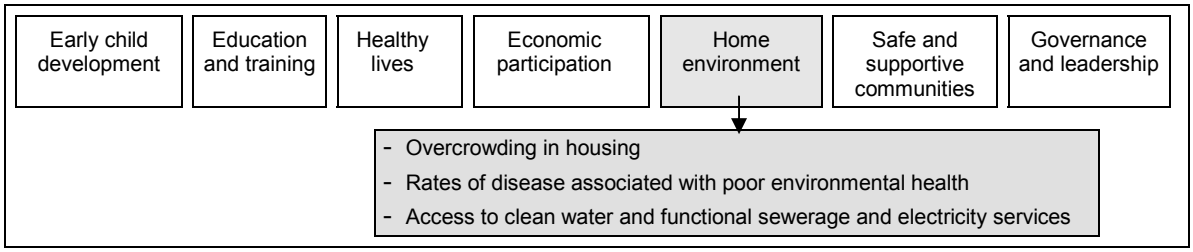
9 Home environment

Strategic areas for action



A wide range of factors influence people's health and wellbeing. This chapter covers some of the key environmental influences on health, such as appropriate housing conditions and access to clean water and functional sewerage and electricity services. Many other environmental factors also influence health; for example, air quality, noise pollution, occupational health, food quality and pest control.

Many COAG targets and headline indicators reflect the importance of the home environment:

- life expectancy (section 4.1)
- young child mortality (section 4.2)
- disability and chronic disease (section 4.8)
- family and community violence (section 4.11).

Other COAG targets and headline indicators can directly influence home environment outcomes:

- employment (section 4.6)
- post secondary education (section 4.7)
- household and individual income (section 4.9).

Outcomes in the home environment strategic area can be affected by outcomes in several other strategic areas for action, or can influence outcomes in other areas:

- early child development (birth weight, early childhood hospitalisations, injury and preventable disease, hearing impediments) (chapter 5)

- healthy lives (access to primary health, potentially preventable hospitalisations, avoidable mortality, mental health) (chapter 7)
- economic participation (labour market participation, home ownership, income support) (chapter 8)
- governance and leadership (engagement with service delivery) (chapter 11).

The indicators in this strategic area focus on some key outcomes of healthy environments, as well as some factors that contribute to a healthy home environment:

- overcrowding in housing — overcrowding can have negative effects on health, family relationships and even children's education. If a house is not appropriately designed for the number of residents, the bathroom, kitchen and laundry facilities may be inadequate, making it more difficult to prevent the spread of infectious diseases. Cramped living conditions can increase domestic tensions and contribute to domestic violence. Overcrowding also affects the ability of children to do homework or study, or even to gain sufficient sleep and relaxation. This section reports Census data on overcrowding (section 9.1)
- rates of disease associated with poor environmental health — many rural and remote Indigenous communities still struggle to achieve the basic level of environmental health that has been achieved for the rest of the population. Poor environmental health can contribute to the spread of diseases that tend to have environmental causes, including tuberculosis, rheumatic heart disease, respiratory diseases, urinary tract infections, kidney stones, intestinal worms, trachoma and intestinal infectious diseases. This section reports on hospitalisations for environment related diseases. Hospitalisations data reflect more serious cases of diseases, but do not necessarily show overall incidence of disease (section 9.2)
- access to clean water and functional sewerage and electricity services — many rural and remote Indigenous communities rely on localised water, sewerage and electricity systems. Each community needs a clean, adequate and reliable supply of water for drinking, cooking and washing; a functional sewerage system to prevent sewage from contaminating drinking water and food; and functional electricity services for refrigeration of foods and power for hot water, cooking and lighting. Access to these basic services requires a combination of both functioning community infrastructure and functioning household hardware. This section reports available data on community and household infrastructure for discrete Indigenous communities (section 9.3).

Attachment tables

Attachment tables for this chapter are identified in references throughout this chapter by an 'A' suffix (for example, table 9A.1.1). These tables can be found on the Review web page (www.pc.gov.au/gsp), or users can contact the Secretariat directly.

9.1 Overcrowding in housing

Box 9.1.1 **Key messages**

- Indigenous people were 4.8 times as likely as non-Indigenous people to live in overcrowded housing in 2006 (figure 9.1.1). Overcrowding was highest in very remote areas (65.1 per cent) (figure 9.1.2).
- The proportion of Indigenous people living in overcrowded housing decreased from 30.7 per cent in 2001 to 27.2 per cent in 2006 (figure 9.1.1).

A much higher proportion of Indigenous people live in overcrowded conditions than other Australians. Overcrowding places pressure on the household infrastructure that supports health (for example, septic tanks, sewerage pipes and washing machines), sometimes referred to in the literature as health hardware (Torzillo et al. 2008), and can be a contributor to poor health. Overcrowding can also contribute to poor educational outcomes (Biddle 2007) and family violence.

Reasons for overcrowding

Cultural and social factors influence the way housing is used in Indigenous communities. Households with many members, often of multiple generations and including extended family, are not unusual. Living in large family groupings is not a problem; it can be the cultural norm (Keys Young 1998). Large households need not be overcrowded provided sufficient bedrooms, bathrooms and kitchen spaces are available. Indigenous household and community populations may fluctuate quite dramatically for social, cultural or seasonal reasons. Indigenous people are often mobile, and sharing homes with visiting relations and kin is common (ABS 2004). A 1993 study in the north-west of South Australia found that some houses had relatively stable numbers of residents, while others had wide variations in numbers. The numbers in one house varied from zero to 32 at various times of the year (Pholeros, Rainow and Torzillo 1993). While such fluctuations may result in periodic overcrowding in some households, it can be the cultural norm (Keys Young 1998).

Taylor (2004), in a study of Wadeye and the Thamarrurr Regional Council area in the NT, reported both short-term and long-term variations in the numbers of people living in each house as people moved between houses, to and from outstations, and in and out of the region. The average number of people per house was 16, with one residence having an average occupancy of 22 people. Houses in the Thamarrurr region averaged three bedrooms each, giving an average occupancy rate of approximately five people per bedroom.

Overcrowding can also be due to inadequate, inappropriate or poorly maintained housing stock (DHAC 1999). In remote and very remote areas in particular, it is more expensive and logistically more difficult to construct and maintain infrastructure.

The Western Australian Aboriginal Child Health Survey (Silburn et al. 2006) identified factors associated with Aboriginal children living in overcrowded housing. Overcrowded housing was associated with:

- housing quality — there was a significantly greater likelihood of high household occupancy in houses with one or more indicators of poor housing quality relative to those with none
- higher levels of life stress events — those households that had experienced seven or more life stress events in the 12 months prior to the survey were almost twice as likely to have high household occupancy than households reporting 0–2 life stress events
- overuse of alcohol — when overuse of alcohol was causing problems in the household, there was an increased likelihood of overcrowded conditions relative to other households.

Associations between labour force status and education, and housing overcrowding for Indigenous and non-Indigenous people are discussed in chapter 13 of this report.

Income and housing affordability also play a role in overcrowding. Indigenous people have substantially lower incomes than non-Indigenous people, which is discussed in section 4.9 of this report.

Although Indigenous people have access to a range of housing assistance programs, housing costs are high relative to incomes (ABS and AIHW 2008). The ABS found that in 2006, the median weekly mortgage payment for Indigenous home owners with a mortgage was $264. The median weekly rent for Indigenous private/other renters was $190, for Indigenous renters of public housing, $100, and for Indigenous renters of Indigenous or mainstream community housing, $60.

Racial discrimination in obtaining rental housing may also lead to overcrowding for Indigenous people (EOC 2004).

Housing overcrowding is associated with homelessness for both Indigenous and non-Indigenous people. The Supported Accommodation Assistance Program (SAAP) is the major response by the Australian Government and State and Territory governments to address homelessness. Indigenous people are overrepresented among SAAP clients. Of the 109 900 SAAP clients, in Australia, in 2006-07, 20 100 (18.3 per cent) were Indigenous (AIHW 2009).

Data issues

Overcrowding data in this report were derived using the Canadian National Occupancy Standard for housing appropriateness (box 9.1.2), which is the preferred standard used by the ABS to measure overcrowding, especially for Indigenous people. This occupancy standard will reflect the culture and preferences of some but not all Indigenous people. For example, it does not account for the influence of climate and culture on living arrangements. In warmer rural areas people may live outside their houses rather than inside them at certain times of the year, and the standard does not take into account how verandas or larger living spaces might be used (Pholeros, Rainow and Torzillo 1993). Indigenous cultures and lifestyles vary widely across Australia, as do climates.

The occupancy standard determines overcrowding by comparing the number of bedrooms with the number and characteristics of people in a dwelling (other measures of overcrowding include the proportion of people living in dwellings with less than one bedroom per person (Biddle 2008)). In addition, the number of bathrooms and toilets, and the size of kitchens, bedrooms and other living spaces may be as important as, or more important than, the number of bedrooms, particularly in larger households. If a house has sufficient working taps, tubs, showers, toilets, insect screens and protection from the weather it will be better equipped to prevent the disease transmission that is often more prevalent in overcrowded households. These issues are further discussed in section 9.3.

Box 9.1.2 **Housing occupancy standard used by ABS**[a]

There is no single standard measure for housing overcrowding. The ABS uses a standard which is sensitive to both household size and composition. Based on the following criteria used to assess bedroom requirements, households requiring at least one additional bedroom are considered to be overcrowded:

- there should be no more than two persons per bedroom
- a household of one unattached individual may reasonably occupy a bed-sit (that is, have no bedroom)
- couples and parents should have a separate bedroom
- children less than five years of age of different sexes may reasonably share a bedroom
- children five years of age or over of different sexes should not share a bedroom
- children less than 18 years of age and of the same sex may reasonably share a bedroom
- single household members aged 18 years or over should have a separate bedroom.

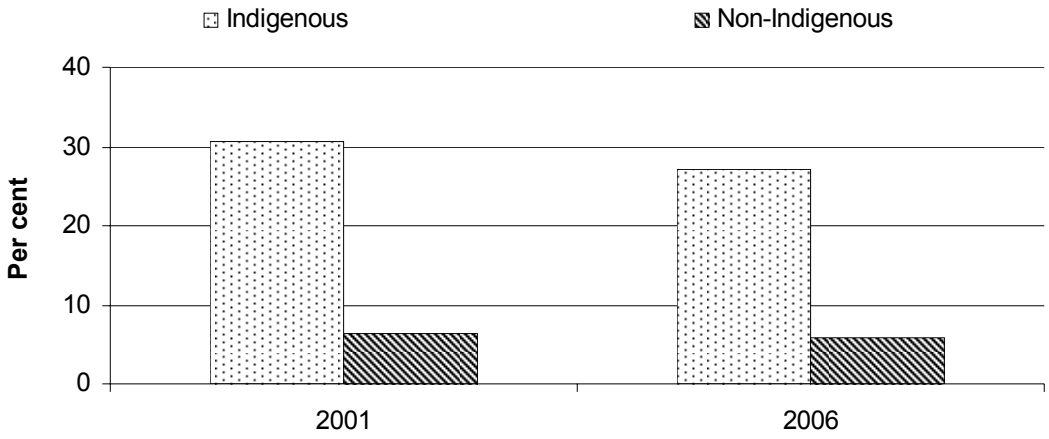
a Based on the Canadian National Occupancy Standard for housing appropriateness.

Source: ABS (2004).

Overcrowding in housing for both Indigenous and non-Indigenous people is reported here using data from the ABS 2001 Census and the ABS 2006 Census. The 2007 report used data for Indigenous people from the National Aboriginal and Torres Strait Islander Social Survey (NATSISS) to measure housing overcrowding, which are not comparable to the data in this report.

Housing utilisation cannot be determined for all households in the Census as the required information on the number of bedrooms and the demographic composition of the household was not always provided. Therefore, overcrowding rates in this report are based on the number of people who were living in households for which utilisation could be determined.

Figure 9.1.1 **Proportion of people living in overcrowded housing, 2001 and 2006[a]**



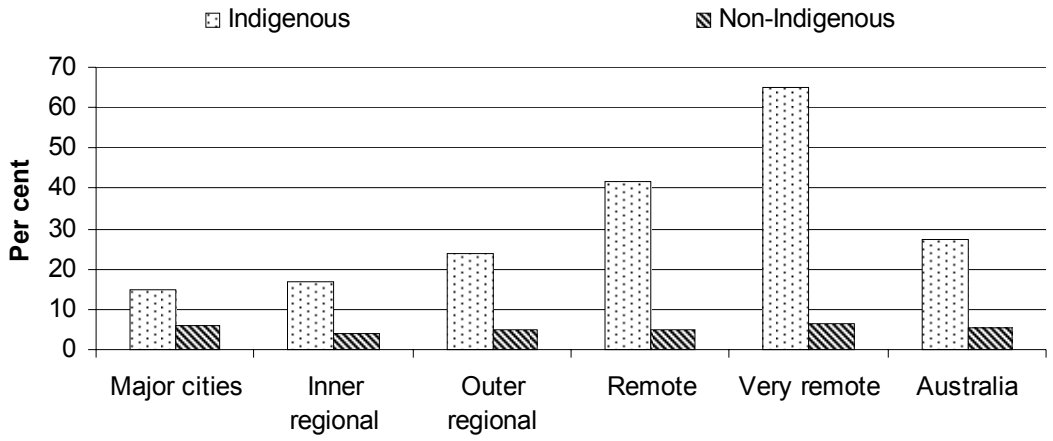
a Based on the Canadian National Occupancy Standard for housing appropriateness.

Source: ABS (unpublished) derived from the *2006 Census of Population and Housing*; *2001 Census of Population and Housing*; table 9A.1.5.

Between 2001 and 2006:

- the proportion of Indigenous people living in overcrowded housing decreased from 30.7 per cent to 27.2 per cent and the proportion of non-Indigenous people living in overcrowded housing also decreased, from 6.3 per cent to 5.7 per cent. The gap between Indigenous and non-Indigenous proportions fell from 24.4 percentage points to 21.5 percentage points (figure 9.1.1)
- the average size of Indigenous households decreased from 3.5 to 3.4 people. The average size of a non-Indigenous household was the same in both years at 2.6 people (table 9A.1.1)
- the average number of people per bedroom remained at 1.3 in Indigenous households and remained at 1.1 for non-Indigenous households (table 9A.1.1).

Figure 9.1.2 **Proportion of people living in overcrowded housing, by remoteness area, 2006[a]**



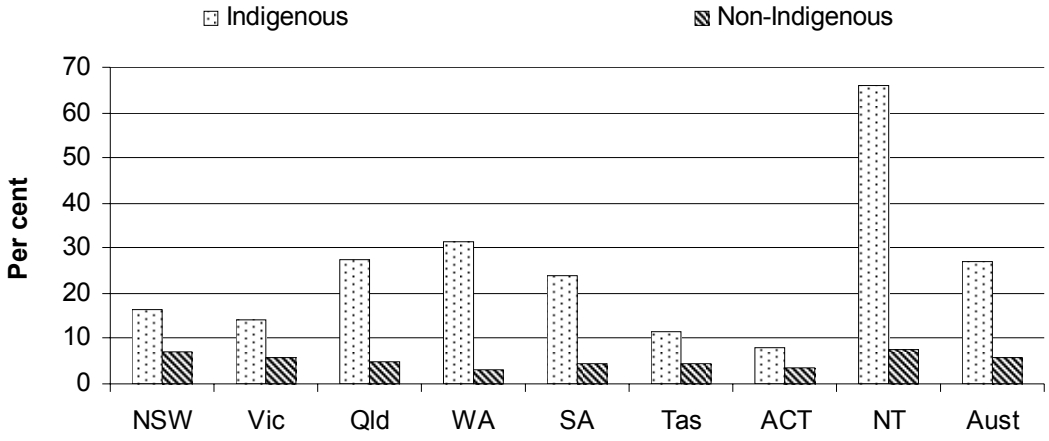
a Based on the Canadian National Occupancy Standard for housing appropriateness.

Source: ABS (unpublished) derived from the *2006 Census of Population and Housing*; table 9A.1.2.

In 2006:

- Indigenous people were more likely than non-Indigenous people to live in overcrowded housing in all remoteness areas (figure 9.1.2)
- the proportion of Indigenous people living in overcrowded housing was highest in very remote areas (65.1 per cent) and lowest in major cities (15.1 per cent) (figure 9.1.2)
- the proportion of non-Indigenous people living in overcrowded housing did not vary greatly with remoteness (figure 9.1.2).

Figure 9.1.3 **Proportion of people living in overcrowded housing, by State/Territory, 2006[a, b]**



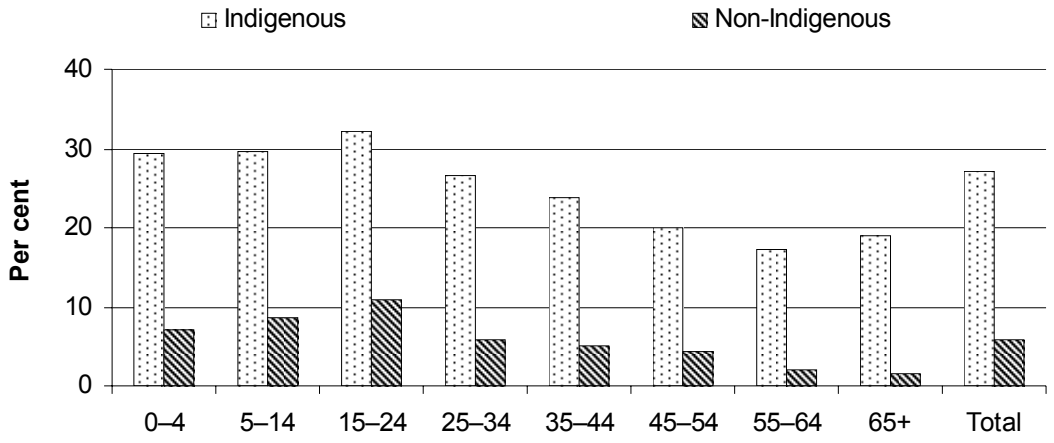
a Based on the Canadian National Occupancy Standard for housing appropriateness. **b** Australia includes 'Other territories'.

Source: ABS (unpublished) derived from the *2006 Census of Population and Housing*; table 9A.1.3.

Across states and territories, in 2006:

- Indigenous people were more likely than non-Indigenous people to live in overcrowded housing in all states and territories (figure 9.1.3)
- the proportion of Indigenous people living in overcrowded housing varied greatly across states and territories and was highest in the NT (65.9 per cent) and lowest in the ACT (8.7 per cent) (figure 9.1.3)
- the ratio between housing overcrowding rates for Indigenous and non-Indigenous people was highest in WA (10.2 times the non-Indigenous rate) and lowest in NSW (2.3 times the non-Indigenous rate) (figure 9.1.3).

Figure 9.1.4 **Proportion of people living in overcrowded housing, by age, 2006[a]**



a Based on the Canadian National Occupancy Standard for housing appropriateness.

Source: ABS (unpublished) derived from the *2006 Census of Population and Housing*; table 9A.1.5.

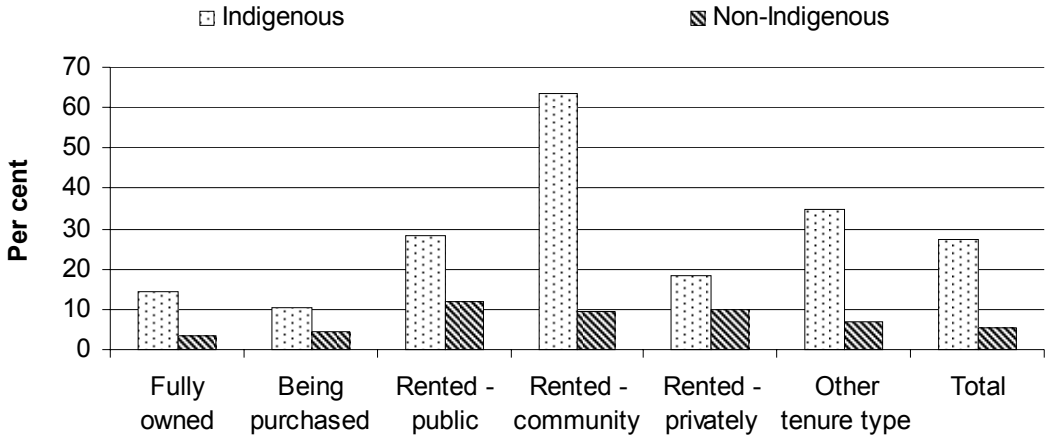
Across age groups, in 2006:

- Indigenous people of all ages were more likely than non-Indigenous people to live in overcrowded housing (figure 9.1.4)
- the proportion of Indigenous people living in overcrowded housing varied across age cohorts and was highest for children and adults aged up to 24 years (30.4 per cent) and lowest for those aged 55 to 64 (17.2 per cent) (figure 9.1.4 and table 9A.1.5).

In 2006:

- Indigenous people were more likely than non-Indigenous people to live in overcrowded housing, regardless of their housing tenure. Overcrowding rates were highest for those living in rented community housing (63.6 per cent) (figure 9.1.5), which was the dominant tenure type for Indigenous people in remote areas (ABS and AIHW 2008).

Figure 9.1.5 **Proportion of people living in overcrowded housing, by tenure type, 2006[a]**



a Based on the Canadian National Occupancy Standard for housing appropriateness.

Source: ABS (unpublished) derived from the *2006 Census of Population and Housing*; table 9A.1.4.

9.2 Rates of disease associated with poor environmental health

Box 9.2.1 **Key messages**

- Hospitalisation rates for Indigenous people for all diseases associated with poor environmental health (scabies, influenza and pneumonia, asthma, intestinal infectious diseases, bacterial diseases and acute upper respiratory infections) were higher than for non-Indigenous people in 2006-07 (table 9.2.1). There was little significant change in these hospitalisation rates from 2004-05 to 2006-07 (figure 9.2.2).
- Death rates for diseases associated with poor environmental health were much higher for Indigenous people than non-Indigenous people between 2003–07 (figure 9.2.4).

During the late 1800s and early 1900s, most public health efforts focused on the control of infectious diseases, particularly epidemics. In the following century improvements in sanitation, drinking water quality, food safety, disease control and housing conditions resulted in big improvements to public health and longevity for most Australians (DHAC 1999). However, many rural and remote Indigenous communities still struggle to achieve the basic level of environmental health that has been achieved for the rest of the population (enHealth 2007; DHAC 1999).

A list of diseases associated with poor environmental health was developed in consultation with the Australian Institute of Health and Welfare (AIHW). Hospitalisations and death rates for these diseases are discussed in this chapter. Some of these diseases can be attributed to overcrowding in housing (section 9.1) and drinking water and sewerage services (section 9.3). Hospitalisation data indicate that diseases associated with poor environmental health are much more common among Indigenous people than non-Indigenous people (table 9.2.1). Some diseases, such as acute rheumatic fever and scabies, continue to exist in Indigenous communities with very few occurrences evident in hospitalisations data for the non-Indigenous population.

The data used in this section are for hospitalisations, defined by the AIHW as discharges, transfers, deaths or changes in care type. Hospitalisations data reflect more serious cases of diseases, but do not necessarily show overall incidence of disease. Many people may not go to a hospital for treatment. In addition, a patient in a remote area may be admitted to hospital whereas in an urban area the same patient could be managed as an outpatient. Hospital data can also include some duplication, as patients can have multiple admissions for some chronic conditions, as well as changes in conditions (such as transfer from a medical ward to a rehabilitation centre within a hospital) (AIHW 2008).

Most hospitalisation data used in this section are for six jurisdictions: NSW, Victoria, Queensland, WA, SA, and the NT. These data have sufficient levels of Indigenous identification for 2004-05, 2005-06 and 2006-07. Longer time series data for Queensland, WA, SA and the NT from 2001-02 to 2006-07 are discussed briefly in this section.

Box 9.2.2 provides an example of a program that assists in improving environmental health for Indigenous people.

Box 9.2.2 'Things that work' — Improving environmental health for Indigenous people

An **Animal Management Program** (Queensland) aims to control animal populations, reduce negative health, social, economic and environmental effects and improve animal health and welfare. Negative effects from unmanaged animals include disease and parasite transmission to people and domestic animals, contamination of water supply, spillage and distribution of rubbish, increased fly breeding from faecal deposits and damage to the natural environment.

One community with the program in place for only eight months reported high community acceptance, with 85 per cent of dogs registered, and a 60 per cent reduction in dog bites (Queensland Government, unpublished).

Table 9.2.1 **Age standardised hospitalisation rates (per 1000) for selected types of diseases associated with poor environmental health, by Indigenous status, NSW, Victoria, Queensland, WA, SA, and public hospitals in the NT, 2006-07**[a, b, c, d]

	Indigenous			*Non-Indigenous*[d]			*Total Australians*		
ICD-10 diagnosis codes and descriptions	*Males*	*Females*	*Total*	*Males*	*Females*	*Total*	*Males*	*Females*	*Total*
Intestinal infectious diseases (A00–A09)	4.71	5.01	4.88	2.52	2.62	2.67	2.60	2.73	2.67
Tuberculosis (A15–A19)	0.43	0.14	0.27	0.07	0.05	0.06	0.08	0.05	0.06
Bacterial diseases (A20–A49)	7.31	7.91	7.62	2.66	1.88	2.25	2.73	1.86	2.25
Diphtheria (A36)	np	np	0.02	–	–	–	–	–	–
Whooping cough (A37)	0.06	0.09	0.07	0.02	0.02	0.02	0.02	0.02	0.02
Meningococcal infection (A39)	0.04	0.05	0.05	0.02	0.02	0.02	0.02	0.02	0.02
Trachoma (A71)	np	np	np	np	np	np	np	np	–
Acute hepatitis A (B15)	np	np	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Acute hepatitis B (B16)	0.16	0.09	0.12	0.03	0.01	0.02	0.03	0.01	0.02
Scabies (B86)	2.48	3.01	2.76	0.04	0.03	0.10	0.10	0.10	0.10
Acute rheumatic fever (I00–I02)	0.21	0.30	0.26	0.01	0.00	0.01	0.01	0.01	0.01
Chronic rheumatic heart diseases (I05–I09)	0.26	0.73	0.51	0.09	0.11	0.10	0.09	0.12	0.10
Acute upper respiratory infections (J00–J06)	2.51	3.22	2.89	1.62	1.38	1.56	1.65	1.47	1.56
Influenza and pneumonia (J10–J18)	12.37	11.16	11.70	3.19	2.46	2.86	3.35	2.48	2.86
Asthma (J45)	2.35	4.43	3.46	1.54	1.52	1.58	1.55	1.59	1.58
Lung disease due to external agents (J60–J70)	0.78	0.33	0.54	0.45	0.24	0.32	0.46	0.22	0.32
Pneumonitis due to solids and liquids (J69)	0.66	0.32	0.48	0.41	0.22	0.30	0.42	0.20	0.30
Toxic effects of metals (T56)	np	–	np	0.01	0.01	0.01	0.01	0.01	0.01

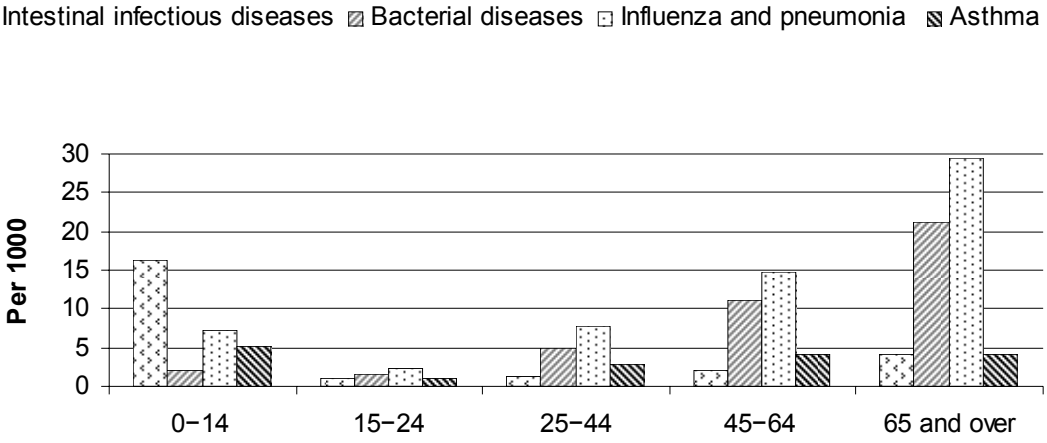
– Nil or rounded to zero. **np** not published. [a] Any diagnosis was used to select the infectious diseases (ICD-10 codes A00–B99), principal diagnosis was used to select the other conditions. [b] Identification of Indigenous patients is incomplete and completeness varies across jurisdictions. [c] Data are based on state of usual residence. [d] Non-Indigenous includes hospitalisations identified as non-Indigenous as well as those with a 'not stated' Indigenous status.

Source: AIHW National Hospital Morbidity Database (unpublished); tables 9A.2.1–3.

In 2006-07, after adjusting for age differences in the Indigenous and non-Indigenous populations, in NSW, Victoria, Queensland, WA, SA and the NT hospitalisation rates for all diseases associated with poor environmental health were higher for Indigenous than non-Indigenous people:

- the hospitalisation rate for influenza and pneumonia was 11.7 per 1000 for Indigenous people — 4 times the rate for non-Indigenous people (2.9 per 1000) (table 9.2.1)
- the hospitalisation rate for bacterial diseases was 7.6 per 1000 for Indigenous people — 3.4 times the hospitalisation rate for non-Indigenous people (2.3 per 1000) (table 9.2.1)
- the hospitalisation rate for intestinal infectious diseases was 4.9 per 1000 for Indigenous people — 1.8 times the hospitalisation rate for non-Indigenous people (2.7 per 1000) (table 9.2.1)
- the biggest difference in hospitalisation rates between Indigenous and non-Indigenous people was for scabies. Indigenous people were 28 times more likely to present with scabies (2.8 per 1000) than non-Indigenous people (0.1 per 1000) (table 9.2.1)
- Indigenous people also had much higher hospitalisation rates for chronic rheumatic heart diseases (0.5 per 1000 compared with 0.1 per 1000). Acute rheumatic fever appears to be a problem only in the Indigenous population (0.3 per 10 000 people) with almost no occurrences evident in hospitalisations data for non-Indigenous people (table 9.2.1)
- acute upper respiratory infections were a problem for both the Indigenous and non-Indigenous populations, but were more prevalent for Indigenous people. The Indigenous hospitalisation rate was 1.9 times that for non-Indigenous people (2.9 per 10 000 compared with 1.6 per 1000) (table 9.2.1).

Figure 9.2.1 **Hospitalisation rates for selected diseases associated with poor environmental health, Indigenous people, by age group, NSW, Victoria, Queensland, WA, SA, and public hospitals in the NT, 2006-07[a, b]**



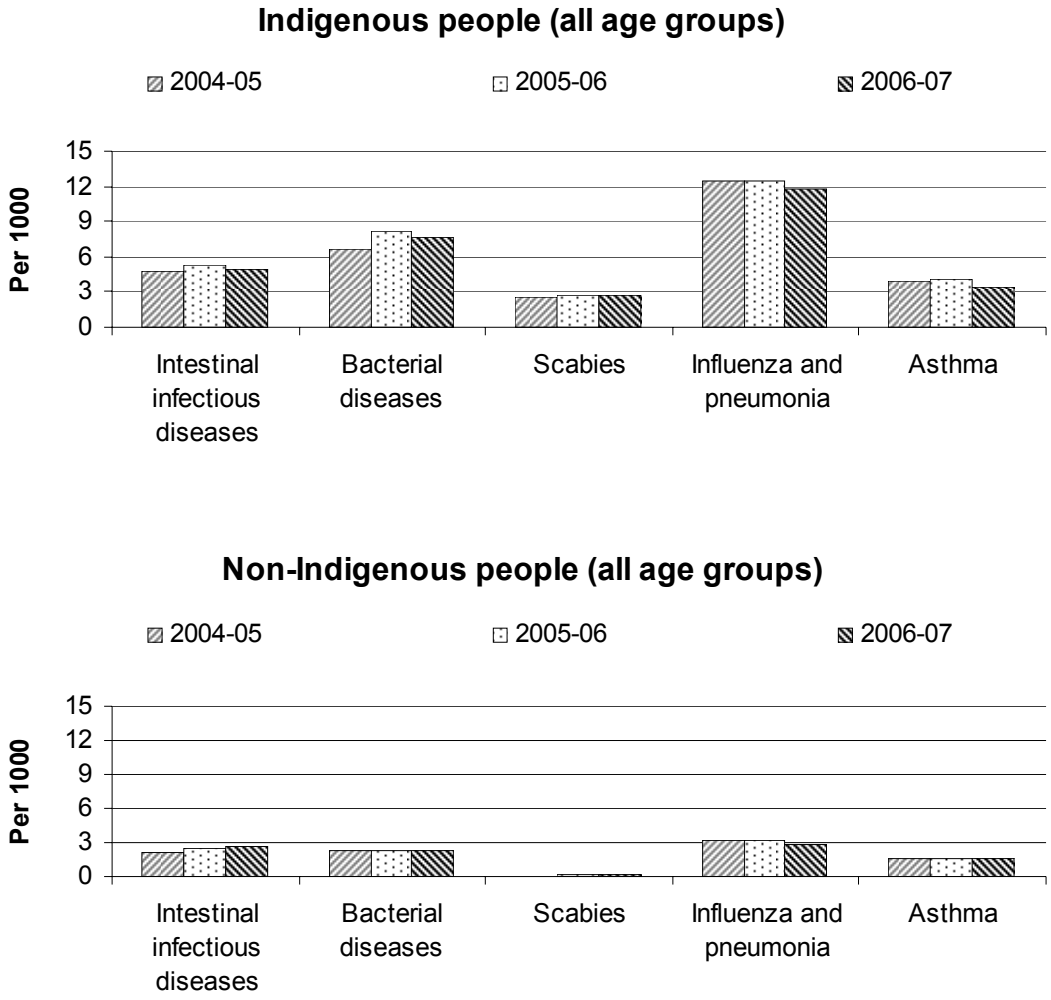
[a] Any diagnosis was used to select the infectious diseases (ICD-10 codes A00–B99), principal diagnosis was used to select the other conditions. [b] Identification of Indigenous patients is incomplete and completeness varies across jurisdictions.

Source: AIHW National Hospital Morbidity Database (unpublished); tables 9A.2.1–3.

In 2006-07, in NSW, Victoria, Queensland, WA, SA and the NT:

- for the most common infectious diseases associated with poor environmental health, Indigenous children (0–14 years), Indigenous people aged 45–64 and the Indigenous elderly (65 years and over) had higher hospitalisation rates than other age groups (figure 9.2.1). These age groups were also the most at risk in the non-Indigenous population (tables 9A.2.1–3)
- Indigenous children had the highest rate for intestinal infectious disease (16.3 per 1000), while Indigenous people aged 65 and over had the highest rates for bacterial diseases (21.3 per 1000) and influenza and pneumonia (29.6 per 1000).

Figure 9.2.2 **Age standardised hospitalisation rates for selected diseases associated with poor environmental health, NSW, Victoria, Queensland, WA, SA, and public hospitals in the NT[a, b, c, d]**



[a] Any diagnosis was used to select the infectious diseases (ICD-10 codes A00–B99), principal diagnosis was used to select the other conditions. [b] Identification of Indigenous patients is incomplete and completeness varies across jurisdictions. [c] Directly age standardised using the 2001 Australian population. [d] 'Non-Indigenous' includes cases where Indigenous status was 'Not stated'.

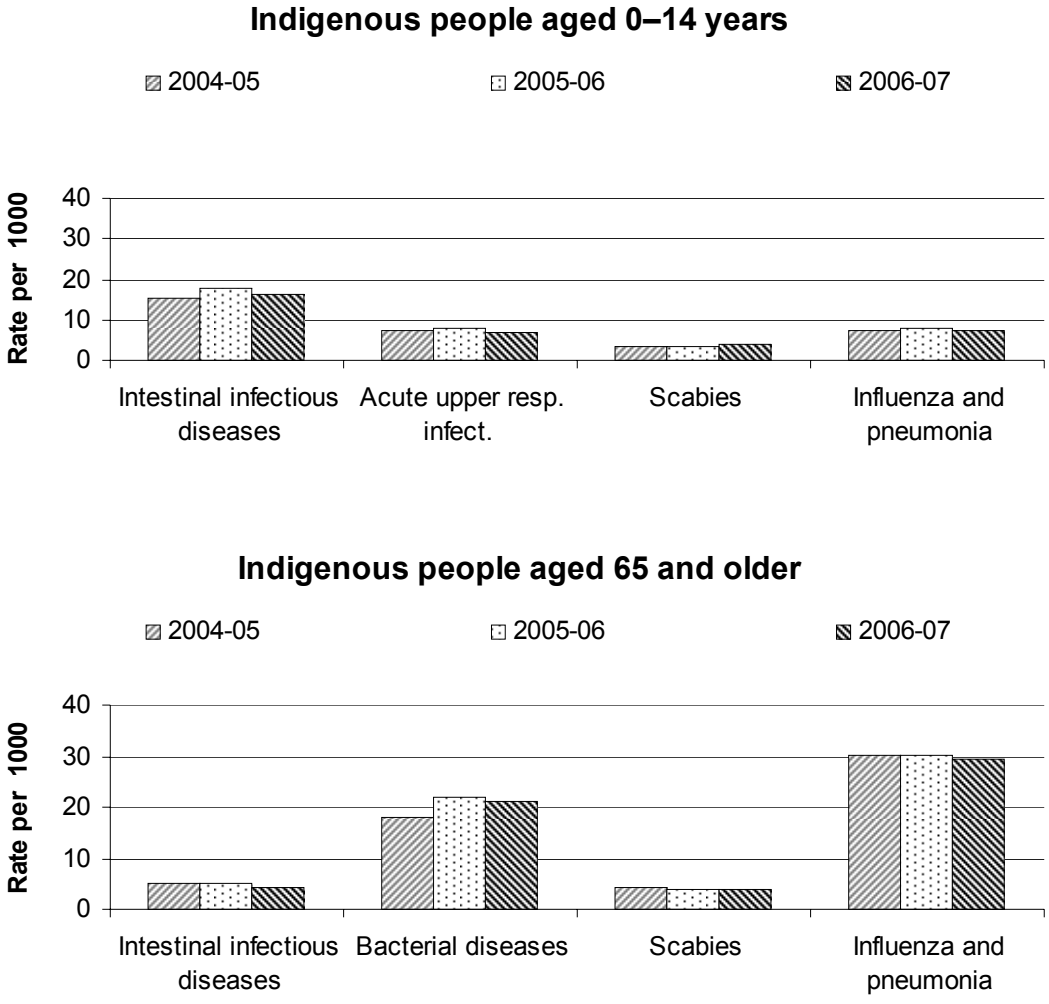
Source: AIHW National Hospital Morbidity Database (unpublished); tables 9A.2.3, 9A.2.6 and 9A.2.9.

Hospitalisation rates for selected diseases associated with poor environmental health were much higher for Indigenous people than non-Indigenous people between 2004-05 and 2006-07 (figure 9.2.2). Over time, rates of the most common environmentally based diseases remained fairly constant for both Indigenous and non-Indigenous people, with no clear overall trend.

- Data for Queensland, WA, SA, and NT for a longer period of time (from 2001-02 to 2006-07) are contained in tables 9A.2.10–16. In all years, Indigenous

people had much higher rates of hospitalisation rates for intestinal infectious diseases, bacterial diseases, scabies, influenza and pneumonia and asthma than non-Indigenous people. Over time rates fluctuated with no clear trend (table 9A.2.10).

Figure 9.2.3 **Hospitalisation rates for selected diseases associated with poor environmental health, vulnerable age groups of Indigenous people, NSW, Victoria, Queensland, WA, SA, and public hospitals in the NT[a, b, c]**



a Any diagnosis was used to select the infectious diseases (ICD-10 codes A00–B99), principal diagnosis was used to select the other conditions. **b** Identification of Indigenous patients is incomplete and completeness varies across jurisdictions – Nil or rounded to zero. **c** 'Acute upper rep. infect'. = 'Acute upper respiratory infection'.

Source: AIHW National Hospital Morbidity Database (unpublished); tables 9A.2.3, 9A.2.6 and 9A.2.9.

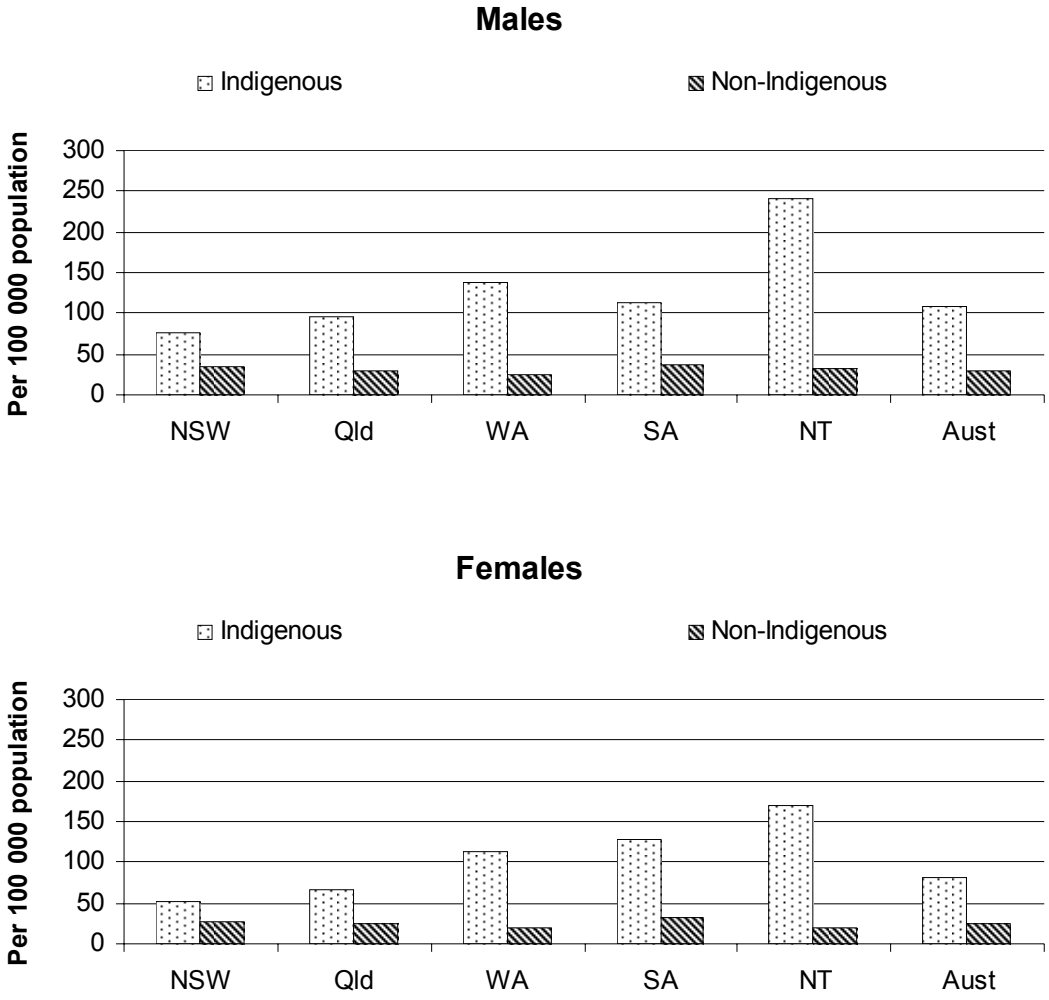
Figure 9.2.3 shows hospitalisation rates for the four most commonly occurring diseases associated with poor environmental health between 2004-05 and 2006-07, for two vulnerable Indigenous age groups:

- for 0–14 years, hospitalisation rates increased for intestinal infectious diseases and scabies and showed no change for acute upper respiratory infections and influenza and pneumonia (figure 9.2.3)
- for Indigenous people aged 65 years and over, hospitalisation rates for bacterial diseases increased and there was little change for intestinal infectious disease, scabies and influenza and pneumonia (figure 9.2.3).

Data for Queensland, WA, SA, and the NT for a longer period of time (from 2001-02 to 2006-07) are contained in tables 9A.2.10–16. For these jurisdictions from 2001-02 to 2006-07:

- for Indigenous people aged 0–14 years, there was a decrease in hospitalisations for intestinal infectious diseases, scabies and influenza and pneumonia, and no change in hospitalisations for bacterial diseases (table 9A.2.10)
- for Indigenous people aged 65 years and over, there was an increase in hospitalisations for bacterial diseases and influenza and pneumonia and no change in hospitalisations for intestinal infections diseases and scabies (table 9A.2.10).

Figure 9.2.4 **Death rates from diseases associated with poor environmental health, age standardised, 2003–07**[a, b, c, d]



[a] Data on deaths of Aboriginal and Torres Strait Islander Australians are affected by differing levels of coverage of deaths identified as Indigenous across states and territories. Care should be exercised in analysing these data, particularly in making comparisons across states and territories and between the Indigenous and non-Indigenous data. [b] Denominators used in the calculation of rates for the Indigenous population are *Experimental Estimates and Projections, Aboriginal and Torres Strait Islander Australians* (ABS Cat. no. 3238.0, low series, 2001 base). There are no comparable population data for the non-Indigenous population. Denominators used in the calculation of rates for comparison with the Indigenous population have been derived by subtracting Indigenous population estimates/projections from total estimated resident population and should be used with care, as these data include population units for which Indigenous status as not stated. [c] Australia includes 'other territories'. [d] Non-Indigenous includes deaths with 'Not stated' Indigenous status.

Source: ABS *Causes of Death, Australia*, Cat. no. 3303.0 (unpublished); table 9A.2.17.

In NSW, Queensland, WA, SA and the NT, between 2003-07:

- death rates for diseases associated with poor environmental health were much higher people for Indigenous people than non-Indigenous people in all jurisdictions (figure 9.2.4)

- death rates for diseases associated with poor environmental health were higher for Indigenous males than females in all jurisdictions, while for non-Indigenous males and females death rates were similar, and did not vary much across jurisdictions (figure 9.2.4)
- death rates for Indigenous males for diseases associated with poor environmental health were highest in the NT (241.2 per 100 000) and lowest in NSW (75.7 per 100 000) (figure 9.2.4)
- death rates for Indigenous females for diseases associated with poor environmental health were also highest in the NT (170.5 per 100 000) and lowest in NSW (51.1 per 100 000) (figure 9.2.4).

9.3 Access to clean water, functional sewerage and electricity services

Box 9.3.1 **Key messages**

- The number of discrete Indigenous communities without an organised sewerage system decreased from 91 in 2001 to 25 in 2006 (table 9A.3.4).
- The number of discrete Indigenous communities without an organised electricity supply decreased from 80 in 2001 (ABS 2007), to 32 in 2006 (table 9A.3.7).
- In 2006, of the 322 discrete Indigenous communities with a reported usual population of 50 or more, 165 (51.2 per cent) had experienced water supply interruptions; 130 (40.4 per cent) had experienced sewerage overflows or leakages; and 246 (76.4 per cent) had experienced an electricity interruption; in the previous 12 months (tables 9A.3.2, 9A.3.5 and 9A.3.7).

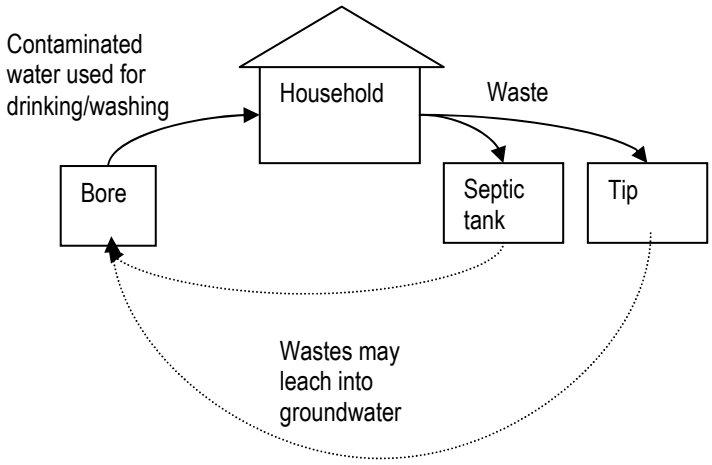
This indicator complements the indicator of rates of diseases associated with poor environmental health (section 9.2). To prevent disease, a community needs a clean (free of microbiological and toxic contamination), adequate and reliable supply of water for drinking, cooking and washing. A functional sewerage system prevents sewage from contaminating drinking water and food. Access to a reliable electricity supply is essential for cooking, refrigeration, washing machines and other appliances. Access to a reliable electricity supply is also critical for education, businesses and many government services.

Many Indigenous people live in urban areas where reliable drinking water, sewerage and electricity systems are used by everyone. While the performance of essential service providers varies across Australia, cities and large towns generally monitor the quality of drinking water and have reticulated sewerage systems where

waste is collected and treated at central treatment plants. Access to electricity services is also generally reliable in cities and large towns.

In rural and remote areas, there is a greater reliance on local or individual household systems, like generators, septic tanks and drinking water sourced from bores and rainwater tanks. If households are overcrowded and/or if these systems are not adequately maintained, wastes can leach into the groundwater and contaminate drinking water, as shown in figure 9.3.1 (setbacks between septic systems help prevent contamination, while floods can bring contamination into drinking water if sources are not adequately protected).

Figure 9.3.1 **Environmental health risks from inadequate or poorly maintained environmental health hardware**



Source: Adapted from ABS and AIHW (2005)

Torzillo et al. (2008) examined the state of housing in Indigenous communities in rural and remote Australia, and the living practices and 'health hardware' necessary to maintain family health. The surveys involved a limited cost repair following initial inspection and a repeat visit six months later to examine improvements in the performance of health hardware. The project both collected valuable data and directly improved outcomes for Indigenous people. Further details are provided in box 9.3.2.

Box 9.3.2 'Things that work' — assessing the health hardware in Indigenous communities

Adequate 'health hardware (septic tanks, sewerage pipes, washing machines, etc.) is critical for healthy living practices. In a project funded by the Australian Government and the NSW Department of Health Torzillo et al (2008) undertook a detailed assessment of 4343 houses in 132 Indigenous communities between 1999 and 2006, involving the assessment of 250 items. After the first survey, limited cost repairs of non-functioning health hardware were undertaken. The authors then returned six months later for a repeat assessment of 3448 houses in 112 of those communities.

The initial surveys found very low proportions of houses met minimum safety standards (11 per cent for electrical, 54 per cent for gas, 31 per cent for structure and access and 12 per cent for fire). After low cost repairs, follow up surveys found these numbers rose to 62 per cent, 76 per cent, 54 per cent and 31 per cent, respectively.

The **Housing for Health** program in NSW improves living conditions in Aboriginal communities, particularly for children aged 0–5 years. Since 1999, over 53 000 hardware items have been repaired in 2210 homes in 70 communities, which has reached over 9400 Aboriginal people.

Across all Housing for Health projects in NSW, overall improvements in house function have shown: nearly nine fold improvements in electrical safety; over four fold improvements in fire safety; around two and a half fold improvement in ability to wash people and to wash clothes and bedding in homes; over two fold increase in removing waste safety in homes; and over three and a half fold improvement in the ability to prepare store and cook food in the home. Recent studies have indicated significant reductions in hospital admissions for infections for people living in houses that have been involved in this program (NSW Department of Health, unpublished).

Data from the ABS 2006 Community Housing and Infrastructure Needs Survey (CHINS) are reported for access to clean water, functional sewerage and electricity services in discrete Indigenous communities and are the most recent data currently available. ABS 2006 CHINS data were also reported for access to clean water and functional sewerage in the 2007 report. CHINS data are limited to discrete Indigenous communities and are not comparable with performance indicators commonly used by water, sewerage and electricity utilities to measure performance. Access to electricity services is reported for the first time in this report.

Source of drinking water supply

In 2004-05, there were 384 water providers in the water supply industry in Australia. Of these, 235 were minor urban (fewer than 10 000 connections), 61 were non-major urban (between 10 000 and 50 000 connections), 29 were major urban (greater than 50 000 connections) and 59 were irrigation/rural (businesses that

supply predominantly to agriculture) (ABS 2005). People who live outside areas serviced by utilities rely on other sources for their drinking water. While most Indigenous people live in cities and towns and have access to the same water and sewerage services as non-Indigenous people, some live in relatively small, discrete Indigenous communities.

In Australia in 2004-05, most (96 per cent) of the water supplied by the water supply industry originated from inland surface water. Groundwater accounted for 4 per cent of the total water supplied. Most (89 per cent) of the total water consumed by households was distributed by an organised water supply, and 11 per cent was water from a self-extracted source (such as rainwater tanks and direct extraction from surface or groundwater) (ABS 2005).

On 30 June 2006, the estimated resident Indigenous population of Australia was 517 043 (ABS 2008). At the time of the 2006 CHINS, 92 960 people (which includes some non-Indigenous people)[1] lived in 1187 discrete Indigenous communities.[2]

Table 9.3.1 **Reported usual population in discrete Indigenous communities, by remoteness area 2006**[a]

Remoteness area	*Communities with population of:*					All communities	Reported usual population
	Less than 50	50–99	100–199	200–499	500–999		
Major cities	2	–	2	–	–	4	346
Inner regional	5	5	8	1	–	19	1870
Outer regional	20	9	16	4	–	52	10 254
Remote	71	14	8	7	2	104	11 237
Very remote	767	95	58	59	17	1008	69 253
Australia	**865**	**123**	**92**	**71**	**19**	**1187**	**92 960**

a A community's usual population was generally estimated by the community representative without reference to community records. This methodology is considered to be less reliable than a population count as undertaken in the 2006 Census of Population and Housing. – Nil or rounded to zero.

Source: ABS 2006 CHINS, Cat. no. 4710.0.

In 694 discrete Indigenous communities (58.5 per cent), the most common source of drinking water in 2006 was bore water, a decrease from 784 communities (64.5 per cent) in 2001. Between 2001 and 2006, the number of Indigenous

1 CHINS population data include both Indigenous and non-Indigenous people living in discrete Indigenous communities.

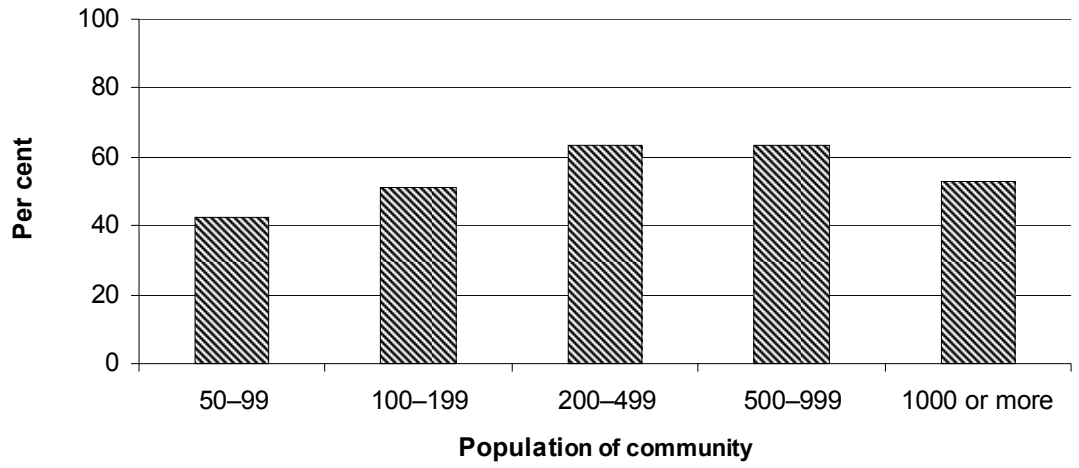
2 Discrete Indigenous communities are defined by the ABS as geographic locations inhabited by or intended to be inhabited predominantly (greater than 50 per cent of usual residents) by Aboriginal or Torres Strait Islander peoples, with housing or infrastructure that is managed on a community basis.

communities that were connected to a town water supply increased from 186 to 209. Less common sources of drinking water (not part of a mainstream town supply) included rain water, rivers or reservoirs, wells or springs (ground water), carted water or some other organised supply. The number of communities with no organised water supply decreased from 21 (1.7 per cent) to 9 (0.8 per cent) between 2001 and 2006 (table 9A.3.1).

Reliability and adequacy of water supply

A reliable and adequate supply of water is essential for drinking, washing and hygienic food preparation and handling. In 2006, the CHINS collected data on interruptions to water supply in discrete Indigenous communities.

Figure 9.3.2 **Proportion of discrete Indigenous communities that experienced water interruptions, by reported usual population 2006**[a, b, c]



[a] In the 12 months prior to the survey. [b] Only a small proportion of communities with less than 50 people responded to this question, and the data are not included in the chart. [c] Causes of 'water interruptions' include 'equipment breakdown', 'ran out of water', 'lack of power', 'poor water quality', 'planned interruption' and 'other reasons'.

Source: ABS 2006 CHINS, Cat. no. 4710.0; table 9A.3.2.

- In 2006, between 42.3 and 63.4 per cent of discrete Indigenous communities (depending on the size of the community) reported having experienced drinking water interruptions in the previous 12 months (figure 9.3.2). The total reported usual population of discrete Indigenous communities reporting water supply interruptions was 44 563 (table 9A.3.2).

- 182 communities (with a total population of 21 291) reported having experienced water supply interruptions. Of these, 69 (37.9 per cent) had experienced five or more interruptions in the previous 12 months (table 9A.3.2).

Water quality

Data on testing of drinking water are included here as an indicator of the quality of drinking water.

Most drinking water in Australia is regularly tested to measure its compliance with guidelines and standards, which have been established to ensure that drinking water is safe for human consumption.

Data on drinking water testing and treatment in discrete Indigenous communities are only available from the ABS 2006 CHINS for those communities that were not connected to a nearby mainstream town supply, and data were not collected in 'administered' communities with a population of fewer than 50 residents.

The definition for the CHINS data item for water test failures does not specify whether one sample failed testing, all samples failed testing or whether water was outside the failure rates permitted by the various water quality guidelines. Therefore, results should be interpreted with caution.

- In 2006, there were 194 Indigenous communities with populations of 50 or more that were not connected to a town water supply. Three-quarters of these (149 communities) had drinking water sent away for testing (table 9A.3.3). Of these, 43 communities (28.9 per cent) failed the testing. These communities had a combined population of 12 059 people (table 9A.3.3).

Types of sewerage systems

In the 2006 CHINS, 25 discrete Indigenous communities reported having no organised sewerage system[3], an improvement from 91 communities in 2001 (table 9A.3.4). The total usual population of communities without organised sewerage facilities was 1969 (ABS 2007).

Septic tanks, both with common effluent disposal and leach drains, and pit toilets continue to be the main sewerage systems in small communities. In discrete Indigenous communities, a total of 593, or half of the communities, reported the use

[3] Organised sewerage systems include: town systems, community water borne systems, septic tanks and pit toilets.

of a septic system with a leach drain in 2006, and 202 communities reported using pit toilets (table 9A.3.4).

Between 2001 and 2006, the number of communities connected to a nearby mainstream town sewerage system increased from 89 to 121 (from 7.3 per cent to 10.2 per cent of all communities) (table 9A.3.4). By 2006, a total population of 32 256 people in discrete Indigenous communities were connected to a mainstream town sewerage system (ABS 2007).

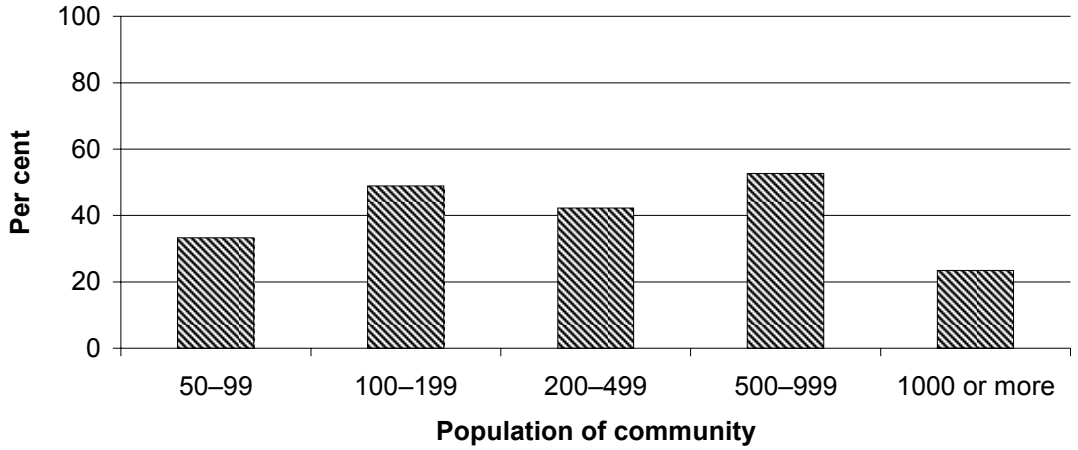
Numbers of community water-borne systems also increased slightly, with 108 communities reporting the use of such systems in 2006, compared to 96 in 2001 (table 9A.3.4). Community water-borne systems involve flush toilets and closed sewerage pipe systems using gravity and pumping stations to a common sewerage treatment plant (ABS 2007).

In communities with populations of 50 or more people, sewerage systems were reported to be connected to all permanent dwellings. A total of 192 small communities with a population of fewer than 50 people reported that a sewerage system was not connected to all permanent dwellings; 69 were located in WA, 61 in the NT, 51 in Queensland and 10 in SA (ABS 2007).

Sewerage system overflows and leakages

Sewerage system leaks and overflows create potential health risks to people living in their vicinity and can also contaminate drinking water sources.

Figure 9.3.3 **Proportion of discrete Indigenous communities that experienced sewerage system overflows or leakages, by usual population, 2006[a, b]**



[a] In the 12 months prior to the survey. [b] Data not collected in 'administered' communities with a population of less than 50.

Source: ABS 2006 CHINS, Cat no. 4710.0; table 9A.3.5.

- In 2006, between 23.5 and 52.6 per cent of discrete Indigenous communities (depending on the size of the community) experienced sewerage overflows or leakages in the previous 12 months (figure 9.3.3).
- In 2006, 142 communities reported sewerage overflows or leakages. Blocked drains (95 communities) and equipment failure (62 communities) accounted for the largest proportion of overflows and leakages. The total population in communities affected by sewerage overflows or leakages was 30 140 people (table 9A.3.5).
- Of the 142 communities that reported sewerage overflows or leakages, 31 (21.8 per cent) had experienced 10 or more overflows or leakages in the previous 12 months (table 9A.3.6).

Access to cooking, washing and toilet facilities

In 2006, 14 028 (89.6 per cent) of Indigenous Housing Organisation (IHO) managed permanent dwellings[4] had access to their own cooking, washing and toilet facilities (ABS 2007).

[4] ABS defines 'IHO managed permanent dwellings' as: 'Permanent dwellings located in discrete Indigenous communities, towns or other localities which are managed by an Indigenous organisation that provides housing to Aboriginal and Torres Strait Islander peoples. This includes permanent dwellings which are owned by State or Territory housing authorities, but managed by

The proportion of IHO managed permanent dwellings that had access to their own cooking, washing and toilet facilities varied across remoteness areas. Non-remote areas had the highest proportion (94.6 per cent) of houses with access to these facilities, compared with 87.5 per cent in remote and 89.0 per cent in very remote areas (ABS 2007).

A total of 161 communities reported access to public toilet facilities within the community. Of these, 125 communities (77.6 per cent) reported all toilets in working order (ABS 2007).

Electricity services

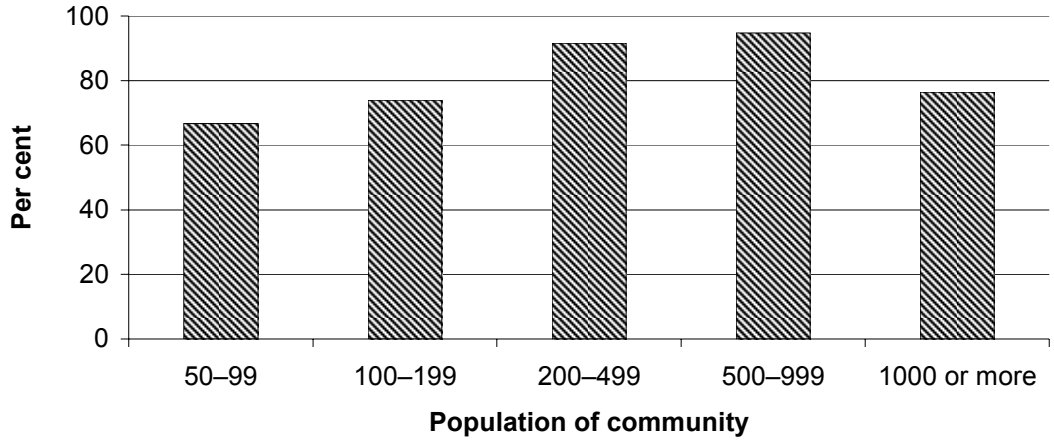
In 2006, 32 (2.7 per cent) of discrete Indigenous communities reported that they had no organised electricity supply (table 9A.3.7), an improvement on the 80 (7 per cent) of communities that reported no organised supply in 2001 (ABS 2007). The total usual population of communities without an organised electricity supply was 284 in 2006. Of the 32 discrete communities that reported no organised electricity supply, 31 were communities of less than 50 people (table 9A.3.7).

Community generators were the most common source of electricity supply reported in 2006, supplying 377 (35.9 per cent) of the 1049 discrete Indigenous communities with an organised electricity supply. State grid/transmitted supply was the second most common electricity source, supplying 274 (26.1 per cent) discrete Indigenous communities with an organised electricity supply. Of the remaining discrete Indigenous communities with an organised electricity supply, 178 (17.0 per cent) used domestic generators, 105 (10.0 per cent) used solar and 107 (10.2 per cent) used solar hybrid (table 9A.3.7).

Discrete Indigenous communities of fewer than 50 people tended to rely more heavily on domestic generators, solar and solar hybrid for electricity supplies than communities of 50 or more. Just over half of discrete Indigenous communities of fewer than 50 people with an organised electricity supply used these sources, compared with just under 5 per cent of discrete Indigenous communities with 50 or more people. In contrast, 94.7 per cent of discrete Indigenous communities with 50 people or more with an organised electricity supply were supplied by the state grid/transmitted supply or community generators, compared with just under half for discrete Indigenous communities of less than 50 people (table 9A.3.7).

an Indigenous Housing Organisation (IHO). Excluded are dwellings in discrete Indigenous communities which are not managed by an IHO' (ABS 2007).

Figure 9.3.4 **Proportion of discrete Indigenous communities that experienced electricity interruptions, by usual population, 2006[a, b]**



a In the 12 months prior to the survey. **b** Excludes communities connected to town supply. Data not collected in 'administered' communities with a population of fewer than 50. Totals include 'not stated'.

Source: ABS 2006 CHINS, Cat no. 4710.0; table 9A.3.7.

- In 2006, between 66.7 and 94.7 per cent of discrete Indigenous communities (depending on the size of the community) experienced electricity interruptions in the previous 12 months (figure 9.3.4).
- In 2006, 246 of the 322 discrete Indigenous communities with a population of 50 or more (76.4 per cent) had experienced an electricity interruption in the previous 12 months (table 9A.3.7).
- In 2006, 275 communities reported electricity supply interruptions. Storms (168 communities) and equipment breakdown (150 communities) accounted for the largest proportion of interruptions. The total population in communities affected by electricity supply interruptions was 67 849 people (table 9A.3.7).
- Of the 275 communities that reported electricity interruptions, 90 (32.7 per cent) had experienced 10 or more interruptions in the previous 12 months (table 9A.3.7).

9.4 Future directions in data

Rates of diseases associated with poor environmental health

The AIHW is working with states and territories to improve the identification of Indigenous people in hospitalisations data. See chapter 2 and appendix 4 for more information.

Access to clean water, functional sewerage and electricity supply

ABS CHINS data used in this chapter to report on drinking water, sewerage and electricity services are limited to discrete Indigenous communities and definitions are not comparable to those used for performance reporting by major water, sewerage and electricity utilities. It would be useful if data could be collected for discrete Indigenous communities using standard industry indicators, definitions and guidelines.

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