children was seen among girls aged 10–14 years, with regard to obstetric procedures. These procedures were reported for Aboriginal and Torres Strait Islander girls at a rate 27 times that for other Australian girls.

For the majority of procedure chapters, rates were comparable between children in remote, rural and metropolitan areas, with some exceptions. Rates for cardiovascular procedures in metropolitan areas were nearly twice the rates for those in remote areas. Hospitalisations with allied health interventions for children in remote areas were 1.6 times the rates for those in metropolitan and rural areas. Hospitalisation rates for children in remote areas for dental procedures were also 1.6 times the rates for those in metropolitan areas. The greatest difference in rates for any procedure was in obstetric procedures. The rate among girls in remote areas for obstetric procedures was 18 times the rate for girls in metropolitan areas, and 14 times the rate for girls in rural areas.

5. Disability

Children with severe disabilities may be in good health, but may have long-term activity limitations and participation restrictions, which they and their parents and carers must cope with.[1] Childhood disability can create serious financial hardship for parents and carers; they can have difficulty taking up employment that enables them to care for the child, which in turn reduces their ability to afford the additional care needed for their child. Parents of children with a disability can often be excluded from normal social activities outside the home. A disability affects the overall wellbeing of the parents, the child and their siblings.

This chapter presents information on the prevalence of disability among Australian children. The information is derived from the 1998 ABS Survey of Disability, Ageing and Carers. Disability is defined by the ABS as the presence of one or more of 17 restrictions, limitations or impairments which had lasted, or were likely to last, for a period of 6 months or more. Children with a disability can also have a core activity restriction, if the disability limits their ability to some degree to perform tasks in relation to self-care, mobility, communication, schooling and/or employment. There are four levels of core activity restriction: profound, severe, moderate and mild. People with a profound restriction are not able to do, or always need help with, a core activity. Those with a severe restriction may sometimes need help with a core activity, may have difficulty understanding or being understood by others, or may use sign language more easily than spoken communication. People with a moderate restriction need no help but have difficulty with a core activity, while those with a mild restriction need no help and have no difficulty with core activities, but may have other difficulties, for example with walking long distances, using public transport, walking up and down stairs or bending to pick up an object from the floor (ABS 1999a).

Prevalence of disability and core activity restriction

The indicator for the prevalence of disability is the number of children aged 0–14 years with a disability (with and without specific core activity restriction) as a rate per 1,000 children aged 0–14 years.

In 1998, based on the ABS definition of disability, it was estimated that approximately 296,000 children aged 0–14 years had a disability (Table 5.1). The rate of disability was estimated to be about 75.4 per 1,000 children aged 0–14 years.

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1. In 1998, the ABS used the term ‘activity restriction’ for what is called ‘activity limitation’ by WHO.

Table 5.1: Estimated number of children aged 0–14 years with a disability, 1998

		Total with specific core activity restriction[a]		Total without specific core activity restriction		Total with disability	
	Age (years)	Number	Rate per 1,000 children	Number	Rate per 1,000 children	Number	Rate per 1,000 children
Males	0–4	21,973	33.5	8,290	12.6	30,263	46.1
	5–9	72,901	107.5	5,167	7.6	78,068	115.2
	10–14	72,614	108.9	11,831	17.7	84,445	126.6
	0–14	*167,486*	*83.1*	*25,289*	*12.6*	*192,775*	*95.7*
Females	0–4	9,249	14.8	7,813	12.5	17,062	27.7
	5–9	43,033	67.0	4,903	7.6	47,936	74.7
	10–14	33,041	51.7	5,538	8.7	38,579	60.3
	0–14	*85,322*	*44.5*	*18,254*	*9.6*	*103,576*	*54.1*
Persons	**0–14**	**252,809**	**64.2**	**43,542**	**11.2**	**296,351**	**75.4**

(a) 'Specific core activity restriction' includes restrictions in self-care, mobility, communication and schooling or employment.

Note: Estimates of 9,300 or less have an associated relative standard error of 25% or more.

Source: AIHW analysis of ABS 1998 Survey of Disability, Ageing and Carers unit record file.

- Overall in 1998, more boys were reported to have a disability than girls (95.7 per 1,000 compared with 54.1 per 1,000). In all age groups, boys had higher rates of disability and core activity restriction than girls.

Most children with a disability (252,809 children or 85%) had a core activity restriction. The proportion of core activity restriction was lowest among children under 5 years. This is largely due to the difficulties in identifying activity restriction in this age group.

While the prevalence of disability appears to have increased from 69.9 per 1,000 children in 1993 to 75.4 per 1,000 children in 1998, the two ABS disability surveys are not strictly comparable. In 1998, a severity assessment of core activity restriction for children under 5 years of age was introduced, leading to the identification of an estimated 28,100 children aged 0–4 with a severe or profound core activity restriction. In addition, a change in the wording of a survey question from 'slow at learning or understanding' in the 1993 survey to 'difficulty in learning or understanding' in the 1998 survey is thought to have encouraged more reporting of intellectual and developmental disabilities among children aged 0–14 years.

The estimated prevalence of disability and activity restriction by area of residence is presented in Table 5.2.

Table 5.2: Children aged 0–14 years with a disability in capital cities and the balance of States/ Territories, 1998 (rate per 1,000 children)

		Total with specific core activity restriction		Total without specific core activity restriction		Total with disability	
	Age (years)	**Capital city**	**Balance of States/ Territories**	**Capital city**	**Balance of States/ Territories**	**Capital city**	**Balance of States/ Territories**
Males	0–4	29.5	40.0	8.1(a)	20.0(a)	37.6	60.1
	5–9	100.4	118.5	9.5(a)	4.7(b)	109.9	123.2
	10–14	108.0	110.2	17.0(a)	18.8(a)	125.0	129.0
	0–14	*79.1*	*89.4*	*11.5*	*14.5*	*90.6*	*103.9*
Females	0–4	16.5(a)	12.1(a)	7.8(a)	20.2(a)	24.3	32.3(a)
	5–9	63.3	72.9	9.9(a)	4.2(b)	73.1	77.0
	10–14	46.5	59.5	8.8(a)	8.4(b)	55.4	68.0
	0–14	*42.1*	*48.1*	*8.8*	*11.0(a)*	*50.9*	*59.0*
Persons	**0–14**	**61.0**	**69.3**	**10.2**	**12.8**	**71.2**	**82.1**

(a) Estimates have an associated relative standard error of 25% or more.

(b) Estimates have an associated relative standard error of 50% or more.

Source: AIHW analysis of ABS 1998 Survey of Disability, Ageing and Carers unit record file.

- The overall disability rate in 1998 was higher for children not living in capital cities than for those living in capital cities (82.1 compared with 71.2 per 1,000). This was due to higher rates of specific core activity restriction for children not living in capital cities (69.3 versus 61.0).
- The rates for both sexes were higher for children not living in capital cities than for those living in capital cities.

The indicator for the prevalence of severe or profound core activity restriction is the number of children aged 0–14 years with severe or profound core activity restriction as a rate per 1,000 children.

Table 5.3: Types of restriction of children aged 0–14 years with a disability, 1998 (rate per 1,000 children)

	Age (years)	Profound / severe core activity restriction	Moderate core activity restriction	Mild core activity restriction	Schooling or employment restriction only(a)	Total number with specific core activity restriction
Males	0–4	31.0	2.5(c)	—	—	21,973
	5–9	65.1	7.6(b)	21.7	13.2(b)	72,901
	10–14	49.5	9.7(b)	23.0	26.7	72,614
	0–14	*48.7*	*6.6*	*15.0*	*19.9*	*167,486*
Females	0–4	11.6(b)	3.2(c)	—	—	9,249(b)
	5–9	38.7	4.8(b)	9.8(b)	13.7(b)	43,033
	10–14	23.1	2.7(c)	8.8(b)	17.1	33,041
	0–14	*24.6*	*3.6(b)*	*6.3*	*15.4*	*85,322*
Persons	**0–14**	**37.0**	**5**	**11**	**17.7**	**252,809**

(a) These rates are for children aged 5–14 years. The estimates of children with schooling restriction include children with schooling restriction only and with no restriction in core activities. Some children with a mild, moderate, severe or profound restriction may also have schooling restriction.

(b) Estimates have an associated relative standard error of 25% or more.

(c) Estimates have an associated relative standard error of 50% or more.

Source: AIHW analysis of ABS 1998 Survey of Disability, Ageing and Carers unit record file.

- Among children with specific activity restriction in 1998, the highest rates were for children with profound or severe restriction (37.0 per 1,000).
- Disability status varied by age. Children aged 5–9 years had the highest rate of profound/severe activity restriction (around 65.1 per 1,000 boys and 38.7 per 1,000 girls).

Main disabling condition

A person's main disabling condition was defined in the 1998 disability survey as 'a long-term condition identified by a person as the one causing the most problems' (ABS 1999a:69). The main disabling conditions reported for children aged 0–14 years are shown in Table 5.4.

Table 5.4: Main disabling condition of children aged 0–14 years with a disability, 1998

	Number			Rate per 1,000 children		
Main disabling condition	**Males**	**Females**	**Persons**	**Males**	**Females**	**Persons**
Intellectual & other mental[(a)]	100,973	31,023	131,996	50.0	16.1	33.5
Respiratory diseases	32,190	20,551	52,742	16.0	10.8	13.5
Diseases of ear	8,759	10,005	18,764	4.3	5.2	4.8
Nervous system diseases	9,518	7,715	17,234	4.7	4.0	4.4
Disease of eye	4,298	2,876	7,174	2.1	1.5	1.8
Other musculoskeletal disorder	2,298	3,163	5,460	1.1	1.6	1.4
Psychiatric[(b)]	2,578	1,020	3,598	1.3	0.5	0.9
Other circulatory diseases	1,561	1,412	2,973	0.8	0.7	0.8
Head injury/any other brain damage	1,031	1,028	2,059	0.5	0.5	0.5
Arthritis	781	626	1,407	0.4	0.3	0.4
Stroke	—	299	299	—	0.2	0.1
All other diseases and conditions[(c)]	28,788	23,857	52,645	14.4	12.5	13.5
Total	**192,776**	**103,575**	**296,351**	**95.7**	**54.1**	**75.4**

(a) Includes the group entitled 'Intellectual and developmental disorders' and 'Other mental and behavioural disorders'. The definition has changed since the 1993 survey and now includes Down syndrome.

(b) Includes the group entitled 'Psychoses/mood affective disorders' and 'Neurotic/stress-related /somatoform disorders' in ABS publications. The definition has changed since the 1993 survey.

(c) Includes other physical diseases and conditions such as spina bifida, neoplasms and diseases of urinary system, genital organs and breast.

Note: Estimates of 9,300 or less have an associated relative standard error of 25% or more, and estimates of 2,700 or less have an associated relative standard error of 50% or more.

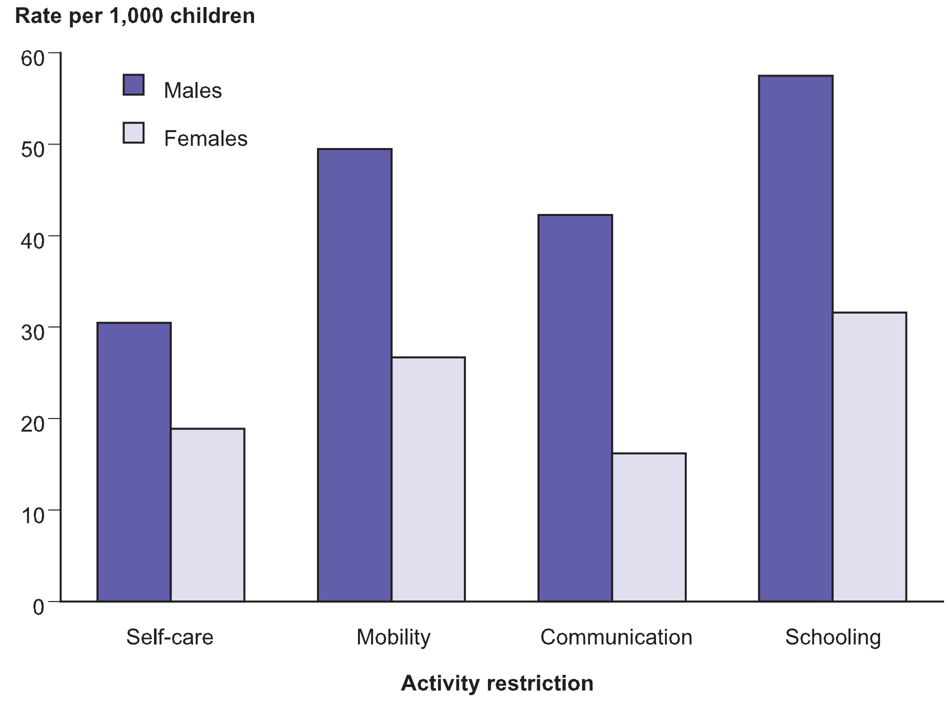
Source: AIHW analysis of ABS 1998 Survey of Disability, Ageing and Carers unit record file.

- In 1998, intellectual and other mental disorders were the most commonly reported main disabling condition of children aged 0–14 years, with a rate of 50.0 per 1,000 boys and 16.1 per 1,000 girls. These conditions were highest in the 10–14 years age group. The rate of disability due to intellectual and other mental disorders in 1998 was almost twice that reported in 1993 (33.5 compared with 16.3 per 1,000 children). Changes to a survey question in 1998 are thought to be responsible for the increased reporting of intellectual and developmental disabilities among children aged 0–14 years, especially among boys.
- Respiratory diseases were the second most frequently reported disabling condition of children aged 0–14 years, with a rate of 16.0 for boys, and 10.8 for girls. These diseases were most frequent among children aged 5–9 years and were more common for boys than for girls.
- Diseases of the nervous system and of the ear were also among the most frequently reported main disabling conditions.

A number of the conditions covered in this report cause disability. Asthma was estimated to be the main disabling condition for 49,800 children, accounting for 17% of all children with a disability. Congenital malformations were estimated to affect over 15,300 children, accounting for 5% of all children with a disability. Cerebral palsy and epilepsy were estimated to affect over 8,200 and 5,800 children, respectively, and accounted for 3% and 2% of all children with a disability, respectively. Accidents or injuries have caused some disabilities—this is estimated to be the case for over 7,100 children, and these account for 2% of all children with a disability.

Activity limitation

Children are regarded as having activity limitations if they have difficulty doing a particular activity, need help from another person or use an aid.



Note: Questions about schooling restriction were only asked of people aged 5 and over.

Source: AIHW analysis of ABS 1998 Survey of Disability, Ageing and Carers unit record file [Table A5.1].

Figure 5.1: Activity limitation rates for children aged 0–14 years, 1998

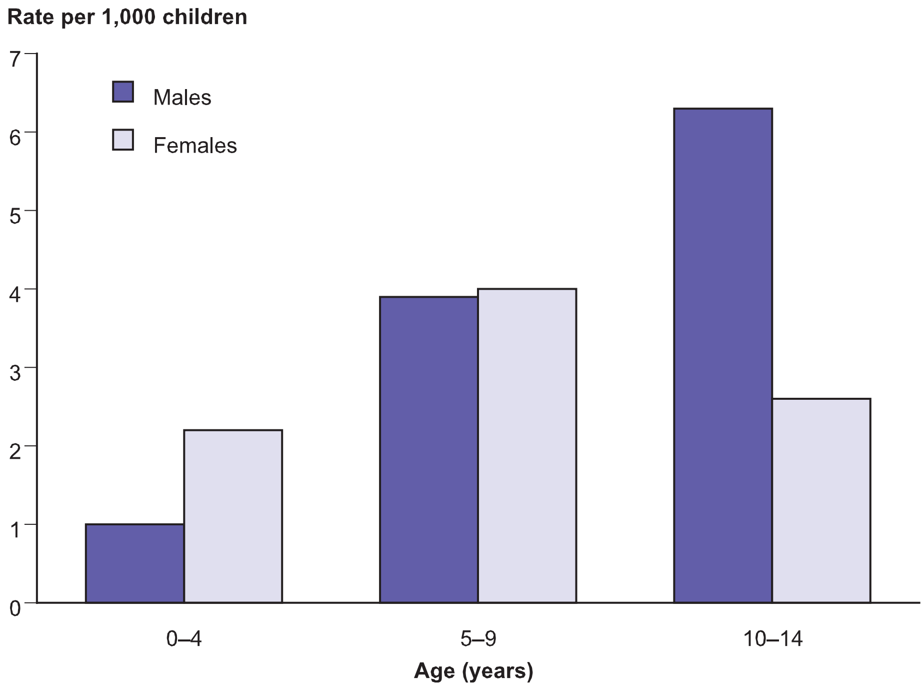
- In 1998, the most commonly reported activity restriction was schooling limitations, followed by mobility and communication limitations.
- The rates for all activity limitations were higher for boys than for girls.

Visual and hearing impairments

Sight and hearing problems can play a role in hindering children's development and their ability to learn.

Visual impairment

Overall in 1998, approximately 13,600 children were estimated to have some form of visual impairment or loss of sight (not corrected by glasses or contact lenses; ABS 1999a). Of these, 59% were boys and 41% were girls.



Note: Estimates for boys aged 0–9 years, and for girls aged 0–14 years, have an associated relative standard error of 50% or more. Estimates for boys aged 10–14 years have an associated relative standard error of 25% or more.

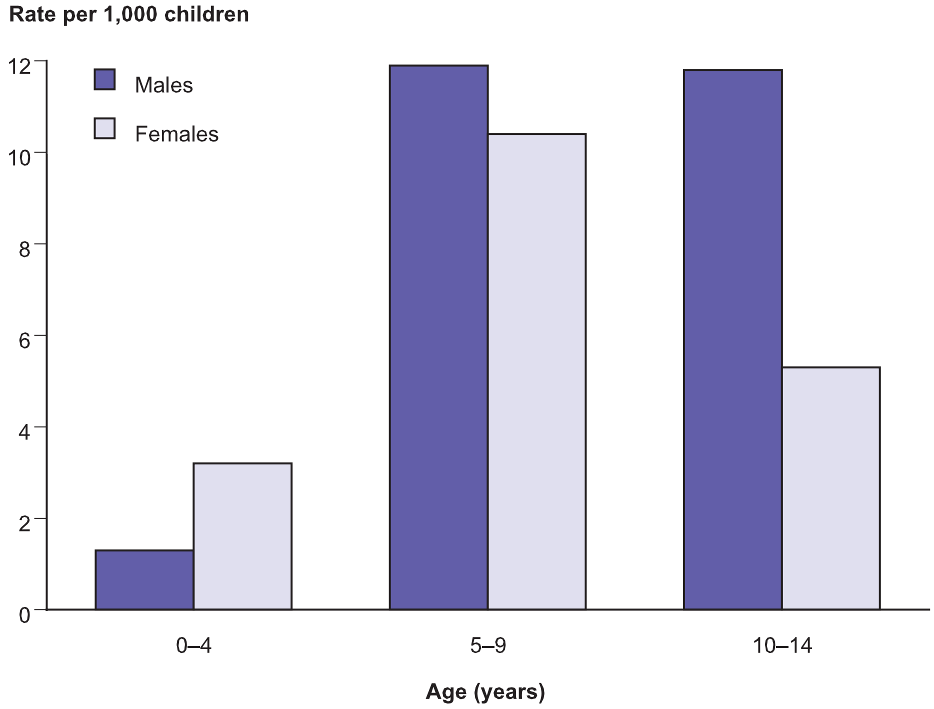
Source: AIHW analysis of ABS 1998 Survey of Disability, Ageing and Carers unit record file [Table A5.2].

Figure 5.2: Visual impairment rates for children aged 0–14 years, 1998

- In 1998, 3.5 per 1,000 children aged 0–14 years had some form of visual impairment. Visual impairment was highest among boys aged 10–14 years and girls aged 5–9 years.
- Most visual impairment was partial loss of vision. Of children aged 0–14 years, 3.3 per 1,000 were reported as having this condition, with higher levels for boys (3.7) than girls (2.9). Only 0.2 per 1,000 children had a total loss of vision.
- Only 8% of visual impairment was due to complications of surgery, injury and other external causes.

Hearing impairment

Hearing impairments (loss of hearing where communication is restricted, or where an aid is used to help with or substitute for hearing; ABS 1999a) are more common than visual impairments among children aged 0–14 years. In 1998, approximately 28, 800 children were reported as having some form of hearing impairment.



Note: Estimates for children aged 0–4 years have an associated relative standard error of 50% or more. Estimates for children aged 5–14 years have an associated relative standard error of 25% or more.

Source: AIHW analysis of ABS 1998 Survey of Disability, Ageing and Carers unit record file [Table A5.3].

Figure 5.3: Hearing impairment rates for children aged 0–14 years, 1998

- Of all children aged 0–14 years in 1998, 7.3 per 1,000 had some form of hearing impairment, with 0.6 per 1,000 children reporting a total loss of hearing and 6.7 per 1,000 a partial loss of hearing. Overall, hearing impairment was highest in the 5–9 age group (11.1).
- More boys than girls were reported as having a hearing impairment (8.3 compared with 6.3).
- The highest rates were for boys aged 5–9 and 10–14 years and girls aged 5–9 years.

Effect of disability on schooling

In 1998, it was estimated that approximately 241,000 out of 249,000 (97%) children aged 5–14 years with a disability attended school. The most common main disabling conditions for these children are intellectual disability and hearing impairments (AIHW: Moon et al. 1998).

Table 5.5: Schooling characteristics of children aged 5–14 years with a disability, 1998

	Number			Per cent		
Schooling characteristics	**Males**	**Females**	**Persons**	**Males**	**Females**	**Persons**
Schooling arrangements						
Mainstream school	141,830	80,525	222,355	90.6	95.3	92.3
No special class	101,840	61,549	163,389	65.1	72.9	67.8
Special class	39,990	18,976	58,966	25.6	22.5	24.5
Special school	14,649	3,961	18,610	9.4	4.7	7.7
Difficulties at school	98,881	49,496	148,377	63.2	58.6	61.6
Fitting in socially	43,971	15,947	59,918	28.1	18.9	24.9
Hearing difficulties	7,141	4,037	11,178	4.6	4.8	4.6
Sight difficulties	2,681	3,571	6,252	1.7	4.2	2.6
Other difficulties	45,088	25,941	71,029	28.8	30.7	29.5
Need time off school	9,799	6,432	16,231	6.3	7.6	6.7

Notes

1. Children may fall into more than one or none of these groups.
2. Estimates of 9,300 or less have an associated relative standard error of 25% or more, and estimates of 2,700 or less have an associated relative standard error of 50% or more.

Source: AIHW analysis of ABS 1998 Survey of Disability, Ageing and Carers unit record file.

- In 1998, most children with a disability were enrolled in mainstream schools (92.3%), 67.8% in no special class and 24.5% in a special class.
- A special school was attended by 7.7% of children attending school.
- Around 61.6% of children with a disability who attended schools were reported to have difficulties at school because of their disability.
- The most frequently reported difficulty was fitting in socially. Approximately 1 in 4 children (24.9%) with a disability were reported as having this difficulty.
- About 6.7% of the children needed time off school because of their disability.

6. Burden of disease

In the previous chapters, levels of mortality, morbidity and disability in children, as well as those associated with specific health conditions, were examined. Mortality attributable to a particular condition is a simple measure, which is routinely used in causes of death statistics. Until very recently, mortality rates in general, and infant mortality rates in particular, were used as proxy measures or indices of population health. It was generally agreed that a high infant mortality rate was an indicator of poor health, a high rate of illness and poor conditions of birth.

The problems associated with using mortality to measure population health are twofold. Not only does it ignore the impact of morbidity, but it also focuses policy towards reducing mortality only, rather than also looking at other health outcomes. As diseases vary in the extent to which they can cause either death or disability, mortality measures underestimate health outcomes that are severely disabling but do not result in death. A summary measure of population health that is based on mortality alone is not adequate to describe the impact of these health conditions. It is therefore important to use summary measures which can encompass mortality, morbidity and disability, and can therefore more appropriately influence the development of health strategies and health priorities, resource allocation and research. For these reasons there has been an interest at the international level in developing a single measure of the whole population's health that accounts for both mortality and morbidity attributable to disease.

The AIHW burden of disease and injury study provides a measure of the years of healthy life lost due to illness (AIHW: Mathers et al. 1999). This study combined information on the impact of premature death and non-fatal health outcomes for any particular disease or health condition, to produce a summary measure of population health known as the disability-adjusted life year (DALY). One DALY is one year of healthy life lost due to illness. DALYs are calculated as the sum of years lost due to premature mortality (YLL) and the equivalent years of healthy life lost due to poor health and disability (YLD).[1] The measure uses a severity weight for each health condition ranging from 0 to 1, where a health condition with a severity weight of 0 has no adverse impact, while one with a weight of 1 is equivalent to death.

There have been a number of criticisms of the original World Health Organization global burden of disease study, which may also apply to the AIHW burden of disease and injury study. One of the main criticisms is the appropriateness of applying disease severity weights derived from overseas research to people affected with disability in other countries, such as when Dutch severity weights were used in the AIHW study. The influence of societal and environment factors, such as the existence of assistance devices and the person's goals and expectations, has a great impact on hardship and therefore on quality of life. When disability is measured, the same disease condition can be either more or less severe, depending on these factors and the extent of discrimination (Reidpath et al. 2001). Another fundamental criticism is the lack of acceptability of the DALY concept to some groups of people with a disability with regard to differences in value between a healthy life and a life with a disability.

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[1] YLL are calculated for each life due to death as the difference between the age at death and the average life expectancy of a person of the same age as the person who died. YLD are calculated for a given condition by estimating the number of new cases of that condition in a specified time. For each condition the YLD is derived from the average duration of the condition and severity weights that quantify the equivalent of loss of healthy living with this condition.

This section provides an overview of the burden of disease due to illness and conditions affecting Australian children, using the summary measure DALYs. This information comes from the AIHW report on the burden of disease and injury in Australia (AIHW: Mathers et al. 1999). The classification of the diseases and conditions used in the AIHW burden of disease study is based on the International Classification of Diseases, 9th Revision (ICD-9).

The burden of mortality (YLL)

In 1996, Australians of all ages lost 1,348,233 years of life (YLL) due to premature mortality. The mortality burden for children aged 0–14 years made up 5% of the total mortality burden, with YLL for boys 39,642 (5% of the male mortality burden), and YLL for girls 28,808 (5% of the female mortality burden). This represented 19.7 YLL per 1,000 boys, 15.1 YLL per 1,000 girls, and 17.5 YLL per 1,000 children.

Table 6.1: Mortality burden (YLL) in children aged 0–14 years, 1996

Disease category	Males	Females	Children	Contribution to total burden (per cent of child YLL)
Conditions originating in the perinatal period	11,928	9,498	21,426	31.3
Congenital anomalies (malformations)	7,681	6,106	13,787	20.1
Injuries	7,518	4,087	11,605	17.0
Ill-defined conditions	3,731	2,819	6,550	9.6
Neoplasms	2,666	2,008	4,674	6.8
Nervous system and sense organ disorders	2,005	1,051	3,056	4.5
Infectious and parasitic diseases	1,093	558	1,651	2.4
Acute and chronic respiratory diseases	1,184	1,083	2,267	3.3
Endocrine and metabolic disorders	607	832	1,439	2.1
Cardiovascular disease	688	524	1,212	1.8
Diseases of the digestive system	360	94	454	0.7
Musculoskeletal diseases	—	91	91	0.1
Genitourinary diseases	31	58	89	0.1
Mental disorders	59	—	59	0.1
Skin diseases	—	—	—	—
Oral health	—	—	—	—
Nutritional deficiencies	—	—	—	—
Maternal conditions	. .	—	—	—
All causes	**39,642**	**28,808**	**68,450**	**100.0**
YLL per 1,000 children	**19.7**	**15.1**	**17.5**	**. .**

. . Not applicable.

Source: AIHW: Mathers et al. 1999.

- For children aged 0–14 years in 1996, conditions originating in the perinatal period were responsible for more years of life lost than any other cause (31.3% of the child mortality burden), with conditions originating in the perinatal period and congenital anomalies together responsible for 51.4% of the child mortality burden.
- Injuries were responsible for 17.0% of the child mortality burden.

The burden of disability (YLD)

In 1996, Australians of all ages lost 1,162,041 healthy years of life because of disability (YLD). The disability burden for children aged 0–14 years made up 13% of the total disability burden, with YLD in boys 81,157 (14% of the male disability burden), and in girls 63,754 (11% of the female disability burden). This represented 40.5 YLD per 1,000 boys, 33.5 YLD per 1,000 girls, and 37.1 YLD per 1,000 children.

Table 6.2: Disability burden (YLD) in children aged 0–14 years, 1996

Disease category	Males	Females	Children	Contribution to total burden (per cent of child YLD)
Acute and chronic respiratory diseases	26,752	21,590	48,342	33.4
Mental disorders	20,808	13,114	33,922	23.4
Congenital anomalies (malformations)	7,542	6,093	13,635	9.4
Injuries	7,611	4,553	12,164	8.4
Conditions originating in the perinatal period	4,674	4,341	9,015	6.2
Nervous system and sense organ disorders	3,342	2,702	6,044	4.2
Infectious and parasitic diseases	2,028	2,054	4,082	2.8
Nutritional deficiencies	1,864	1,852	3,716	2.6
Endocrine and metabolic disorders	2,403	2,168	4,571	3.2
Musculoskeletal diseases	862	1,419	2,281	1.6
Skin diseases	765	1,064	1,829	1.3
Diseases of the digestive system	838	533	1,371	0.9
Cardiovascular disease	511	561	1,072	0.7
Oral health	499	473	972	0.7
Neoplasms	401	311	712	0.5
Genitourinary diseases	152	236	388	0.3
Ill-defined conditions	105	231	336	0.2
Maternal conditions	. .	9	9	<.1
All causes	**81,157**	**63,754**	**144,911**	**100.0**
YLD per 1,000 children	**40.5**	**33.5**	**37.1**	**. .**

. . Not applicable.

Source: AIHW: Mathers et al. 1999.

- Respiratory diseases (including asthma) were responsible in 1996 for more years of healthy life lost due to disability than any other cause (48,342 YLD, or 33.4% of the child disability burden).
- Mental disorders were also responsible for a high proportion of the child disability burden (23.4%).
- Congenital anomalies and injuries were responsible for 9.4% and 8.4% of the child disability burden, respectively.

Total burden of disease (DALYs)

In 1996, Australians lost 2,510,274 healthy years of life due to premature mortality or disability (DALYs). The burden of disease among children aged 0–14 accounted for 9% of the total burden of disease, with DALYs for boys 120,707 (9% of the male disease burden) and for girls 92,562 (8% of the female disease burden). This represented DALYs of 60.2 per 1,000 boys, 48.6 per 1,000 girls, and 54.5 per 1,000 children.

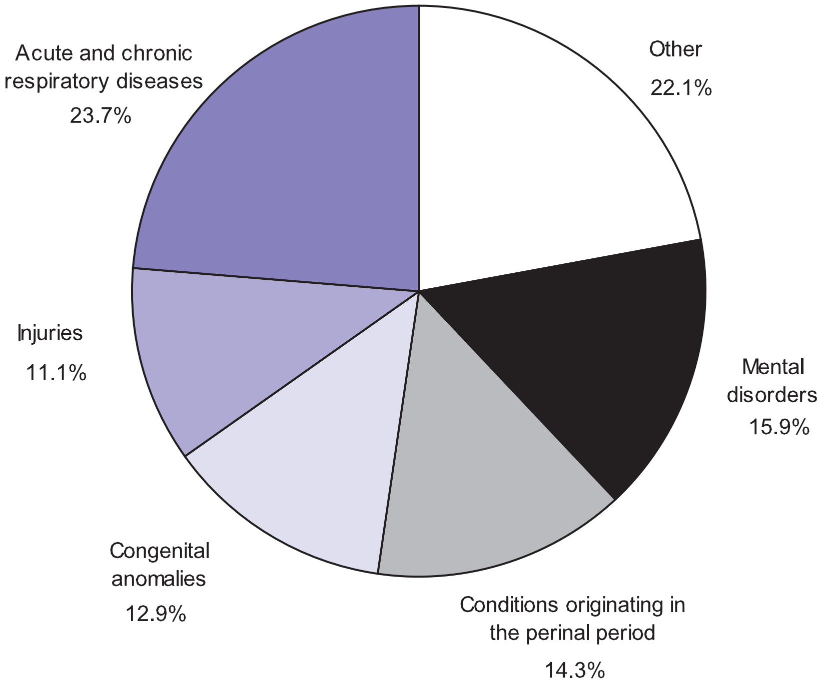
Table 6.3: Total burden of disease (DALYs) in children aged 0–14 years, 1996

Disease category	Males	Females	Persons	Per cent of total children
Acute and chronic respiratory diseases	27,935	22,673	50,608	23.7
Mental disorders	20,868	13,114	33,982	15.9
Conditions originating in the perinatal period	16,602	13,838	30,440	14.3
Congenital anomalies (malformations)	15,223	12,199	27,422	12.9
Injuries	15,129	8,640	23,769	11.1
Nervous system and sense organ disorders	5,347	3,753	9,100	4.3
Ill-defined conditions	3,836	3,051	6,887	3.2
Infectious and parasitic diseases	3,122	3,062	6,184	2.9
Neoplasms	3,067	2,318	5,385	2.5
Endocrine and metabolic disorders	3,010	3,000	6,010	2.8
Nutritional deficiencies	1,864	1,852	3,716	1.7
Musculoskeletal diseases	862	1,511	2,373	1.1
Cardiovascular disease	1,198	1,085	2,283	1.1
Skin diseases	765	1,064	1,829	0.9
Diseases of the digestive system	1,198	627	1,825	0.9
Oral health	499	473	972	0.5
Genitourinary diseases	182	294	476	0.2
Maternal conditions	. .	9	9	<.05
All causes	**120,707**	**92,562**	**213,269**	**100.0**
DALYs per 1,000 children	**60.2**	**48.6**	**54.5**	**. .**

. . Not applicable.

Source: AIHW: Mathers et al. 1999.

A graphical representation of the leading causes of disease burden in children aged 0–14 years is presented in Figure 6.1.



Source: AIHW: Mathers et al.1999 [Table A6.1].

Figure 6.1: Main causes of disease burden in children aged 0–14 years, 1996

- In 1996, acute and chronic respiratory diseases were responsible for the highest proportion of disease burden among children, accounting for 24% of the total burden.
- Mental disorders were also responsible for a high proportion of the disease burden, accounting for 16%.
- Conditions associated with infancy (conditions originating in the perinatal period and congenital anomalies) feature prominently in the leading causes of disease burden, accounting for 27%.

Table 6.4: Leading specific causes of disease burden (DALYs) in children aged 0–14 years, 1996

Disease	Males	Females	Persons	Per cent of total
1. Asthma	21,663	17,219	38,882	18.2
2. Low birthweight	6,892	6,075	12,967	6.1
3. Attention-deficit hyperactivity disorder	9,369	3,590	12,959	6.1
4. Birth trauma and asphyxia	4,524	3,589	8,113	3.8
5. Other chromosomal disorders	4,140	3,376	7,516	3.5
6. Congenital heart disease	3,911	3,263	7,174	3.4
7. Sudden infant death syndrome (SIDS)	3,731	2,819	6,550	3.1
8. Other congenital anomalies (malformations)	3,765	2,646	6,411	3.0
9. Depression	2,961	3,361	6,322	3.0
10. Other neonatal causes	3,458	2,805	6,263	2.9

Source: AIHW: Mathers et al. 1999.

- Asthma was the leading specific cause of disease burden for Australian children in 1996, accounting for 18.2% of their total disease burden.
- This was followed by low birthweight and attention-deficit hyperactivity disorder (each 6.1%).

Part III: Maternal, perinatal and infant conditions

Chapter 7: Maternal and infant conditions

Chapter 8: Sudden infant death syndrome (SIDS)

Chapter 9: Congenital malformations

7. Maternal and infant conditions

The overwhelming majority of pregnancies and confinements in Australia do not result in mortality or severe illness. However, pregnancy, childbirth and infancy remain a time of vulnerability for mothers and their children.

Illness in an infant's first few days of life, and problems associated with the health of the mother, can impact on a child's future health as well as their immediate wellbeing and development. Many factors which affect the health of infants and children have their origin in the womb. Smoking during pregnancy can have a number of detrimental effects on the foetus, including low birthweight, spontaneous abortion and stillbirth (Winstanley et al. 1995). Excessive alcohol intake can also have a number of effects on the foetus, such as increased heartbeat and dilation of the small blood vessels. At the most serious level, alcohol use can cause foetal alcohol syndrome, the main features of which are cranio-facial malformations, prenatal and/or postnatal growth deficiency, and evidence of damage to the central nervous system (National Institute on Alcohol Abuse and Alcoholism 2000). Maternal nutrition is also important for the developing foetus, with poor nutrition possibly leaving it susceptible to disease later in life (Barker 1998). Diseases and conditions linked to under-nourishment of the foetus include coronary heart disease, hypertension and non-insulin dependent diabetes. There is also now strong evidence that an adequate intake of folate, a B-group vitamin, by the mother before and in early pregnancy, can prevent up to 70% of neural tube birth defects (spina bifida and related defects) and possible other non-neural tube defects (Lumley et al. 2001).

The age of the mother can also impact on the development of the foetus. When a woman becomes pregnant at either a relatively early or late age, the risk of encountering complications increases. Older and younger mothers have a greater risk of giving birth to a baby that is pre-term and of a low birthweight. Babies of older mothers are at greater risk of perinatal death and are more likely to be born with a chromosomal disorder, while women who become pregnant in adolescence are more likely to miscarry (ABS 2001a).

Adequate antenatal care is another factor shown to be important for the health of the neonate (Gibson & Colley 1982; Dixon et al. 2000). Early antenatal care is a protective factor for babies. New South Wales statistics have shown that the proportion of mothers who commenced antenatal care before 20 weeks gestation in 1995 and 1999 has remained stable at about 86% (NSW Health 2001).

This chapter introduces some factors associated with pregnancy, including trends in fertility, maternal age at confinement, and maternal mortality. Primarily, however, it focuses on the health of the foetus and neonate from a gestational age of 20 weeks and up to 28 days following birth (the perinatal period), because this is the time of greatest risk for infants developing serious illness in the first year of life.

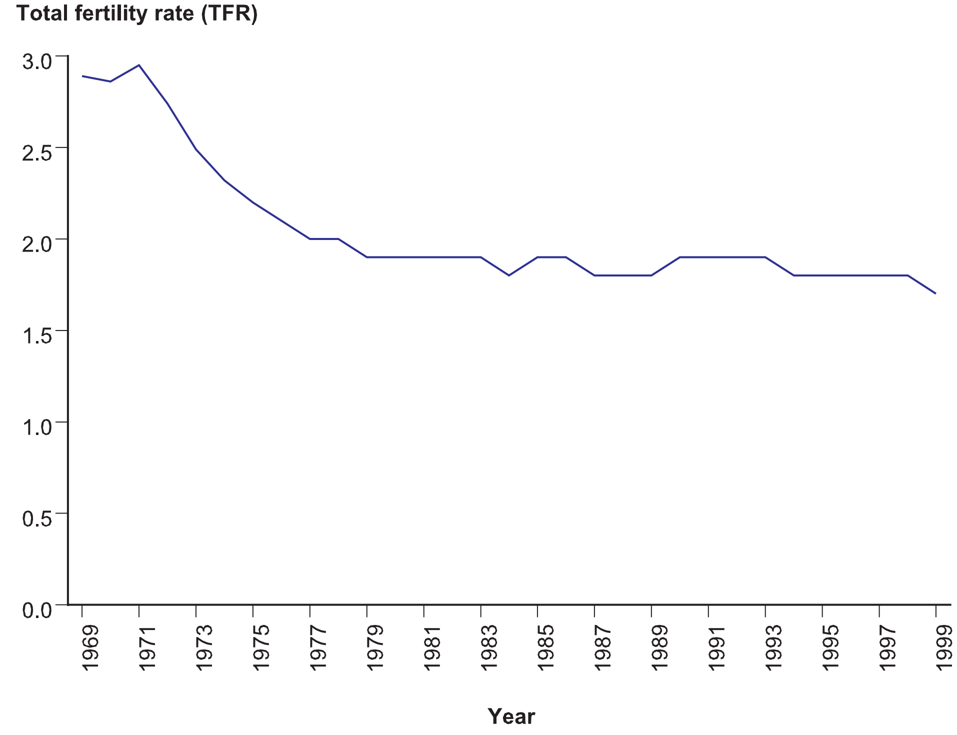
The data presented are drawn from a variety of sources, including reports from the AIHW National Perinatal Statistics Unit, the AIHW National Hospital Morbidity Database and the AIHW Mortality Database, as well as data from the ABS.

Maternal factors

Fertility

The level of child-bearing in a year is measured by the total fertility rate (TFR), which is the average number of children a woman would bear during her lifetime based on the rates of child-bearing experienced by women at each age in the reference year. For a population to replace itself, the TFR should be 2.1 births per woman. Following a peak of 3.6 children per woman in the early 1960s, the TFR of Australian women has been falling. Between 1969 and 1999, the TFR decreased by 41% (2.9 births per woman compared with 1.7) (Figure 7.1).

The major contributing factors to the decline in the TFR in Australia in the last three decades are an increase in the proportion of women who postpone child-bearing to a later age and therefore have fewer children, and an increase in the proportion of women who never have children. This shift towards later family formation has also been observed in other developed countries.

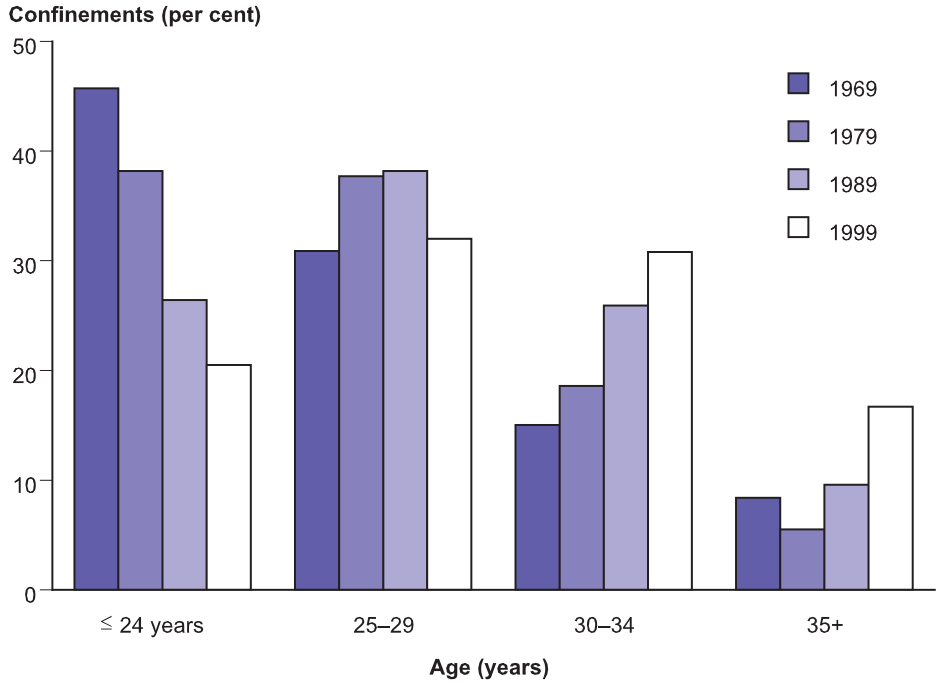


Source: ABS, various years (b) [Table A7.1].

Figure 7.1: Total fertility rate in Australia, 1969–99

- In 1999, the TFR was 1.7 children per woman. The TFR has been declining over the last three decades and has been below replacement since 1977.
- The sharpest decline occurred in the 1970s, when the TFR fell by 36%, from 3.0 in 1971 to 1.9 in 1979.

The fall in fertility has also been accompanied by a distinct change in the timing of births. The number of births distributed by maternal age is shown in Figure 7.2.



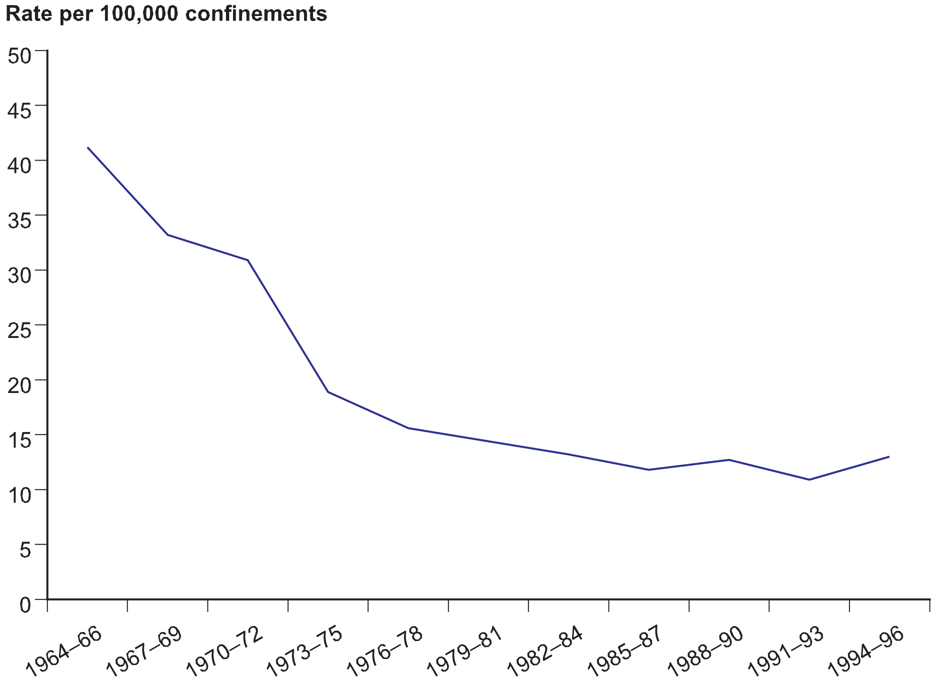
Source: ABS, various years (b) [Table A7.2].

Figure 7.2: Confinements by maternal age group, 1969–99

- In 1969, nearly 1 in 4 births (23%) were to women aged 30 years and over. By 1999, the proportion had almost doubled to 47%.
- The increase in the percentage of births to older women was accompanied by a decrease in the proportion of women aged 24 years or less giving birth (46% in 1969 compared with 21% in 1999).

Maternal mortality

Maternal deaths occur infrequently in Australia. Maternal mortality includes both direct maternal deaths (those resulting from obstetric complications of the pregnant state) and indirect maternal deaths (where the cause of death was a pre-existing disease, but which may have been aggravated by the effects of pregnancy). Trends in maternal mortality are presented in Figure 7.3.



Note: Maternal mortality includes both direct and indirect maternal deaths.

Source: AIHW NPSU & NHMRC 2001 [Table A7.3].

Figure 7.3: Maternal deaths, 1964–66 to 1994–96

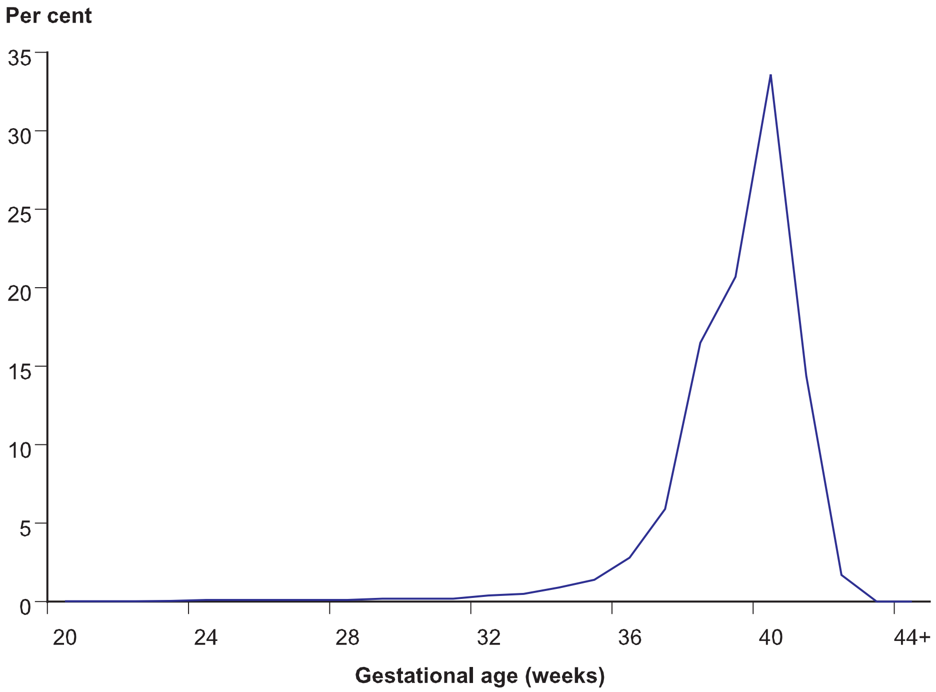
- Between 1964–66 and 1994–96, the maternal mortality rate decreased substantially, from 41.2 to 13.0 per 100,000 confinements per triennium (a 68% decrease).
- Over the 3 years 1994–96, there were 100 maternal deaths (13.0 per 100,000 confinements). The rate in 1994–96 represents an increase of 19% from the previous period (1991–93), when the rate was 10.9 per 100,000 confinements.
- The rate of direct maternal mortality in 1994–96 was 6.0 per 100,000 confinements (AIHW NPSU & NHMRC 2001). The main causes of direct maternal deaths were pulmonary embolism (17%), amniotic fluid embolism (17%) and pre-eclampsia (13%).

Factors associated with births

In Australia in 1999, there were 257,394 total births, based on birth notifications to the State and Territory perinatal collections. This section provides data on certain characteristics of these births, including gestational age, birthweight and Apgar score.

Gestational age and birthweight

Data on the outcomes of pregnancies are collected by the AIHW National Perinatal Statistics Unit (NPSU) and are published annually. Of the 257,394 total births in Australia in 1999 notified to the NPSU, the overwhelming majority were live births (232,514). Only 0.7% of all births were stillbirths (foetal deaths). Most live births occurred between 37 and 41 weeks of gestation. These births are known as full-term. Babies born before 37 weeks are known as pre-term. The distribution of births by gestational age in 1999 is shown in Figure 7.4.



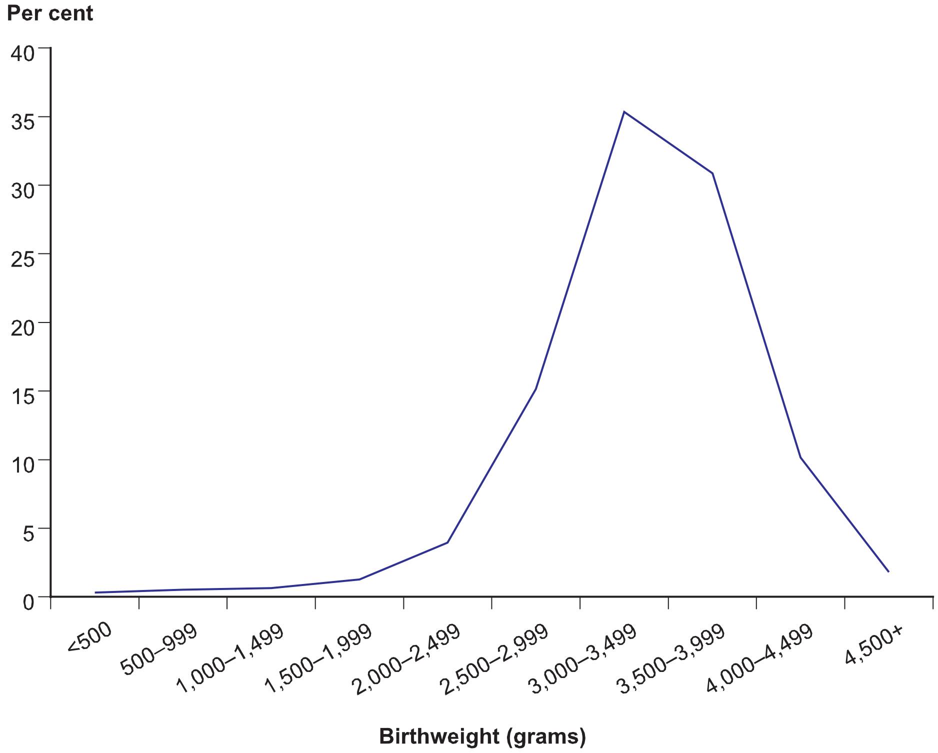
Note: Data for Tasmania unavailable for 1999; 1998 data used as an estimate.

Source: AIHW NPSU: Nassar et al. 2001 [Table A7.4].

Figure 7.4: Gestational age of live births, 1999

- In 1999, approximately 9 out of 10 (91%) live births were full-term babies born between 37 and 41 weeks of gestation.
- Just over half of live births (55% or 138,609 births) occurred at 39 or 40 weeks.
- Just over 7% (18,359 births) of babies were pre-term and less than 1% of live births had a gestational age of 30 weeks or less.
- Only 2% of live births were more than 41 weeks.

In 1999, the mean birthweight of live births in Australia was 3,373 grams. The mean birthweight was slightly lower (3,360 g) when all births (live births and stillbirths) were included (AIHW NPSU: Nassar et al. 2001). The distribution of babies' birthweight in 1999 is shown in Figure 7.5.



Note: Data for Tasmania unavailable for 1999; 1998 data used as an estimate.

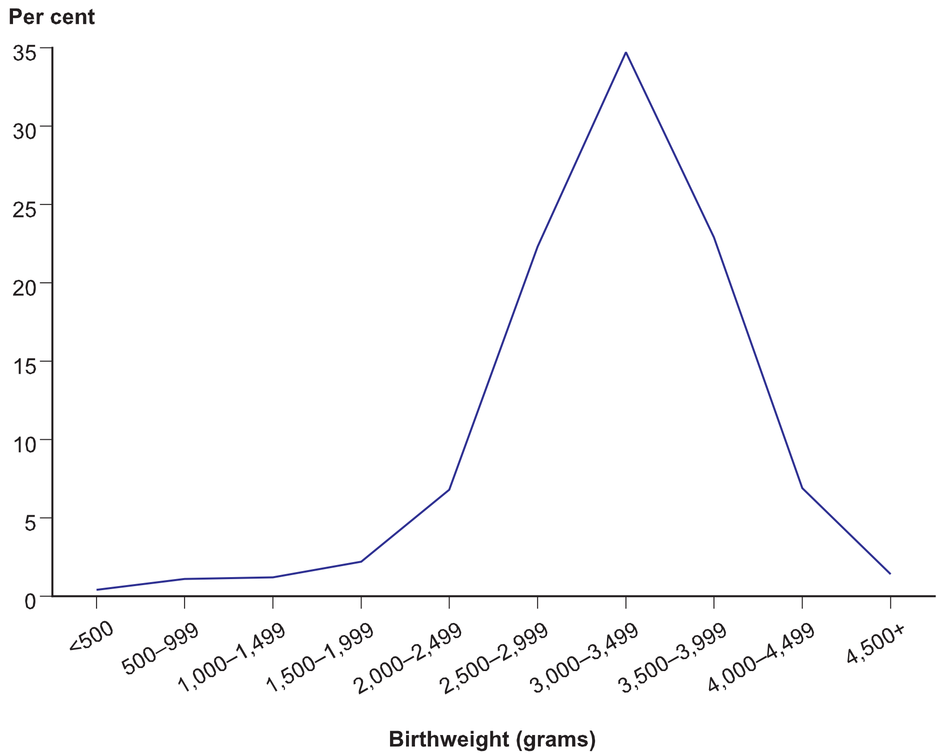
Source: AIHW NPSU: Nassar et al. 2001 [Table A7.5].

Figure 7.5: Birthweight of all babies (still and live births), 1999

- In 1999, approximately 7% of all babies (17,208 births) were born weighing less than 2,500 grams (including very and extremely low birthweight babies). Of all births, 2% were of babies of very low birthweight (<1,500 g) and 1% of extremely low birthweight (<1,000 g).
- The majority of births (93%) were of babies weighing 2,500 grams or more. Of all births, 170,316 babies or 66% weighed between 3,000 and 3,999 grams.

Birthweight of babies born to Indigenous mothers

In 1999, 8,930 babies were born to Indigenous mothers. The mean birthweight of all babies of Indigenous mothers in 1999 was 3,149 grams. This was 211 grams less than the Australian average of 3,360 grams in 1999.



Note: Data for Tasmania unavailable for 1999; 1998 data used as estimate.

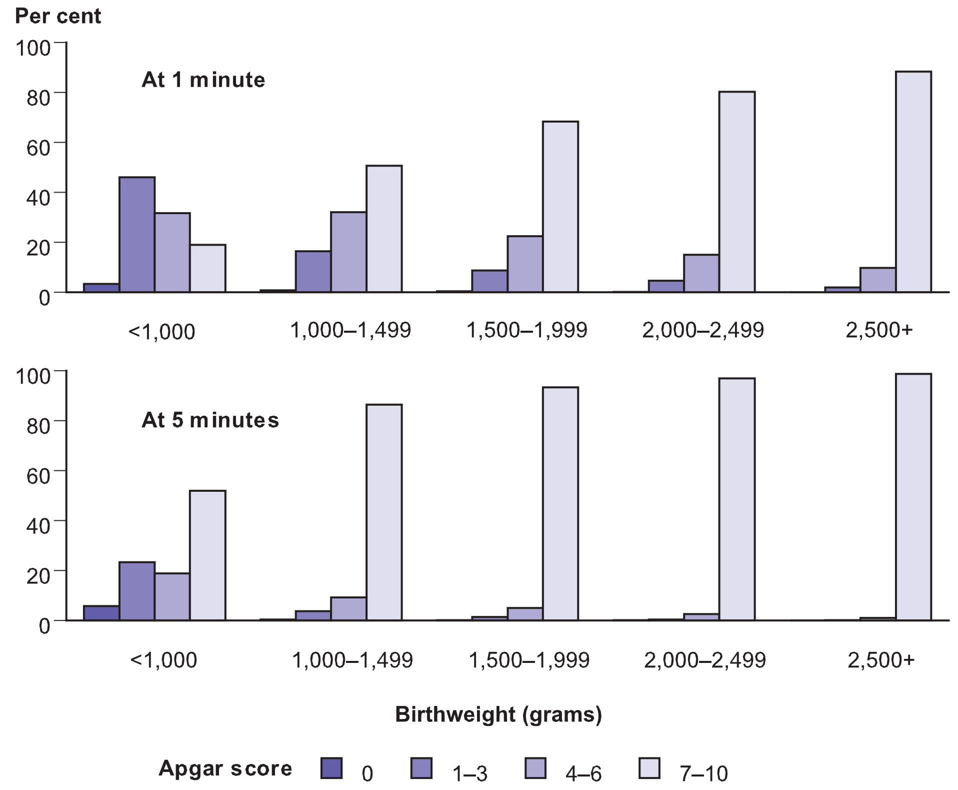
Source: AIHW NPSU: Nassar et al. 2001 [Table A7.6].

Figure 7.6: Birthweight of babies born to Indigenous mothers, 1999

- The majority of babies born to Indigenous mothers in 1999 (79%) were born weighing between 2,500 and 3,999 grams.
- A relatively high proportion (1,154 or 13%) weighed less than 2,500 grams at birth—almost double the proportion of low birthweight babies nationally.
- The remaining 8% weighed over 4,000 grams.

Apgar score

The Apgar score is a numerical score that is calculated in the first and fifth minute after birth. The score represents the sum of five two-point measures and is used as an assessment tool to test a baby's condition. In general, the higher the score, the better the condition of the baby. The five characteristics that make up the Apgar score are heart rate, breathing, colour, muscle tone and reflex irritability. Apgar scores are generally higher for babies 5 minutes after birth than 1 minute after birth. Apgar scores of singleton, live babies born in 1999 are presented in Figure 7.7.



Note: Data for Tasmania unavailable for 1999; 1998 data used as an estimate.
Source: AIHW NPSU: Nassar et al. 2001 [Table A7.7].

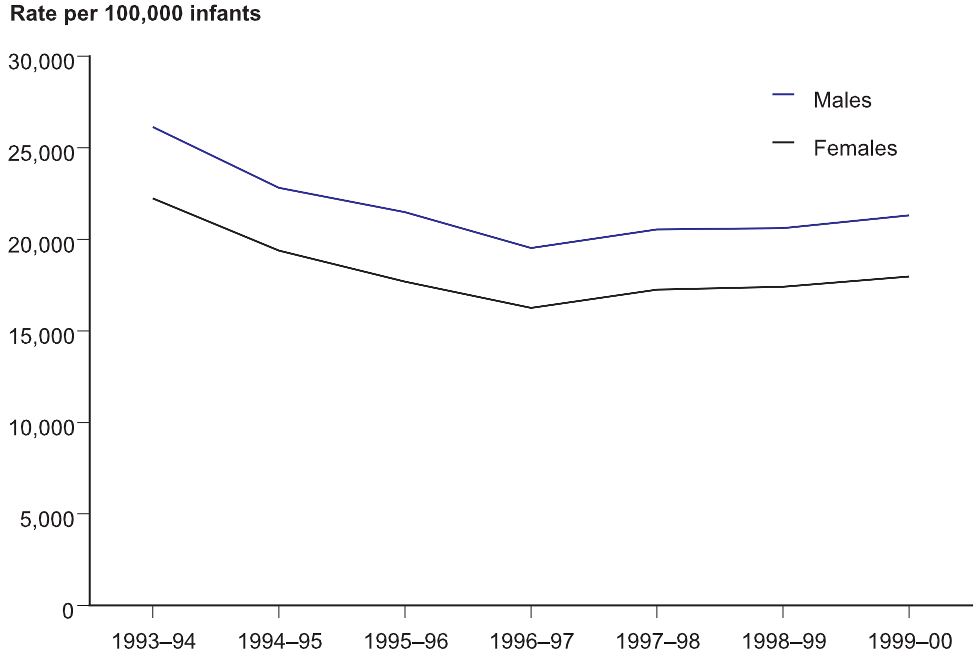
Figure 7.7: Apgar scores for live, singleton births at 1 and 5 minutes, 1999

- After 1 minute, almost half (49%) of babies who had an extremely low birthweight (less than 1,000 g) had a low Apgar score (between 0 and 3), compared with only 2% of babies weighing 2,500 grams or more.
- After 5 minutes, scores tended to improve, with almost all babies weighing 2,500 grams or more scoring 7–10 (99%). Just over half (52%) of extremely low birthweight babies scored between 7 and 10 on the Apgar scale after 5 minutes.

Conditions originating in the perinatal period

Hospitalisations

A large proportion (35%) of all infant hospitalisations is for conditions originating in the perinatal period. The indicator for hospitalisations for perinatal conditions is the number of hospitalisations of infants for conditions originating in the perinatal period as a rate per 100,000 infants (Figure 7.8). In 1999–00, there were 49,305 hospitalisations of infants for conditions originating in the perinatal period.



Note: ICD-9-CM codes 760–779 (1993–94 to 1997–98) and ICD-10-AM codes P00–P96 (1998–99 to 1999–00).
Source: AIHW National Hospital Morbidity Database [Table A7.8].

Figure 7.8: Hospitalisation rates for infants for conditions originating in the perinatal period, 1993–94 to 1999–00

- During the period 1993–94 to 1996–97, the hospitalisation rate for conditions originating in the perinatal period decreased from 24,236.3 to 17,935.9 per 100,000 infants. The rate then increased to 19,684.8 per 100,000 in 1999–00.
- Hospitalisation rates in 1999–00 for both male and female infants were 1.2 times lower than in 1993–94 (19,684.8 compared with 24,236.3). The difference could be due to changing admission practices or changes in the prevalence of these conditions.
- Between 1993–94 and 1999–00, male infants had a consistently higher hospitalisation rate than female infants.

Hospitalisation rates for babies for the most frequently reported conditions originating in the perinatal period in 1999–00 are presented in Table 7.1.

Table 7.1: Hospitalisation rates for infants for conditions originating in the perinatal period, 1999–00

	Rate per 100,000 infants			
Diagnosis blocks	Males	Females	Persons	Per cent
Disorders related to length of gestation and foetal growth	7,615.1	7,308.7	7,465.9	37.9
Respiratory and cardiovascular disorders specific to the perinatal period	5,818.4	3,880.6	4,874.8	24.8
Haemorrhagic and haematological disorders of foetus and newborn	2,549.3	2,051.4	2,306.8	11.7
Other disorders originating in the perinatal period	2,295.6	2,218.7	2,258.1	11.5
Transitory endocrine and metabolic disorders specific to foetus and newborn	1,273.9	1,065.1	1,172.2	6.0
Infections specific to the perinatal period	585.2	462.4	525.4	2.7
Conditions involving the integument and temperature regulation of foetus and newborn	512.8	371.4	444.0	2.3
Foetus and newborn affected by maternal factors and by complications of pregnancy, labour and delivery	332.3	330.4	331.4	1.7
Birth trauma	214.8	176.3	196.0	1.0
Digestive system disorders of foetus and newborn	116.7	103.3	110.2	0.6
Total	**21,341.0**	**17,968.3**	**19,684.8**	**100.0**

Note: ICD-10-AM codes P05–P08, P20–P29, P50–P61, P90–PP96, P70–P74, P35–P39, P80–P83, P00–P04, P10–P15, P75–P78.

Source: AIHW National Hospital Morbidity Database.

- In 1999–00, there were 49,305 hospitalisations of infants for conditions originating in the perinatal period.
- Disorders related to length of gestation and foetal growth (37.9%), respiratory and cardiovascular disorders (24.8%) and haemorrhagic and haematological (blood) disorders of the foetus and newborn (11.7%) accounted for 74.4% of hospitalisations for conditions originating in the perinatal period in 1999–00.
- The remaining 25.6% of hospitalisations for conditions originating in the perinatal period were for birth trauma, digestive disorders and endocrine and metabolic disorders.

The impact of conditions originating in the perinatal period can also be examined in terms of the length of time infants spent in hospital. In 1999–00, there were 440,203 hospital bed days for which conditions originating in the perinatal period were the principal diagnosis, with an average length of stay of 8.9 days. Conditions originating in the perinatal period were also responsible for an additional 34,890 bed days where they were not the main reason for hospital stay but where they had to be managed during hospitalisations for other conditions.

Aboriginal and Torres Strait Islander infants

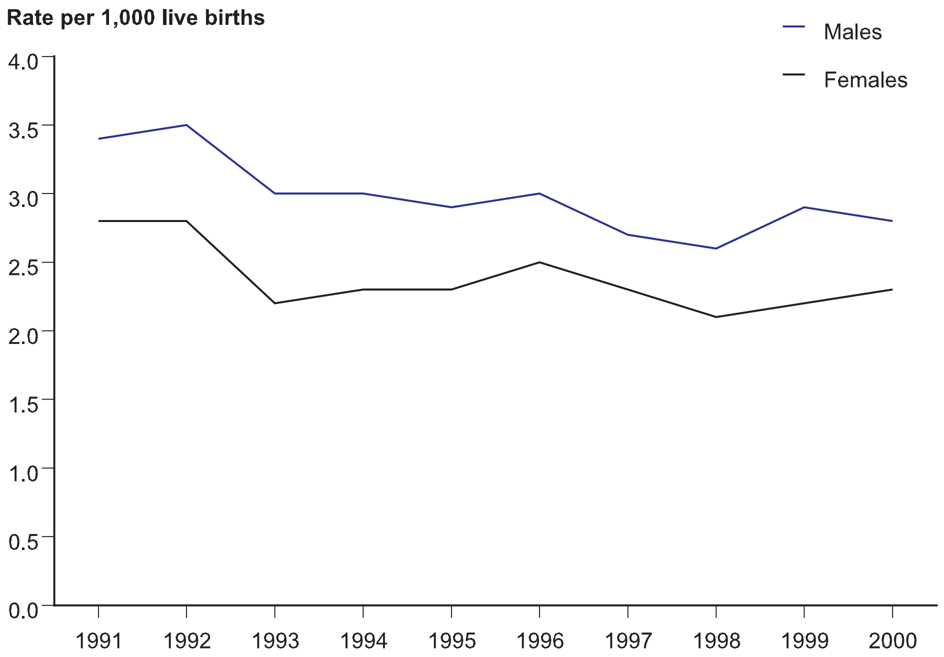
The hospitalisation rate for Aboriginal and Torres Strait Islander infants for conditions originating in the perinatal period was almost identical to that of other Australian infants. In 1999–00, there were 19,294.6 hospitalisations per 100,000 Indigenous infants compared with 19,274.3 per 100,000 other Australian infants. Indigenous males had a higher hospitalisation rate than Indigenous females.

Infants in metropolitan, rural and remote areas

There was little difference in the rate of hospitalisations for conditions originating in the perinatal period for babies who lived in different areas (19,855.3 per 100,000 infants in metropolitan regions compared with 19,494.8 in rural areas and 19,171.2 in remote areas).

Deaths

In 2000, nearly half (49%) of the deaths in infants were caused by conditions originating in the perinatal period. The indicator for deaths from conditions originating in the perinatal period is the number of deaths of infants from conditions originating in the perinatal period in a given year as a rate per 1,000 live births. The death rates for 1991–00 are presented in Figure 7.9. In 2000, 636 infants died from conditions originating in the perinatal period.



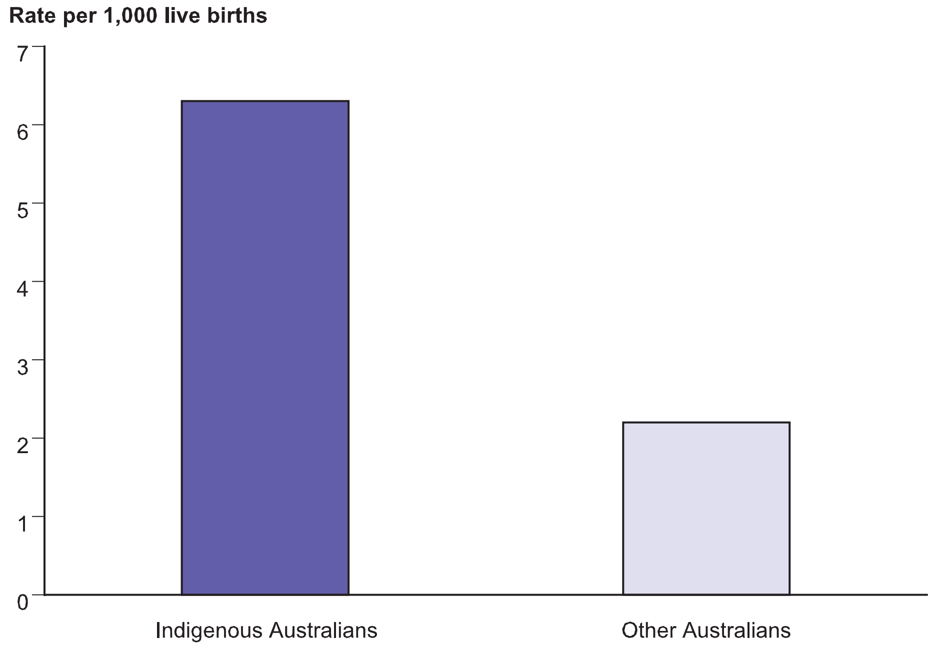
Note: ICD-9 codes 760–779 (1991 to 1996) and ICD-10 codes P00–P96 (1997 to 2000).

Source: AIHW Mortality Database [Table A7.9].

Figure 7.9: Death rates for infants from conditions originating in the perinatal period, 1991–00

- In 2000, the death rate from conditions originating in the perinatal period was 2.5 deaths per 1,000 live births. This rate was 19% lower than the rate of 3.1 deaths per 1,000 live births in 1991.
- Male infants had consistently higher death rates from conditions originating in the perinatal period than female infants.

Aboriginal and Torres Strait Islander infants



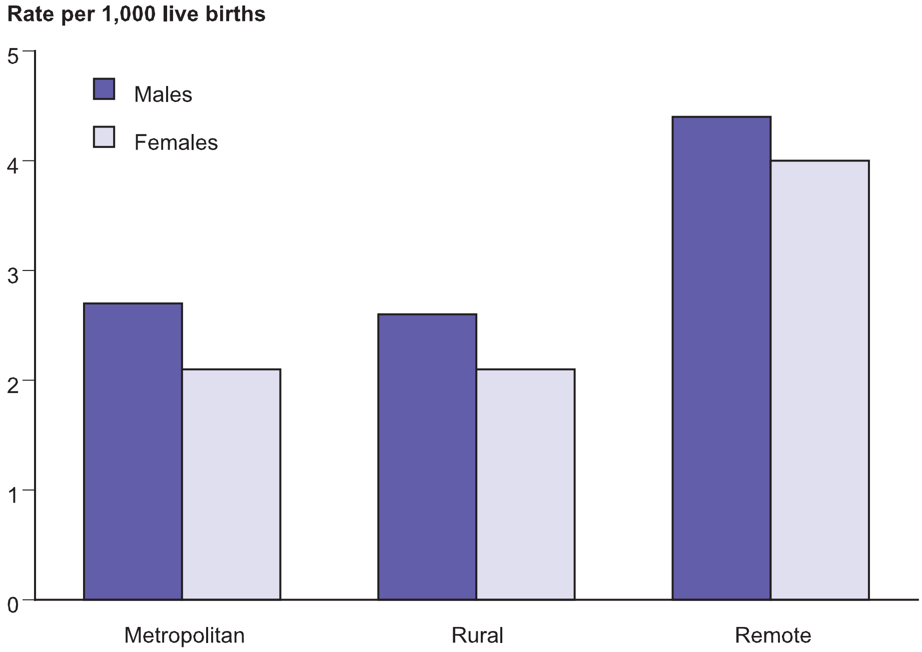
Notes
1. ICD-10 codes P00–P96.
2. Includes Qld, WA, SA and NT only.

Source: AIHW Mortality Database [Table A7.10].

Figure 7.10: Average death rates for Aboriginal and Torres Strait Islander and other Australian infants from conditions originating in the perinatal period, 1998–00

- Between 1998 and 2000 in Queensland, Western Australia, South Australia and the Northern Territory, 126 Aboriginal and Torres Strait Islander infants died from conditions originating in the perinatal period.
- The mortality rate was much higher for Indigenous infants than for other Australian infants in these States and Territories. For 1998–00, the average rate for Aboriginal and Torres Strait Islander infants was almost 3 times higher than the rate for other Australian infants (6.3 compared with 2.2 per 1,000 live births).

Infants in rural, remote and metropolitan areas



Note: ICD-10 codes P00–P96.

Source: AIHW Mortality Database [Table A7.11].

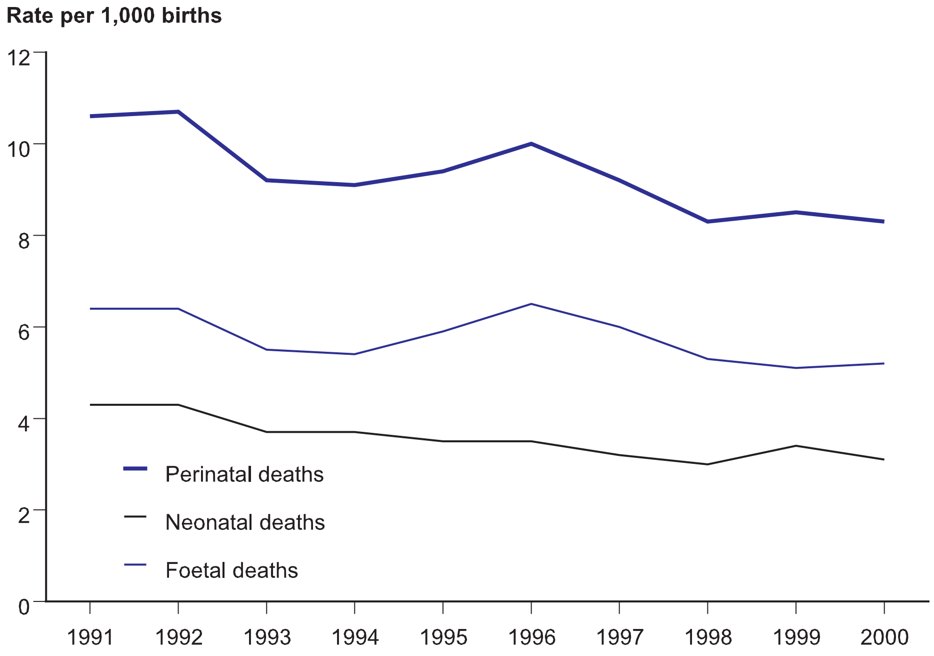
Figure 7.11: Average death rates for infants in metropolitan, rural and remote areas from conditions originating in the perinatal period, 1998–00

- Between 1998 and 2000, 1,279 infants in metropolitan areas, 438 in rural areas and 123 in remote areas died from conditions originating in the perinatal period.
- The average mortality rate in remote areas was 1.8 times the rate in rural and metropolitan areas (4.2 compared with 2.4 per 1,000 live births). There was little difference in the death rates for infants in metropolitan and rural areas.
- The higher death rate of infants in remote areas probably reflects the high number of Aboriginal and Torres Strait Islander children living in remote Australia, and their higher mortality rates.

Perinatal death rates

Perinatal deaths are composed of foetal and neonatal deaths from all causes. A foetal death, sometimes called a stillbirth, is defined in Australia as the death of a foetus of at least 20 weeks gestation or 400 grams weight before birth. Neonatal deaths are deaths of babies who are born alive, but who die within 28 days of birth.

The indicator for perinatal deaths is the number of foetal and neonatal deaths in a given year as a rate per 1,000 total births. The indicator for foetal deaths is the number of foetal deaths (i.e. babies that die before delivery, of at least 400 g or 20 weeks gestation) in a given year as a rate per 1,000 total births. The indicator for neonatal deaths (i.e. deaths before 29 days of age, of babies that were liveborn) is the number of neonatal deaths in a given year as a rate per 1,000 live births.



Notes

1. Data based on Australian definition of foetal death (400 g, or if birthweight is unavailable, gestational age of 20 weeks or more).
2. The denominator for rates of foetal deaths and perinatal deaths is total births (i.e. still and live births), while rates of neonatal deaths are calculated using live births only.

Source: ABS 2001b [Table A7.12].

Figure 7.12: Foetal, neonatal and perinatal death rates, 1991–00

- In 2000, there were 2,076 perinatal deaths. Of these, 37% (773) were neonatal deaths, and 63% (1,303) were foetal deaths.
- Between 1991 and 2000, the perinatal death rate fell from 10.6 to 8.3 per 1,000 total births. This represents a decrease of 25%.
- In 1991, the neonatal death rate was 4.3 per 1,000 total births, compared with 3.1 in 2000.
- The foetal death rate also fell between 1991 and 2000, from 6.4 to 5.2 per 1,000 total births.

Aboriginal and Torres Strait Islander infants

Table 7.2: Foetal, neonatal and perinatal death rates for Aboriginal and Torres Strait Islander and other Australian children,[(a)] 1996–98

	Indigenous Australians		Other Australians	
Type of perinatal death	Number	Rate per 1,000 births[(b)]	Number	Rate per 1,000 births[(b)]
Foetal deaths	328	13.2	5,055	6.8
Neonatal deaths	185	7.6	2,219	3.0
Perinatal deaths	513	20.7	7,274	9.8

(a) National estimate is based on data from all States and Territories.

(b) The denominator for rates of foetal deaths and perinatal deaths is total births (i.e. still and live births), while rates of neonatal deaths are calculated using live births only.

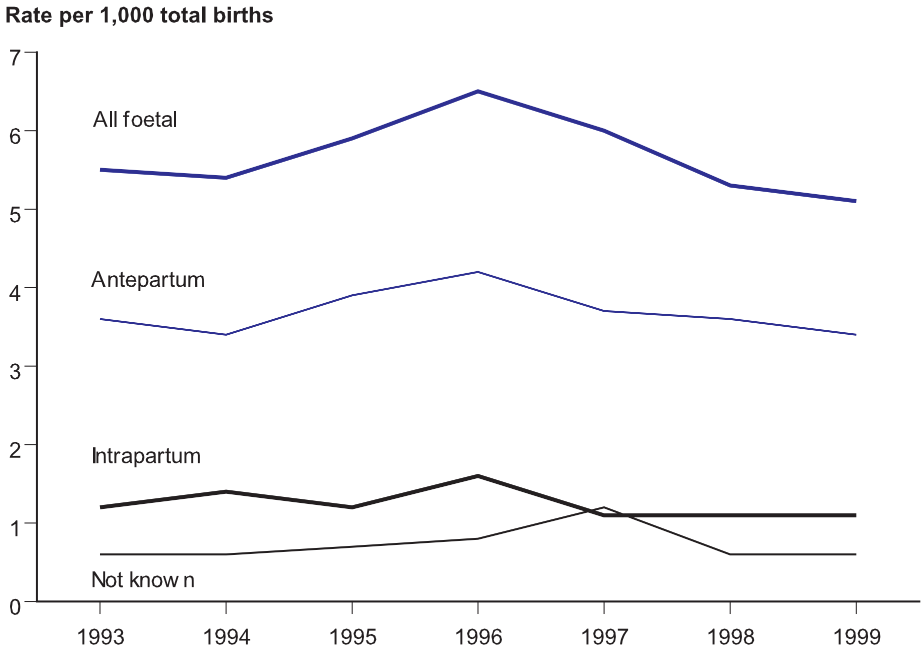
Note: Data based on Australian definition of foetal death (i.e. 400 g/ 20 weeks gestation).

Source: ABS & AIHW 2001.

- For 1996–98, the rate of perinatal mortality for babies born to Indigenous mothers was twice the rate for babies born to non-Indigenous mothers (20.7 per 1,000 total births compared with 9.8).
- The neonatal death rate for babies born to Indigenous mothers was 7.6 per 1,000 live births compared with 3.0 per 1,000 for other Australian babies. The foetal death rate was 13.2 per 1,000 total births compared with 6.8 per 1,000 other Australian births.

Time of foetal deaths

Foetal deaths are classified by the time of death. An ‘antepartum foetal death’ is a foetal death occurring before the onset of labour, while an ‘intrapartum foetal death’ is a foetal death occurring during labour. Types of foetal deaths between 1993 and 1999 are presented in Figure 7.13.



Note: Data based on Australian definition of foetal death (400 g, or if birthweight is unavailable, gestational age of 20 weeks or more).

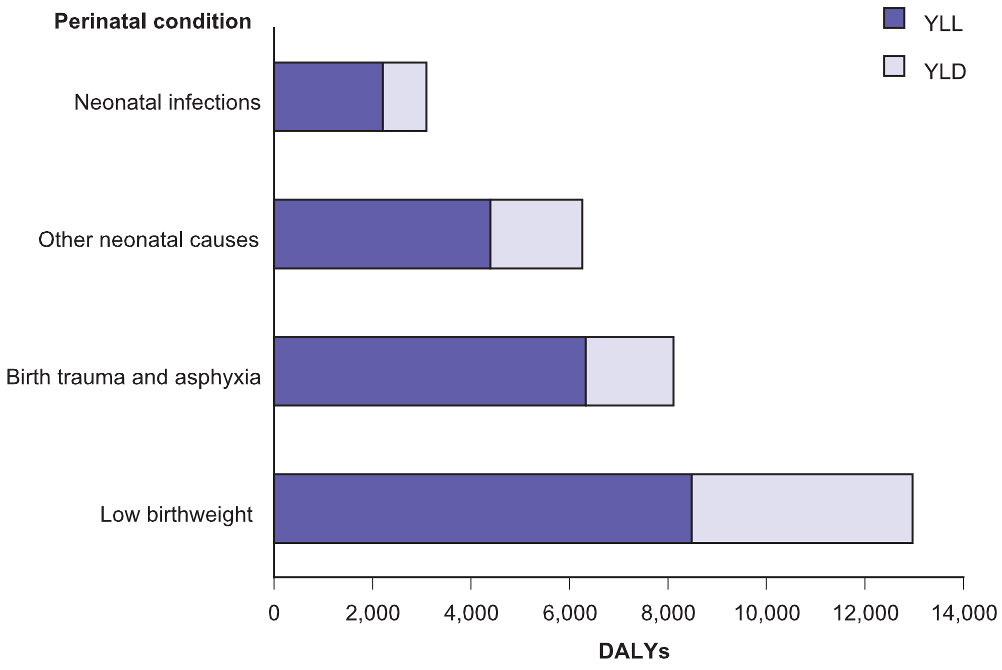
Source: AIHW NPSU: Nassar et al. 2001 [Table A7.13].

Figure 7.13: Type of foetal death, 1993–99

- The majority (67%) of foetal deaths in 1999 occurred before the onset of labour (antepartum).
- In 1999, 22% of foetal deaths occurred during labour (intrapartum).

Burden of disease

In 1996, conditions originating in the perinatal period were estimated to account for 14.3% of the total disease burden in children aged 0–14 years (30,440 DALYs). The total burden of disease was higher in boys (55% of total) than in girls (45%). These conditions caused a higher mortality burden (21,426 YLL; 70% of the total burden) than disability burden (9,015 YLD; 30%). The total disease burden from specific conditions originating in the perinatal period is shown in Figure 7.14.



Source: AIHW: Mathers et al. 1999 [Table A7.14].

Figure 7.14: Total burden of disease from conditions originating in the perinatal period in children aged 0–14 years, 1996

- Low birthweight was the main contributor to the burden from conditions originating in the perinatal period (27%) in 1996 and accounted for 6% of the total burden of disease in children.
- Birth trauma and asphyxia were also leading causes of disease burden in children among conditions originating in the perinatal period.

8. Sudden infant death syndrome (SIDS)

Sudden infant death syndrome (SIDS) can be defined as 'the sudden death of an infant under one year of age which remains unexplained after a thorough case investigation, including performance of a complete autopsy, examination of the death scene, and review of the clinical history' (Willinger et al. 1991:681).

SIDS was the main cause of death among infants for most of the 1990s. However, the rate of SIDS declined over the decade, especially in the early 1990s. The fall coincided with the 1991 National SIDS Council of Australia public health education campaign, 'Reducing the Risks of Cot Death'. The rate is higher in low (1,500–2,499 g) and very low (500–1,499 g) birthweight infants than in normal birthweight children (Sowter et al. 1999).

A number of factors are considered to increase the risk of SIDS, although many of them remain contentious. The two major risk factors are sleeping position and maternal smoking (American Academy of Pediatrics 2000). NHMRC guidelines (1991) suggest that babies be placed on their back, or on their side in such a way that they cannot roll onto their stomach, to sleep. This is also the first recommendation made by the National SIDS Council of Australia (2001a) for reducing SIDS. In Tasmania, changes in sleep position from the stomach to the back accounted for 70% of the decline in SIDS. Changes in the prevalence of other risk factors accounted individually for less than 10% of the fall in the Tasmanian rate, suggesting that while these factors helped to reduce deaths from SIDS, they were not significant contributors to the decrease (Dwyer et al. 1995).

Smoking during pregnancy, or smoking near the baby once it is born, has been shown to increase the risk of SIDS (NHMRC 1991). The risk increases with the number of cigarettes smoked near the baby, particularly if the person smokes in the same room as the baby (Klonoff-Cohen et al. 1995). MacDorman et al. (1997) suggest that smoking is one of the most important preventable risk factors for SIDS, with intervention programs having the potential to reduce rates considerably.

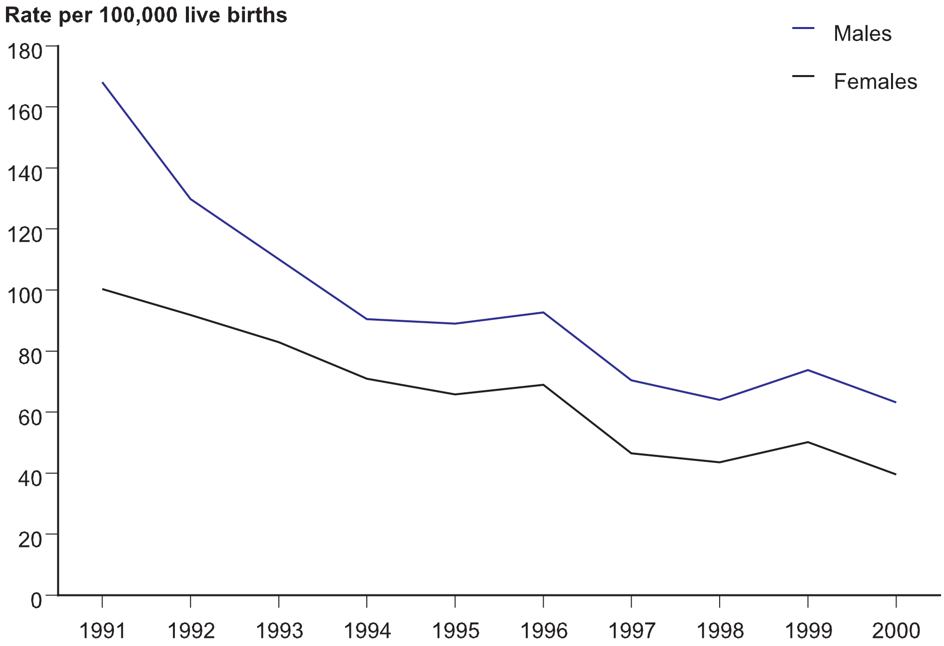
The risk of SIDS may be reduced by breastfeeding (NHMRC 1991), although this effect is negated if the infant is exposed to tobacco smoke (Klonoff-Cohen et al. 1995).

One contentious risk factor is sharing a bed with parents, with evidence for this factor being mixed. Blair et al. (1999) found that bed-sharing did not increase the risk of SIDS when infants were older than 14 weeks, when parents did not smoke, or when the infant was put back in his/her own cot. The risk was greater for infants aged 4–13 weeks, and for infants whose parents smoked. Sleeping with an infant on a sofa or chair has been seen to increase the risk of SIDS or accidental suffocation, and should be avoided (Blair et al. 1999; Kemp et al. 2000).

Trends

The indicator for SIDS deaths is the number of infants whose death is attributable to SIDS in a given year as a rate per 100,000 live births.

Since 1991, the SIDS rate has been falling, apart from a small increase in 1996, and again in 1999 (Figure 8.1).

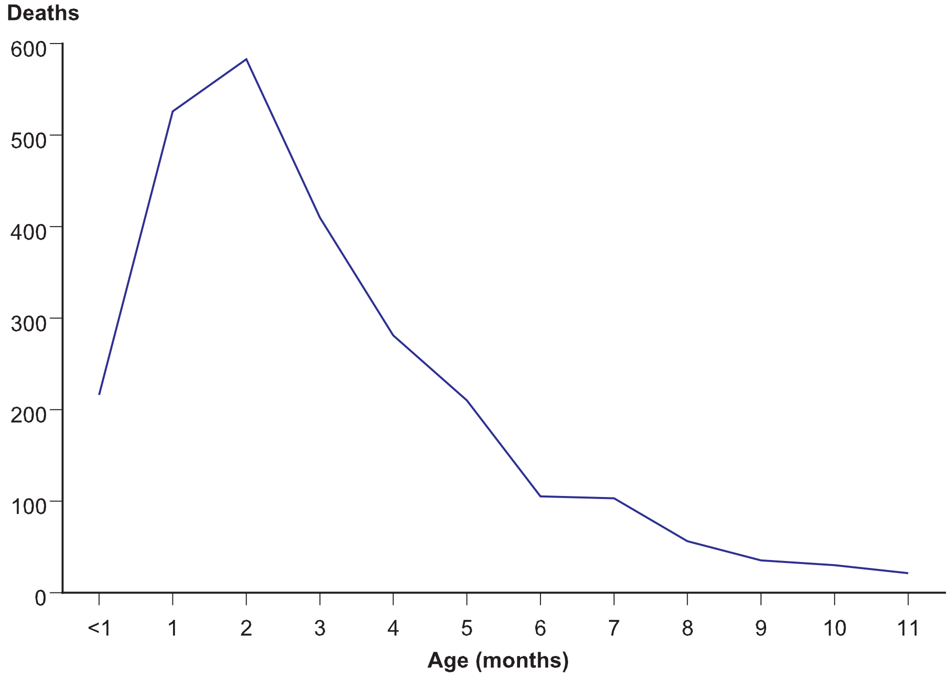


Note: ICD-9 code 798.0 (1991 to 1996) and ICD-10 code R95 (1997 to 2000).
Source: AIHW Mortality Database [Table A8.1].

Figure 8.1: SIDS rates for infants, 1991–00

- Between 1991 and 2000, the SIDS death rate decreased by 62%. In 1991, 242 male and 137 female SIDS deaths were recorded, with rates of 168.1 and 100.4, respectively. In 2000, 81 male and 48 female SIDS deaths were recorded, with rates of 63.2 and 39.5 per 100,000 live births, respectively.
- Over the decade, male death rates were on average 1.4 times higher than female rates.

Age distribution



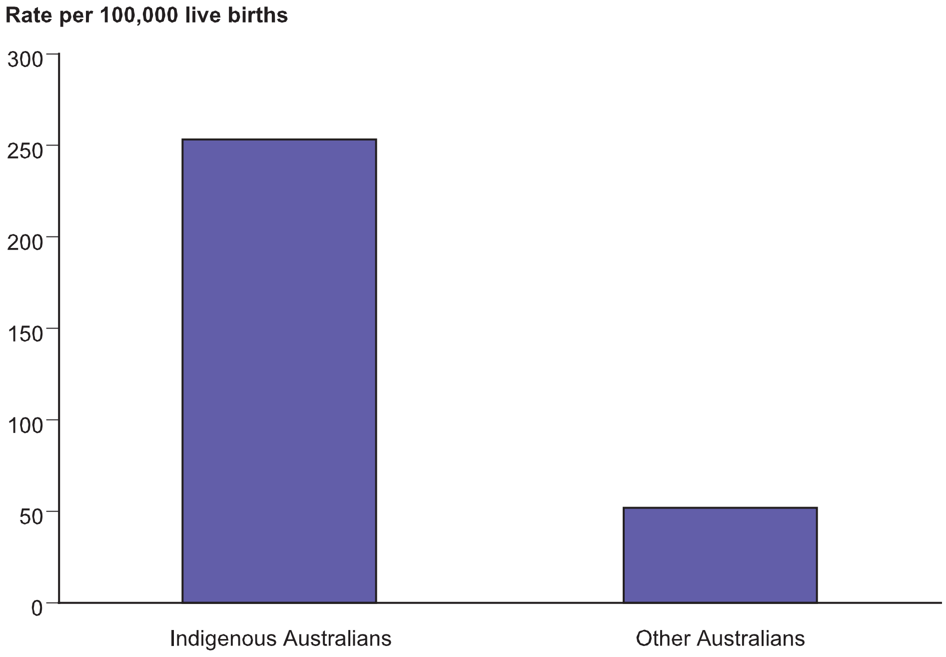
Note: ICD-9 code 798.0 (1991 to 1996) and ICD-10 code R95 (1997 to 2000).
Source: AIHW Mortality Database [Table A8.2].

Figure 8.2: Total number of SIDS deaths, 1991–00

- Between 1991 and 2000, 2,084 infants died from SIDS. The highest number of SIDS deaths across 1991–00 occurred around 2 months of age. Throughout the decade, 22% occurred at 2 months, and 20% at 1 month of age.
- Between 1991 and 2000, 71 children between the ages of 1 and 3 years were reported as having died from SIDS. However, these children do not meet the definition of SIDS, due to their age.

Aboriginal and Torres Strait Islander Infants

SIDS rates are much higher among Aboriginal and Torres Strait Islander infants than among other Australian infants (Figure 8.3).



Notes
1. ICD-10 code R95.
2. Includes Qld, WA, SA and NT only.

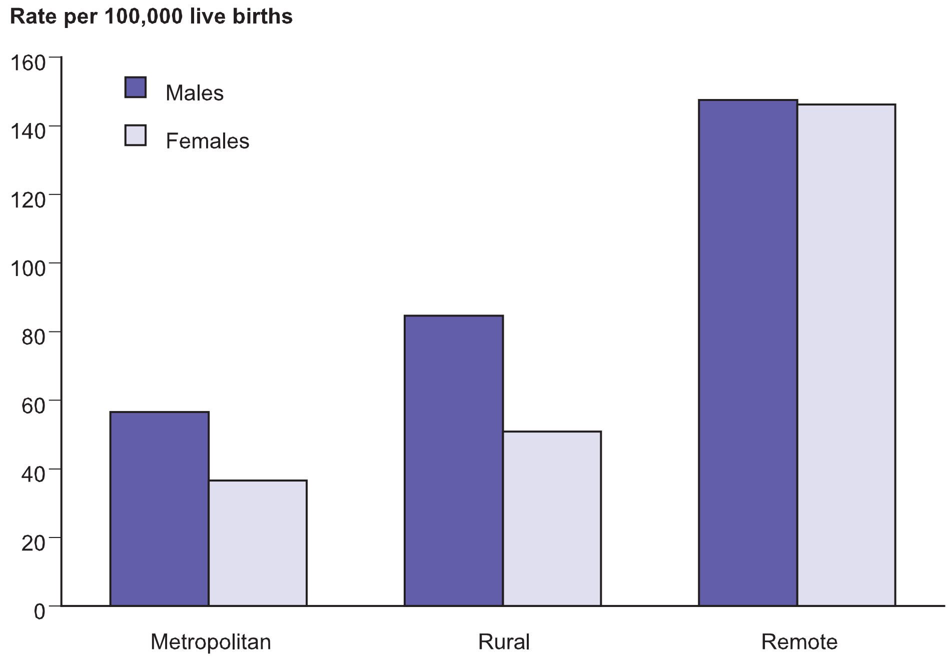
Source: AIHW Mortality Database [Table A8.3].

Figure 8.3: Average SIDS rates for Aboriginal and Torres Strait Islander and other Australian infants, 1998–00

- Between 1998 and 2000 in Queensland, Western Australia, South Australia and the Northern Territory, 51 Aboriginal and Torres Strait Islander infants died from SIDS.
- The average SIDS death rates for Aboriginal and Torres Strait Islander infants were 5 times those for other Australian infants (253.2 compared with 51.9).

In order to address the higher incidence of SIDS among Aboriginal and Torres Strait Islander populations, the National SIDS Council of Australia (2001b) has prepared a pamphlet specifically targeted towards educating Indigenous women, which includes clear statements and illustrations about preventing SIDS.

Infants in metropolitan, rural and remote areas



Note: ICD-10 code R95.

Source: AIHW Mortality Database [Table A8.4].

Figure 8.4: Average SIDS rates for infants in metropolitan, rural and remote areas, 1998–00

- Between 1998 and 2000, 250 infants in metropolitan areas, 126 in rural areas and 43 in remote areas died from SIDS.
- Average SIDS rates were between 2 and 4 times higher in remote areas than in metropolitan areas, depending on sex (147.5 compared with 56.6 per 100,000 live male births, 146.2 compared with 36.6 per 100,000 live female births). However, it is possible that the higher rates in rural and remote areas may result from incorrectly using diagnostic guidelines, because of isolation and a lack of resources (Byard 2001).
- In remote areas, the female rate was approximately the same as for male infants. In rural areas, male infants had an average rate 1.6 times that of female infants (84.6 compared with 50.9 per 100,000 live births).

Burden of disease attributable to SIDS

In 1996, SIDS was estimated to account for 6,278 DALYs or 2.9% of the total disease burden in children aged 0–14 years (AIHW: Mathers et al. 1999). Boys accounted for 55% of the SIDS burden of disease, and girls 45%.

9. Congenital malformations

Congenital malformations are anatomical defects, chromosomal abnormalities or other genetic diseases that are present at birth. Major congenital malformations are defined as those malformations which are either lethal or significantly affect the child's function and/or appearance. Minor congenital malformations are defined as those which do not have functional or cosmetic importance, but sometimes may signify an underlying genetic disorder (AIHW NPSU: Hurst et al. 2001).

The causes of most human congenital malformations cannot be determined. One review suggests that the cause is unknown for approximately 60% of malformations (Kalter & Warkany 1983a, 1983b). The causes that are known can be classified into certain groups. Congenital malformations that are caused by a single major mutant gene are thought to account for approximately 7.5% of all congenital malformations. Chromosomal abnormalities are estimated to be the cause of 6% of all malformations. Congenital malformations can also be caused by an interaction between genetic and non-genetic factors, as seen with Down syndrome, which becomes more common as maternal age increases. It has been suggested that such interactions account for 20% of malformations (Kalter & Warkany 1983a). As well as genetic factors, there are specific environmental factors which have been found to cause congenital malformations. These may include maternal infections such as rubella, maternal illness such as diabetes, environmental substances such as mercury, teratogenic agents taken by the mother (drugs or chemicals which can cause congenital malformations), and nutritional deficiencies such as a lack of folate. Maternal illness and teratogenic drugs are thought to account for approximately 5% of all congenital malformations.

Knowing that some congenital malformations result from environmental factors means that it is possible to decrease occurrence through primary prevention. For example, thalidomide, a teratogenic drug previously used to treat morning sickness, is no longer given to women, and doctors are more careful when prescribing drugs to pregnant women. Immunisation against rubella in adolescence is a preventive measure to ensure women do not contract rubella while pregnant. Increasing the consumption of folate prior to conception can decrease the likelihood of neural tube defects occurring in the baby.

Prenatal tests can be done to screen for and to diagnose congenital malformations and abnormalities, such as amniocentesis for chromosomal abnormalities, and ultrasound for anencephalus, hydrocephalus, spina bifida and other malformations (Williams et al. 1989; Garne & Berman 1999).

Notifications

Infants and foetuses with major congenital malformations are reported to the AIHW National Perinatal Statistics Unit (NPSU) by the State and Territory birth defects registers, and these data are collated into a national data collection. These data describe major congenital malformations diagnosed in liveborn infants in the first 28 days, in stillbirths of at least 20 weeks gestation or 400 grams birthweight, and in induced abortions related to congenital malformations.

The indicator for congenital malformations is the total number of births diagnosed with a major congenital malformation in a given year as a rate per 10,000 total births.

In 1997, 4,489 infants, or 175 infants per 10,000 total births (both live and still births), had a major congenital malformation notified to the NPSU (Table 9.1). Of these infants, 77.6% had malformations affecting a single body system, 6.7% had malformations affecting more than one system and 15.6% had an identifiable chromosomal defect.

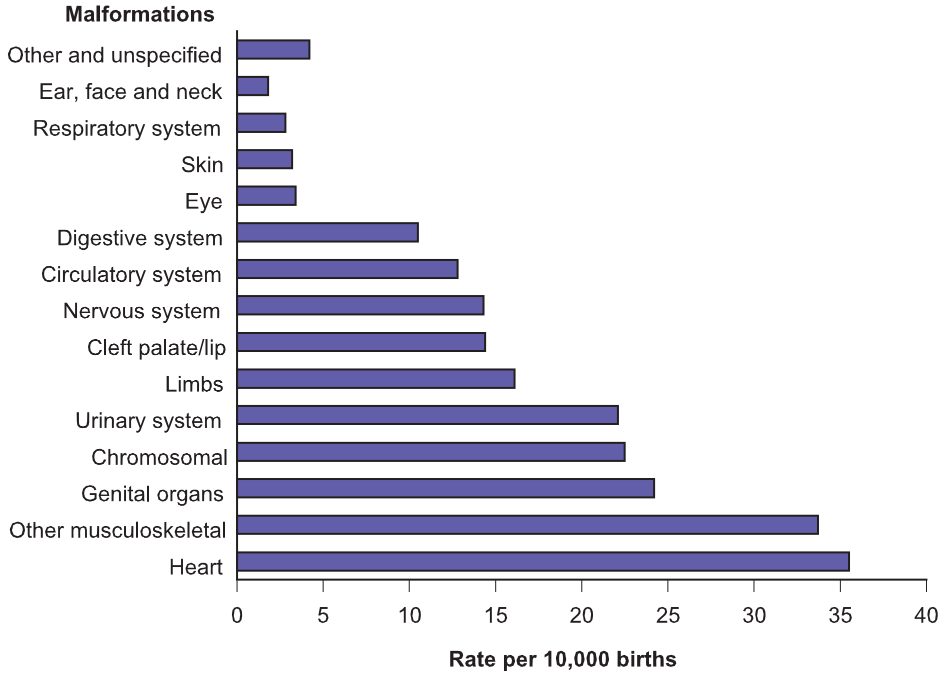
Table 9.1: Notifications of births with major congenital malformations, 1990–97

	1990	1991	1992	1993	1994	1995	1996	1997
Notifications	4,751	4,589	4,500	4,426	4,297	4,561	4,522	4,489
Rate per 10,000 births	179.8	177.4	169.4	169.9	164.4	175.4	175.9	175.2

Source: AIHW NPSU: Hurst et al.1999, 2001; AIHW NPSU: Lancaster et al. 1997; AIHW NPSU: Lancaster & Pedisich 1995; AIHW NPSU 1993.

- Between 1990 and 1994, the rate of major congenital malformations declined from 179.8 to 164.4 per 10,000 births. Between 1995 and 1997, the rate remained fairly constant at around 175 per 10,000 births.

The major anatomical systems affected by congenital malformations are shown in Figure 9.1.

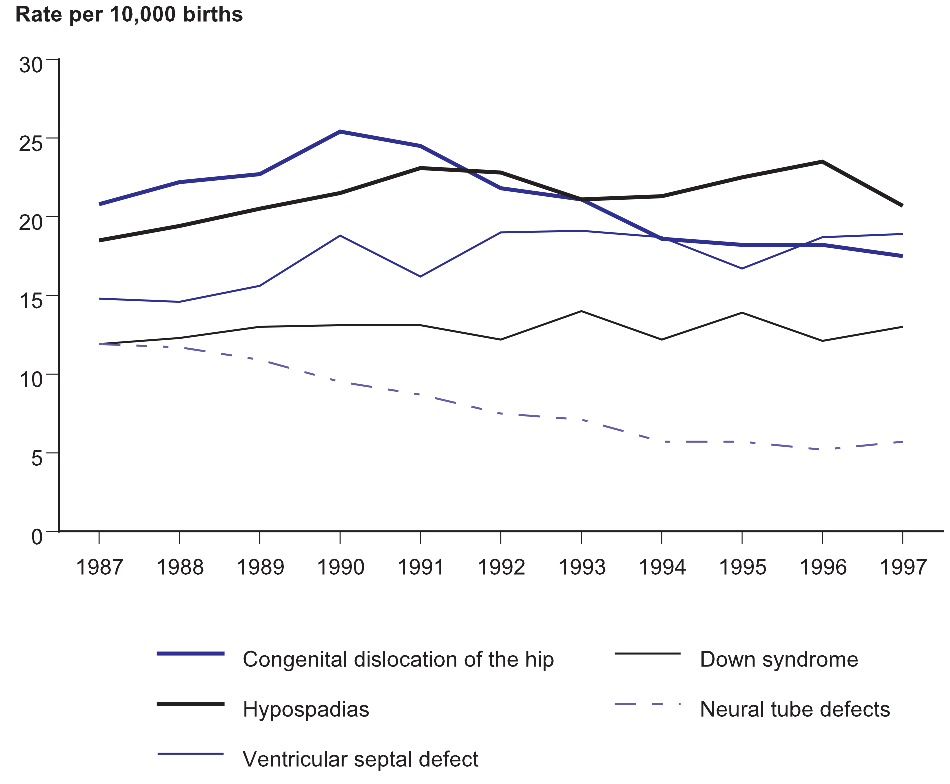


Source: AIHW NPSU: Hurst et al. 2001 [Table A9.1].

Figure 9.1: Congenital malformation rates in infants, 1997

- In 1997, malformations of the heart were the most common congenital malformations (35.5 per 10,000 births, accounting for 20% of all congenital malformations). These were followed by malformations of the musculoskeletal system (33.7, or 19%), malformations of the genital organs (24.2, or 14%), chromosomal malformations (22.5, or 13%), and malformations of the urinary system (22.1, or 13%).

Major congenital malformations



Source: AIHW NPSU: Hurst et al. 1999, 2001 [Table A9.2].

Figure 9.2: Notification rates for selected major congenital malformations, 1987–97

- Hypospadias, a malformation of the male genital organs, was the most common congenital malformation in 1997 (531 births). It is characterised by an opening of the urethra on the underside of the penis. The notification rate for this condition in 1997 was 20.7 per 10,000 total births, compared with 18.5 in 1987.
- Ventricular septal defect is a congenital malformation of the heart characterised by an abnormal connection between the ventricles of the heart (sometimes known as 'hole in the heart'), and is usually characterised by a heart murmur. The hole sometimes spontaneously closes in early childhood (AIHW: Hurst et al. 1999). In 1997, 484 infants were born with this malformation. The notification rate for this condition has also increased since 1987 (18.9 compared with 14.8).
- Congenital dislocation of the hip affected 449 infants in 1997. In this condition, the head of the femur is either displaced, or is able to be displaced, from the pelvis. The notification rate for this condition was 17.5 per 10,000 total births in 1997, compared with 20.8 in 1987.
- Down syndrome was the most common chromosomal abnormality in 1997, affecting 332 infants. This syndrome is characterised by a specific pattern of malformations, including muscular weakness, flat face, slanted eyes, small ears, intellectual disability, and variable occurrence of other minor and major congenital

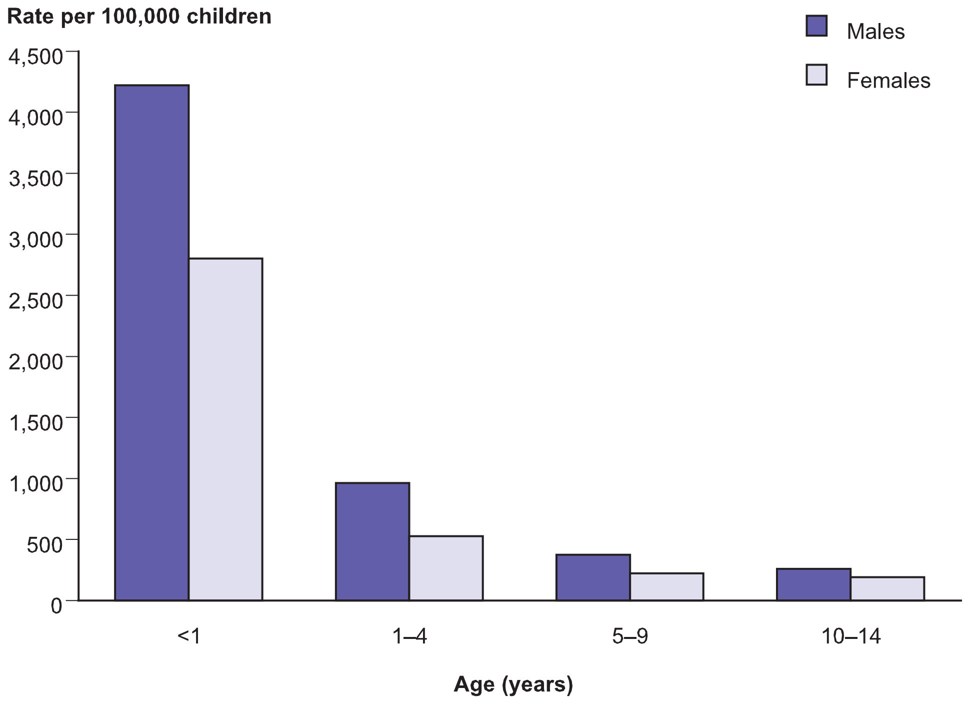
malformations. The notification rate for Down syndrome was 13.0 per 10,000 births in 1997.

- Neural tube defects (spina bifida, anencephalus and encephalocele) affected 146 infants in 1997. Such defects have decreased by about half since 1987 (5.7 compared with 11.9 per 10,000 births), with the greatest reductions seen in spina bifida and encephalocele. The occurrence of neural tube defects is thought to be reduced by giving folic acid to pregnant women and even before pregnancy (Kennedy 1998).

In 1996, 527 terminations of pregnancy for foetal malformations were notified to the NPSU. Ascertainment of terminations is incomplete and varies by State and Territory. The most common reasons for termination of pregnancy were Down syndrome, other chromosomal abnormalities, neural tube defects (including spina bifida, anencephalus and encephalocele) and cardiac defects.

The duration of pregnancy was not known for 68.1% of notified terminations. Among pregnancies for which the gestational age was known, chromosomal malformations, particularly Down syndrome, were the main reasons for the majority of terminations occurring before 16 weeks gestation. Terminations due to anencephalus, spina bifida and other malformations were more likely to occur just before 20 weeks, when most pregnant women are screened by ultrasound examination (AIHW NPSU: Hurst et al. 1999).

Hospitalisations



Note: ICD-10-AM codes Q00–Q99.
Source: AIHW National Hospital Morbidity Database [Table A9.3].

Figure 9.3: Hospitalisation rates for children aged 0–14 years for congenital malformations, 1999–00

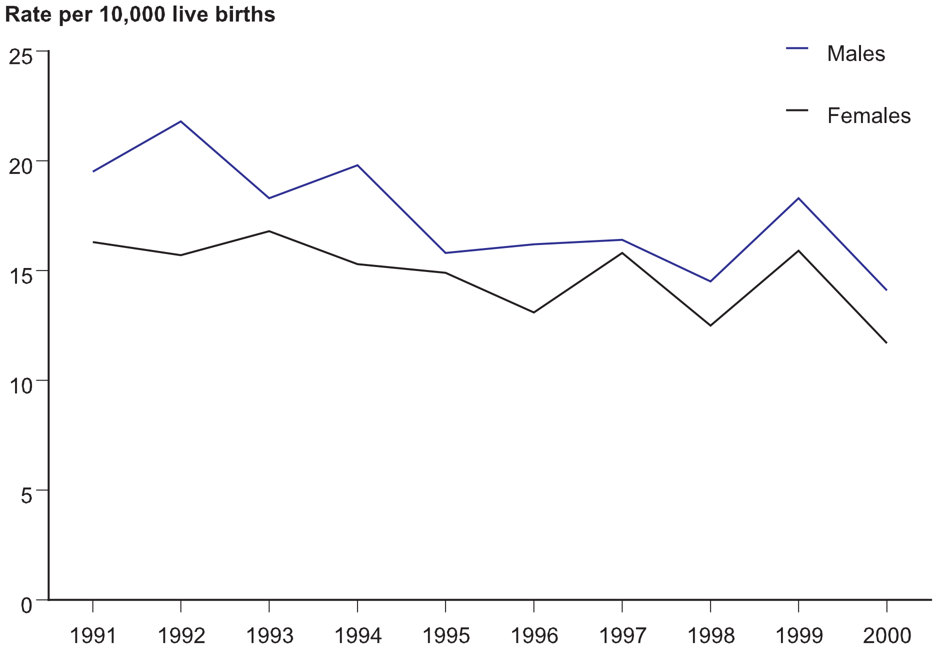
- In 1999–00, there were 23,489 hospitalisations of children aged 0–14 years for congenital malformations. Of these, 8,842 or 38% were infants.
- Children under the age of 1 year had the highest hospitalisation rate among children for congenital malformations (4,220.8 per 100,000 boys and 2,802.4 per 100,000 girls).
- For all age groups, boys had higher hospitalisation rates than girls. This difference was greatest among children aged 1–4 years, where boys were hospitalised at a rate 1.8 times that of girls. The difference was least among children aged 10–14 years.

The impact of congenital malformations can also be examined in terms of the length of time children spent in hospital. In 1999–00, the average length of stay was 2.7 days, with 81,136 hospital bed days with a principal diagnosis of congenital malformations. Congenital malformations were also responsible for an additional 22,976 bed days where they were not the main reason for hospital stay but where they had to be managed during hospitalisations for other conditions.

Deaths

Congenital malformations are a major cause of childhood mortality in Australia. In 2000, they were responsible for 25% of all deaths in children aged under 1 year and for 8% of all deaths in children aged 1–14 years. Congenital malformations of the circulatory system and of the nervous system were the two largest contributors, accounting for 8% and 4% respectively of all infant deaths from congenital malformations. This was followed by malformations of the respiratory system, which accounted for 2% of infant deaths from congenital malformations (ABS 2001b).

The indicator for congenital malformation deaths is the number of deaths of infants from congenital malformations in a given year as a rate per 10,000 live births. In 2000, there were 323 deaths of infants from congenital malformations.



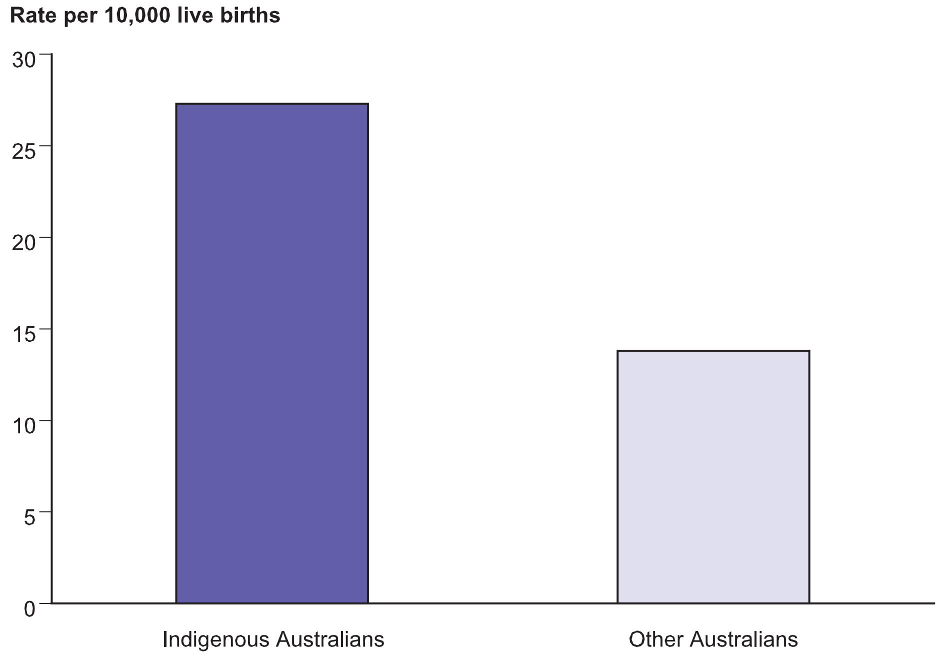
Note: ICD-9 codes 740–759 (1991 to 1996) and ICD-10 codes Q00–Q99 (1997 to 2000).

Source: AIHW Mortality Database [Table A9.4].

Figure 9.4: Congenital malformation death rates for infants, 1991–00

- There was a general decline in the death rate of infants from congenital malformations over the period 1991–00, from 18.0 to 12.9 per 10,000 live births. However, there was a rise in 1997 for females, and in 1999 for all infants.
- Male infants had a higher death rate from all congenital malformations than did females. In 2000, the death rate of male infants was 1.2 times that of female infants.

Aboriginal and Torres Strait Islander children



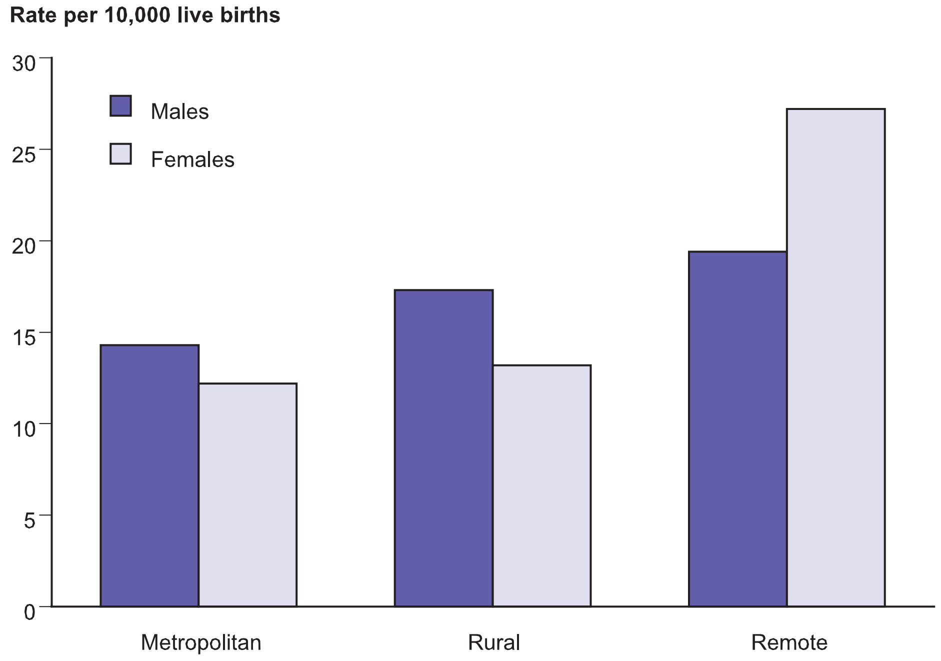
Notes
1. ICD-10 codes Q00–Q99.
2. Includes Qld, WA, SA and NT only.

Source: AIHW Mortality Database [Table A9.5].

Figure 9.5: Average congenital malformations death rates for Aboriginal and Torres Strait Islander and other Australian infants, 1998–00

- Between 1998 and 2000 in Queensland, Western Australia, South Australia and the Northern Territory, there were 55 deaths of Aboriginal and Torres Strait Islander infants from congenital malformations.
- Aboriginal and Torres Strait Islander infants died at a rate twice as high as that for other Australian infants (27.3 compared with 13.8 per 10,000 live births).

Children in metropolitan, rural and remote areas



Note: ICD-10 codes Q00–Q99.

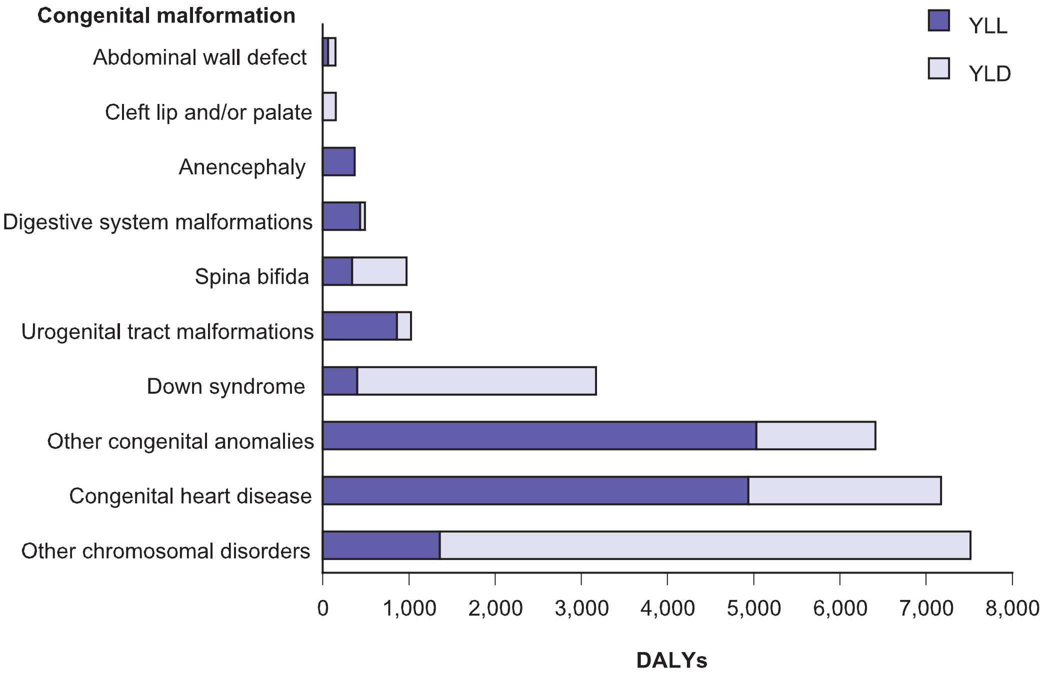
Source: AIHW Mortality Database [Table A9.6].

Figure 9.6: Average congenital malformations death rates for infants in metropolitan, rural and remote areas, 1998–00

- Between 1998 and 2000, there were 709 infants in metropolitan areas, 283 in rural areas and 68 in remote areas who died from congenital malformations.
- Average death rates were higher in remote areas than in rural or metropolitan areas (23.2 compared with 15.3 and 13.3 per 10,000 live births, respectively).
- In metropolitan and rural areas, death rates were higher among male infants than female infants. However, the pattern was reversed in remote areas, where female infants died at a rate of 27.2 per 10,000 live births, and male infants died a rate of 19.4.

Burden of disease attributable to congenital malformations

In 1996, congenital malformations were estimated to account for 12.9% of the total disease burden in children aged 0–14 years (27,422 DALYs). The total burden of disease was higher in boys (56% of the burden in children) than in girls (44%). The congenital malformations disability and mortality burdens were relatively even (13,635 YLD, 13,787 YLL). The total burden of disease from selected congenital malformations is shown in Figure 9.7.



Source: AIHW: Mathers et al. 1999 [Table A9.7].

Figure 9.7: Total burden of disease from selected congenital malformations in children aged 0–14 years, 1996

- 'Other chromosomal disorders' were responsible for the greatest total burden of disease in 1996 among children aged 0–14 years, followed by congenital heart disease, 'other congenital anomalies' and Down syndrome.
- Most of the disease burden in congenital heart disease, urogenital tract malformations, digestive system malformation and anencephaly was from premature mortality, while in spina bifida, Down syndrome and other chromosomal disorders the main burden was from disability.

Part IV: Vaccine-preventable and other communicable diseases

Chapter 10: Vaccine-preventable diseases

Chapter 11: Other communicable diseases

Infectious diseases are illnesses caused by bacteria, viruses, parasites and other agents that can be passed from person to person, or from insects, birds and animals to humans. Bacteria cause diseases such as pertussis (whooping cough) and tuberculosis; viruses cause diseases such as mumps, rubella, measles and poliomyelitis; while parasites cause diseases such as malaria and hydatid disease.

Infectious diseases were responsible for considerable illness and death among children in Australia in the late 1800s and early 1900s. However, the impact of these diseases was dramatically reduced by improvements in hygiene and the introduction of antibiotics and mass immunisation programs. Immunisation is achieved by the administration of vaccines. Vaccines are usually made from extracts of killed viruses or bacteria, or from live but weakened strains of viruses or bacteria. The vaccine stimulates an immune response in the child that either prevents the infection or reduces the severity of disease. Although a very small number of children suffer adverse effects from vaccinations, the great majority are protected from dangerous complications—or death—that were once a common outcome of childhood infectious diseases (DHAC 2001a).

Mass vaccination occurred from the 1930s for diphtheria, from the 1940s for pertussis, from the 1950s for combined diphtheria-tetanus-pertussis and poliomyelitis, and from the 1970s for measles (Gidding et al. 2001). Widespread immunisation continued into the 1980s and 1990s, as more vaccines became available. Despite a reduction in the incidence of vaccine-preventable diseases since the introduction of immunisation, these diseases remain a problem in Australia. As long as cases of these diseases continue to occur, Australian children remain at risk. The 1995 ABS Children's Immunisation Australia survey (ABS 1996a) suggested that the majority of parents whose children are not immunised are either misinformed about the nature of immunisation or 'had not got around to it'. There remains a very small proportion of parents who object to immunisation on religious or other grounds. Inappropriate caution among health professionals about vaccinating children with previous adverse reactions to certain vaccines—particularly whooping cough—may have contributed to the re-emergence of these diseases in the past (Frost & Johns 1996; Burgess et al. 1998).

Many communicable diseases are notifiable in Australia so that the number of cases can be monitored and appropriate public health measures implemented. All vaccine-preventable diseases—diseases for which the NHMRC schedule recommends routine vaccination/immunisation for children—are notifiable. This means that when a vaccine-preventable disease occurs in an Australian child, medical practitioners and hospitals are legally obliged to report that event.

This section reports on notifications, hospitalisations and deaths from vaccine-preventable diseases and from selected other communicable diseases that cause significant mortality and morbidity in Australian children.

10. Vaccine-preventable diseases

Although vaccines are available for a wide range of potential diseases, the vaccine-preventable diseases considered here are those appearing on the NHMRC schedule recommended for routine vaccination/immunisation of children in Australia. They are pertussis (whooping cough), tetanus, diphtheria, poliomyelitis, invasive *Haemophilus influenzae* type b infection (Hib), measles, mumps, rubella and hepatitis B (see 'Vaccination coverage estimates' in Part VIII: Risk and protective factors).

A number of changes in the vaccination/immunisation schedule have occurred since 1998. These are outlined in the most recent edition of the *Australian Immunisation Handbook* (NHMRC 2000). The most important change has been the introduction of a universal vaccination program for infants against hepatitis B, for children born from May 2000 onwards.

This section provides information on the level of vaccine-preventable diseases in children, using official notification data for each disease, as well as information on hospitalisations and deaths. Information on one rare long-term effect of measles, brain damage caused by encephalitis (inflammation of the brain), is also included.

Information on the occurrence and impact of communicable diseases comes mainly from the following sources: disease notifications through the National Notifiable Diseases Surveillance System (NNDSS); hospitalisations from the AIHW National Hospital Morbidity Database; and deaths data from the AIHW Mortality Database. The Australian Paediatrics Surveillance Unit (APSU) annual reports and other special reports were also used as additional sources of information.

Notifications, hospitalisations and deaths from vaccine-preventable diseases

Notifications of vaccine-preventable diseases continue to occur in both adults and children. A summary of notifications, hospitalisations and deaths of children aged 0–14 years from vaccine-preventable diseases is shown in Table 10.1.

Table 10.1: Notifications, hospitalisations and deaths of children aged 0–14 years from vaccine-preventable diseases, 1993–00

Disease	Notifications	Hospitalisations	Deaths
Pertussis (whopping cough)	22,555	4,123	8
Haemophilus influenzae type b disease	697	831	16
Measles	8,635	1,365	6[(a)]
Rubella	4,775	196	1[(b)]
Mumps	584	114	0
Hepatitis B	69	91	0
Tetanus	1	3	0
Total	**37,316**	**6,723**	**31**

(a) Three of these deaths were due to subacute sclerosing panencephalitis.

(b) Death from rubella was due to congenital rubella.

Note: Data for notifications and deaths are per calender year (l January 1993 to 31 December 2000), while data for hospitalisations are per financial year (1 July 1993 to 30 June 2000).

Source: Communicable Diseases Network Australia–National Notifiable Diseases Surveillance System, AIHW National Hospital Morbidity Database and AIHW Mortality Database.

- Between 1993 and 2000, more than 37,000 children suffered a vaccine-preventable disease and more than 6,000 hospitalisations occurred as a result of contracting one of these diseases. Whooping cough, measles and rubella were the most commonly occurring vaccine-preventable diseases in Australian children.

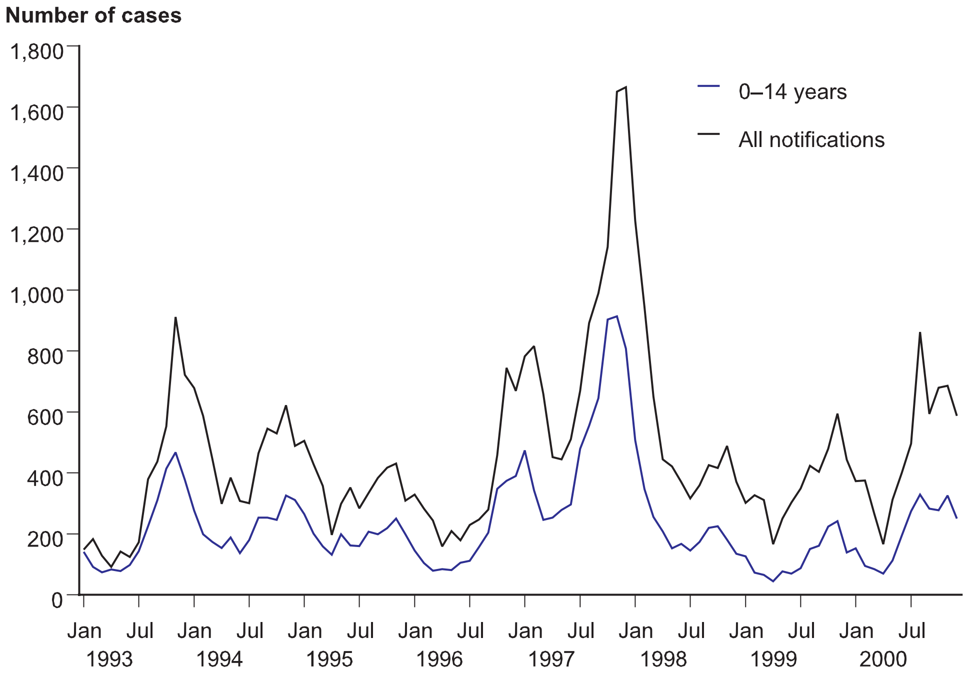
- Over the same period, the vaccine-preventable disease responsible for the most deaths of children in Australia was *Haemophilus influenzae* type b disease (Hib), with 16 deaths.

There have been no notified cases of polio in Australian children since 1972 and no cases of diphtheria since 1993. Only 1 case of tetanus has been notified in children since 1993, and this occurred in 2000.

The impact of vaccine-preventable diseases can be examined by looking at the length of time children spent in hospital. In 1999–00, there were 1,367 bed days for which vaccine-preventable diseases were the principal diagnoses, with an average length of stay of 4.5 days. Of all vaccine-preventable diseases, pertussis was responsible for by far the highest number of bed days (1,037 as a principal diagnosis, with an average length of stay of 5.0 days).

Pertussis (whooping cough)

Pertussis is a highly infectious acute bacterial respiratory infection caused by *Bordetella pertussis* (NHMRC 2000). The symptoms include a severe, violent cough, which may persist for 3 months. Infants are most at risk from the potentially serious consequences of the infection, particularly during the period before they are old enough to be vaccinated. The case fatality rate for babies under 6 months is 0.5%, mainly from pertussis pneumonia or brain damage caused by lack of oxygen in the blood. Pertussis remains one of the most frequently reported vaccine-preventable diseases and cyclic epidemics of pertussis continue to occur. In the 1990s, the highest peak occurred in 1997 (Figure 10.1).



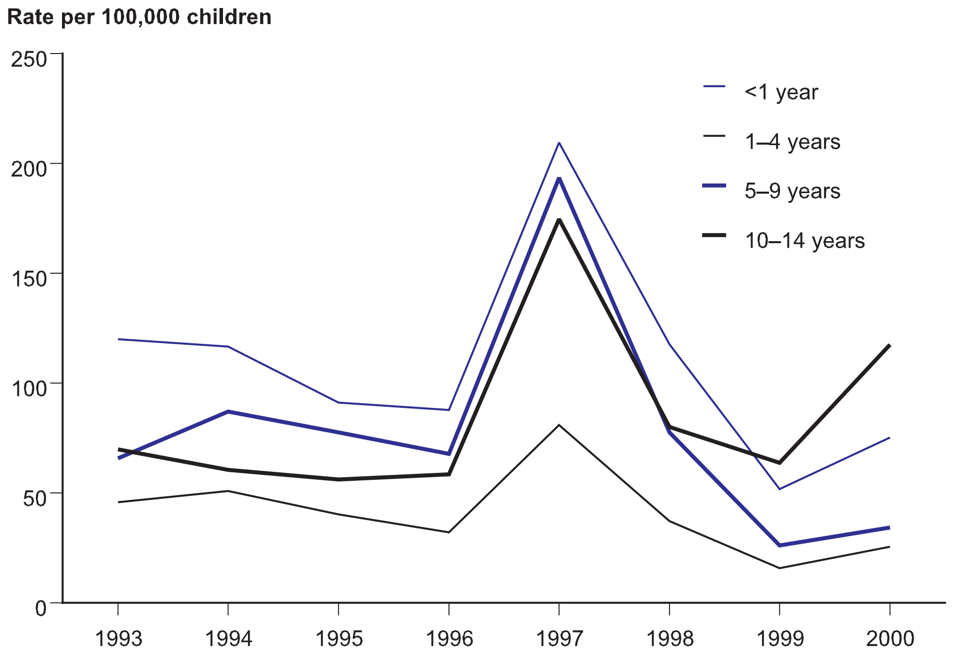
Source: Communicable Diseases Network Australia–NNDSS, unpublished data [Table A10.1].

Figure 10.1: Pertussis notifications for children aged 0–14 years and for the total population, 1993–00

- Between 1993 and 2000, pertussis accounted for the highest number of notifications of all vaccine-preventable diseases. Over the review period, there were 45,215 notifications of pertussis, of which 50% (or 22,555) were for children aged 0–14 years.
- The majority of notifications (76%) among children were for those older than 4 years. For children aged 0–14 years, 48% of the notifications were for boys.
- After relatively low numbers of pertussis notifications in the early part of this period, notifications have increased, particularly during the epidemic in 1997 and early 1998. The highest number received in one month was in December 1997, with 1,665 cases notified.
- There has been a seasonal pattern in the distribution of notifications and hospitalisations for pertussis, with peak notifications in late spring or summer.

The indicator for pertussis notifications is the number of notifications for pertussis in children aged 0–4 years in a given year as a rate per 100,000 children aged 0–4 years.

Time series in pertussis notification rates for children aged 0–14 years are shown in Figure 10.2.

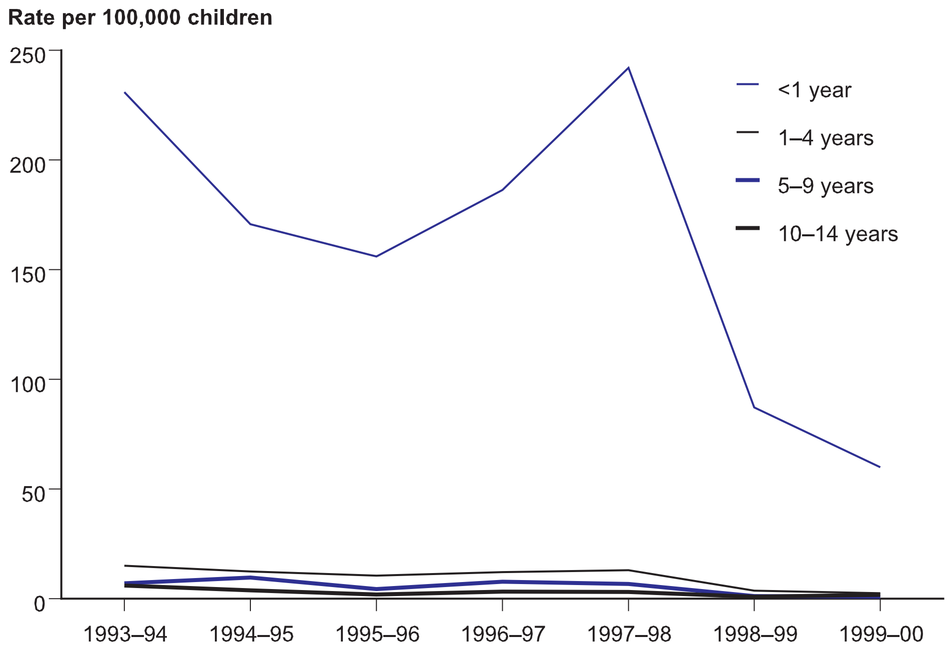


Source: Communicable Diseases Network Australia–NNDSS, unpublished data [Table A10.2].

Figure 10.2: Pertussis notification rates for children aged 0–14 years, 1993–00

- The average annual notification rate for pertussis in children aged 0–14 years was 72.1 per 100,000 children (67.8 for boys and 76.7 for girls). The rate was lowest in 1999 and highest during the 1997 epidemic. During 1997, five boys and one girl died of complications of this disease.
- In 2000, the notification rate for pertussis in children aged 0–4 years was 35.3 per 100,000 children.
- In all years except 1999 and 2000, the rate was highest among infants. The rate was lowest among children aged 1–4 years, in all years.
- During 1993 and 1994, the rates for children aged 5–9 years were higher than the rates for children aged 10–14 years. From 1995 to 1998, there was little difference in rates between these two age groups. It has been suggested that changes in the relative rates of notification for children aged 5–9 years and 10–14 years may be the outcome of the introduction of an additional booster dose of pertussis vaccine for preschoolers in 1994 (McIntyre et al. 2000).

Time series in hospitalisation rates for children aged 0–14 years for pertussis are shown in Figure 10.3.



Note: ICD-9-CM code 033 (1993–94 to 1997–98) and ICD-10-AM code A37 (1998–99 to 1999–00).
Source: AIHW National Hospital Morbidity Database [Table A10.3].

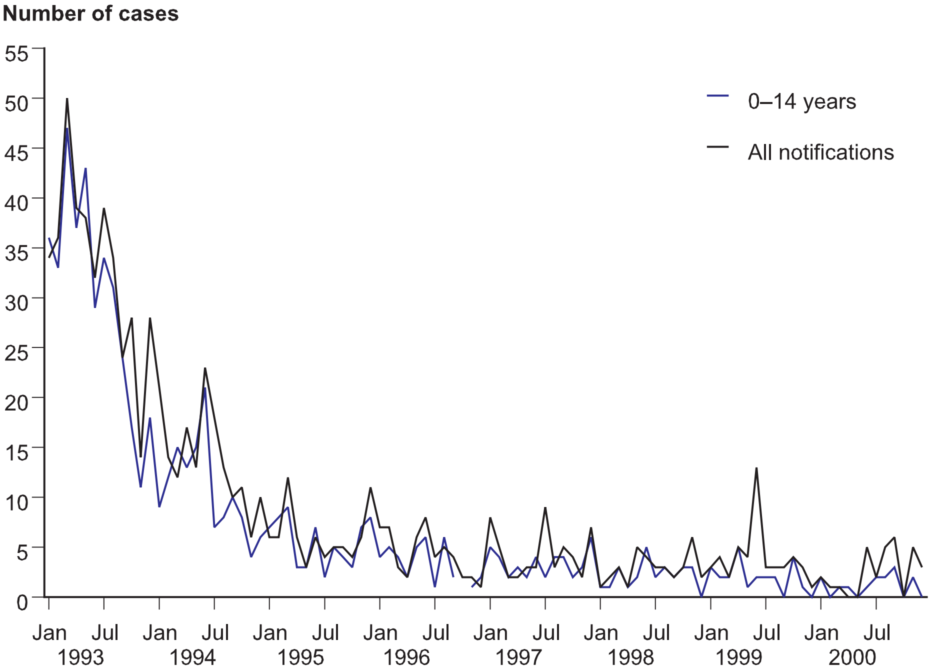
Figure 10.3: Hospitalisation rates for children aged 0–14 years for pertussis, 1993–94 to 1999–00

- There were 4,123 hospitalisations of children aged 0–14 years for pertussis in the period 1993–94 to 1999–00, an average of 589 hospitalisations per year. The average rate of hospitalisation was 15.6 per 100,000 children. The highest rate (23.4 per 100,000) occurred in 1997, the year with the highest notifications.
- Infants accounted for the overwhelming majority of hospitalisations, with an average rate of 154.6 per 100,000. This is expected because the disease is more severe in very young children.
- The hospitalisation rate for infants has decreased substantially over the review period, from 230.8 to 59.9.

Between 1993 and 2000, 8 children died from pertussis. All were infants, with 6 male and 2 female deaths.

Haemophilus influenzae type b infection (Hib)

Haemophilus influenzae type b may result in serious illness in young children, with complications including meningitis, epiglottitis (inflammation of the epiglottis) and pneumonia (NHMRC 2000). Meningitis and epiglottitis are often fatal if not treated. Long-term effects from non-fatal cases may include deafness and intellectual impairment. Prior to the introduction of a vaccine in 1993, Hib infections were an important cause of mortality and morbidity. As there are no ICD codes which specify *Haemophilus influenzae* type b as the causative organism, *Haemophilus influenzae* meningitis and acute epiglottitis were used to identify presumed Hib cases in all hospital and mortality data. Hib causes virtually all cases of acute epiglottitis in children (NHMRC 1997a). Similarly, the more serious cases of *Haemophilus influenzae* meningitis requiring hospitalisations or causing death are likely to be type b infections.



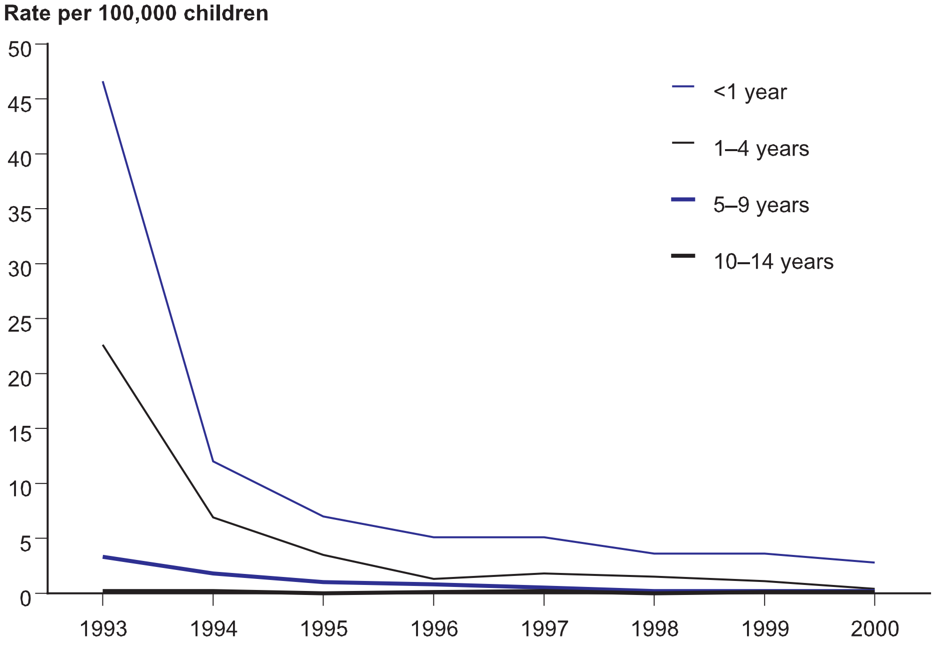
Source: Communicable Diseases Network Australia–NNDSS, unpublished data [Table A10.1].

Figure 10.4: Hib notifications for children aged 0–14 years and for the total population, 1993–00

- Between 1993 and 2000, there were 855 notifications of Hib. Of these, 82% were for children aged 0–14 years. Among children, 55% of the notifications were for boys. The majority of Hib notifications among children aged less than 15 years (85%) were for children aged less than 5 years.
- There has been a dramatic decline in the notifications of Hib, corresponding with the introduction of Hib vaccination as part of the standard childhood immunisation schedule in 1993.

The indicator for Hib notifications is the number of notifications for Hib in children aged 0–4 years in a given year as a rate per 100,000 children aged 0–4 years.

Time series in Hib notification rates for children aged 0–14 years are shown in Figure 10.5.

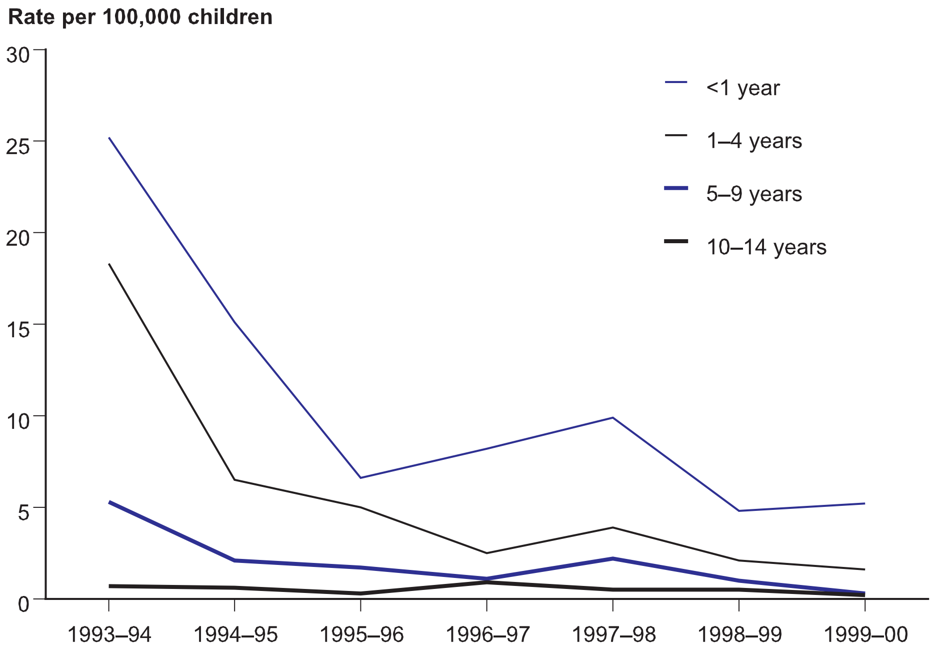


Source: Communicable Diseases Network Australia–NNDSS, unpublished data [Table A10.4].

Figure 10.5: Hib notification rates for children aged 0–14 years, 1993–00

- Between 1993 and 2000, the highest notification rates for Hib were for children aged 0–4 years. In 2000, the rate for this age group was 0.9 per 100,000 children.
- The introduction of vaccination was most important in the reduction in the number of Hib cases in children aged less than 5 years. In 1993, notification rates were 46.6 per 100,000 infants and 22.6 per 100,000 children aged 1–4 years. By 2000, the rates were 2.8 for infants and 0.4 for children aged 1–4 years.

Time series in hospitalisation rates for children aged 0–14 years for Hib disease are shown in Figure 10.6.



Note: ICD-9-CM code 320.0 & 464.3 (1993–94 to 1997–98) and ICD-10-AM code G00.0 & J05.1 (1998–99 to 1999–00).

Source: AIHW National Hospital Morbidity Database [Table A10.5].

Figure 10.6: Hospitalisation rates for children aged 0–14 years for Hib disease, 1993–94 to 1999–00

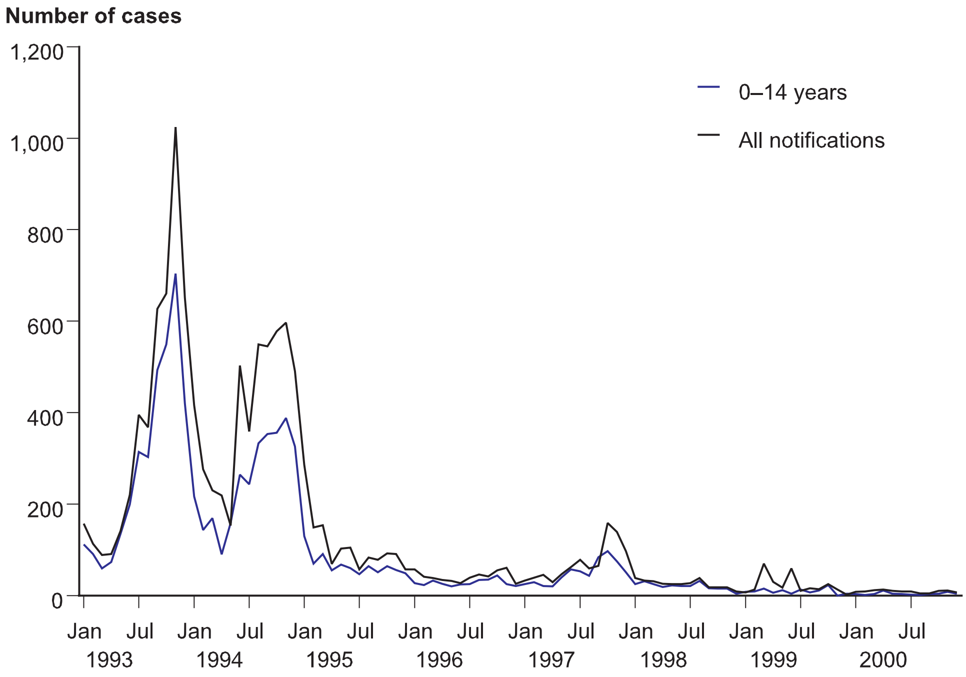
- Between 1993–94 and 1999–00, there were 831 hospitalisations for Hib disease: 57% were for *Haemophilus influenzae* meningitis and 43% were for acute epiglottitis.
- Over this period, the hospitalisation rate decreased by 90% from 8.6 to 0.9 per 100,000 children.
- Infants had the highest hospitalisation rates for Hib disease over this period, followed by children aged 1–4 years.

Between 1993 and 2000, 16 children died from Hib disease—the majority (88%) were from *Haemophilus influenzae* meningitis.

Measles

Measles is a highly infectious viral illness. It is often a serious disease which may be complicated by otitis media, broncho-pneumonia and encephalitis. Measles encephalitis has a high mortality rate (10–15% of cases), while a high proportion (15–40%) of survivors have permanent brain damage (NHMRC 2000). Subacute sclerosing panencephalitis (SSPE) is a late complication of measles that is always fatal (see page 127).

Measles vaccination first became available in Australia in 1968. A two-dose measles/mumps/rubella (MMR) vaccination strategy for children and adolescents was implemented in 1994. In 1998, as part of the Australian Measles Control Campaign, all primary school children were offered a dose of MMR vaccine regardless of their immunisation status. This coincided with the lowering of the recommended age for the second dose of MMR vaccine from 10–16 years to 4–5 years of age (McIntyre et al. 2000).



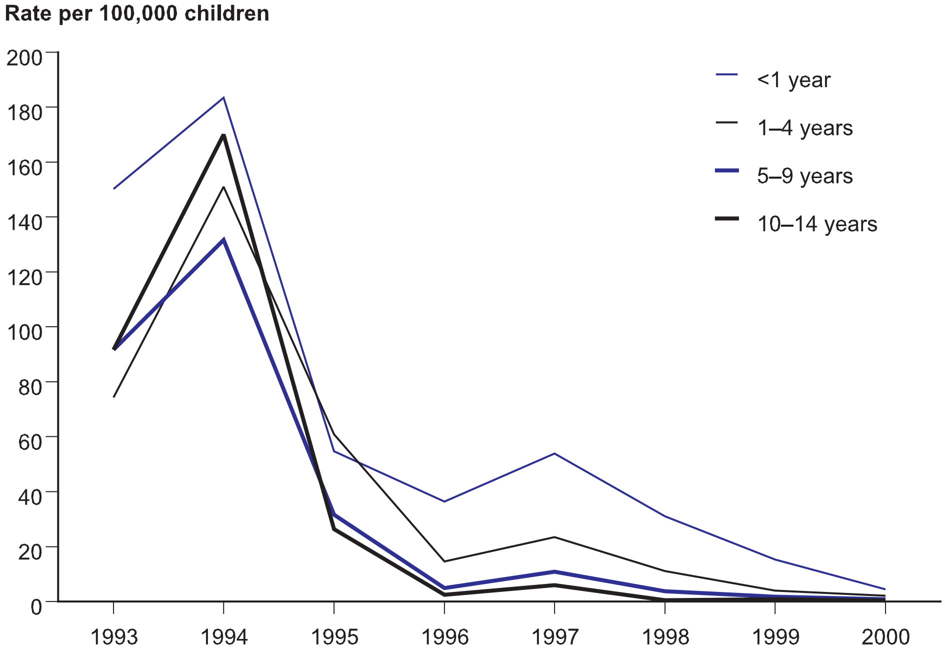
Source: Communicable Diseases Network Australia–NNDSS, unpublished data [Table A10.1].

Figure 10.7: Measles notifications for children aged 0–14 years and for the total population, 1993–00

- Measles accounted for the second highest number of notifications of all vaccine-preventable diseases between 1993 and 2000. Over this period there were 12,815 measles notifications, of which 8,635 (67%) were for children 0–14 years. More than half of these notifications (57%) were for children aged 5–14 years.
- The last major measles epidemic in Australia occurred in 1993 and 1994. In those two years there were 4,536 and 4,915 notifications, respectively. The highest number of cases notified in the last 4 years was in 1997 (852 cases).

The indicator for measles notifications is the number of notifications for measles in children aged 0–14 years in a given year as a rate per 100,000 children.

Time series in measles notification rates for children aged 0–14 years are shown in Figure 10.8.



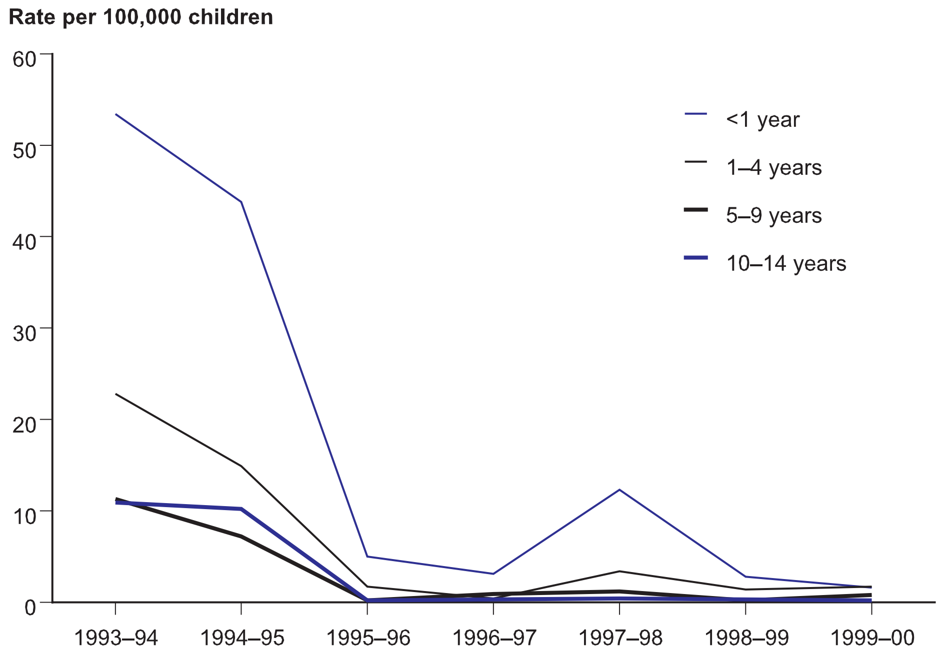
Source: Communicable Diseases Network Australia–NNDSS, unpublished data [Table A10.6].

Figure 10.8: Measles notification rates for children aged 0–14 years, 1993–00

- Although in 2000 the notification rate for measles in children aged 0–14 years was low (1.2 per 100,000 children aged 0–14 years), notification rates were high for children in all age groups in 1993 and 1994, and particularly for younger children (0–4 years) in 1997. The highest rates, reported in 1993 and 1994, occurred during a major epidemic.
- Between 1993 and 2000, the highest rates were among infants. It has been suggested that delayed vaccination of children aged less than 2 years could contribute to the high rates of measles among young children (McIntyre et al. 2000).
- The decline in the overall incidence of measles may be a result of the introduction in 1994 of a second dose of MMR vaccine for children aged 10–16 years. There was a decrease in measles notifications for children aged 10–14 years, from 170 to less than 1.

As with any vaccine-preventable disease, although notifications are declining, measles is not under control. An outbreak can occur when the number of non-immune individuals reaches a level that supports transmission. As vaccination coverage improves among children, older people are more likely to account for a higher proportion of notifications. Young adults aged 18–30 years are presently most at risk of measles (Lambert et al. 1999) and are being encouraged to make sure they are up-to-date with their MMR immunisations. The low notification rates for measles since July 1998 may be a result of the success of the Measles Control Campaign and increases in overall measles vaccination coverage.

Time series in hospitalisation rates for children aged 0–14 years for measles are shown in Figure 10.9.



Note: ICD-9-CM code 055 (1993–94 to 1997–98) and ICD-10-AM code B05 (1998–99 to 1999–00).
Source: AIHW National Hospital Morbidity Database [Table A10.7].

Figure 10.9: Hospitalisation rates for children aged 0–14 years for measles, 1993–94 to 1999–00

- Between 1993–94 and 1999–00, peaks in the number of hospitalisations for measles have occurred at the same times as peaks in the numbers of notifications. The hospitalisation rate was highest in 1993–94 and lowest in 1996–97 and 1998–99.
- Of children aged 0–14 years, infants had the highest rates.
- In 1999–00, boys were hospitalised at a rate 3.5 times higher than for girls (1.4 compared with 0.4 per 100,000 children). This difference was due to higher hospitalisation rates for boys aged 1–9 years than for girls in the same age group.

Three children died from measles during the period 1993 to 2000.

Subacute sclerosing panencephalitis (SSPE)[1] is a rare, late complication of measles causing progressive brain damage and finally death, occurring in 1 in 25,000 cases of measles (NHMRC 2000). Because there is considerable delay between measles infection

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[1] ICD-9-CM code 046.2 and ICD-10-AM code A81.1.

and the onset of SSPE, some children affected by the measles epidemics (mid-1992, mid-1995 and 1997) may not present with the condition for several years.

According to the 1998 Australian Paediatric Surveillance Unit (APSU) Annual Report, there was a total of 5 cases of SSPE identified between 1995 and 1998 (APSU 1998).[2] All of the children with SSPE had an onset of symptoms before 16 years of age and none had a definite history of measles vaccination. The delay between measles infection and the onset of symptoms was between 13 and 15 years. On the basis of these cases, the annual incidence of SSPE for the period 1995–98 was estimated to be 0.02 per 100,000 children aged less than 16 years.

There were 27 hospitalisations of children aged 0–14 years for SSPE between 1993–94 and 1999–00; most of these admissions (89%) were of boys. It is likely that a number of these were series of admissions for a small number of individual children.

Between 1993 and 2000, there was a total of 7 deaths from SSPE. Of these deaths, 3 (43%) were of children aged 0–14 years.

Rubella

Rubella is a mild infectious disease caused by a virus. However, a very high risk of foetal damage exists if a pregnant woman contracts rubella, particularly in the first 8–10 weeks of her pregnancy (NHMRC 2000). Birth defects, including multiple defects (congenital rubella syndrome), occur in up to 90% of such cases. Foetal defects include intellectual impairments, cataracts, deafness, cardiac abnormalities, intra-uterine growth retardation, failure to thrive and developmental delays. As long as rubella exists in the community, the risk remains that non-immune pregnant women will be infected and their babies will be born with severe impairments.

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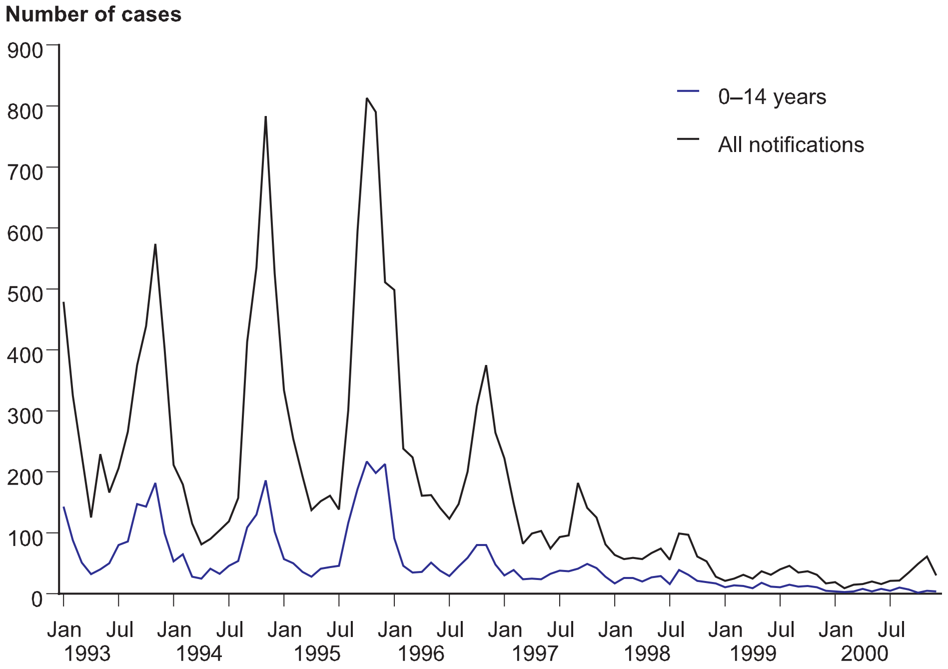
[2] APSU collects data from paediatricians and other doctors who see children with the rare and serious conditions monitored by the APSU.



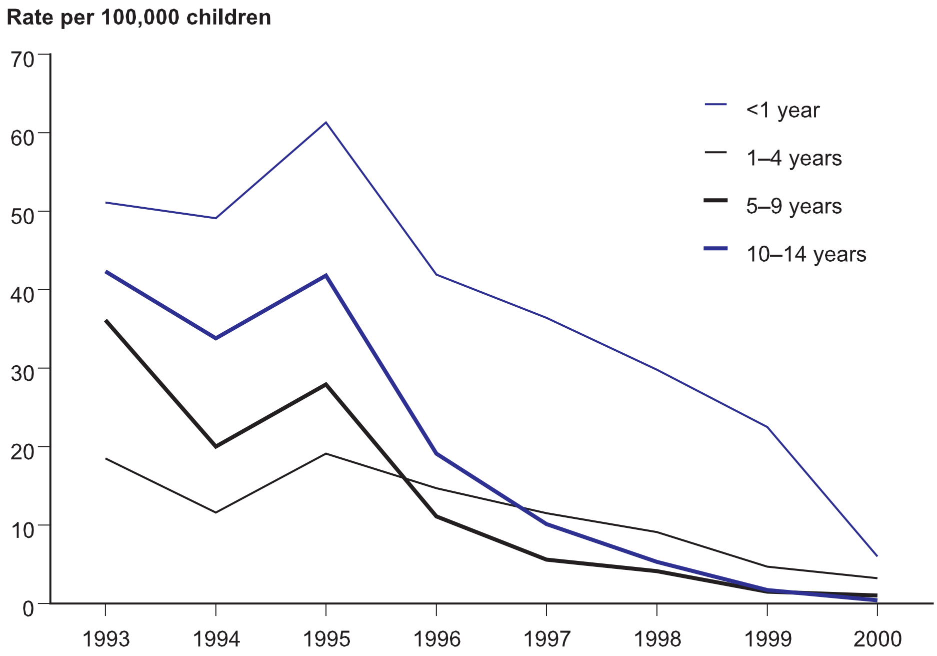
Source: Communicable Diseases Network Australia–NNDSS, unpublished data [Table A10.1].

Figure 10.10: Rubella notifications for children aged 0–14 years and for the total population, 1993–00

- During 1993–2000, there were 17,251 notifications for rubella. Of these, 28% (4,775 cases) were for children aged 0–14 years. More than half of the notifications for children (66%) were for children aged 5–14 years, and 54% of these were for boys.
- This period is characterised by a number of rubella outbreaks, with the last major one in 1995. During that outbreak, there were 4,379 notifications, with 812 reported in October of that year. In 1995, 1,218 rubella notifications were for children aged 0–14 years.
- There is a marked seasonal pattern for rubella infections, with the highest numbers in the spring of each year.

The indicator for rubella notifications is the number of notifications for rubella in children aged 0–14 years in a given year as a rate per 100,000 children.

Time series in rubella notification rates for children aged 0–14 years are shown in Figure 10.11.



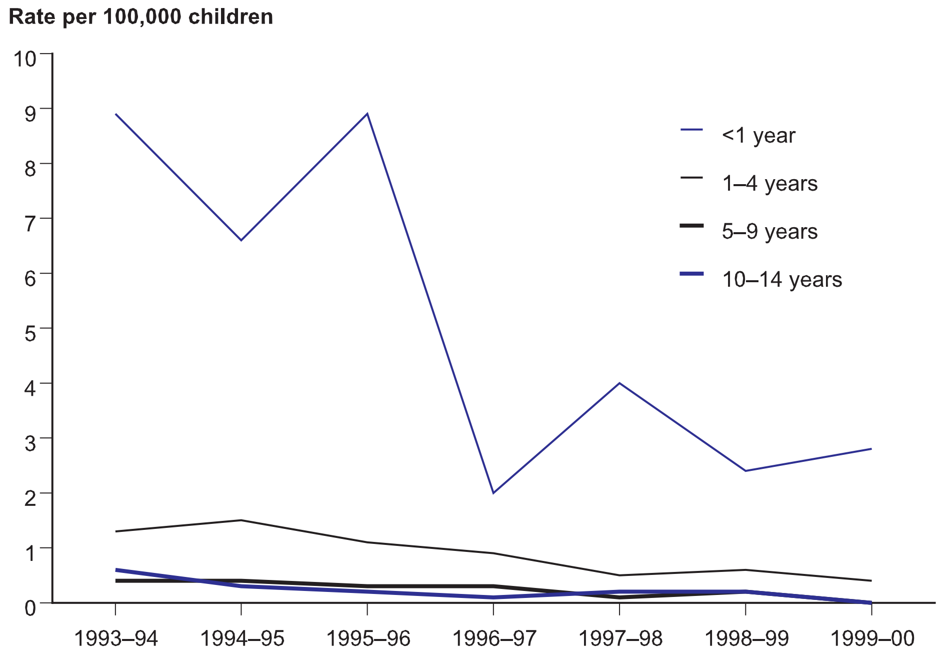
Source: Communicable Diseases Network Australia–NNDSS, unpublished data [Table A10.8].

Figure 10.11: Rubella notification rates for children aged 0–14 years, 1993–00

- The notification rates for rubella fell between 1993 and 2000, from 34.2 to 1.6 per 100,000 children aged 0–14 years. The decline was greater for boys than for girls.
- Notification rates were highest among infants.

Boys had consistently higher notification rates than girls in all age groups. The largest difference was between boys and girls aged 10–14 years. For example, in 1995 the rate for boys in that age group was 46.1 per 100,000, compared with 36.9 per 100,000 for girls. This higher incidence may be related to a lack of immunity among boys in this age group. Until 1994, only girls received a dose of rubella at age 10–16 years (NHMRC 1997a). The decline in the rate of notifications for boys aged 0–14 years since 1996 is mainly due to the fall in notifications for boys aged 10–14. This is the outcome of the introduction of adolescent vaccination for boys in 1994–95.

Time series in hospitalisation rates for children aged 0–14 years for rubella are shown in Figure 10.12.



Note: ICD-9-CM code 056 (1993–94 to 1997–98) and ICD-10-AM code B06 (1998–99 to 1999–00).
Source: AIHW National Hospital Morbidity Database [Table A10.9].

Figure 10.12: Hospitalisation rates for children aged 0–14 years for rubella, 1993–94 to 1999–00

- Hospitalisations for rubella peaked at the same time as the number of notifications. The highest hospitalisation rate for children aged 0–14 years was 1.3 per 100,000 in 1993–94, declining to 0.3 in 1999–00.
- Infants had the highest rates among all children aged 0–14 years.
- In all years and in most age groups, rates for boys were higher than for girls.

There were no recorded deaths from rubella between 1993 and 2000. Rubella is a more serious threat to unborn children whose mothers contract the disease during pregnancy (see next section).

Congenital rubella syndrome[3]

The major impact of rubella on the community is from children born with congenital abnormalities due to maternal rubella during pregnancy. According to the APSU Annual Report 2000 (APSU 2001), there were 42 cases of congenital rubella identified through the APSU between 1993 and 2000, with 27 of these children born in Australia. Of these 27 cases, 21 (78%) had defects attributable to congenital rubella, with more than half (17 cases) having multiple defects. Based on these 27 cases, the estimated

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[3] ICD-9-CM code 771.0 and ICD-10-AM code P35.0.

incidence of congenital rubella in liveborn children was 1.3 per 100,000 live births for 1993–00 and the incidence of congenital rubella with defects was 1.1 per 100,000 live births (APSU 2001).

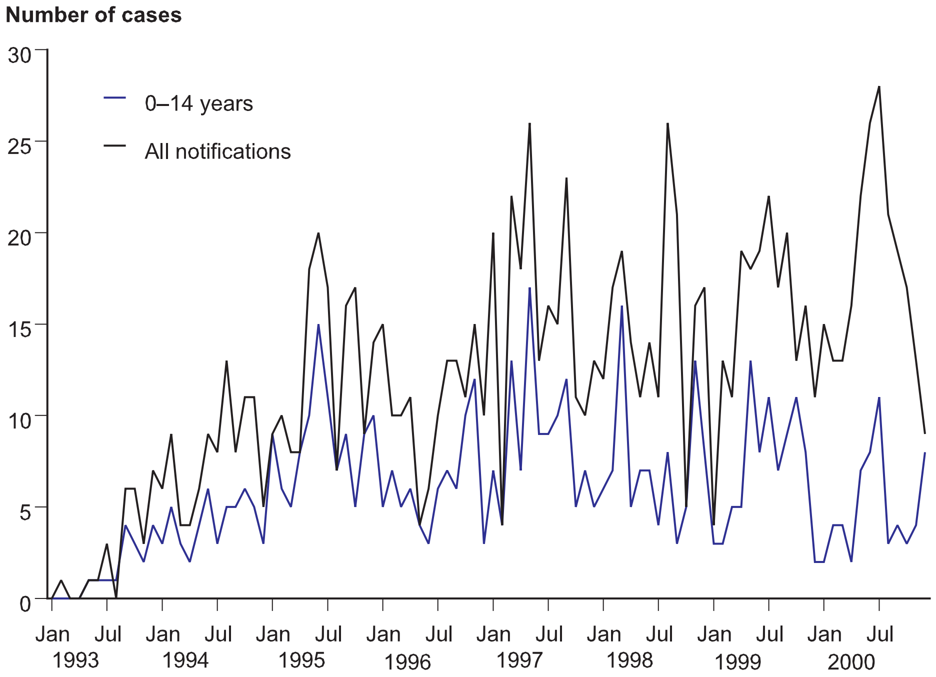
Data are also available on the number of registered cases of congenital rubella notified to each State and Territory health authority. Over the period 1981–97, there were 27 cases notified to the registers (AIHW NPSU: Hurst et al. 2001). The rate for congenital rubella over that period was estimated from these cases to be 0.1 per 10,000.

Between 1993–94 and 1999–00, there were 38 hospital admissions for children aged 0–14 years for congenital rubella. Most of the hospitalisations (70%) were of children aged 0–4 years.

Between 1993 and 2000, there were 6 recorded deaths due to congenital rubella, 3 males and 3 females. All deaths except one (an infant) were of adults older than 20 years.

Mumps

Mumps is a disease caused by viral infection. It is characterised by swelling of the salivary glands in the neck, but some infections can be without clinical symptoms. Mumps is usually a relatively mild disease in childhood. However, in about 15% of adult cases, other glands including those in the groin and the testicles can be affected and the disease can be severe. Although some complications may occur with mumps, permanent damage is rare. Loss of hearing is the most serious of the rare complications (NHMRC 2000).



Note: The difference in the scale of the number of cases in this graph compared to others in this section is due to low actual numbers of cases.

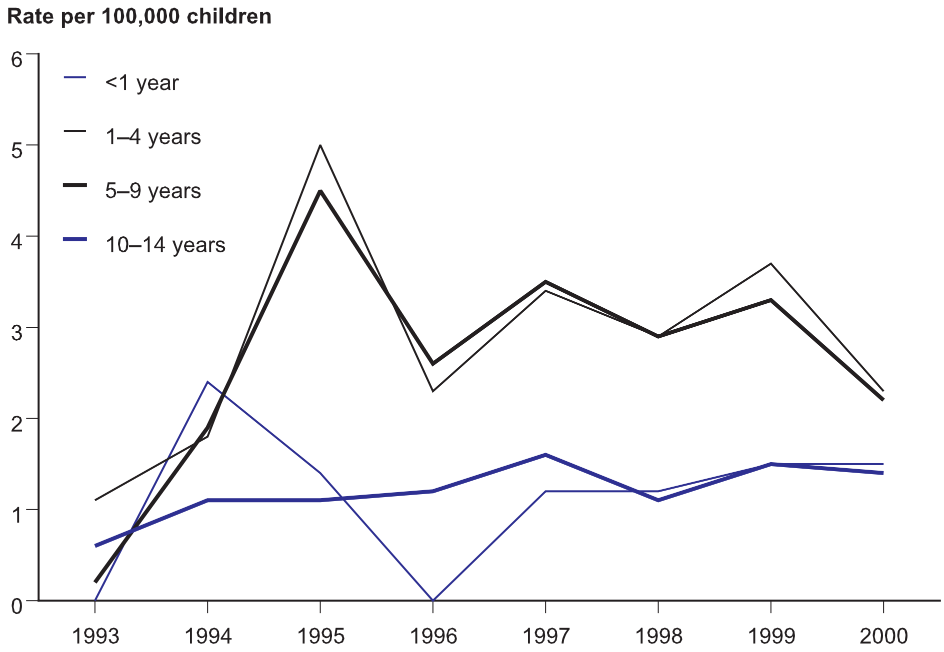
Source: Communicable Diseases Network Australia–NNDSS, unpublished data [Table A10.1].

Figure 10.13: Mumps notifications for children aged 0–14 years and for the total population, 1993–00

- Over the period 1993 to 2000, there were 1,172 total notifications of mumps. Of these, 584 cases or almost half were for children aged 0–14 years. More than half of these cases were boys (61%) and 64% were children 5 years and older.
- Notifications for mumps among children have varied from month to month, ranging from 1 to 17 cases per month.

The indicator for mumps notifications is the number of notifications for mumps in children aged 0–14 years in a given year as a rate per 100,000 children.

Time series in mumps notification rates for children aged 0–14 years are shown in Figure 10.14.



Note: Mumps was not notifiable in Queensland between July 1999 and June 2000.

Source: Communicable Diseases Network Australia–NNDSS, unpublished data [Table A10.10].

Figure 10.14: Mumps notification rates for children aged 0–14 years, 1993–00

- Notification rates for mumps are low. The average annual notification rate over the period 1993 to 2000 was 2.1 per 100,000 children. In 2000, the rate was 1.4.
- The annual notification rate has varied in recent years. The highest rate was 3.3 per 100,000 children in 1995.
- The highest notification rates were for children aged 0–4 years and 5–9 years. In all years, rates were higher for boys than for girls.
- Notification rates increased from 1993 but appear to have levelled out in 1999. The rise in notifications in the early 1990s was attributed to a combination of improved reporting and an increased incidence in the disease (McIntyre et al. 2000).

Time series in hospitalisation rates for children aged 0–14 years for mumps are shown in Table 10.2.

Table 10.2: Hospitalisations for children aged 0–14 years for mumps, 1993–94 to 1999–00

	1993–94	1994–95	1995–96	1996–97	1997–98	1998–99	1999–00
Number	13	20	23	13	11	20	14
Rate per 100,000 children	0.3	0.5	0.6	0.3	0.3	0.5	0.4

Note: ICD-9-CM code 072 (1993–94 to 1997–98) and ICD-10-AM code B26 (1998–99 to 1999–00).

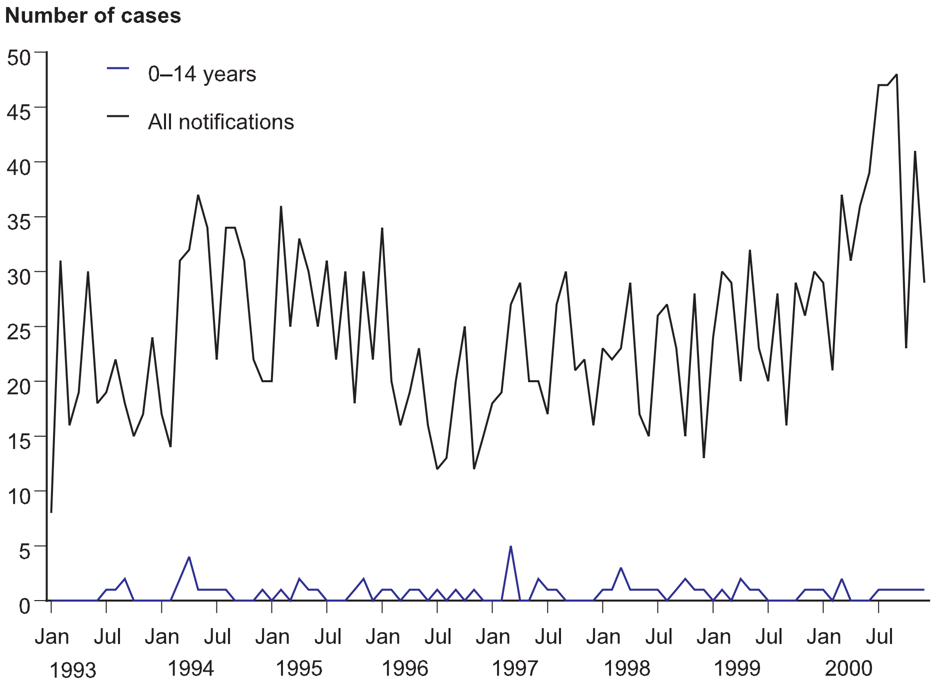
Source: AIHW National Hospital Morbidity Database.

- Over the period 1993–94 to 1999–00, there were 114 hospitalisations of children aged 0–14 years for mumps.
- The hospitalisation rate for mumps was low, and varying between 0.3 and 0.6 per 100,000 over the period. The average rate was 0.4.
- Hospitalisation rates were highest for children aged 0–4 years.

There were no recorded deaths of children from mumps between 1993 and 2000.

Hepatitis B

Infection with the hepatitis B virus causes acute hepatitis in about half of all infected adults, but in young children infection usually occurs without symptoms (NHMRC 2000). Following acute infection, 1% to 12% of those infected as adults, and importantly up to 90% of those infected as very young children, remain persistently infected for many years. As well as being able to infect others, those infected as very young children also have a significantly increased risk of chronic hepatitis and primary liver cancer in later life.



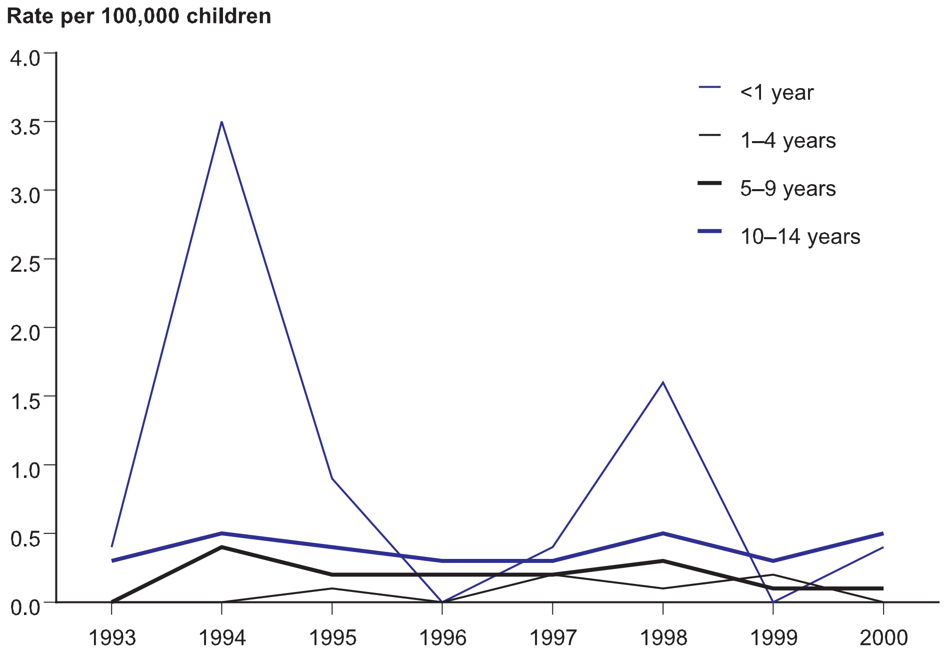
Source: Communicable Diseases Network Australia–NNDSS, unpublished data [Table A10.1].

Figure 10.15: Hepatitis B notifications for children aged 0–14 years and for the total population, 1993–00

- Notification for hepatitis B started in 1993, with the highest annual number of cases (428) recorded in 2000. The incidence of hepatitis B in children is low, being only 3% of the total notifications.
- The total number of cases notified in Australia between 1993 and 2000 was 2,374. Of the cases notified for children aged 0–14 years, the majority (71%) were for those aged 5–14 years.

The indicator for hepatitis B notifications is the number of notifications for hepatitis B in children aged 0–14 years in a given year as a rate per 100,000.

Time series in hepatitis B notification rates for children aged 0–14 years are shown in Figure 10.16.



Source: Communicable Diseases Network Australia–NNDSS, unpublished data [Table A10.11].

Figure 10.16: Hepatitis B notification rates for children aged 0–14 years, 1993–00

- The annual notification rate for children with hepatitis B was relatively stable over the period 1993–00, at around 0.1 to 0.5 per 100,000 children. In 2000, the rate was 0.2 (0.3 for girls compared with 0.2 for boys).
- The highest notification rates were for infants, and were highest in 1994 and 1998.

Time series in hospitalisation rates for children aged 0–14 years for hepatitis B are shown in Table 10.3.

Table 10.3: Hospitalisations for children aged 0–14 years for hepatitis B, 1993–94 to 1999–00

	1993–94	1994–95	1995–96	1996–97	1997–98	1998–99	1999–00
Number	6	16	14	11	14	14	16
Rate per 100,000 children	0.2	0.4	0.4	0.3	0.4	0.4	0.4

Note: ICD-9-CM codes 070.2 & 070.3 (1993–94 to 1997–98) and ICD-10-AM codes B16, B18.0 & B18.1 (1998–99 to 1999–00).

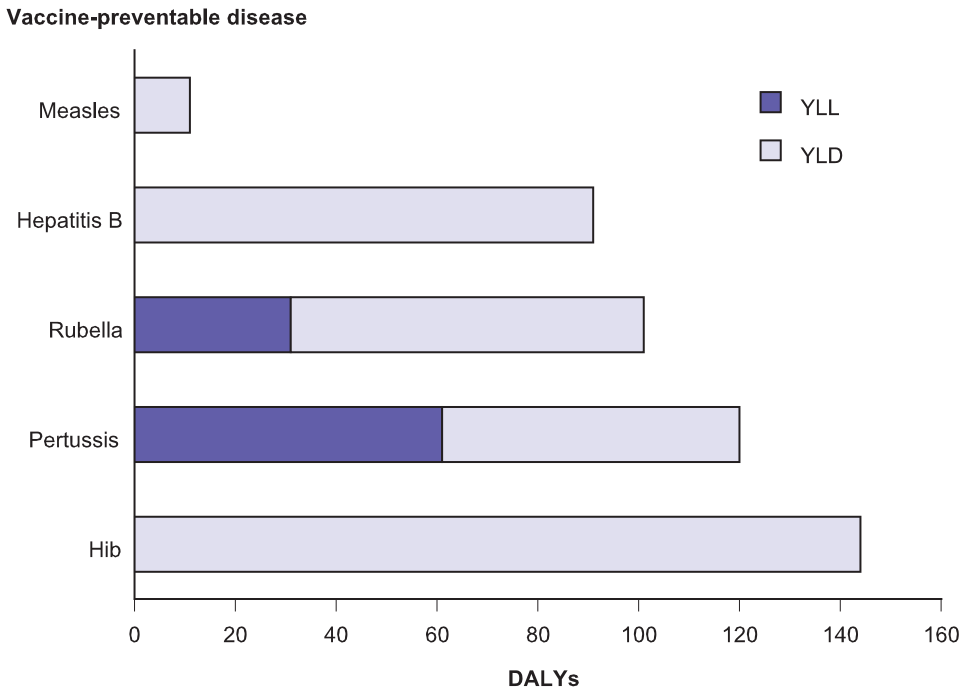
Source: AIHW National Hospital Morbidity Database.

- Between 1993–94 and 1999–00, there were 91 hospitalisations of children aged 0–14 for hepatitis B. The average hospitalisation rate was 0.3 per 100,000 children.
- The rate remained relatively steady over the period—between 0.2 and 0.4 per 100,000 children each year.
- Hospitalisations were highest among children aged 10–14 years and 5–9 years.

There were no deaths of children from hepatitis B during the period 1993 to 2000. The risk of death from hepatitis B for acutely infected children increases as they become adults.

Burden of disease attributable to vaccine-preventable disease

In 1996, vaccine-preventable diseases were estimated to account for 467 DALYs or 0.2% of the total burden of disease in children aged 0–14 years (AIHW: Mathers et al. 1999). This is a reflection of the fact that these diseases no longer exert a heavy toll on children. The burden was higher for boys (56% of the total) than for girls (44%). The burden of vaccine-preventable diseases is largely accounted for by the disability burden (375 YLL; 80%). The mortality burden accounted for 20% of the total burden (92 YLL). The burden of disease due to certain vaccine-preventable diseases is shown in Figure 10.17.



Source: AIHW: Mathers et al. 1999 [Table A10.12].

Figure 10.17: Total burden of disease from vaccine-preventable diseases in children aged 0–14 years, 1996

- *Haemophilus influenzae* type b was responsible for the greatest burden of disease among vaccine-preventable diseases (31% of the total burden) in 1996.
- Pertussis accounted for 26% of the total burden, rubella for 22% and hepatitis B for 19%. Measles was responsible for only 2%.
- The entire burden in Hib, hepatitis B and measles was due to disability, while in rubella and pertussis the burden was due to both disability and mortality.

11. Other communicable diseases

This chapter presents information on other communicable diseases in children. This is a selective coverage of certain communicable diseases which are thought to be important to monitor in children. These include meningococcal disease, invasive pneumococcal disease, varicella (chickenpox), rotavirus, respiratory syncytial virus, hepatitis A and rheumatic fever. Of these diseases, hepatitis A and meningococcal disease have been notifiable in Australia since 1991, and invasive pneumococcal disease since 2001. Although vaccines are available for most of these diseases, they are not currently included in the recommended childhood immunisation schedule. This is partly related to a combination of factors, including the lack of effectiveness of certain vaccines to warrant their universal use, or where cost-benefit analysis indicates that it is more cost effective if the vaccines are indicated only for those at high risk of the disease. However, intervention against a number of diseases through publicly funded programmes is currently being considered. These diseases include varicella, meningococcal disease and invasive pneumococcal disease (DHA, pers. comm., April 2002).

Information on notifiable communicable diseases is derived from the National Notifiable Diseases Surveillance System (NNDSS) maintained by the Commonwealth Department of Health and Ageing. Information on deaths and hospitalisations is derived from the AIHW Mortality Database and the AIHW National Hospital Morbidity Database.

Meningococcal disease

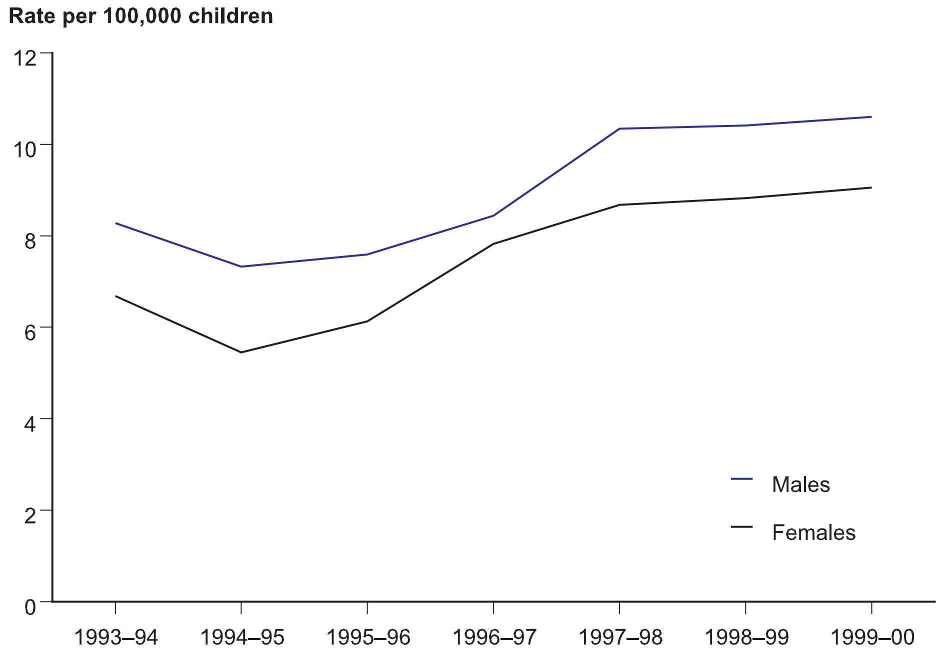
Meningococcal infections are caused by the bacterium *Neisseria meningitidis* (meningococcus). Strains of this bacterium can be divided into 13 distinct groups (serogroups), with serogroups A, B and C accounting for over 90% of cases of meningococcal disease. Meningococci are a common cause of bacterial meningitis in Australia. Meningococcal disease mainly affects children under 5 years and adolescents. Transmission occurs between people through infected droplets and respiratory secretions spread by coughing, sneezing, kissing, and sharing utensils or food. The case fatality rate from invasive meningococcal diseases is about 10% (NHMRC 2000).

In Australia, the incidence of meningococcal disease and the frequency of outbreaks have been rising over the last decade. Most of the notifiable cases in 2000 (93%) were due to serogroups B and C. Serogroup B caused the majority of meningococcal disease nationally (56%) and in all States and Territories, except in Victoria where serogroup C disease predominated (54%). Serogroup C is associated with a significantly higher case fatality rate (12%) than serogroup B (5.9%) (Tapsall 2001). Between 1993 and 2000 there were 1,818 notifications for meningococcal disease in children aged 0–14 years. Notification rates were highest for children aged 0–4 years (NNDSS, unpublished data).

No one vaccine is effective against all types of meningococcus. One available vaccine is effective against some types (A, C, Y and W135), but not against type B, which is responsible for most of the disease. Also, this vaccine is effective in older children and adults, but less effective in children under 2 years (Patel et al. 1997). Therefore, routine vaccination of children with the available vaccine is not recommended at the present time (NHMRC 2000). School or community-based vaccination programs, however, have been used in Australia to manage clusters of outbreaks of the disease. In the UK, a conjugate meningococcal group C vaccine introduced among people aged 0–18 years resulted in a dramatic decline in the incidence and death due to serogroup C in this age group (Miller et al. 2001). The use of this vaccine in Australian children and adolescents is currently being considered (DHA, pers. comm., April 2002).

As effective management of an individual with meningococcal disease relies on the accuracy of the diagnosis (which in some cases can be difficult), it is recommended that when meningococcal disease is suspected, immediate intravenous antibiotic therapy be used. It has also been recommended that antibiotics against the other common causes of meningitis, which include *Streptococcus pneumoniae* and *Haemophilus influenzae* type b, be used.

Hospitalisations



Note: ICD-9-CM code 036 (1993–94 to 1997–98) and ICD-10-AM code A39 (1998–99 to 1999–00).

Source: AIHW National Hospital Morbidity Database [Table A11.1].

Figure 11.1: Hospitalisation rates for children aged 0–14 years for meningococcal disease, 1993–94 to 1999–00

- There were 2,224 hospitalisations of children aged 0–14 years due to meningococcal disease between 1993–94 and 1999–00. Of all hospitalisations, 56% were of boys and 44% girls.
- The overall hospitalisation rate rose from 7.5 per 100,000 children aged 0–14 years to 9.8 per 100,000, an increase of 31%. The rate was consistently higher for boys than for girls. Although rates rose for both boys and girls, the increase was greater for girls. Hospitalisation rates for girls rose from 6.7 to 9.1 (a 36% increase), while those for boys rose from 8.3 to 10.6 (a 28% increase).

Deaths

Table 11.1: Meningococcal disease deaths of children aged 0–14 years, 1991–00

	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Number	15	12	18	12	11	14	9	15	14	12
Rate per 100,000 children	0.4	0.3	0.5	0.3	0.3	0.4	0.2	0.4	0.4	0.3

Note: ICD-9 code 036 (1991 to 1996) and ICD-10 code A39 (1997 to 2000).

Source: AIHW Mortality Database.

- Between 1991 and 2000, 132 children aged 0–14 years died from meningococcal disease. Over half of these deaths (55%) were of boys. The majority (82%) were children under 5 years. Of children who died from meningococcal disease, 8% (11) were Aboriginal and Torres Strait Islander children.
- In 2000, the death rate was 0.4 per 100,000 boys and 0.3 per 100,000 girls. Of the 12 children who died in 2000, the majority (83%) were under 10 years of age.

Invasive pneumococcal disease

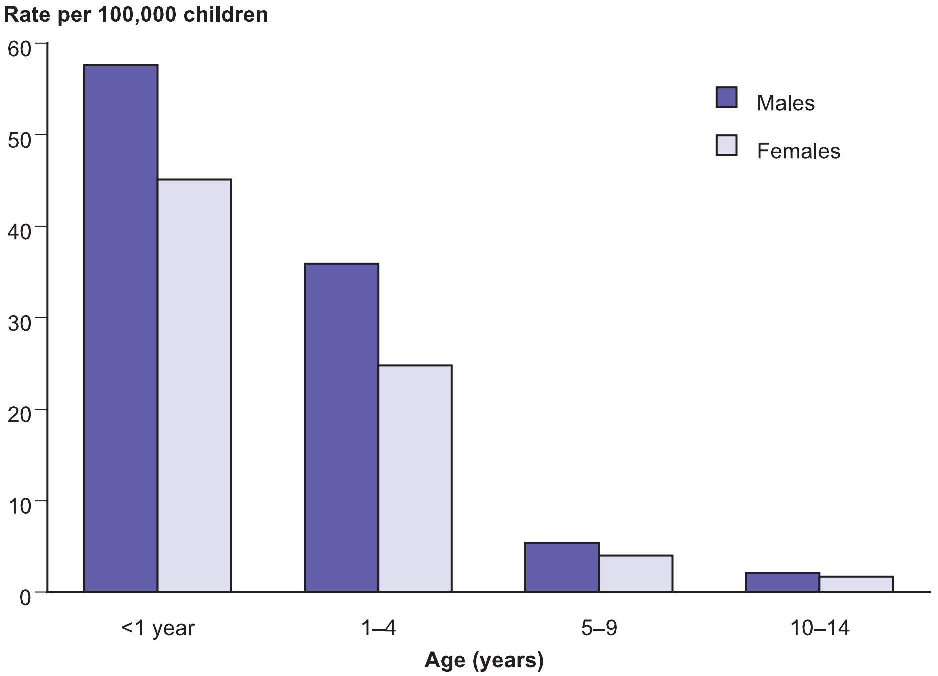
Invasive pneumococcal disease (IPD) is caused by the bacterium *Streptococcus pneumoniae* (the pneumococcus) which usually inhabits the upper respiratory tract. It can spread from the nasopharynx to cause infection in other parts of the respiratory tract. The major clinical conditions of invasive pneumococcal disease are pneumonia, bacteraemia, meningitis and otitis media—with pneumonia being the most common clinical disease. Although up to 90 types (serogroups) have been identified (each inducing a specific immune response), only a limited number are responsible for causing most of the disease. In a study carried out in Western Australia, 18 types were responsible for causing disease in 92% of cases (NHMRC 2000).

Management of IPD relies on the use of antibiotics. The increasing rates of antimicrobial resistance in pneumococcus, however, represent major problems for therapy for IPD, especially for meningitis. Resistance to penicillin rose from 1% in 1989 to 7% in 1994, and to more than 20% in 1997 (Turnidge et al. 1999). This increased resistance has implications for life-threatening as well as non-life-threatening infections with pneumococcus.

In Australia, the incidence of IPD is highest among Aboriginal and Torres Strait Islander people, and this incidence is as high as anywhere in the world (Torzillo et al. 1995). The incidence was estimated to be 76 per 100,000 Indigenous people, compared with 6 per 100,000 other Australians (NHMRC 2000). In a survey carried out in central Australia, there were 185 episodes of IPD; of these, 88% were in Indigenous people. More than half of these cases were in children under 5 years. Indigenous children are 11 times more likely to suffer IPD than other Australian children (Torzillo et al. 1995). Among Indigenous children under 2 years, the incidence was 2,053 per 100,000 children. The main diagnoses in Indigenous children were pneumonia, meningitis and septicemia. The case fatality rate for Indigenous children aged 1–4 years was 2%.

The currently available vaccine contains components derived from the 23 most frequent types causing pneumonia infections in the USA. These are similar to the types causing the disease in Australia. Although most adults appear to respond to the vaccine, the response among children under 2 years is poor (NHMRC 2000). Pneumococcal vaccines are funded by the Commonwealth Government for all Aboriginal and Torres Strait Islander adults aged 50 years and over, and for other age groups where the person is at an increased risk of complications from pneumococcal disease. In 2001, a conjugate pneumococcal vaccine was introduced for children at high risk: Indigenous children under 2 years of age, and children with predisposing medical conditions (DHA, pers. comm., April 2002).

Hospitalisations



Note: ICD-10-AM codes A40.3 (Septicaemia due to *Streptococcus pneumoniae*), G00.1 (Pneumococcal meningitis) & J13 (Pneumonia due to *Streptococcus pneumoniae*).

Source: AIHW National Hospital Morbidity Database [Table A11.2].

Figure 11.2: Hospitalisation rates for children aged 0–14 years for invasive pneumococcal disease, 1999–00

- In 1999–00, there were 528 hospitalisations of children aged 0–14 years for pneumococcal disease. Of all hospitalisations, 59% were of boys and 41% girls.
- The rates were highest for infants, followed by children aged 1–4 years: 51.5 per 100,000 infants, compared with 30.5 per 100,000 children aged 1–4 years.

Deaths

Between 1997 and 2000, 21 children aged 0–14 years died from invasive pneumococcal disease. Of these, 2 were Aboriginal and Torres Strait Islander children.

Varicella (Chickenpox)

Chickenpox is a highly contagious infection caused by the varicella-zoster virus. In healthy children, chickenpox is usually a mild disease of short duration, with an average incubation (time between infection and the appearance of symptoms) of about 2 weeks. The majority of children (75%) will have had chickenpox by the age of 12.

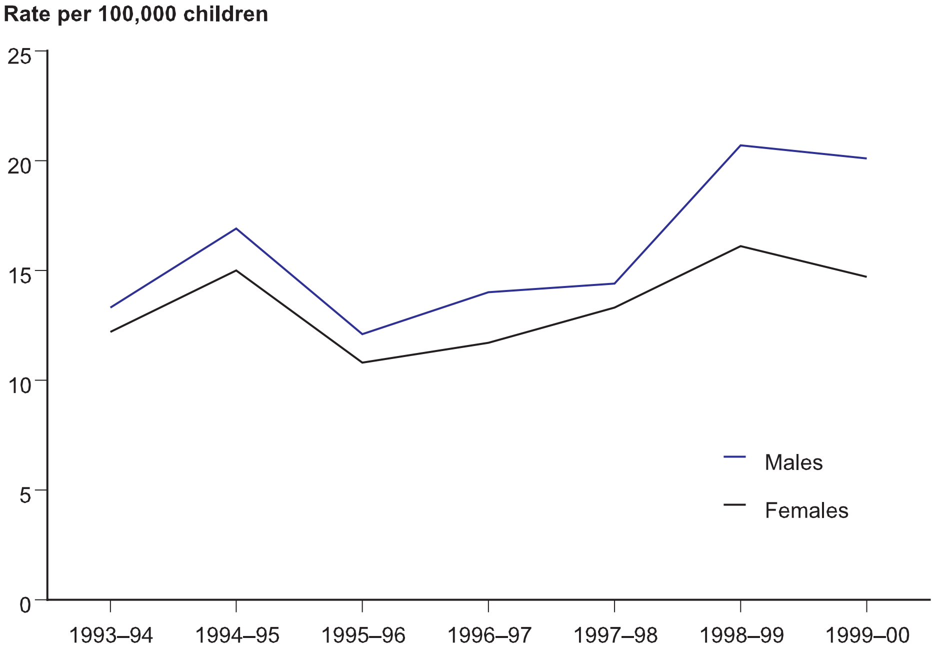
Chickenpox is more severe and can cause serious and fatal illness at any age if the immune system is weakened or suppressed. For children with weakened immune systems, the case fatality rate is estimated to be between 7% and 10%, compared with between 0.1% and 0.4% among healthy children (NHMRC 2000).

Chickenpox is more serious in adults, and although only about 2% of the cases occur in adults, they account for 25% of all varicella-zoster viral-related deaths (Joseph & Noah 1988). Varicella-zoster can cause severe illness in pregnant women, the foetus and the newborn baby. The impact of this viral infection during pregnancy for the mother and the foetus varies with the period of gestation. For the mother, the risk of adverse effects is greatest in the third trimester, whereas for the foetus the risk is greatest in the first and second trimesters (Heuchan & Isaacs 2001).

Chickenpox during pregnancy may result in foetal varicella, which is a mild and self-limiting disease. Occasionally, however, it produces a characteristic pattern of abnormality known as congenital varicella syndrome (CVS), which includes congenital malformations such as skin scars, limb underdevelopment and eye damage. The incidence of CVS in Australia is estimated to be 1 in 107,000 pregnancies (NHMRC 2000).

There are two vaccines available for varicella in Australia which have been approved by the NHMRC for use in children from 12 months of age. These vaccines, however, are not currently included in the standard childhood immunisation schedule. They have been recommended for adults in high-risk occupations (workers in day care centres, teachers and health workers) and for non-immune women prior to pregnancy. The Commonwealth Department of Health and Ageing is currently considering the benefits of including the varicella vaccine on the NHMRC vaccination schedule (DHA, pers. comm., April 2002).

Hospitalisations



Note: ICD-9-CM code 052 (1993–94 to 1997–98) and ICD-10-AM code B01 (1998–99 to 1999–00).

Source: AIHW National Hospital Morbidity Database [Table A11.3].

Figure 11.3: Hospitalisation rates for children aged 0–14 years for varicella, 1993–94 to 1999–00

- Between 1993–94 and 1999–00, there were 3,962 hospitalisations of children aged 0–14 years due to varicella: 56% were of boys and 44% girls.
- The hospitalisation rate increased from 12.8 to 17.5 per 100,000 children. The rate was consistently higher for boys than for girls; although rates rose for both, the increase was higher for boys. Hospitalisation rates for boys rose from 13.3 to 20.1, a 51% increase, while those for girls rose by 20%, from 12.2 to 14.7.

In 1999–00, hospitalisation rates were highest for infants, followed by those aged 1–4 years: 49.5 per 100,000 infants, compared with 34.3 per 100,000 children aged 1–4 years. The rate was substantially lower for children aged 10–14 years at 3.9 per 100,000.

The greatest difference in hospitalisation rates between boys and girls was for infants, where rates were 1.7 times higher for boys.

Deaths

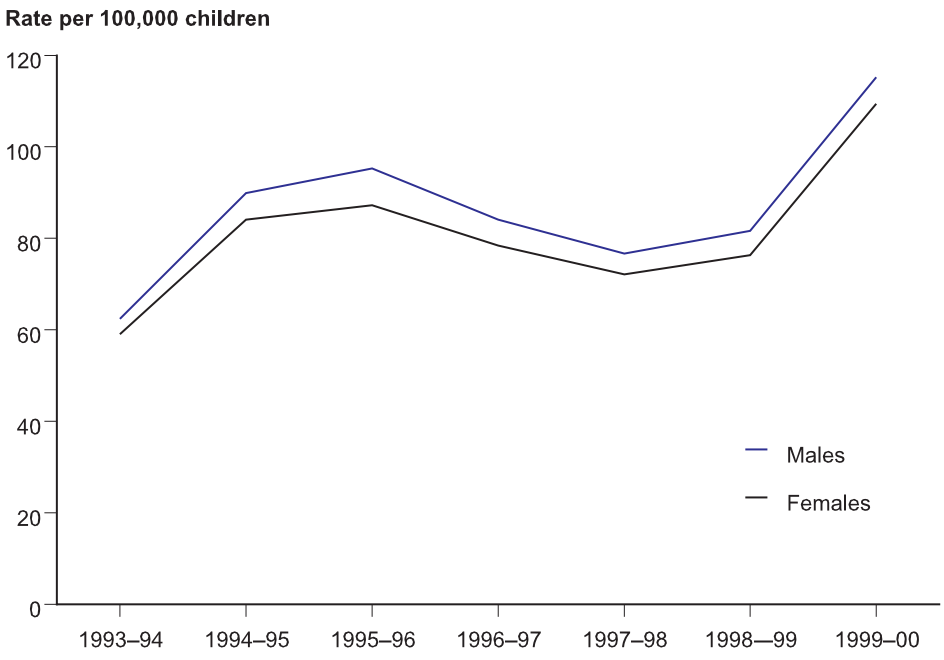
Death from chickenpox among children is not common. Between 1991 and 2000, there were 20 deaths of children aged 0–14 years attributed to chickenpox.

Rotavirus

Rotavirus is a major cause of gastroenteritis, affecting infants and young children worldwide. In some children the illness is mild with only some watery diarrhoea, while in others it can be severe, with fever, vomiting and diarrhoea leading to dehydration. In Australia, it has been estimated that between 50% and 60% of hospitalisations of children with acute gastroenteritis can be attributed to rotavirus (Ferson 1996; Carlin et al. 1998).

Because of the public health benefits, preventing rotavirus gastroenteritis through vaccination has an obvious appeal. Currently, vaccination trials are in progress to determine the effectiveness of different vaccines. However, as an interim measure, it is recommended that efforts should be directed towards improving the management of acute cases of gastroenteritis in children presenting in emergency departments and in community settings, where evidence indicates that management is not optimal (Ferson & Henry 1998).

Hospitalisations



Note: ICD-9-CM code 008.61 (1993–94 to 1997–98) and ICD-10-AM code A08.0 (1998–99 to 1999–00).
Source: AIHW National Hospital Morbidity Database [Table A11.4].

Figure 11.4: Hospitalisation rates for children aged 0–14 years for rotaviral enteritis, 1993–94 to 1999–00

- Between 1993–94 and 1999–00, there were 22,450 hospitalisations of children aged 0–14 years due to rotavirus. Throughout this period, the hospitalisation rate was always higher for boys than for girls.
- The rate rose from 60.8 per 100,000 children in 1993–94 to 112.4 in 1999–00, an increase of 85%.
- In 1999–00, the rate was highest for infants and for children aged 1–4 years: 406.4 per 100,000 infants, compared with 297.4 per 100,000 children aged 1–4 years.
- Among infants, the hospitalisation rate was higher for boys (450.6 per 100,000) than for girls (359.9).

Deaths

Between 1997 and 2000, 1 male infant died from rotavirus (in 1999). It is difficult to estimate deaths prior to 1997 because ICD-9 codes are not specific enough to obtain these data.

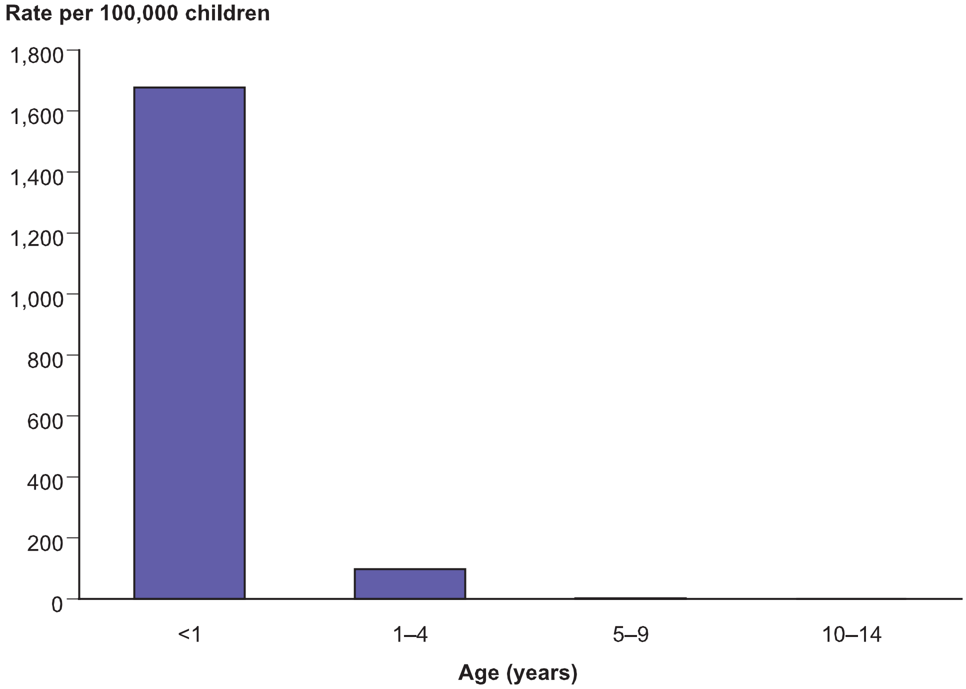
Respiratory syncytial virus

Respiratory syncytial virus is the major cause of lower respiratory infections in infants. The virus is highly infectious, and is transmitted by close contact, coughing or sneezing. Annual outbreaks cause many hospital admissions, putting a high strain on the hospital system. The peak incidence of the disease is between 1 and 6 months of age (NHMRC 2000). It is estimated that around 3% of each year's birth cohort are admitted to hospital with bronchiolitis every winter in Europe, Australasia and North America (Allport et al. 1997). In infants, it was estimated that 25–40% of infections with respiratory syncytial virus lead to pneumonia and bronchiolitis (NHMRC 2000). Traditionally, certain groups of infants are considered to be at a high risk of developing severe respiratory syncytial virus bronchiolitis. These include infants born prematurely, and those with chronic lung disease due to prematurity, other cardio-respiratory disease or those with some form of immunodeficiency (Sharland & Bedford-Russell 1999).

There is currently no available vaccine for respiratory syncytial virus. Treatment includes the use of bronchodilators, anti-inflammatory drugs and antibodies to neutralise the virus. One type of antibody has been registered in Australia to prevent serious lower respiratory tract disease caused in children at high risk of respiratory syncytial virus infection (NHMRC 2000). Results from initial clinical trials in the United Kingdom with this product showed a relative reduction in hospital admissions related to respiratory syncytial virus of 55% among infants born prematurely (Sharland & Bedford-Russell 1999).

Hospitalisations

As the disease classification code prior to 1997–98 (ICD-9-CM) was only specific to respiratory syncytial virus pneumonia, data on hospitalisations are only presented for the most recent year 1999–00.



Note: ICD-10-AM code B97.4 (RSV), J12.1 (RSV pneumonia), J20.5 (acute RSV bronchitis), J21.0 (acute RSV bronchiolitis).
Source: AIHW National Hospital Morbidity Database [Table A11.5].

Figure 11.5: Hospitalisation rates for children aged 0–14 years for respiratory syncytial virus, 1999–00

- In 1999–00, there were 5,224 hospitalisations of children aged 0–14 years for respiratory syncytial virus (pneumonia, acute bronchitis, acute bronchiolitis): 58% boys and 42% girls.
- The overall hospitalisation rate was 142 per 100,000. Rates were highest among infants, followed by children aged 1–4 years: 1,677 per 100,000 infants, compared with 98 per 100,000 children aged 1–4 years.

Deaths

Between 1997 and 2000, 1 female infant died from respiratory syncytial virus (in 1999). As the disease classification code prior to 1997 (ICD-9) was only specific to respiratory syncytial virus pneumonia, data on deaths are only presented for the most recent years.

Hepatitis A

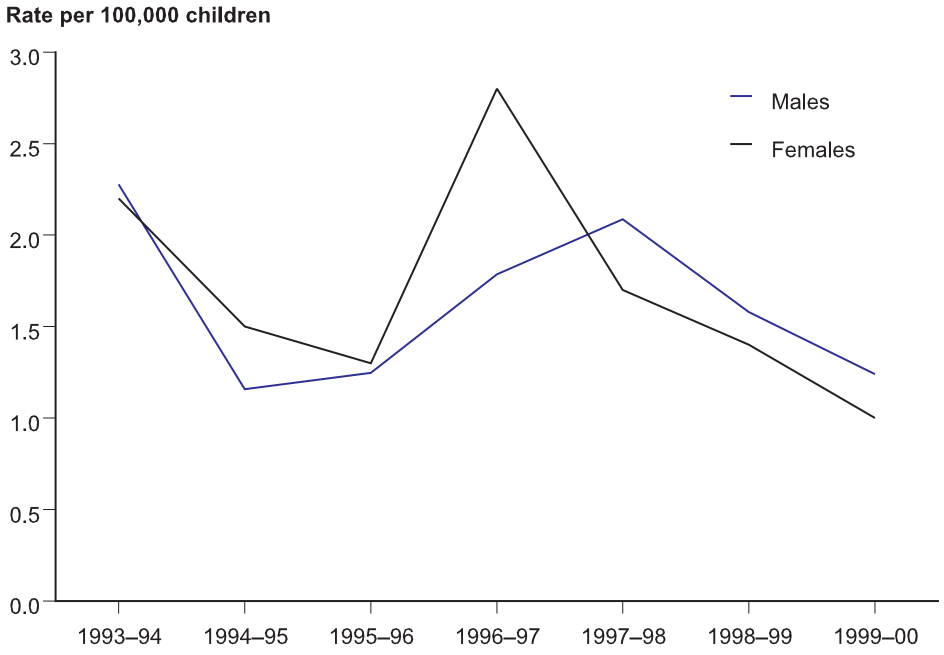
Hepatitis A is an acute infection of the liver caused by the hepatitis A virus. The virus is transmitted by a faecal oral route, and the incubation period ranges from 14 to 50 days. Infected individuals excrete the virus in their faeces for 2 weeks prior to illness, and for 1 week after the appearance of symptoms.

Fulminant (severe, rapidly developing) hepatitis A is rare in children in industrialised countries. Occasional cases tend to be among children who travelled to hepatitis A endemic countries or who live in conditions of considerable socioeconomic disadvantage and poverty. Hepatitis A is readily transmitted in environments with inadequate sanitation and water supply, low hygiene and overcrowding.

The incidence of hepatitis A viral infection (HAV) in Aboriginal and Torres Strait Islander children is higher than in other Australian children. In north Queensland, the incidence in 1996–97 was found to be up to 6 times higher among Indigenous people than among other Australian people. Indigenous people accounted for 29% of all HAV infections, but accounted for only 8% of the population. The notification rate for hepatitis A among children aged less than 5 years was 264 per 100,000 children, compared with 10 per 100,000 other Australian children in that age group (Merritt et al. 1999).

It has been argued that an effective hepatitis A control program requires effective vaccines as well as more general programs to improve Aboriginal and Torres Strait Islander health (McCaughan & Torzillo 2000). Vaccination of preschool aged Indigenous children could provide a means of preventing cases of fulminant hepatitis A in Indigenous communities, as well as reducing the extent of future outbreaks in these communities (Hanna et al. 2000).

Hospitalisations



Note: ICD-9-CM code 0700, 0701 and ICD-10-AM code B15.

Source: AIHW National Hospital Morbidity Database [Table A11.6].

Figure 11.6: Hospitalisation rates for children aged 0–14 years for viral hepatitis A, 1993–94 to 1999–00

- Between 1993–94 and 1999–00, there were 455 hospitalisations for hepatitis A of children aged 0–14 years. The hospitalisation rate for children aged 0–14 years was highest in 1996–97 (2.3 per 100,000 children) and lowest in 1999–00 (1.1 per 100,000 children).
- The rate declined from 2.2 in 1993–94 to 1.1 per 100,000 in 1999–00, although the rate for girls peaked in 1996–97 at 2.8. While rates were higher for girls than for boys during the early part of the review period, the opposite was true during the later part.
- With the exception of 1996–97, the highest hospitalisation rates were for children aged 5–9 years.

Deaths

Death from hepatitis A is uncommon. Since 1991, there have been 3 deaths, all of children aged under 5 years. Two were of girls aged 4 years, and both died in 1998. The third child was a boy aged 2 years who died in 1994. All deaths were of Aboriginal and Torres Strait Islander children.

Rheumatic fever and rheumatic heart disease

Rheumatic fever is a recurrent disease, caused by group A streptococcus bacteria associated with infections of the throat and the skin. Rheumatic fever occurs mainly in children and young adults and is characterised by fever, inflammation, pain and swelling in and around the joints, and inflammatory involvement of the pericardium and valves of the heart. Repeated attacks of acute rheumatic fever lead to cumulative damage to the heart valves and muscles, leading to rheumatic heart disease.

Rheumatic fever used to be a common disease in paediatric hospitals in Australia in the early part of the 20th century (Carapetis & Currie 1998). Its decline occurred as a result of economic development and improved living conditions. Rheumatic fever continues, however, to be common among socially and economically disadvantaged populations worldwide and in disadvantaged population groups living in affluent countries, such as Aboriginal and Torres Strait Islander people. Aboriginal people living in the Top End of the Northern Territory have one of the highest reported incidences of acute rheumatic fever in the world (Carapetis et al. 1996). In this population, the annual incidence between 1989 and 1993 was estimated to be between 2 and 7 cases per 1,000 children aged 5–14 years. Up to 3% of some Aboriginal communities have rheumatic heart disease, while, in contrast, prevalence of the disease in non-Aboriginal populations is 0.014% (Carapetis & Currie 1998).

The causes of the high rates of rheumatic fever among Aboriginal and Torres Strait Islander people are thought to be overcrowding, poor living conditions and sanitation, which expose children to group A streptococci, and limited access to medical care.

In the short term, prevention strategies which rely on accurate diagnosis of rheumatic fever and timely treatment with penicillin can be used. However, in the long term, improving the living standards of Indigenous Australians, especially those living in remote communities, is the only cost-effective viable objective. This strategy will impact not only on rheumatic fever levels but also on a number of other communicable diseases which continue to afflict Aboriginal and Torres Strait Islander children.

Incidence of rheumatic fever

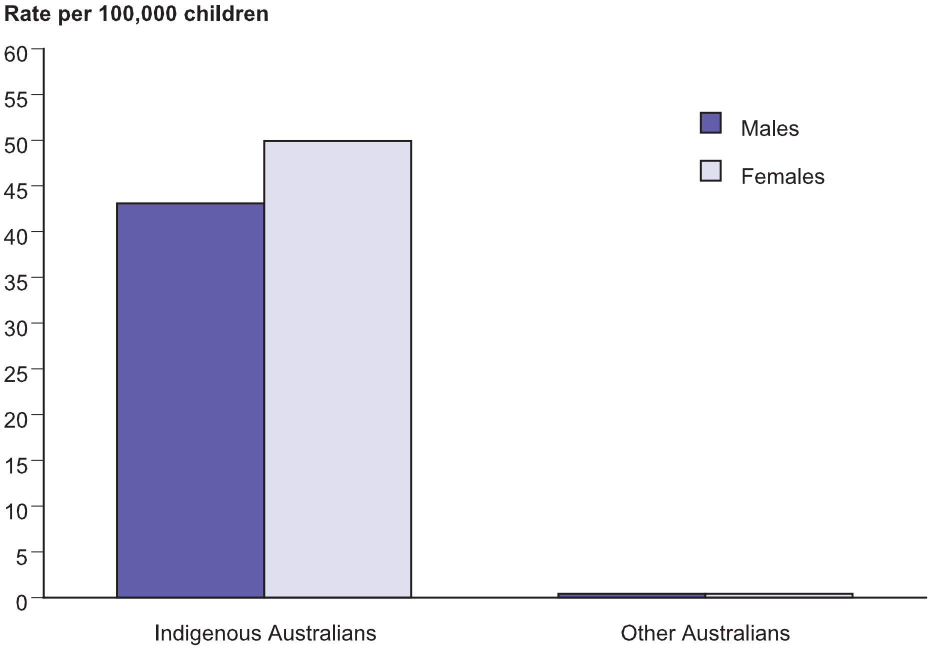
Table 11.2: Rheumatic fever among Aboriginal and Torres Strait Islander children aged 5–14 years in the Top End of the Northern Territory, 1994–01

Year	Number	Rate per 100,000 children
1994	18	204
1995	13	148
1996	21	238
1997	14	159
1998	24	270
1999	17	191
2000	14	154
2001	13	143

Sources: AIHW 2001b (1994 to 1999); Northern Territory Rheumatic Heart Disease Register, unpublished data (2000 to 2001).

- Between 1994 and 2001, there were 134 cases of rheumatic fever in Aboriginal and Torres Strait Islander children aged 5–14 years.
- The rate of acute rheumatic fever among Indigenous children in 2001 was the lowest over this period.

Hospitalisations



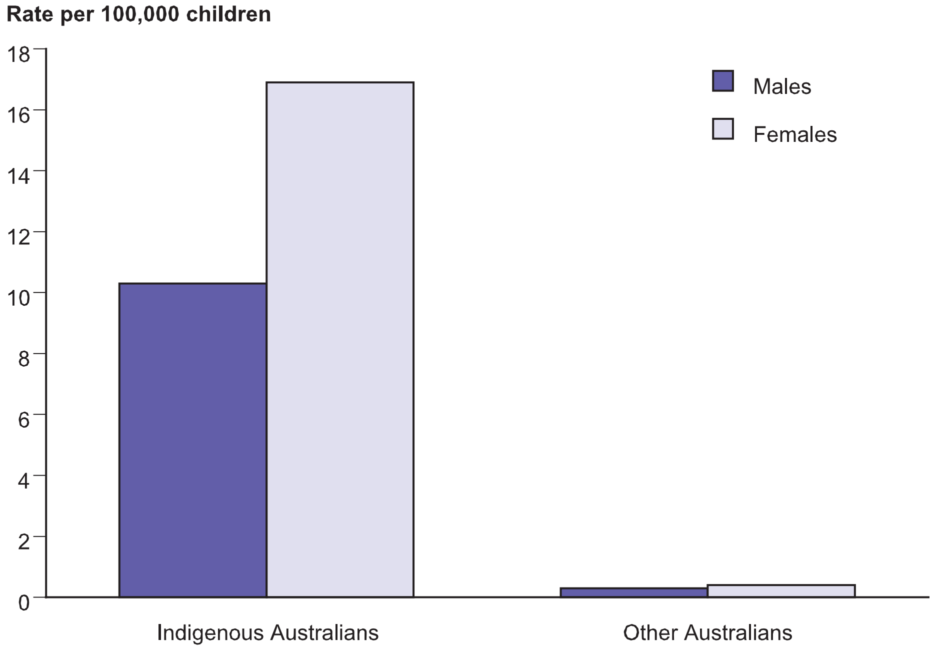
Note: ICD-10-AM codes I00–I02.

Source: AIHW National Hospital Morbidity Database [Table A11.7].

Figure 11.7: Hospitalisation rates for Aboriginal and Torres Strait Islander and other Australian children aged 0–14 years for rheumatic fever, 1999–00

- In 1999–00, there were 88 hospitalisations for acute rheumatic fever in children aged 0–14 years. Of these, 82% were Aboriginal and Torres Strait Islander children.
- The rate of hospitalisation of Indigenous children was 46.4 per 100,000, compared with 0.4 per 100,000 for other Australian children.
- Among Indigenous children, hospitalisations were higher for girls (53%, with a rate of 49.9) than for boys (47%, with a rate of 43.1).

Repeated attacks of rheumatic fever can lead to rheumatic heart disease. Hospitalisation rates for children aged 0–14 years for rheumatic heart disease in 1999–00 are shown in Figure 11.8.



Note: ICD-10-AM code I05–I09.

Source: AIHW National Hospital Morbidity Database [Table A11.8].

Figure 11.8: Hospitalisation rates for Aboriginal and Torres Strait Islander and other Australian children aged 0–14 years for rheumatic heart disease, 1999–00

- In 1999–00, there were 33 hospitalisations for rheumatic heart disease in children aged 0–14 years. Of these, 64% were of Indigenous children and 36% of other Australian children. This represents a rate of 13.5 per 100,000 for Indigenous children, compared with just 0.3 for other Australian children.
- Among Indigenous children, the hospitalisation rate was 1.6 times higher for girls than for boys (16.9 compared with 10.3).

Deaths

Between 1991 and 2000, 3 children died from rheumatic fever; none was identified as Aboriginal and Torres Strait Islander. Over the same period, 6 children died from rheumatic heart disease; all but one were Indigenous.

Part V: Chronic diseases

Chapter 12: Asthma

Chapter 13: Diabetes

Chapter 14: Cancer

Chapter 15: Other chronic diseases

Chapter 16: Mental health problems and disorders

A chronic disease is defined here as one which is generally characterised by uncertain cause, multiple risk factors, and a long period of illness, does not improve without treatment and is rarely able to be completely cured (McKenna et al. 1998). The focus of this section of the report is chronic non-communicable diseases. While a number of communicable or infectious diseases can be chronic in nature, such as HIV/AIDS and hepatitis C, these conditions are not included here.

Long-term illnesses and long periods of hospital treatment are commonly associated with older people and not with children. However, a small but significant number of children suffer from chronic diseases. These diseases cause stress on children and their families, and demand substantial amounts of time, energy and personal resources in order to cope with the situation (Jessop & Stein 1989).

There are many different types of chronic diseases and conditions. Some are present at birth, while others may develop at a later stage during infancy or childhood. The wide scope of chronic diseases and conditions encompasses such problems as inborn errors of metabolism, birth defects, unresolved respiratory problems in very low birthweight infants, spina bifida, cerebral palsy, diabetes, haemophilia, cystic fibrosis, severe asthma, muscular dystrophy, cancers, head injuries and seizures. While some children with chronic diseases or conditions of childhood may grow out of them later in life, most will not be able to lead normal lives in the absence of special care or management (Stein 1989). However, if the problem is routinely managed, many children with chronic diseases and conditions can function well and live almost normal lives.

Chronic diseases in childhood are significant for several reasons. An important consideration is that they occur at a time when they threaten the normal trajectory of a child's development. The care of children with chronic diseases is extremely complex and fragmented. Care is frequently very costly and the costs are magnified because the diseases continue over a long time and their cumulative toll on children and their families is high in social, psychological and economic terms. Also, because children with chronic diseases are also growing developmentally and emotionally, their care needs are very different from those of chronically ill adults.

Just as the socioeconomic status of the family can influence child health, it is also an important factor in the outcome of a chronic childhood illness. Family composition, and economic, social and personal resources, greatly influence the ability of a family to meet the needs of a chronically ill child (Jessop & Stein 1989).

Finally, there is evidence that chronically ill children, and their families, are at greater risk of developing psychological and emotional difficulties than other children and their families. The Ontario Child Health Survey estimated the risk of psychiatric disorders for those with chronic conditions to be twice as high as that for healthy children (Cadman et al. 1987). This consequence of chronic illness is preventable.

The majority of children overcome the obstacles that chronic illness presents. However, it is important to normalise as much as possible the life experiences of these children, minimising periods of hospitalisation, and maintaining contact with family and friends.

This next section presents information on a number of chronic diseases and conditions. These include asthma, diabetes, cancer, cerebral palsy, epilepsy, cystic fibrosis and mental health problems. Most of the information is derived from hospital morbidity data and death data.

12. Asthma

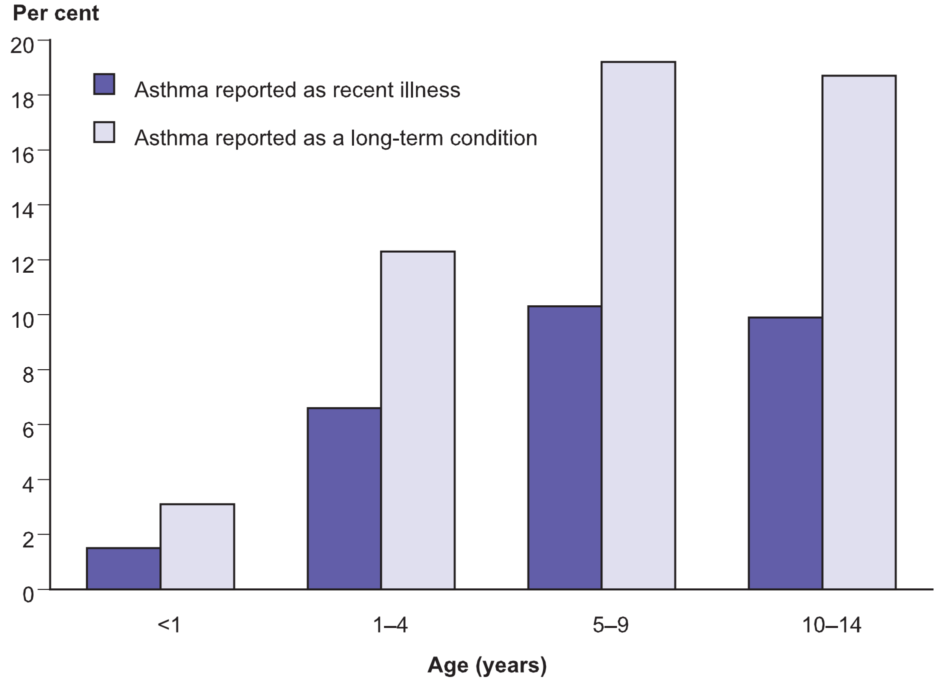
Asthma is a disease characterised by recurrent episodes of wheeze, shortness of breath and sometimes cough. The disease is of unknown cause but tends to run in families and is closely linked to allergy. The role of environmental and developmental factors in either causing or protecting against asthma has been the subject of intense interest but, based on the available evidence, has not yet been firmly established. Symptoms may occur spontaneously, or in response to one of a wide range of trigger factors, such as pollen, physical activity, cold weather and tobacco smoke. In the majority of people, asthma can be effectively controlled by a combination of using regular preventer medications, taking reliever medications as required for symptoms, and avoiding or controlling certain trigger factors. In some people with severe disease or in those in whom effective disease management has not been implemented, adverse outcomes may include poor quality of life, interference with work, study or other activities, need for urgent medical care including hospitalisation, and, rarely, premature death. Death attributable to asthma is extremely rare in children (National Asthma Campaign 1998).

It is difficult to quantify the prevalence of asthma, as prevalence depends on whether it is measured as the occurrence of self-reported wheeze, as a diagnosis by a general practitioner based on symptoms, or by a combination of symptoms and lung function tests (Woolcock et al. 2001). It is estimated that over 2 million people in Australia are affected by asthma (ABS 1998b). Of all people with asthma, approximately 30% are children aged 0–14 years. Australia ranks among the highest prevalence rates for childhood asthma in the world (Robertson et al. 1998), with the prevalence of asthma on the rise. Over the last two decades, population-based studies have estimated that the prevalence of current wheeze in Australian children has been increasing at a rate of 1.4% per year (Woolcock et al. 2001). In view of the severe impact of the disease on children's lives and the growing costs of treating asthma on the health care system in Australia, asthma was endorsed as the sixth National Health Priority Area in 1999.

This chapter covers information on asthma prevalence, morbidity and mortality. Information for this chapter is derived from three sources: parent-reported prevalence of asthma from the 1995 ABS National Health Survey; hospitalisation data from the AIHW National Hospital Morbidity Database; and death data from the AIHW Mortality Database.

Prevalence of asthma

The indicator for asthma prevalence is the number of children aged 0–14 years who were reported to have asthma in a given year as a percentage of all children aged 0–14 years. The prevalence of asthma as a recent illness (experienced in the 2 weeks prior to the interview) and as a long-term condition (current condition having lasted, or expected to last, for 6 months or more) in children aged 0–14 years is shown in Figure 12.1.



Source: AIHW analysis of data from the 1995 ABS NHS [Table A12.1].

Figure 12.1: Parent-reported prevalence rates for asthma in children aged 0–14 years, 1995

- In the 1995 ABS National Health Survey, 16% of children aged 0–14 were reported to have asthma as a long-term condition. The proportion increased with age and peaked in children aged 5–9 years, where 19% were reported as having asthma as a long-term condition.
- Almost 20% of school-aged children were reported to have asthma as a long-term condition. Half of these children had taken an action for their asthma in the past fortnight.

The prevalence of asthma-associated symptoms is shown in Table 12.1.

Table 12.1: Parent-reported prevalence rates for asthma-associated symptoms in children aged 0–14 years, 1995 (per cent)

	Age (years)				
Asthma-associated symptoms	**<1**	**1–4**	**5–9**	**10–14**	**0–14**
Woke at night with coughing	7.1	18.3	22.6	17.8	18.8
Wheezy chest after physical exertion	. .	9.7	14.3	17.7	14.2(a)
Bout of coughing during physical exertion	. .	11.8	15.1	13.2	13.5(a)
Has wheezy/whistly chest	16.7	22.9	26.6	25.9	24.4

. . Not applicable

(a) For children aged 1–14 years.

Source: AIHW analysis of data from the 1995 ABS NHS.

- In 1995, most asthma-associated symptoms were more common among children aged 5–9 years than among children in other age groups. A wheezy chest after physical exertion was most common in the 10–14 years age group.
- Almost one-quarter of children (24.4%) had a wheezy/whistly chest, and 18.8% were reported to wake up at night with coughing.

Hospitalisations

Asthma is one of the most frequent reasons for the hospitalisation of children. The indicator is the number of hospitalisations due to asthma in children aged 0–14 years in a given year as a rate per 100,000 children. Time series in hospitalisation rates for asthma are shown in Table 12.2.

Table 12.2: Hospitalisation rates for children aged 0–14 years for asthma, 1993–94 to 1999–00 (per 100,000 children)

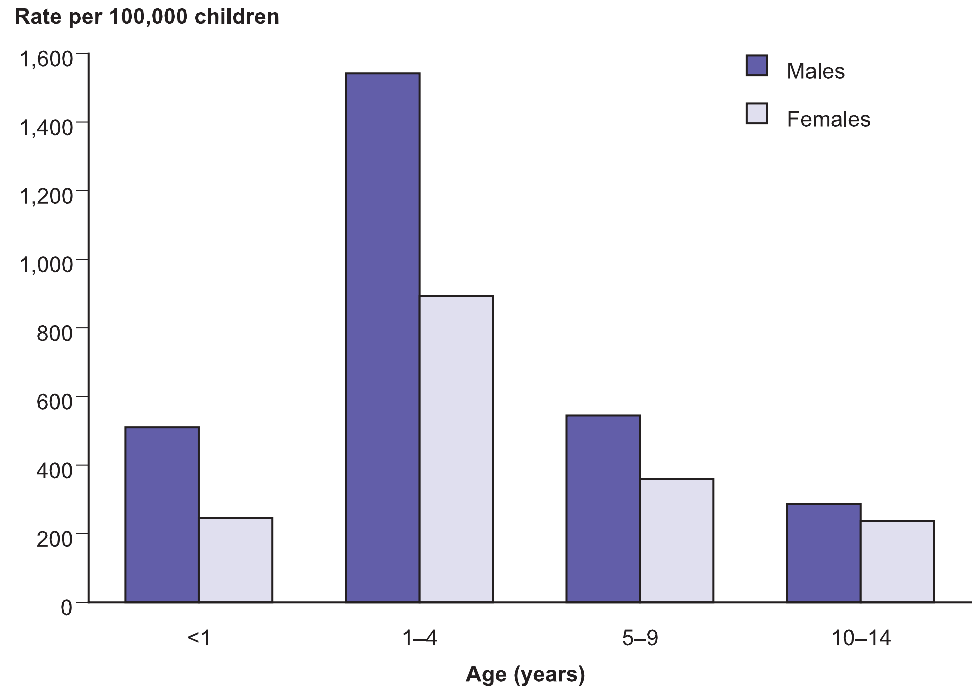
	Age (years)	1993–94	1994–95	1995–96	1996–97	1997–98	1998–99	1999–00
Males	<1	1,193.8	1,216.8	1,013.6	1,015.6	798.5	705.8	510.5
	1–4	2,130.9	2,105.2	2,106.4	2,122.4	1,723.4	1,954.4	1,542.3
	5–9	903.3	740.6	785.1	693.2	662.9	698.2	544.9
	10–14	527.7	435.0	423.4	373.0	390.0	367.9	286.6
	0–14	*1,128.4*	*1,038.0*	*1,035.6*	*992.6*	*866.3*	*926.4*	*724.6*
Females	<1	574.6	503.9	413.8	437.0	329.9	320.6	245.2
	1–4	1,185.0	1,158.9	1,158.2	1,193.2	945.0	1,115.1	892.4
	5–9	549.6	483.9	493.0	417.3	387.8	452.1	359.1
	10–14	442.1	372.2	354.1	328.1	328.3	294.3	236.8
	0–14	*686.0*	*629.2*	*620.0*	*597.0*	*513.4*	*568.7*	*453.8*
Persons	**0–14**	**912.9**	**838.9**	**833.1**	**799.9**	**694.5**	**752.2**	**592.8**

Note: ICD-9-CM code 493 (1993–94 to 1997–98) and ICD-10-AM codes J45 & J46 (1998–99 to 1999–00).

Source: AIHW National Hospital Morbidity Database.

- Hospitalisations for asthma among children aged 0–14 years decreased between 1993–94 and 1999–00. The rate fell by 35%, from 912.9 4 to 592.8 per 100,000.
- The hospitalisation rate was consistently between 1.6 and 1.7 times higher for boys than for girls in all years examined.

The hospitalisation rate for asthma among children aged 0–14 years in 1999–00 is shown in Figure 12.2.



Note: ICD-10-AM codes J45 & J46.
Source: Table 12.2.

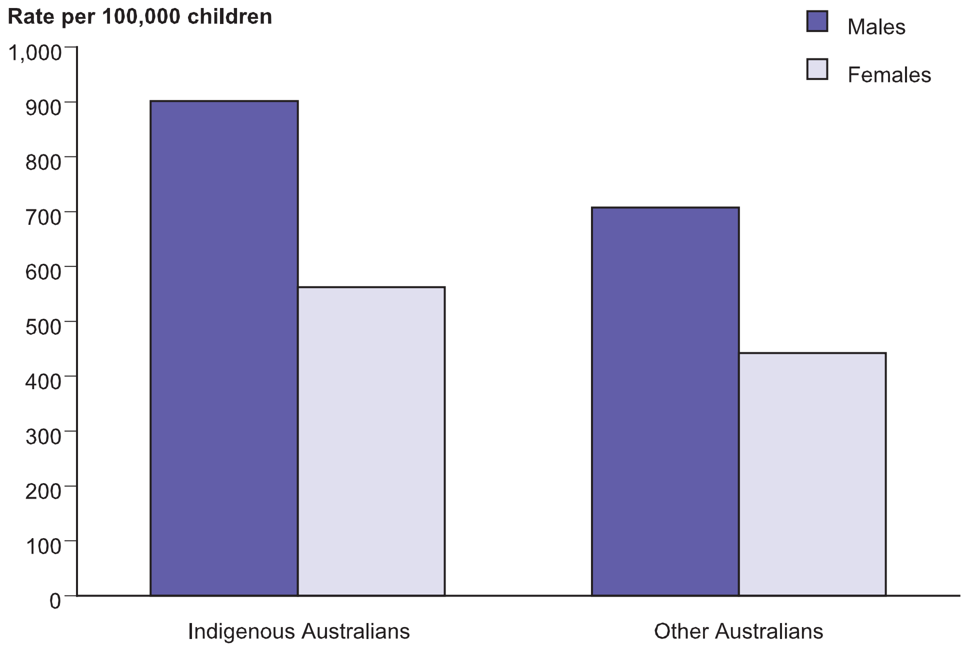
Figure 12.2: Hospitalisation rates for children aged 0–14 years for asthma, 1999–00

- In 1999–00, there were 22,983 hospitalisations of children aged 0–14 years for asthma. This included 6,653 (29%) hospitalisations for severe asthma.
- Boys were hospitalised more often than girls in all age groups, with the greatest difference among infants. The rate was 724.6 per 100,000 boys, compared with 453.8 per 100,000 girls.
- The hospitalisation rate was highest among children aged 1–4 years. Among boys, the rate was almost 3 times that for infants. There was a similar pattern for girls.

The impact of asthma can also be examined in terms of the length of time children spent in hospital. In 1999–00, there were 41,952 hospital bed days for which asthma was the principal diagnosis, with an average length of stay of 1.8 days. Asthma was also responsible for an additional 14,079 bed days where it was not the principal diagnosis but where it had to be managed during hospitalisations for other conditions.

Aboriginal and Torres Strait Islander children

The hospitalisation rate for asthma among Aboriginal and Torres Strait Islander and other Australian children is shown in Figure 12.3.

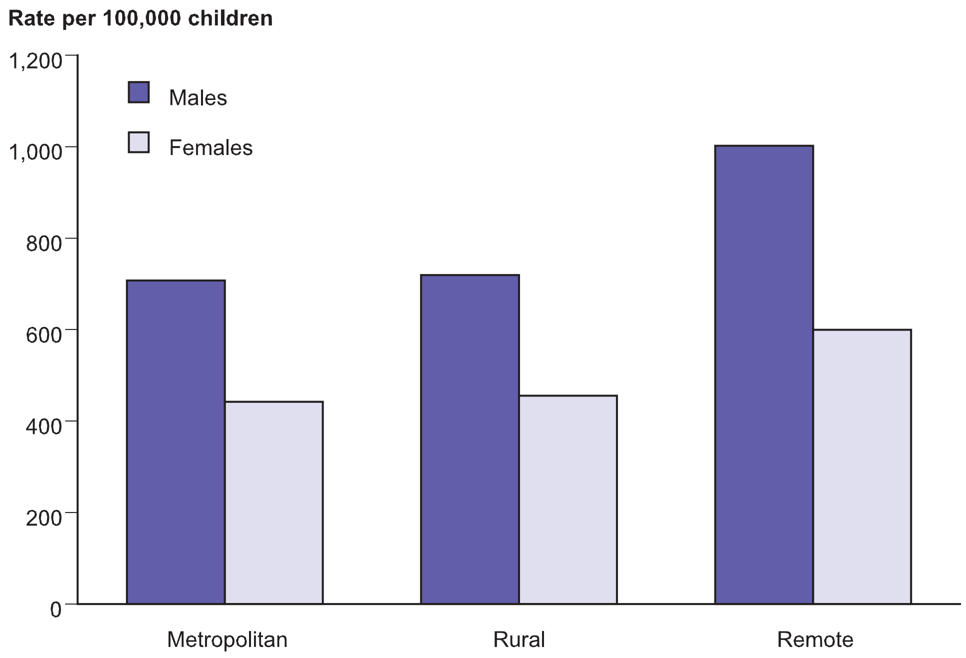


Note: ICD-10-AM codes J45 & J46.
Source: AIHW National Hospital Morbidity Database [Table A12.2].

Figure 12.3: Hospitalisation rates for Aboriginal and Torres Strait Islander and other Australian children aged 0–14 years for asthma, 1999–00

- In 1999–00, the hospitalisation rate for asthma was higher for Aboriginal and Torres Strait Islander children than for other Australian children (735.8 compared with 578.4 per 100,000).

Children in metropolitan, rural and remote areas



Note: ICD-10-AM codes J45 & J46.

Source: AIHW National Hospital Morbidity Database [Table A12.3].

Figure 12.4: Hospitalisation rates for children aged 0–14 years for asthma, by area of residence, 1999–00

- In 1999–00, the hospitalisation rate for children aged 0–14 years for asthma was highest for those living in remote areas (804.8 per 100,000 children). The rates of hospitalisation for asthma were similar for children in rural and metropolitan areas (591.1 and 578.1, respectively).
- Across all areas, rates were higher for boys than for girls. For instance, the rate for children aged 0–14 years in remote areas was 1,002.1 per 100,000 boys, compared with 599.7 per 100,000 girls.

Deaths

Death from asthma is uncommon in children. Between 1991 and 2000, there were 141 deaths of children aged 0–14 years due to asthma—the average death rate over the 10-year period was around 0.4 per 100,000 children.

Table 12.3: Asthma deaths in children aged 0–14 years, 1991–00

	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Number	16	11	17	12	20	13	15	12	13	12
Rate per 100,000 children	0.4	0.3	0.4	0.3	0.5	0.3	0.4	0.3	0.3	0.3

Note: ICD-9 code 493 (1991 to 1996) and ICD-10 codes J45 & J46 (1997 to 2000).

Source: AIHW Mortality Database.

- While the death rate from asthma among children aged 0–14 years did not show a definite decline between 1991 and 2000, deaths from asthma in all ages have been reported to have fallen by 28%, from a peak of 964 in 1989 to 685 in 1998 (Woolcock et al. 2001).
- The highest average death rate was for children aged 10–14 years (0.6 per 100,000 children), and was lowest for infants (0.1 per 100,000 infants).

Burden of disease attributable to asthma

In 1996, asthma was the leading cause of the total disease burden in children, estimated to account for 18.2% of the total disease burden (38,882 DALYs). The burden was greater in boys (56% of total) than in girls (44%). The asthma disability burden accounted for the majority (99%) of the total burden of asthma (38,492 YLD). The asthma mortality burden (391 YLL) contributed only 1%.

13. Diabetes

Diabetes mellitus is a group of diseases characterised by high levels of blood glucose resulting from defects in insulin secretion, insulin action, or both. Insulin is a hormone produced by the pancreas that helps the body to use glucose. In 2000, diabetes was the sixth leading cause of death among Australians (ABS 2001b). Over the course of the disease, diabetes can be associated with serious complications, including heart disease, stroke, blindness and neurological problems, and with premature death. Persons with diabetes, however, can take measures to reduce the likelihood of such occurrences.

Although there are two types of diabetes, it is usually Type 1 (juvenile onset or insulin dependent diabetes) which affects children. Type 1 diabetes occurs when the pancreas is unable to produce insulin. It is believed to result from an auto-immune destruction of the pancreatic cells producing insulin, leading to insulin deficiency. Susceptibility to Type 1 diabetes is thought to be determined by an interaction between genetic factors and environmental triggers (Atkinson & MacLaren 1994). Type 2 diabetes (late onset, non-insulin dependent diabetes) is of less relevance to children. Type 2 diabetes occurs when the pancreas does not produce enough insulin (insulin insufficiency) or when the body cannot use the produced insulin (insulin resistance). Risk factors for Type 2 diabetes include older age, obesity, family history of diabetes, physical inactivity and ethnicity.

There are no national estimates of the prevalence of diabetes based on clinical evidence such as measured blood glucose level. While the Australian Diabetes, Obesity and Lifestyle Study (AusDiab) conducted between 1999 and 2000 attempted to fill this gap, participation in the survey was restricted to adults. Data are available, however, on the prevalence of diabetes (Type 1) in children from the 1995 ABS National Health Survey. The estimated prevalence of Type 1 diabetes based on the survey was around 0.1% (ABS 1997).

Data on the incidence of Type 1 diabetes are also patchy. Regional studies indicate that the incidence is between 12 and 15 per 100,000 children aged 0–14 years (McCarthy et al. 1996). The incidence of Type 1 diabetes in Australian children is on the rise. Data from the New South Wales Register show that between 1992 and 1996 the incidence increased at a rate of 3% per year (17.1 per 100,000 in 1992 compared with 21.6 in 1996; in Handelsman & Jackson 1999).

While it is estimated that up to 98% of diabetes in children is Type 1 (Handelsman & Jackson 1999), Type 2 diabetes, which is usually only seen in adults, is being increasingly reported in children in the USA, UK and other countries (Ehtisham et al. 2001; Fagot-Campagna 2001). The emergence of Type 2 in children has been linked to lifestyle factors such as little exercise and to obesity in children from certain ethnic groups (American Diabetes Association 2000). Although the incidence and prevalence of Type 2 diabetes in Australian children are not known, they can be expected to increase over the next decade.

Information for this chapter is derived from three sources: the National Diabetes Register; the AIHW National Hospital Morbidity Database; and the AIHW Mortality Database.

Incidence of diabetes

The indicator for the incidence of Type 1 diabetes is the total number of children aged 0–14 years who are recorded on the National Diabetes Register as receiving insulin in a given year as a rate per 100,000 children. Data on incidence are derived from this register, which is held at the AIHW. The register records the characteristics of people who began to use insulin from January 1999 (AIHW 2001c). Data for the register are gathered from two sources: the National Diabetes Services Scheme, which collects information about people who are insulin treated in all age groups and the Australian Paediatrics Endocrine Group, which collects information on people under 15 years of age with Type 1 diabetes.

Of the 13,347 people on the register between January 1999 and December 2000, 1,333 (10%) were children aged 0–14 years. Incidence rates of insulin-treated diabetes in children aged 0–14 years in Australia in 2000 are shown in Table 13.1.

Table 13.1: Incidence of diabetes (predominantly Type 1) among children aged 0–14 years, 2000

	Males		Females	
Age (years)	**Number**	**Rate per 100,000 children**	**Number**	**Rate per 100,000 children**
0–4	84	13.0	75	12.2
5–9	138	20.2	133	20.5
10–14	165	24.3	148	22.9
0–14	**387**	**19.2**	**356**	**18.6**

Source: AIHW 2001c.

- In 2000, the incidence of diabetes among children aged 0–14 years was 19.2 per 100,000 boys and 18.6 per 100,000 girls. This is similar to incidence rates of Type 1 diabetes reported in regional studies.
- Rates increased with age, with children aged 10–14 years having the highest rates (24.3 for boys, 22.9 for girls).

Children in metropolitan, rural and remote areas

Table 13.2: Incidence of diabetes among children aged 0–14 years in metropolitan, rural and remote areas, 2000

	Metropolitan	Rural	Remote
Number	498	231	14
Rate per 100,000 children	18.4	21.0	9.4

Source: AIHW 2001c.

- In 2000, the incidence of diabetes among children aged 0–14 years was highest among those in rural areas (21.0 per 100,000 children), followed by those in metropolitan areas (18.4). Rates in remote areas were half those in rural or metropolitan areas (9.4).
- Aboriginal and Torres Strait Islander children made up 1% (15) of all children on the register.

According to the National Diabetes Register, the low numbers and rates of Type 1 diabetes in Indigenous children and in children living in remote areas are unlikely to reflect actual differences in prevalence between these groups. Instead, they are more likely to reflect the extent to which Indigenous communities use services other than the National Diabetes Services Scheme. For example, these communities have access to services and products free of charge through health service centres and Aboriginal community councils. Similarly, people living in remote areas are able to access free treatment products through selected pharmacies (AIHW 2001c).

Hospitalisations

The indicator for diabetes hospitalisations is the number of hospitalisations of children aged 0–14 years for diabetes in a given year as a rate per 100,000 children.

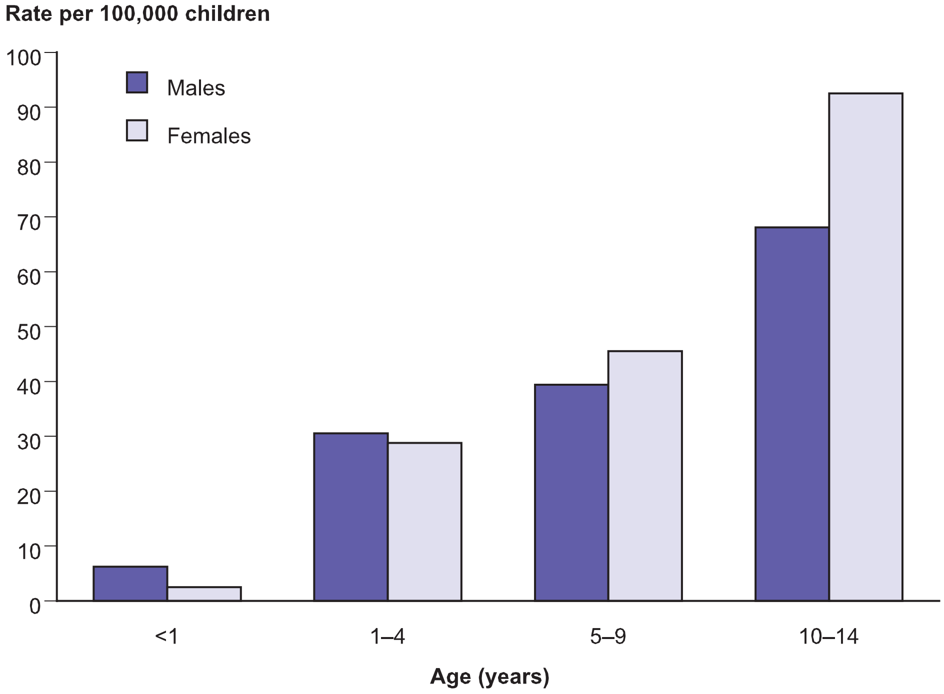
Table 13.3: Hospitalisation rates for children aged 0–14 years for diabetes, 1993–94 to 1999–00 (per 100,000 children)

	Age (years)	1993–94	1994–95	1995–96	1996–97	1997–98	1998–99	1999–00
Males	<1	6.8	0.0	5.3	4.6	5.4	3.1	6.2
	1–4	25.2	23.8	27.9	31.1	27.1	28.2	30.5
	5–9	28.5	35.9	41.1	42.3	40.5	37.4	39.4
	10–14	58.3	69.5	71.2	69.4	67.7	74.9	68.1
	0–14	*35.9*	*41.2*	*45.0*	*45.6*	*43.4*	*44.9*	*44.2*
Females	<1	3.2	8.8	6.4	2.4	7.3	0.8	2.5
	1–4	25.5	24.1	24.2	28.6	26.7	25.5	28.8
	5–9	39.5	43.0	45.0	42.7	45.3	43.0	45.5
	10–14	91.9	94.2	86.5	86.6	89.0	80.6	92.5
	0–14	*50.5*	*52.4*	*50.4*	*50.6*	*52.1*	*47.8*	*53.5*
Persons	**0–14**	**43.0**	**46.7**	**47.6**	**48.0**	**47.7**	**46.3**	**48.7**

Note: ICD-9-CM code 250 (1993–94 to 1997–98) and ICD-10-AM codes E10–E14 (1998–99 to 1999–00).

Source: AIHW National Hospital Morbidity Database.

- There was a 13% increase in the overall hospitalisation rate for children aged 0–14 years for diabetes over the period 1993–94 to 1999–00, from 43.0 to 48.7 per 100,000 children.
- The hospitalisation rates for girls were higher than those for boys.
- Most of the increase in overall rates was due to the rise in the hospitalisation rate for boys. The rate for boys increased by 23%, compared with a 6% increase for girls over the same period.



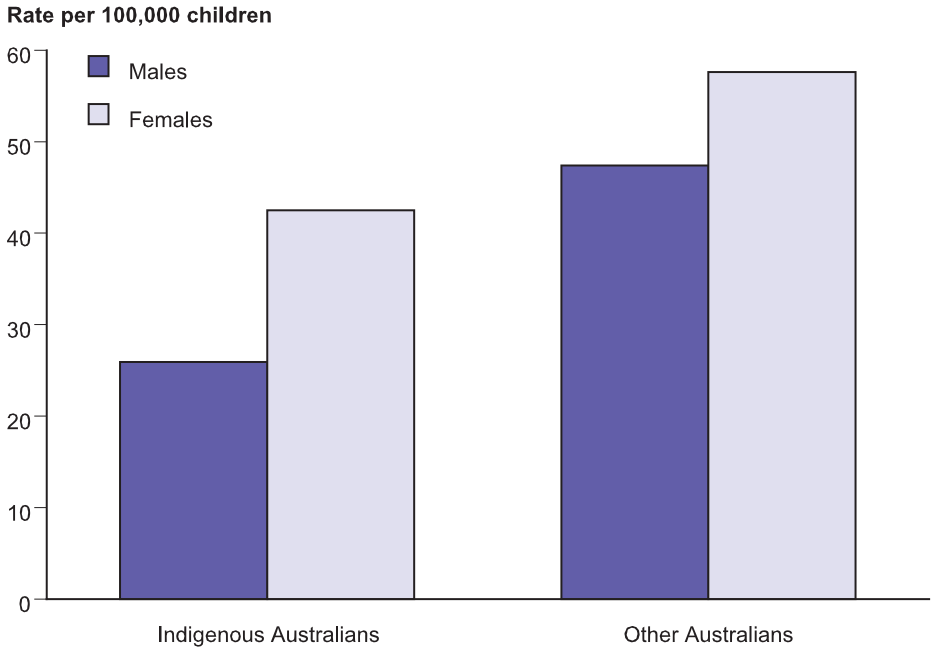
Note: ICD-10-AM codes E10–E14.
Source: Table 13.3.

Figure 13.1: Hospitalisation rates for children aged 0–14 years for diabetes, 1999–00

- In 1999–00, there were 1,935 hospitalisations of children aged 0–14 years for diabetes. The hospitalisation rate was highest in the 10–14 years age group. The rate increased from 4.4 per 100,000 infants to 80.0 per 100,000 children aged 10–14 years. This is to be expected, as diabetes is a chronic disease and the prevalence becomes progressively higher in older age groups.
- The hospitalisation rate was higher for girls than for boys among children aged 5 years or older. For children aged less than 5 years, it was slightly higher for boys than for girls.

The impact of diabetes on the health system can be examined in terms of the length of time children spent in hospital. In 1999–00, there were 7,575 hospital bed days for which diabetes was the principal diagnosis, with an average length of stay in hospital of 3.9 days. Diabetes was also responsible for an additional 1,075 bed days where it was not the principal diagnosis but where it had to be managed during hospitalisations for other conditions.

Aboriginal and Torres Strait Islander children



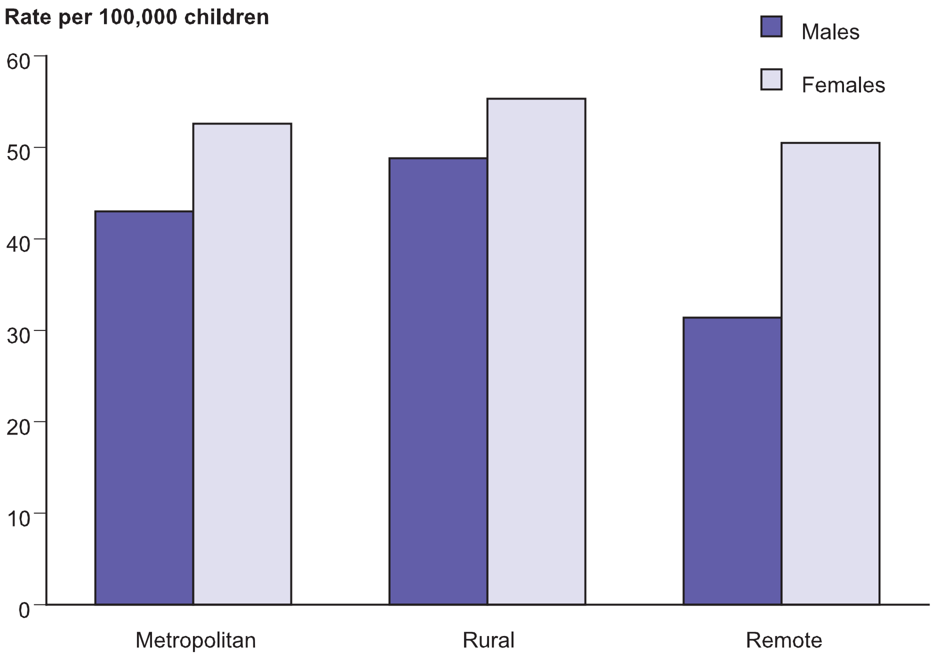
Note: ICD-10-AM codes E10–E14.

Source*:* AIHW National Hospital Morbidity Database [Table A13.1].

Figure 13.2: Hospitalisation rates for Aboriginal and Torres Strait Islander and other Australian children aged 0–14 years for diabetes, 1999–00

- In 1999–00, there were 49 hospitalisations of Aboriginal and Torres Strait Islander children aged 0–14 years for diabetes. Most of these cases were of girls (30, or 61%); 63% of all hospitalisations (31) were of children aged 10–14 years.
- The hospitalisation rate was lower for Aboriginal and Torres Strait Islander children than for other Australian children (34.0 compared with 52.4 per 100,000 children).
- Similar to the national pattern, the rate for Aboriginal and Torres Strait Islander girls was higher than for boys (42.5 compared with 25.9).

Children in metropolitan, rural and remote areas



Note: ICD-10-AM codes E10–E14.

Source: AIHW National Hospital Morbidity Database [Table A13.2].

Figure 13.3: Hospitalisation rates for children aged 0–14 years for diabetes, by area of residence, 1999–00

- The hospitalisation rate for diabetes was highest for children aged 0–14 years living in rural areas: 52.0 per 100,000 children, compared with 47.7 for children living in metropolitan areas and 40.7 for those living in remote areas. Both boys and girls living in rural areas had higher hospitalisation rates than boys and girls living in other areas.
- The greatest differences in rates were between girls and boys in remote areas, where girls were hospitalised at a rate 1.6 times that of boys. The rate was 50.5 per 100,000 girls, compared with 31.4 per 100,000 boys.
- Similar to the national pattern, rates in all areas were highest for children aged 10–14 years.

Deaths

Over the period 1991 to 2000, 16 children aged 0–14 years died from diabetes (11 girls and 5 boys). The low death rate from diabetes may be a reflection of improved management of the disease through medication.

Burden of disease attributable to diabetes

In 1996, Type 1 diabetes was estimated to account for 0.9% of the total burden of disease in children aged 0–14 years (2,158 DALYs) (AIHW: Mathers et al. 1999). The total disease burden was slightly higher in girls (51% of the total) than in boys (49%). The diabetes disability burden accounted for 97% of the total burden of disease (2,097 YLD), and the diabetes mortality burden for 3% (61 YLL).

14. Cancer

Cancer is a group of diseases in which cells become abnormal, grow in an uncontrolled way and spread to other parts of the body, a process known as metastasis. Cancers can develop from most types of cells in different parts of the body and are usually classified according to their organ or tissue of origin and histological features. Different types of cancers vary in their signs and symptoms, how fast they grow, how they spread and how they react to different treatments.

Cancers in children tend to differ from those observed in adults in appearance, site of origin and response to treatment. While most cancers in adults are carcinomas derived from epithelial tissues (skin and the lining of body cavities and glands), cancers in children are mostly sarcomas, which originate in tissues such as the bone marrow, nerve tissues, lymph nodes, bone and muscle (Simone & Lyons 2001). In children, leukaemia (a cancer of white blood cells) is the most common cancer, accounting for approximately one-third of all childhood cancers. The majority of leukaemia cases are acute lymphoblastic leukaemia, which affects immature lymphocytes. Brain tumours are the most common solid tumours in childhood and make up about a fifth of all children's cancers (Miller et al. 1995).

Childhood cancer is relatively uncommon—only 2% of all cancers occur in children—and the causes of most of these cancers remain unknown. Chromosomal and genetic abnormalities explain a small percentage of cancer cases. A number of environmental factors, such as exposure to chemicals or maternal infection, have also been linked with childhood cancer; however, it has proven difficult to substantiate the associations between these factors and childhood cancer (National Cancer Institute 1999). One recent study carried out in Western Australia found that children whose mothers had taken folate during pregnancy had a 60% reduced risk of developing acute lymphoblastic leukaemia (Thompson et al. 2001), suggesting there may also be as yet unknown factors which can protect against cancer.

Many cancers are serious and can be fatal. In 2000, cancer was the second leading cause of death in children aged 1–14 years. However, medical treatment is often successful if the cancer is detected early. The risk of death due to certain cancers can therefore be reduced through intensive monitoring, and early detection and treatment. Significant increases in survival rates have been reported for many types of childhood cancers over the last 2 years in association with clinical trials and the development of new treatments (Stiller 1994; National Cancer Institute 1999). For example, the 5-year survival rate in the USA for all childhood cancers combined increased from 55.6% in 1974–76 to 73.8% in 1989–94 (National Cancer Institute 1999).

This chapter presents a summary of childhood cancers. Information on cancer incidence is derived from data maintained by the National Cancer Statistics Clearing House (NCSCH) at the AIHW. The NCSCH collects statistics produced by the States and Territories cancer registries on the incidence of all cancers, excluding non-melanocytic skin cancer.[1] Other information presented in this chapter is derived from the AIHW Mortality Database and the AIHW National Hospital Morbidity Database.

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[1] Non-melanocytic skin cancers (ICD-9 code 173) are by far the biggest category of all skin cancers. Because of practical difficulties many of these are not required to be notified under legislation. This is because many of these cancers are treated in general practice and other non-specialist clinics.

Incidence of childhood cancer

The indicator for cancer incidence is the number of new cases of cancer diagnosed in children aged 0–14 years in a given year as a rate per 100,000 children. The incidence of all cancers in children aged 0–14 years between 1991 and 1998 is shown in Table 14.1.

Table 14.1: Incidence rates of cancer in children aged 0–14 years, 1991–98

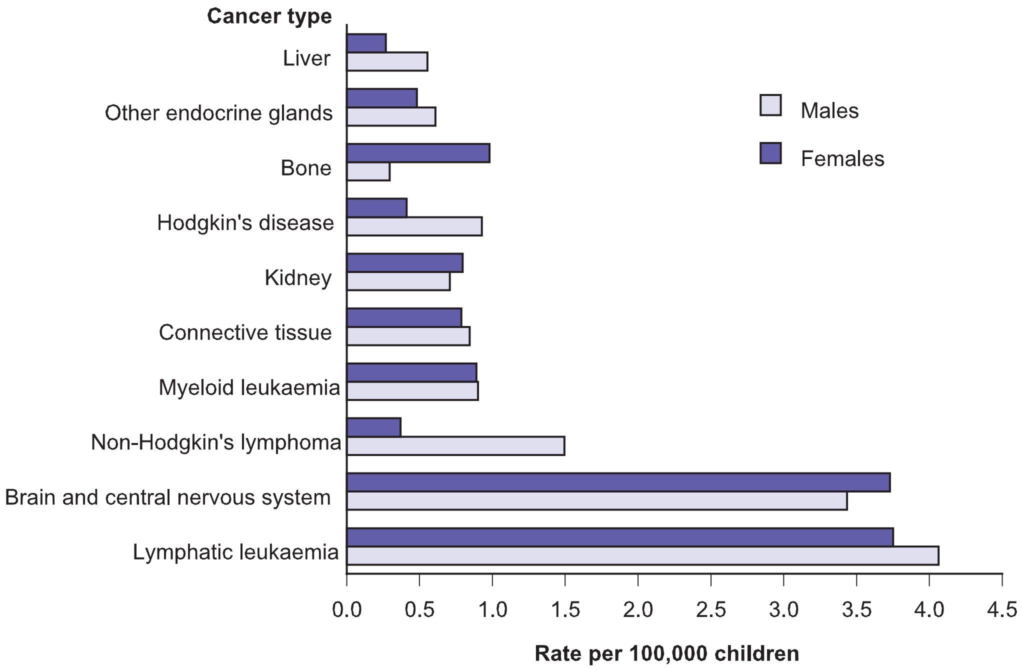
	Age (years)	1991	1992	1993	1994	1995	1996	1997	1998
Males	0–4	22.1	20.8	24.1	23.6	24.0	23.3	21.6	21.3
	5–9	11.6	13.9	10.4	13.2	13.6	10.9	12.8	13.3
	10–14	11.4	11.4	14.6	13.9	11.9	15.8	13.8	13.7
	0–14	*15.1*	*15.4*	*16.4*	*16.9*	*16.5*	*16.7*	*16.1*	*16.1*
Females	0–4	17.8	19.3	19.1	17.1	18.6	19.2	20.7	19.4
	5–9	9.5	10.4	8.3	10.9	9.5	12.1	7.0	11.2
	10–14	12.4	11.2	13.0	10.4	9.8	14.3	11.9	12.5
	0–14	*13.2*	*13.7*	*13.5*	*12.8*	*12.7*	*15.2*	*13.2*	*14.4*
Persons	**0–14**	**14.2**	**14.5**	**15.0**	**14.9**	**14.7**	**15.9**	**14.7**	**15.2**

Note: ICD-9 codes 140–208 (excluding 173).

Source: AIHW National Cancer Statistics Clearing House.

- Between 1991 and 1998, there were 4,603 new cases of cancer diagnosed in children aged 0–14 years, with 56% of the cases reported in boys and 44% in girls. Annual incidence rates ranged from 15.1 to 16.9 per 100,000 boys and from 12.7 to 15.2 per 100,000 girls. This is consistent with studies showing very little change in the incidence of cancer in children in the last two decades (Linet et al. 1999).
- In all years examined, and in most age groups, rates were consistently higher for boys than for girls.
- In 1998, cancer incidence was highest in children aged 0–4 years (21.3 per 100,000 boys, 19.4 per 100,000 girls), followed by those aged 10–14 years (13.7 per 100,000 boys, 12.5 per 100,000 girls). This is a reflection of the fact that some types of cancers are more common in children of particular ages than others, although cancer can develop in children of any age. For example, Hodgkin's lymphoma tends to occur in children aged 10 years or older, while leukaemia, liver, kidney and endocrine cancers are more common among children aged less than 10 years, and most common among children aged 0–4 years.

The incidence rates for the most common types of cancer among children aged 0–14 years in 1998 are shown in Figure 14.1.



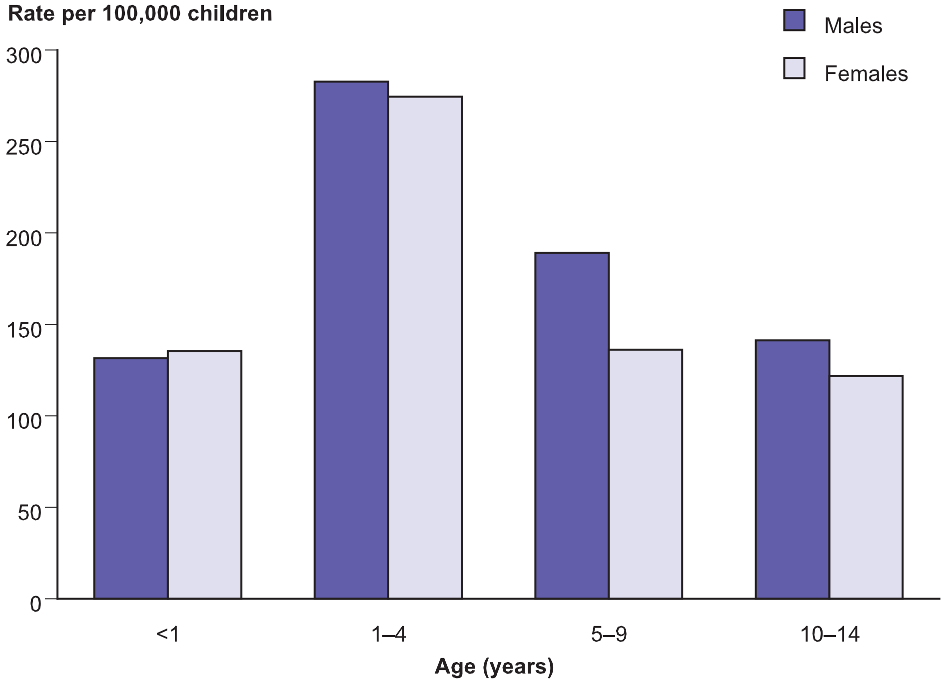
Note: ICD-9 codes 204, 191 & 192, 200 & 202, 205, 171, 189, 201, 170, 194 and 155.

Source: AIHW National Cancer Statistics Clearing House [Table A14.1].

Figure 14.1: Incidence rates of selected cancers in children aged 0–14 years, 1998

- The most common types of cancers among children aged 0–14 years in 1998 were lymphatic leukaemia (4.1 per 100,000 boys, 3.8 per 100,000 girls) and cancers of the brain and the central nervous system (3.4 for boys, 3.7 for girls). These accounted for nearly 44% of all cancers diagnosed in this age group (AIHW & AACR 2000).
- The incidence rate of non-Hodgkin's lymphoma was almost 4 times higher in boys than in girls (1.5 compared with 0.4), while rates for Hodgkin's disease were twice as high in boys as in girls (0.9 compared with 0.4).

Hospitalisations



Note: ICD-10-AM codes C00–C97 (excluding non-melanocytic skin cancer C44).
Source: AIHW National Morbidity Database [Table A14.2].

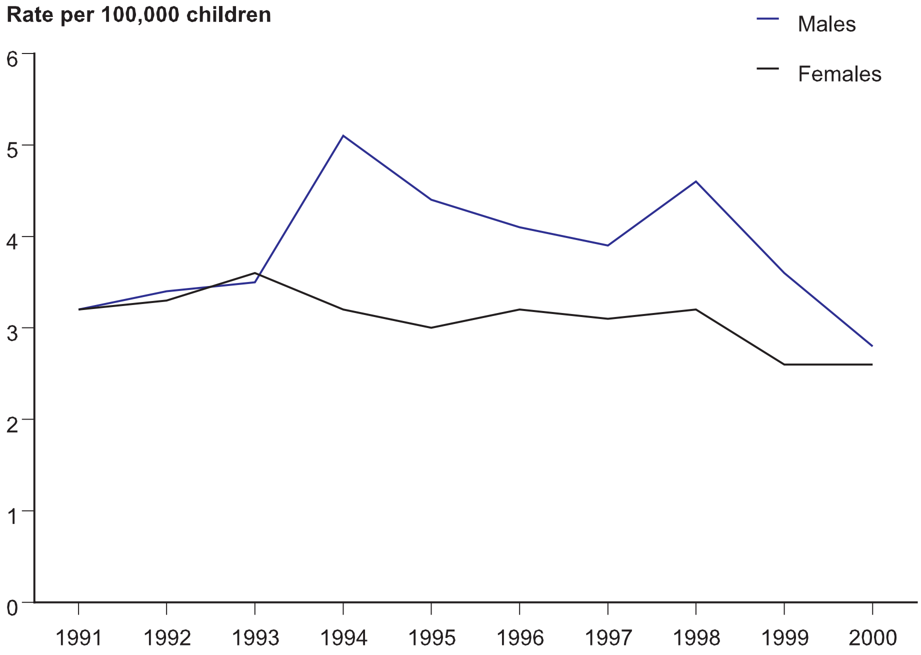
Figure 14.2: Hospitalisation rates for children aged 0–14 years for cancer, 1999–00

- In 1999–00, there were 7,094 hospitalisations of children aged 0–14 years for cancer. The overall rate of hospitalisation was 181.8 per 100,000 children.
- The rate for boys was 194.5, compared with 168.4 for girls. Older boys were hospitalised at a higher rate than girls, while among those aged under 5 years, the rates were very similar.
- The rate varied by age, with children aged 1–4 years hospitalised at the highest rate: 278.7, compared with 133.3 for infants, and 163.4 and 131.7 for children aged 5–9 and 10–14 years, respectively.

The impact of cancer can also be examined in terms of the length of time children spent in hospital. In 1999–00, there were 25,441 hospital bed days for which cancer was the principal diagnosis, with an average length of stay in hospital of 3.5 days. Cancer was also responsible for an additional 9,836 bed days where it was not the main reason for hospital stay but where it had to be managed during hospitalisations for other conditions.

Deaths

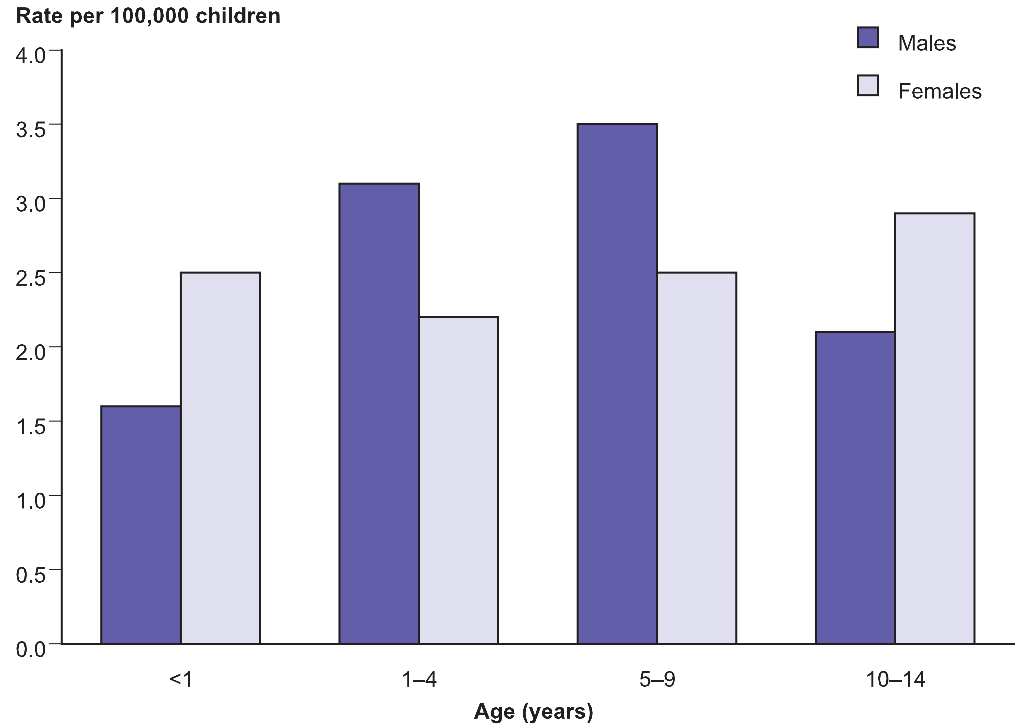
The indicator for cancer deaths is the number of deaths from cancer in children aged 0–14 years in a given year as a rate per 100,000 children.



Note: ICD-9 codes 140–208 (excluding 173) and ICD-10 codes C00–C97 (excluding C44).
Source: AIHW Mortality Database [Table A14.3].

Figure 14.3: Cancer death rates for children aged 0–14 years, 1991–00

- Between 1991 and 2000, 1,353 children aged 0–14 years died from cancer, with a higher proportion of deaths of boys (57%) than girls (43%).
- The death rate ranged between 3.1 and 4.2 per 100,000. Boys generally had a higher rate than girls.
- The highest mortality rate for boys was 5.1 in 1994 and the lowest was 2.8 in 2000. The rate for girls in 1999 and 2000 was the lowest over the 10-year period (2.6 in both years).



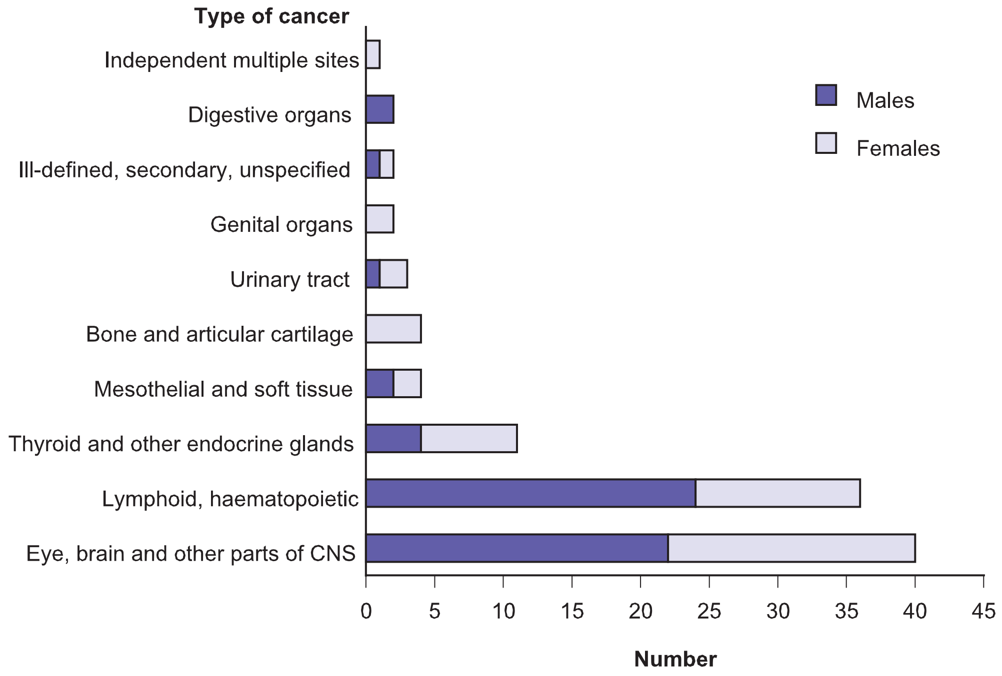
Note: ICD-10 codes C00–C97 (excluding C44).

Source: AIHW Mortality Database [Table A14.4].

Figure 14.4: Cancer death rates for children aged 0–14 years, 2000

- In 2000, for children aged 1–4 and 5–9 years, the death rate from cancer was higher for boys than for girls. However, the opposite was true for infants and those aged 10–14 years.
- The rate for most cancers was highest for children aged 0–4 years and lowest for those aged 10–14. This may partly reflect the different survival rates for the types of cancer affecting different age groups.

Deaths from specific cancers are shown in Figure 14.5.



Note: ICD-10 codes C00–C97 (excluding C44).
Source: AIHW Mortality Database [Table A14.5].

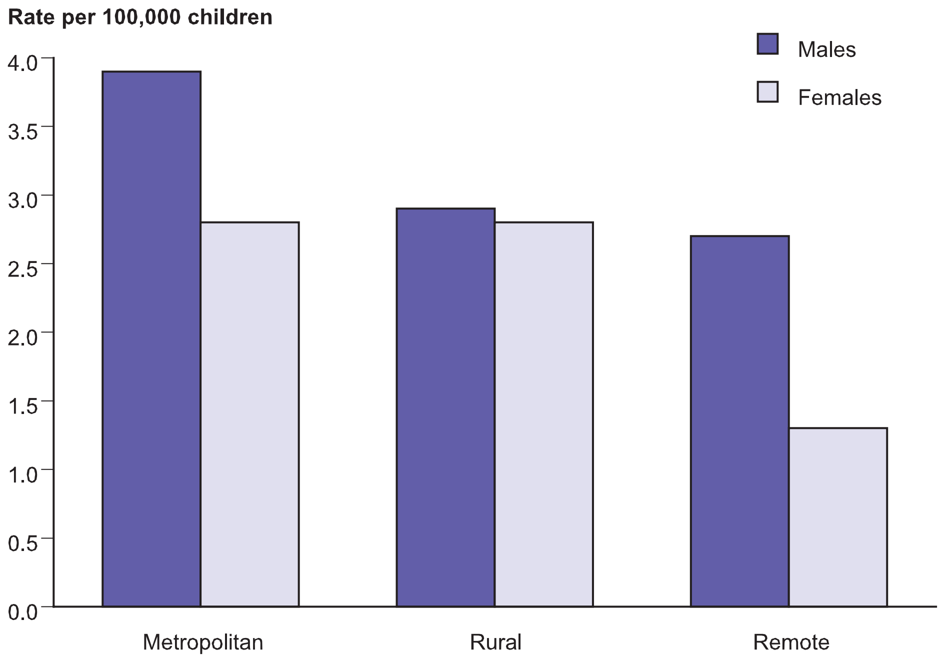
Figure 14.5: Number of deaths from specific cancers in children aged 0–14 years, 2000

- In 2000, 105 children died from cancer. More boys (53%) died than girls (47%).
- Most of the deaths (38%) were due to cancer of the eye, brain and other parts of the central nervous system; 34% were due to cancers of lymphoid and haematopoietic tissues.
- The cancers with the highest incidence were not necessarily the ones causing the most deaths. This is due to differences between cancers in treatment success and survival rates.

Aboriginal and Torres Strait Islander children

Between 1998 and 2000 in Queensland, Western Australia, South Australia and the Northern Territory, 7 Aboriginal and Torres Strait Islander children aged 0–14 years died from cancer. Of these children, 3 were boys and 4 were girls.

Children in metropolitan, rural and remote areas



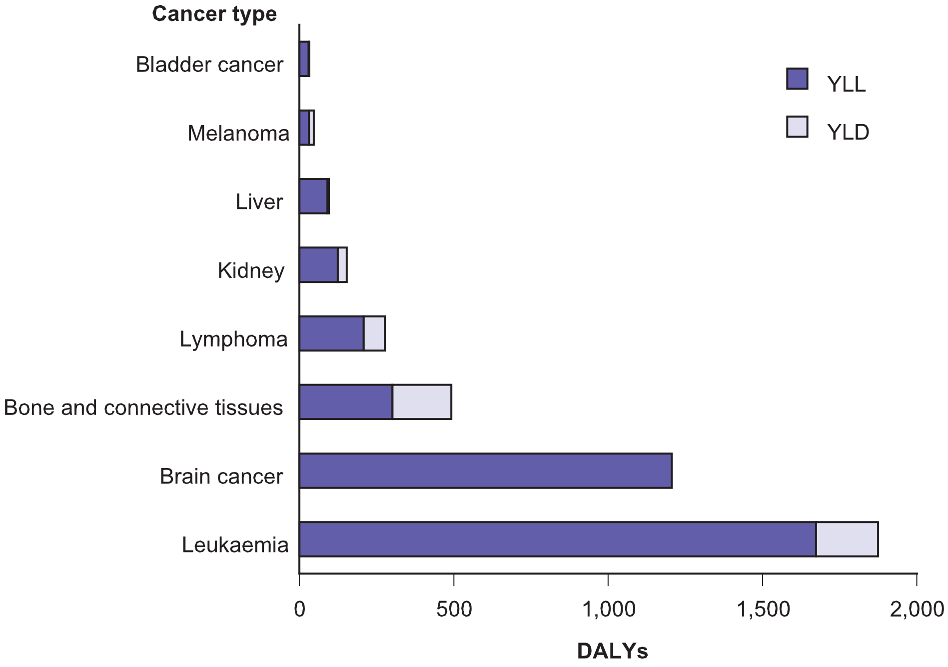
Note: ICD-10 codes C00–C97 (excluding C44).
Source: AIHW Mortality Database [Table A14.6].

Figure 14.6: Average cancer death rates for children aged 0–14 years, by area of residence, 1998–00

- Cancer death rates in 1998–00 were higher for children living in metropolitan and rural areas than for those living in remote areas (3.4 and 2.9 per 100,000 children in metropolitan and rural areas and 2.1 per 100,000 children in remote areas).
- In all areas, rates were higher for boys than girls.

Burden of disease attributable to cancer

In 1996, cancer was estimated to account for 0.2% of the total disease burden in children aged 0–14 years (4,960 DALYs). The total burden of disease was higher in boys (57% of total) than in girls (43%). Cancer caused a far greater mortality burden (4,307 YLL; 87% of total) than disability burden (654 YLD; 13%) (Figure 14.7).



Source: AIHW: Mathers et al. 1999 [Table A14.7].

Figure 14.7: Total burden of disease from selected cancers in children aged 0–14 years, 1996

- The cancers responsible for the greatest proportion of the total burden of disease in 1996 were leukaemia (38% of the cancer disease burden), brain cancer (24%), and cancer of the bone and connective tissues (10%).

15. Other chronic diseases

The previous chapters covered a number of important chronic diseases which affect Australian children. These have national indicators, which are used to monitor change over time. This chapter, however, focuses on other chronic diseases and conditions which also cause considerable morbidity in Australian children, but for which there are no national indicators. This chapter will provide information on three specific conditions: cerebral palsy, epilepsy and cystic fibrosis.

Cerebral palsy

Cerebral palsy covers a range of neurological impairments and is characterised by poor control of movement or posture. Cerebral palsy is the most common physical disability in childhood. It develops in about 2 to 2.5 per 1,000 children during the first year of life (MacLennan 1995).

The causes of cerebral palsy are the subject of much debate and controversy (MacLennan 1995). The commonly held view is that it is caused by events occurring during childbirth (Bakketeig 1999). However, studies in Australia and elsewhere have shown that, in the majority of cases, the origins of cerebral palsy are likely to be related to events happening in the antenatal period (before birth). Studies have shown that hypoxia (a deficiency of oxygen reaching the tissues of the body) during birth accounts for only 10% of cases of cerebral palsy (Gilles et al. 1996; MacLennan 1999). The frequency of cerebral palsy has been stable over the last 40 years, occurring in 0.2–0.25% of births, despite improvements in technology and care during delivery. This supports the view that the majority of cases have their origin in the antenatal period.

Hospitalisations

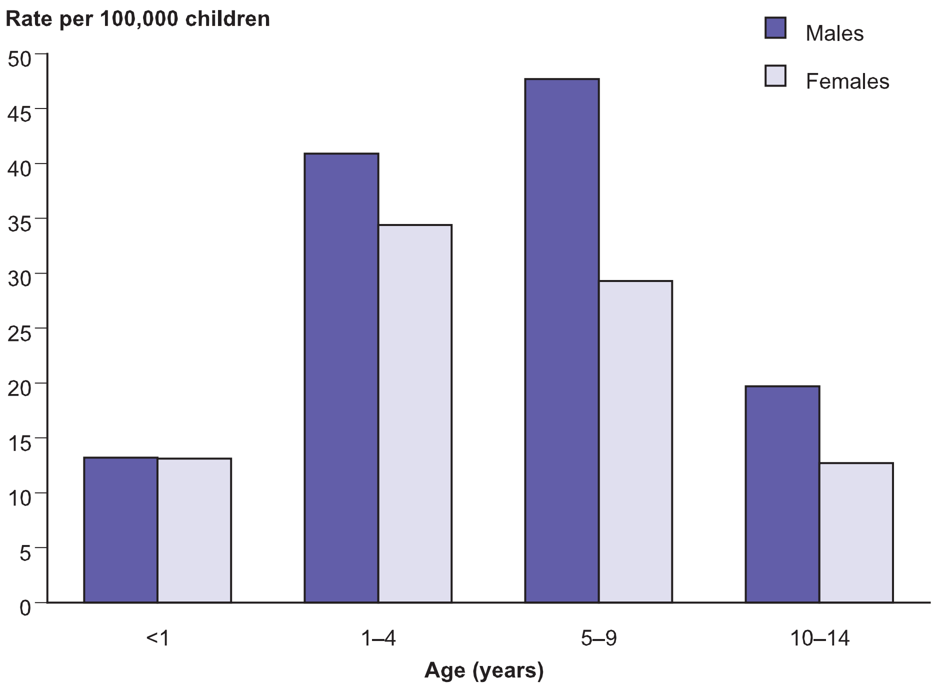
Table 15.1: Hospitalisation rates for children aged 0–14 years for cerebral palsy, 1993–94 to 1999–00 (per 100,000 children)

	Age (years)	1993–94	1994–95	1995–96	1996–97	1997–98	1998–99	1999–00
Males	<1	18.1	18.1	19.6	30.6	18.6	14.1	13.2
	1–4	43.6	12.4	24.1	54.4	60.1	46.3	40.9
	5–9	13.4	9.9	20.6	28.6	35.6	39.6	47.7
	10–14	15.9	5.0	11.5	11.9	11.8	11.1	19.7
	0–14	*22.6*	*9.5*	*18.5*	*30.2*	*33.2*	*30.3*	*34.3*
Females	<1	4.8	9.6	9.5	25.9	18.7	13.2	13.1
	1–4	43.3	15.0	14.6	22.9	40.2	33.5	34.4
	5–9	20.6	8.0	25.7	21.6	17.7	19.8	29.3
	10–14	11.5	4.3	5.8	8.1	10.2	11.1	12.7
	0–14	*22.6*	*8.8*	*15.1*	*17.8*	*21.3*	*20.1*	*24.1*
Persons	**0–14**	**22.6**	**9.1**	**16.8**	**24.1**	**27.4**	**25.4**	**29.4**

Note: ICD-9-CM code 343 (1993–94 to 1997–98) and ICD-10-AM code G80 (1998–99 to 1999–00).

Source: AIHW National Hospital Morbidity Database.

- Over the 7-year period 1993–94 to 1999–00, the hospitalisation rate for children aged 0–14 years for cerebral palsy rose from 22.6 to 29.4 per 100,000 children. The increase was greater for boys than for girls. For boys the rate increased from 22.6 to 34.3, while for girls it increased from 22.6 to 24.1.
- Hospitalisation rates for boys and girls were very similar in 1993–94 and 1994–95. However, in more recent years, boys had higher rates for cerebral palsy than girls.



Note: ICD-10-AM code G80.

Source: Table 15.1.

Figure 15.1: Hospitalisation rates for children aged 0–14 years for cerebral palsy, 1999–00

- In 1999–00, there were 1,149 hospitalisations of children aged 0–14 years for cerebral palsy, with a rate of 29.4 per 100,000 children. The rate was higher for boys than for girls (34.3 compared with 24.1).
- The rate was highest for children aged 5–9 years, followed by those aged 1–4 years. The rates were 38.8 per 100,000 children aged 5–9 years compared with 13.0 for infants, 37.7 for children aged 1–4 years, and 16.3 for children aged 10–14 years.

The impact of cerebral palsy can also be examined by looking at the length of time children spent in hospital. In 1999–00, there were 5,001 hospital bed days for which cerebral palsy was the principal diagnosis, with an average length of stay in hospital of 4.4 days. Cerebral palsy was also responsible for an additional 3,955 bed days where it was not the main reason for hospital stay but where it had to be managed during hospitalisations for other conditions.

Deaths

Between 1991 and 2000, 290 children died from cerebral palsy, with approximately equal numbers of deaths of boys and girls. Deaths of all children aged 0–14 years are shown in Table 15.2.

Table 15.2: Cerebral palsy deaths in children aged 0–14 years, 1991–00

	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Number	30	25	30	36	30	29	20	37	28	25
Rate per 100,000 children	0.8	0.7	0.8	0.9	0.8	0.7	0.5	1.0	0.7	0.6

Note: ICD-9 code 343 and ICD-10 code G80.

Source: AIHW Mortality Database.

- The average death rate from cerebral palsy was 0.8 per 100,000 for both boys and girls.
- Rates were higher for younger children, particularly for infants.

Epilepsy

Epilepsy is a condition where a person has recurring fits or seizures that are not caused by fever or a present injury. The fit usually occurs when there is a sudden disruption in the electrical activity in the brain, accompanied by altered consciousness and/or other behavioural manifestations. Most fits are mild but a seizure that lasts a long time can lead to *status epilepticus*, a life-threatening condition characterised by continuous seizures, sustained loss of consciousness and respiratory distress. Non-convulsive epilepsy can impair physical coordination, vision and other senses.

The prevalence of epilepsy in childhood is estimated to be 4 to 8 per 1,000 children aged 0–14 years (Franklin & Nelson 1998). The incidence of epilepsy is highest in very young and older people, with some people experiencing spontaneous cure. Although the cause of epilepsy is not known for most children, some epilepsy in children can be caused by a previous head injury, infections of the brain or problems during pregnancy or birth (Braunwald et al. 2001). Other risk factors known to contribute to epilepsy include family history, congenital malformation, cerebral palsy, mental retardation and central nervous system infection.

Hospitalisations

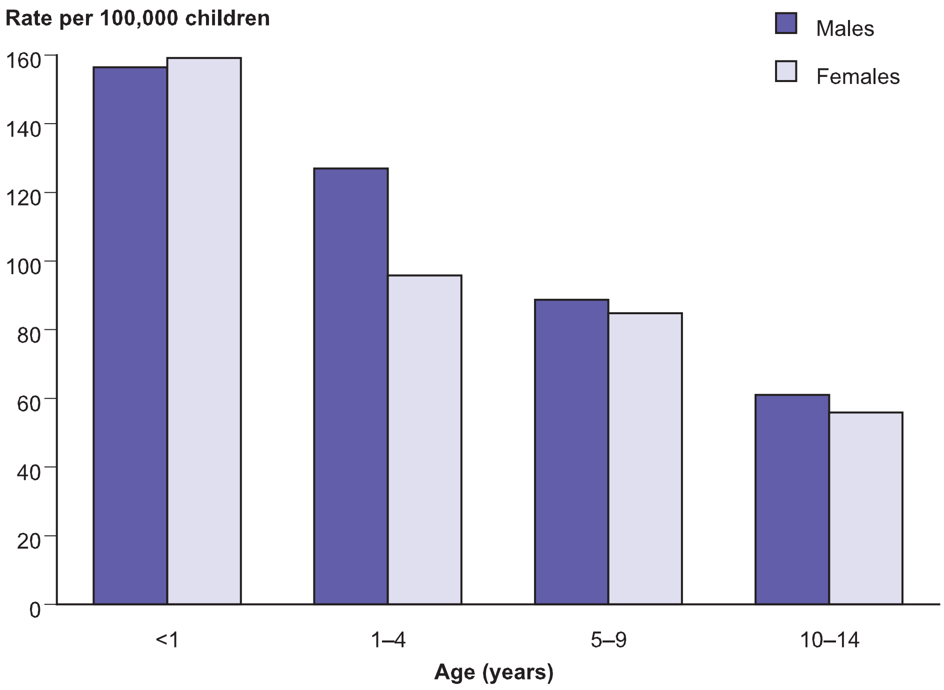
Table 15.3: Hospitalisation rates for children aged 0–14 years for epilepsy, 1993–94 to 1999–00 (per 100,000 children)

	Age (years)	1993–94	1994–95	1995–96	1996–97	1997–98	1998–99	1999–00
Males	<1	154.5	129.5	179.6	167.1	144.6	155.9	156.4
	1–4	153.1	139.5	166.4	183.3	183.7	129.3	127.0
	5–9	87.6	86.2	100.4	98.8	99.1	97.5	88.7
	10–14	74.8	67.4	20.8	24.6	22.8	64.9	61.0
	0–14	*105.5*	*97.2*	*97.4*	*101.7*	*99.8*	*99.3*	*94.5*
Females	<1	195.0	145.9	145.6	184.7	119.7	107.7	159.1
	1–4	146.4	133.1	131.2	145.9	135.1	114.9	95.8
	5–9	89.9	85.6	97.5	97.8	94.1	78.2	84.8
	10–14	66.0	69.0	67.3	64.3	66.8	68.7	55.9
	0–14	*104.4*	*97.0*	*99.9*	*105.6*	*97.9*	*86.9*	*83.3*
Persons	**0–14**	**105.0**	**97.1**	**98.6**	**103.6**	**98.9**	**93.3**	**89.1**

Note: ICD-9-CM code 345 and ICD-10-AM code G40.

Source: AIHW National Hospital Morbidity Database.

- The hospitalisation rate for epilepsy for children aged 0–14 years remained fairly constant over the period 1993–94 to 1999–00, fluctuating between 105.0 per 100,000 children in 1993–94 and 89.1 per 100,000 children in 1999–00.
- Children aged under 5 years had the highest hospitalisation rates, with rates then decreasing with age for both boys and girls.
- Over most of the 7-year period, boys had higher rates than girls.



Note: ICD-10-AM code G40.
Source: Table 15.3.

Figure 15.2: Hospitalisation rates for children aged 0–14 years for epilepsy, 1999–00

- In 1999–00, there were 3,465 hospitalisations of children aged 0–14 years for epilepsy, with a hospitalisation rate of 89.1 per 100,000 children. The rate was higher for boys than for girls (94.5 compared with 83.3 per 100,000).
- The rate was highest for infants.

The impact of epilepsy can also be examined in terms of the length of time children spent in hospital. In 1999–00, there were 8,804 hospital bed days for which epilepsy was the principal diagnosis, with an average length of stay of 2.5 days. Epilepsy was also responsible for an additional 4,484 bed days where it was not the main reason for hospital stay but where it had to be managed during hospitalisations for other conditions.

Deaths

Between 1991 and 2000, 142 children died from epilepsy: 58% were boys, and 42% girls.

Table 15.4: Epilepsy deaths in children aged 0–14 years, 1991–00

	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Number	19	13	11	13	18	18	14	13	10	13
Rate per 100,000 children	0.5	0.3	0.3	0.3	0.5	0.5	0.4	0.3	0.3	0.3

Note: ICD-9 code 345 and ICD-10 code G40.

Source: AIHW Mortality Database.

- Between 1991 and 2000, the average epilepsy death rate was 0.4 per 100,000 children. The rate was slightly higher for boys than for girls (0.4 compared with 0.3).
- Mortality was highest among children aged less than 5 years.

Most deaths from epilepsy in children appear to be of those with symptomatic epilepsy (epilepsy considered to be the consequence of a known or suspected disorder of the central nervous system). Long-term follow-up studies of children with epilepsy reveal that they are between 7 and 13 times more likely to die than other children (Callenbach et al. 2001; Harvey et al. 1993). It is children with symptomatic epilepsy (those more prone to seizures) who are at greatest risk of death.

Cystic fibrosis

Cystic fibrosis is a recessive genetic disorder affecting glands which produce body secretions such as sweat, mucus and enzymes. Cystic fibrosis therefore affects many organs in the body but primarily the lungs, pancreas and the reproductive system, resulting in recurrent lung infections and failure to thrive (Waterson et al. 1997). The most serious effect is on the lungs. People who have cystic fibrosis have thick and sticky mucus in their lungs, which is difficult to shift. Children with cystic fibrosis experience a persistent cough, which helps to clear away mucus build-up in the lung. The mucus creates a breeding ground for bacteria and other infections, with regular infections leading to irreversible lung tissue scarring.

There is no cure for cystic fibrosis. However, early screening has improved disease management by optimising nutritional status and preventing lung infections (Doull 2001). Gains from early screening and better management include an improved life expectancy for people with cystic fibrosis. Comparisons of median age at death from cystic fibrosis in 10 countries (including Australia) showed an increase in the median age at death from 8 years in 1974 to 21 years in 1994 (Fogarty et al. 2000).

It is estimated that approximately 1 in every 2,500 births in Australia is a child with cystic fibrosis.

Hospitalisations

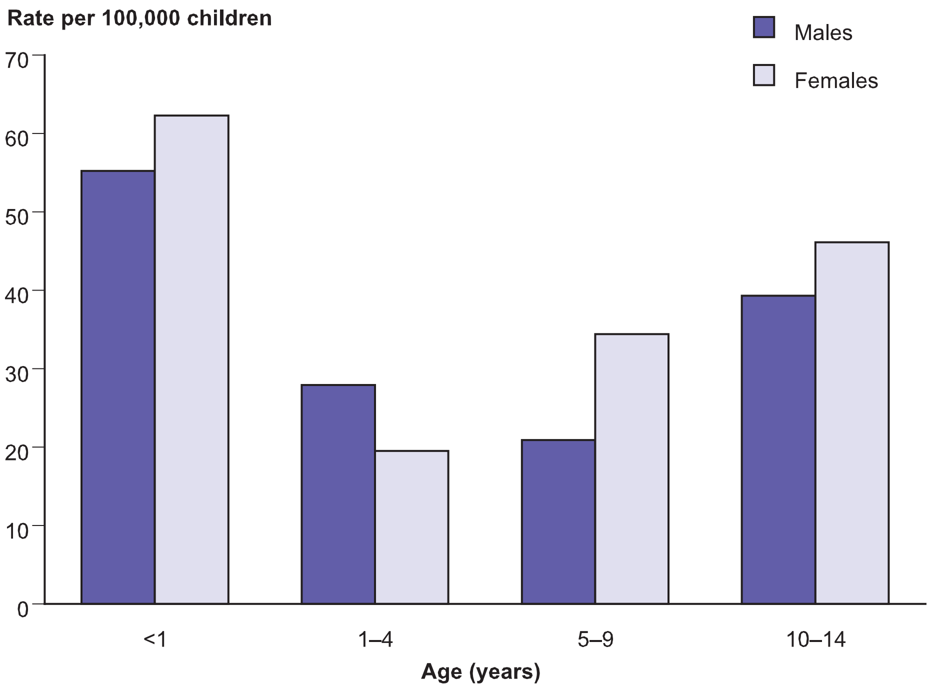
Table 15.5: Hospitalisation rates for children aged 0–14 years for cystic fibrosis, 1993–94 to 1999–00 (per 100,000 children)

	Age (years)	1993–94	1994–95	1995–96	1996–97	1997–98	1998–99	1999–2000
Males	<1	36.2	59.5	43.8	42.9	48.7	49.4	55.2
	1–4	12.4	10.7	15.1	16.8	17.1	19.9	27.9
	5–9	15.4	15.8	24.9	27.4	22.8	23.0	20.9
	10–14	22.3	24.5	30.1	41.6	37.8	43.8	39.3
	0–14	*18.3*	*20.2*	*25.3*	*30.3*	*28.0*	*30.8*	*31.2*
Females	<1	47.8	35.9	35.8	55.9	79.0	58.4	62.3
	1–4	17.6	15.2	17.3	22.3	22.2	23.5	19.5
	5–9	19.0	17.9	31.4	26.9	29.2	27.7	34.4
	10–14	20.8	27.6	38.7	41.0	37.3	43.8	46.1
	0–14	*21.2*	*21.6*	*30.4*	*32.3*	*33.3*	*34.0*	*36.2*
Persons	**0–14**	**19.7**	**20.9**	**27.8**	**31.3**	**30.6**	**32.4**	**33.6**

Note: ICD-9-CM code 277.0 and ICD-10-AM code E84 (1998–99 to 1999–00).

Source: AIHW National Hospital Morbidity Database.

- The hospitalisation rate for children aged 0–14 years for cystic fibrosis rose from 18.3 to 31.2 per 100,000 boys (an increase of 70%) and from 21.2 to 36.2 per 100,000 girls (71%) between 1993–94 and 1999–00.
- Over the entire 7-year period, the rates were higher for girls than for boys.



Note: ICD-10-AM codes E84.

Source: Table 15.5.

Figure 15.3: Hospitalisation rates for children aged 0–14 years for cystic fibrosis, 1999–00

- In 1999–00, there were 1,319 hospitalisations of children aged 0–14 years for cystic fibrosis, with a higher hospitalisation rate for girls than for boys (36.2, compared with 31.2). The overall rate was 33.6 per 100,000 children.
- The highest rates were observed for those under 1 year of age. This is because newly diagnosed infants are admitted for treatment after screening.

The impact of cystic fibrosis can also be examined in terms of the length of time children spent in hospital. In 1999–00, there were 13,929 hospital bed days for which cystic fibrosis was the principal diagnosis, with an average length of stay in hospital of 10.6 days. Cystic fibrosis was also responsible for an additional 377 bed days where it was not the main reason for hospital stay but where it had to be managed during hospitalisations for other conditions.

Deaths

The cystic fibrosis death rate for children aged 0–14 is relatively low, as people with cystic fibrosis usually die at older ages. Between 1991 and 2000, there were 106 deaths, of which the majority (72%) were of girls.

Table 15.6: Cystic fibrosis deaths in children aged 0–14 years, 1991–00

	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Number	8	7	15	10	12	9	18	11	10	6
Rate per 100,000 children	0.2	0.2	0.4	0.3	0.3	0.2	0.5	0.3	0.3	0.1

Note: ICD-9 code 277.0 and ICD-10 code E84.

Source: AIHW Mortality Database.

- Between 1991 and 2000, the average cystic fibrosis death rate was 0.3 per 100,000 children.
- The death rate for girls was twice that for boys (0.4 compared with 0.2 per 100,000). Girls appear to be at higher risk of death from cystic fibrosis than boys. This may in part be due to nutritional factors. The risk of death from cystic fibrosis has been shown to increase as weight-for-height percentage decreases (Kerem et al. 1992).
- In most years, death rates were highest among children aged 10–14 years.

16. Mental health problems and disorders

Mental health problems experienced by children may be manifested early on as disturbances of feelings, behaviours and thoughts. If these disturbances are distressing to the child or the parents, and if social and other functioning of the child is affected, then a mental health problem may be identified (Zubrick et al. 1995). Mental disorders are characterised by a clinically significant set of symptoms, as set out in the *Diagnostic and Statistical Manual of Mental Disorders, 4th edition* (DSM-IV) (APA 1994; Sawyer et al. 2000). There are clear diagnostic criteria which should be met in order for a diagnosis of mental disorder to be made, including that the symptoms must cause clinically significant impairment in social, academic or occupational functioning.

Because of its enormous social and public health importance, mental health is one of the six National Health Priority Areas (AIHW & DHFS 1997). Families in which there are children with mental health problems face many difficulties, with parents likely to worry more about their children's health, reporting having less time for their own needs, experiencing more stress and being less able to cope than other parents (DHAC 2000a; Dupaul et al. 2001).

While genetic factors have been implicated in some types of mental illnesses, such as schizophrenia, bipolar disorder and depression (Hyman 1999), mental health problems and disorders can be due to an interaction between biological factors and adverse psychosocial experiences (USDHHS 2000). It has been suggested that some children may have a genetic vulnerability to certain disorders, but that these disorders will not develop without the interaction of the genes with non-genetic risk factors. A number of risk factors have been associated with a higher likelihood of developing a mental disorder, but this does not mean that these factors cause mental illness, or that everyone who is exposed to them will develop a mental disorder. In many cases, different risk factors may be closely associated with one another, for example, a child with poor social skills may also experience peer rejection and social isolation. Risk factors can be individual (particular to the person), contextual (a product of the environment), or the result of the interaction between the person and the environment. Risk factors may include:

- Individual factors—prenatal brain damage, insecure attachment in infancy or childhood, low intelligence, difficult temperament, poor social skills, low self-esteem.
- Family or social factors—having only one resident parent, marital discord between parents, parental substance misuse, parental mental disorder, social isolation.
- School context—bullying, peer rejection, inadequate behaviour management, failure to achieve academically.
- Life events and situations—physical, sexual and emotional abuse, divorce and family breakup, physical illness or impairment, poverty, homelessness.
- Community and cultural factors—socioeconomic disadvantage, social or cultural discrimination, neighbourhood violence and crime, population density and housing conditions (DHAC 2000a:16).

This chapter examines the mental health problems and disorders experienced by children. It also examines self-inflicted injury and suicide, which are often associated with mental health problems, particularly depression (Groholt et al. 2000). Prevalence data on mental health problems and disorders are derived from the Child and Adolescent Component of the National Survey of Mental Health and Wellbeing, conducted in 1998 on 4,500 children and adolescents. Data on hospitalisations come from the AIHW National Hospital Morbidity Database, while data on deaths come from the AIHW Mortality Database.

Prevalence of mental health problems

The Child Behaviour Checklist was used in the Child and Adolescent Component of the National Survey of Mental Health and Wellbeing to examine emotional and behavioural problems, and in turn to obtain prevalence data on mental health problems in children aged 4–17 years. The indicator for the prevalence of mental health problems is the number of children aged 4–12 years with a mental health problem in a given year as a percentage of all children aged 4–12 years.

Sawyer et al. (2000) considered children to have mental health problems when they were experiencing a number of emotional and behavioural problems in the range typically seen in children attending mental health clinics. The areas in which emotional and behavioural problems were assessed are presented in Box 16.1.

Box 16.1: Mental health problems assessed by the Child Behaviour Checklist

General areas

Total problems: all mental health problems reported by parents.

Internalising problems: inhibited or over-controlled behaviour (e.g. anxiety or depression).

Externalising problems: antisocial or under-controlled behaviour (e.g. delinquency or aggression).

Specific Areas

Somatic complaints: chronic physical complaints without known cause or medically verified basis.

Delinquent behaviour: breaking rules and norms set by parents and communities (e.g. lying, swearing, stealing or truancy).

Attention problems: difficulty concentrating and sitting still, and impaired school performance.

Aggressive behaviour: bullying, teasing, temper tantrums and fighting.

Social problems: impaired peer relationships.

Withdrawn: shyness and social isolation.

Anxious/Depressed: feelings of loneliness, sadness, being unloved, worthlessness, anxiety and general fears.

Thought problems: strange behaviours or ideas, obsessions.

Source: Sawyer et al. 2000:9.

The survey estimated that 15.0% of boys and 14.4% of girls aged 4–12 years had some type of mental health problem.

Table 16.1: Prevalence of mental health problems among children aged 4–12 years, 1998 (per cent)

	Males	Females
General areas		
Total problems	15.0	14.4
Externalising problems	13.6	12.2
Internalising problems	15.0	11.3
Specific areas		
Somatic complaints	7.2	5.6
Delinquent behaviour	7.4	7.8
Attention problems	7.4	6.2
Aggressive behaviour	5.9	5.2
Social problems	6.5	3.9
Withdrawn	5.4	2.9
Anxious/depressed	4.1	2.9
Thought problems	3.2	2.7

Note: Problem areas are not mutually exclusive, and thus ‘total problems’ do not equal the sum of internalising and externalising problems.

Source: Sawyer et al. 2000.

- Among children aged 4–12 years in 1998, externalising problems were reported for 13.6% of boys and 12.2% of girls, while internalising problems were reported for 15.0% of boys and 11.3% of girls.
- The specific problems most frequently identified were somatic complaints (identified in 7.2% of boys and 5.6% of girls), delinquent behaviour (7.4% of boys and 7.8% of girls) and attention problems (7.4% of boys and 6.2% of girls). These problems were also the ones most frequently identified among older children.

Sawyer et al. (2000) also investigated the relationship between demographic characteristics and mental health problems. Children and adolescents living in one-parent, step/blended or low-income families were more likely to have mental health problems. Mental health problems were also more prevalent in families with one or both parents unemployed.

Mental disorders

The survey also examined the prevalence among Australian children aged 6–12 years[1] of three mental disorders: depressive disorder, conduct disorder and attention-deficit hyperactivity disorder (ADHD). The Diagnostic Interview Schedule for Children (Version IV) (Shaffer et al. 2000, cited in Sawyer et al. 2000) was used. This Schedule uses the diagnostic criteria described in the DSM-IV, which are shown in Box 16.2.

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[1] The Diagnostic Interview Schedule is not suitable for use with children under the age of 6 years.

Box 16.2: Symptoms of depressive, conduct and attention-deficit hyperactivity disorders

Depressive disorder: *Symptoms include having a depressed mood most of the day, nearly every day; considerably decreased interest or pleasure in activities; failing to make expected weight gains; insomnia; fatigue or loss of energy; feelings of worthlessness or excessive/inappropriate guilt; decreased ability to concentrate; recurrent thoughts of death, suicidal thoughts or suicide attempt.*

Conduct disorder*: A repetitive and persistent pattern of behaviour in which the basic rights of others or major age-appropriate societal norms or rules are violated. Symptoms may include aggression to people or animals (bullying, fighting, being physically cruel to people or animals), destruction of property (lighting fires, deliberately destroying other's property), deceitfulness or theft (breaking into houses or cars, shoplifting) and serious violations of rules (staying out at night against parent's rules, running away from home, school truancy).*

Attention-deficit hyperactivity disorder (ADHD): *Characterised by symptoms of inattention (e.g. failing to attend to details, not listening when spoken to directly, losing things necessary for tasks or activities, being easily distracted by extraneous stimuli), hyperactivity (e.g. fidgeting with hands or feet, leaving seat in classroom when inappropriate, talking excessively) and impassivity (e.g. blurting out answer before questions are complete, having difficulty taking turn, interrupting or intruding on others).*

Source: APA 1994.

There are many negative psychological and psychosocial factors that are associated with child mental disorders such as depression, ADHD and conduct disorder. Young people who are depressed may be at an increased risk of suicide, with about one-third of depressed adolescents likely to attempt suicide in the next two decades (NHRMC 1997b). Depression can also lead to increased substance abuse, poor family relationships, higher levels of delinquency, and lower self-esteem.

Some studies have shown an association between ADHD and substance abuse disorders, with a high prevalence of ADHD being reported among adults in treatment for substance abuse (Chilcoat & Breslau 1999; Clure et al. 1999). Preschool children with ADHD have more problem behaviours and fewer social skills than their peers, and have deficits in pre-academic skills even before entering school (Dupaul et al. 2001). Boys with ADHD, particularly those who are aggressive, report more depressive symptoms, lower self-esteem and less overall happiness than do boys without ADHD (Treuting & Hinshaw 2001). Girls with ADHD report more depression, anxiety, stress, social concern, and lower self-esteem than other girls (Rucklidge & Tannock 2001).

Children who have conduct disorders are also at increased risk of substance abuse, and have more school behaviour problems, more contacts with police, and more suicidal behaviour than other children (MacDonald & Achenbach 1999). Sanders et al. (2000) suggest that childhood conduct problems result in considerable long-term costs in many areas of life. They are also associated with a high use of clinical, educational, welfare and justice services.

The indicator for the prevalence of ADHD or depressive disorder or conduct disorder is calculated as the number of children aged 6–12 years diagnosed with ADHD or depressive disorder or conduct disorder in a given year as a percentage of all children aged 6–12 years.

The prevalence of these three mental disorders among children in 1998 is shown in Table 16.2.

Table 16.2: Prevalence of mental disorders among children aged 6–12 years, 1998 (per cent)

Disorder	Males	Females
ADHD[(a)]	19.3	8.8
Depressive disorder[(b)]	3.7	2.1
Conduct disorder	4.8	1.9

(a) The high proportion of children with ADHD could be influenced by diagnostic definitions of ADHD.

(b) Includes major depressive disorder and dysthymic disorder, a chronic depressive condition.

Note: The impairment criteria required by DSM-IV could not be incorporated into the criteria for a diagnosis used in the survey. It is also possible that for some children their symptoms may be been better accounted for by another mental disorder that was not assessed in the survey.

Source: Sawyer et al. 2000.

- Of these disorders in 1998, ADHD was the most prevalent among children aged 6–12 years, reported in 19.3% of boys and 8.8% of girls. However, Sawyer et al. (2000:20) suggest that the prevalence of ADHD could have been overestimated, as some children reported to have ADHD 'may have been more appropriately diagnosed with another disorder not included in the survey'.
- Depressive disorder was reported in 3.7% of boys and 2.1% of girls. It has been suggested that the prevalence of this disorder could have been underestimated, as the prevalence was based on parent report and parents may not always recognise subjective distress experienced by children (Sawyer et al. 2000).
- Conduct disorder was reported in 4.8% of boys, and 1.9% of girls.
- All three disorders had a higher prevalence among boys than among girls.

Many children who have one mental disorder may also have another. Of all children in the survey (aged 6–17 years) with ADHD, depressive or conduct disorders, 23% also had symptoms that met the criteria for one of the other disorders. Boys had a higher rate of comorbidity (27%) than girls (15%). Children with comorbid disorders are particularly at risk. For example, children with both conduct and depressive disorders are more likely to engage in substance abuse (MacDonald & Achenbach 1999).

Sawyer et al. (2000) found that, similar to the findings on mental health problems, mental disorders in general were also more prevalent in children from step/blended and one-parent families, families with the lowest incomes, and/or families where one or both parents were unemployed.

Hospitalisations

There are a number of service providers for children with mental health problems or disorders. The most commonly used services are provided by school counsellors, family doctors or paediatricians, private psychologists or social workers, and other community health services. Some children, however, are hospitalised for their mental disorder.

Three main types of information are presented here: time series for hospitalisation rates; most frequent groups of diagnoses (using classification blocks from the F chapter of the

ICD-10-AM, which contain groups of related diagnoses); and most frequent specific diagnosis.[2]

The indicator for hospitalisations for mental and behavioural disorders is the number of children aged 1–14 years hospitalised for mental and behavioural disorders in a given year as a rate per 100,000 children aged 1–14 years.

Hospitalisation rates for children aged 1–14 years for mental and behavioural disorders are presented only for 1996–97 to 1999–00, as, prior to this time, public psychiatric hospitals were not fully included in the AIHW National Hospital Morbidity Database.

Table 16.3: Hospitalisation rates for children aged 1–14 years for mental and behavioural disorders, 1996–97 to 1999–00 (per 100,000 children)

	Age (years)	1996–97	1997–98	1998–99	1999–00
Males	1–4	100.3	159.1	113.6	126.6
	5–9	378.2	427.1	296.8	283.7
	10–14	583.4	555.8	390.1	416.2
	1–14	*370.6*	*395.5*	*277.1*	*285.2*
Females	1–4	53.4	64.6	63.4	41.1
	5–9	56.3	74.8	41.3	67.2
	10–14	365.7	353.8	309.9	392.0
	1–14	*164.4*	*170.1*	*142.2*	*174.1*
Persons	**1–14**	**270.1**	**285.6**	**211.4**	**231.1**

Note: ICD-9-CM codes 290–316 (excluding 307.4) and ICD-10-AM codes F00–F99 (excluding F51 & F70–F79).

Source: AIHW National Hospital Morbidity Database.

- Over this period, hospitalisation rates for mental and behavioural disorders were consistently higher for boys than for girls, in all age groups. In 1999–00, the rate for boys was 1.2 times the rate for girls.
- Rates were generally higher for children in older age groups than in younger age groups. One exception was in 1998–99, when the rate for girls aged 1–4 years was greater than that for girls aged 5–9 years.
- Although hospitalisation rates for children for mental and behavioural disorders seem to have decreased between 1997–98 and 1998–99, this is likely to be influenced by the introduction of the ICD-10-AM coding system in 1998–99.

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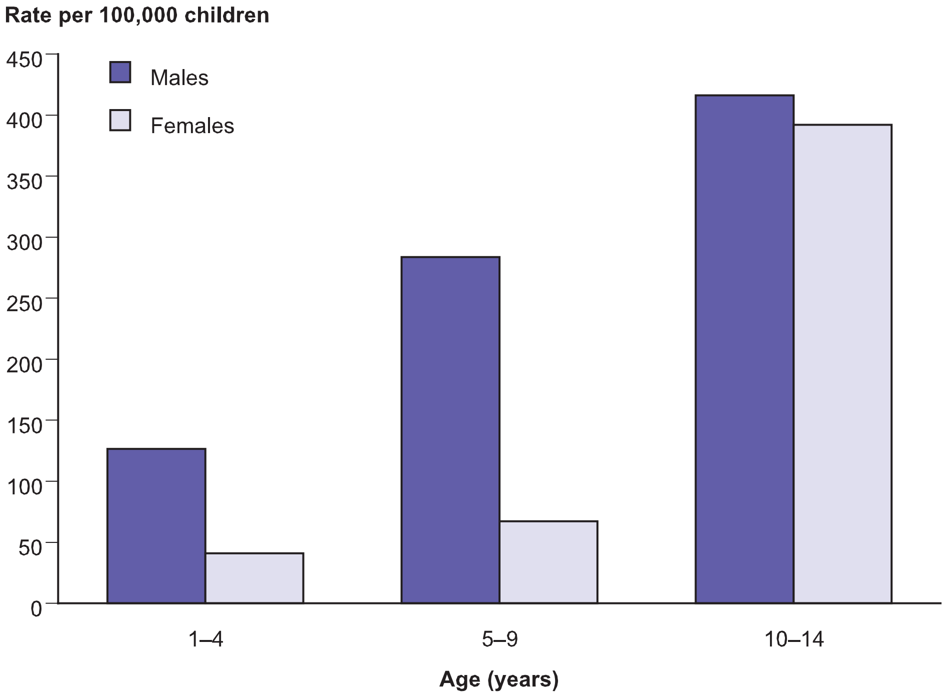
[2] Codes representing 'mental retardation' (F70–F79) and 'non-organic sleeping disorders' (F51) were not included in the analyses. With the introduction of ICD-10-AM, a large increase in the number of infants hospitalised for non-organic sleeping disorders occurred. Non-organic sleeping disorders were omitted because of this large increase from previous years, and because of the likelihood that many of the children who were coded as having these disorders did not meet the criteria for diagnosis, namely that the sleeping disorder was due to emotional disturbance.

Age-specific hospitalisation rates are shown in Figure 16.1.



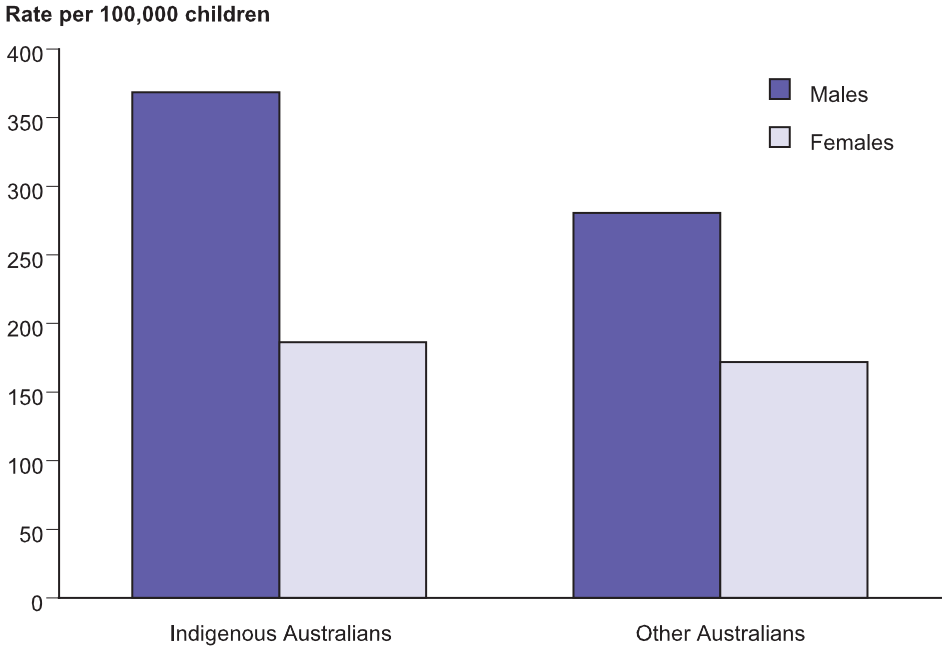
Note: ICD-10-AM codes F00–F99 (excluding F51 & F70–F79).
Source: Table 16.3.

Figure 16.1: Hospitalisation rates for children aged 1–14 years for mental and behavioural disorders, 1999–00

- In 1999–00, there were close to 8,600 hospitalisations of children aged 1–14 years for a mental and behavioural disorder (a rate of 231.1 hospitalisations per 100,000).
- Boys were hospitalised at a rate 1.6 times that of girls (285.2 compared with 174.1).
- Rates increased with age. Children aged 10–14 years were hospitalised at the highest rate.
- It is not known how many hospitalisations meet the strict diagnostic criteria for mental disorders, particularly for children aged less than 4 years, in whom diagnosis of a specific mental health disorder can be problematic or difficult.

In 1999–00, there were 36,950 hospital bed days for which mental and behavioural disorders were the principal diagnoses, with an average length of stay of 3.9 days. Girls stayed in hospital on average twice as long as boys. Differences in the average length of stay for boys and girls may reflect the type of treatment required for different mental disorders in boys and girls. For example, length of hospitalisation for anorexia nervosa can be quite long, which is reflected in the longer average length of hospital stay for girls. Mental and behavioural disorders were also responsible for an additional 10,338 bed days where they were not the main reason for hospital stay but where they had to be managed during hospitalisations for other conditions.

Aboriginal and Torres Strait Islander children



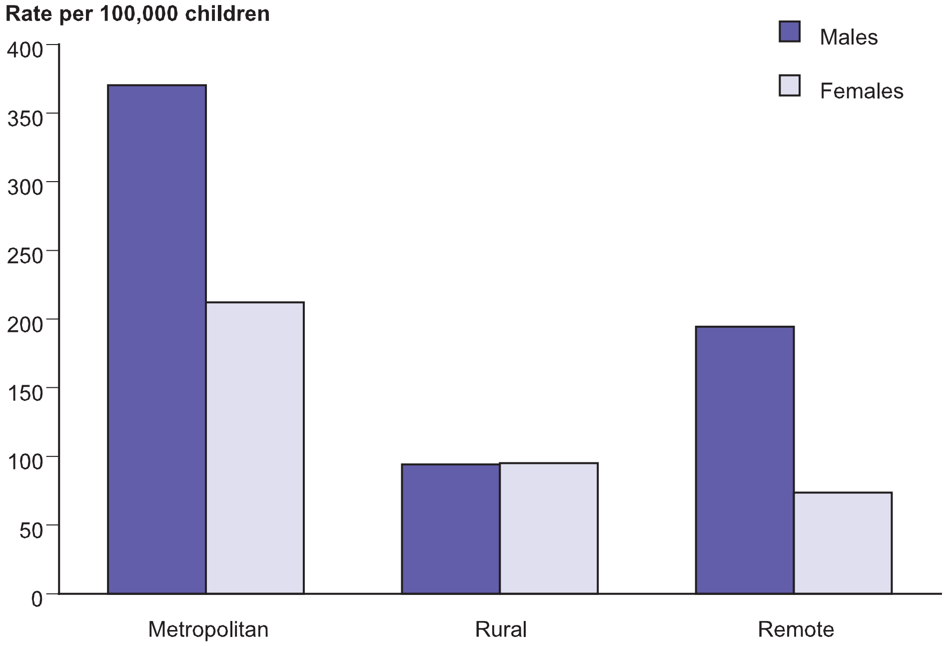
Note: ICD-10-AM codes F00–F99 (excluding F51 & F70–F79).

Source: AIHW National Hospital Morbidity Database [Table A16.1].

Figure 16.2: Hospitalisation rates for Aboriginal and Torres Strait Islander and other Australian children aged 1–14 years for mental and behavioural disorders, 1999–00

- In 1999–00, there were 402 hospitalisations of Aboriginal and Torres Strait Islander children aged 1–14 years for mental and behavioural disorders (a rate of 279.0 per 100,000 children).
- Aboriginal and Torres Strait Islander boys were hospitalised at a rate 1.3 times that for other Australian boys (368.4 compared with 280.5). This difference was mainly due to a higher rate of hospitalisations for Indigenous boys aged 10–14.
- Aboriginal and Torres Strait Islander girls were hospitalised at a rate only slightly higher than that for other Australian girls (186.4 compared with 171.8). However, a large difference was seen for girls aged 5–9 years, with Indigenous girls being hospitalised at a rate 3.6 times as high as that for other Australian girls.

Children in metropolitan, rural and remote areas



Note: ICD-10-AM codes F00–F99 (excluding F51 & F70–F79).
Source: AIHW National Hospital Morbidity Database [Table A16.2].

Figure 16.3: Hospitalisation rates for children aged 1–14 years for mental and behavioural disorders, by area of residence, 1999–00

- Hospitalisation rates in 1999–00 for mental and behavioural disorders for both boys and girls aged 1–14 years were highest for those living in metropolitan areas.
- Boys in remote areas were hospitalised at a rate twice that of boys in rural areas.
- Rates for girls in rural and remote areas were fairly similar.

Main causes of hospitalisation for mental and behavioural disorders

The indicator for hospitalisations for mental and behavioural disorder groups is the number of children aged 1–14 years hospitalised due to a mental and behavioural disorder group in a given year as a percentage of the number of hospitalisations of children aged 1–14 years for all mental and behavioural disorders.[3]

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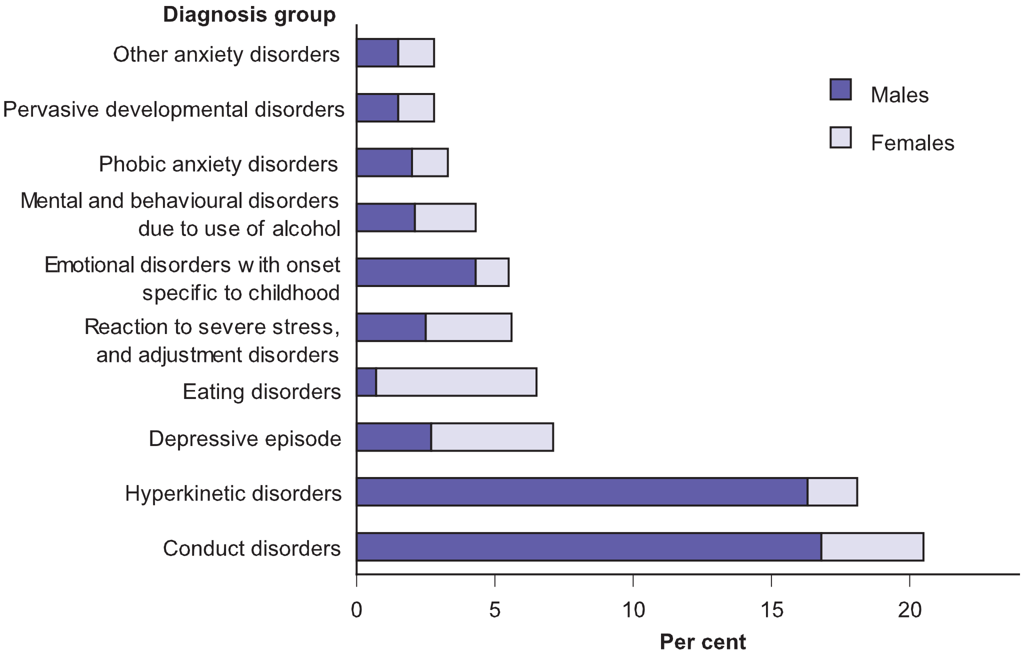
[3] This indicator needs further development. As the denominator is the total number of hospitalisations for mental and behavioural disorders each year, and this number varies from year to year, the proportion of children in a particular disorder group could vary even if the number of children hospitalised for these conditions remained the same from one year to the next.

In 1999–00, the 10 most frequent groups of mental and behavioural disorder diagnoses accounted for 76% of all hospitalisations for mental and behavioural disorders among children aged 1–14 years (Figure 16.4).



Note: ICD-10-AM codes F91, F90, F32, F50, F43, F93, F10, F40, F84, F41.

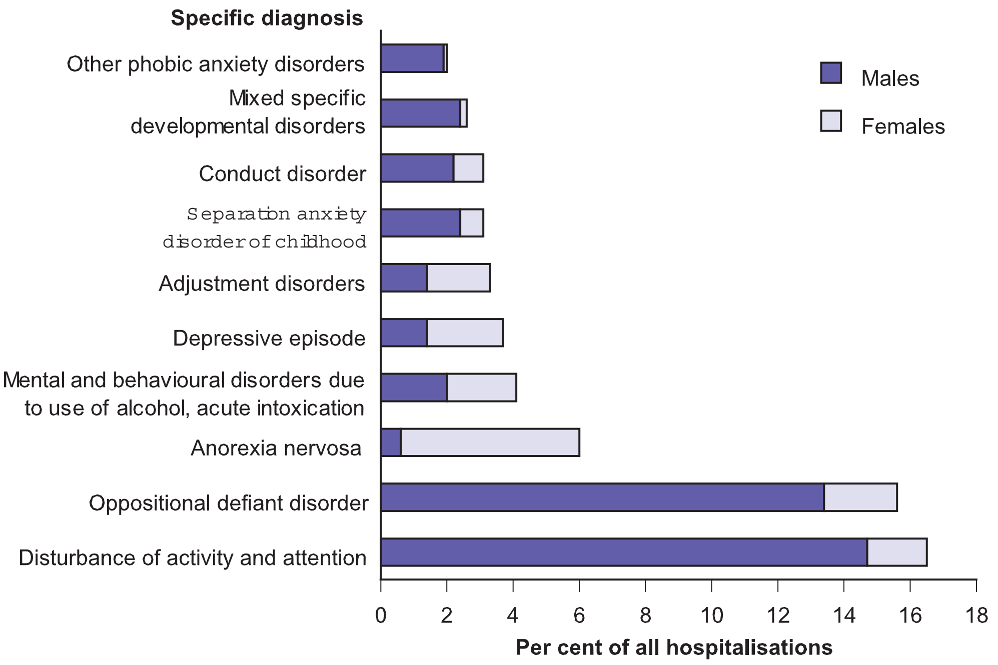
Source: AIHW National Hospital Morbidity Database [Table A16.3].

Figure 16.4: Hospitalisations for children aged 1–14 years for mental and behavioural disorders, most frequent disorder groups, 1999–00

- For children aged 1–14 years in 1999–00, the most freqent diagnosis groups resulting in hospitalistion for mental and behavioural disorders were conduct disorders (21%), hyperkinetic disorders (18%) and depressive episode (7%).
- For boys aged 1–14 years, the most frequent diagnosis group resulting in hospitalisation was conduct disorders (17% of all hospitalisations for mental and behavioural disorders). The next most frequent group was hyperkinetic disorders (16%). Most boys hospitalised for these disorders were aged 5–14 years.
- For girls aged 1–14 years, the most frequent diagnosis group was eating disorders (6%). The majority of girls hospitalised for eating disorders were aged 10–14 years. The next most frequent diagnosis group for girls aged 1–14 years was depressive episode, accounting for 4% of all hospitalisations with mental and behavioural disorders.

The indicator for hospitalisations for specific mental and behavioural disorders is the number of children aged 1–14 years hospitalised due to a specific mental and behavioural disorder in a given year as a percentage of the number of hospitalisations of children aged 1–14 years for all mental and behavioural disorders.[4]

In 1999–00, the 10 most frequent specific diagnoses accounted for 60% of all hospitalisations for mental and behavioural disorders among children aged 1–14 years (Figure 16.5).



Note: ICD-10-AM codes F90.0, F91.3, F50.0, F10.0, F32,9, F43.2, F93.0, F91.9, F83, F40.8.

Source: AIHW National Hospital Morbidity Database [Table A16.4].

Figure 16.5: Hospitalisations for children aged 1–14 years for mental and behavioural disorders, most frequent specific diagnoses, 1999–00

- For children aged 1–14 years in 1999–00, the most frequent specific diagnoses resulting in hospitalistion for mental and behavioural disorders were disturbance of activity and attention (17%), oppositional defiant disorder (16%) and anorexia nervosa (6%).
- For boys aged 1–14 years, the most frequent specific diagnoses resulting in hospitalisation in 1999–00 were disturbance of activity and attention and oppositional defiant disorder (15% and 13% of all hospitalisations for mental and behavioural disorders, respectively).
- For girls aged 1–14 years, the most frequent specific diagnoses were anorexia nervosa (5%), depressive disorder and oppositional defiant disorder (2% each).

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[4] This indicator also needs further development. See note for indicator for hospitalisations for mental and behavioural disorder groups.

Aboriginal and Torres Strait Islander children

Table 16.4: Hospitalisations of Aboriginal and Torres Strait Islander children aged 1–14 years with mental and behavioural disorders, most frequent diagnosis groups, 1999–00

Diagnosis group	Number	Per cent of all hospitalisations for mental and behavioural disorders
Hyperkinetic disorders	167	41.5
Conduct disorders	72	17.9
Mental and behavioural disorders due to use of alcohol	29	7.2
Mental and behavioural disorders due to use of volatile solvents	25	6.2
Reaction to severe stress, and adjustment disorders	20	5.0
All hospitalisations for mental and behavioural disorders	**402**	**100.0**

Note: Hospitalisations for boys and girls have been combined due to small numbers of hospitalisations for some of these disorders.

Source: AIHW National Hospital Morbidity Database.

- Five diagnosis groups (Table 16.4) accounted for 78% of hospitalisations of Aboriginal and Torres Strait Islander children for mental and behavioural disorders in 1999–00.
- Hyperkinetic disorders were responsible for the highest proportion of hospitalisations, accounting for 41.5%.
- Conduct disorders accounted for 17.9% of hospitalisations, and mental and behavioural disorders due to use of alcohol accounted for 7.2%.

Table 16.5: Hospitalisations of Aboriginal and Torres Strait Islander children aged 1–14 years for mental and behavioural disorders, most frequent specific diagnoses, 1999–00

Diagnosis	Number	Per cent of all hospitalisations for mental and behavioural disorders
Disturbance of activity and attention	164	40.8
Oppositional defiant disorder	60	14.9
Mental and behavioural disorders due to use of alcohol, acute intoxication	22	5.5
Adjustment disorders	15	3.7
Unspecified non-organic psychosis	12	3.0
All hospitalisations for mental and behavioural disorders	**402**	**100.0**

Note: Hospitalisations for boys and girls have been combined due to small numbers of hospitalisations for some of these disorders.

Source: AIHW National Hospital Morbidity Database.

- The specific diagnoses in Table 16.5 accounted for 68% of hospitalisations of Aboriginal and Torres Strait Islander children for mental and behavioural disorders in 1999–00.
- The most frequent specific diagnosis was disturbance of activity and attention, which accounted for 40.8% of all hospitalisations for mental and behavioural disorders.
- The next most frequent specific diagnosis among Indigenous children was oppositional defiant disorder, which accounted for 14.9% of all hospitalisations for mental and behavioural disorders.

Children in metropolitan, rural and remote areas

Table 16.6: Hospitalisations of children aged 1–14 years for mental and behavioural disorders, most frequent diagnosis groups, by area of residence, 1999–00

	Number		Per cent of all hospitalisations for mental and behavioural disorders	
Diagnosis group	**Metropolitan**	**Non-metropolitan**	**Metropolitan**	**Non-metropolitan**
Conduct disorders	1,631	126	22.1	10.8
Hyperkinetic disorders	1,493	59	20.2	5.0
Depressive episode	510	99	6.9	8.5
Eating disorders	482	74	6.5	6.3
Reaction to severe stress, and adjustment disorders	348	125	4.7	10.7
Emotional disorders with onset specific to childhood	456	17	6.2	1.5
Mental and behavioural disorders due to use of alcohol	218	153	3.0	13.1
Phobic anxiety disorders	277	5	3.8	0.4
Pervasive developmental disorders	193	47	2.6	4.0
Other anxiety disorders	190	45	2.6	3.8
All hospitalisations for all mental disorders	**7,385**	**1,171**	**100.0**	**100.0**

Note: Hospitalisations for boys and girls and for children in rural and remote areas have been combined due to small numbers of hospitalisations for some of these disorder groups.

Source: AIHW National Hospital Morbidity Database

- In 1999–00, conduct disorders and hyperkinetic disorders were responsible for a greater proportion of hospitalisations of children for mental and behavioural disorders in metropolitan areas.
- Reaction to severe stress, adjustment disorders, and mental and behavioural disorders due to use of alcohol were responsible for a greater proportion of hospitalisations in non-metropolitan areas.

Table 16.7: Hospitalisations of children aged 1–14 years for mental and behavioural disorders, most frequent specific diagnoses, by area of residence, 1999–00

	Number		Per cent of all hospitalisations for mental and behavioural disorders	
Diagnosis	**Metropolitan**	**Non-metropolitan**	**Metropolitan**	**Non-metropolitan**
Disturbance of activity and attention	1,369	47	18.5	4.0
Oppositional defiant disorder	1,308	31	17.7	2.6
Anorexia nervosa	453	60	6.1	5.1
Mental and behavioural disorders due to use of alcohol, acute intoxication	211	141	2.9	12.0
Depressive episode, unspecified	261	59	3.5	5.0
Adjustment disorders	190	88	2.6	7.5
Separation anxiety disorder of childhood	259	7	3.5	0.6
Conduct disorder, unspecified	199	60	2.7	5.1
Mixed specific developmental disorders	210	15	2.8	1.3
Other phobic anxiety disorders	171	1	2.3	0.1
All hospitalisations for all mental disorders	**7,385**	**1,171**	**100.0**	**100.0**

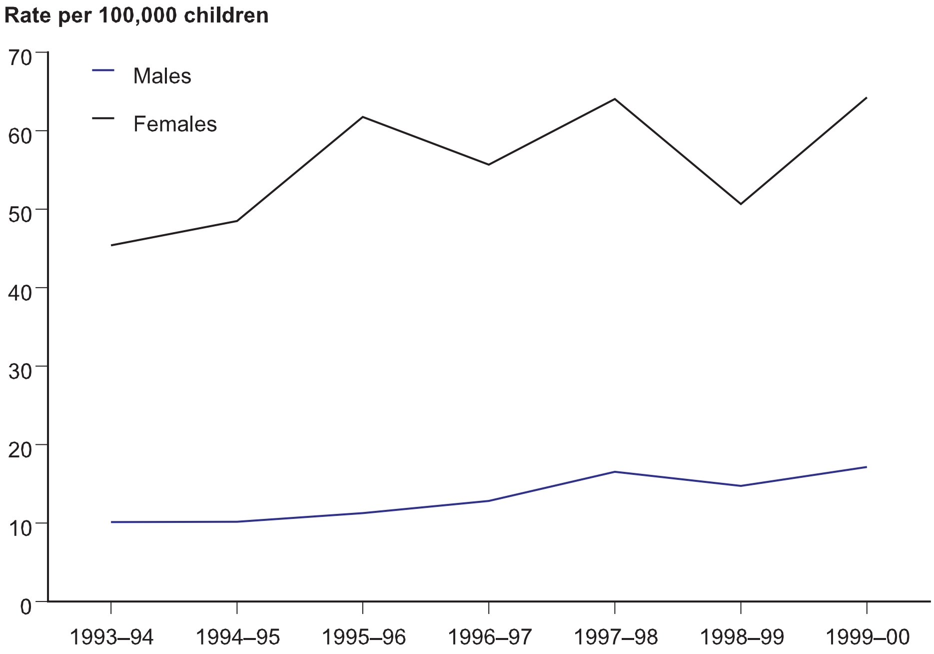
Note: Hospitalisations for boys and girls and for children in rural and remote areas have been combined due to small numbers of hospitalisations for some of these disorders.

Source: AIHW National Hospital Morbidity Database.

- In 1999–00, there was a higher proportion of hospitalisations of children for disturbance of activity and attention and oppositional defiant disorder in metropolitan areas.
- The proportion of hospitalisations for alcohol use (acute intoxication) was higher among children in non-metropolitan areas.

Intentional self-inflicted injuries

Intentional self-inflicted injuries are often associated with mental health problems and disorders, such as depression (Groholt et al. 2000). In 1999–00, 547 children aged 0–14 years were hospitalised for intentional self-inflicted injuries, with the vast majority (97%) aged between 10–14 years. For this reason, the remainder of this section will deal with hospitalisations for intentional self-inflicted injuries of children in this age group only.



Note: ICD-9-CM codes E950–E959 (1993–94 to 1996–97) and ICD-10-AM codes X60–X84 (1998–99 to 1999–00).
Source: AIHW National Hospital Morbidity Database [Table A16.5].

Figure 16.6: Hospitalisation rates for children aged 10–14 years for self-inflicted injuries, 1993–94 to 1999–00

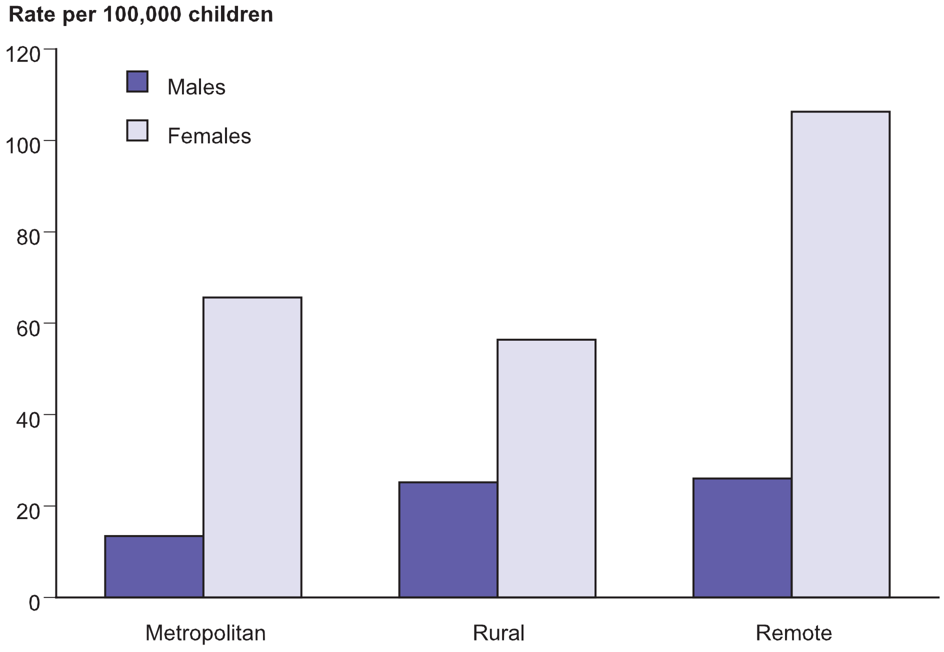
- In 1999–00, 414 girls and 116 boys were hospitalised for self-inflicted injuries.
- Between 1993–94 and 1999–00, hospitalisation rates for self-inflicted injuries were between 3 and 6 times higher for girls than for boys. However, the sex difference has been decreasing since 1995–96, with the rate for girls 3.7 times that for boys in 1999–00, compared with 5.5 times in 1995–96, the year in which the difference was greatest.
- Rates have been increasing since 1993–94. For both girls and boys, hospitalisations for self-inflicted injuries were at their highest point in 1999–00 (64.2 and 17.1 per 100,000, respectively).

For both boys and girls, poisoning was the most common reason for hospitalisation: 331 girls (80%) and 88 boys (76%). Using a sharp object was the next most common reason for hospitalisation.

Aboriginal and Torres Strait Islander children

In 1999–00, 37 Aboriginal and Torres Strait Islander children were hospitalised for self-inflicted injuries, compared with 484 other Australian children. Indigenous children were hospitalised at a rate twice that of other Australian children (77.0 compared with 38.3 per 100,000 children). Most Indigenous children (29, or 78%) were hospitalised for poisoning.

Children in metropolitan, rural and remote areas



Note: ICD-10-AM codes X60–X84.
Source: AIHW National Hospital Morbidity Database [Table A16.6].

Figure 16.7: Hospitalisation rates for children aged 10–14 years for self-inflicted injuries, by area of residence, 1999–00

- In 1999–00, 347 children in metropolitan areas, 153 in rural areas and 29 in remote areas were hospitalised for self-inflicted injuries.
- The highest rates of hospitalisation were for girls who lived in remote areas, and lowest for those in rural areas. Rates for girls in remote areas were approximately twice those for girls in rural areas, and 1.6 times those for girls in metropolitan areas.
- Hospitalisation rates for boys were lowest in metropolitan areas. Boys in both remote and rural areas were hospitalised for self-inflicted injuries at a very similar rate, which was twice that for boys in metropolitan areas.

For both boys and girls in all locations, poisoning was responsible for the highest proportion of hospitalisations for self-inflicted injury.

Deaths

Deaths attributable to mental and behavioural disorders among children under the age of 15 are very low. In 2000, only 3 deaths were classified as being caused by mental and behavioural disorders, two of which were drug or alcohol related. These data do not include death by suicide, which is generally associated with some form of mental disorder.

Suicide

The indicator for suicide is the number of deaths attributed to suicide for children aged 10–14 years in a given year as a rate per 100,000 children aged 10–14 years. Data on suicide are derived from the AIHW Mortality Database.

Table 16.8: Suicide deaths in children aged 10–14 years, 1991–00

	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Number										
Males	6	5	4	3	5	7	8	6	10	6
Females	2	2	1	3	—	7	7	1	7	1
Persons	8	7	5	6	5	14	15	7	17	7
Rate per 100,000 children										
Persons	0.6	0.6	0.4	0.5	0.4	1.1	1.1	0.5	1.3	0.5

Note: ICD-9 codes E950–E959 (1991 to 1996) and ICD-10 codes X60–X84 (1997 to 2000).

Source: AIHW Mortality Database.

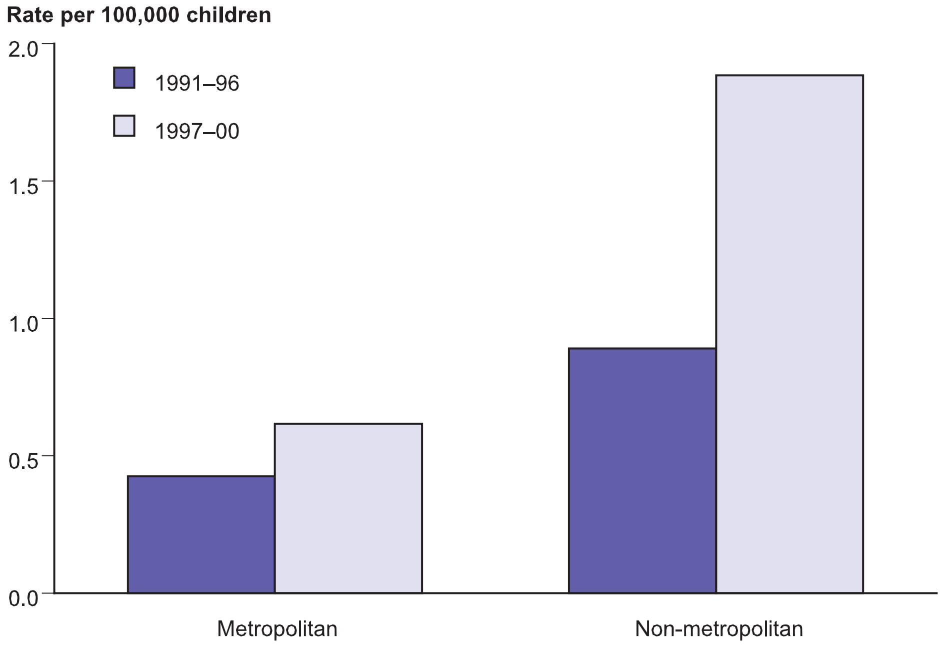
- In 2000, there were 7 deaths from suicide of children aged 10–14 years. Over the decade, there were 91 suicides, with two-thirds of these males.

Most suicides in this age group are a result of hanging. For boys, firearms were the second most common method of suicide over the period. However, fewer shooting deaths occurred between 1996 and 2000 than between 1991 and 1995 (4, compared with 11).

Aboriginal and Torres Strait Islander children

In Queensland, Western Australia, South Australia and the Northern Territory from 1991 to 2000, 4 Aboriginal and Torres Strait Islander boys and 6 Aboriginal and Torres Strait Islander girls committed suicide. Of these 10 suicides, 9 took place between 1996 and 2000.

Children in metropolitan and non-metropolitan areas



Note: ICD-9 codes E950–E959 and ICD-10 codes X60–X84.
Source: AIHW Mortality Database [Table A16.7].

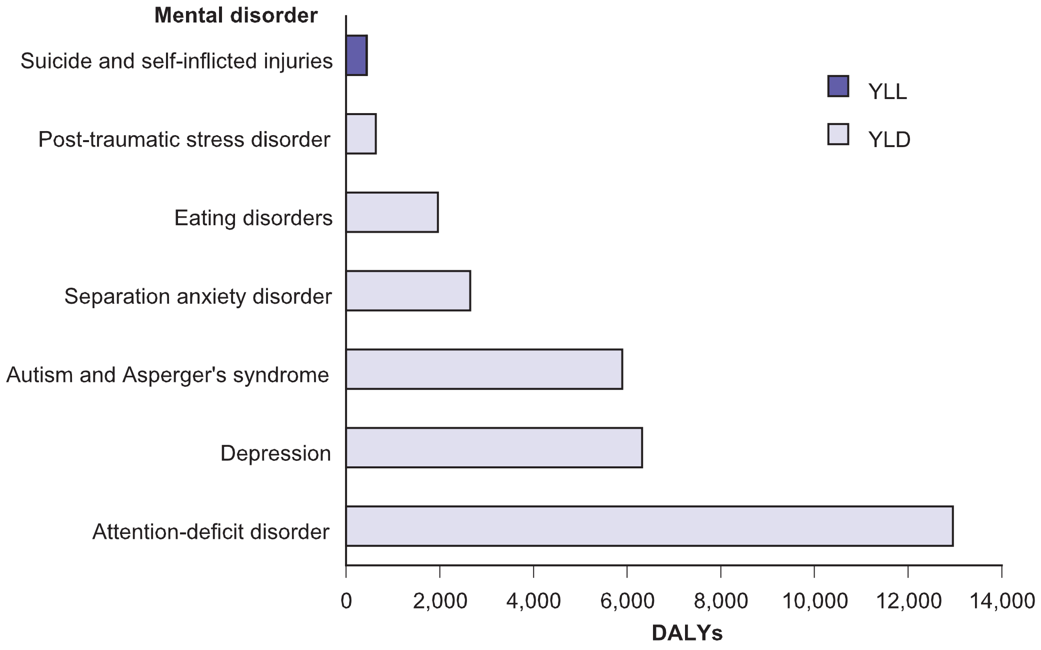
Figure 16.8: Suicide death rates for children aged 10–14 years in metropolitan and non-metropolitan areas, 1991–96 and 1997–00

- From 1991 to 2000, there were 44 deaths of children aged 10–14 years from suicide in metropolitan areas and 46 in non-metropolitan areas.
- In both time periods, suicide rates were higher in non-metropolitan areas than in metropolitan areas.
- In non-metropolitan areas, rates in 1997–00 were 2.1 times higher than in 1991–96. In metropolitan areas, rates were 1.4 times higher in 1997–00 than in 1991–96.

The Child and Adolescent Component of the National Survey of Mental Health and Wellbeing also examined thoughts of suicide and suicidal behaviour among children and adolescents aged 13–17 years. It was found that 12.0% had experienced thoughts of suicide, and 4.2% had made a suicide attempt, with 0.9% requiring treatment by a doctor or nurse. Children and adolescents aged 13–17 years with more emotional and behavioural problems reported considerably higher levels of suicidal thoughts and behaviour. Of those with a very high level of problems, 42% reported they had had serious thoughts about suicide, whereas only 2% of those with a low level of problems had considered suicide (Sawyer et al. 2000).

Burden of disease attributable to mental disorders

In 1996, mental disorders (excluding mental retardation) were estimated to account for 14.3% of the total burden of disease in children aged 0–14 years (30,476 DALYs) . The total burden of disease was higher in boys (62% of total) than in girls (38%). Almost all of the total burden of mental health disorders was due to the burden of disability (30,416 YLD; 99.8% of total) , with the mortality burden accounting for only 0.2% (59 YLL). The total burden of disease for different disorders is shown in Figure 16.9.



Note: There is a small amount of disease burden attributed to other mental disorders and to substance use disorders.

Source: AIHW: Mathers et al. 1999 [Table A16.8].

Figure 16.9: Total burden of disease from mental disorders in children aged 0–14 years, 1996

- Attention-deficit disorder and depression were the disorders responsible for the greatest burden of disease from mental disorders among children aged 0–14 years in 1996.
- The main disorders for which a mortality burden existed were suicide and substance use disorders.

Service use

A small proportion of children with mental health problems and disorders attend mental health services. The Child and Adolescent Component of the National Survey of Mental Health and Wellbeing found that 25% of children who scored in the clinical range of the *Total Problems* scale on the Child Behaviour Checklist had attended one or more types of mental health service in the 6 months prior to the survey (Sawyer et al. 2000). Of children whose parents reported that they needed professional help for emotional or behavioural problems, 45% had attended a mental health service in the previous 6 months. Barriers to obtaining help included the cost of the services, lack of knowledge of where to get help, and the belief that parents could handle the problem.

Of children with ADHD, depressive disorder or conduct disorder, 29% had attended a mental health service during the 6 months prior to the survey (Sawyer et al. 2000). Services most often attended included counselling in school, those provided by a family doctor, paediatrician, private psychologist/social worker, and other community health services. Of those children with ADHD, depressive disorder or conduct disorder, 3% had attended a mental health clinic and 2% a hospital-based department of psychiatry.

Part VI: Oral health

Chapter 17: Dental health

17. Dental health

Australian children generally experience good oral health. Oral health refers to the health of a number of tissues in the mouth, including mucous membrane, connective tissue, muscles, bone, teeth and periodontal structures or gums. It may also refer to immunological, physiological, sensory and digestive system functioning, but is most often used to refer to two specialised tissues of the mouth: the teeth, and the gums (AIHW 2000a).

Decayed teeth are the cause of considerable illness and pain, and losing permanent teeth can lead to difficulties in chewing, higher levels of discomfort while eating, personal embarrassment, social isolation, and a need for assistance (AIHW 2000a). Good oral heath throughout infancy and early childhood contributes to better dental health in adulthood, resulting in less decay and reduced loss of natural teeth. Early preventive strategies, including water fluoridation, improved oral hygiene practices, better diet, regular brushing and flossing and improved disease management, all help to maintain the health of teeth and gums. The level of access to dental health services in terms of availability and affordability is also an important determinant of dental health.

Oral health outcomes are usually measured in terms of dental health, which is measured in terms of the number of decayed, missing or filled teeth for both baby (deciduous) and adult (permanent) teeth. Another measure of good oral health is the proportion of children with no tooth decay.

Following the introduction of the School Dental Scheme in 1977, there have been great improvements in the dental health of Australian children, including a decline in average decay experience, and an increase in the proportion of children with no dental decay (AIHW 1996). Adding fluoride to the public water supply has also been an effective and socially equitable way of reducing dental decay (AIHW 1998).

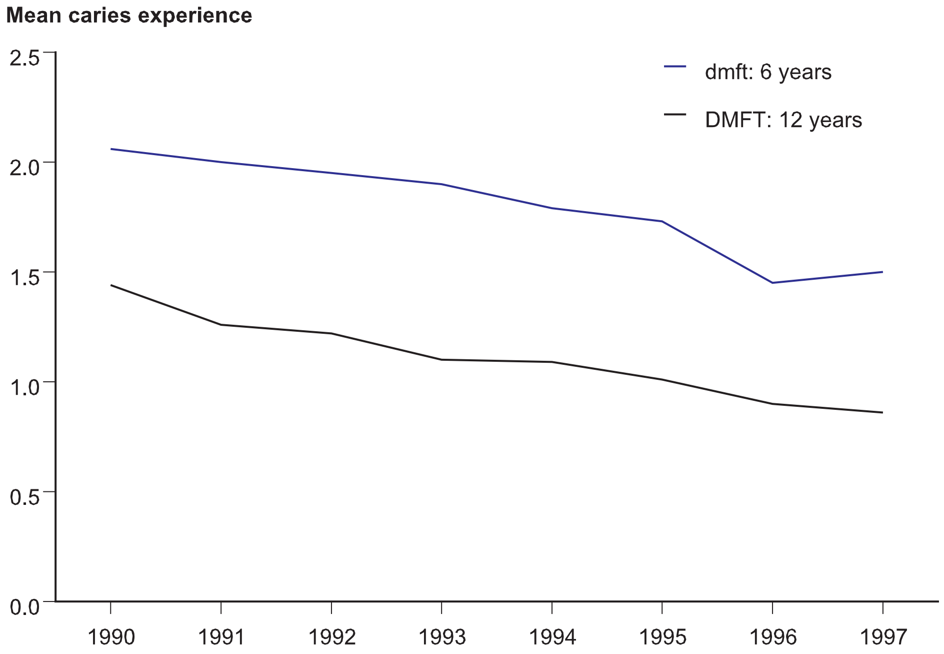
The Child Dental Health Survey monitors the dental health of children enrolled in the dental services operated by all State and Territory health departments (AIHW DSRU: Armfield et al. 2000). School dental services typically provide dental care to primary school-aged children, although in New South Wales screens children up to Year 8. The data obtained from the school dental scheme have some limitations, as only children enrolled with school dental services are represented in the sample. The scheme is not accessible to all schoolchildren and there is some variation among State and Territory programs with respect to priority age groups and the nature of services. Some States and Territories serve 80% of primary school children, while others serve smaller proportions.

Data in this chapter come from the Child Dental Health Survey and the 1999 National Dental Telephone Interview Survey conducted by the Dental Statistics and Research Unit (DSRU) of the AIHW.

Dental health of school children

Dental decay experience is expressed as a dmft or DMFT score: the number of teeth currently decayed, teeth extracted due to decay, and teeth with fillings (AIHW 2000a). The ‘dmft’ score describes decay experience in deciduous teeth, while the ‘DMFT’ score describes decay experience in permanent teeth. The other commonly used statistic is the percentage of individuals who are decay free, that is, when both dmft and DMFT equal zero.

The indicator for dental decay is the mean dmft score for children aged 6 years and the mean DMFT score for children aged 12 years. The mean numbers of decayed teeth among children aged 6 years (dmft) and 12 years (DMFT) from 1990 to 1997 are shown in Figure 17.1.

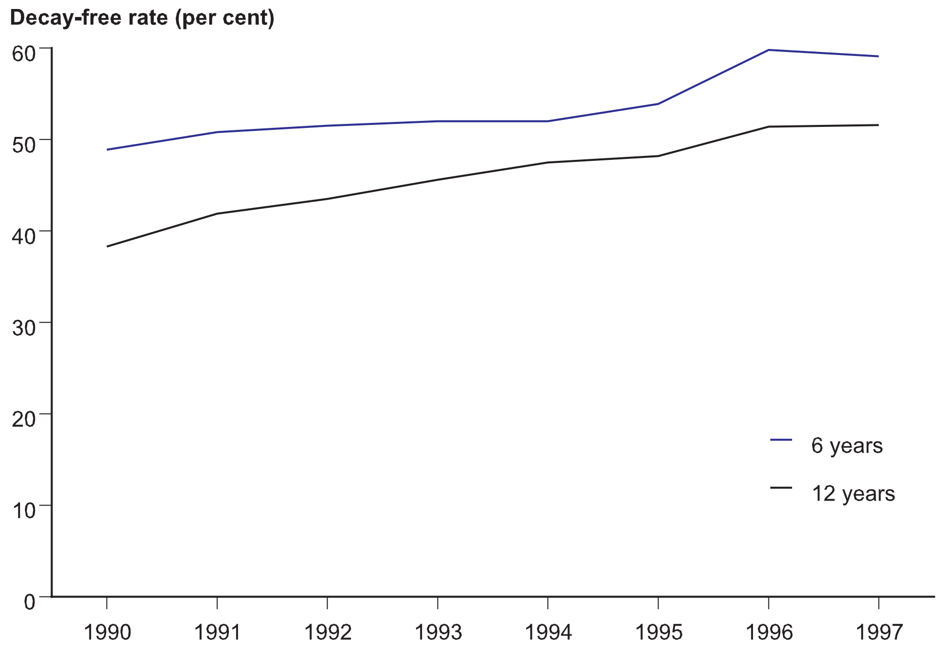


Source: AIHW DSRU 1993; AIHW DSRU: Davies et al. 1994a, 1994b; AIHW DSRU: Davies & Spencer 1995, 1997a, 1997b; AIHW DSRU: Armfield et al. 1999, 2000 [Table A17.1].

Figure 17.1: Mean caries experience of children aged 6 and 12 years, 1990–97

- The mean number of decayed teeth in children aged 6 and 12 years decreased between 1990 and 1997. Among children aged 6 years, the average number of baby teeth affected by decay (dmft) decreased from 2.1 to 1.5. Among children aged 12 years, the average number of permanent teeth affected by decay (DMFT) decreased from 1.4 to 0.9.
- The mean number of decayed teeth was higher in the baby teeth of children aged 6 years than in the permanent teeth of children aged 12 years.

The indicator for the decay-free rate is the number of children aged 6 years or 12 years with a dmft + DMFT score of zero as a percentage of all children aged 6 years or 12 years. The decay-free experience of children aged 6 and 12 years from 1990 to 1997 is shown in Figure 17.2.



Source: AIHW DSRU 1993; AIHW DSRU: Davies et al. 1994a, 1994b; AIHW DSRU: Davies & Spencer 1995, 1997a, 1997b; AIHW DSRU: Armfield et al. 1999, 2000 [Table A17.2].

Figure 17.2: Proportion of children aged 6 and 12 years free from decay experience, 1990–97

- The proportions of children aged 6 and 12 years free from decay experience gradually increased between 1990 and 1997. The proportion of children aged 6 years rose from 49% to 59%, while the proportion of children aged 12 years rose from 38% to 52%.

While there have been general improvements in the dental health of Australian children, problems with dental health are still seen in Aboriginal and Torres Strait Islander and overseas-born children. Davies et al. (1997) found that, in 1992, Aboriginal and Torres Strait Islander children had significantly more decayed teeth and higher aggregate decay experience in both baby and adult teeth than other Australian children. They also found that overseas-born children had more fillings and fissure sealants than other Australian children. Data from the 1998 Child Dental Health Survey for children in the Northern Territory show that Indigenous children are more likely than other Australian children to have decayed, missing or filled baby teeth. Moreover, in children aged 6–14 years, the proportion of Indigenous children with no decayed permanent teeth was consistently lower than for other Australian children at every age examined (ABS & AIHW 2001).

Dental health can also be looked at by examining the proportion of the child population in immediate need of treatment. These data are recorded for New South Wales, Queensland, South Australia and the Northern Territory (Table 17.1).

Table 17.1: Children in need of immediate treatment and the state of their dental health, 1997

Age (years)	Proportion needing immediate treatment (per cent)	Mean dmft	Mean DMFT	Proportion with 5 or more decayed teeth (per cent)
4	12.0	1.58	—	11.8
5	10.5	2.73	0.01	16.5
6	10.6	2.73	0.10	10.1
7	10.6	2.74	0.20	6.5
8	9.4	2.59	0.43	9.7
9	8.7	2.34	0.68	1.7
10	8.6	2.15	0.82	2.7
11	8.5	1.60	1.21	2.6
12	9.9	0.66	1.52	2.3
13	12.1	0.38	1.46	2.9
14	10.5	0.10	2.14	7.9

Note: Excludes Vic, WA, Tas and ACT.

Source: AIHW DSRU: Armfield et al. 2000.

- The highest proportions of children needing immediate treatment in 1997 were those aged 4 years and 13 years, with 12.0% and 12.1%, respectively, requiring immediate treatment.
- The highest proportion of children with 5 or more decayed teeth (16.5%) were aged 5 years.
- Generally, a greater proportion of younger children (aged 4–7 years) required immediate treatment. The proportion requiring immediate treatment increased again among children aged 13 and 14 years.

Dental consultations by children

The indicator for dental consultations is the number of children aged 5–9 and 10–14 years who had a dental consultation in the past 12 months as a percentage of all children aged 5–9 and 10–14 years.

Information on dental visits by children aged 5–14 years, gathered from the National Dental Telephone Interview Survey, is shown in Table 17.2.

Table 17.2: Dental consultations by children aged 5–14 years, 1999

Question	Age (years)	
	5–9	**10–14**
Time since last dental visit		
Never	8.6%	0.4%
<12 months	78.5%	79.5%
1–<2 years	11.6%	15.1%
2–<5 years	1.3%	5.1%
5+ years	0.0%	0.0%
Place of last dental visit		
Private	38.5%	44.8%
Public clinic	3.9%	8.2%
School dental service	57.6%	47.1%
Reason for last dental visit:[(a)]		
Problem	24.6%	29.0%
Check-up	75.4%	71.0%
Mean number of:[(a)]		
Visits	1.92	2.60
Extractions	0.22	0.30
Fillings	0.52	0.37
Scale and clean services	0.53	0.71
Social impact		
Toothache[(b)]	5.7%	8.6%
Food avoidance[(c)]	10.8%	9.2%

(a) Among children who made a dental visit in the previous 12 months.

(b) Percentage reporting experience of toothache as 'very often', 'often', or 'sometimes' during the last 12 months.

(c) Percentage reporting avoidance of eating some foods because of problems with their teeth or mouth as 'very often', 'often', or 'sometimes' during the last 12 months.

Source: 1999 National Dental Telephone Interview Survey (AIHW DSRU).

- The majority of children aged 5–14 years in 1999 had visited a dentist or dental professional in the previous 12 months: 78.5% of children aged 5–9 years, and 79.5% of children aged 10–14 years.
- Over half of children aged 5–9 years (57.6%) and just under half of those aged 10–14 years (47.1%) used the school dental service on their last visit to a dentist or dental professional. Of children aged 5–9 years, 38.5% had last used a private dentist, while of children aged 10–14 years, the proportion was 44.8%.
- A higher proportion of children had last visited a dentist for a check-up rather than for a problem (75.4% of children aged 5–9 years, and 71.0% of children aged 10–14 years).
- For children aged 5–9 years, the average number of visits was 1.9, while for children aged 10–14 years, the average number was 2.6.
- Toothache in the previous 12 months was reported for 5.7% of all children aged 5–9 years, and 8.6% of children aged 10–14 years. A small proportion of children were also reported to avoid eating some foods due to tooth or mouth problems: 10.8% of children aged 5–9 years, and 9.2% of children aged 10–14 years.

Part VII: Injury

Chapter 18: External causes of injury

Chapter 18: External causes of injury

Injury is the leading cause of child death and one of the main causes of ill-health in Australia.[1] For every child who dies from injury, many more are admitted to hospital for treatment, and others are treated in emergency departments. Injuries can have lasting effects, such as disability or disfigurement, that can impair a child's development and future wellbeing. In addition, disability or death from injury significantly impacts on a child's family.

The risk of injury and types of injury suffered are strongly associated with sex and age of the child, the area of residence, and the socioeconomic status of the family. For most types of childhood injury, and for every age after infancy, boys are at higher risk of injury than girls. This difference between boys and girls may be related to differences in behaviour or differences in exposure related to traditional male and female roles. Differences in socialisation, operating even at an early age, may also result in differences in risk-taking behaviours between boys and girls (Wilson et al. 1991). The injury pattern is also strongly associated with age (AIHW NISU: Moller & Kreisfeld 1997). For example, the risk of hospitalisation for falls increases with age, but for other conditions, such as poisoning, younger children (<5 years) are more at risk than those aged 5 years or more (AIHW NISU: Steenkamp & Cripps 2001).

The area of a child's residence is also an important factor. Children living on farms are more likely to suffer different types of injury, and those living in remote areas are more likely to have higher rates of injury than those in metropolitan areas.

The rate and severity of injury are also related to the socioeconomic status of the family. Poor children are more likely to be injured and more likely to die from their injuries than children from better-off families. In a recent international report on childhood injury, it was suggested that the risk of child deaths from injury appears to rise steeply with poverty (UNICEF 2001). The likelihood of a child being injured or killed was associated with single parenthood, low maternal education, young maternal age at birth, poor housing, large family size, and parental drug or alcohol abuse. Children from low socioeconomic status groups are more likely to suffer injury from certain causes, such as house fire or assault, which are more often fatal than other causes of injury.

Injuries also vary by intent. Some intentionally inflicted injuries may be labelled as 'accidents'. While it can be difficult to distinguish between unintentional (accidental) injury and injury due to neglect and intentional injury, strategies that focus on the prevention of unintentional injury in at-risk families may also reduce intentional injury and therefore indirectly reduce the risks of child abuse and neglect (Wilson et al. 1991).

Preventing injury in childhood must use a full range of approaches such as education, environmental modification, maintaining national design standards as well as improving regulations and legislation (National Center for Injury Prevention and Control 1999). Environmental modification includes initiatives such as the use of safe furniture, installing smoke alarms in homes and safe keeping of drugs and poisons. Programs that focus on educational and public awareness, as well as on families at risk, can be used to highlight certain injury prevention strategies in the home. Legislation requiring the use of safety equipment, such as seat belts, car safety seats, bike helmets, and the fencing of swimming pools, has reduced much of the injury that was once thought difficult to prevent.

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[1] 'Injury' as defined here includes poisoning.

This chapter examines the more serious spectrum of childhood injury, including that which requires hospitalisation or results in death. The focus is on external causes, rather than the nature of the injuries themselves, since the circumstances of injury are most relevant to injury prevention.

Hospitalisations for all injuries

The indicator for hospitalisation for all injuries is the number of hospitalisations for injuries in children aged 0–14 years in a given year as a rate per 100,000 children. The rates of hospitalisation for injuries for children aged 0–14 years between 1993–94 and 1999–00 are shown in Table 18.1.

Table 18.1: Hospitalisation rates for children aged 0–14 years for injuries as a result of external causes,[(a)] 1993–94 to 1999–00 (per 100,000 children)

	Age (years)	1993–94	1994–95	1995–96	1996–97	1997–98	1998–99	1999–00
Males	<1	1,260.9	1,253.7	1,125.3	1,238.9	1,328.0	1,322.3	1,250.5
	1–4	2,122.8	2,086.5	2,167.8	2,375.0	2,324.7	2,274.7	2,293.9
	5–9	1,771.5	1,784.8	1,795.5	1,845.4	1,902.7	1,858.6	1,907.1
	10–14	2,235.5	2,244.2	2,312.3	2,383.8	2,347.8	2,302.8	2,361.8
	0–14	*1,982.7*	*1,979.8*	*2,018.7*	*2,122.1*	*2,122.2*	*2,078.9*	*2,114.8*
Females	<1	991.7	985.5	927.1	979.1	1,048.2	1,062.8	1,040.5
	1–4	1,595.9	1,564.7	1,634.1	1,676.2	1,700.7	1,788.0	1,745.4
	5–9	1,223.2	1,199.5	1,253.2	1,370.7	1,310.9	1,343.2	1,332.4
	10–14	1,167.0	1,149.6	1,168.1	1,148.2	1,134.0	1,112.2	1,076.3
	0–14	*1,288.6*	*1,266.1*	*1,304.9*	*1,352.6*	*1,339.2*	*1,367.2*	*1,338.9*
Persons	**0–14**	**1,644.7**	**1,632.1**	**1,670.8**	**1,747.0**	**1,740.5**	**1,731.9**	**1,736.6**

(a) Includes all hospitalisations where injury or poisoning was recorded as the principal diagnosis for which an external cause was documented. This is the case for all hospital data in this chapter.

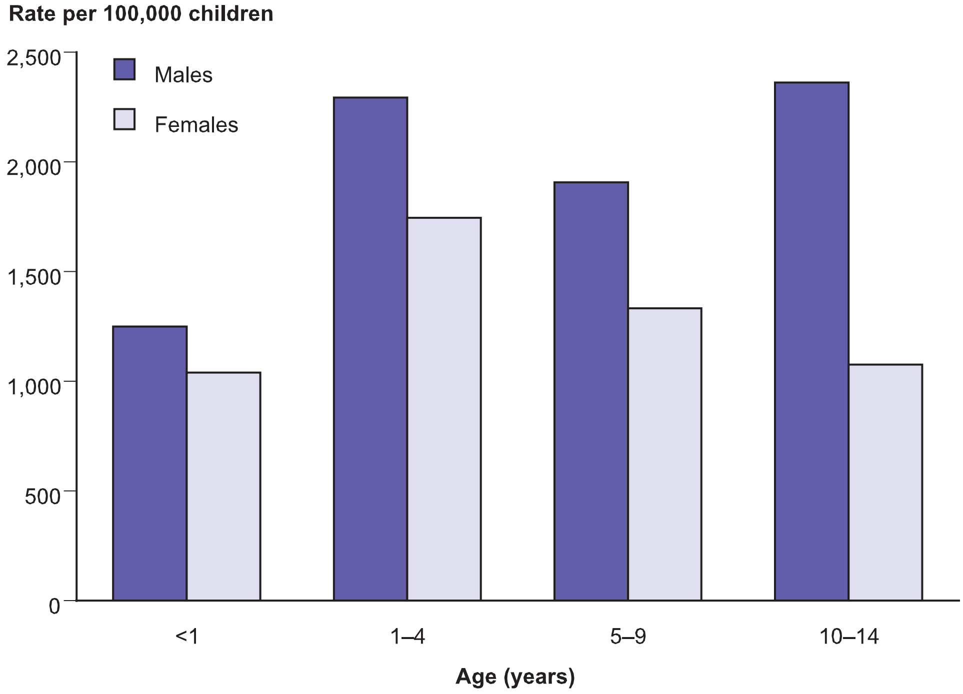
Notes

1. ICD-9-CM codes E800–E999 & 800–999 (1993–94 to 1997–98) and ICD-10-AM codes V01–Y99 & S00–T98 (1998–99 to 1999–00). ICD-10-AM codes for falls (W00–W19) are not equivalent to ICD-9-CM codes for falls (E880–E888) because there is no equivalent to ICD-9-CM code E887 (Fracture, cause unspecified) in ICD-10-AM.
2. These data include codes for complications of medical and surgical care. In 1999–00, these codes (Y40–Y84) accounted for approximately 6% of hospitalisations for injury.

Source: AIHW National Hospital Morbidity Database.

- The rates of hospitalisation for all injuries for children aged 0–14 years appear to have remained fairly constant over the period 1993–94 to 1999–00. However, the changeover to ICD-10-AM in 1998–99 means that the time series should be interpreted with caution because of variations in injury coding.
- Boys had higher rates than girls. This sex difference was constant for all age groups.
- Among boys, those aged 10–14 years had the highest rate of hospitalisation for injury over the period, while among girls, those aged 1–4 years had the highest rate.

The hospitalisation rates for injuries for children aged 0–14 years in 1999–00 are shown in Figure 18.1.



Note: ICD-10-AM codes V01–Y99 & S00–T98.

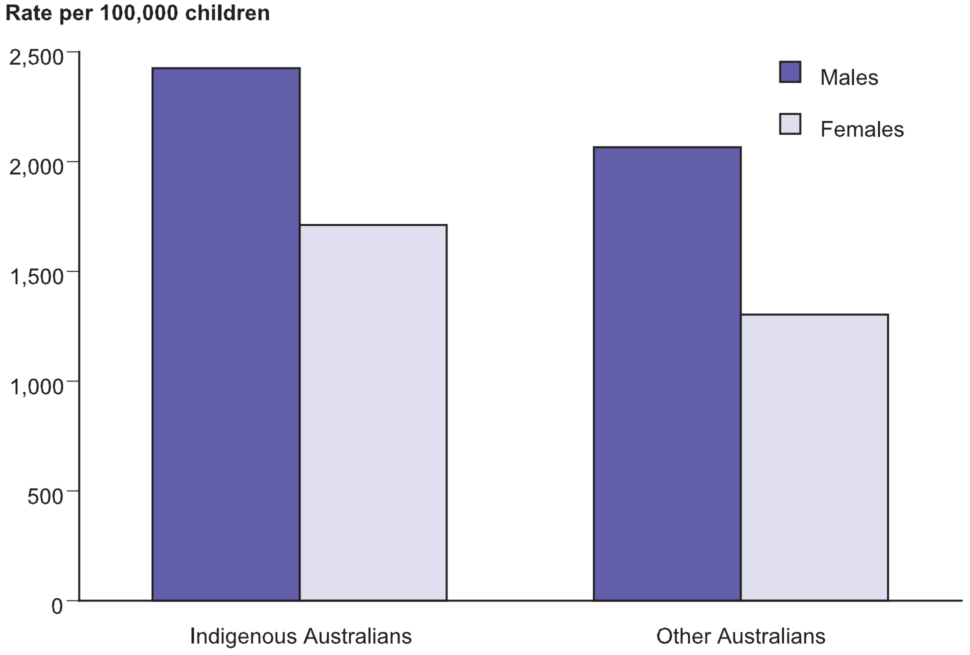
Source: Table 18.1.

Figure 18.1: Hospitalisation rates for children aged 0–14 years for injuries, 1999–00

- In 1999–00, there were 68,150 hospitalisations for injury in children. Rates ranged from 2,361.8 per 100,000 boys aged 10–14 years to 1,040.5 per 100,000 infant girls.
- In all age groups, the hospitalisation rate for injury or poisoning was consistently higher for boys than for girls.
- Among boys, those aged 10–14 years and 1–4 years had the highest rates of hospitalisation for treatment of an injury, while among girls, those aged 1–4 years had the highest rates.

Aboriginal and Torres Strait Islander children

The rates of hospitalisation for all injuries for Aboriginal and Torres Strait Islander children are presented in Figure 18.2.



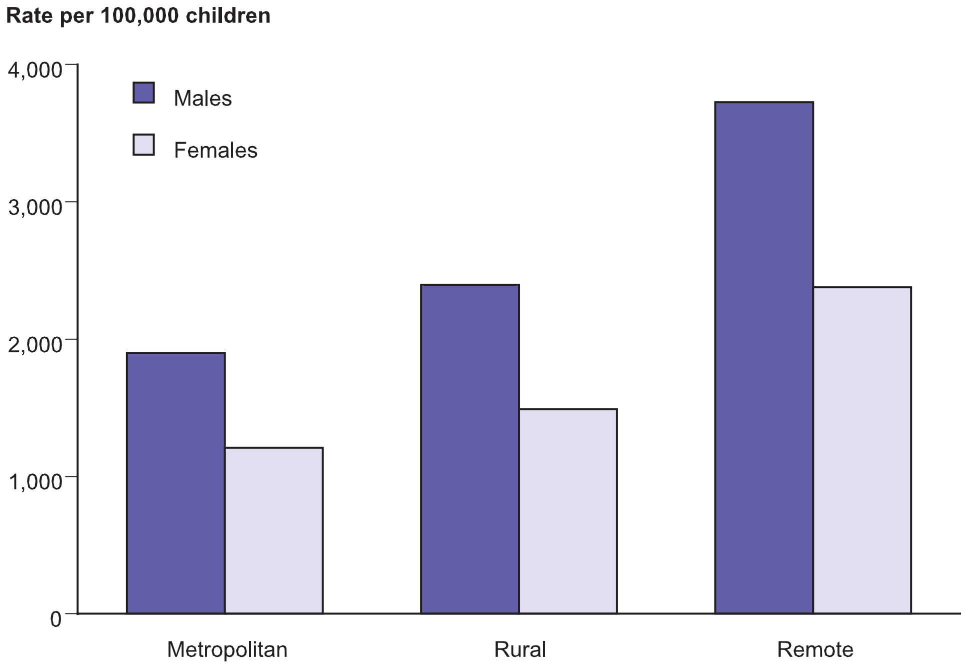
Note: ICD-10-AM codes V01–Y999 & S00–T98.
Source: AIHW National Hospital Morbidity Database [Table A18.1].

Figure 18.2: Hospitalisation rates for Aboriginal and Torres Strait Islander and other Australian children aged 0–14 years for injuries, 1999–00

- In 1999–00, there were 3,357 hospitalisations of Aboriginal and Torres Strait Islander children aged 0–14 for injuries. The rate for all injuries was greater for Indigenous children than for other Australian children across all age groups (2,075.5 compared with 1,693.8 per 100,000 children).
- Consistent with findings for all Australian children, Indigenous children in the 1–4 years age group had a higher rate than children of other ages.

Children in metropolitan, rural and remote areas

The distribution of hospitalisation rates for injuries in 1999–00 by area of residence is presented in Figure 18.3.



Note: ICD-10-AM codes V01–Y999 & S00–T98.

Source: AIHW National Hospital Morbidity Database [Table A18.2].

Figure 18.3: Hospitalisation rates for children aged 0–14 years for injuries, by area of residence, 1999–00

- In 1999, 41,987 children in metropolitan areas, 21,310 in rural areas and 4,494 in remote areas were hospitalised for injuries.
- The rates of hospitalisation in 1999–00 for injury in rural and remote areas were higher than in metropolitan areas.
- Boys in all areas had higher rates than girls.
- Among boys in metropolitan areas, those aged 1–4 years had the highest rates, while in rural and remote areas, those aged 10–14 years had the highest rates. Irrespective of area of residence, girls aged 1–4 years had the highest rates.

Hospitalisation for specific external causes of injury

To form a comprehensive picture of childhood injury in Australia, it is necessary to identify the causes of injury suffered by children.

Six of the most common groups of external causes of injury recorded in children aged 0–14 years are shown in Table 18.2.

Table 18.2: Hospitalisation rates for children aged 0–14 years for specific external causes of injuries, 1999–00 (per 100,000 children)

	Age (years)	Falls	Pedal cyclist injured in transport accident	Accidental poisoning	Burns and scalds	Pedestrian injured in transport accident	Assault	Other causes
Males	<1	340.1	0.8	112.1	145.5	3.1	87.2	561.8
	1–4	719.6	46.2	307.0	155.4	43.1	20.2	1,002.3
	5–9	862.7	151.4	23.6	33.1	40.1	10.0	786.3
	10–14	871.4	286.2	19.5	39.2	33.1	41.4	1,071.0
	0–14	*791.5*	*157.2*	*104.1*	*75.5*	*36.1*	*28.3*	*922.1*
Females	<1	350.1	0.8	103.3	100.0	4.9	60.7	420.6
	1–4	585.1	22.9	263.3	108.7	28.8	17.5	719.1
	5–9	696.8	75.3	15.7	19.0	19.6	5.7	500.3
	10–14	365.1	72.3	20.2	13.0	21.7	12.6	571.4
	0–14	*534.4*	*55.2*	*89.4*	*46.6*	*21.7*	*14.9*	*576.7*
Persons	**0–14**	**666.2**	**107.5**	**96.9**	**61.4**	**29.1**	**21.8**	**753.8**

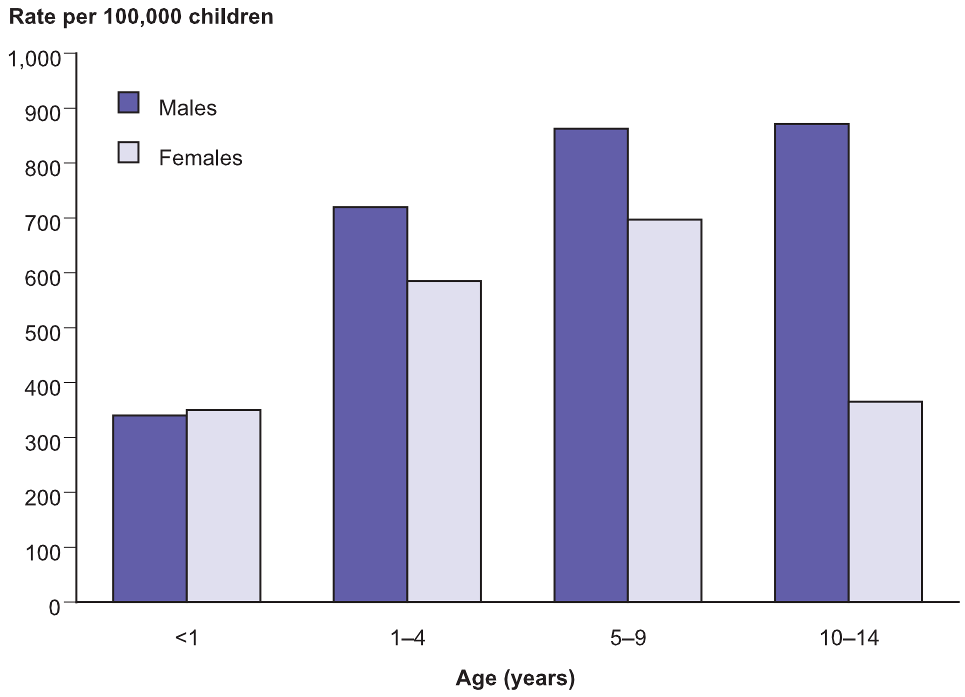
Note: Categories: Falls ICD-10-AM codes S00–T98 & W00–W19; Pedal cyclist injured in transport accident ICD-10-AM codes S00–T98 & V10–V19; Accidental poisoning ICD-10-AM codes S00–T98 & X40–X49; Burns and scalds ICD-10-AM codes S00–T98 & X10–X19 & X00–X09; Pedestrian injured in transport accident ICD-10-AM codes S00–T98 & V01–V09; Assault ICD-10-AM codes S00–T98 & X85–Y09.

Source: AIHW National Hospital Morbidity Database.

- In 1999–00 for all age groups, falls were by far the most common external cause of hospitalisation for injury among children.
- Pedal cycle injuries were the second most common cause among children. Rates were highest among those aged 5–14 years.
- For both boys and girls, accidental poisoning was the third most common cause. Burns and scalds were the fourth most common cause. Rates for both accidental poisoning and burns and scalds were highest among children aged less than 5 years.
- Hospitalisation rates for pedestrians injured in a transport accident were distributed evenly across age groups but were more common for boys than for girls.
- The 'other' category accounted for the remainder of external causes, which amounted to 43% of hospitalisations for injuries. The group which accounted for the greatest proportion of hospitalisations among these was exposure to inanimate mechanical forces, which includes injuries such as being hit by an object or cut by a sharp object. This group accounted for 17% of all injury hospitalisations. Other types of external causes in the 'other' category included exposure to unspecified factors, exposure to animate mechanical forces (e.g. injuries by another person or an animal), medical complications, and motorcycle accidents.

Falls

Falls are the most common cause of injury hospitalisation for Australian children (AIHW NISU: Steenkamp & Cripps 2001). They are important to examine given the varying degrees of severity this type of injury causes, and the association between falls and the physical design of a child's environment. The indicator for hospitalisations for falls is the number of hospitalisations of children aged 0–14 years for falls in a given year as a rate per 100,000 children.



Note: ICD-10-AM codes S00–T98 & W00–W19.

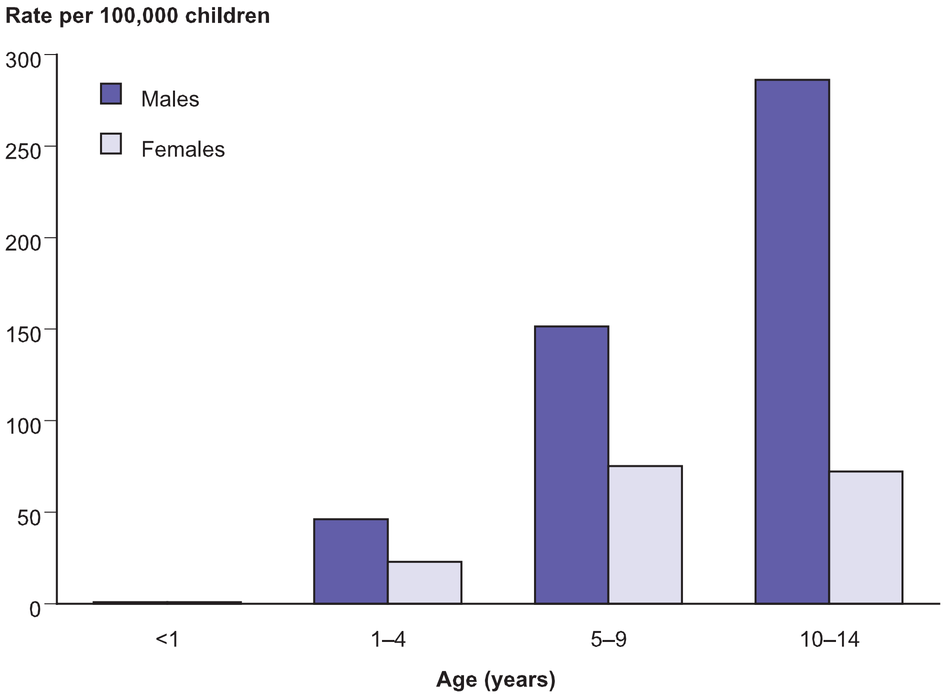
Source: Table 18.2.

Figure 18.4: Hospitalisation rates for children aged 0–14 years for injuries from falls, 1999–00

- In 1999–00, there were 26,202 hospitalisations of children aged 0–14 years for injuries from falls, with a hospitalisation rate of 666.2 per 100,000 children.
- Hospitalisation rates were higher for boys than for girls (791.5 compared with 534.4).
- The age group with the highest rate for falls in both sexes was children aged 5–9 years (781.9).
- Boys aged 10–14 years were hospitalised at a rate 2.4 times higher than girls in the same age group.

Pedal cycling injuries

Injuries caused as a result of pedal cycling are a common reason for hospitalisations of children. The indicator for hospitalisations for pedal cycling injuries is the number of hospitalisations of children aged 0–14 years for pedal cycling injuries in a given year as a rate per 100,000 children.



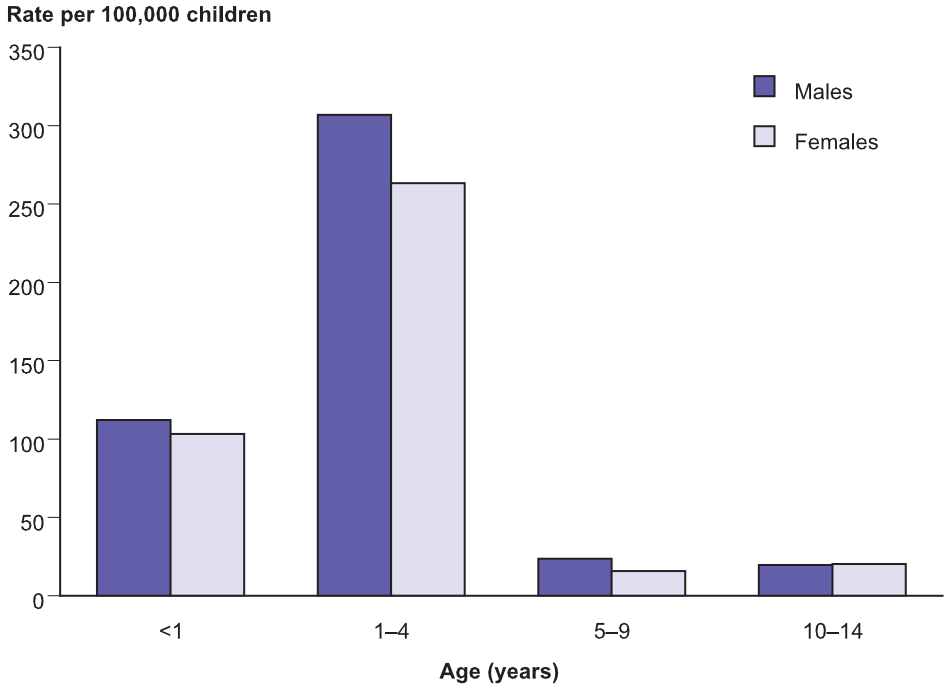
Note: ICD-10-AM codes: S00–T98 & V10–V19.
Source: Table 18.2.

Figure 18.5: Hospitalisation rates for children aged 0–14 years for injuries from pedal cycling, 1999–00

- In 1999–00, there were 4,283 hospitalisations of children aged 0–14 years for injuries from pedal cycling, with a hospitalisation rate of 107.5 per 100,000 children.
- Hospitalisation rates increased markedly with age for both boys and girls. However, boys aged 10–14 years were hospitalised at a rate 1.9 times the rate for boys aged 5–9 years, whereas the rates for girls aged 5–9 years and 10–14 years were almost the same.
- Male cyclists were hospitalised at a much higher rate than girls. In 1999–00, boys aged 10–14 years were hospitalised at a rate 4 times that for girls in the same age group.

Accidental poisoning

The indicator for hospitalisations for poisoning is the number of hospitalisations of children aged 0–14 years for poisoning in a given year as a rate per 100,000 children.



Note: ICD-10-AM codes S00–T98 & X40–X49.

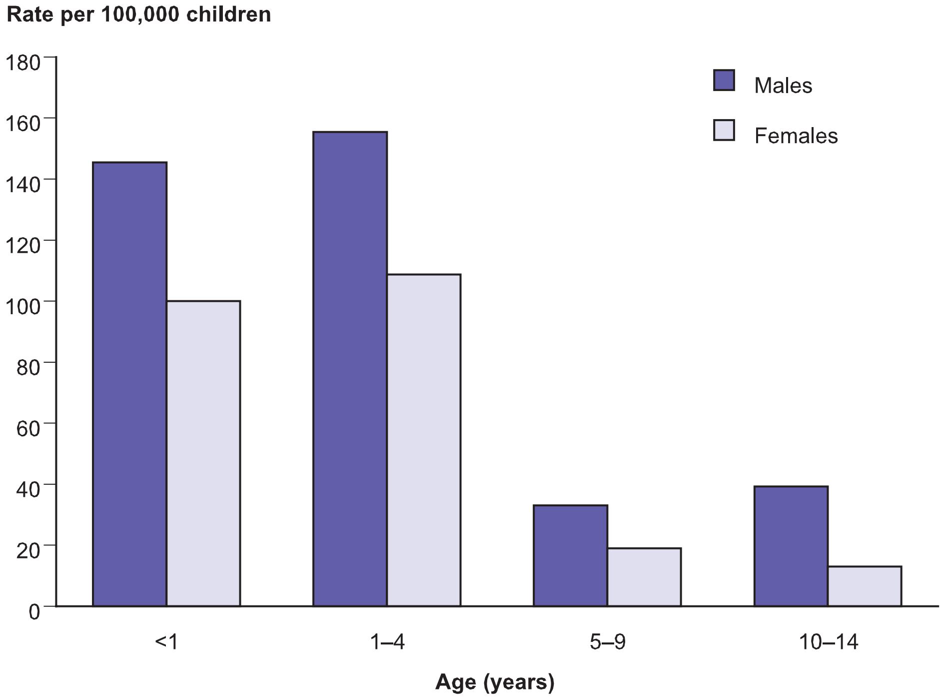
Source: Table 18.2.

Figure 18.6: Hospitalisation rates for children aged 0–14 years for poisoning, 1999–00

- In 1999–00, there were 3,711 hospitalisations of children aged 0–14 years for accidental poisoning, with a hospitalisation rate of 96.9 per 100,000 children.
- Children aged 1–4 years, followed by infants, had higher rates than other children, with rates dropping sharply for older children. For example, children aged 1–4 years had rates more than 14 times those for children aged 5–9 or 10–14 years (285.7 compared with 19.8 per 100,000 children aged 5–9 and 10–14 years).
- Among children aged less than 10 years, hospitalisation rates for boys were slightly higher than for girls, but this difference disappeared for children aged 10 years and over.

Burns and scalds

The indicator for hospitalisations for burns and scalds is the number of hospitalisations of children aged 0–14 years for burns and scalds in a given year as a rate per 100,000 children.



Note: ICD-10-AM codes S00–T98 & X00–X09 & X10–X19.

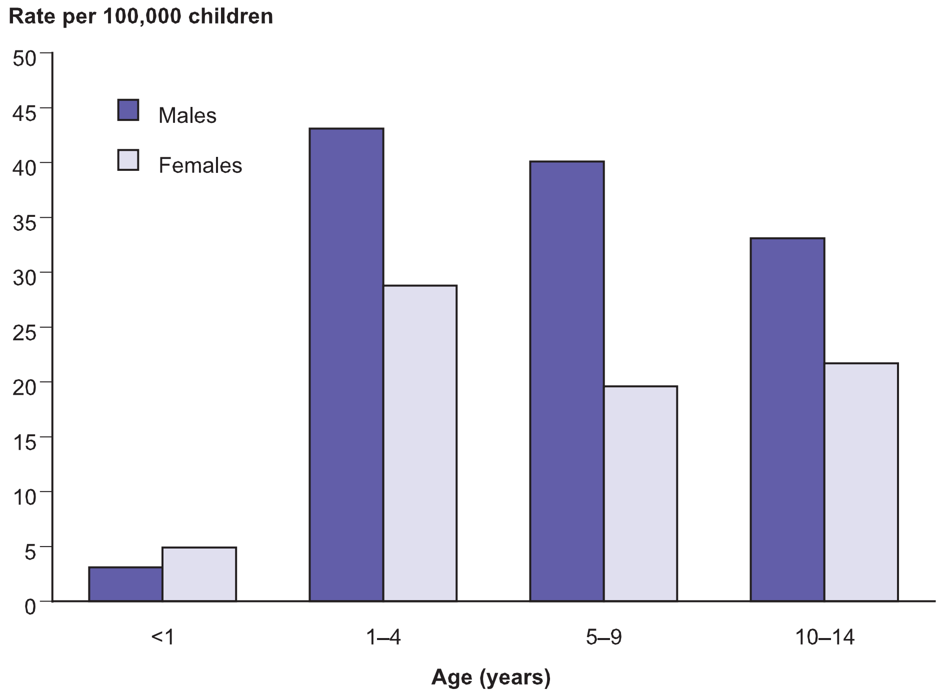
Source: Table 18.2.

Figure 18.7: Hospitalisation rates for children aged 0–14 years for injuries from burns and scalds, 1999–00

- In 1999–00, there were 2,361 hospitalisations of children aged 0–14 years for injuries from burns and scalds, with a hospitalisation rate of 61.4 per 100,000 children.
- Boys were hospitalised at a rate 1.6 times that for girls (75.5 compared with 46.6).
- Rates were highest for children aged less than 5 years (132.7 for children aged 1–4 years and 123.4 for infants).

Pedestrian injuries

The indicator for hospitalisations for pedestrian injuries is the number of hospitalisations of children aged 0–14 years who were injured as pedestrians in a given year as a rate per 100,000 children.



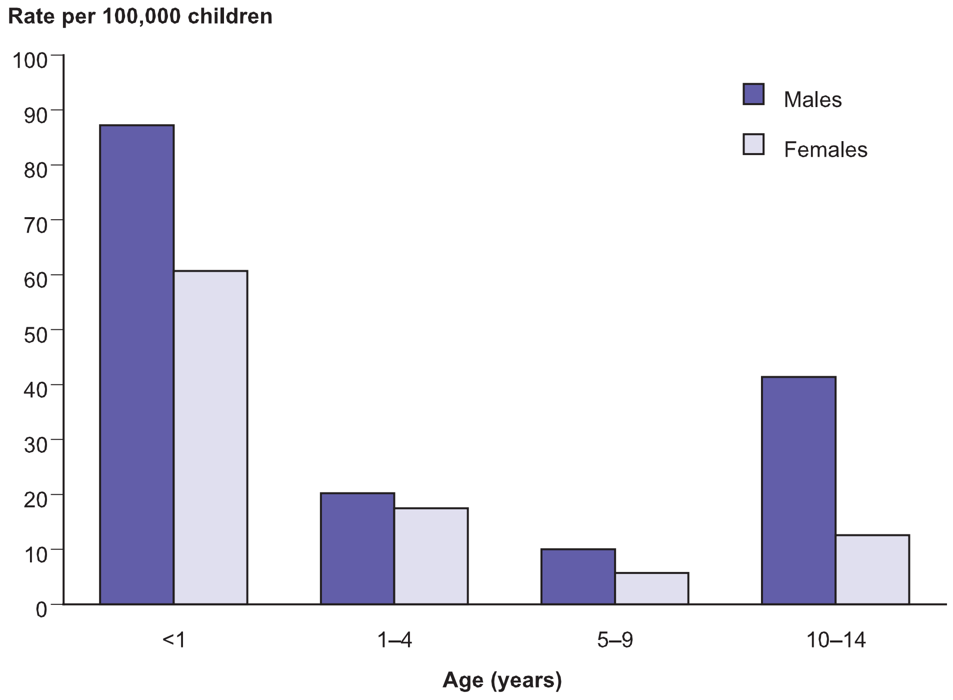
Note: ICD-10 codes S00–T98 & V01–V09.
Source: Table 18.2.

Figure 18.8: Hospitalisation rates for children aged 0–14 years for injuries from pedestrian accidents, 1999–00

- In 1999–00, there were 1,144 hospitalisations of children aged 0–14 years for injuries from pedestrian accidents, with a hospitalisation rate of 29.1 per 100,000 children.
- In all age groups except infants, boys had higher hospitalisation rates than girls. The rate for boys aged 0–14 years was 36.1, compared with 21.7 for girls.
- Among children aged 1–14 years, hospitalisation rates decreased with age and were lowest for those aged 10–14 years.

Assault

The indicator for hospitalisations for assault is the number of hospitalisations of children aged 0–14 years who were injured for assault in a given year as a rate per 100,000 children.



Note: ICD-10-AM codes S00–T98 & X85–Y09.

Source: Table 18.2.

Figure 18.9: Hospitalisation rates for children aged 0–14 years for injuries from assault, 1999–00

- In 1999–00, there were 845 hospitalisations of children aged 0–14 years for injuries from assault, with a hospitalisation rate of 21.8 per 100,000 children.
- In all age groups, the rate was higher for boys than for girls.
- The highest rates were for infants.
- The next highest rate for was for boys aged 10–14 years, where the rate was approximately 3 times that for girls in the same age group.

Aboriginal and Torres Strait Islander children

The rates of hospitalisations for injuries from external causes for Aboriginal and Torres Strait Islander and other Australian children are presented in Table 18.3.

Table 18.3: Hospitalisation rates for Aboriginal and Torres Strait Islander and other Australian children aged 0–14 years for injuries, 1999–00 (per 100,000 children)

	Age (years)	Falls	Burns and scalds	Assault	Accidental poisoning	Pedal cyclist injured in transport accident	Pedestrian injured in transport accident	Other causes
Indigenous Australians								
Males	<1	389.7	305.0	559.1	84.7	16.9[(a)]	16.9[(a)]	847.2
	1–4	713.5	350.3	103.8	320.0	56.2	64.9	1,063.7
	5–9	883.3	114.0	42.7	46.3	156.7	78.4	1,100.6
	10–14	768.4	52.0	128.1	48.0	192.1	48.0	1,032.5
	0–14	*766.4*	*169.9*	*122.4*	*122.7*	*131.9*	*60.6*	*1,051.1*
Females	<1	374.4	142.6	285.3	89.1	—	—	784.5
	1–4	581.3	202.8	112.7	301.9	36.1	103.6	941.8
	5–9	782.6	52.2	48.4	29.8	96.9	48.4	622.3
	10–14	348.5	20.7	136.9	37.3	83.0	16.6	643.2
	0–14	*558.4*	*88.34*	*110.9*	*109.1*	*69.4*	*49.4*	*725.7*
All children		**664.4**	**130.0**	**116.8**	**116.1**	**108.1**	**55.1**	**891.8**
Other Australians								
Males	<1	333.6	132.9	62.8	111.7	—	2.4[(a)]	540.8
	1–4	709.9	143.0	15.8	302.4	45.5	41.7	983.7
	5–9	847.8	29.3	8.4	22.3	148.9	38.2	759.9
	10–14	859.3	37.0	37.6	18.3	284.4	32.1	1,053.3
	0–14	*779.5*	*69.33*	*23.7*	*102.0*	*155.5*	*34.7*	*901.0*
Females	<1	342.9	94.5	45.5	100.6	0.9[(a)]	5.2	394.5
	1–4	578.3	101.8	12.9	258.7	22.3	24.9	699.9
	5–9	681.7	17.4	3.9	14.8	72.9	18.3	488.0
	10–14	360.1	12.7	7.7	19.3	70.9	21.6	558.7
	0–14	*525.4*	*43.71*	*10.4*	*87.4*	*53.8*	*20.3*	*561.5*
All children		**655.6**	**56.9**	**17.2**	**94.9**	**113.7**	**27.7**	**735.6**

(a) Figure denotes that the rate is based on a number less than 5.

Note:.Categories: Falls ICD-10-AM codes S00–T98 & W00–W19; Pedal cyclist injured in transport accident ICD-10-AM codes S00–T98 &V10–V19; Accidental poisoning ICD-10-AM codes S00–T98 & X40–X49; Burns and scalds ICD-10-AM codes S00–T98 & X10–X19 & X00–X09; Pedestrian injured in transport accident ICD-10-AM codes S00–T98 & V01–V09; Assault ICD-10-AM codes S00–T98 & X85–Y09.

Source: AIHW National Hospital Morbidity Database.

- In 1999–00, there were 1,072 hospitalisations of Aboriginal and Torres Strait Islander children for accidental falls. Indigenous children had higher hospitalisation rates for falls than other Australian children (664.4 compared with 655.6 per 100,000 children). Indigenous boys had higher rates than Indigenous girls (766.4 compared with 558.4).

- There were 216 hospitalisations of Aboriginal and Torres Strait Islander children for burns and scalds. Indigenous children had a hospitalisation rate for injuries from burns and scalds approximately 2.3 times that for other Australian children (130.0 compared with 56.9). Indigenous boys had a higher rate than Indigenous girls (169.9 compared with 88.3).
- There were 188 hospitalisations of Aboriginal and Torres Strait Islander children for assault. Hospitalisation rates were higher for Indigenous children than for other Australian children. The difference was most apparent for infants, where the rate was 7.8 times higher than for other Australian infants (425.7 compared with 54.4). Among Indigenous infants, males had higher rates than females (559.1 compared with 285.3).
- There were 160 hospitalisations of Aboriginal and Torres Strait Islander children for injuries from pedal cycling. The rates of hospitalisation were different for Indigenous children and other Australian children aged 10–14 years. Other Australian children had hospitalisation rates 1.3 times higher than those for Indigenous children.
- There were 90 hospitalisations of Aboriginal and Torres Strait Islander children who were pedestrians injured in a transport accident. Hospitalisation rates were higher for Indigenous children than for other Australian children, with the overall rate for Indigenous children almost twice the rate for other children (55.1 compared with 27.7).

Children in metropolitan, rural and remote areas

Table 18.4: Hospitalisation rates for children aged 0–14 years in metropolitan, rural and remote areas for injuries, 1999–00 (per 100,000 children)

Age (years)	Falls	Pedal cyclist injured in transport accident	Accidental poisoning	Burns and scalds	Pedestrian injured in transport accident	Assault	Other causes
Metropolitan							
<1	323.3	0.6[(a)]	94.2	115.7	3.4	47.6	431.6
1–4	623.2	33.0	247.1	113.6	35.3	14.5	798.6
5–9	733.3	111.2	16.9	22.0	30.1	6.1	559.7
10–14	575.5	170.3	17.5	16.7	32.0	24.0	681.9
0–14	*624.0*	*102.1*	*84.0*	*51.2*	*30.3*	*17.0*	*654.9*
Rural							
<1	367.9	—	138.6	124.2	4.8[(a)]	113.1	614.8
1–4	669.6	38.2	353.0	152.2	31.3	23.9	923.3
5–9	839.8	117.5	23.0	29.1	26.7	8.3	740.4
10–14	714.1	201.4	22.4	35.6	17.4	27.2	1,042.9
0–14	*720.7*	*115.8*	*119.0*	*70.7*	*23.4*	*25.8*	*880.0*
Remote							
<1	610.9	10.2[(a)]	162.9	244.3	10.2[(a)]	305.4	814.5
1–4	952.6	42.0	464.0	306.0	81.4	56.8	1,396.8
5–9	1,129.5	131.7	46.5	73.6	50.4	36.8	1,398.8
10–14	835.0	244.0	35.8	143.3	29.1	98.5	1,893.9
0–14	*950.1*	*136.2*	*162.6*	*170.3*	*49.0*	*80.8*	*1,520.7*

(a) Figure denotes that the rate is based on a number less than 5.

Notes

1. Categories: Falls ICD-10-AM codes S00–T98 & W00–W19; Pedal cyclist injured in transport accident ICD-10-AM codes S00–T98 & V10–V19; Accidental poisoning ICD-10-AM codes S00–T98 & X40–X49; Burns and scalds ICD-10-AM codes S00–T98 & X10–X19 & X00–X09; Pedestrian injured in transport accident ICD-10-AM codes S00–T98 & V01–V09; Assault ICD-10-AM codes S00–T98 & X85–Y09.

Source: AIHW National Hospital Morbidity Database.

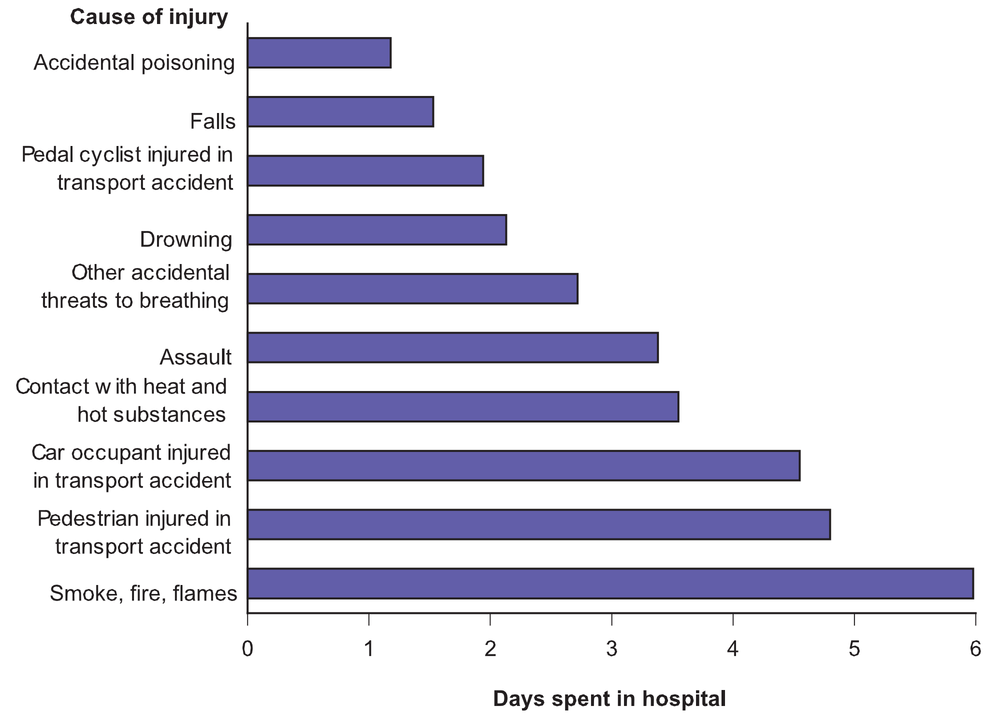
- For each of the six external causes of injuries, except for pedestrian injures, the rate of hospitalisation in 1999–00 was highest for children living in remote areas, followed by those in rural areas, and was lowest for children in metropolitan areas. For pedestrian injuries, the rate was lowest for children in rural areas.
- Hospitalisation rates for falls for children living in remote areas were 1.5 times higher than those for children in metropolitan areas (950.1 compared with 624.0 per 100,000). Children in remote areas were also hospitalised at a rate 1.3 times higher than those in rural areas (720.7 per 100,000).
- Children living in remote areas were hospitalised for pedal cycling injuries at a slightly higher rate than those in rural and metropolitan regions (136.2, compared with 115.8 and 102.1, respectively).
- Hospitalisation rates for accidental poisoning were higher in rural and remote regions than in metropolitan areas. The rate was 1.9 times and 1.4 times higher for children in remote and rural regions, respectively, than for children from metropolitan areas.

- The hospitalisation rate for burns and scalds for children in metropolitan areas was 51.2 per 100,000 children, compared with 70.7 in rural areas and 170.3 in remote areas.
- The rate for child pedestrians injured in transport accident was highest for children living in remote areas (49.0 per 100,000), followed by metropolitan areas (30.3). Pedestrian injuries were least common in rural areas (23.4).
- Hospitalisation rates for assault were higher in rural and remote areas than in metropolitan areas. The overall rate in metropolitan areas was 17.0 per 100,000, compared with 25.8 in rural areas and 80.8 in remote regions.

Severity of injury

Severity of injury is difficult to quantify. Currently, the best proxy national indicator of injury severity available among hospitalisation data is the average length of hospital stay. This is not a perfect proxy as factors other than severity influence length of stay (e.g. social circumstances, hospital policy, etc.). Also, the way in which length of stay is currently calculated in hospital data tends to overestimate short stay and underestimate long stay.

In 1999–00, there were 129,381 bed days for which hospitalisations for injuries were the principal diagnoses, with an average length of stay of 1.4 days. Of these hospitalisations, 38% were short stay (same-day) hospitalisations. Injuries were also responsible for an additional 24,145 bed days where they were not the main reason for hospital stay but where they had to be managed during hospitalisations for other conditions. The average length of stay for particular types of injury causes are presented in Figure 18.10.



Source: AIHW National Hospital Morbidity Database [Table A18.3].

Figure 18.10: Average length of stay of children aged 0–14 years hospitalised for injuries, by selected external causes, 1999–00

- In 1999–00, injuries related to exposure to smoke, fire and flames were responsible for the longest average length of hospital stay for children aged 0–14 years, with an average length of stay of approximately 6 days.
- This category was closely followed by injuries to pedestrians in transport accidents and injuries to car occupants in motor vehicle accidents, for which the average lengths of stay were almost 5 days.

Place where injury occurred

The place where an injury occurs can often provide important information for developing preventative strategies to reduce the number of children at risk of serious injury.

Unfortunately, the location of injuries is not always specified or collected (location was recorded for only 46% of hospitalisations for external causes of injury). The available data for 1999–00 are presented in Table 18.5.

Table 18.5: Location where injuries of children aged 0–14 years occurred, 1999–00 (per cent)

Location	Males	Females	Persons
Home	53.3	62.2	56.7
Sports and athletics area	18.8	11.8	16.1
School, other institution, and public administrative area	12.6	12.0	12.4
Other specified places	7.7	6.8	7.3
Street and highway	2.5	2.1	2.4
Trade and services area	1.9	2.6	2.1
Health services area	1.4	1.2	1.3
Residential institution	0.7	0.7	0.7
Farm	0.7	0.4	0.6
Industrial and construction area	0.5	0.3	0.4
Total	**100**	**100**	**100**

Note: Percentages calculated based upon those records where place of occurrence of injury was actually recorded.

Source: AIHW National Hospital Morbidity Database.

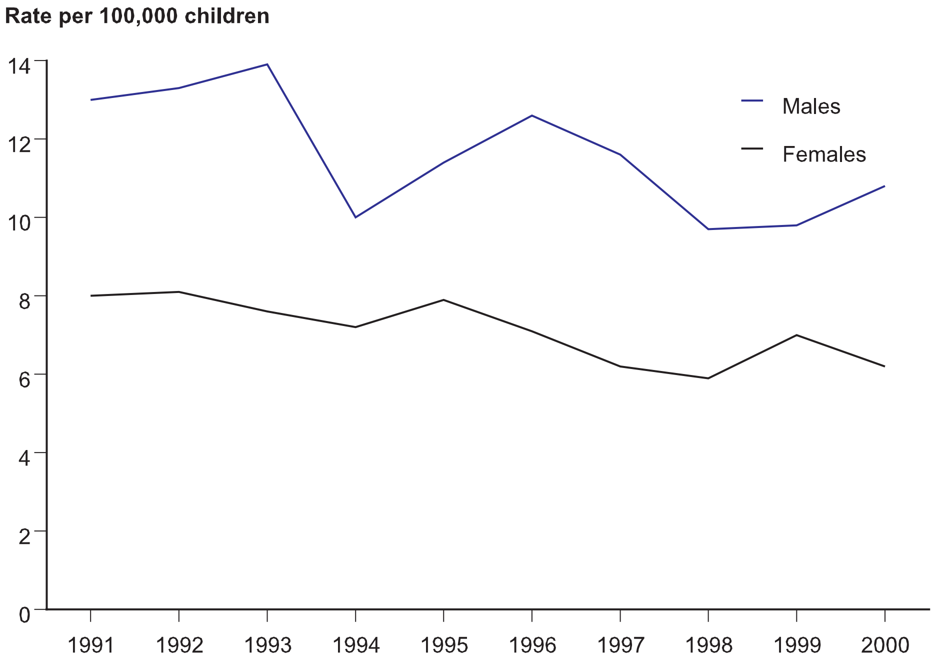
- The majority of injuries to children occurred in the home (56.7%).
- Injuries were also commonly sustained while at sports and athletics areas, grounds and playing fields (16.1%) and while at institutions such as school, libraries or child care (12.4%).
- Only 2.1% of the injuries were received in trade and services (shopping) areas.

Deaths from all injuries

Deaths from injury are more common for boys than for girls. In a comparison of all OECD countries between 1991 and 1995 (UNICEF 2001), boys aged 1–14 years were 1.7 times more likely to die from injuries than girls. The difference between the sexes was greatest for children aged 10–14 years. The study also showed that a boy aged 1–4 years was 1.4 times more likely to die from injury than a girl of the same age.

Australia has the seventh lowest child injury death rate among OECD countries for children aged 10–14 years. However, the death rate for those aged 1–4 years does not compare favourably with other OECD countries, with a ranking of twentieth place (UNICEF 2001).

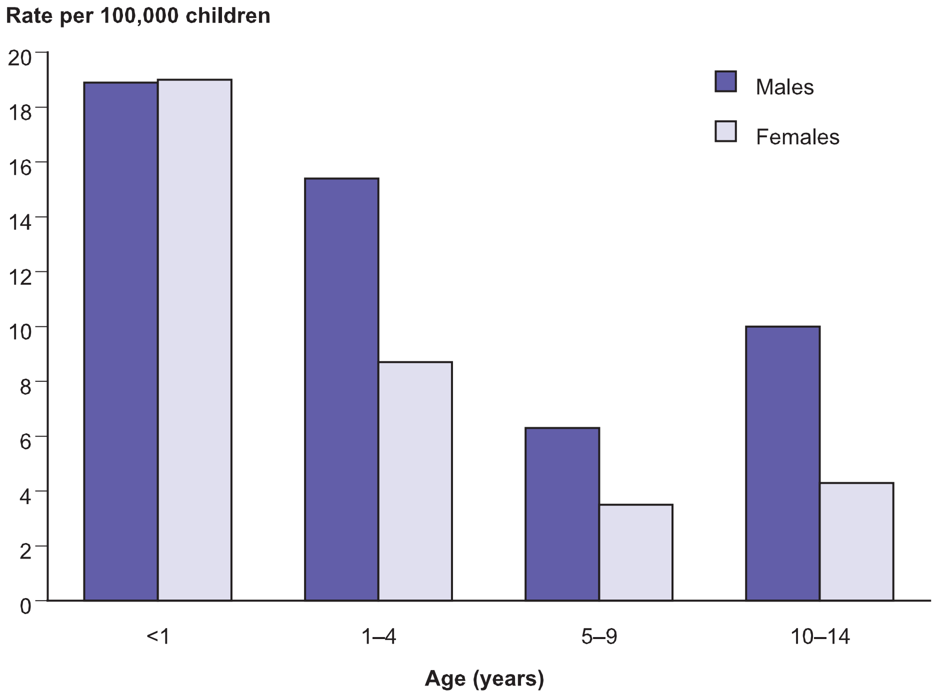
The indicator for all injuries death rate is the number of deaths from all injuries in children aged 0–14 years in a given year as a rate per 100,000 children (Figure 18.11).



Note: ICD-9 codes E800–E999 (1991 to 1996) and ICD-10 codes V01–Y99 (1997 to 2000).
Source: AIHW Mortality Database [Table A18.4].

Figure 18.11: Injury death rates for children aged 0–14 years, 1991–00

- Over the period 1991 to 2000, 3,635 children died from injury. However, the death rate from injury has generally declined over time. In 1991, it was 10.5 per 100,000 children, but by 2000 it had fallen to 8.6 per 100,000 children, representing a reduction of 18%.
- In all years examined, the rate was higher for boys than for girls.
- The rate for boys fell from 13.0 in 1991 to 10.8 in 2000 (17% decrease). Over the same period, the rate for girls fell from 8.0 to 6.2 (23% decrease).



Note: ICD-10 codes V01–Y99.

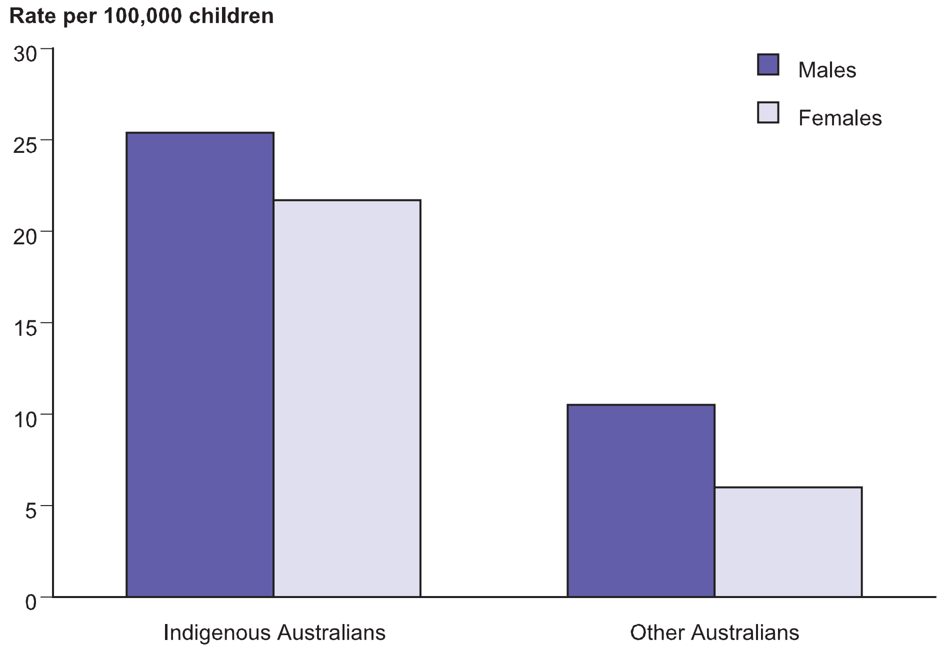
Source: AIHW Mortality Database [Table A18.4].

Figure 18.12: Injury death rates for children aged 0–14 years, 2000

- In 2000, 332 children died as the result of injury. The overall injury death rate for children aged 0–14 years was 8.6 per 100,000 children. The rate for boys was higher than for girls (10.8 compared with 6.2). Boys aged 1–14 years had higher rates than girls of the same age.
- Rates were highest for young children (<1 year and 1–4 years).

Aboriginal and Torres Strait Islander children

Deaths from injury in 1998–00 of Aboriginal and Torres Strait Islander children compared with other Australian children are presented in Figure 18.13.



Notes
1. ICD-10 codes V01–Y99.
2. Includes Qld, WA, SA, and NT only.

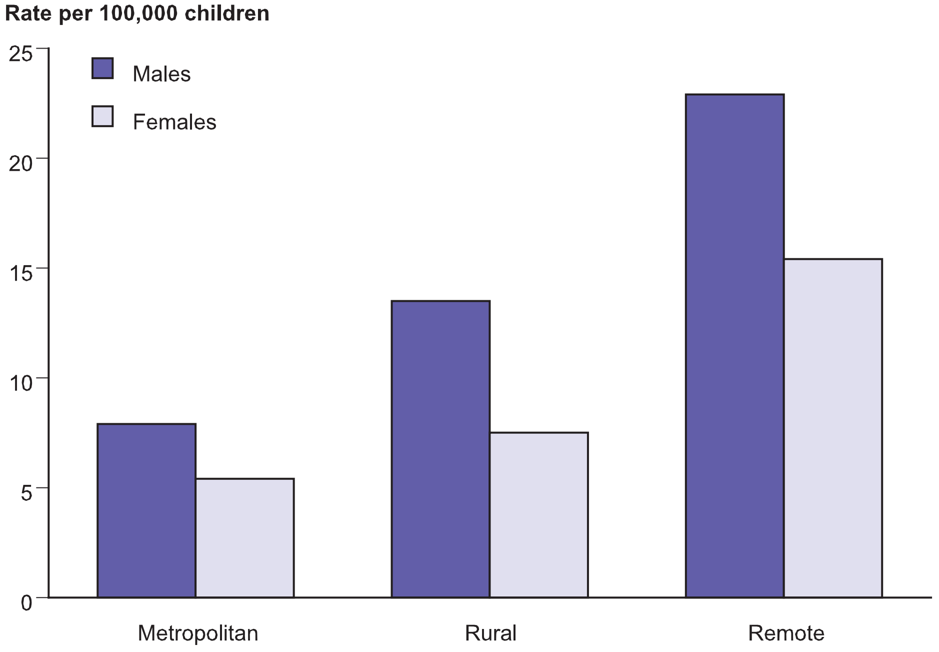
Source: AIHW Mortality Database [Table A18.5].

Figure 18.13: Average injury death rates for Aboriginal and Torres Strait Islander and other Australian children aged 0–14 years, 1998–00

- A total of 71 Aboriginal and Torres Strait Islander children from Queensland, Western Australia, South Australia and the Northern Territory died from injuries between 1998 and 2000. The average death rate of Indigenous children was 2.8 times that of other Australian children.
- Indigenous boys had higher rates than Indigenous girls (25.4 per 100,000 boys compared with 21.7 per 100,000 girls).

Children in metropolitan, rural and remote areas

Death rates for children in rural and remote areas compared with children in metropolitan areas are presented in Figure 18.14.



Note: ICD-10 codes V01–Y99.

Source: AIHW Mortality Database [Table A18.6].

Figure 18.14: Average injury death rates for children aged 0–14 years in metropolitan, rural and remote areas, 1998–00

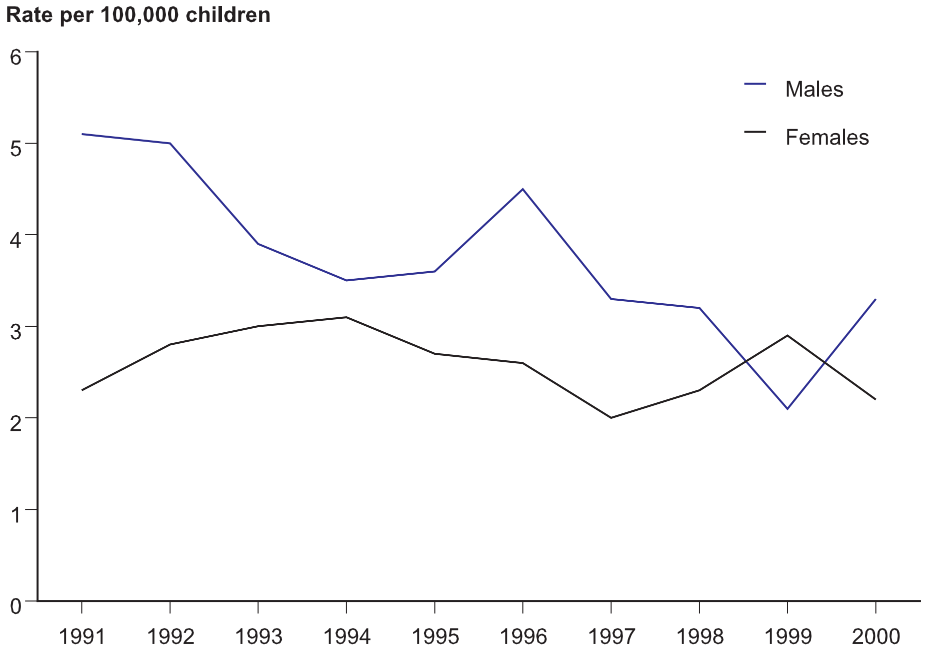
- Between 1998 and 2000, 537 children in metropolitan areas, 334 in rural areas and 84 in remote areas died from injuries.
- Average child injury deaths were 2.9 times as common in remote areas (19.2 per 100,000) and 1.6 times as common in rural areas (10.6) as in metropolitan areas (6.7).
- Boys had higher rates than girls, regardless of area.

Deaths from specific injuries

This section examines deaths from injuries caused by motor vehicle accidents, accidental drowning and assaults.

Motor vehicle accidents

The indicator for motor vehicle accident deaths is the number of deaths from motor vehicle accidents of children aged 0–14 years in a given year as a rate per 100,000 children (Figure 18.15).



Note: ICD-9 codes E810–E819 (1991 to 1996) and ICD-10 codes V02–V04 (.1, .9), V09.2, V12–V14 (.3–.9), V19 (.4–.6), V20–V28 (.3–.9), V29 (.4–.9), V30–V39 (.4–.9), V40–V49 (.4–.9), V50–V59 (.4–.9), V60–V69 (.4–.9), V70–V79 (.4–.9), V80 (.3–.5), V81.1, V82.1, V83–V86 (.3–.9), V87 (.0–.8), V89.2 (1997 to 2000).

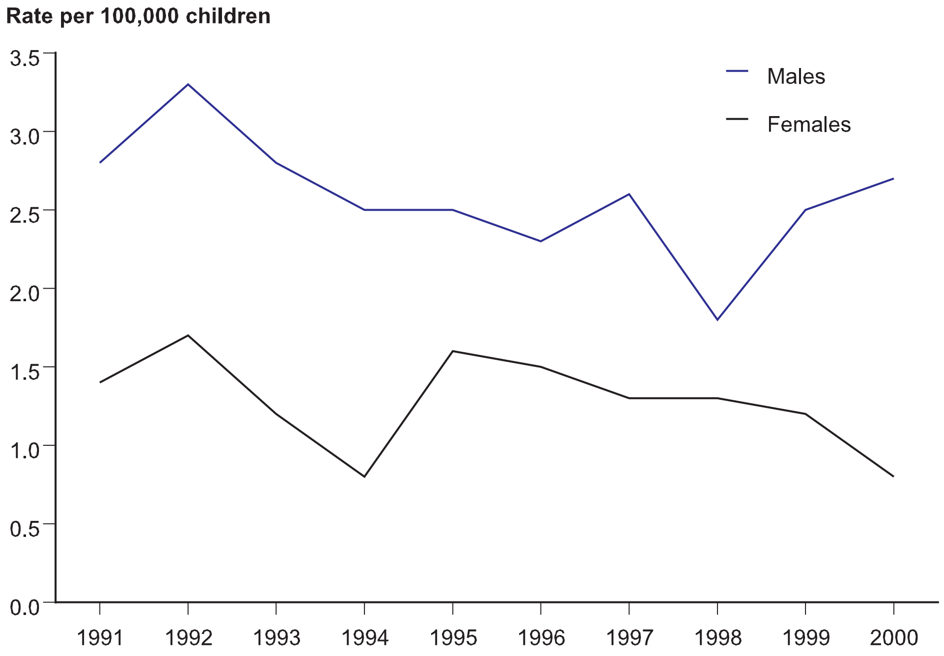
Source: AIHW Mortality Database [Table A18.7].

Figure 18.15: Motor vehicle accident death rates for children aged 0–14 years, 1991–00

- Between 1991 and 2000, 1,234 children aged 0–14 years died from motor vehicle accidents. The death rate declined from 3.7 per 100,000 children in 1991 to 2.7 in 2000.
- In all years except 1999, more boys died than girls. In 1999, 55 girls and 43 boys were killed in motor vehicle accidents.

Accidental drowning

The indicator for accidental drowning is the number of deaths from accidental drowning of children aged 0–14 years in a given year as a rate per 100,000 children.



Note: ICD-9 code E910 (1991 to 1996) and ICD-10 codes W65–W74 (1997 to 2000).
Source: AIHW Mortality Database [Table A18.8].

Figure 18.16: Accidental drowning death rates for children aged 0–14 years, 1991–00

- Over the period 1991 to 2000, 750 children died as a result of accidental drowning. The death rate over the period declined from 2.1 to 1.8 deaths per 100,000 children. Fencing of swimming pools has been shown to significantly reduce the risk of child deaths due to accidental drowning (Thompson & Rivara 2001). In Australia in 1993–94, a mandatory requirement was introduced for all new pools to be fenced (AIHW NISU: Moller & Kreisfeld 1997).
- The rate was consistently higher for boys than for girls across the whole period. In 2000, the rate for boys was more than 3 times that for girls (2.7 compared with 0.8).
- Young children aged 1–4 years had the highest rate.
- Of all accidental drowning deaths in 2000, over a third (23, or 34%) occurred in swimming pools.

Assaults

The indicator for assault deaths is the number of deaths of children aged 0–14 years from assault in a given year as a rate per 100,000 children.

Table 18.6: Assault death rates for children aged 0–14 years, 1991–99 (per 100,000 children)

	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Males	0.6	0.2[(a)]	1.3	0.8	0.9	0.6	0.9	0.9	0.9	0.8
Females	1.0	0.7	0.9	1.0	0.8	0.7	0.6	0.6	0.6	0.6
Persons	**0.8**	**0.4**	**1.1**	**0.9**	**0.9**	**0.7**	**0.8**	**0.8**	**0.7**	**0.7**

(a) Rate based on a number less than 5.

Note: ICD-9 codes E960–E969 (1991 to 1996) and ICD-10 codes X85–Y09 (1997 to 2000).

Source: AIHW Mortality Database.

- Over the period 1991 to 2000, 291 children died as a result of assault. Assault death rates for children varied from year to year, ranging between 0.4 and 1.1 per 100,000 children.
- In 2000, 26 children died from injuries inflicted by another person. The assault death rate for boys was 1.3 times higher than the rate for girls.

Aboriginal and Torres Strait Islander children

Table 18.7: Deaths from motor vehicle accidents, accidental drowning and assault in Aboriginal and Torres Strait Islander and other Australian children aged 0–14 years, 1998–00

	Indigenous Australians		Other Australians	
Cause of death	Total number	Average rate per 100,000 children	Total number	Average rate per 100,000 children
Motor vehicle	23	7.9	116	2.8
Accidental drowning	9	2.9	83	2.0
Assault	5	1.6	34	0.8

Notes

1. Includes Qld, WA, SA, and NT only.
2. ICD-10-AM codes used for drowning were W65–W74; for assault were X85–Y09; for motor vehicle were V02–V04 (.1, .9), V09.2, V12–V14 (.3–.9), V19 (.4–.6), V20–V28 (.3–.9), V29 (.4–.9), V30–V39 (.4–.9), V40–V49 (.4–.9),V50–V59 (.4–.9), V60–V69 (.4–.9), V70–V79 (.4–.9), V80 (.3–.5), V81.1, V82.1, V83–V86 (.3–.9), V87 (.0–.8), V89.2.

Source: AIHW Mortality Database.

- For 1998–00, the average motor vehicle accident death rate was 2.8 times higher for Aboriginal and Torres Strait Islander children than for other Australian children (7.9 compared with 2.8 per 100,000).
- The average assault death rate for Aboriginal and Torres Strait Islander children was twice that of other Australian children (1.6 compared with 0.8).
- The average accidental drowning death rate for Aboriginal and Torres Strait Islander children was almost 1.5 times that of other Australian children (2.9 compared with 2.0).

Children in metropolitan, rural and remote areas

Table 18.8: Deaths from motor vehicle accidents, accidental drowning and assault in children aged 0–14 years in metropolitan, rural and remote areas, 1998–00

	Metropolitan		Rural		Remote	
Cause of death	Total number	Average rate per 100,000 children	Total number	Average rate per 100,000 children	Total number	Average rate per 100,000 children
Motor vehicle	174	2.2	110	3.4	27	6.2
Accidental drowning	117	1.5	66	2.2	15	3.3
Assault	62	0.8	18	0.6	3	0.7

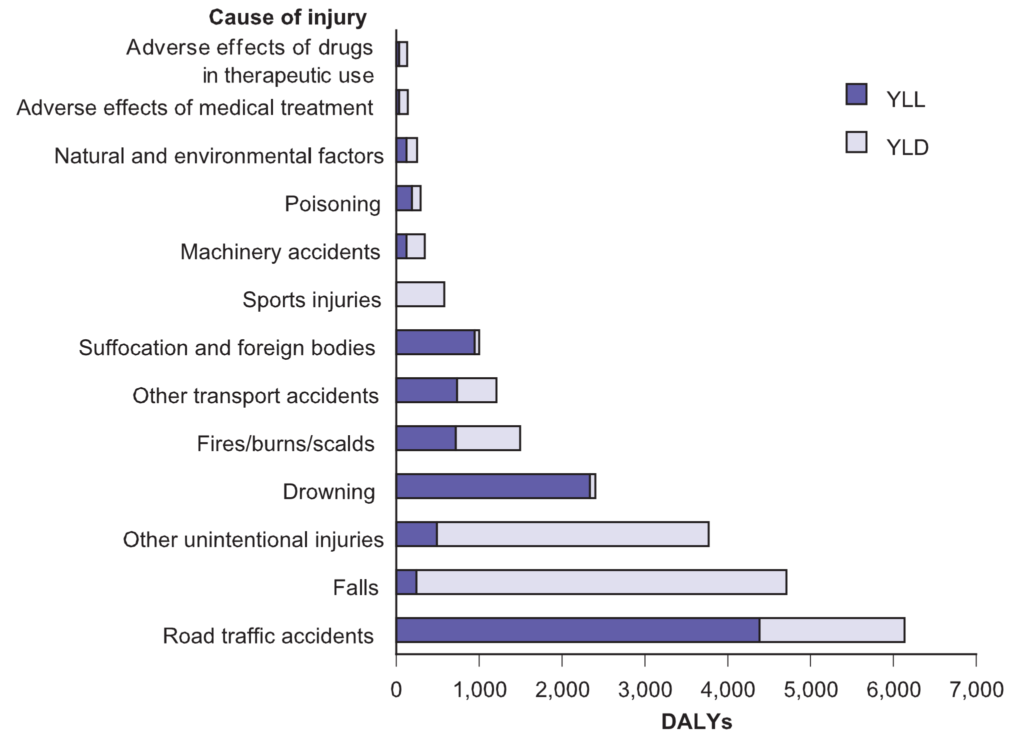
Note: 1CD-10 codes W65–W74, X85–Y09, V02–V04 (.1, .9), V09.2, V12–V14 (.3–.9), V19 (.4–.6), V20–V28 (.3–.9), V29 (.4–.9), V30–V39 (.4–.9), V40–V49 (.4–.9),V50–V59 (.4–.9), V60–V69 (.4–.9), V70–V79 (.4–.9), V80 (.3–.5), V81.1, V82.1, V83–V86 (.3–.9), V87 (.0–.8), V89.2.

Source: AIHW Mortality Database.

- For 1998–00, the average motor vehicle accident death rate was higher for children in remote areas than for those in rural or metropolitan areas (6.2 compared with 3.4 and 2.2 per 100,000 children, respectively).
- The average accidental drowning death rate was also higher in remote areas, and was more than twice the rate in metropolitan areas.
- The average assault death rate in rural areas (0.6 per 100,000 children) was lower than that in metropolitan and remote areas (0.8 and 0.7, respectively).

Burden of disease attributable to injuries

Injuries can cause a range of physical, cognitive and psychological disabilities that can seriously affect the quality of life of children and their families (AIHW: Mathers et al. 1999). In 1996, injuries were estimated to account for 11.1% of the total disease burden in children aged 0–14 years (23,769 DALYs). The total burden was higher in boys (64% of total) than in girls (36%). Injuries cause a slightly higher disability burden (12,164 YLD; 51% of total) than mortality burden (11,605 YLL; 49%).



Note: There is a small amount of burden of disease attributed to surgical/medical misadventure.

Source: AIHW: Mathers et al. 1999 [Table A18.9].

Figure 18.17: Total burden of disease from injuries and poisoning in children aged 0–14 years, 1996

- Of all causes of injury in 1996, road traffic accidents were responsible for the highest burden of disease, accounting for 27% of the injury burden. The mortality burden was greater than the disability burden for traffic accidents.
- Falls and other unintentional injuries were also responsible for a considerable proportion of the injury disease burden, although the disability burden from these conditions was far greater than the mortality burden.

Part VIII: Risk and protective factors

Chapter 19: Family environment

Chapter 20: Biological and behavioural factors

The causes of poor health are many and complex. People can experience poor health because of factors beyond their control, such as genetic factors (including inheriting genes that predispose them to certain illnesses and genetic abnormalities that occur during conception) or the random incidence of certain diseases and injury. However, lifestyle and behaviour, attitudes, beliefs and knowledge, socioeconomic factors, family patterns, and the social and physical environment also affect health. These types of factors are known as risk and protective factors.

Risk factors are defined as those factors which make it more likely that a person will develop a problem or disorder (Sanders et al. 2000). Protective factors, on the other hand, reduce the likelihood of a person suffering a disease, or enhance their response to the disease should it occur. Both risk and protective factors exist within individuals, families and communities. From a public health perspective, the reduction of risk factors and the enhancement of protective factors have the potential to significantly reduce the occurrence of disease and injury (Dadds et al. 2000).

The importance of risk and protective factors to individual health and wellbeing has been increasingly recognised in recent years. Optimal growth and development in the prenatal life and early childhood have been shown to be critical to good health over an individual's lifetime. For example, nutritional deficiencies in-utero which reduce foetal growth can impair the development of endocrine and other tissues in the long term (McCance et al. 1994). Similarly, low birthweight can lead to adverse health outcomes during childhood and later in life (Barker et al. 1990). Some factors which affect the health of infants and children have their origin in the womb. For example, maternal smoking and excessive alcohol consumption during pregnancy can have a number of detrimental effects on the foetus, including low birthweight, spontaneous abortion and stillbirth.

The development of good health across a person's life begins in childhood, during which either good or poor health behaviours are learned. Instilling positive health behaviours in childhood can mitigate a number of risk factors and may be more successful than attempting to change behaviour later in life. For example, over-consumption of food and lack of physical activity can lead to overweight and obesity in children, which have been linked to poor health both in childhood and later in life. Adverse health is to some degree preventable, if early interventions take place. For example, an adequate intake of folate, a B-group vitamin, by the mother before and in early pregnancy can prevent up to 70% of neural tube birth defects (spina bifida and related defects). Changes in the sleeping position of infants have resulted in a dramatic decline in deaths from SIDS. An unnecessarily large number of children are seriously injured in Australia. These injuries and conditions are, to some degree, preventable, through public awareness and modification of unsafe environments.

A number of issues are particularly pertinent to child health. Children are less in control of their own behaviour than adults, and have less control over their physical and social environments, their lifestyles and their attitudes and knowledge. Their health is largely determined by the living conditions, knowledge and attitudes and lifestyles of the adults who care for them.

The health of children is strongly associated with the socioeconomic conditions of the family and the mental status of parents and carers. The ethnicity of a child's parents is also a significant determinant of child health in Australia. Aboriginal and Torres Strait Islander children in all age groups are at higher risk of disease or injury and have higher mortality than other Australian children. Poor socioeconomic circumstances and living conditions and higher rates of pre-term and low birthweight babies all contribute to the higher death rates.

The sex of the child is also an important determinant of health. In many areas, boys suffer poorer health outcomes, greater morbidity and consistently higher injury from accidents, than girls. While some of the difference is biologically determined, a major component is the outcome of accepted social differences in behaviour between boys and girls.

Although in this report the focus is on the relationship between individual risk and protective factors and health outcomes, there is a legitimate argument that a more successful approach to improve children's health and wellbeing would include structural factors such as economic, political, social and environmental conditions. Stanley (2001) has argued that when individual factors are the only focus, the main underlying societal factors influencing health issues remain unaddressed.

Risk and protective factors covered in this part include those associated with individuals and their families. Family factors include family type, family socioeconomic status, family functioning and carer's self-assessed health. Children who are found to be in need of protection by State/Territory community services departments are also examined as a population that has multiple family risk factors. Biological and behavioural factors examined include birthweight, nutrition, physical activity, overweight and obesity, drug use, use of sun protection and immunisation.

19. Family environment

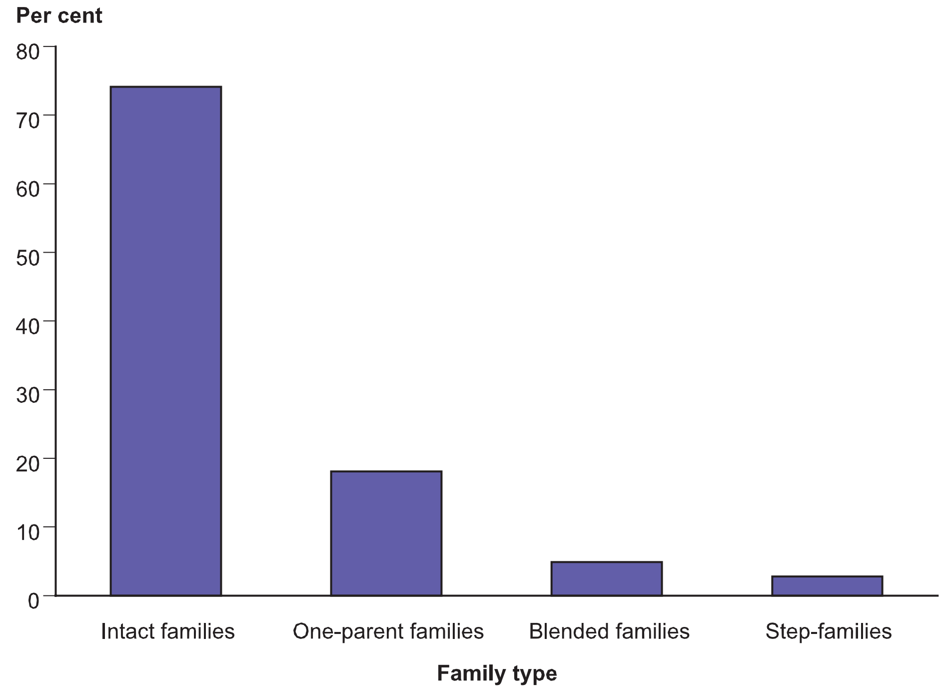
The family environment of children can have an important effect on their health and wellbeing, both in childhood and in the longer term (Centre for Community Child Health 2000). This section examines some of the social and economic characteristics of families that have been identified as risk and protective factors for child health and wellbeing. Some of these risk factors, such as low socioeconomic status and poor family functioning, often occur together and may have a cumulative effect on child health outcomes.

Family type

In Australia, families with children are generally categorised into four family types—intact families, one-parent families, step-families and blended families. The ABS (1999b:128–32) defines these family types as follows:

- An intact family is a 'couple family containing at least one child who is the natural child of both members of the couple, and no child who is the stepchild of either member of the couple'.
- A one-parent family is 'a family consisting of a lone parent with at least one dependent or non-dependent child (regardless of age) who is usually resident in the household'.
- A step-family is 'a couple family containing one or more children, at least one of whom is the stepchild of either member of the couple and none of whom is the natural or foster child of both members of the couple'.
- A blended family is 'a couple family containing two or more children, of whom at least one is the natural child of both members of the couple, and at least one is the stepchild of either member of the couple'.

The proportions of Australian children aged 0–17 years in these family types are shown in Figure 19.1.



Source: ABS 1998c [Table A19.1].

Figure 19.1: Proportion of Australian children aged 0–17 years by family type, 1997

- In 1997, the majority of Australian children (74%) aged 0–17 years lived in intact families, that is, with both natural parents (ABS 1998c). A substantial minority of children (18%) lived in one-parent families: 16% with their mother only and 2% with their father only. A small proportion of children (8%) lived in step- or blended families: 3% in step-families and 5% in blended families.

Living in a one-parent, step- or blended family is a risk factor for poorer health and wellbeing, because of factors that tend to be associated with these types of families. For instance, for one-parent families, these factors include low socioeconomic status and parental stress due to lack of adult support within the household. For families where parents have experienced marital breakdown, whether one-parent, step- or blended families, they may include factors such as the effects of divorce on children and conflict between separated or divorced parents.

Boys in one-parent families have been found to be more likely to have poor health, injuries and chronic illness than boys in intact families, and children in one-parent families are more likely to have a disability or impairment (AIHW: Mathers 1995). However, the stress caused by having a child with a chronic illness, disability or impairment can also lead to marital breakdown and the formation of one-parent families.

In the 1998 Child and Adolescent Component of the National Survey of Mental Health and Wellbeing, Sawyer et al. (2000) found that higher proportions of children in one-parent families and in step- or blended families had mental disorders than children in intact families. Similarly, Silburn et al. (1996), using data from the 1993 Western

Australian Child Health Survey, found that family type was one of the significant risk factors for a child's poor mental health status: children in one-parent and step- or blended families were found to have a higher risk of mental health problems than children in intact families when other significant risk factors were controlled. It is possible that, in these circumstances, 'family type' may be a proxy for factors such as the long-term effects of divorce on children or conflicting relationships between non-resident parents (see below), factors that were not examined in the survey.

Family socioeconomic status

Many studies have found a strong association between family socioeconomic status and child health and wellbeing (Jolly 1990). Family income, parental employment status and/or education—all of which are strongly associated with one another—are generally used as indicators of socioeconomic status.

Most research overseas and in Australia has found that low family income is highly correlated with poor child health and wellbeing. Children living in poor families, for instance, have higher injury rates, are likely to be hospitalised more frequently, have a higher prevalence of obesity and have worse dental health than other children (AIHW: Mathers 1995). They are also more likely to have behavioural disorders and psychiatric problems.

The relationship between family income and the health status of children, based on data from the 1995 ABS National Health Survey, was examined in detail in *Australia's Children: their health and wellbeing 1998* (AIHW: Moon et al. 1998). The health status measures examined in that report included the frequency of long-term and recent conditions, the frequency of specific conditions, breastfeeding and health services use.

Children from low-income families were reported to have the highest number and frequency of long-term conditions (lasting for 6 months or more), while children from high-income families had the highest number and frequency of recent conditions (in the last 2 weeks; AIHW: Moon et al. 1998). The prevalence of specific conditions by income group was variable. The conditions with the higher reported prevalence in the lower income groups included deafness, bronchitis and migraine. Otitis media and epilepsy had a higher reported prevalence in the middle income groups, while dental problems, eczema, hay fever and injuries had a higher reported prevalence in the highest income groups.

Breastfeeding in general and exclusive breastfeeding for at least 3–6 months has many beneficial health effects for children. A clear relationship was observed between the proportion of children never breastfed and income groups. Nearly 20% of children in the lower income groups were not breastfed, compared with just under 10% in the higher income groups. Also, around half of children under 4 years in the lowest income groups, compared with under 40% in the highest income group, were not exclusively breastfed for the first 3 months of life.

Health services use reflects both health status and access to services. The relationship between use and family income was examined in regard to hospitalisations, visits to emergency departments, visits to doctors and visit to dentist (AIHW: Moon et al. 1998). The most obvious relationship between income and health services use was in visits to dentist: nearly 5% of children in the lowest income group reported having visited a dentist in the 2 weeks prior to the survey, compared with 8% in the highest income groups.

As noted, family employment status is another indicator of socioeconomic status. Families with no parent employed generally have low incomes and live in poor economic circumstances—they are also more likely to be socially isolated than families with an employed parent. Living in a jobless family may have long-term effects on children’s development, their educational progress and their own employment prospects. Long-term unemployment often leads to stress, tension and family conflict, which may impact on children’s emotional and mental health (McClelland 1994).

Children living in low socioeconomic status families are more likely to have poor health for several reasons (AIHW 1992; Jolly 1990). Families with low incomes are unable to buy the goods and services that are necessary for good health—such as food that provides adequate nutrition and good quality housing. They are also more likely to live in poor physical and socioeconomically deprived environments. Families with low socioeconomic status are less likely to use preventive and early intervention health services and more likely to delay seeking help when they are sick. The cost of health services can also be a deterrent to the use of services. Children in poor families who obtain most of their primary health care from accident or emergency departments at public hospitals also suffer from a lack of continuity of care.

One-parent families are more likely to be disadvantaged than couple families in terms of their socioeconomic status. Sole parents are more likely to have low incomes and less likely to be employed and therefore to suffer from financial stress (Harding & Szukalska 2000).

Aboriginal and Torres Strait Islander children experience a number of disadvantages in their socioeconomic status compared with other Australian children. Indigenous families are more likely to have low incomes, less likely to have a parent employed and/or to have post-school educational qualifications, and more likely to be renting their home, and be living in overcrowded conditions and in improvised dwellings such as sheds and humpies (AIHW 2000a). Their disadvantaged socioeconomic status and living conditions are among the factors that put Indigenous people at ‘greater risk of ill health and reduced wellbeing’ (ABS & AIHW 1999:24).

Family income

Income distribution is generally analysed using the concept of ‘income units’, which are broadly defined as individuals or related groups of people living in the same household that share income (ABS 1999b:43). The total number of income units in the population (comprising family income units, couples without children, and single people) can be divided into five equal groups, according to income, in order to compare their relative economic wellbeing. Each group, or ‘quintile’, contains 20% of the income units in the population. Family income units are not necessarily evenly distributed across the income quintiles.

The distribution of families with dependent children aged 0–17 years (and children living in those families) across the income quintiles for the total population, according to gross income, is shown in Table 19.1. Gross income is family income from sources such as earnings, government income support and family payments.

Table 19.1: Gross income quintiles for families with dependent children aged 0–17 years, 1999–00 (per cent)

	Income quintile (all income units)/Gross income per week ($)						
Family type	**Lowest/ <231**	**Second/ 231–421**	**Third/ 422–673**	**Fourth/ 674–1,103**	**Highest/ >1,103**	**Total**	**Total ('000)**
Families							
Couple families with dependants	3.9	6.6	15.7	31.2	42.6	100.0	1,991.9
One parent with dependants	6.6	44.3	28.5	16.8	3.8	100.0	490.7
Total	*4.4*	*14.1*	*18.2*	*28.4*	*34.9*	*100.0*	*2,482.6*
Children aged 0–17 years							
In couple income units	3.9	6.2	15.8	32.4	41.6	100.0	3,859.3
In one-parent income units	5.8	43.0	30.8	16.7	3.8	100.0	828.9
Total	*4.2*	*12.7*	*18.5*	*29.7*	*34.9*	*100.0*	*4,688.3*

Source: ABS unpublished data 1999–00 Survey of Income and Housing Costs.

- In 1999–00, only 4.2% of children aged 0–17 years (or 197,300 children) lived in families with gross incomes in the lowest quintile (less than $231 per week). Another 12.7% (or 596,100 children) lived in families with gross incomes in the second lowest quintile (between $231 and $421 per week). To put these income levels into perspective, in 1999–00, families with taxable incomes of less than $28,200 per year (or $540 per week) were eligible for the Commonwealth Government's low-income family payments.[1]
- Children in one-parent families were more likely to live in families with low gross incomes. For instance, almost half (48.8%) of the children in one-parent families lived in families with gross incomes in the bottom two quintiles (less than $422 per week) compared with 10.1% of children in couple families.

When examining the gross income distribution, it appears that couples with children are relatively 'wealthy' compared with other income units, since, in 1999–00, almost two-thirds of couples with children (73.8%) had incomes in the top two quintiles ($674 or more per week). Comparing income units on the basis of gross income, however, does not take into account differences in income unit size and composition. A couple with two children, for instance, may have the same gross income as a single person, but because a family has greater needs, they cannot achieve the same standard of living as a single person. Differences in the needs of different income units can be taken into account, however, by using equivalence scales to adjust the net income (gross income less taxes) of income units for differences in size and composition. The distribution of equivalent income presents a very different picture of relative economic wellbeing.

One indicator for socioeconomic status is the number of dependent children aged 0–17 years living in families with equivalent incomes in the lowest equivalent income quintile as a percentage of all dependent children aged 0–17 years living in families (Table 19.2).

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[1] Taxable income includes income from wages and salaries and government income support, but excludes family payments. Thus, taxable income is generally somewhat lower than gross income.

Table 19.2: Equivalent (OECD) income quintiles for families with dependent children aged 0–17 years, 1999–00 (per cent)

	Income quintile (all income units)/Gross income per week ($)						
Family type	Lowest/ <231	Second/ 231–421	Third/ 422–673	Fourth/ 674–1,103	Highest/ >1,103	Total	Total ('000)
Families							
Couple families with dependants	17.8	19.7	29.1	21.9	11.5	100.0	1,991.9
One parent with dependants	37.2	22.5	26.7	10.3	3.2	100.0	490.7
Total	*21.6*	*20.3*	*28.6*	*19.6*	*9.9*	*100.0*	*2,482.6*
Children aged 0–17 years							
In couple income units	21.2	21.7	28.6	19.6	8.9	100.0	3,859.3
In one-parent income units	43.5	23.2	23.7	7.5	2.1	100.0	828.9
Total	*25.2*	*22.0*	*27.7*	*17.5*	*7.7*	*100.0*	*4,688.3*

Source: ABS unpublished data 1999–00 Survey of Income and Housing Costs.

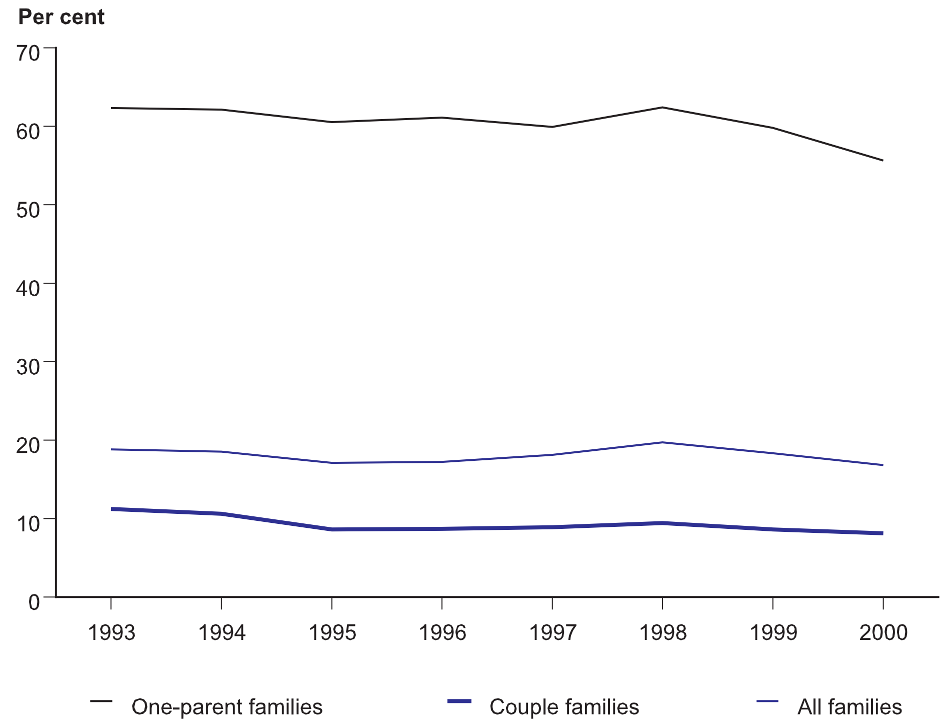
- Using the OECD equivalence scale (ABS 1999b), in 1999–00, 25.2% of children (or 1,179,200 children) lived in families with incomes in the lowest quintile. The proportion of children in one-parent families with incomes in the lowest quintile was twice that of children in couple families, 43.5% compared with 21.2%.

Many researchers have argued that while low income is a good indicator of poverty and disadvantage, it should not be used as the only indicator (Brownlee 1990). They consider that poverty and disadvantage should be measured using both indicators of resources, such as income and indicators of 'living conditions'. One indicator used in research studies on family poverty is the proportion of households with dependent children who went without food because of a shortage of money (Gordon & Pantazis 1997).

The indicator for food security used here is the number of households with dependent children aged 0–14 years that reported ever running out of food and having no money to buy more, as a percentage of all households with dependent children aged 0–14 years. From the 1995 ABS National Nutrition Survey, an estimated 8% of households with dependent children under 15 years ran out of food and had no money to buy more, at least once, in the previous 12 months (ABS unpublished data).

Families without a parent employed

Another indicator of socioeconomic status is the number of children aged 0–14 years living in families where no parent was employed, as a percentage of all children aged 0–14 years living in families (Figure 19.2).



Source: ABS 2001a; ABS, various years (c) [Table A19.2].

Figure 19.2: Proportion of children living in families where no parent is employed, June 1993 to June 2000

- The proportion of all children under 15 years living in families without a parent employed fell from 19% in June 1993 to 17% in June 2000, or from around 712,000 children to around 677,000 children, albeit with some fluctuation over this period.
- Over the period, the proportion of children with no parent employed was considerably higher for those in one-parent families than in couple families. This is hardly surprising, given that single parents have no co-resident parent available to care for their children while they work. In 2000, among children who lived in couple families, 8% lived in families where neither parent was employed. Of children who lived in one-parent families, 56% lived in families where the parent was not employed.
- Reflecting the growth in the 1990s in the total number of single parents who were not employed (AIHW 2001d), the number of children living in one-parent families where the parent was not employed increased from around 361,000 in 1993 to around 411,000 in 2000. Conversely, the number of children living in couple families where neither parent was employed fell from 351,000 to 266,000 over the same period.

Family functioning

Another important aspect of the family environment to consider when examining risk factors for child health and wellbeing is family functioning. It must be noted, however, that no general agreement exists as to what constitutes ‘family functioning’, although there is general consensus that proxy measures such as family type are inadequate

(Zubrick et al. 2000). Silburn et al. (1996:37) defined family functioning as ‘achieving some degree of acceptance of each individual reaching consensus on decisions, communicating feelings and solving day to day problems’. In their analysis of the 1993 Western Australian Child Health Survey, these researchers measured family functioning using indicators such as marital relationship quality, family discord, life-stress events (for example, divorce) and parent’s disciplinary style.

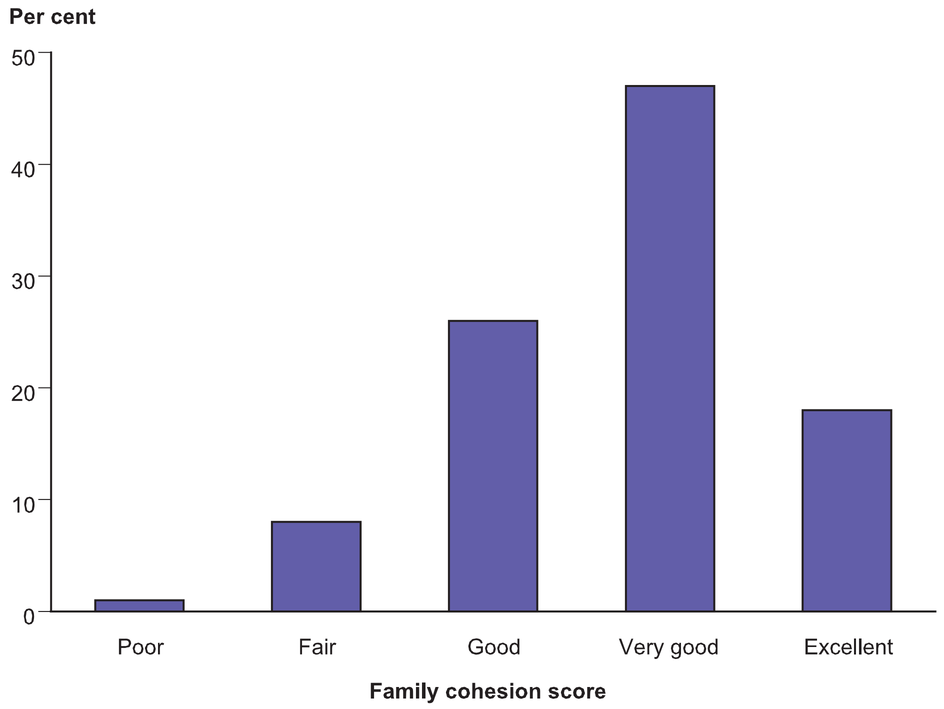
Silburn et al. (1996) found that two aspects of family functioning—family discord and parental disciplinary style—were significant risk factors for children’s poor mental health. Research studies in other countries have also shown links between parental conflict and children’s wellbeing and behaviour (Grych & Fincham 1990). Children who are exposed to parental conflict may become fearful and angry, and often suffer from stress. In modelling their behaviour on parents who resolve arguments with fighting, they may also become more aggressive. In Australia, a recent study on children with asthma found that how children feel about their illness is likely to be affected by their family functioning (Sawyer 2001). Children who lived in families where there was tension and conflict were more distressed and frightened by their asthma symptoms than other children with asthma.

In the following section, three aspects of family functioning are examined—family cohesion, divorce and parenting styles.

Family cohesion

The 1998 Child and Adolescent Component of the National Survey of Mental Health and Wellbeing examined the relationship between the level of family cohesion, and the mental health of children aged 4–17 years (Sawyer et al. 2000). The survey measured family cohesion by asking parents with a child aged 4–17 years about their family’s ability to get on with one another. Families with difficulty getting on with one another were characterised as follows—‘They do not always agree and they may get angry’. Families’ ability to get on was rated on a five-point scale, from ‘poor’ to ‘excellent’.

The indicator of family cohesion is the number of children aged 4–12 years living in families where family cohesion is low as a percentage of all children aged 4–12 years living in families. Data for families with children aged 4–12 years is presented in Figure 19.3.



Source: Child and Adolescent Component of the National Survey of Mental Health and Wellbeing, unpublished data [Table A19.3].

Figure 19.3: Family cohesion in families with children aged 4–12 years, 1998

- In 1998, only 9% of parents with a child aged 4–12 years reported that their family's ability to 'get along' was 'poor' or 'fair'—less than 1% of parents reported that it was 'poor'.
- Almost two-thirds (65%) of parents rated their family's ability to get on as 'very good' (47%) or 'excellent' (18%).

While the survey found that children with more emotional and behavioural problems lived in 'less cohesive' families, the causal direction may be two-way. The poor degree of family cohesion may affect the child's mental health, but having children with poor mental health may also affect family cohesion.

Children experiencing divorce

Research in Australia, as overseas, has found that parental separation and divorce tend to have negative effects on children's emotional and mental health in the short term. However, in the long term, the health of most (but not all) children is not affected and they adjust to their changed family circumstances (Amato 1987, 1997). Studies suggest that, in the longer term, the level of family conflict has a more important effect on children's emotional and mental health than whether or not children had experienced the divorce of their parents (Dunlop & Burns 1989).

Data on children under the age of 18 affected by divorce are presented in Table 19.3. Data are not available on the number of children who experience the break-up of their parents' de facto relationship. In 1997, 9% of couple families with children were living in de facto relationships (ABS 1998c).

The indicator for children experiencing divorce is the number of children under 18 years affected by divorce (that is, whose parents divorce) in a given year as a rate per 1,000 children.

Table 19.3: Children under 18 years affected by divorce, 1991–99

	1991	1992	1993	1994	1995	1996	1997	1998	1999
Number	46,700	45,700	48,100	47,500	n.a.	52,500	51,700	51,600	53,400
Rate per 1,000 children	10.2	10.0	10.5	10.1	n.a.	11.2	11.0	11.0	11.3

Note: Numbers have been rounded to the nearest 100.

Source: ABS 2001a.

- Between 1991 and 1999, the number of children under 18 affected by divorce rose from 46,700 to 53,400. The rate increased from 10.2 to 11.3 per 1,000 (ABS 2001a).

Parenting style

As noted, Silburn et al. (1996) found that parental disciplinary style was a significant risk factor for children's mental health and wellbeing. In the 1993 Western Australian Child Health Survey, caregivers were asked about the parenting behaviours they used to deal with children's misbehaviour and the methods they employed to encourage desirable behaviour. Parental disciplinary style was classified into four categories:

- encouraging—characterised by high use of rewards and reinforcements and low frequency of coercive methods;
- inconsistent—characterised by high frequency of coercive methods and high levels of reinforcement;
- neutral—characterised by low frequency of coercive discipline and low use of reinforcements; and
- coercive—characterised by high levels of coercive discipline and low use of reinforcement.

While almost half (49%) of parents used an 'encouraging' style, more than a third (38%) had a parenting style that was 'inconsistent'. Only a small proportion of parents had a 'neutral' or 'coercive' style (7% and 5%, respectively).

The survey found higher rates of mental health problems among children whose parents used coercive (29%) or inconsistent disciplinary styles (24%), compared with an average of 18% for all children.

Carer's self-assessed health

Children rely on their principal and other carers for their physical, emotional, and economic needs and support. When disruption to parenting or caregiving occurs, as sometimes happens with the onset of a physical or mental illness in the principal caregiver, the needs of the child may receive less attention, or in extreme cases may not be met at all.

The health and wellbeing of the principal carer is therefore an important risk factor for children's health and wellbeing, because it will often affect the capacity of a parent or other significant adult to provide adequate care for the child. Sometimes children with a sick parent or carer may take on the role of carer themselves, taking on extra responsibility for the care of younger siblings, household chores or even care of the ill adult, which may impact negatively upon the child's personal wellbeing. In addition, the health of an immediate family member such as a parent can be a good predictor of child's future health, given the important role of genetics and hereditary factors, as well as factors such as the family's health behaviours.

The indicator of carer's self-assessed health is the number of principal caregivers of children aged 0–14 years who assessed their health status as 'excellent' or 'very good' as a percentage of all principal caregivers.

In the 1993 Western Australian Child Health Survey, parents were asked to evaluate their own general health, according to whether it was 'excellent', 'very good', 'good', 'fair' or 'poor'. Silburn et al. (1996) found that 66% of principal caregivers (mostly mothers) and 71% of secondary caregivers reported that their physical health was 'excellent' or 'very good'. Single parents were more likely to report that they had worse health than principal caregivers in couple families: 51% of single parents reported that their health was 'good', 'fair' or 'poor', compared with 30% of principal caregivers in couple families.

Silburn et al. (1996) found that children whose parents had general health problems, a chronic condition, a disability, or a history of mental health problems were more likely to have lower levels of general health and/or a mental health problem. Among children with one or both parents reporting a lower level of general health, 31% were reported as having a lower level of general health. Among children with one or both parents reporting a history with mental health problems, 29% had a lower level of general health, and 28% reported having a mental health problem.

Children in need of protection

Children who are in need of protection include those who have been abused, neglected or otherwise harmed, and/or whose parents cannot provide adequate care and protection for them. Child abuse and neglect is associated with multiple risk factors such as low socioeconomic status, family disruption, domestic violence and substance abuse (AIHW 2001e). Children in need of protection are of concern to health professionals because of the profound negative impact abuse and neglect can have on children's health and wellbeing. Child abuse and neglect is generally classified into one of the following four categories: physical abuse, sexual abuse, emotional abuse, and neglect.

The relationship between child abuse and neglect and child health and wellbeing is complex and is related to the type, severity and duration of the abuse or neglect and to the context in which it occurs. The more frequent, the more prolonged and the more serious the abuse or neglect, the more damaging it will be for the child (NSW Commission for Children and Young People 2001). The presence or absence of other risk factors also influences the effects on the child. For example, the effects of abuse or neglect have been found to be less harmful if the child receives emotional support from another important adult in his or her life (Shonkoff & Phillips 2000). The negative effects of child abuse and neglect are likely to be compounded when additional risk factors are present.

Abuse and neglect can have both short-term and long-term adverse consequences for children. Physical and sexual abuse can have an immediate damaging effect on children's health through the injuries that children incur. In addition, children who have been abused or neglected often have poor developmental outcomes, such as lower social competence, poor school performance and impaired language ability. The longer term effects of abuse and neglect are primarily related to a child's mental health and include depression, anxiety disorders and suicidal and self-injurious behaviours (Shonkoff & Phillips 2000).

In extreme cases, child abuse and neglect can lead to serious harm or injury. One measure for such extreme cases is the rate of hospital separations due to assault. In 1999–00, the rate of hospitalisation of children aged 0–14 years for injuries inflicted by another person was 21.8 per 100,000.

There are no reliable measures of the prevalence of child abuse and neglect in Australia, mainly due to the difficulties in both defining and measuring abuse and neglect. Prevalence rates can vary considerably depending on the definitions used. In Australia, child protection is the responsibility of the State and Territory Governments. The AIHW collects national data on child protection notifications, investigations and substantiations, children on care and protection orders, and children in out-of-home care. It should be noted that these national data relate to situations that have come to the attention of child protection authorities in each jurisdiction, and therefore only include a proportion of all abuse and neglect cases that occur within the community.

The following section provides data on children who were the subject of a child protection substantiation and children on care and protection orders.

Children in substantiations

Child abuse or neglect or harm to a child is substantiated if, in the professional opinion of officers of the child protection authority, there is reasonable cause to believe that a child has been, is being or is likely to be abused or neglected or otherwise harmed (AIHW 2001e).

One indicator of children in need of protection is the number of children aged 0–14 years who were the subject of a child protection substantiation, as a rate per 1,000 children.

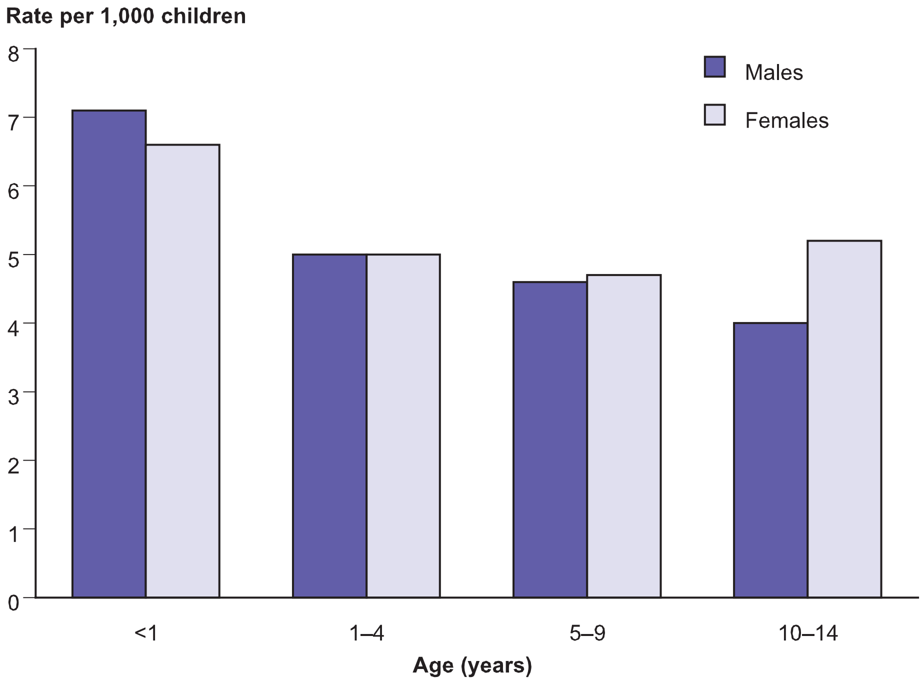
Table 19.4: Children aged 0–14 years who were the subject of a substantiation, 1990–91 to 1999–00

	1990–91	1991–92	1992–93	1993–94	1994–95	1995–96	1996–97	1997–98	1998–99	1999–00
Number	16,330	15,695	20,127	22,615	18,957	23,403	n.a.	19,884	19,659	19,150
Rate per 1,000 children	4.3	4.1	5.3	5.9	4.9	6.0	n.a.	5.1	5.0	4.9

Source: AIHW 2001e.

- In 1999–00, 19,150 children aged 0–14 years (4.9 per 1,000 children) were the subject of a child protection substantiation in Australia.
- The number and rate increased from 16,330 (4.3 per 1,000) in 1990–91 to 23,403 (6.0 per 1,000) in 1995–96 and then decreased to 19,150 (4.9 per 1,000) in 1999–00.
- Changes in the number and rate of children in substantiations in the second half of the 1990s are partly due to changes in child protection policies in a number of jurisdictions. Therefore, it is difficult to assess trends in the rate of children subject to substantiations over time.

Rates of children in substantiations varied by the age and sex of the child (Figure 19.4).



Source: AIHW child protection data collection [Table A19.4].

Figure 19.4: Rates of children aged 0–14 years who were the subject of a child protection substantiation, 1999–00

- Rates of children in substantiations in 1999–00 were highest for those under 1 year, with male infants having the highest rates of all children aged 0–14 years (7.1 per 1,000 male infants and 6.6 per 1,000 female infants). Because of their vulnerability, young children are at a greater risk of abuse and neglect and most jurisdictions have special procedures in place to protect them (Victoria DHS 1999). Rates of substantiations were lowest for children aged 5–9 years (4.6 for boys and 4.7 for girls).
- The difference in rates between boys and girls was greatest for children aged 10–14 years (4.0 and 5.2, respectively). The higher rates of girls aged 10–14 years is due to their overrepresentation in substantiations of sexual abuse. There were almost 3 times as many girls as boys who were the subject of a substantiation of sexual abuse (AIHW 2001e).

Children on care and protection orders

Most children and families who come into contact with the child protection authorities through the substantiation process or through other avenues are assisted by the provision of appropriate support services. Such services include parenting education, family mediation and counselling, and in-home family support. In situations where further intervention is required in order to protect a child, the child protection authority may apply to the relevant court to have the child admitted to a care and protection order.

Recourse to the court is generally a last resort and is used in situations where supervision and counselling are resisted by the family, where other avenues for resolution of the situation have been exhausted, or where removal of a child into out-of-home care requires legal authorisation. Children on orders are those children for whom there are more serious concerns about their safety and wellbeing.

A care and protection order provides the community services department with greater authority and responsibility for the child. These orders include guardianship and custody orders as well supervision orders. The data on children on care and protection orders show the total number of children on these orders at 30 June of each year and are therefore a measure of the prevalence of children on orders at a point in time.

Another indicator of children in need of protection is the number of children aged 0–14 years on care and protection orders as a rate per 1,000 children.

Table 19.5: Children aged 0–14 years on care and protection orders at 30 June, 1991–00

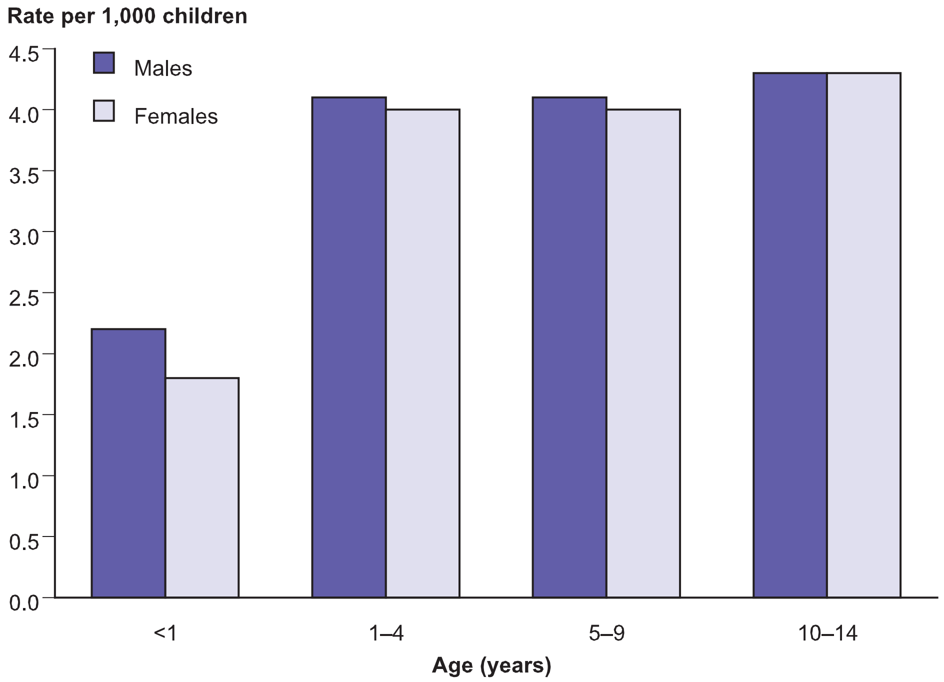
	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Number	9,545	9,261	9,167	9,744	10,419	10,537	12,703	13,280	14,475	15,704
Rate per 1,000 children	2.5	2.4	2.4	2.5	2.7	2.7	3.2	3.4	3.7	4.0

Note: The scope of the data collection for children on care and protection orders was changed in 1997, so the data from 1997 onwards should not be compared with previous years.

Source: AIHW 2001e.

- The number of children aged 0–14 years on care and protection orders at 30 June increased from 9,545 (2.5 per 1,000) to 10,537 (2.7) between 1991 and 1996, and then from 12,703 (3.2) to 15,704 (4.0) between 1997 and 2000.

The rates of children on care and protection orders varied by age and to a lesser extent by sex (Figure 19.5).



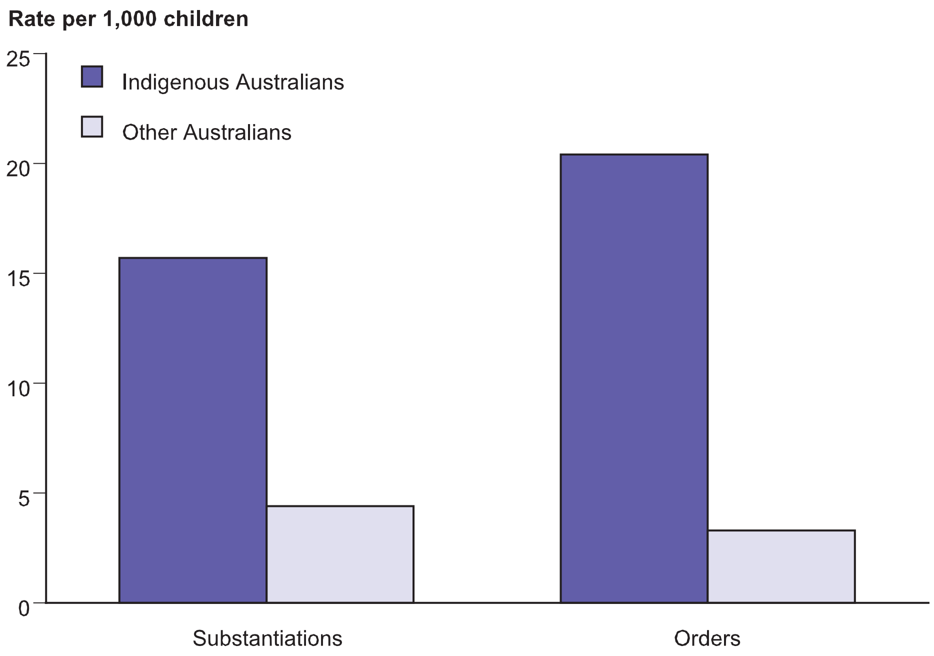
Source: AIHW child protection data collection [Table A19.5].

Figure 19.5: Rates of children aged 0–14 years on care and protection orders, 30 June 2000

- The rates of children on orders generally increased with the age of the child. At June 2000, rates were lowest for children under 1 (2.2 per 1,000 for male infants and 1.8 per 1,000 female infants) and highest for those aged 10–14 years (4.3 for both boys and girls).
- There was a slightly higher rate of boys on orders than of girls (4.1 compared with 3.9).

Aboriginal and Torres Strait Islander children

Aboriginal and Torres Strait Islander children are overrepresented in the child protection system. The rates of Indigenous children in substantiations in 1999–00 and on care and protection orders at 30 June 2000 were considerably higher than the rates for other Australian children.



Source: AIHW child protection data collection and AIHW children on care and protection orders data collection [Table A19.6].

Figure 19.6: Rates of Aboriginal and Torres Strait Islander and other Australian children aged 0–14 years in substantiations in 1999–00 and on care and protection orders, 30 June 2000

- The rate of Indigenous children aged 0–14 years in substantiations in 1999–00 was 15.7 per 1,000, compared with 4.4 for other Australian children.
- The rate of Indigenous children on care and protection orders at 30 June 2000 was 20.4 per 1,000, compared with 3.3 for other Australian children.

There are likely to be a number of different reasons for the over representation of Indigenous children in the child protection system, including 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).

20. Biological and behavioural factors

Poor health is associated with a range of personal and behavioural factors. This section describes data on the status of a number of these factors in children. While some of these risk factors are common to a number of diseases, such as the association between poor nutrition, physical inactivity, smoking and cardiovascular disease and diabetes, others are more specific to a particular disease. The biological and behavioural factors described here include low birthweight, breastfeeding, eating breakfast, physical activity, overweight and obesity, substance use, sun protection and immunisation.

Low birthweight

Low birthweight babies (those born weighing less than 2,500 g) are at increased risk of hospitalisation and neonatal death and are more likely to suffer from physical and neurological complications than babies with normal birthweight. They are also at increased risk of death and hospitalisation later in life (McIntire et al. 1999; Power & Li 2000). These babies are more likely to develop high blood pressure, non-insulin dependent diabetes and impaired glucose tolerance later in life (Barker et al. 1990; Hales et al. 1991). Frankel et al. (1996) found that low birthweight was associated with increased risk of coronary heart disease among obese adults. Stein et al. (1996) suggest that coronary heart disease has its origins in foetal under-nutrition.

In addition to the increased risk of morbidity and mortality, children with an extremely low birthweight (less than 1,000 g) have also been found to have more psychosocial problems. These children are at risk of having difficulties at school. Teenagers who had an extremely low birthweight were less likely to achieve well on intellectual measures, particularly arithmetic, than their peers (Saigal 2000).

Risk factors for low birthweight include younger gestational age, younger or older maternal age, higher number of previous births and multiple births. Cigarette smoking, alcohol consumption and inadequate nutrition are also risk factors for low birthweight. Low birthweight is more common in babies born to families with low socioeconomic status (James et al. 1997), single mothers and Indigenous mothers.

The indicator for low birthweight is the number of infants born weighing less than 2,500 grams in a given year as a percentage of all births (live and still).

The number and proportion of infants born with a low birthweight in 1999 are shown in Table 20.1.

Table 20.1: Infants weighing less than 2,500 grams at birth, 1999

	NSW	Vic	Qld	WA	SA	Tas	ACT	NT	Australia
Infants born at less than 2,500 g	5,541	4,340	3,286	1,720	1,218	415	332	356	17,208
Total births	87,289	62,689	48,747	25,771	18,519	6,092	4,688	3,599	257,394
Proportion of low birthweight infants (per cent)	6.3	6.9	6.7	6.7	6.6	6.9	7.1	10.0	6.7

Source: AIHW NPSU: Nassar et al. 2001.

- In 1999, 17,208 infants had a birthweight less than 2,500 grams. This represented 6.7% of all infants born in the year.
- The proportions of low birthweight infants varied across States and Territories, and was highest in the Northern Territory: 10.0%, compared with 7.1% or less in other States and Territories. This is a reflection of the higher number of Aboriginal and Torres Strait Islander infants with low birthweight in the Northern Territory (Table 20.2).

The proportion of low birthweight infants in Australia remained relatively consistent during the 1990s, ranging from 6.3% to 6.7% (AIHW NPSU: Lancaster et al. 1994; AIHW NPSU: Nassar et al. 2001).

Aboriginal and Torres Strait Islander infants

Table 20.2: Indigenous infants weighing less than 2,500 grams at birth, 1999

	NSW	Vic	Qld	WA	SA	Tas	ACT	NT	Australia
Indigenous infants born at less than 2,500 g	261	70	321	232	75	7	4	184	1,154
Total Indigenous births	2,059	445	2,849	1,545	445	129	55	1,295	8,822
Proportion of low birthweight Indigenous infants (per cent)	12.6	15.5	11.1	14.8	16.7	5.3	7.3	14.3	13.0

Note: Data for Tasmania unavailable; 1998 data used as estimate.

Source: AIHW NPSU: Nassar et al. 2001.

- In 1999, 1,154 (13.0%) Aboriginal and Torres Strait Islander infants were born weighing less than 2,500 grams, compared with 6.7% of all Australian infants.

Nutrition

Childhood is a time of rapid growth and development, and a balanced, nutritious diet is an important contributor to this growth and to health in general. Poor nutrition is associated with a number of illnesses, including obesity, coronary heart disease, stroke, hypertension, some cancers, Type 2 diabetes, and osteoporosis (AIHW: Lester 1994). Establishing a healthy diet in childhood is likely to encourage the development of a healthy diet through adolescence and into adulthood, as eating habits begin early in childhood and are maintained through life (Campbell 1999).

The National Health and Medical Research Council (NHMRC 1995) suggests that a healthy diet for children should include a wide variety of nutritious foods: bread, cereals, fruit and vegetables, foods containing calcium and iron, a moderate amount of sugars, age-appropriate fat intake and low salt intake. Children are encouraged to drink water and engage in physical activity. Breastfeeding for infants is also encouraged and supported.

Cashel (2000) summarised data on the nutritional intake of Australian children from the 1995 ABS National Nutrition Survey. While the fat intake of children aged 2–15 years approximated that recommended by the NHMRC dietary guidelines, the intake of saturated fats for all children was higher than recommended. Calcium intake was lower than recommended, as was the intake of iron by girls. While over 98% of children ate cereal foods prior to the day of the survey, girls aged 4–7 years and boys aged 8–11 years did not eat the recommended amounts of breads and cereals.

The National Nutrition Survey also showed that children consumed less fruits and vegetables than recommended, with 30% of children aged 2–7 years eating no fruit, and a similar percentage consuming no vegetables, on the day prior to the survey (ABS & DHFS 1997). Consumption of fruit declined with age for both boys and girls, with 50% of boys and 42% of girls aged 12–15 years consuming no fruit on the day prior to the survey. The proportion of boys who had eaten no vegetables on the day prior to the survey ranged from 32% (children aged 2–3 years) to 21% (children aged 12–15 years), while for girls the proportion ranged from 20% (children aged 2–5 years) to 14% (children aged 12–15 years).

Inadequate consumption of fruit and vegetables is responsible for 2.7% of the total burden of disease among Australians, with most of this burden (75%) due to cancer, and much of the remaining burden relating to heart disease and stroke (AIHW: Mathers et al. 1999).

Two particularly important nutritional factors which impact on the health of infants and children are breastfeeding and eating breakfast.

Breastfeeding

Breastfeeding has many positive effects on the survival, growth, development and health of infants and young children, as well as greater social and economic benefits (American Academy of Pediatrics 1997). Babies are born with an immune system that is not fully developed, and the mother's antibodies in breastmilk protect the infant from disease while its own immune system is developing, particularly in the first 4–6 months of life (NHMRC 1995, 1996a). A number of studies have shown that breastfeeding has a protective effect against many acute conditions, such as diarrhoea, respiratory infection, otitis media, bacterial meningitis, urinary tract infection, and necrotising enterocolitis (a serious gastrointestinal disease which can lead to death). Other studies show a protective effect of breastmilk against sudden infant death syndrome (SIDS), as well as against chronic diseases such as diabetes mellitus and allergic diseases such as eczema and asthma (American Academy of Pediatrics 1997). Raisler et al. (1999) found that breastfed infants made fewer visits to health professionals, a finding supported by Weimer (1998), who suggested that breastfeeding can lead to reduced health care costs, as well as reducing the time parents are absent from work in order to care for a sick child.

Breastfeeding also has beneficial health effects for the mother. Breastfeeding is thought to encourage bonding between mother and baby (NHMRC 1996a). In addition, studies have shown that breastfeeding can lead to less bleeding after giving birth, as well as delaying ovulation and menstruation (cited in American Academy of Pediatrics 1997).

In view of the importance of appropriate feeding practices for the survival, growth and health of infants, the World Health Organization commissioned a systematic review of the current scientific evidence on the optimal duration of exclusive breastfeeding. This review compared the benefits of exclusive breastfeeding for up to 6 months versus 4 months of age and concluded that exclusive breastfeeding up to 6 months of age has several benefits for the mother and infant. It was therefore recommended that infants should be breastfed up to 6 months, with the introduction of complementary food and continued breastfeeding thereafter (WHO 2001).

In Australia, the NHMRC (1995) has placed breastfeeding first on the list of 'Dietary guidelines for children and adolescents', emphasising the importance of breastmilk as the only food necessary for infants up to 4–6 months. Currently, Australia is working to harmonise breastfeeding definitions with those of WHO to allow international comparability (DHAC, pers. comm., October 2001).

The indicator for breastfeeding is the number of infants fully breastfed at 3 and at 6 months of age in a given year as a percentage of all infants aged 3 and 6 months in the same year. Data for this indicator come from two sources. In the 1995 ABS National Health Survey (NHS), parents were asked about breastfeeding of infants aged 0–3 years, for the years 1992–95. More recent data at the State level are available from the 1999–00 Victorian Maternal and Child Health Survey.

Donath & Amir (2000) used unit record data from the NHS to estimate the percentage of children breastfed at discharge from hospital, at 3 months (13 weeks) of age, and at

6 months (25 weeks) of age, who were born between 1992 and 1995 (Table 20.3). Children were said to be breastfed 'exclusively' if they did not consume infant formula, cow's milk, other milk substitutes or solid food on a regular basis.

Table 20.3: Proportion of infants breastfed at discharge from hospital, 13 and 25 weeks, 1992–95 (per cent)

	NSW	Vic	Qld	WA	SA	Tas	ACT	NT	Australia
At discharge from hospital	78.4	82.2	84.1	87.0	82.2	78.1	90.1	88.5	81.8
Exclusively breastfed at 13 weeks	56.6	56.0	56.3	62.8	53.3	60.2	63.8	70.9	57.1
Exclusively and partially breastfed at 13 weeks	60.0	61.7	63.8	69.0	62.2	63.0	68.7	76.3	62.6
Exclusively breastfed at 25 weeks	17.2	18.3	19.2	21.9	18.4	22.3	17.0	24.6	18.6
Exclusively and partially breastfed at 25 weeks	44.2	45.0	47.7	50.6	46.1	43.9	53.8	64.7	46.2

Source: Donath & Amir 2000.

- During 1992–95, 81.8% of infants were breastfed following discharge from hospital.
- At 13 weeks (3 months) of age, just over half (57.1%) were exclusively breastfed, and 63% exclusively or partially breastfed.
- At 25 weeks (6 months) of age, 18.6% were exclusively breastfed, and 46.2% exclusively or partially breastfed.
- The highest rates of breastfeeding were found in the Australian Capital Territory, the Northern Territory and Western Australia.
- The percentage of infants exclusively breastfed at 3 months of age (57.1%) comes close to the proposed target of 60% for the year 2000 (Nutbeam et al. 1993). However, the percentage exclusively breastfed at 6 months (18.6%) falls very short of the set target of 50%.

Donath & Amir (2000) found a strong relationship between breastfeeding and socioeconomic status based on the area in which the child lived. Infants from the most disadvantaged areas were significantly less likely to be breastfed at any age compared with those from other areas.

More recent information about breastfeeding is available from Victoria (Table 20.4). The definitions used in Victoria are different from those used in the ABS NHS, which affects comparability of the data, but in the absence of recent national data they are useful to consider.[1]

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[1] In Victoria, the following definitions of breastfeeding apply: an 'exclusively' or 'fully breastfed' infant is one who does not regularly (at least once a day) receive any milk other than breast milk, but may receive some solids. A 'partly breastfed' infant is one who regularly (at least once a day) receives some breast milk

Table 20.4: Victorian infants breastfed at 3 and 6 months of age, 1992–93 to 1999–00

		Age			
		3 months		6 months	
		Number	Per cent	Number	Per cent
1992–93	Fully breastfed	n.a.	52.7	n.a.	39.0
	Partly breastfed	n.a.	5.0	n.a.	4.5
1995–96	Fully breastfed	33,829	53.0	25,071	39.0
	Partly breastfed	3,231	5.0	3,209	5.0
1998–99	Fully breastfed	32,118	52.4	24,557	40.1
	Partly breastfed	3,373	5.5	2,824	4.6
1999–00	Fully breastfed	32,703	52.1	24,986	39.8
	Partly breastfed	3,776	6.0	2,927	4.7

Source: Victoria DHS 1998, 2001.

- Breastfeeding rates remained fairly constant in Victoria between 1992–93 and 1999–00. Throughout this time, just over half of infants aged 3 months were fully or partly breastfed, and under half of infants aged 6 months were fully or partly breastfed.
- In 1999–00, 52.1% of infants aged 3 months, and 39.8% of infants aged 6 months, were fully breastfed, compared with 52.7% of infants aged 3 months, and 39.0% of infants aged 6 months, in 1992–93.

Aboriginal and Torres Strait Islander infants

Data from the ABS 1994 National Aboriginal and Torres Strait Islander Survey (ABS 1996b) indicate that 66.3% of Indigenous boys and 66.5% of Indigenous girls up to 12 years of age had been breastfed as infants. Of children up to 12 years of age, 12.2% had been breastfed for 1–3 months, 11.7% for 3–6 months, 14.5% for 6–12 months, and 27.4% for 12 months or more. A greater proportion of Indigenous babies in the Northern Territory (56.6%) were breastfed for 12 months or more than in any other State or Territory.

However, data from the 1995 ABS National Health Survey (ABS 1999c) suggest that a higher proportion (74.9%) of Aboriginal and Torres Strait Islander infants had been breastfed. While this rate is lower than the 86.3% reported for other Australian infants, a greater proportion of Aboriginal and Torres Strait Islander infants were breastfed for 24 weeks or more than other Australian infants (60.5% compared with 53.4%).

Proportion of children eating breakfast

Breakfast is an important contributor to nutritional wellbeing. It has been suggested that not eating breakfast may have negative effects on cognitive functioning (Shaw 1998), a factor very important for schoolchildren. Skipping breakfast (or lunch) has been suggested as a possible indicator of subclinical eating disorder (Melve & Baerheim 1994). Missing breakfast has also been associated with overweight and obesity. Ortega et al. (1998) found that overweight and obese children aged 9–13 years, especially girls, skipped breakfast more often than children with a healthy weight. Overweight and obese children were also likely to eat less nutritious breakfasts, and eat less breads and cereals. As a result, they consumed lower quantities of carbohydrates, thiamine, niacin, pyridoxine, vitamin D and iron. Ortega et al. (1998) suggest that eating an inadequate breakfast plays a part in the making of poor food choices through the rest of the day and may lead to an increased risk of obesity in the future.

Shaw (1998) undertook a study in Queensland to determine why children skipped breakfast, and found that out of approximately 700 children aged 13 years, 82 (12%) reported not eating breakfast. The only statistically significant variable was sex, with girls skipping breakfast more than 3 times as often as boys. Girls were also more likely to skip lunch, and to have been on a diet to lose weight. Missing breakfast was not related to income. The most common reason given for skipping breakfast was lack of time in the morning (52% of those who skipped breakfast), followed by being 'not hungry' (22%) and 'not feeling like it' (14%). A year after the initial survey, of those who had said that they skipped breakfast, 27% said they always or almost always ate breakfast, suggesting that breakfast habits may be somewhat subject to change.

The indicator for children eating breakfast is the number of children aged 2–15 years eating breakfast 5 or more days per week in a given year as a percentage of all children aged 2–15 years. The most current national data on the number of times per week Australian children usually have breakfast come from the 1995 ABS National Nutrition Survey (Table 20.5).

Table 20.5: Proportion of Australian children aged 2–15 years eating breakfast, 1995 (per cent)

	Age (years)					
	2–11			12–15		
Number of times breakfast is consumed per week	**Males**	**Females**	**Persons**	**Males**	**Females**	**Persons**
Rarely or never	0.2[(a)]	0.6[(a)]	0.3[(a)]	0.9[(a)]	6.4	3.6
One to two days	1.3	2.6	1.9	6.2	12.8	9.4
Three to four days	3.8	4.7	4.2	5.3	9.3	7.2
Five or more days	93.7	92.2	93.0	86.5	70.9	78.9
Total	**100**	**100**	**100**	**100**	**100**	**100**
Sample total (number)	**970**	**951**	**1,921**	**349**	**304**	**653**

(a) Estimates have a relative standard error of between 25% and 50% and should be used with caution.

Source: ABS & DHFS 1997.

- In 1995, the majority of children consumed breakfast 5 or more days per week: 93.0% of children aged 2–11 years and 78.9% of older children (12–15 years).
- Older children were more likely than younger children to rarely or never eat breakfast (3.6% compared with 0.3%) or to eat it on only 1 or 2 days per week (9.4% compared with 1.9%).

- A higher proportion of boys ate breakfast on 5 or more days than girls, with a higher proportion of girls rarely or never eating breakfast, or doing so on only 1 or 2 days per week. This was especially true for children aged 12–15 years.

Physical and other activities

Physical activity is important for the health of children. Children are naturally physically active, but contemporary life in urban communities can constrain activity (Booth 2000a). Physical activity in children is important for a number of reasons, including maintaining and improving physical fitness, health and wellbeing, growth and development, encouraging active lifestyles which will continue into adulthood, and reducing the risk of chronic diseases in adulthood (Biddle et al. 1998). Among adults, physical activity has been associated with a lowered risk of premature mortality, coronary heart disease, high blood pressure, colon cancer, and Type 2 diabetes (USDHSS 1996). Physical inactivity is estimated to be responsible for 6.7% of the total burden of disease in the entire Australian population, with ischaemic heart disease and stroke accounting for 60% of this disease burden (AIHW: Mathers et al. 1999). While there is only a weak association between physical activity in childhood and immediate or future health outcomes (Riddoch 1998), physical activity has been seen to prevent or delay, and help reduce, high blood pressure in some adolescents (USDHSS 1996). Physical activity in children has also been associated with good mental health and, in particular, good self-esteem (Mutrie & Parfitt 1998).

Many activities now widely undertaken by children involve very little physical activity, including watching television and videos and playing computer games. Being driven to school and other places that they may once have walked to has also decreased the amount of physical activity undertaken by children (Booth 2000b). It has been proposed that watching television limits spontaneous activity levels and encourages increased food intake, both of which can lead to overweight and obesity (Rossner 1998). Borzekowski & Robinson (2001) found that only one or two exposures to a 10–30-second food commercial on television can influence young children's short-term food preferences. Robinson (1999) found that reducing television viewing significantly reduced the body mass index (BMI) in children.

Despite the increase in sedentary activities, it is likely that the majority of children (an estimated 80%) are sufficiently active (Booth 2000a). However, the substantial minority who are not sufficiently active are probably also overweight, and at risk of becoming inactive and overweight adults. People of all ages are encouraged to engage in moderate amounts of daily physical activity (USDHSS 1996). This can be achieved in children through play, transport and recreation, with vigorous-intensity activity, such as organised sport, physical education, and dance, 3–4 times a week, providing additional benefits (Shilton & Naughton 2001; Booth 2000a).

There are no national data on the total amount of physical activity undertaken by children. However, in 2000, the Australian Bureau of Statistics (ABS 2001c) undertook a survey on the cultural and leisure activities of Australian children, which provides information on some types of physical activities undertaken by children. There are also State data available on New South Wales schoolchildren, from the 1997 New South Wales Schools Fitness and Physical Activity Survey (Table 20.6). This survey provides information on, among other things, physical activity for children aged 7–16 years. The information presented here is restricted to children aged 13–14 years (Year 8).

Children in New South Wales were considered to be 'active' using the following criteria: 'active' equated to 3.5 hours of moderate-intensity activity over five sessions during a normal week, and 'vigorously active' was defined as participating in at least three 20-minute sessions of fairly vigorous activities per week.

Table 20.6: Proportion of New South Wales schoolchildren in Year 8 sufficiently active each week during summer and winter school terms, 1997 (per cent)

	Summer school terms			Winter school terms		
	Active, but not vigorously active	Vigorously active	Total active	Active, but not vigorously active	Vigorously active	Total active
Year 8 males	16	65	81	13	63	76
Year 8 females	18	63	81	21	48	69

Source: Booth et al. 1997.

- In 1997, boys and girls in Year 8 were physically active to the same degree in summer, but boys were more physically active in winter (76%, compared with 69% of girls).
- A higher percentage of boys in both summer and winter school terms were vigorously active, compared with girls (65% compared with 63% in summer, 63% compared with 48% in winter).
- Both the proportion of active children and the proportion of vigorously active children declined in the winter school terms.

The most common activities for boys in Years 8 and 10 (13–16 years) were recreational cycling, school sport, walking for transport, soccer, cricket, swimming and basketball, while the most common activities for girls in Years 8 and 10 were walking for transport, swimming, school sport, walking for pleasure, netball, recreational cycling and dancing.

The 2000 ABS Children's Participation in Cultural and Leisure Activities Survey (ABS 2001c) looked at participation of children aged 5–14 years in selected cultural and leisure activities (Table 20.7).

Table 20.7: Children aged 5–14 years participating in selected cultural and leisure activities, 2000

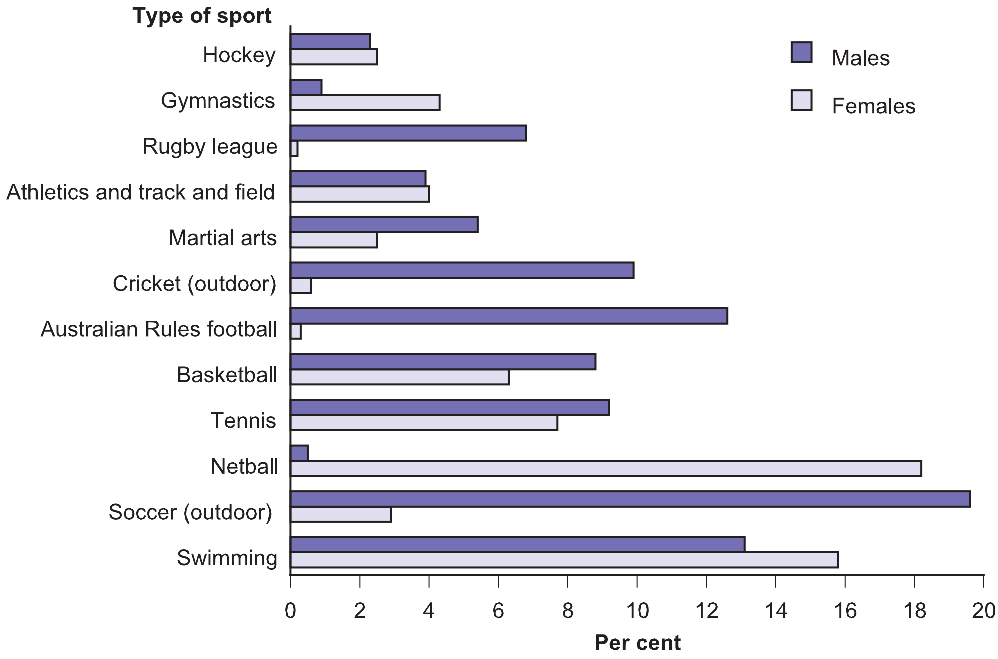
	Males		Females	
	Estimated number ('000)	Per cent	Estimated number ('000)	Per cent
Organised cultural activities[(a)]	266.8	19.7	510.9	39.7
Playing musical instrument	213.8	15.8	260.1	20.2
Dancing	22.9	1.7	251.1	19.5
Singing	38.9	2.9	85.6	6.6
Drama	42.8	3.2	79.0	6.1
Organised sport[(a)]	895.2	66.1	673.0	52.3
Leisure activities[(b)]	1,342.6	99.1	1,276.0	99.1
Watching TV/videos	1,312.2	96.9	1,248.1	96.9
Playing electronic or computer games	1,071.5	79.1	747.5	58.1
Bike riding	963.1	71.1	723.0	56.1
Arts and crafts	466.1	34.4	704.6	54.7
Skateboarding/rollerblading	481.6	35.6	335.8	26.1
Computer activities[(c)]	1,281.6	94.6	1,216.7	94.5
Using a computer but not the Internet	638.5	47.1	625.5	48.6
Accessing the Internet	643.1	47.5	591.3	45.9

(a) Outside of school hours during the 12 months prior to interview in April 2000.
(b) Outside of school hours during the past 2 school weeks prior to interview in April 2000.
(c) During or outside of school hours during the 12 months prior to interview in April 2000.

Source: ABS 2001c.

- Over the year to April 2000, 29.4% of children participated in at least one of the four selected organised cultural activities out of school hours. Twice as many girls as boys participated in at least one of in these activities (39.7% compared with 19.7%). Playing a musical instrument was the most popular of these activities among both boys and girls (undertaken by 15.8% of boys and 20.2% of girls). Approximately three-quarters of children who played a musical instrument received lessons.
- Over the period, 1.6 million children (59.4%) took part in sports that had been organised by a school, club or association out of school hours. Organised sport was undertaken by 66.1% of boys and 52.3% of girls. The highest proportion of children participating in organised sport was in the age group 9–11 years, with 67.3% participating.
- The most popular leisure activity undertaken by children outside of school hours during the 2 school weeks prior to the survey was watching TV and videos, undertaken by 96.9% of boys and girls. Playing electronic or computer games was also undertaken by a large proportion of children (68.9%), but was more popular among boys (79.1% participating) than girls (58.1% participating).
- Computer activities during or outside of school hours were undertaken by the majority of boys and girls (94.6% and 94.5%, respectively). Accessing the Internet was more popular among children aged 12–14 years than among children aged 5–11 years. Most children (94%) used the computer at school, and a high proportion (75.5%) used the computer at home. For children using the computer at home, 84.3% used it to play games, and 83.9% used it for school or educational reasons. For children using the Internet at home, 82.6% for school or educational reasons, with just over half (51.5%) using it for e-mail or chat rooms.

Participation in selected organised sports is shown in Figure 20.1.



Note: This graph displays children aged 5 to 14 years who participated in organised sport (to a maximum of three per child) outside of school hours during the 12 months prior to interview in April 2000.

Source: ABS 2001c [Table A20.1].

Figure 20.1: Participation of children aged 5–14 years in selected organised sports, 2000 (per cent)

- Among all boys surveyed, the most popular sport was outdoor soccer, with a participation rate of 20%, followed by swimming and Australian rules football (13% each). Among all girls surveyed, the most popular sport was netball, with a participation rate of 18%, followed by swimming (16%) and tennis (8%).
- Participation in some sports, such as swimming, tennis, basketball, athletics and track and field, was fairly even between boys and girls. However, boys predominated in outdoor soccer, Australian rules football, outdoor cricket, and rugby league, while girls predominated in netball and gymnastics.

Overweight and obesity

The prevalence of overweight and obesity among Australian children has increased in recent years. The reasons for this increase are complex. Overweight and obesity are to some extent related to family factors. Hediger et al. (2001) found that maternal body mass index (BMI) is the strongest predictor of child BMI, with children of an overweight or obese mother 3–4 times more likely to be overweight. While genetic factors can play a role in determining body weight, modelling influences cannot be ruled out. Also, because the prevalence of obesity has been increasing so rapidly, genetic factors cannot be the only reason (Dietz 2000). Lifestyle factors such as poor diet and lack of physical activity are also contributing causes, with an increase in the consumption of take-away foods and other foods that are high in fat and sugar contributing to a high daily energy intake in the absence of high levels of physical activity.

Children classified as overweight or obese have a range of health problems (Hansen 2000), including psychosocial problems and respiratory problems. Hill (2000) suggests that psychosocial problems are the most immediate common problems associated with childhood obesity, and include poor body image, disordered eating, decreased self-worth (particularly in obese adolescents), peer teasing and victimisation.

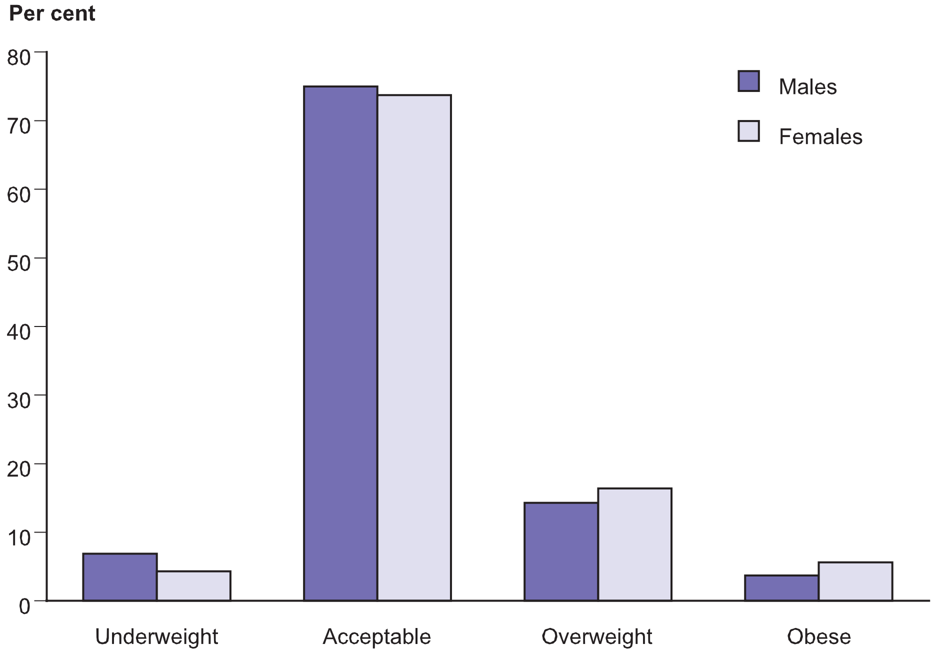
A number of chronic diseases, including increased risk of high blood pressure, heart disease, osteoarthritis, Type 2 diabetes, and some cancers, have been associated with obesity in adulthood (Eckersley 2001). While there are few data linking childhood obesity to chronic diseases in adulthood, childhood obesity can lead to obesity in adulthood, which in turn can lead to increased risk of poor health (Rossner 1998). In 1996, obesity was estimated to account for 4.3% of the total burden of disease among Australians, with cardiovascular diseases and hypertension accounting for 40% of this burden, and diabetes for 28% (AIHW: Mathers et al. 1999).

Overweight and obesity are measured by the BMI measurement, which is the ratio of weight in kilograms to the square of height in metres (kg/m^2). BMI is used to categorise people into one of four groups—underweight, acceptable weight, overweight, or obese. While there are standard adult cut-off points (a BMI of ≥ 25 and <30 kg/m^2 indicates overweight, and a BMI of ≥ 30 kg/m^2 indicates obesity), Cole et al. (2000) suggest that age- and sex-specific BMI cut-off points are more appropriate for use with children.

The indicator for overweight and obesity is the number of children aged 2–14 years whose BMI is above the cut-off points for overweight and obese for their age and sex in a given year as a percentage of all children aged 2–14 years. The most recent data on the weight of Australian children come from the 1995 ABS National Nutrition Survey.

Analyses of data from the 1995 survey using the age- and sex-specific cut-off points proposed by Cole et al. (2000) show that 19–23% of Australian children aged 2–18 years are overweight or obese, depending on age (Booth et al. 2001; Magarey et al. 2001). Between 1985 and 1995, the rate of overweight and obesity in children aged 7–15 years almost doubled. In 1985, 10.7% of boys and 11.8% of girls were overweight or obese, while in 1995, 20.0% of boys and 21.5% of girls were overweight or obese (Magarey et al. 2001).

As the data published by Magarey et al. (2001) included older children, the AIHW analysed the 1995 survey data using Cole et al.'s age- and sex-specific cut-off points for children aged 2–14 years (Figure 20.2).



Source: Table 20.8.

Figure 20.2: Proportion of children aged 2–14 years who are underweight, of acceptable weight, overweight or obese, 1995

- In 1995, while the majority of Australian children aged 2–14 years—75.0% of boys and 73.7% of girls—were of an acceptable weight, a relatively high proportion were overweight and obese: 14.3% of boys and 16.4% of girls were overweight, and 3.7% of boys and 5.6% of girls were obese.
- A small percentage of children were underweight: 6.9% of boys and 4.3% of girls.

The proportion of children aged 2–14 years according to their weight status and by sex is presented in Table 20.8.

Table 20.8: Proportion of children aged 2–14 years who are underweight, of acceptable weight, overweight or obese, 1995 (per cent)

	Age (years)	Underweight	Acceptable	Overweight	Obese	Total (number)
Males	2–4	4.3	78.9	14.6	2.2	261
	5–9	8.0	77.2	10.4	4.3	489
	10–14	7.3	70.3	18.3	4.1	456
	2–14	*6.9*	*75.0*	*14.3*	*3.7*	*1,206*
Females	2–4	4.8	72.5	18.5	4.2	285
	5–9	3.3	74.7	14.9	7.1	465
	10–14	4.9	73.3	16.9	4.9	426
	2–14	*4.3*	*73.7*	*16.4*	*5.6*	*1,176*

Source: AIHW analysis of ABS NNS data, 1995.

- The proportion of children who were overweight or obese in 1995 was highest among boys aged 10–14 years (22.4%), and among girls aged 2–4 years (22.7%). While there were differences in the proportion of children who were overweight or obese among boys of different age groups, these differences were smaller among girls of different age groups.

Aboriginal and Torres Strait Islander children

Data from the ABS 1994 National Aboriginal and Torres Strait Islander Survey (NATSIS) (ABS 1998d) show that around 13% of boys and 19% of girls aged 7–15 years were above the 95th percentile for age and sex, indicating that they were overweight.

Data from the same survey show that, compared with all Australian children, a higher proportion of Indigenous children are underweight. Approximately 15% of boys and 11% of girls aged 7–15 years were below the 5th percentile for their age and sex, indicating they are underweight. While this methodology for estimating weight status is different from that using age- and sex-specific BMI cut-offs, it is unlikely that this alone accounts for the observed difference. Ruben & Walker (1995) have estimated that a minimum of 20% of all Aboriginal children in the Top End of the Northern Territory are malnourished.

The highest proportion of those underweight was among boys aged 11 years and girls aged 8 years. A greater proportion of Indigenous children who lived in rural areas were underweight than those in other areas.

Children in metropolitan, rural and remote areas

There are slight differences in the weight status of children in metropolitan, rural and remote areas (Table 20.9).

Table 20.9: Proportion of children aged 2–14 years who are underweight, of acceptable weight, overweight or obese, by area of residence, 1995 (per cent)

	RRMA area	Underweight	Acceptable	Overweight	Obese	Total (number)
Males	Metropolitan	7.9	72.8	14.5	4.8	725
	Rural and remote	5.3	79.0	13.7	2.0	481
Females	Metropolitan	3.8	72.9	16.8	6.5	697
	Rural and remote	5.1	75.1	15.8	4.0	479

Source: AIHW analysis of ABS NNS data, 1995.

- Among both boys and girls, a slightly higher percentage of children in rural and remote areas were of an acceptable weight, compared with children in metropolitan areas, in 1995.
- There was a higher percentage of underweight, overweight and obese boys in metropolitan areas than in rural and remote areas.
- There was a higher percentage of underweight girls in rural and remote areas than in metropolitan areas, but overweight and obesity were slightly more prevalent among girls in metropolitan areas.

Lynch et al. (2000) found that, in Sydney, BMI differed between different ethnic groups, with children of Mediterranean backgrounds having the highest BMI, followed by white (north European), mixed race (mainly Asian-white and Arab-white), and Asian children. Booth et al. (2001) suggest that the greater prevalence of overweight and obesity among boys in urban areas may be due to the confounding effects of ethnic background, as people from Middle Eastern and European backgrounds were more likely to live in the city. A higher proportion of girls in urban areas were also seen to be overweight and obese in this analysis of NNS data, and it is possible that this is also due, in part, to ethnic background.

Dieting and disordered eating

Australian studies have shown that a large proportion of children are worried about being overweight or want to be thinner, even among those children with an acceptable weight (Rolland et al. 1997; Thomas et al. 2000). Although eating disorders are fairly rare among children, Patton et al. (1999) stated that dieting is the most important predictor of new eating disorders, with risk of eating disorder increasing as severity of dieting increases. Thomas et al. (2000) found that the most significant predictors of dieting were lower self-esteem and higher BMI.

Australian studies have shown that a considerable proportion of children (31–40% of girls, 24% of boys) have dieted or are currently dieting to lose weight (Rolland et al. 1997; Thomas et al. 2000). Nowak (1998) found that, in Queensland, boys aged 12–15 years who dieted to lose weight reduced high-fat and high-sugar foods, and snacks, while increasing some low-fat foods such as yoghurt, fruit and low-fat milk. However, girls aged 12–15 years who dieted to lose weight reduced not only high-fat foods but also bread, meat and dairy products, and skipped meals and snacks. Often the lower intake of core foods and the tendency to skip meals continued after the dieting had ended.

Prevalence data are not available for the number of children in Australia who suffer from disordered eating, or who are experiencing clinical eating disorders. The Child and Adolescent Component of the 1998 National Survey of Mental Health and Wellbeing gathered some data from children and adolescents aged 13–17 years on dieting and exercise behaviour (Table 20.10). The survey indicated that 17% of children and adolescents aged 13–17 years (26.1% of girls and 7.4% of boys) were dieting to control weight, and 36.2% (46.9% of girls and 25.5% of boys) were exercising to control weight. It is unlikely that all these adolescents were overweight and needed to lose weight, although this information is not available from the survey. A much smaller percentage of adolescents were using inappropriate weight loss behaviours, such as vomiting or using laxatives (1.9%) or taking medication (0.6%). These behaviours were more common among girls than boys.

Table 20.10: Proportion of children aged 13–17 years reporting dieting and exercise behaviours, 1998 (per cent)

Dieting and exercise behaviour	Males	Females	All adolescents
Dieting to control weight	7.4	26.1	16.8
Exercising to control weight	25.5	46.9	36.2
Losing weight by vomiting/laxatives	0.8	3.0	1.9
Losing weight by taking medication	0.3	0.9	0.6

Source: Sawyer et al. 2000.

In 1999–00, children aged 10–14 years were hospitalised for eating disorders (ICD-10-AM code F50) at a rate of 75.7 girls and 7.7 boys per 100,000 children. Of hospitalisations for an eating disorder, the majority (95%) were for anorexia nervosa.

Substance use

During childhood and adolescence, individuals develop attitudes and behaviours that may continue into adult life. These behaviours often include use of alcohol and other drugs. Experimentation with drugs often includes those that are used legally by adults, such as alcohol and tobacco, but can also include a range of illicit drugs (drugs that are illegal), ranging from cannabis to opiates such as heroin.

The younger the age of initiation to drug use, the more likely it is to continue, and the more likely there are to be longer-term adverse affects. These effects can include association with delinquent peers and participation in deviant behaviour and crime (Johnson 2001; Zhang et al. 1997). Alcohol use among children, especially when alcohol is consumed in binge quantities, is also a risk factor for future hazardous patterns of alcohol consumption (Grant & Dawson 1997).

A number of factors are known to influence a child’s decision to experiment with alcohol and other drugs. While use of tobacco and illicit drugs is usually actively discouraged by society, and adult family members, initiation to responsible alcohol use, especially in older children, can begin during childhood depending on family values and attitudes towards drinking, and peer behaviours. A study commissioned in 1998 by the then Commonwealth Department of Health and Family Services (Shanahan & Hewitt 1999) found that peer group norms were very influential in adolescent alcohol use, with the types of drinking behaviours adopted depending on the drinking behaviours of peer groups. Adolescents indicated that they drank alcohol, among other reasons, to try a new experience, socialise or relax, because of peer pressure, to drown problems, or because they did not feel good about themselves.

Smoking behaviour can also be influenced by family and peer factors. One common finding is that children with parents or family members who smoke are more likely to take up smoking themselves. Similarly, children who believe that their parents would disapprove of smoking are less likely to experiment with tobacco. On the other hand, experimenting with cigarettes can also be a rebellion against adult authority, a way of bonding with peers or establishing personal identity. Other variables such as low education and poor socioeconomic circumstances may also be connected with children taking up smoking (Winstanley et al. 1995). Another widely researched influence is the smoking behaviour of friends. Peer pressure is well established as a reason that children take up smoking, but, equally, representations of smoking in popular culture such as movies and television can also make impressions on young people about the status and ‘fashionable’ aspects of smoking.

Since tobacco use is the risk factor associated with the greatest disease burden in Australia, responsible for about 9.7% of the total burden of disease in the Australian population (AIHW: Mathers et al. 1999), dissuading young people from taking up smoking is a high-priority public health issue. Given the wide variety of reasons that children start to smoke tobacco (Rugkasa et al. 2001), reduced smoking rates can be achieved as a result of health promotion and prevention action that targets health risk behaviour more generally. In addition, adult-focused initiatives (such as the National Tobacco Campaign) can have a beneficial flow-on effect for youth by contributing to effective prevention.

Tobacco and alcohol use

The indicator for tobacco and alcohol use is the number of children aged 12, 13 and 14 years who smoked tobacco/drank alcohol in the last week as a percentage of all children aged 12, 13 and 14 years. Data in this section are from the Australian Secondary Students Alcohol and Drug Survey (ASSAD). This survey is conducted in a sample of Australian schools. In 1999, 26,489 students in years 7–12 were included in the survey. The tobacco and alcohol findings from the 1999 ASSAD Survey for children aged 12, 13 and 14 years are presented in Table 20.11.

In interpreting data on smoking, alcohol and drug use, it should be noted that students' reporting of substance use might not reflect the true prevalence of these behaviours. Letcher & White (1999) suggest that their figures may underestimate substance use by young people, as their sample is biased towards children with good school attendance. However, they also point out that the prevalence of substance use among younger students may be inflated, because of misunderstanding of some aspects of the questionnaire, and/or because some children may have overestimated their use of illicit substances as an expression of bravado.

Table 20.11: Secondary students aged 12–14 years consuming alcohol and smoking tobacco at least once in the previous week, 1999

		12 years		13 years		14 years		12–14 years	
Substance		**Number[(a)]**	**Per cent**	**Number[(a)]**	**Per cent**	**Number[(a)]**	**Per cent**	**Number[(a)]**	**Per cent**
Tobacco	Males	8,119	6	15,119	11	27,245	21	50,482	13
	Females	7,024	6	16,846	13	27,437	22	51,307	14
	Persons	15,145	6	31,969	12	54,686	21	101,800	13
Alcohol	Males	25,180	19	32,586	25	45,312	34	103,078	26
	Females	14,261	11	27,592	22	37,560	30	79,413	21
	Persons	39,442	15	60,180	23	82,877	32	182,499	24

(a) Estimated number of secondary students aged 12–14 using tobacco or drinking alcohol in the week before the survey. Numbers are estimated from 1999 school enrolments and based on the portion of students smoking tobacco or drinking alcohol found in a sample of 26,489 secondary students in Years 7 to 12.

Source: 1999 ASSAD Survey, Centre for Behavioural Research in Cancer, Anti-Cancer Council of Victoria, unpublished data.

- In 1999, more children aged 12–14 years were estimated to have consumed alcohol in the past week than had smoked tobacco. Approximately 1 in 4 (24%) children aged 12–14 years were estimated to have consumed alcohol, and more than 1 in 8 (13%) were estimated to have smoked tobacco, in the previous week.
- Use of tobacco and alcohol increased with age. It was estimated that 22% of girls aged 14 years had smoked tobacco in the last week, compared with 13% of girls aged 13 years and 6% of girls aged 12 years.
- Boys of all ages were more likely to have consumed alcohol in the past week than girls (26% of boys compared with 21% of girls aged 12–14 years). There was no marked sex difference in the estimated percentage of children reporting recent tobacco use (around 13%).

The Australian National Drug Strategy Household Survey conducted in 1998 also found that a number of 14-year-old children had had experience with tobacco, alcohol and other drugs. Of children aged 14 years, 11.4% were estimated to be either occasional or regular smokers, and 32% occasional or regular drinkers (AIHW, unpublished data).

Time-series information on tobacco and alcohol use by children aged 12–15 years is presented in Figures 20.3 and 20.4.[2]

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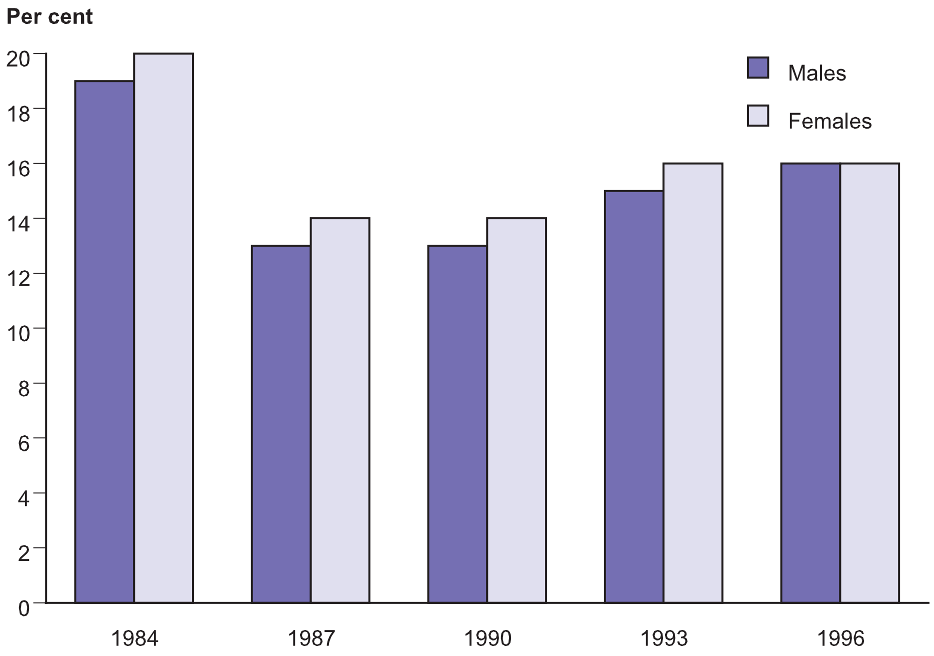
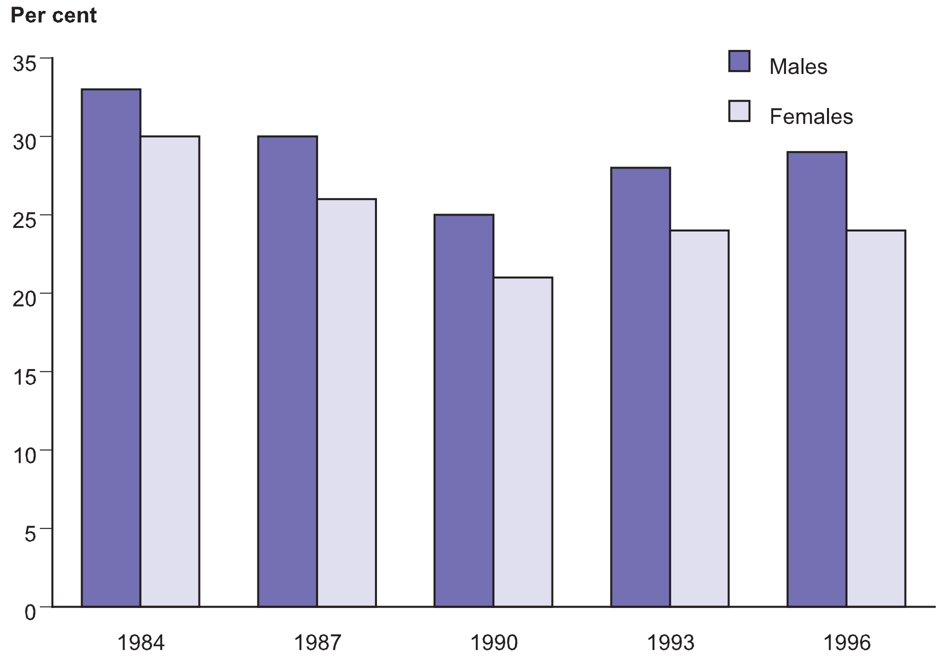
[2] Note the different age grouping from Table 20.11.



Source: Hill et al. 1999 [Table A20.2].

Figure 20.3: Proportion of secondary students aged 12–15 years who smoked tobacco at least once in the previous week, 1984–96

- Between 1984 and 1990, the estimated proportion of students who had smoked in the previous week fell from 20% to 14%. However, the proportion of students increased again after 1990.
- With the exception of 1996, the proportion of female students was consistently higher than that of male students.



Source: White et al. 2000 [Table A20.3].

Figure 20.4: Proportion of secondary students aged 12–15 years who drank alcohol at least once in the previous week, 1984–96

- Between 1984 and 1990, the proportion of students estimated to have drunk alcohol in the previous week fell, from 33% to 25% for male students, and from 30% to 21% for female students. The proportion then increased, to reach 29% and 24% of male and female students, respectively, in 1996.
- The proportion of male students was consistently higher than that of female students.

Other drugs

An additional component of the ASSAD Survey was conducted nationally for the second time in 1999. The expanded survey was aimed at gathering information about the use of illicit drugs, such as marijuana, opiates and amphetamines as well as other substances such as pain-killers and inhalants.

The survey estimated that, in 1999, 29% of males and 23% of females aged 12–15 years had taken an illicit drug at least once in their lifetime. Approximately half that number reported taking any illicit drug in the previous month (15% of males and 11% of females).

The percentage of children aged 12–14 years who had used illicit drugs in the previous 12 months is shown in Table 20.12.

Table 20.12: Illicit drug use among secondary school students aged 12–14 years in the previous 12 months, 1999 (per cent)

	Males			Females		
Substance	**12 years**	**13 years**	**14 years**	**12 years**	**13 years**	**14 years**
Marijuana	9	16	26	6	13	23
Pain-killers/analgesics[(a)]	90	90	92	93	94	96
Tranquillisers[(b)]	9	10	10	6	9	10
Steroids[(b)]	3	3	3	2	1	1
Inhalants	24	23	22	27	26	24
Opiates[(b)]	2	2	3	1	3	3
Amphetamines[(b)]	3	4	6	1	3	6
Cocaine	2	3	3	1	3	3
Hallucinogens	2	2	5	1	3	5
Ecstasy/designer drugs	2	3	3	1	2	3

(a) For medical and non-medical purposes.

(b) For non-medical purposes.

Source: 1999 ASSAD Survey, Centre for Behavioural Research in Cancer, Anti-Cancer Council of Victoria, unpublished data.

- In 1999, apart from pain-killers/analgesics, marijuana, inhalants and tranquillisers were the drugs used by the highest proportion of students aged 12–14 years in the previous 12 months.
- Use of marijuana increased with age, with estimates showing that 9% of boys aged 12 years, 16% aged 13 years, and 26% aged 14 years had used it in the previous 12 months. A similar pattern was seen for girls: 6%, 13% and 23% of girls of corresponding ages.
- Inhalants are substances which vaporise in air and which cause intoxication when inhaled. Many ordinary household products readily available to children are inhalants, such as glue, aerosol sprays, butane gas (from cigarette lighters), some cleaning fluids, felt-tipped pens, liquid paper, chrome-based paints and petrol. Use of inhalants decreased slightly with age: 24% of boys aged 12 years, 23% aged 13 years and 22% aged 14 years. The corresponding proportions of girls were 27%, 26% and 24%. This was one group of drugs which was used by a slightly higher proportion of girls than boys.
- The use of tranquillisers (for non-medical purposes) among boys aged 12–14 years was fairly evenly spread across the age groups (9–10%), but estimated use increased with age for girls (6%, 9% and 10%). Proportions of girls and boys using tranquillisers were similar among those aged 13 and 14 years.

The Australian National Drug Strategy Household Survey found that, of children aged 14 years, 15.5% had used an illicit drug in the last year (AIHW, unpublished data). This proportion mostly comprised marijuana use.

Sun protection

Exposure to sunlight in childhood is the main risk factor for melanoma and other types of skin cancer in adulthood. The rates of melanoma in Australia are among the highest in the world, matched only by New Zealand. The origins of this disease are strongly linked to patterns of sun (UV radiation) exposure (AIHW & AACR 2000). While adult sun exposure (especially sunburn) can increase the risk of melanoma, it is childhood exposure which is the greatest risk factor. The relationship between the risk of melanoma and sun exposure is also affected by a person's sensitivity to sunlight, so that those who tan poorly have a greater risk of melanoma if exposed to an increased level of sunlight than those who tan well.

According to the Cancer Council of Australia (2001), one in two Australians will develop some form of skin cancer during their lifetime. Thousands of people are treated for skin cancer and more than 1,000 die from the disease each year. Every year, doctors remove more than 720,000 lesions from the skins of Australians because they are suspected skin cancers.

There are three main types of skin cancer: basal cell and squamous cell carcinomas (also known as non-melanocytic skin cancers), and melanoma. Non-melanocytic skin cancer is the most frequently occurring cancer in Australia (almost 300,000 new cases each year), but the least life-threatening, although some cases can be fatal. Melanoma is the most dangerous type. Overall, it is the third most prevalent cancer in women, and the fourth most prevalent in men (AIHW 2000a). Among people aged 15–44 years, melanoma is the most frequently occurring cancer. It accounts for 0.8% of the total burden of disease in the Australian population (AIHW: Mathers et al. 1999).

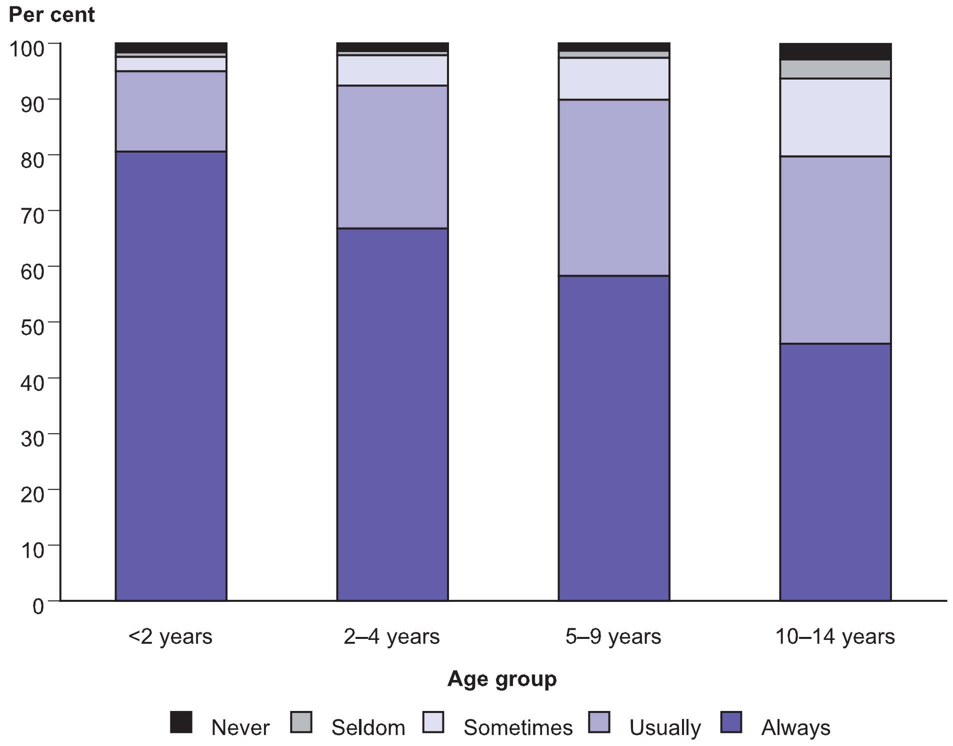
Children and adolescents spend long periods of time in the sun and do not always take precautions to avoid over-exposure. A Queensland study of 133 mothers on the use of appropriate skin protection for themselves and their children found that, even though use of protection was relatively high, by 6 months of age, one-third of toddlers had been sunburnt (Stanton et al. 2000). By 3 years of age, it was shown that 8 out of 10 children had been sunburnt and one-third had suffered painful sunburn. The National Health and Medical Research Council (NHMRC) continues to recommend education programs that target primary prevention behaviours in young people, including staying out of the sun during the hottest part of the day, wearing protective clothing including hats, making use of shade and applying sunscreen correctly.

Skin cancer rates in young Australians have levelled out and decreased recently. This is thought to be the result of public education campaigns about skin cancer and increasing awareness of the damaging effects of UV light (Cancer Council Australia 2001). Recent policy changes are also likely to have affected sun protection, such as 'no hat, no play' policies in schools, and the funding of shade provision for outside play areas (NHMRC 1996b).

However, it may be easier to protect younger children from the sun than older children and adolescents. While the level of knowledge among adolescents about the importance of protection is high, the type of sun protection they actually use depends on their perceptions of acceptability and fashion (NHMRC 1996b).

Children who employ sun-protective behaviours

The indicator for sun protection is the number of children aged 0–14 years usually or always carrying out sun-protective behaviours as a percentage of children aged 0–14 years who are exposed to the sun. Data on children who use sun protection are available from the 1995 ABS National Health Survey (Figure 20.5).

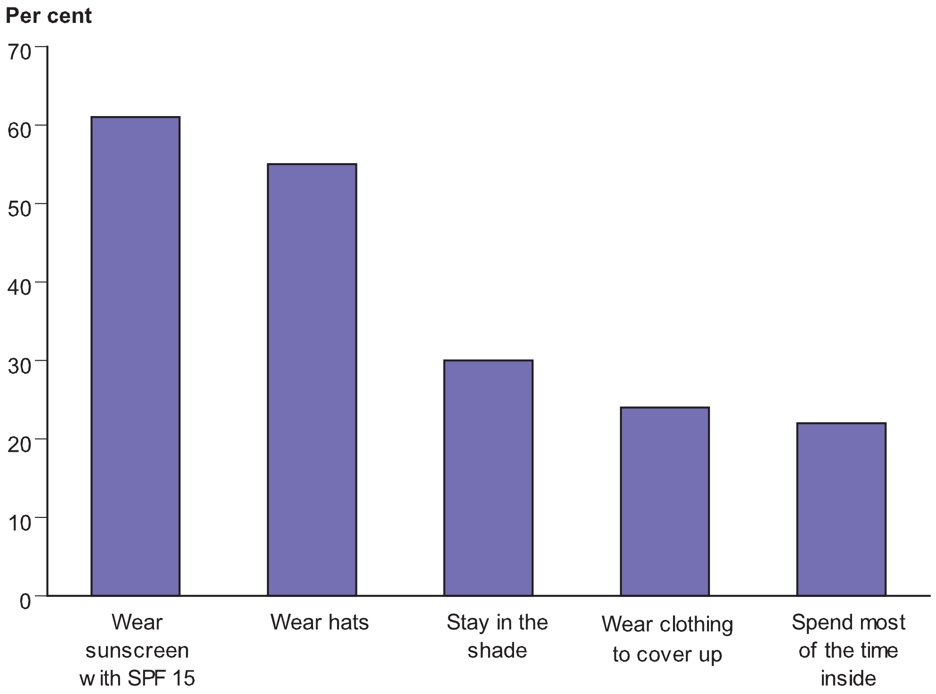


Source: AIHW analysis of ABS NHS data, 1995 [Table A20.4].

Figure 20.5: Proportion of children aged 0–14 years using sun protection, 1995

- In 1995, most children (87%) aged 0–14 years always or usually used sun protection when they were in the sun.
- Of all children exposed to the sun, 58% were estimated to have always used sun protection. The proportion always using protection decreased with age, from 81% of those less than 2 years, to 46% of those aged 10–14 years.

National estimates of the proportion of children aged 12–14 years using different types of sun protection during sunny days in summer were derived from the Australian Secondary Students Alcohol and Drug survey (1999) (Figure 20.6).



Source: 1999 ASSAD Survey, Centre for Behavioural Research in Cancer, Anti-Cancer Council of Victoria, unpublished data [Table A20.5].

Figure 20.6: Proportion of students aged 12–14 years who usually or always engaged in protective behaviours on a sunny day in summer, 1999

- Among students aged 12–14 years in 1999, the most common form of sun protection was sunscreen with SPF 15 (61% of students), followed by wearing hats (55%). Staying in the shade was used by 30% of students as a form of sun protection.
- Wearing clothing to cover up was used by 24% of students, while 22% spent most of the time inside.

The 1995 ABS National Health Survey showed that the majority of children aged 0–14 years (89%) who had been exposed to the sun had used some sun protection in the month prior to the survey. The types of sun protection which were used by the greatest proportion of children were sunscreen and wearing a hat (Table 20.13).

Table 20.13: Type of sun protection used by children aged 0–14 years who had used sun protection in the previous month, 1995 (per cent)

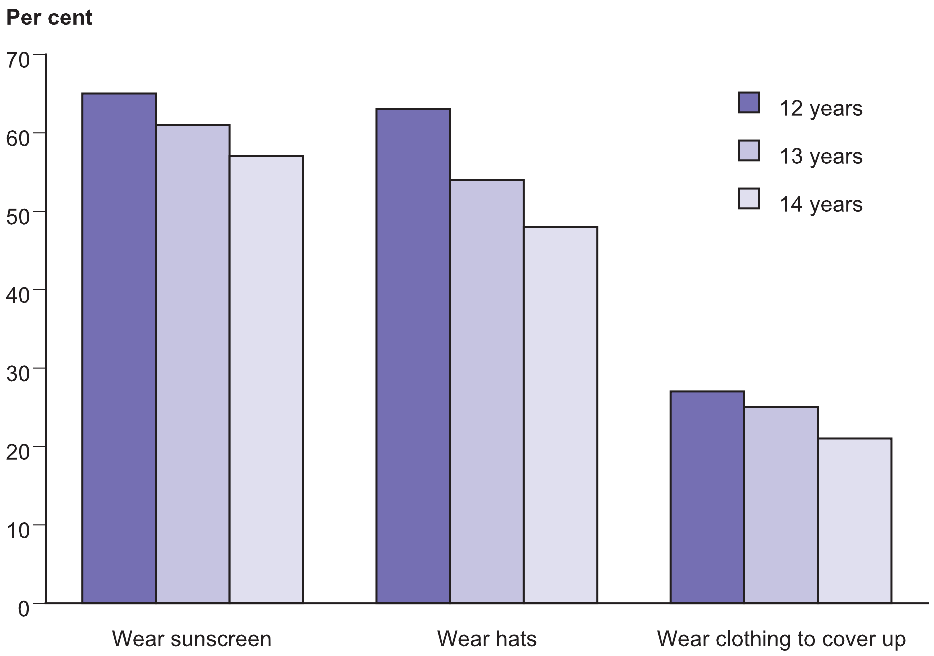
	Age (years)	Hat	Sunscreen	Clothing	Avoided sun	Sunglasses	Umbrella	Other
Males	<2	84.5	64.6	64.4	51.0	10.8	11.3	3.5
	2–4	94.7	75.9	64.9	35.6	25.4	5.9	0.3
	5–9	96.6	71.5	58.4	24.9	20.2	3.4	0.6
	10–14	93.0	63.9	51.2	15.9	21.6	1.9	0.3
	0–14	*93.7*	*69.1*	*58.0*	*27.0*	*20.7*	*4.3*	*0.8*
Females	<2	81.2	62.5	66.4	54.6	13.8	10.6	4.1
	2–4	93.5	78.5	64.0	39.7	29.5	6.6	0.6
	5–9	94.5	76.6	58.6	28.2	26.2	5.3	0.6
	10–14	79.9	80.1	54.3	24.2	32.4	3.6	0.4
	0–14	*87.8*	*76.6*	*59.1*	*32.1*	*27.6*	*5.6*	*0.9*

Source: AIHW analysis of ABS NHS data, 1995.

- For all children in 1995, there was a general trend of higher use of different types of sun protection in the age groups 2–4 and 5–9 years, and lower use among children aged 10–14 years.
- A higher proportion of boys was reported to wear hats in all age groups than girls. More girls than boys used sunscreen, except those less than 2 years. These differences were also noted in the ASSAD Survey, with 68% of girls and 55% of boys aged 12–14 years reporting using sunscreen, and 67% of boys and 42% of girls wearing hats.
- Data from the NHS show that girls were more likely to avoid the sun and to wear sunglasses than boys, while similar proportions of boys and girls used clothes to cover up. These data are slightly different from those of the ASSAD, where 30% of boys and only 19% of girls aged 12–14 reported wearing clothing to cover up.

Some of the sex differences may be explained in terms of current fashions. For example, boys are more likely than girls to wear caps or other types of hats as an accessory, rather than purely for sun protection. Similarly, boys are more likely to wear shirts with a collar, while girls will more often wear clothes which expose their skin, such as singlets, or other tops without sleeves.

Data from the ASSAD Survey show that younger adolescents are more likely to use sun protection, regardless of the type of protection, than older adolescents (Figure 20.7).



Source: 1999 ASSAD Survey, Centre for Behavioural Research in Cancer, Anti-Cancer Council of Victoria, unpublished data (Table A20.6).

Figure 20.7: Type of sun protection used by students aged 12–14 years who usually or always engaged in protective behaviours on a sunny day in summer, 1999

- Of children aged 12 years in 1999, 65% usually or always wore sunscreen with SPF 15, compared with 61% of children aged 13 years and 57% of children aged 14 years.
- Among children aged 12 years, 63% usually or always wore hats. This decreased to 54% of children aged 13 years, and to 48% aged 14 years. This was the greatest difference in all types of sun protection between younger and older children.
- Wearing clothing to cover up also declined with age: 27% of children aged 12 years, 25% aged 13 years and 21% aged 14 years employed this type of sun protection.

Immunisation

Vaccination coverage in Australia has been estimated in a number of ways, including using surveys conducted by the Australian Bureau of Statistics and other organisations (Lister et al. 1999). More recently, the implementation of the Australian Childhood Immunisation Register (ACIR) has provided a means of measuring coverage at a national level for vaccines on the Australian Standard Vaccination Schedule.

The ACIR was set up as part of the National Childhood Immunisation Program to collect information on the vaccination status of children under 7 years of age who live in Australia. The ACIR, which commenced in 1996, was developed in response to a decline in childhood immunisation in Australia and the resulting increase in the incidence of vaccine-preventable childhood diseases. The ACIR enables improved surveillance and reporting of vaccination coverage.

Since 1997, as part of the Immunise Australia Program, a number of incentives have been introduced to improve vaccination coverage. Schemes to encourage parental compliance with the immunisation schedule include linking the vaccination status of a child to the Commonwealth Child Care Benefit payment and to the Maternity Immunisation Allowance. The General Practice Immunisation Incentives scheme provides financial incentives to general practitioners who monitor, promote and provide age-appropriate immunisation services to children under 7 years of age.

This section provides information on the vaccination status of children. Vaccination coverage estimates are reported for birth cohorts at 1 and 2 years of age. The first estimates for coverage at 1 year of age for children born between 1 January and 31 March 1996 were published in 1998 (O'Brien et al. 1998). Subsequent reports have been published on a quarterly basis. Data are available on vaccination coverage of successive cohorts of children both nationally and by State and Territory.

Vaccination coverage estimates

According to the Australian Standard Vaccination Schedule, a child who is fully immunised at 1 year of age has received three doses of diphtheria/tetanus/pertussis (DTP) vaccine, three doses of oral polio vaccine and two or three doses of *Haemophilus influenzae* type b (Hib) vaccine (depending on the particular Hib vaccine used) (NHMRC 1997a, 2000). Full immunisation at 2 years of age requires a booster dose of DTP, a Hib booster and a dose of measles/mumps/rubella (MMR) vaccine.

Vaccination coverage goals for Australia for the year 2000, recommended by the NHMRC, called for greater than 90% coverage of children at 2 years of age and near 100% coverage of children at school entry age against diphtheria, tetanus, pertussis, poliomyelitis, measles, mumps, rubella and Hib. Vaccine coverage needs to exceed 90% in order to achieve and maintain the level of herd (or community) immunity necessary to interrupt the ongoing transmission of vaccine-preventable diseases (Lister et al. 1999).

The indicator for childhood vaccination at 1 year of age is the number of children fully vaccinated at 1 year of age as a percentage of the total number of children aged 1 year on the ACIR. The latest data on vaccination coverage for children fully immunised at 1 and 2 years of age are presented in Tables 20.14 and 20.15.

Table 20.14: Proportion of children immunised at 1 year of age, preliminary results for birth cohort 1/7/00–30/9/00 (per cent)

Vaccine	NSW	VIC	Qld	WA	SA	Tas	ACT	NT	Australia
Diphtheria, tetanus, pertussis	91.8	93.1	92.7	90.6	92.5	92.6	92.4	88.8	92.2
Poliomyelitis	91.7	93.1	92.6	90.6	92.4	92.4	92.2	89.1	92.1
Haemophilus influenzae type b	93.8	94.8	94.6	93.9	94.5	95.5	93.7	93.1	94.3
Fully immunised for age	**89.9**	**91.0**	**91.5**	**89.1**	**90.5**	**91.3**	**90.9**	**87.2**	**90.4**
Total number of children	**21,750**	**15,190**	**12,373**	**6,256**	**4,362**	**1,477**	**1,049**	**792**	**63,249**

Note: Age calculated at 30 September 2001.

Source: Australian Childhood Immunisation Register, Health Insurance Commission.

- Vaccination coverage for all vaccines due by 1 year of age for the cohort of children born between 1 July and 30 September 2000 was just over 90%.
- Coverage was highest for Hib vaccine (94.3%) and lowest for poliomyelitis vaccine (92.1%).

- Vaccination coverage for most States and Territories was around 90%, ranging from 91.5% in the Queensland to 87.2% in the Northern Territory.

The indicator for childhood vaccination at 2 years of age is the number of children fully vaccinated at 2 years of age as a percentage of the total number of children aged 2 years on the ACIR.

Table 20.15: Proportion of children immunised at 2 years of age, preliminary results for birth cohort 1/7/99–30/9/99 (per cent)

Vaccine	NSW	VIC	Qld	WA	SA	Tas	ACT	NT	Australia
Diphtheria, tetanus, pertussis	89.1	91.0	91.8	88.2	91.6	92.4	92.0	85.8	90.3
Poliomyelitis	93.6	95.2	94.4	93.1	95.4	96.0	95.3	93.9	94.3
Haemophilus influenzae type b	95.0	96.2	95.0	94.0	96.2	96.6	96.4	91.9	95.3
Measles, mumps, rubella	92.4	94.0	94.0	91.5	94.4	94.1	94.0	93.1	93.2
Fully immunised	**86.3**	**88.8**	**90.2**	**85.5**	**89.8**	**90.0**	**90.1**	**83.5**	**88.0**
Total number of children	**22,173**	**15,838**	**12,660**	**6,245**	**4,578**	**1,534**	**1,065**	**786**	**64,879**

Note: Age calculated at 30 September 2001.

Source: Australian Childhood Immunisation Register, Health Insurance Commission.

- Vaccination coverage for all vaccines due by 2 years of age for the cohort of children born between 1 July and 30 September 1999 was 88.0%.
- Coverage ranged from 90.2% in Queensland to 83.5% in the Northern Territory.
- As Medicare numbers are used as unique identifiers for matching vaccination records, the limited use of Medicare numbers in the Northern Territory has been suggested to be the most likely reason for the lower rates of vaccination there, due to difficulties in matching data (NHPC 2001).

A comparison of vaccination coverage at 1 and 2 years of age between the first birth cohort and the latest birth cohort for which data are available is shown in Table 20.16.

Table 20.16: Proportion of children fully immunised for all vaccines due by 1 year of age for birth cohorts 1/1/96–31/3/96 and 1/7/00–30/9/00 and by 2 years for the birth cohort 1/1/96–31/3/96 and 1/7/99–30/9/99

	Immunisation by 1 year of age		Immunisation by 2 years of age	
	Birth cohort		Birth cohort	
Vaccine	1/1/96–30/3/96	1/7/00–30/9/00	1/1/96–30/3/96	1/7/99–30/9/99
Diphtheria, tetanus, pertussis	77.4	92.2	76.0	90.3
Poliomyelitis	77.2	92.1	82.7	94.3
Haemophilus influenzae type b	77.2	94.3	76.5	95.3
Measles, mumps, rubella	n.a.	n.a.	82.5	93.2
All vaccines	**74.9**	**90.4**	**63.8**	**88.0**

Source: Australian Childhood Immunisation Register, Health Insurance Commission, unpublished data.

- Overall vaccination coverage at 1 year of age increased from 74.9% in 1996 to 90.4% in 2000.
- The increase in coverage was evident for all vaccines but was highest for the Hib vaccine.
- A similar increase in vaccination coverage over time was also evident at 2 years of age. Overall coverage of fully vaccinated children increased from 63.8% in 1996 to 88.0% in 1999.

- No data are yet available on vaccination coverage for children at school entry age.
- The data presented here indicate that, although the NHMRC target of 90% for coverage at 2 years of age has not been achieved, it is within reach in the near future.

Part IX: Health services

Chapter 21: Health services to individuals

21. Health services to individuals

Australia has a complex health system, with a range of types and providers of services and a number of funding and regulatory mechanisms. Services are provided by medical practitioners, other health professionals, hospitals, and other government and non-government agencies. Funding is provided by the Commonwealth Government, State and Territory Governments, private health insurers, and individual Australians (AIHW 2000a).

Patients admitted to public hospitals are not charged for their treatment, food or accommodation, unless private treatment has been chosen. Emergency department and outpatient services are free. Australians treated as 'private patients' can choose their own doctors, but all hospital services must be paid for by the patient, their private health insurance, or other arrangements such as compensation. Patients who visit dentists and other private sector health professionals must meet the cost of these consultations themselves, or with the support of private health insurance (AIHW 2000a). Some dental hospitals and community health centres offer free treatment, but eligibility is restricted and the waiting times can be lengthy.

There are differences in the provision of health services to particular population groups. There is an uneven distribution of services between metropolitan, rural and remote areas, with a lack in many rural and remote communities. People in rural and remote areas may also have difficulty accessing health services, compared with those living in metropolitan areas, due to problems with distance, time, cost and transport (AIHW: Strong et al. 1998). These barriers to service provision are even greater for people living in poverty. Socioeconomic status can be a factor in whether or not people use health services, even in metropolitan areas where many services are available. Ward & Pratt (1996) found that in Perth, Western Australia, children were more likely to consult a doctor if their parents did not have to pay upfront for the consultation (that is, they were bulk-billed).

In metropolitan areas, there are 306 doctors per 100,000 population; in rural and remote areas, there are 144 doctors per 100,000 population (AIHW 2000a). Similarly, there are many more nurses and dentists per 100,000 population in metropolitan areas than in non-metropolitan areas. The Commonwealth Government has introduced a number of initiatives in an attempt to address this imbalance, such as increasing the number of medical students from rural and remote regions and from Aboriginal and Torres Strait Islander populations. Other strategies being used include telemedicine (telecommunication centres set up specifically for the delivery of health care services), increasing the number of temporary resident overseas-trained doctors, and using incentive schemes to attract doctors to rural and remote areas and to keep them there (AIHW 2000a).

People in rural and remote areas are less likely to use general practitioners, instead using services such as hospital in- or out-patient services, salaried community medical services (such as Aboriginal health services) and substitute primary care providers (such as Aboriginal health workers and registered nurses) (AIHW: Strong et al. 1998). People requiring specialist services must travel to larger towns, or wait for services to come to them on a rotation basis. Models of health care in rural and remote areas are quite different from those in metropolitan areas because of the distances that doctors, community care nurses, and patients have to travel. Rates of hospital admission and length of stay are greatly influenced by travel distances.

Factors such as poverty are compounded by cultural issues which affect Aboriginal and Torres Strait Islander communities (Hupalo & Herden 1999). Communities need to have control over health services, particularly population health interventions, in order for them to be effective. To this end, in 1994 the Commonwealth Government established the Office for Aboriginal and Torres Strait Islander Health (OATSIH), which funds Aboriginal and Torres Strait Islander primary health and substance misuse services, such as those administered by the National Aboriginal Community Controlled Health Organisation (NACCHO). In 1998–99, over 80% of these services diagnosed and treated illness and disease (DHAC 2001b). Other services undertaken in Indigenous primary health care services include immunisation, monitoring of child health, and providing health-related community support services such as transport and school-based activities. In 1999, most health workers, substance misuse workers, dental assistants, and drivers or field officers in Indigenous health services were Indigenous Australians, while most doctors, nurses, specialists and dentists were other Australians.

This chapter provides an overview of health services using currently available national data, including information on specialist services in public hospitals, the labour force providing these services, and private health insurance coverage and health service use.

Provision of services

Specialist services in public hospitals

Information on specialist services for children in public hospitals is available from two national data collections. First, information on the number of certain specialised services is collected as part of the National Public Hospital Establishments Database, collated by the AIHW from data provided by each of the States and Territories. Second, information on the number of beds available in public hospitals for mental health services particularly targeting children and adolescents was included in the National Survey of Mental Health Services, conducted in 1998 for the Mental Health and Special Programs Branch of the then Commonwealth Department of Health and Aged Care.

Table 21.1: Number of public acute[(a)] hospitals with certain specialised services, 1999–00

Specialised services	NSW	Vic	Qld	WA	SA	Tas	ACT	NT	Australia
Obstetric/maternity services	90	67	61	40	32	5	3	5	303
Specialist paediatric service	49	25	29	15	9	3	2	3	134
Neonatal intensive care unit (level III)	13	4	3	2	2	1	1	1	27

(a) Excludes psychiatric and drug and alcohol hospitals.

Note: Data for Victoria and South Australia may be slightly underestimated as some small multi-campus rural services reported at network rather than campus level. Consequently, if two campuses within the group had a specialised type of service, they were counted as one.

Source: AIHW 2001f.

- In 1999–00, there were 303 specialised obstetric/maternity services in public hospitals across Australia.
- Specialised paediatric services were provided in 134 hospitals, with most of these in the largest three States (New South Wales, Victoria and Queensland).
- There were 27 hospitals with neonatal intensive care units nationwide in 1999–00.

Table 21.2: Beds for specialised child and adolescent mental health services for children aged 0–18 years, 1997

Services subprogram	NSW	Vic	Qld	WA	SA	Tas	ACT	NT	Australia
Number									
Acute	54	70	25	36	15	—	—	—	200
Non-acute	31	—	15	—	—	—	—	—	46
Total	*85*	*70*	*40*	*36*	*15*	—	—	—	*246*
Beds per 100,000									
Acute	3.4	6.1	2.8	7.6	4.1	—	—	—	4.2
Non-acute	2.0	—	1.7	—	—	—	—	—	1.0

Source: DHAC 2000b.

- In 1997, there were 246 beds available across Australia for specialised child and adolescent mental health services. Of these, 81% were for acute care. No beds were available for these specialised services in Tasmania, the Australian Capital Territory or the Northern Territory.
- There were 4.2 beds for acute mental health care, and 1 bed for non-acute care, per 100,000 population aged 0–18 years. In Western Australia, there were more beds per 100,000 for acute care (7.6) than in any other State or Territory.
- Nationally, there was a 14% increase in the number of beds available for specialised child and adolescent mental health services between 1994 and 1997. The number increased in Victoria and Queensland, by 67% and 43%, respectively, while the number in New South Wales, Western Australia and South Australia fell by 5%, 3% and 25%, respectively (DHAC 2000b).

Labour force

Information is provided here on both medical practitioners and registered nurses specialising in areas directly relating to child health. Data come from State and Territory surveys and are compiled into a national data collection by the AIHW.

Medical practitioners

Data on medical practitioners come from the national medical labour force survey conducted by the AIHW in conjunction with the annual re-registration of medical practitioners. All medical practitioners registered in each State and Territory were included in the survey.

Table 21.3: Medical practitioners with specialties in child health areas, as a proportion of all medical specialists, 1998

Specialised services	Number	Per cent[(a)]
All medical specialists practising in each specialty		
Paediatric medicine	865	4.6
Paediatric surgery	86	0.5
Obstetrics and gynaecology	1,081	5.7
Specialists for whom the speciality is their main field of practice		
Paediatric medicine	793	4.8
Paediatric surgery	77	0.5
Obstetrics and gynaecology	1,055	6.4
Specialists in training		
Paediatric medicine	397	8.9
Paediatric surgery	10	0.2
Obstetrics and gynaecology	273	6.1

(a) Percentages are determined within each specialised services group.

Note: In 1998, the response rate for the survey was 81.3%.

Source: AIHW 2000b.

- In 1998, 865 (4.6%) specialists worked in the area of paediatric medicine, and 86 (0.5%) in paediatric surgery. Most of these also listed these areas as their main specialty of practice (793 and 77, respectively). The number of doctors specialising in paediatric medicine increased from 790 in 1996, while the number of paediatric surgeons has remained constant.
- There were 397 doctors training in the specialty of paediatric medicine (8.9% of all specialists in training), and 10 in paediatric surgery (0.2%). These numbers are slightly lower than those in 1996.
- Of all specialist doctors, 1,081 (5.7%) were specialists in obstetrics and gynaecology. There were 273 doctors training in the specialty of obstetrics and gynaecology (6.1% of all specialists in training), an increase from 254 in 1996.

General practitioners (GPs) may also obtain further qualifications in particular areas, or have a special interest in these areas. Information is available from the survey on the number of GPs with interests in health services for children (paediatric medicine, obstetrics/gynaecology, adolescent health) and for certain population groups (rural and remote medicine, Aboriginal health).

Table 21.4: Primary care practitioners mainly practising in a special interest area, as a proportion of all primary care practitioners, 1998

	Vocational registered/ RACGP trainee[(a)]		OMPs[(b)]		Total	
Special interest area	**Number**	**Per cent**	**Number**	**Per cent**	**Number**	**Per cent**
Paediatric medicine	23	2.3	25	4.0	48	2.9
Obstetrics and gynaecology	32	3.1	4	0.6	36	2.2
Adolescent health	14	1.4	5	0.8	19	1.2
Rural and remote medicine	11	1.1	8	1.3	19	1.2
Aboriginal health	37	3.6	4	0.6	41	2.5

(a) Royal Australian College of General Practitioners trainee: general practitioner trainee.

(b) OMPs: other medical practitioners not vocationally registered.

Source: AIHW 2000b.

- In 1998, 48 GPs (2.9%) stated they had a special interest in the area of paediatric medicine. A smaller number (19 or 1.2%) were particularly interested in adolescent health.
- Thirty-six GPs (2.2%) had an interest in obstetrics and gynaecology, and 41 (2.5%) in Aboriginal health.
- Fewer GPs were interested in rural and remote medicine (19 or 1.2%).
- For all special interest areas except paediatric medicine and rural and remote medicine, vocationally registered GPs or GP trainees made up the majority of primary care practitioners mainly practising in a special interest area.

Registered nurses

The AIHW compiles the national data on nurses used for this section in a similar manner as for the medical labour force information. The latest published data are for 1997.

Table 21.5: Registered nurses working in child health related areas, as a proportion of all registered nurses, 1997

	Number	Per cent
Area of clinical nursing[(a)]		
Paediatric	3,826	2.5
Midwifery	13,675	8.9
Developmental disability	1,838	1.2
Child and family health	2,620	1.7
School children's health	628	0.4
Work setting of main job		
Developmental disability service	2,511	1.4
School	665	0.4

(a) For registered nurses employed as clinicians.

Note: In 1997, the response rate for the survey was 78.7%.

Source: AIHW 2001g.

- In 1997, there were nearly 4,000 registered nurses working in the clinical area of paediatrics (2.5% of all nurses), and another 2,620 in child and family health (1.7%).

- Of the clinical areas related to child health, midwifery had the highest number of registered nurses (13,675 or 8.9%).
- Over 600 registered nurses (0.4%) across Australia worked in a school.

Table 21.6: Registered nurses with qualifications in child health related areas, 1997

Post-basic qualifications[(a)]	Number
Midwifery	39,186
Child and family health	5,916
Paediatric	2,990
Neonatal intensive care	2,581
Developmental disability	1,257
Paediatric intensive care	576

(a) For NSW, Vic, Tas and the ACT, figures represent all post-basic qualifications held by registered nurses. For Qld, SA and the NT, figures represent post-basic qualifications held by registered nurses, where the skills learned have been used for 12 months or more in the previous 5 years. For WA, they represent post-basic qualifications held by registered nurses where the skills learned have ever been used.

Source: AIHW 1999b.

- In 1997, more nurses had post-basic qualifications in midwifery (39,186) than in any other area.
- Many nurses also had post-basic qualifications in child and family health (5,916).

Private health insurance

This section provides information on the health insurance coverage of Australian children.

In recent years, the Commonwealth Government has introduced a number of incentives in order to encourage Australians to take up private health insurance, with the stated aim of alleviating some of the burden on the public health system.

- In July 1997, the Commonwealth announced that, in families where the combined taxable income was greater than $100,000 a year, a Medicare levy surcharge of 1%, in addition to the normal 1.5% Medicare levy, would be payable for families without private health insurance. This surcharge was introduced to encourage high-income earners to take out or retain private health insurance.
- In January 1999, the Commonwealth introduced the 30% Rebate Initiative, whereby all Australians who qualify for Medicare and who are members of a registered health insurance fund are entitled to receive a 30% rebate on any premiums they pay to the fund.
- The Lifetime Health Cover initiative commenced in July 2000. This initiative rewards people for taking out private hospital cover earlier in life and maintaining it. People who take out, and maintain, private hospital cover before their 31st birthday will always pay the lowest premium, while those who join later will pay a 2% loading on top of their premium for each year they are aged over 30 years at the date of joining.

Table 21.7: Children aged 0–14 years living in families with private health insurance, June 1999 to June 2001

	1999		2000		2001	
Age (years)	Number	Per cent of all children	Number	Per cent of all children	Number	Per cent of all children
0–4	326,095	25.6	482,912	38.2	490,684	39.0
5–9	366,110	27.5	560,146	42.1	585,144	44.1
10–14	404,906	30.8	606,723	45.7	644,944	48.2
0–14	**1,097,111**	**28.0**	**1,649,781**	**42.1**	**1,720,772**	**43.9**

Source: Private Health Insurance Administration Council 2001.

- In June 2001, over 1.7 million Australian children aged 0–14 years were covered by private health insurance. This was 43.9% of the child population.

Table 21.8: Percentage change in insurance status of children aged 0–14 years living in families with private health cover, June 1999 to June 2001

Age (years)	June 1999 to June 2000	June 2000 to June 2001
0–4	48.1	1.6
5–9	53.0	4.5
10–14	49.8	6.3
0–14	**50.4**	**4.3**

Source: Private Health Insurance Administration Council 2001.

- Between June 1999 and June 2000, there was a considerable increase (50.4%) in the number of children covered by private health insurance, most likely due to anticipation of the introduction of the Lifetime Health Cover initiative in July 2000.
- The number of children covered by private health insurance also increased between June 2000 and June 2001, although the percentage change (4.3%) was far smaller than that for the year before.

Use of services

This section provides information on the use of services such as hospitals, sight and hearing tests, and baby health clinics, and on Medicare use.

Hospital admissions

Information on the patient status of hospital admissions to public and private hospitals is available from the AIHW National Hospital Morbidity Database. Of all hospital admissions in 1999–00 of children aged 0–14 years, 82% were to public hospitals, and 18% to private hospitals (Table 21.9).

Table 21.9: Hospitalisations of children aged 0–14 years, 1999–00

	Public hospitals[a]		Private hospitals[b]		All hospitals	
Patient status	**Number**	**Per cent**	**Number**	**Per cent**	**Number**	**Per cent**
Eligible public patient	397,387	89.4	7,541	7.7	404,928	74.7
Eligible private patient	42,237	9.5	89,389	91.2	131,626	24.3
Other eligible patient[c]	2,315	0.5	467	0.5	2,782	0.5
Ineligible patient	2,334	0.5	136	0.1	2,470	0.5
Unknown	20	<.1	446	0.5	466	0.1
Total	**444,293**	**100.0**	**97,979**	**100.0**	**542,272**	**100.0**

(a) Includes public psychiatric hospitals.

(b) Includes private free-standing day hospital facilities.

(c) Includes eligible Department of Veterans' Affairs patients.

Source: AIHW National Hospital Morbidity Database.

- In 1999–00, 89.4% of hospitalisations of children aged 0–14 years in public hospitals were of public patients. Of children in private hospitals, 7.7% were public patients.
- Of hospitalisations of children in private hospitals, 91.2% were of private patients. Hospitalisations of private patients in public hospitals made up 9.5% of public hospital admissions.

Sight and hearing tests

The indicator for sight and hearing tests is the number of children aged 0–14 years who had their sight or hearing tested as a percentage of all children aged 0–14 years.

Data on sight and hearing tests were collected in the 1995 ABS Children's Health Screening survey (ABS 1996c). These data are presented in the following tables.

Table 21.10: Percentage of children aged 0–14 years having sight and/or hearing tests, 1995 (per cent)

	Age group (years)				
	Less than 2	**2–4**	**5–9**	**10–14**	**0–14**
Both sight and hearing tests	28.4	33.7	63.1	63.1	52.6
Sight tests only	4.9	4.7	9.1	16.2	10.0
Hearing tests only	17.3	22.6	12.0	7.5	13.3
Neither sight nor hearing tests	48.7	38.2	14.9	11.8	23.1
Other[a]	0.7	0.9	0.9	1.4	1.0
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**

(a) Includes not known if tested, and type of test not stated.

Source: ABS 1996c.

- Among children aged 0–14 years in 1995, 52.6% had had both sight and hearing tests. This percentage was higher among those aged 5–14 years (63.1%) than among those under 5 years.
- Of all children, 23.1% had had neither sight nor hearing tests.

Table 21.11: Reason for most recent sight or hearing test among children aged 0–14 years, 1995 (per cent)

	Age group (years)			
Reason for last test	**0–4**	**5–9**	**10–14**	**0–14**
Sight tests				
Known/suspected vision problems	11.2	20.0	30.1	22.6
Check-up	86.6	76.9	65.2	73.8
Other/not stated	2.2	3.1	4.7	3.6
Hearing tests				
Known/suspected hearing problems	8.7	14.0	13.0	12.2
Other medical ear problems	4.2	5.7	5.9	5.4
Check-up	85.3	78.2	78.9	80.3
Other/not known	1.8	2.0	2.2	2.0

Source: ABS 1996c.

- In 1995, the majority of children aged 0–14 years having sight tests were having a routine check-up (73.8%).
- Known or suspected vision problems were the reason for a sight test for 22.6% of children.
- A routine check-up was also the most common reason for hearing tests (80.3%).
- Known or suspected hearing problems led to a hearing test for 12.2%, while other medical ear problems were the reasons for hearing tests for 5.4% of children.

Baby health clinic visits

The indicator for baby health clinic visits is the number of children aged 0–3 years who visited a baby health clinic as a percentage of all children aged 0–3 years.

Table 21.12: Proportion of children aged 0–3 years who have visited a baby health clinic, 1995 (per cent)

Whether visited a baby health clinic	NSW	Vic	Qld	WA	SA	Tas	ACT	NT[(a)]	Australia
Yes	89.4	97.4	73.3	94.9	86.5	95.1	86.3	96.5	88.9
No	9.9	2.36	25.8	5.1	13.2	4.5	10.9	3.5	10.6
Not known	0.7	*	0.9	*	0.3	0.3	2.8	*	0.5
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**

* subject to sampling error variability too high for most practical uses.

(a) Estimates relate to predominantly urban areas.

Source: ABS 1996c.

- In 1995, among children aged 0–3 years, 88.9% had visited a baby health clinic.
- The proportions were highest in Victoria (97.4%), the Northern Territory (96.5%) and Tasmania (95.1%).
- It should be noted that baby health screening also occurs at places other than baby health clinics, and so these data may be an underestimation of actual screening levels.

Table 21.13: Frequency of visits to baby health clinics among children aged 0–3 years, 1995 (per cent)

	Age group (months)					
	0–2	**3–5**	**6–11**	**12–18**	**18⁺**	**0–18⁺**
Had regular checks[(a)]	55.9	61.8	59.6	46.9	57.6	56.4
Had irregular checks	*	18.9	28.7	42.3	30.6	29.5
Not checked/not stated	9.0	4.4	1.9	2.7	2.6	3.1
Had visited baby health clinic	64.9	85.1	90.2	91.8	90.8	88.9
Had not visited baby health clinic	35.1	14.8	9.5	8.2	8.5	10.6
Not stated	*	0.1	0.3	*	0.7	0.5
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**

* subject to sampling error variability too high for most practical uses.

(a) Received checks as per NHMRC recommendations.

Source: ABS 1996c.

- In 1995, only 56.4% of children aged 0–3 years had received regular health checks. Children aged 3–5 months were most likely to have had them (61.8%).
- Of all children, 10.6% had not visited a baby health clinic. Among infants aged 0–2 months, the proportion was 35.1%.

Medicare use

Medicare items cover services provided outside hospitals by medical practitioners, either general or specialised, and treatment as a public patient in a public hospital.

Table 21.14: Average number of Medicare items per child aged 0–14 years, 1999–00

Sex	Age group	NSW	Vic	Qld	WA	SA	Tas	ACT	NT	Australia
Males	0–4	10.2	9.7	9.8	8.4	9.3	8.3	8.3	5.3	9.6
	5–9	5.1	5.0	4.7	4.0	4.3	4.1	4.2	2.5	4.8
	10–14	4.5	4.3	4.3	3.9	3.8	3.7	3.8	2.1	4.2
Females	0–4	9.4	8.8	9.0	7.7	8.5	7.7	7.7	4.8	8.8
	5–9	5.1	5.0	4.7	4.2	4.3	4.2	4.3	2.5	4.4
	10–14	4.5	4.4	4.5	4.1	4.1	4.0	4.1	2.3	4.4

Source: HIC 2000.

- In 1999–00, there were nearly 10 Medicare items claimed for every boy under 5, and 9 items claimed for every girl under 5. For boys and girls aged 5–14 years, there were between 4 and 5 items claimed for each child.
- For every age group, the average number of Medicare items claimed for children in the Northern Territory was lower than the national average, and lower than in all other States and the Australian Capital Territory. It is likely that this relates to the shortage of general practitioners in rural and remote areas, and the tendency of people in these areas to seek medical care from other health professionals.

Abbreviations

Glossary

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References

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Abbreviations

AACR	Australasian Association of Cancer Registries
ABS	Australian Bureau of Statistics
ACIR	Australian Childhood Immunisation Register
ADHD	Attention-deficit hyperactivity disorder
AIHW	Australian Institute of Health and Welfare
AHMAC	Australian Health Ministers’ Advisory Council
APSU	Australian Paediatric Surveillance Unit
ASSAD	Australian Secondary Students Alcohol and Drug (Survey)
BEACH	Bettering the Evaluation and Care of Health
BMI	Body mass index
CVS	Congenital varicella syndrome
DALY	Disability-adjusted life year
DHA	Commonwealth Department of Health and Ageing
DHAC	Commonwealth Department of Health and Aged Care
DHFS	Commonwealth Department of Health and Family Services
DHS	Victoria Department of Human Services
DHSH	Commonwealth Department of Human Services and Health
dmft	Number of decayed, missing and filled deciduous teeth
DMFT	Number of decayed, missing and filled permanent teeth
DPIE	Commonwealth Department of Primary Industries and Energy
DSM-IV	Diagnostic and Statistical Manual of Mental Disorders, 4th edition
DSRU	Dental Statistics and Research Unit
DTP	Diphtheria/tetanus/pertussis (vaccine)
HAV	Hepatitis A viral infection
Hib	*Haemophilus influenzae* type b
HIC	Health Insurance Commission
HREOC	Human Rights and Equal Opportunity Commission
ICD-9	International Classification of Diseases, 9th Revision
ICD-9-CM	International Classification of Diseases, 9th Revision, clinical modification
ICD-10	International Classification of Diseases, 10th Revision
ICD-10-AM	International Classification of Diseases, 10th Revision, Australian modification
IPD	Invasive pneumococcal disease
LBW	Low birthweight
MMR	Measles/mumps/rubella (vaccine)
NACCHO	National Aboriginal Community Controlled Health Organisation
NATSIS	National Aboriginal and Torres Strait Islander Survey
NCSCH	National Cancer Statistics Clearing House
NDSHS	National Drug Strategy Household Survey
NHMRC	National Health and Medical Research Council
NHS	National Health Survey
NISU	National Injury Surveillance Unit

NNDSS	National Notifiable Diseases Surveillance System
NNS	National Nutrition Survey
NPSU	National Perinatal Statistics Unit
OATSIH	Office for Aboriginal and Torres Strait Islander Health
OECD	Organisation for Economic Cooperation and Development
OMP	Other medical practitioners
RACGP	Royal Australian College of General Practitioners
RRMA	Rural, remote and metropolitan areas
SIDS	Sudden infant death syndrome
SSPE	Subacute sclerosing panencephalitis
TFR	Total fertility rate
UNICEF	United Nations Children's Fund
USDHSS	United States Department of Health and Human Services
WHO	World Health Organization
YLD	Years of healthy life lost to disability
YLL	Years of life lost to premature mortality

States/Territories

NSW	New South Wales
Vic	Victoria
Qld	Queensland
WA	Western Australia
SA	South Australia
Tas	Tasmania
ACT	Australian Capital Territory
NT	Northern Territory

Glossary

Aboriginal: A person of Aboriginal descent who identifies as an Aboriginal and is accepted as such by the community in which he or she lives.

Acute: Coming on sharply to a crisis and often brief, intense and severe.

Age-specific rate: A rate for a specific age group. The numerator and denominator relate to the same age group.

Age standardisation: A method of removing the influence of age when comparing populations with different age structures.

Bed days: The number of full or partial days of stay for patients who were admitted for an episode of care and who underwent separation during the reported period. A patient who is admitted and separated on the same day is allocated 1 bed day.

Birth cohort: People who are born in the same year.

Birthweight: The first weight of the baby (stillborn or liveborn) obtained after birth (usually measured to the nearest 5 grams and obtained within 1 hour of birth).

Cause of death: From information reported on the medical certificate of cause of death, each death assigned an underlying cause of death according to rules and conventions of the 9th or 10th revision of the International Classification of Diseases. The underlying cause is defined as the disease which initiated the train of events leading directly to death. Deaths from injury or poisoning are classified according to the circumstances of the violence which produced the fatal injury, rather than to the nature of the injury.

Confinement: Pregnancy resulting in at least one birth.

Congenital: A condition that is recognised at birth, or that is believed to have been present since birth, including conditions which are inherited or caused by environmental factors.

Core activity restrictions: The extent of a person's disability; 'core activities' are defined as self-care (bathing, dressing, eating, using toilet), mobility (moving around at home and away from home, getting into or out of bed or chair, using public transport), and communication (understanding and being understood by others). A person with a *profound* restriction is unable to perform a core activity, or always needs assistance with that activity, while a person with a *severe* restriction sometimes needs assistance to perform the activity.

Diagnosis: A decision based on the recognition of clinically relevant symptomatology, the consideration of causes that may exclude a diagnosis of another condition, and the application of clinical judgment.

Disability: The presence of one or more of 17 restrictions, limitations or impairments.

Disordered eating: Problematic eating behaviour like skipping meals for the purpose of weight loss.

Eating disorder: Clinically severe disturbances in eating behaviour, such as anorexia or bulimia nervosa.

External cause: Environmental event, circumstance and/or condition as the cause of injury, poisoning and/or other adverse effect.

Gestation: The carrying of young in the uterus from conception to delivery.

Hospitalisation: The term used to refer to the episode of care, which can be a total hospital stay (from admission to discharge, transfer or death), or a portion of a hospital stay beginning and ending in a change of type of care (for example, from acute to rehabilitation).

Immunisation: Inducing immunity against infection by the use of antigen to stimulate the body to produce its own antibodies. See also *Vaccination.*

Incidence: The number of *new* cases (of an illness or event, etc.) occurring during a given period. Compare with *Prevalence.*

Indicator: A key statistic that indicates an aspect of population health status, health determinants, interventions, services or outcomes. Indicators are designed to help assess progress and performance, as a guide to decision making. They may have an indirect meaning as well as a direct one; for example, Australia's overall death rate is a direct measure of mortality but is often used as a major indicator of population health.

Indigenous: A person of Aboriginal and/or Torres Strait Islander descent who identifies as an Aboriginal and/or Torres Strait Islander and is accepted as such by the community with which he or she is associated.

*Infants: C*hildren aged less than 1 year.

International Classification of Diseases: The World Health Organization's internationally accepted classification of causes of death and diseases. The 10th Revision (ICD-10) is currently in use.

Intervention (for health): Any action taken by society or an individual which 'steps in' (intervenes) to improve health, such as medical treatment and preventive campaigns.

Length of stay: Duration of hospital stay, calculated by subtracting the date the patient is admitted from the day of separation. All leave days, including the day the patient went on leave, are excluded. A same-day patient is allocated a length of stay of 1 day.

Live birth: Live birth is the complete expulsion or extraction from its mother of a product of conception, irrespective of the duration of pregnancy, which after such separation, breathes or shows any other evidence of life, such as beating of the heart, pulsation of the umbilical cord, or definite movement of voluntary muscles, whether or not the umbilical cord has been cut or the placenta is attached; each product of such a birth is considered live born (WHO definition).

Medicare: A national, government-funded scheme that subsidises the cost of personal medical services, and that covers all Australians to help them afford medical care.

Medications: Pharmaceutical drugs available only on the prescription of a registered medical practitioner and available only from pharmacies.

Morbidity: Refers to ill-health in an individual and to levels of ill-health in a population or group.

National Health Priority Areas (NHPA): The NHPA initiative is a collaborative effort involving the Commonwealth Government and State and Territory Governments that seeks to focus public attention and health policy on those areas that are considered to contribute significantly to the burden of illness in the community, and for which there is potential for health gain.

Neural tube defects: Defects such as spina bifida and anencephalus that have arisen in the neural tube, the part of the embryo that develops into the brain and spinal chord.

Organisation for Economic Cooperation and Development (OECD): An organisation of 24 developed countries, including Australia.

Prescription drugs: Pharmaceutical drugs available only on the prescription of a registered medical practitioner and available only from pharmacies.

Prevalence: The number or proportion (of cases, instances, etc.) present in a population at a given time. Compare with *Incidence*.

Principal diagnosis: The diagnosis established to be the problem that was chiefly responsible for the patient's episode of care in hospital.

Private health insurance: Health insurance funds offer benefits to members for approved services provided in both public and private hospitals. They also operate ancillary tables which provide benefits for a wide range of non-hospital health and health-related services. There are a number of categories of health insurance membership which provide a wide range of benefits cover. These include 'exclusionary tables' under which funds are able to tailor the range of benefits provided to meet particular needs of different groups of contributors.

Private patients: Persons admitted to a private hospital; or persons admitted to a public hospital who decided to choose the doctor(s) who will treat them and to have private ward accommodation. This means they will be charged for medical services, food and accommodation.

Psychiatric hospitals: Establishments devoted primarily to the treatment and care of admitted patients with psychiatric disorders.

Public health: Health activities which aim to benefit a population. Prevention, protection and promotion of health are emphasised, as distinct from treatment tailored to individuals with symptoms. Examples include provision of a clean water supply and good sewerage, conduct of anti-smoking campaigns, and screening for diseases such as cancer of the breast and cervix.

Public hospital: A hospital controlled by a State or Territory health authority. In Australia, public hospitals offer free diagnostic services, treatment, care and accommodation to all who need it.

Public patient: A patient admitted to a public hospital who has agreed to be treated by doctors of the hospital's choice and to accept shared ward accommodation. This means the patient is not charged.

Quintile: A group derived by ranking the population according to specified criteria and dividing it into five equal parts.

Socioeconomic status: A relative position in the community as determined by occupation, income and level of education.

Torres Strait Islander: A person of Torres Strait Islander descent who identifies as a Torres Strait Islander and is accepted as such by the community in which he or she lives.

Vaccination: The process of administering a vaccine to a person to produce immunity against infection. See also *Immunisation.*

Data sources and methods

A number of data sources have been used to compile this report, including population-based data sources and sample surveys. The two main data sources used throughout are the AIHW Mortality Database and the AIHW National Hospital Morbidity Database. The section below explores these data sources.

AIHW Mortality Database

The AIHW is supplied with annual death data from the State and Territory Registrars of Births Deaths & Marriages. The data, which constitute the AIHW Mortality Database, include all deaths registered in Australia from 1964 to the present. Data are added annually towards the end of each year. For some attributes, data are inconsistent because particular States or Territories do not collect the same information on death certificates, or data codes have changed over time. It is also important to note that deaths are recorded by the date of death and the year in which they were registered, which may differ from the year the death actually occurred. Approximately 6% of deaths in a particular calendar year are registered in subsequent years, most being deaths that occurred in December of the preceding year. Since 1997, the causes of death in the Mortality Database have been coded using the International Classification of Diseases, 10th Revision (ICD-10). Variables contained in the AIHW Mortality Database which were used in this report include underlying cause of death, age, sex, area of residence and Indigenous status.

AIHW National Hospital Morbidity Database

The National Hospital Morbidity Database is compiled by the AIHW from data supplied by the State and Territory health authorities. It is a collection of electronic summary records of hospitalisations for patients admitted to public and private hospitals in Australia. Data are compiled when patients leave the hospital or 'are separated', because only when a patient leaves the hospital is a final diagnosis and length of stay in hospital available. Data are held for hospital separations ending the period 1 July to 30 June, 1993–94 to 1999–00. Almost all hospitals in Australia are included. The total number of records for 1999–00 was 5.9 million. The National Health Data Dictionary definitions form the basis of the database, ensuring a high standard of data comparability. From 1993–94 to 1997–98, all principal diagnoses leading to the hospitalisation have been coded using the International Classification of Diseases, 9th Revision, Clinical Modification (ICD-9-CM) while since 1998–99 the International Classification of Diseases, 10th Revision, Australian Modification (ICD-10-AM) has been used. In 1998–99, the year when the change-over from ICD-9-CM to ICD-10-AM took place, some States and Territories supplied their hospital data to AIHW already coded in ICD-10-AM (NSW, Vic, ACT and NT), while others supplied their data coded in ICD-9-CM (Qld, SA, Tas and WA). Data supplied from these States had to be mapped to ICD-10-AM by the AIHW. Variables contained in the AIHW National Hospital Morbidity Database which were used in this report include the principal diagnosis, age, sex, area of residence and Indigenous status.

National Health Survey (NHS)

The Australian Bureau of Statistics (ABS) conducted the 1995 National Health Survey from January 1995 to January 1996. Trained interviewers conducted personal interviews with residents of approximately 24,000 private and non-private dwellings. The first of the NHS series was conducted in 1989–90. However, similar national surveys covering health status and the use of health services were conducted by the ABS in 1977–78 and 1983.

This survey provides information on the health status of the Australian population. Topics covered include use of health services and facilities, smoking, alcohol consumption and exercise. The 1995 NHS was also designed to provide information on the health of Aboriginal and Torres Strait Islander Australians. The sample includes private dwellings and a small selection of non-private dwellings (such as hotels, motels and boarding houses). The survey was conducted in both urban and rural areas in all States and Territories.

Bettering the Evaluation and Care of Health (BEACH) Program

The BEACH Program is aiming to establish an ongoing database of GP–patient encounter information. The program continuously collects information about the patients seen, the reasons for seeking medical care, problems managed and treatments provided in general practice in Australia. This information can then be used to assess patient-based risk factors and the relationship these factors have with health service activity. The survey uses a cross-sectional, paper-based data collection system developed over the past 20 years in the Department of General Practice, University of Sydney. Data collection is ongoing, with 20 general practitioners (GPs) recording their consultations for the program per week. An Australia-wide random sample of 1,000 GPs is taken annually from HIC Medicare records. A sample of 100 consecutive consultations is collected from each GP.

Disability, Ageing and Carers Survey

The Disability, Ageing and Carers Survey is conducted by the Australian Bureau of Statistics (ABS). It provides information on people with disabilities, older people and people who provide assistance to others because of their disabilities. The most recent survey was conducted in 1998. Previous surveys were conducted in 1981, 1988 and 1993.

Households with a member (such as parent or child) with a disability were identified, together with families in which a member is a primary carer. The survey sample includes private dwellings and selected non-private dwellings (such as hotels, motels, hospitals, nursing homes and other establishments providing care accommodation, but excluding corrective institutions). The survey was conducted in both urban and rural areas in all States and Territories, but since 1997 excludes persons living in some remote and sparsely settled parts of Australia.

National Notifiable Diseases Surveillance System (NNDSS)

The National Notifiable Diseases Surveillance System (NNDSS) was established in 1990 by the Communicable Diseases Network of Australia and New Zealand (CDNANZ). The NNDSS coordinates the national surveillance of more than 40 communicable diseases. Notifications are made to State or Territory health authorities under the provisions of the public health legislation in their jurisdiction. Computerised, de-identified unit records of notifications are supplied to the NNDSS secretariat at the Department of Health and Ageing for collation, analysis and publication in the *Communicable Diseases Intelligence* journal.

Data provided for each notification include a unique record reference number, State or Territory code, disease code, date of onset, date of notification to the relevant health authority, sex, age, Aboriginality, postcode of residence, and the confirmation.

The quality and completeness of data compiled in the NNDSS are influenced by various factors. Surveillance of communicable diseases varies between jurisdictions, as each State and Territory has specific requirements under its public health legislation for notification by medical practitioners, laboratories and hospitals. The notifiable diseases and the case definition may also vary between jurisdictions. Further, the way in which notifications are made differs between States and Territories. In some jurisdictions, different diseases are required to be notified by different health care providers. Therefore, the proportion of diagnosed cases of a particular disease which are subsequently notified to health authorities is not known with confidence and may vary between diseases, between jurisdictions and over time.

National Cancer Statistics Clearing House (NCSCH)

The AIHW maintains the National Cancer Statistics Clearing House (NCSCH). Information on the incidence of cancer in the Australian population is provided to the NCSCH by the State and Territory cancer registries. The NCSCH is the only national database of cancer incidence in Australia. The earliest cases recorded in the database are those diagnosed in 1982.

The Child and Adolescent Component of the National Survey of Mental Health and Well-being (The Mental Health of Young People in Australia)

The Child and Adolescent Component of the National Survey of Mental Health and Wellbeing (also known as the Mental Health of Young People in Australia) was commissioned by the Mental Health Branch of the then Commonwealth Department of Health and Aged Care and undertaken by the University of Adelaide. The data were collected between February and April 1998. Households were randomly selected in proportion to the population of each State or Territory, and spread proportionally across metropolitan and non-metropolitan areas (except in the Northern Territory, where only children in metropolitan areas were included). A representative sample of 4,500 children was recruited, and the response rate for the survey was 70%. Information was gathered from parents of children and from adolescents aged 13–17 years. Parents were interviewed, and both parents and adolescents completed a self-report questionnaire (Sawyer et al. 2000).

National Dental Telephone Interview Survey

The AIHW Dental Statistics Research Unit at Flinders University conducted the National Dental Telephone Interview Survey (NDTIS) in mid-1999. The survey comprised a stratified random sample of persons aged 5 years or more. Proxy interviews were conducted for children, usually with a parent. The NDTIS collected a wide range of information, including data on oral health status, dental treatment (such as time and place of, and reason for, last dental visit; services received in the previous year; and waiting time), perceived needs, social impact of dental health, hardship and affordability, difficulties associated with dental care, and socio-demographic and economic details. There were 7,824 participants across Australia in the 1999 survey. The sample included responses for 446 and 462 children in the age groups 5–9 years and 10–14 years, respectively.

National Nutrition Survey (NNS)

This survey provided information on food and nutritional intake, eating patterns and selected physical measures of the Australian population. The NNS was conducted in association with the 1995 National Health Survey as a joint project between the ABS and the then Commonwealth Department of Health and Family Services.

Because common variables were collected in both the NHS and the NNS, nutrition data can be linked to the family and demographic information collected in the NHS, together with data on health status, health-related actions, health risk factors and women's health supplementary items.

Australian Secondary Students Alcohol and Drug Survey (ASSAD)

The Centre for Behavioural Research in Cancer in Victoria conducts sample surveys on the use of alcohol and drugs by secondary school children in Australia. The sample is designed to represent students from all types of schools and provides statistically significant national and state-specific estimates for each age and sex group (Letcher & White 1999).

Members of the research team administer a written questionnaire to students at school. Students answer the questionnaire anonymously. The presence of teachers during the survey is discouraged.

The core questionnaire covers the use of tobacco, alcohol, over-the-counter medicines (used for non-medical purposes) and illicit substances. Questions relating to tobacco and alcohol cover the lifetime experience of smoking or drinking. The substances included in the questionnaire represent a wide range of licit and illicit substances, including analgesics, tranquillisers, cannabis, amphetamines, inhalants and steroids.

Australian Childhood Immunisation Register (ACIR)

Data on vaccination rates for Australian children are taken from the Australian Childhood Immunisation Register (ACIR) of the Health Insurance Commission (HIC). Recent data are available from the HIC web site. The ACIR commenced on 1 January 1996. All children from birth to 6 years registered with Medicare are enrolled on the ACIR. Financial incentives to doctors and parents exist to encourage both vaccination of children and their inclusion on the ACIR.

Methodology

Methods of standardisation used in this report

Death rates and hospitalisation rates throughout this report have been standardised to control for any effects of differing age structure in the Australian child population.

Direct age standardisation was the method of standardisation used in all cases except for death rates of Aboriginal and Torres Strait Islander children. For these particular rates, indirect age standardisation was more appropriate given the small numbers involved.

For the direct standardisation, the estimated resident child population of Australia at 1991 was used as the standard. The following formula illustrates the steps undertaken to standardise the data:

$SR = \sum (Ri \times Pi) / \sum Pi$

Where SR = the age-standardised rate

Ri = the age-specific rate for age group i, and

Pi = the standard population in age group i.

Indirect standardisation was used to estimate Aboriginal and Torres Strait Islander death rates. Average death rates in the non-Indigenous Australian child population in the period 1998–00 for Queensland, Western Australia, South Australia and Northern Territory were applied to the number of child deaths in the Aboriginal and Torres Strait Islander populations in these jurisdictions, to obtain the number of expected deaths of Indigenous children in those populations. The standardised mortality ratio was then calculated by dividing the total number of observed deaths in the Aboriginal and Torres Strait Islander populations by the total number of expected deaths. This ratio was then applied to the crude death rates in the standard population to obtain the standardised rate.

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