

1.04 Hospitalisation for pneumonia

The number of hospital separations with a principal diagnosis of pneumonia for Aboriginal and Torres Strait Islander peoples expressed as a rate by age group, age-standardised rate and ratio

Data sources

Data for this measure come from the AIHW National Hospital Morbidity Database. Additional information on invasive pneumococcal disease notifications comes from the National Notifiable Disease Surveillance System.

Hospitalisations

The National Hospital Morbidity Database is a compilation of episode-level records from admitted patient morbidity data collection systems in Australian hospitals in each state and territory. Information on the characteristics, diagnoses and care of admitted patients in public and private hospitals is provided annually to the AIHW by state and territory health departments.

Data are presented for the six jurisdictions which have been assessed by the AIHW as having adequate identification of Indigenous hospitalisations in 2004–05 – New South Wales, Victoria, Queensland, Western Australia, South Australia and the Northern Territory. These six jurisdictions represent approximately 96% of the Indigenous population of Australia. Data are presented by state/territory of usual residence of the patient.

Hospitalisations for which the Indigenous status of the patient was not reported have been included with hospitalisations data for non-Indigenous people under the 'other' category. This is to enable consistency across jurisdictions, as public hospitals in some states and territories do not have a category for the reporting of 'not stated' or inadequately recorded/reported Indigenous status.

Hospitalisation data are presented for the 2-year period July 2004 to June 2006. An aggregate of 2 years of data has been used, as the number of hospitalisations for some conditions is likely to be small for a single year.

The principal diagnosis is the diagnosis established to be the problem that was chiefly responsible for the patient's episode of care in hospital. The additional diagnosis is a condition or complaint either coexisting with the principal diagnosis or arising during the episode of care. The term 'hospitalisation' has been used to refer to a separation which is the episode of admitted patient care, which can be a total hospital stay (from admission to discharge, transfer or death) or a portion of a hospital stay beginning or ending a change in a type of care (for example, from acute to rehabilitation). 'Separation' also means the process by which an admitted patient completes an episode of care by being discharged, dying, transferring to another hospital or changing type of care.

National Notifiable Diseases Surveillance System (NNDSS)

A set of 56 diseases and conditions are notifiable nationally. Data on all these cases are forwarded to the NNDSS, managed by the Australian Government Department of Health and Ageing.

Although identification of Indigenous notifications in all states and territories is incomplete, three jurisdictions (Western Australia, South Australia and the Northern Territory) have

been assessed as having adequate identification in 2001–2002 in the NNDSS. Data on Indigenous status for certain notifiable diseases are not available for the Australian Capital Territory, New South Wales or Tasmania.

Analyses

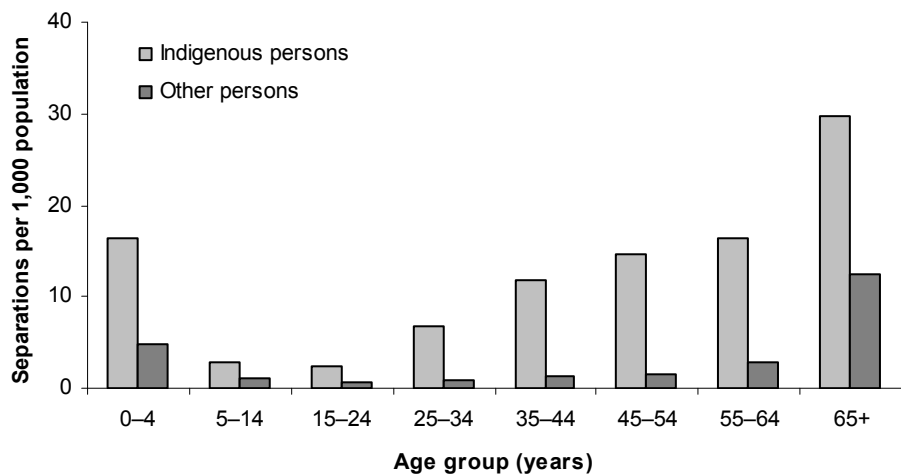
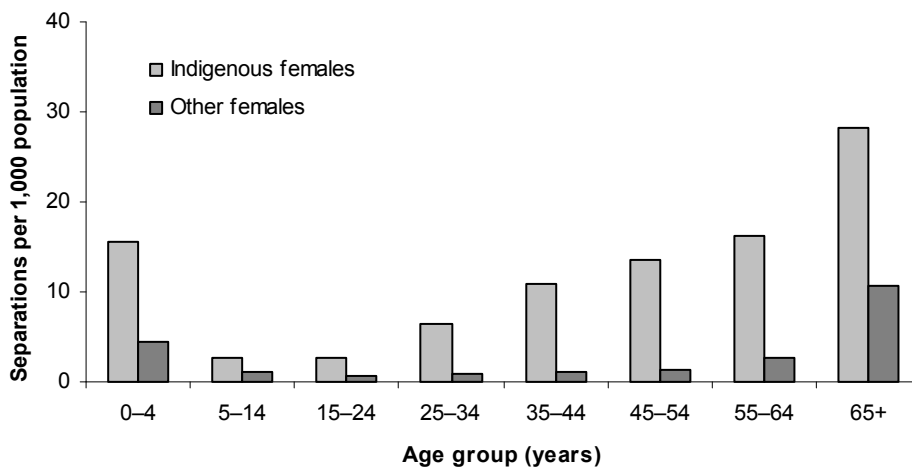
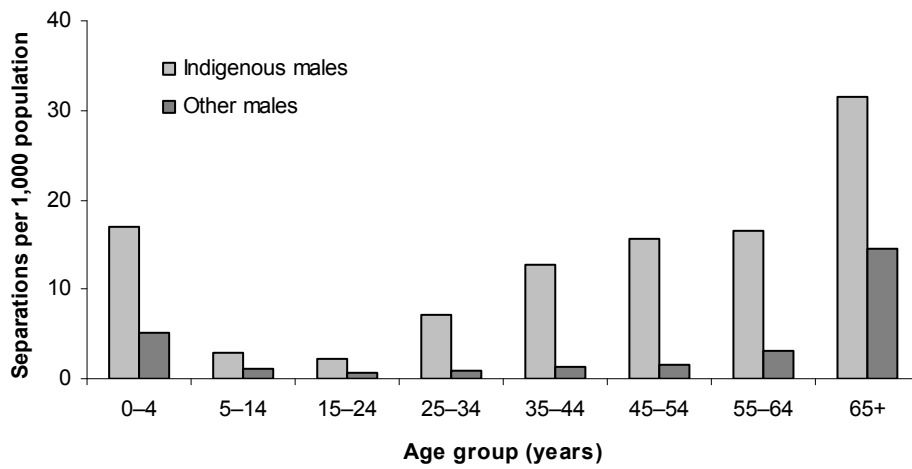
Age-standardised rates and ratios have been used as a measure of hospitalisations in the Indigenous population relative to other Australians. Ratios of this type illustrate differences between the rates of hospital admissions among Indigenous people and those of other Australians, taking into account differences in age distributions.

Hospitalisations

- In the 2-year period July 2004 to June 2006, there were 122,951 hospitalisations for pneumonia in New South Wales, Victoria, Queensland, Western Australia, South Australia and the Northern Territory combined, 7,943 (6%) of which were hospitalisations of Aboriginal and Torres Strait Islander peoples (Table 1.04.1).
- Hospitalisations for pneumonia represented 1.7% of all hospital separations for Aboriginal and Torres Strait Islander Australians.

Hospitalisations by age and sex

- In the 2-year period July 2004 to June 2006, in New South Wales, Victoria, Queensland, Western Australia, South Australia and the Northern Territory combined, Indigenous males and females had higher hospitalisation rates for pneumonia than other males and females across all age groups (Figure 1.04.1).
- The greatest difference in rates occurred in the 35–44 and 45–54 year age groups where Indigenous males and females were hospitalised at around 9–10 times the rate of other Australians.
- For both Indigenous and other Australian males and females, hospitalisation rates were highest among those aged 0–4 years, 55–64 years and 65 years and over.
- Approximately 51% of Indigenous Australians hospitalised for pneumonia were males (4,051) and 49% were females (3,892).



Source: AIHW analysis of National Hospital Morbidity Database.

Figure 1.04.1: Age-specific hospitalisation rates for a principal diagnosis of pneumonia, by Indigenous status and sex, NSW, Vic, Qld, WA, SA and NT, July 2004 to June 2006

Hospitalisations by state/territory

Table 1.04.1 presents hospitalisations for a principal diagnosis of pneumonia for the 2-year period July 2004 to June 2006 for New South Wales, Victoria, Queensland, Western Australia, South Australia and the Northern Territory. As well as rates and ratios for the six jurisdictions which have been assessed as having adequate identification of Indigenous hospitalisations in 2004–05, unadjusted and adjusted national level data are also included in the table. The Australia data are adjusted by applying a completeness factor of 89.4% which is an estimate of the level of Indigenous under-identification in hospital separations data.

- Over the period July 2004 to June 2006, Indigenous Australians in New South Wales, Victoria, Queensland, Western Australia, South Australia and the Northern Territory combined were hospitalised for pneumonia at four times the rate of other Australians.
- When hospital rates are adjusted at the national level for Indigenous under-identification, Indigenous males and females were hospitalised for pneumonia at 4.2 and 5.0 times the rate of other males and females respectively.
- In the Northern Territory, Indigenous Australians were nine times more likely to be hospitalised for pneumonia than other Australians. In Western Australia, Indigenous Australians were seven times more likely to be hospitalised for pneumonia than other Australians. In South Australia and Queensland, Indigenous Australians were hospitalised for pneumonia at four times the rate of other Australians. In New South Wales and Victoria, Indigenous Australians were twice as likely to be hospitalised for pneumonia than other Australians in these jurisdictions.

Table 1.04.1: Hospitalisations for principal diagnosis of pneumonia, by Indigenous status and sex, NSW, Vic, Qld, WA, SA and NT, July 2004 to June 2006^{(a)(b)(c)(d)}

	Indigenous				Other ^(e)				Ratio ⁽ⁱ⁾	
	Number	No. per 1,000 ^(f)	LCL 95% ^(g)	UCL 95% ^(h)	Number	No. per 1,000 ^(f)	LCL 95% ^(g)	UCL 95% ^(h)		
NSW										
Males	702	7.2	6.4	8.1	21,265	3.3	3.3	3.4	2.2*	
Females	627	6.1	5.4	6.7	18,932	2.5	2.5	2.6	2.4*	
Persons	1,329	6.6	6.1	7.1	40,199	2.9	2.9	2.9	2.3*	
Vic										
Males	94	5.6	3.8	7.4	17,865	3.8	3.7	3.8	1.5*	
Females	96	5.7	4.2	7.1	15,846	2.8	2.7	2.8	2.1*	
Persons	190	5.6	4.5	6.7	33,711	3.2	3.2	3.2	1.7*	
Qld										
Males	841	11.7	10.5	12.8	10,834	3.0	2.9	3.1	3.9*	
Females	805	9.5	8.6	10.3	9,677	2.4	2.3	2.4	4.0*	
Persons	1,646	10.4	9.7	11.1	20,511	2.7	2.6	2.7	3.9*	
WA										
Males	923	18.4	16.9	20.0	5,073	2.9	2.8	2.9	6.4*	
Females	948	17.4	16.0	18.8	4,394	2.2	2.1	2.3	7.9*	
Persons	1,871	17.9	16.8	18.9	9,467	2.5	2.4	2.5	7.2*	
SA										
Males	236	14.9	12.4	17.5	5,560	3.6	3.5	3.7	4.2*	
Females	220	11.2	9.3	13.1	5,006	2.8	2.7	2.8	4.0*	
Persons	456	12.8	11.3	14.3	10,566	3.1	3.0	3.2	4.1*	
NT										
Males	1,255	25.8	23.9	27.8	323	3.2	2.8	3.7	8.0*	
Females	1,196	26.0	24.1	27.8	231	2.4	2.0	2.7	11.0*	
Persons	2,451	26.1	24.7	27.4	554	2.8	2.5	3.1	9.3*	
NSW, Vic, Qld, WA, SA and NT^(d)										
Males	4,051	12.9	12.3	13.5	60,920	3.3	3.3	3.4	3.9*	
Females	3,892	11.6	11.1	12.1	54,086	2.6	2.5	2.6	4.5*	
Persons	7,943	12.2	11.8	12.6	115,008	2.9	2.9	2.9	4.2*	
Australia unadjusted⁽ⁱ⁾										
Males	4,092	12.4	11.9	13.0	63,483	3.3	3.3	3.4	3.7*	
Females	3,943	11.3	10.8	11.7	56,299	2.6	2.5	2.6	4.4*	
Persons	8,035	11.8	11.4	12.2	119,784	2.9	2.9	2.9	4.1*	

(continued)

Table 1.04.1 (continued): Hospitalisations for principal diagnosis of pneumonia, by Indigenous status and sex, NSW, Vic, Qld, WA, SA and NT, July 2004 to June 2006^{(a)(b)(c)(d)}

	Indigenous				Other ^(e)				Ratio ⁽ⁱ⁾
	Number	No. per 1,000 ^(f)	LCL 95% ^(g)	UCL 95% ^(h)	Number	No. per 1,000 ^(f)	LCL 95% ^(g)	UCL 95% ^(h)	
Australia adjusted^{(j)(k)}									
Males	4,573	13.9	13.3	14.5	63,002	3.3	3.3	3.4	4.2*
Females	4,406	12.6	12.1	13.1	55,836	2.5	2.5	2.6	5.0*
Persons	8,979	13.2	12.8	13.6	118,840	2.9	2.9	2.9	4.6*

* Represents results with statistically significant differences in the Indigenous/other comparisons at the p < 0.05 level.

- (a) Data are from public and most private hospitals. Data exclude private hospitals in the Northern Territory.
- (b) Categories are based on the ICD-10-AM fifth edition (National Centre for Classification in Health 2006); ICD-10-AM codes J12–J18.
- (c) Financial year reporting.
- (d) Data are reported by state/territory of usual residence of the patient hospitalised and are for New South Wales, Victoria, Western Australia, South Australia, the Northern Territory and Queensland only. These six jurisdictions are considered to have adequate levels of Indigenous identification, although the level of accuracy varies by jurisdiction and hospital. Hospitalisation data for these six jurisdictions should not be assumed to represent the hospitalisation experience in the other jurisdictions.
- (e) 'Other' includes hospitalisations of non-Indigenous people and those for whom Indigenous status was not stated.
- (f) Directly age-standardised using the Australian 2001 standard population.
- (g) LCL = lower confidence limit.
- (h) UCL = upper confidence limit.
- (i) Rate ratio Indigenous:other.
- (j) Includes all eight states and territories, including the Australian Capital Territory and Tasmania; Other Territories and Residence State not applicable (e.g. overseas, at sea, no fixed address).
- (k) Australian hospitalisation numbers and rates have been adjusted for Indigenous under-identification using a national adjustment factor of 0.89. This factor was derived from a study undertaken by the AIHW in 2007 which assessed the level of Indigenous under-identification in hospital data in all states and territories by comparing information gathered from face-to face interviews in public hospitals with results from hospital records. By applying this factor, the number of Indigenous hospitalisations was increased by 11% and these additional hospitalisations then subtracted from the number of hospitalisations for Other Australians.

Source: AIHW analysis of National Hospital Morbidity Database.

Time series analysis

Time series data are presented for the four jurisdictions that have been assessed as having adequate identification of Indigenous hospitalisations for all years from 1998–99 to 2005–06 – Queensland, Western Australia, South Australia and the Northern Territory. These four jurisdictions represent approximately 60% of the Indigenous Australian population. New South Wales and Victoria were identified as having adequate identification of Indigenous hospitalisations from 2004–05 onwards, therefore they were included as part of the current period analysis (2004–05 to 2005–06) but not as part of the time series analyses.

All ages

Hospitalisation rates, rate ratios and rate differences between Indigenous and other Australians for pneumonia over the 7-year period 1998–99 to 2005–06 are presented in Table 1.04.2 and Figure 1.04.2.

- In Queensland, Western Australia, South Australia and the Northern Territory combined, there were apparent declines in hospitalisation rates for pneumonia among Indigenous males and persons overall during the period 1998–99 to 2005–06, however, the declines were only significant for Indigenous males. Hospitalisation rates for pneumonia declined by 15% for Indigenous males over the period.
- There were significant declines in hospitalisation rates among other Australian males over the same period, but there were no significant changes among other Australian females.
- There were also significant declines in the hospitalisation rate ratios and rate differences between Indigenous and other Australian males for pneumonia. The fitted trend implies an average yearly decline of 0.1 in the rate ratio (8% decline over the period) and 0.4 per 1,000 in the rate difference for the period 1998–99 to 2005–06 (16% decline over the period). This reflects a relative and absolute decrease in the gap between the hospitalisation rates for Indigenous and other Australian males for pneumonia.

Children aged 0–4 years

Hospitalisation rates, rate ratios and rate differences between Indigenous and other children aged 0–4 years for pneumonia over the 7-year period 1998–99 to 2005–06 are presented in Table 1.04.3 and Figure 1.04.3.

- In Queensland, Western Australia, South Australia and the Northern Territory combined, there were significant declines in hospitalisation rates for pneumonia among Indigenous children aged 0–4 years during the period 1998–99 to 2005–06. The fitted trend implies an average yearly decline in the rate of around 3 per 1,000 which is equivalent to a 48% decline in the rate over the period.
- Over the same period, there were no significant changes in the hospitalisation rates among other children aged 0–4 years for pneumonia.
- There were significant declines in both the hospitalisation rate ratios and rate differences between Indigenous and other children for pneumonia. The fitted trend implies an average yearly decline of around 0.4 in the rate ratio (39% decline over the period) and 2.6 per 1,000 in the rate difference (53% decline) for the period 1998–99 to 2005–06. This reflects a relative and absolute decline in the gap in hospitalisation rates for pneumonia among Indigenous and other Australian children aged 0–4 years over the period.

Note that changes in the level of accuracy of Indigenous identification in hospital records will result in changes in the level of reported hospital separations for Indigenous

Australians. Also, changes in access, hospital policies and practices all affect the level of hospitalisation over time. Caution should be used in interpreting changes over time as it is not possible to ascertain whether a change in reported hospitalisation is due to changes in the accuracy of Indigenous identification or real changes in the rates at which Indigenous people are hospitalised. An increase in hospitalisation rates may reflect better hospital access rather than a worsening of health.

Table 1.04.2: Age-standardised hospitalisation rates, rate ratios and rate differences for pneumonia, Qld, WA, SA and NT, 1998–99 to 2005–06^(a)

	1998–99	1999–00	2000–01	2001–02	2002–03	2003–04	2004–05	2005–06	Annual change ^(b)	% change over period ^(c)
Indigenous rate (separations per 1,000)										
Males	20.0	18.6	17.0	17.2	17.0	17.0	16.8	16.3	-0.4*	-14.8
Females	15.6	14.7	14.3	12.5	14.6	14.5	14.9	14.9	—	-0.5
Persons	17.6	16.5	15.6	14.7	15.7	15.7	15.7	15.6	-0.2	-7.9
Other Australian^(d) rate (separations per 1,000)										
Males	3.5	3.3	3.1	3.3	3.3	3.2	3.1	3.1	-0.04*	-8.0
Females	2.5	2.4	2.3	2.6	2.5	2.6	2.4	2.4	—	0.4
Persons	2.9	2.8	2.7	2.9	2.8	2.9	2.7	2.7	—	-3.6
Rate ratio^(e)										
Males	5.7	5.7	5.5	5.2	5.2	5.3	5.4	5.3	-0.1*	-7.6
Females	6.2	6.1	6.1	4.9	5.8	5.6	6.2	6.2	—	-0.9
Persons	6.0	6.0	5.8	5.1	5.5	5.5	5.8	5.8	—	-4.6
Rate difference^(f)										
Males	16.5	15.4	13.9	13.9	13.7	13.8	13.6	13.2	-0.4*	-16.2
Females	13.1	12.3	11.9	10.0	12.1	11.9	12.5	12.5	—	-0.7
Persons	14.7	13.7	12.9	11.8	12.8	12.8	13.0	12.9	-0.2	-8.8

* Represents results with statistically significant increases or declines at the $p < 0.05$ level over the period 1998–99 to 2005–06.

(a) Data are from public and most private hospitals. Data exclude private hospitals in the Northern Territory.

(b) Average annual change in rates, rate ratios and rate differences determined using linear regression analysis.

(c) Per cent change between 1998–99 and 2005–06 based on the average annual change over the period.

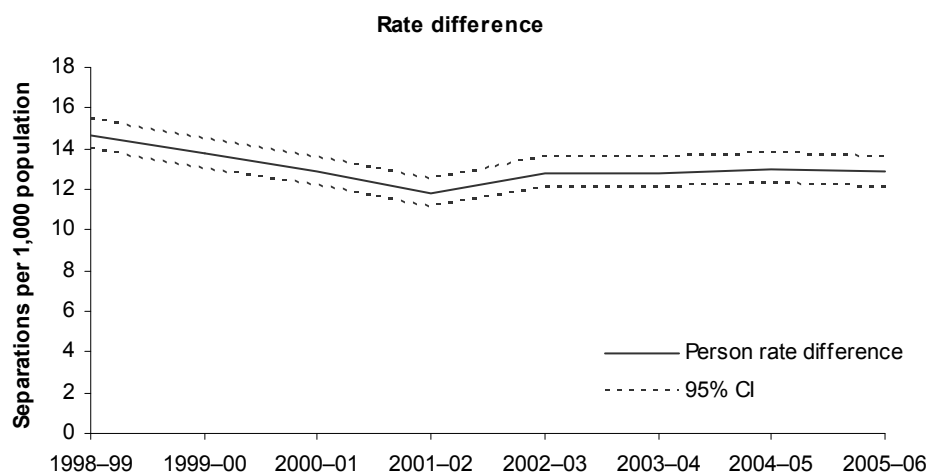
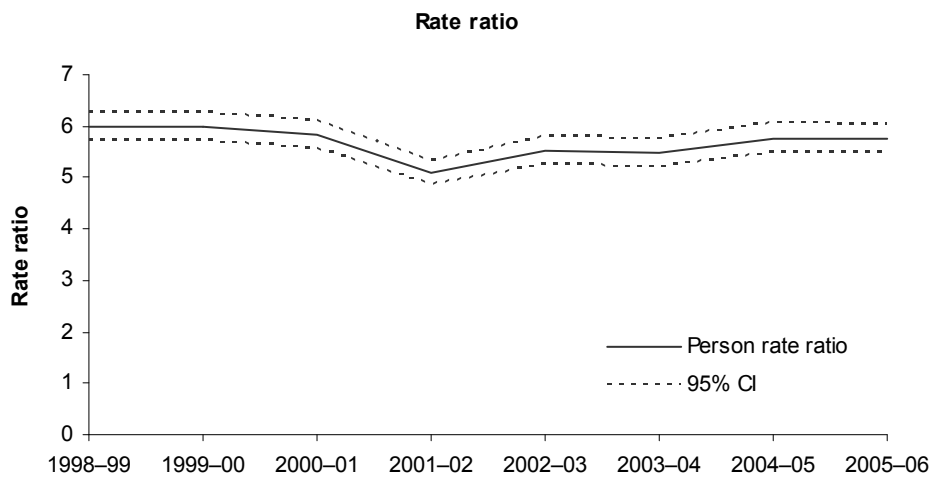
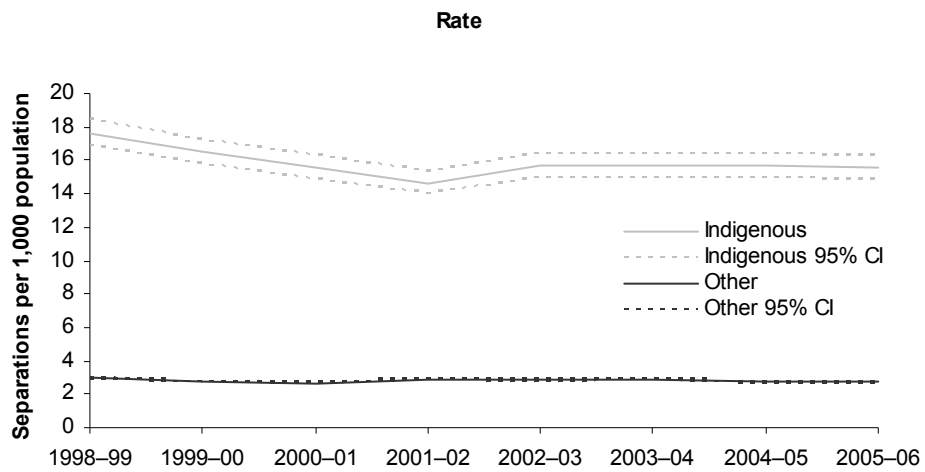
(d) 'Other' includes hospitalisations of non-Indigenous people and those for whom Indigenous status was not stated.

(e) Hospitalisation rates for Indigenous Australians divided by the hospitalisation rates for other Australians.

(f) Hospitalisation rates for Indigenous Australians minus the hospitalisation rates for other Australians.

Note: Rates have been directly age-standardised using the 2001 Australian standard population.

Source: AIHW analysis of National Hospital Morbidity Database.



Source: AIHW analysis of National Hospital Morbidity Database.

Figure 1.04.2: Hospitalisation rates, rate ratios and rate differences between Indigenous and other Australians for pneumonia, Qld, WA, SA and NT, 1998-99 to 2005-06

Table 1.04.3: Children aged 0–4 years, hospitalisation rates, rate ratios and rate differences for pneumonia, Qld, WA, SA and NT, 1998–99 to 2005–06^(a)

	1998–99	1999–00	2000–01	2001–02	2002–03	2003–04	2004–05	2005–06	Annual change ^(b)	% change over period ^(c)
Indigenous rate (separations per 1,000)										
Persons	40.1	36.5	34.8	31.8	30.3	29.6	21.3	20.7	–2.7*	–47.6
Other Australian^(d) rate (separations per 1,000)										
Persons	5.5	5.8	6.2	6.3	6.3	6.3	5.5	4.5	–0.1	–12.6
Rate ratio^(e)										
Persons	7.2	6.3	5.6	5.1	4.8	4.7	3.9	4.6	–0.4*	–38.7
Rate difference^(f)										
Persons	34.5	30.8	28.6	25.5	24.0	23.2	15.8	16.2	–2.6*	–53.2

* Represents results with statistically significant increases or declines at the $p < 0.05$ level over the period 1998–99 to 2005–06.

(a) Data are from public and most private hospitals. Data exclude private hospitals in the Northern Territory.

(b) Average annual change in rates, rate ratios and rate differences determined using linear regression analysis.

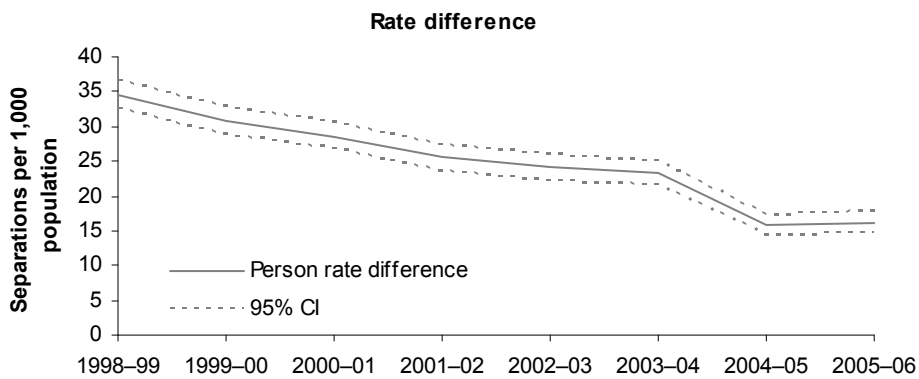
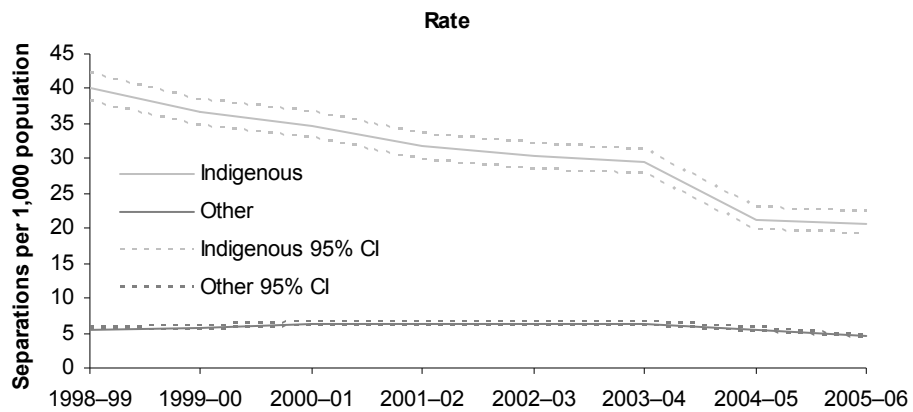
(c) Per cent change between 1998–99 and 2005–06 based on the average annual change over the period.

(d) 'Other' includes hospitalisations of non-Indigenous people and those for whom Indigenous status was not stated.

(e) Hospitalisation rates for Indigenous Australians divided by the hospitalisation rates for other Australians.

(f) Hospitalisation rates for Indigenous Australians minus the hospitalisation rates for other Australians.

Source: AIHW analysis of National Hospital Morbidity Database.



Source: AIHW analysis of National Hospital Morbidity Database.

Figure 1.04.3: Children aged 0-4 years, hospitalisation rates, rate ratios and rate differences between Indigenous and other Australians for pneumonia, Qld, WA, SA and NT, 1998-99 to 2005-06

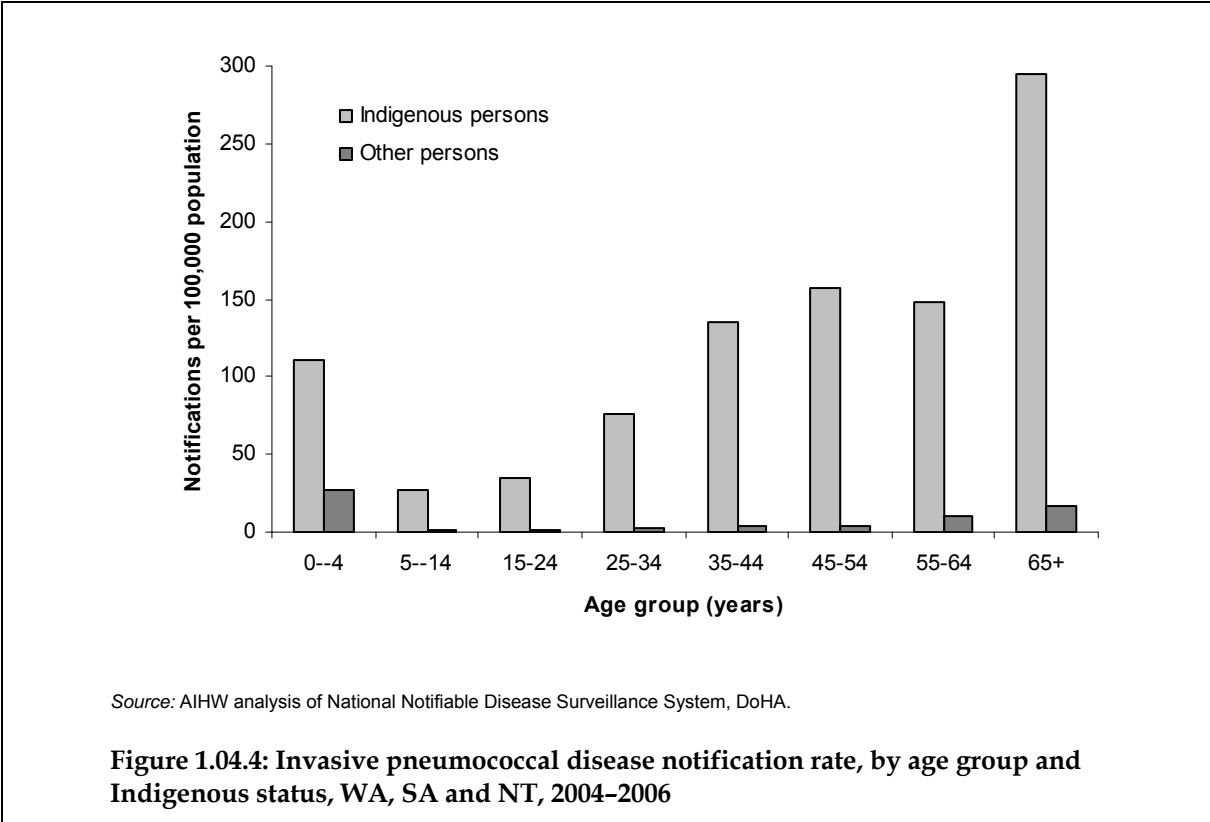
Additional information

Invasive pneumococcal disease

Pneumococcal disease is caused by the bacterium *Streptococcus pneumoniae* and can cause infection in parts of the respiratory tract (otitis media, sinusitis, pneumonia) or enter the bloodstream. Manifestations include meningitis, pneumonia and septicaemia. Invasive pneumococcal disease is defined as a sterile site isolate of *Streptococcus pneumoniae*, usually from blood (Menzies et al. 2004).

Incidence

For the period 2004–2006, there were 403 invasive pneumococcal disease notifications among Indigenous persons in Western Australia, South Australia and the Northern Territory. The notification rate for Indigenous persons was 84.5 per 100,000, which was 12 times the rate for other persons (7.1 per 100,000). Notification rates were highest among those aged 65 years and over and 45–54 years for Indigenous Australians, and highest among those aged 0–4 years and 65 years and over for other Australians. For all age groups, Indigenous Australians had higher notification rates than other Australians. Rate differences were highest among the 35–44 and 45–54 year age groups, where Indigenous Australians suffered from invasive pneumococcal disease at between 37 and 40 times the rate of other Australians. Importantly, the notification rate among Aboriginal and Torres Strait Islander peoples was significantly higher at younger ages than for other Australians. For example, the rate among those aged 5–14 years was equivalent to the rate seen among other Australians aged 65 years and over (Figure 1.04.4).



Hospitalisations

Over the period June 2004 to July 2006, there were 86 hospitalisations of Indigenous people in New South Wales, Victoria, Queensland, Western Australia, South Australia and the Northern Territory combined for invasive pneumococcal disease. Over one-quarter (27%) of these hospitalisations were among those aged 0–4 years.

Time series

Hospitalisation rates, rate ratios and rate differences between Indigenous and other children aged 0–4 years in Queensland, Western Australia, South Australia and the Northern Territory for invasive pneumococcal disease over the 7-year period 1998–99 to 2005–06 are shown in Table 1.04.4.

- In Queensland, Western Australia, South Australia and the Northern Territory combined, there were significant declines in hospitalisation rates for invasive pneumococcal disease among Indigenous children aged 0–4 years during the period 1998–99 to 2005–06. The fitted trend implies an average yearly decline in the rate of around 0.1 per 1,000, which is equivalent to a 66% decline in the rate over the period.
- Over the same period, there was an apparent decline in the hospitalisation rate for invasive pneumococcal disease among other children aged 0–4 years, but the decline was not significant.
- There was a significant decrease in the hospitalisation rates for other children between 2004–05 and 2005–06. This decrease reflects the impact of the introduction of pneumococcal vaccinations for all Australian children from January 2005 (Roche et al. 2007). The introduction of these vaccinations has not had the same impact for Indigenous children, as free pneumococcal vaccinations have been available to all Indigenous children under 2 years of age since 2001.
- There were apparent declines in both the hospitalisation rate ratios and rate differences between Indigenous and other children for invasive pneumococcal disease during the period 1998–99 to 2005–06, but these declines were not significant. The non-significance of the trends can be attributed to the large change in the other Australian rate because of the introduction of pneumococcal vaccinations for all Australian children from January 2005.

Table 1.04.4: Children aged 0–4 years, hospitalisation rates, rate ratios and rate differences for invasive pneumococcal disease, Qld, WA, SA and NT, 1998–99 to 2005–06^(a)

	1998–99	1999–00	2000–01	2001–02	2002–03	2003–04	2004–05	2005–06	Annual change ^(b)	% change ^(c)
Indigenous rate (separations per 1,000)										
Persons	0.6	0.6	0.4	0.2	0.4	0.3	0.2	0.2	-0.1*	-65.6
Other Australian^(d) rate (separations per 1,000)										
Persons	0.1	0.2	0.2	0.3	0.2	0.2	0.1	0.03	-0.01	-83.9
Rate ratio^(e)										
Persons	5.9	2.9	1.6	0.8	1.8	1.6	1.8	6.4	-0.02	-1.8
Rate difference^(f)										
Persons	0.5	0.4	0.1	-0.1	0.2	0.1	0.1	0.1	-0.05	-61.8

* Represents results with statistically significant increases or declines at the $p < 0.05$ level over the period 1998–99 to 2005–06.

- (a) Data are from public and most private hospitals. Data exclude private hospitals in the Northern Territory.
- (b) Average annual change in rates, rate ratios and rate differences determined using linear regression analysis.
- (c) Per cent change between 1998–99 and 2005–06 based on the average annual change over the period.
- (d) 'Other' includes hospitalisations of non-Indigenous people and those for whom Indigenous status was not stated.
- (e) Hospitalisation rates for Indigenous Australians divided by the hospitalisation rates for other Australians.
- (f) Hospitalisation rates for Indigenous Australians minus the hospitalisation rates for other Australians.

Note: Hospitalisations for pneumococcal meningitis (G00.1) and pneumococcal septicaemia (A40.3) have been used as a measure for invasive pneumococcal disease.

Source: AIHW analysis of National Hospital Morbidity Database.

Immunisation

A recent report from the National Centre for Immunisation Research and Surveillance of Vaccine Preventable Diseases found that among adults aged 50–64 years, coverage of pneumococcal vaccine was higher for Indigenous Australians than for other Australians (20% compared with 3% respectively) (Menziés et al. 2004). Indigenous adults in remote areas had higher vaccination coverage rates for this disease than in non-remote areas. Pneumococcal vaccinations are likely to be higher for Indigenous adults than for other adults as the vaccinations have been funded for Indigenous adults since 1999.

Data quality issues

Hospital separations data

Separations

The number and pattern of hospitalisations can be affected by differing admission practices among the jurisdictions and from year to year, and differing levels and patterns of service delivery.

Indigenous status question

Some jurisdictions have slightly different approaches to the collection and storage of the standard Indigenous status question and categories in their hospital collections. The 'not stated category' is missing from several collections. It is recommended that the standard wording and categories be used in all jurisdictions (AIHW 2005).

Under-identification

The incompleteness of Indigenous identification means the number of hospital separations recorded as Indigenous is an underestimate of hospitalisations involving Aboriginal and Torres Strait Islander peoples. For several years, Queensland, South Australia, Western Australia and the Northern Territory reported that Indigenous status in their hospital separations data was of acceptable quality (AIHW 2007). The AIHW, however, has recently completed an assessment of the level of Indigenous under-identification in hospital data in all states and territories. Results from this assessment indicate that New South Wales, Victoria, Queensland, Western Australia, South Australia and the Northern Territory have adequate Indigenous identification (20% or less overall under-identification of Indigenous patients) in their hospital separations data (AIHW unpublished data). It has therefore been recommended that reporting of Indigenous hospital separations be limited to aggregated information from New South Wales, Victoria, Queensland, Western Australia, South Australia and the Northern Territory. The proportion of the Indigenous population covered by these six jurisdictions is 96%. The following caveats have also been recommended for analysis of hospitalisation data from selected jurisdictions (ABS & AIHW 2005):

- *Interpretation of results should take into account the relative quality of the data from the jurisdictions included (currently a small degree of Indigenous under-identification in data from Western Australia and the Northern Territory and relatively marked Indigenous under-identification in data from South Australia and Victoria).*
- *Data for these six jurisdictions over-represent Indigenous populations in less urbanised and more remote locations.*
- *Hospitalisation data for these six jurisdictions are not necessarily representative of the jurisdictions not included.*

From the AIHW study it was possible to produce correction factors for the level of Indigenous under-identification in hospital data for each jurisdiction and at the national level.

Numerator and denominator

Rate and ratio calculations rely on good numerator and denominator data. The changes in the completeness of identification of Indigenous people in hospital records may take place at different rates from changes in the identification of Indigenous people in other administrative collections and population censuses. Denominators used here are sourced from Experimental estimates and projections: Aboriginal and Torres Strait Islander Australians 1991 to 2009 (ABS 2004).

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