

## 1.05 Circulatory disease

**Prevalence, incidence and number of hospital separations with a principal diagnosis of circulatory disease for Aboriginal and Torres Strait Islander peoples expressed as a rate by age group, age-standardised rate and rate ratio**

### Data sources

Data for this measure come from the National Aboriginal and Torres Strait Islander Health Survey, the Bettering the Evaluation and Care of Health survey and the AIHW National Hospital Morbidity Database.

### National Aboriginal and Torres Strait Islander Health Survey

The 2004–05 National Aboriginal and Torres Strait Islander Health Survey (NATSIHS) collected information from 10,439 Indigenous Australians of all ages. This sample was considerably larger than the supplementary Indigenous samples in the 1995 and 2001 National Health Surveys. The survey was conducted in remote and non-remote areas of Australia and collected a range of information from Indigenous Australians. This included information on health-related actions, health risk factors, health status, socioeconomic circumstances and women's health. The survey provides comparisons over time in the health of Indigenous Australians. It is planned to repeat the NATSIHS at 6-yearly intervals, with the next NATSIHS to be conducted in 2010–11. Selected non-Indigenous comparisons are available through the 2004–05 National Health Survey (NHS).

### Bettering the Evaluation and Care of Health (BEACH) survey

Information about encounters in general practice is available from the BEACH survey, which is conducted by the AIHW Australian General Practice Statistics and Classification Unit. Information is collected from a random sample of approximately 1,000 general practitioners (GPs) from across Australia each year. A sample of 100 consecutive GP–patient encounters is collected from each GP. A more detailed explanation of the BEACH methods can be found in *General practice activity in Australia 2008–09* (Britt et al. 2009).

The number of Indigenous patients identified in the BEACH survey is likely to be underestimated because some GPs might not ask the question on Indigenous status, or the patient may choose not to identify themselves (AIHW 2002). Further detailed analyses of this issue are covered in *General practice in Australia, health priorities and policies 1998 to 2008*, (Britt & Miller 2009:101):

'The findings of a BEACH substudy confirmed this suspected under-identification. In the data period reported here, 1.4% of patients encountered identified themselves as Indigenous. In contrast, in a BEACH substudy that asked 9,245 patients a complete set of questions about their cultural background (including Indigenous status) 2.2% (95% CI: 1.6–2.9) of respondents identified themselves as Indigenous (Britt et al. 2007). This rate is similar to the ABS estimates of Indigenous Australians as a proportion of the total population (ABS 2006).

However, the BEACH substudy included Indigenous Australians seen at Community Controlled Health Services funded through Medicare claims, and the estimate of 2.2% could have been an overestimate for the proportion of encounters that are with

Indigenous patients in general practice as a whole. Deeble et al. (2008) conducted further investigations on this data and estimated that the BEACH encounter identification was an underestimate of about 10%, and that a more reliable estimate of the Indigenous population would be about 1.6% of all encounters (Deeble et al. 2008).

The findings of these studies are that some GPs are not routinely asking patients at the encounter about their Indigenous status, even when this is a variable specifically collected for each patient encountered, as it is in BEACH encounter data.'

Before the late inclusion of a 'not stated' category of Indigenous status in 2001–02, 'not stated' responses were included with non-Indigenous encounters. Since then, GP encounters for which Indigenous status was not reported have been included with encounters for non-Indigenous people under the 'other' category.

Data are presented for the 5-year period 2004–05 to 2008–09, during which there were 6,137 GP encounters with Aboriginal and Torres Strait Islander patients recorded in the survey, representing 1.3% of total GP encounters.

## **National Hospital Morbidity Database**

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 that have been assessed by the AIHW as having adequate identification of Indigenous hospitalisations in 2006–08 – 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.

In the period 2007–08, there were around 276,000 hospital separations (episodes of care for admitted patients) for Aboriginal and Torres Strait Islander patients, around 3.5% of all separations. The proportion of separations of Aboriginal and Torres Strait Islander persons was higher in public hospitals (5.4% or 256,425 separations) compared with private hospitals (0.6% or 20,015 separations). Of all Aboriginal and Torres Strait Islander separations, nearly 93% occurred in public hospitals (AIHW 2009).

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, because 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 from July 2006 to June 2008. An aggregate of 2 years of data has been used, because 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. This can include a total hospital stay (from admission to discharge, transfer or death) or a portion of a hospital stay beginning or ending in a change

in the 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.

## Analyses

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

### Self-reported prevalence

Self-reported data from the NATSIHS on the prevalence of heart and circulatory conditions among Aboriginal and Torres Strait Islander people are presented in the tables in this section and Figure 1.05.1.

#### Prevalence by age and sex

- In 2004–05, approximately 12% of Indigenous Australians reported having a heart or circulatory condition as a current and long-term condition. Approximately 7% of Indigenous Australians reported having high blood pressure and 2% reported having a heart murmur or heart valve disorder.
- After adjusting for differences in age structure, approximately 23% of Indigenous Australians reported having a heart or circulatory condition compared with 20% of non-Indigenous Australians.
- High blood pressure was the most common type of heart and circulatory condition that Indigenous and non-Indigenous Australians reported (15% and 11% respectively) (Table 1.05.1), followed by high cholesterol (7% for both population groups).
- Heart and circulatory conditions were most prevalent among those aged 55 years and over (57% for Indigenous Australians and 53% for non-Indigenous Australians).
- A higher proportion of Indigenous Australians reported having a heart or circulatory problem than non-Indigenous Australians across all age groups from 25 years and over (Figure 1.05.1).

Table 1.05.1: Persons reporting heart and circulatory conditions, by Indigenous status and age group, 2004–05<sup>(a)(b)</sup>

	0–24		25–44		45–54		55 years and over		Total (crude)		Total (age-standardised)		Rate ratio
	Indig.	Non-Indig.	Indig.	Non-Indig.	Indig.	Non-Indig.	Indig.	Non-Indig.	Indig.	Non-Indig.	Indig.	Non-Indig.	
	Per cent												
<b>Total with heart or circulatory condition</b>	2	2	17	12	35	28	57	53	12	20	23*	20*	1.2*
Has current and/or long-term high blood pressure	— <sup>(c)</sup>	— <sup>(c)</sup>	8*	4*	23*	14*	43*	34*	7	11	15*	11*	1.4*
Heart murmur/heart valve disorder	1	1	3*	1*	2 <sup>(c)</sup>	2	4	3	2	2	2*	2*	1.0*
<b>Total persons ('000)</b>	<b>272.7</b>	<b>6,396.2</b>	<b>128.8</b>	<b>5,660.9</b>	<b>39.6</b>	<b>2,705.6</b>	<b>33.2</b>	<b>4,529.7</b>	<b>474.3</b>	<b>19,292.4</b>	<b>474.3</b>	<b>19,292.4</b>	..

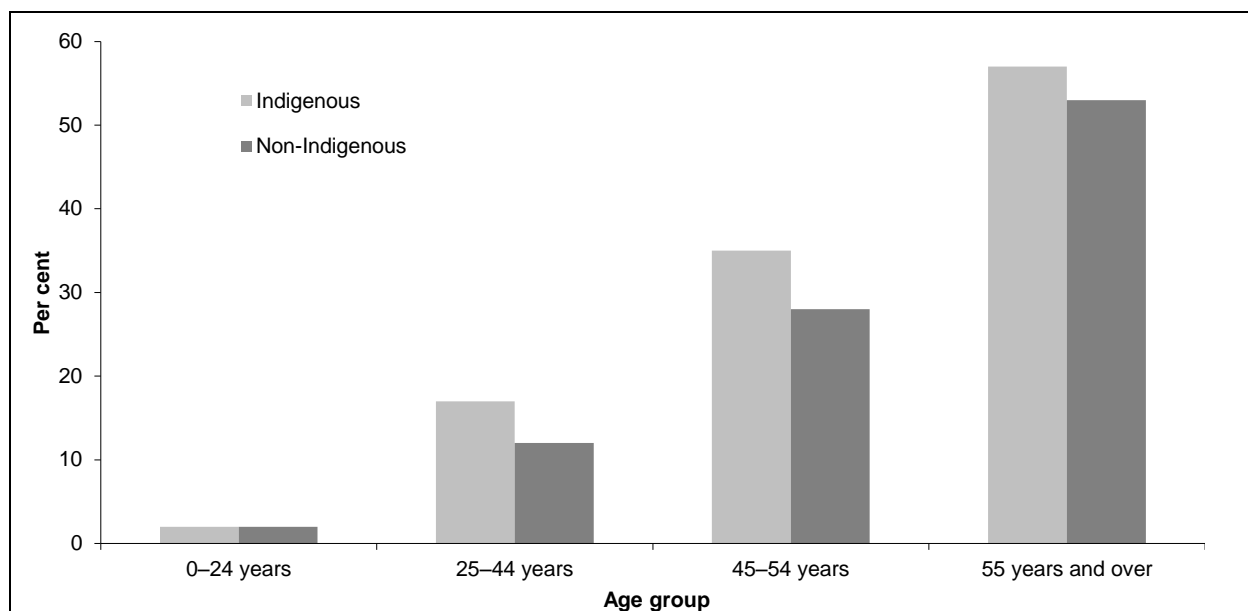
\* Represents results with statistically significant differences in the Indigenous/non-Indigenous comparisons.

(a) Self-reported data from the National Aboriginal and Torres Strait Islander Health Survey 2004–05.

(b) Age-standardised proportions.

(c) Estimate has a relative standard error of 25% to 50% and should be used with caution.

Source: ABS and AIHW analysis of 2004–05 National Aboriginal and Torres Strait Islander Health Survey and 2004–05 National Health Survey.



Source: AIHW analysis of 2004-05 National Aboriginal and Torres Strait Islander Health Survey.

**Figure 1.05.1: Proportion of persons reporting heart and circulatory conditions, by Indigenous status and age group, 2004-05**

### Prevalence by remoteness and time series

- In 2004-05, the prevalence of heart/circulatory conditions was slightly higher among Aboriginal and Torres Strait Islander males and females in remote areas (12% and 17% respectively) than those in non-remote areas (10% and 14% respectively) (Table 1.05.2).
- There has been little change in the prevalence of heart/circulatory conditions among Aboriginal and Torres Strait Islander peoples between 2001 and 2004-05.

**Table 1.05.2: Indigenous persons reporting heart and circulatory problems/diseases<sup>(a)</sup>, by sex and remoteness area, 1995, 2001 and 2004-05**

	1995 <sup>(b)</sup>			2001			2004-05		
	Males	Females	Persons	Males	Females	Persons	Males	Females	Persons
	<b>Per cent</b>								
Remote	n.a.	n.a.	n.a.	10	16	12	12	17	14
Non-remote	15	16	15	10	13	10	10	14	11
<b>Total</b>	<b>n.a.</b>	<b>n.a.</b>	<b>n.a.</b>	<b>10</b>	<b>14</b>	<b>11</b>	<b>11</b>	<b>15</b>	<b>12</b>
<b>Total number</b>	<b>131,616</b>	<b>133,800</b>	<b>265,416</b>	<b>217,893</b>	<b>225,102</b>	<b>442,995</b>	<b>232,362</b>	<b>241,948</b>	<b>474,310</b>

(a) ICD-10-AM based output classification.

(b) Non-remote data are not available from the 1995 National Health Survey.

Sources: ABS and AIHW analysis of 1995 National Health Survey (Indigenous supplement); 2001 National Health Survey (Indigenous supplement); 2004-05 National Aboriginal and Torres Strait Islander Health Survey.

## **Prevalence by selected population and health characteristics**

- In 2004–05, Indigenous Australians aged 15 years and over were more likely to report having heart or circulatory problems if they were in the lowest (1st) quintile of household income than in the highest (5th) income quintile (28% compared with 25%); if the highest year of school completed was Year 9 or below than if Year 12 was the highest year of school completed (30% compared with 24%); and if they were unemployed or not in the labour force (28% and 30%) than if they were employed (23%) (Table 1.05.3).
- Indigenous Australians with reported fair/poor health status were much more likely to report heart or circulatory problems than Indigenous Australians with excellent/very good health status (37% compared with 19%). The proportions for non-Indigenous Australians were similar (34% compared with 16%).
- Indigenous Australians aged 15 years and over were more likely to report heart or circulatory problems if they reported their exercise level as low or sedentary rather than high (28% compared with 11%). They were also more likely to report heart or circulatory problems if they had experienced stressors in the previous 12 months (21%) than if no stressors were experienced (17%); if they drank at risky/high-risk levels in the last 12 months than if they did not (31% compared with 28%); and if they were overweight and obese than if they were normal or underweight (29% compared with 21%).
- Indigenous Australians aged 15 years and over were much more likely to report having heart or circulatory problems if they also reported hypertension, diabetes or high cholesterol than if they did not report these conditions. This was also the case for non-Indigenous Australians.

**Table 1.05.3: Proportion<sup>(a)</sup> of Indigenous and non-Indigenous Australians aged 15 years and over with heart/circulatory problems, by selected population characteristics, 2004–05**

	Indigenous Australians		Non-Indigenous Australians	
	Has heart/circulatory problems	Does not have heart/circulatory problems	Has heart/circulatory problems	Does not have heart/circulatory problems
<b>Household income</b>				
1st quintile	28.2	71.8	25.7	74.3
5th quintile	24.8	75.2	16.7	83.3
<b>Financial stress—able to raise \$2,000 within a week for something important</b>				
Yes	15.9	84.1	n.a.	n.a.
No	20.0	80.0	n.a.	n.a.
<b>Highest year of school completed</b>				
Year 12	23.6	76.4	18.4	81.6
Year 9 or below	30.0	70.0	24.6	75.4
<b>Whether has non-school qualification</b>				
Has a non-school qualification	25.4	74.6	20.7	79.3
Does not have a non-school qualification	28.0	72.0	21.9	78.1
<b>Employment</b>				
Employed	22.5	77.5	17.0	83.0
Unemployed	28.2	71.8	13.6	86.4
Not in the labour force	30.3	69.7	25.9	74.1
<b>Housing</b>				
Owner	17.3	82.7	n.a.	n.a.
Renter	18.4	81.6	n.a.	n.a.
<b>Stressors in last 12 months<sup>(b)</sup></b>				
Serious illness or disability	24.5	75.5	n.a.	n.a.
Total experienced stressors	21.4	78.6	n.a.	n.a.
No stressors	16.8	83.2	n.a.	n.a.
<b>Self-assessed health status</b>				
Excellent/very good	18.8	81.2	15.9	84.1
Good	24.1	75.9	23.2	76.8
Fair/poor	37.4	62.6	33.5	66.5
<b>Smoker status<sup>(b)</sup></b>				
Current daily smoker	29.0	71.0	19.4	80.6
Not current daily smoker	27.7	72.3	22.9	77.1
<b>Risky/high-risk alcohol consumption in last 12 months<sup>(b)</sup></b>				
Yes	31.0	69.0	20.5	79.5
No	28.1	71.9	22.8	77.2

(continued)

**Table 1.05.3 (continued): Proportion<sup>(a)</sup> of Indigenous and non-Indigenous Australians aged 15 years and over with heart/circulatory problems, by selected population characteristics, 2004–05**

	Indigenous Australians		Non-Indigenous Australians	
	Has heart/circulatory problems	Does not have heart/circulatory problems	Has heart/circulatory problems	Does not have heart/circulatory problems
<b>Whether used substances in last 12 months<sup>(b)(c)</sup></b>				
Yes	13.0	87.0	n.a.	n.a.
No	21.3	78.7	n.a.	n.a.
<b>Physical activity<sup>(c)</sup></b>				
Low/sedentary	27.5	72.5	21.9	78.1
Moderate	21.9	78.1	21.0	79.0
High	11.0	89.0	15.4	84.6
<b>Overweight/obesity</b>				
Yes	29.3	70.7	23.8	76.2
No	20.6	79.4	18.5	81.5
<b>Eats vegetables daily</b>				
Yes	27.0	73.0	21.4	78.6
No	24.5	75.5	27.0	73.0
<b>Eats fruit daily</b>				
Yes	27.1	72.9	21.5	78.5
No	24.9	75.1	19.6	80.4
<b>Hypertension</b>				
Yes	97.4	2.6	94.4	5.6
No	11.6	88.4	10.9	89.1
<b>Diabetes</b>				
Yes	39.5	60.5	35.6	64.4
No	23.9	76.1	20.4	79.6
<b>High cholesterol</b>				
Yes	59.6	40.4	44.5	55.5
No	23.4	76.6	18.6	81.4
<b>Total (age-standardised)</b>	<b>26.9</b>	<b>73.1</b>	<b>21.4</b>	<b>78.6</b>
<b>Total (crude)</b>	<b>18.1</b>	<b>81.9</b>	<b>..</b>	<b>..</b>
<b>Total number persons aged 15 years and over</b>	<b>53,179</b>	<b>240,462</b>	<b>3,422,780</b>	<b>12,109,597</b>

(a) Proportions are age-standardised except for data for financial stress, housing tenure, substance use in the last 12 months and stressors experienced in the last 12 months for which crude proportions are presented, as data for non-Indigenous Australians are not available.

(b) Persons aged 18 years and over.

(c) Non-remote areas only.

Source: AIHW analysis of 2004–05 National Aboriginal and Torres Strait Islander Health Survey.



## Hospitalisations

- For the 2-year period July 2006 to June 2008, there were 906,745 hospitalisations for circulatory diseases in New South Wales, Victoria, Queensland, Western Australia, South Australia and the Northern Territory combined, 16,530 (1.8%) of which were hospitalisations of Aboriginal and Torres Strait Islander peoples.
- Circulatory disease is the seventh most common diagnosis at the ICD-10-AM chapter level for Aboriginal and Torres Strait Islander Australians admitted to hospital (excluding the Chapter which includes 'care involving dialysis'). Approximately 3% of all hospitalisations of Indigenous Australians were for circulatory diseases.

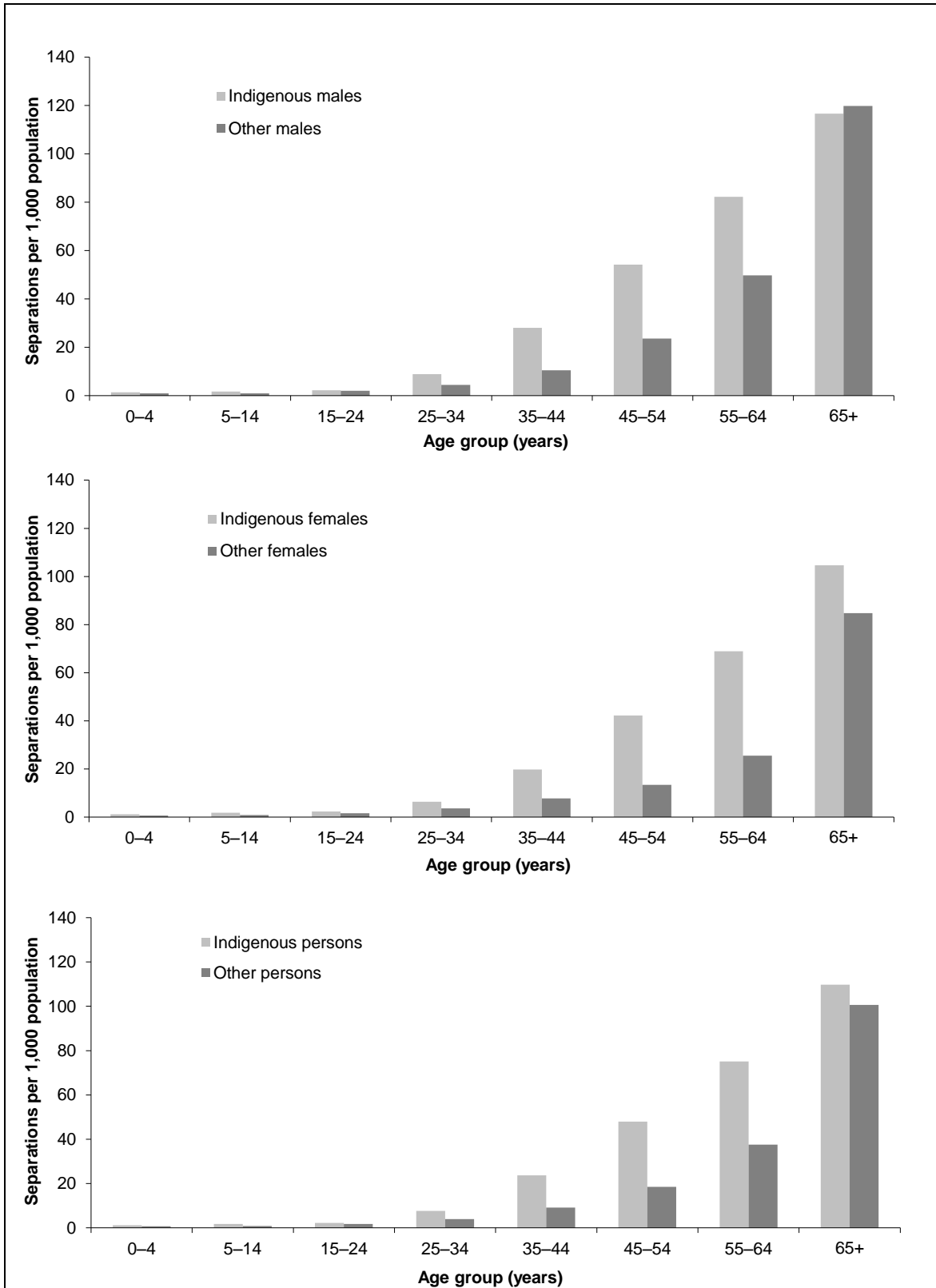
## Hospitalisations by age and sex

- For the 2-year period July 2006 to June 2008, in New South Wales, Victoria, Queensland, Western Australia, South Australia and the Northern Territory combined, Indigenous females had higher hospitalisation rates for circulatory diseases than other females across all age groups. Indigenous males had higher hospitalisation rates for circulatory diseases than other males across all age groups except for those aged over 65 years (Table 1.05.4 and Figure 1.05.2).
- The greatest difference in hospitalisation rates for males occurred in the 25–34, 35–44 and 45–54 year age groups where Indigenous males were hospitalised at between two and three times the rate of other Australian males. The greatest difference in hospitalisation rates for females occurred in the 35–44, 45–54 and 55–64 year age groups where Indigenous females were hospitalised at around three times the rate of other Australian females.
- Hospitalisation rates for circulatory diseases increased with age for both Indigenous and other Australians.
- Approximately 52% of Indigenous Australians hospitalised for circulatory diseases were males (8,630) and 48% were females (7,900).

**Table 1.05.4: Age-specific hospitalisation rates for a principal diagnosis of circulatory disease, by Indigenous status and sex, NSW, Vic, Qld, WA, SA and NT, July 2006 to June 2008**

	0–4	5–14	15–24	25–34	35–44	45–54	55–64	65+
<b>Males</b>	<b>Number per 1,000 population</b>							
Indigenous	1.3	1.7	2.2	8.9	28.0	54.2	82.2	116.6
Other	0.9	0.9	1.9	4.4	10.5	23.6	49.6	119.8
<b>Females</b>								
Indigenous	1.1	1.8	2.3	6.4	19.8	42.2	68.9	104.7
Other	0.6	0.8	1.6	3.6	7.8	13.4	25.5	84.8
<b>Persons</b>								
Indigenous	1.2	1.7	2.3	7.6	23.7	48.0	75.1	109.7
Other	0.8	0.8	1.8	4.0	9.1	18.5	37.6	100.6

Source: AIHW analysis of National Hospital Morbidity Database.



Source: AIHW analysis of National Hospital Morbidity Database.

**Figure 1.05.2: Age-specific hospitalisation rates for a principal diagnosis of circulatory disease, by Indigenous status and sex, NSW, Vic, Qld, WA, SA and NT, July 2006 to June 2008**

## **Hospitalisations by state/territory**

Table 1.05.5 presents hospitalisations for a principal diagnosis of diseases of the circulatory system for the 2-year period July 2006 to June 2008 for New South Wales, Victoria, Queensland, Western Australia, South Australia and the Northern Territory.

Over the period July 2006 to June 2008, Indigenous Australians in New South Wales, Victoria, Queensland, Western Australia, South Australia and the Northern Territory combined were hospitalised for circulatory disease at 1.6 times the rate of other Australians.

- When hospital rates are adjusted at the national level for Indigenous under-identification, Indigenous persons were hospitalised for circulatory disease at 1.7 times the rate of other Australians.
- In Queensland, Western Australia, South Australia and the Northern Territory, Indigenous persons were hospitalised for circulatory diseases at around twice the rate of other Australians. Indigenous persons were hospitalised at 1.6 times the rate of other Australians for circulatory disease in the Australian Capital Territory, 1.4 times the rate of other Australians in New South Wales, and at similar rates to other Australians in Victoria and Tasmania.

**Table 1.05.5: Hospitalisations for principal diagnosis of diseases of the circulatory system, by Indigenous status and sex, NSW, Vic, Qld, WA, SA and NT, Tas and ACT, July 2006 to June 2008<sup>(a)(b)(c)(d)(e)</sup>**

	Indigenous				Other <sup>(f)</sup>				Ratio <sup>(i)</sup>
	Number	No. per 1,000 <sup>(g)</sup>	LCL 95% <sup>(h)</sup>	UCL 95% <sup>(i)</sup>	Number	No. per 1,000 <sup>(g)</sup>	LCL 95% <sup>(h)</sup>	UCL 95% <sup>(i)</sup>	
<b>NSW</b>									
Males	2,443	32.8	31.2	34.4	177,488	25.9	25.8	26.0	1.3*
Females	2,036	26.0	24.7	27.3	130,891	16.3	16.2	16.4	1.6*
Persons	4,479	29.2	28.2	30.2	308,384	20.8	20.7	20.9	1.4*
<b>Vic</b>									
Males	385	22.9	20.3	25.6	140,195	27.3	27.1	27.4	0.8*
Females	422	23.5	21.1	25.9	108,212	17.9	17.8	18.0	1.3*
Persons	807	23.2	21.4	25.0	248,408	22.3	22.2	22.4	1.0
<b>Qld</b>									
Males	2,450	40.7	38.7	42.7	104,170	26.3	26.1	26.4	1.5*
Females	2,405	35.8	34.1	37.5	74,433	17.0	16.8	17.1	2.1*
Persons	4,855	38.1	36.8	39.4	178,603	21.4	21.3	21.5	1.8
<b>WA</b>									
Males	1,519	43.8	41.1	46.6	45,300	23.0	22.8	23.2	1.9*
Females	1,319	34.6	32.4	36.7	31,210	14.4	14.2	14.5	2.4*
Persons	2,838	38.8	37.1	40.4	76,510	18.5	18.4	18.7	2.1*
<b>SA</b>									
Males	538	40.1	36.2	44.1	42,388	25.0	24.8	25.3	1.6*
Females	518	32.7	29.6	35.8	32,665	16.0	15.8	16.2	2.0*
Persons	1,056	36.0	33.5	38.4	75,053	20.2	20.1	20.4	1.8*
<b>NT</b>									
Males	1,295	38.1	35.5	40.8	2,245	19.4	18.4	20.4	2.0*
Females	1,200	29.8	27.9	31.7	1,012	11.8	11.0	12.7	2.5*
Persons	2,495	33.3	31.7	34.8	3,257	16.0	15.3	16.6	2.1*
<b>NSW, Vic, Qld, WA, SA &amp; NT<sup>(k)</sup></b>									
<b>Males</b>	<b>8,630</b>	<b>36.8</b>	<b>35.9</b>	<b>37.8</b>	<b>511,786</b>	<b>25.9</b>	<b>25.9</b>	<b>26.0</b>	<b>1.4*</b>
<b>Females</b>	<b>7,900</b>	<b>30.6</b>	<b>29.8</b>	<b>31.3</b>	<b>378,423</b>	<b>16.6</b>	<b>16.5</b>	<b>16.6</b>	<b>1.8*</b>
<b>Persons</b>	<b>16,530</b>	<b>33.5</b>	<b>32.9</b>	<b>34.1</b>	<b>890,215</b>	<b>21.0</b>	<b>21.0</b>	<b>21.1</b>	<b>1.6*</b>
<b>Tas</b>									
Males	101	13.0	10.1	16.0	8,196	15.5	15.2	15.9	0.8
Females	91	9.7	7.4	11.9	5,983	10.0	9.7	10.2	1.0
Persons	192	11.2	9.4	13.0	14,179	12.6	12.4	12.8	0.9

(continued)

**Table 1.05.5 (continued): Hospitalisations for principal diagnosis of diseases of the circulatory system, by Indigenous status and sex, NSW, Vic, Qld, WA, SA and NT, Tas and ACT, July 2006 to June 2008<sup>(a)(b)(c)(d)(e)</sup>**

	Indigenous				Other <sup>(f)</sup>				Ratio <sup>(j)</sup>
	Number	No. per 1,000 <sup>(g)</sup>	LCL 95% <sup>(h)</sup>	UCL 95% <sup>(i)</sup>	Number	No. per 1,000 <sup>(g)</sup>	LCL 95% <sup>(h)</sup>	UCL 95% <sup>(i)</sup>	
<b>ACT</b>									
Males	30	25.6	13.0	38.3	4,675	16.7	16.2	17.2	1.5
Females	17	18.2	8.2	28.2	3,375	10.8	10.4	11.2	1.7
Persons	47	21.6	13.7	29.5	8,050	13.6	13.3	13.9	1.6*

\* 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. Jurisdictional data excludes private hospitals in the Northern Territory, Tasmania and the Australian Capital Territory.
- (b) Categories are based on the ICD-10-AM fifth edition (National Centre for Classification in Health 2006).
- (c) Financial year reporting.
- (d) Data are reported by state/territory of usual residence of the patient hospitalised.
- (e) Age-standardised rates for New South Wales, Victoria, Queensland, Western Australia, South Australia, the Northern Territory and Australia have been calculated using the direct method, age-standardised by 5-year age group to 75+. Age-standardised rates for Tasmania and the Australian Capital Territory have been calculated using the direct method, age-standardised by 5-year age group to 65+.
- (f) 'Other' includes hospitalisations of non-Indigenous people and those for whom Indigenous status was not stated.
- (g) Directly age-standardised using the Australian 2001 standard population.
- (h) LCL = lower confidence limit.
- (i) UCL = upper confidence limit.
- (j) Rate ratio Indigenous: other.
- (k) New South Wales, Victoria, Western Australia, South Australia, the Northern Territory and Queensland 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.

#### Notes

1. Rates for Indigenous people are calculated using population estimates based on 2006 Census (SERIES B).
2. Care types 7.3, 9 and 10 (Newborn – unqualified days only; organ procurement; hospital boarder) excluded from analysis.

Source: AIHW analysis of National Hospital Morbidity Database.

## Hospitalisations by Australian Standard Geographical Classification

Hospitalisation rates for circulatory diseases in New South Wales, Victoria, Queensland, Western Australia, South Australia and the Northern Territory are presented by Australian Standard Geographical Classification (ASGC) in Table 1.05.6, covering the period July 2007 to June 2009.

- Indigenous Australians in all remoteness areas were more likely to be hospitalised for circulatory diseases than other Australians. The ratio of hospitalisations of Indigenous people compared to other Australians was higher and the difference was statistically significant for all ASGC areas.
- Rates of hospitalisations per 1,000 people were highest for Indigenous people living in *Remote* areas, at 51 per 1,000. The rate was highest for other Australians who lived in *Inner regional* areas, at 24 per 1,000. The lowest rates were observed in *Major cities* for both Indigenous people (28 per 1,000) and other Australians (21 per 1,000).
- Indigenous people were hospitalised for these conditions at a rate of 2.3 times that of other Australians in *Remote* areas of Australia. In *Major cities*, where the lowest ratio was observed, Indigenous Australians were hospitalised at a rate of 1.4 times that of other Australians. Nationally, the rate was 1.7 times.

**Table 1.05.6: Hospitalisations for principal diagnosis of diseases of the circulatory system, by Indigenous status and remoteness, NSW, Vic, Qld, WA, SA and NT, July 2007 to June 2009<sup>(a)(b)(c)(d)(e)(f)</sup>**

	Indigenous				Other <sup>(g)</sup>				Ratio <sup>(k)</sup>
	Number	No. per 1,000 <sup>(h)</sup>	LCL 95% <sup>(i)</sup>	UCL 95% <sup>(j)</sup>	Number	No. per 1,000 <sup>(h)</sup>	LCL 95% <sup>(i)</sup>	UCL 95% <sup>(j)</sup>	
Major cities	4,038	28.4	27.4	29.4	586,641	21.0	20.9	21.0	1.4*
Inner regional	3,374	38.1	36.7	39.6	205,060	23.6	23.5	23.7	1.6*
Outer regional <sup>(l)</sup>	4,349	43.2	41.8	44.7	88,157	23.0	22.8	23.1	1.9*
Remote	2,650	51.2	49.0	53.4	10,473	22.0	21.6	22.4	2.3*
Very remote	2,936	32.5	30.3	34.7	3,160	22.1	21.9	22.3	1.5*
Missing	7	..	..	..	383	..	..	..	..
<b>Total<sup>(m)</sup></b>	<b>17,354</b>	<b>36.5</b>	<b>35.9</b>	<b>37.1</b>	<b>893,874</b>	<b>21.7</b>	<b>21.7</b>	<b>21.8</b>	<b>1.7*</b>

\* 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. Jurisdictional data excludes private hospitals in the Northern Territory.
- (b) Categories are based on the ICD-10-AM fifth edition (National Centre for Classification in Health 2006).
- (c) Financial year reporting.
- (d) Data are reported by state/territory of usual residence of the patient hospitalised.
- (e) Age-standardised rates for New South Wales, Victoria, Queensland, Western Australia, South Australia, the Northern Territory and Australia have been calculated using the direct method, age-standardised by 5-year age group to 65+.
- (f) New South Wales, Victoria, Western Australia, South Australia, the Northern Territory and Queensland 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.
- (g) 'Other' includes hospitalisations of non-Indigenous people and those for whom Indigenous status was not stated.
- (h) Directly age-standardised using the Australian 2001 standard population.
- (i) LCL = lower confidence limit.
- (j) UCL = upper confidence limit.
- (k) Rate ratio Indigenous: other.
- (l) Outer regional includes remote Victoria.
- (m) Total includes hospitalisations where ASGC is missing.

*Notes*

1. Rates for Indigenous are calculated using the 2006 population estimates based on the 2006 Census (Series B).
2. Care types 7.3, 9 and 10 (Newborn – unqualified days only; organ procurement; hospital boarder) excluded from analysis.

Source: AIHW analysis of National Hospital Morbidity Database.

## **Hospitalisations by principal diagnosis**

Table 1.05.7 presents hospitalisations with a principal diagnosis of diseases of the circulatory system by type of circulatory disease for the 2-year period July 2006 to June 2008 for the six jurisdictions.

- In New South Wales, Victoria, Queensland, Western Australia, South Australia and the Northern Territory combined, of all hospitalisations with a principal diagnosis of diseases of the circulatory system, ischaemic heart disease was the most common reason for hospitalisation among Aboriginal and Torres Strait Islander peoples (44%), followed by pulmonary heart disease and other forms of heart disease (30%).
- Indigenous males and females were hospitalised for acute rheumatic fever and chronic rheumatic heart disease at much higher rates than other males and females (5 and 8 times respectively).
- Indigenous males and females were hospitalised for ischaemic heart disease at twice and three times the rate of other males and females respectively.
- Indigenous Australians were hospitalised at almost 3 times the rate of other Australians for hypertension disease.

**Table 1.05.7: Hospitalisations of Indigenous persons for principal diagnosis of diseases of the circulatory system, by type of circulatory disease and sex, NSW, Vic, Qld, WA, SA and NT, July 2006 to June 2008<sup>(a)(b)(c)(d)</sup>**

Principal diagnosis	Males						Females						Persons					
	No.	% <sup>(e)</sup>	No. per 1,000 <sup>(f)</sup>	LCL 95% <sup>(g)</sup>	UCL 95% <sup>(h)</sup>	Ratio <sup>(i)</sup>	No.	% <sup>(e)</sup>	No. per 1,000 <sup>(f)</sup>	LCL 95% <sup>(g)</sup>	UCL 95% <sup>(h)</sup>	Ratio <sup>(i)</sup>	No.	% <sup>(e)</sup>	No. per 1,000 <sup>(f)</sup>	LCL 95% <sup>(g)</sup>	UCL 95% <sup>(h)</sup>	Ratio <sup>(i)</sup>
Ischaemic heart disease (I20–I25)	4,069	47.1	17.2	16.6	17.9	1.7*	3,143	39.8	12.4	11.9	12.9	2.8*	7,212	43.6	14.6	14.3	15.0	2.1*
<i>Acute myocardial infarction (I21)</i>	1,742	20.2	7.2	6.8	7.6	2.2*	1,129	14.3	4.6	4.3	4.9	3.1*	2,871	17.4	5.8	5.5	6.0	2.5*
<i>Subsequent myocardial infarction (I22)</i>	14	0.2	0.1	0.03	0.1	4.3*	20	0.3	0.1	0.04	0.1	9.9*	34	0.2	0.1	0.1	0.1	6.2*
Pulmonary heart disease and other forms of heart disease (I26–I52)	2,516	29.2	11.5	10.9	12.1	1.5*	2,469	31.3	10.2	9.7	10.7	1.9*	4,985	30.2	10.8	10.4	11.2	1.7*
Cerebrovascular disease (I60–I69)	646	7.5	3.5	3.1	3.8	1.6*	683	8.6	3.0	2.8	3.3	1.9*	1,329	8.0	3.2	3.0	3.4	1.8*
<i>Stroke (I60–I64)</i>	557	6.5	3.0	2.7	3.3	1.7*	603	7.6	2.8	2.5	3.0	2.1*	1,160	7.0	2.9	2.7	3.1	1.9*
Acute rheumatic fever and chronic rheumatic heart disease (I00–I09)	274	3.2	0.5	0.4	0.6	5.3*	428	5.4	0.9	0.8	1.0	8.2*	702	4.2	0.7	0.6	0.8	6.9*
Hypertension disease (I10–I15)	200	2.3	0.7	0.6	0.8	2.6*	269	3.4	1.0	0.8	1.1	2.5*	469	2.8	0.8	0.8	0.9	2.6*
Other diseases of the circulatory system (I70–I99) <sup>(i)</sup>	925	10.7	3.4	3.1	3.7	0.6*	908	11.5	3.1	2.8	3.3	0.6*	1,833	11.1	3.2	3.0	3.4	0.6*
<b>Total</b>	<b>8,630</b>	<b>100.0</b>	<b>36.8</b>	<b>35.9</b>	<b>37.8</b>	<b>1.4*</b>	<b>7,900</b>	<b>100.0</b>	<b>30.5</b>	<b>29.8</b>	<b>31.3</b>	<b>1.8*</b>	<b>16,530</b>	<b>100.0</b>	<b>33.4</b>	<b>32.8</b>	<b>34.0</b>	<b>1.6*</b>

(continued)



**Table 1.05.7 (continued): Hospitalisations of Indigenous persons for principal diagnosis of diseases of the circulatory system, by type of circulatory disease and sex, NSW, Vic, Qld, WA, SA and NT, July 2006 to June 2008<sup>(a)(b)(c)(d)</sup>**

\* 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 I00–I99.
- (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 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) Proportion of male, female and total hospitalisations of Indigenous persons in the period 2006–07 to 2007–08.
- (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 disease of arteries, arterioles and capillaries, diseases of veins, lymphatic vessels and lymph nodes and other unspecified disorders of the circulatory system.

*Notes*

1. Rates for Indigenous are calculated using population estimates based on 2006 Census (SERIES B).
2. Care types 7.3, 9 and 10 (Newborn – unqualified days only; organ procurement; hospital boarder) excluded from analysis.

*Source:* AIHW analysis of National Hospital Morbidity Database.

## Hospitalisations by additional diagnosis

Table 1.05.8 presents hospitalisations for additional causes of diseases of the circulatory system for Aboriginal and Torres Strait Islander peoples in New South Wales, Victoria, Queensland, Western Australia, South Australia and the Northern Territory combined.

- For the 2-year period July 2006 to June 2008, hospitalisations of Indigenous Australians with a principal diagnosis of circulatory diseases were commonly reported with other diseases of the circulatory system (67%) and the disease category 'contact with health services and factors influencing health status' which includes dialysis (67%). Furthermore, over half of all hospitalisations of Indigenous Australians with a principal diagnosis of circulatory disease were reported with an additional diagnosis of endocrine, metabolic and nutritional disorders (52%).
- In particular, hospitalisations with a principal diagnosis of ischaemic heart disease, cerebrovascular disease and other heart disease were commonly reported with an additional diagnosis of endocrine, metabolic and nutritional disorders (61%, 54% and 53% respectively).
- Indigenous Australians who were hospitalised with a principal diagnosis of cerebrovascular disease, which includes stroke, had diseases of the nervous system commonly reported as an additional diagnosis of hospitalisation (59%), as well as symptoms, signs and abnormal clinical and laboratory findings (49%).

**Table 1.05.8: Hospitalisations of Indigenous persons for principal diagnosis of circulatory disease, by additional diagnoses of hospitalisation, NSW, Vic, Qld, WA, SA and NT, July 2006 to June 2008<sup>(a)(b)(c)(d)</sup>**

Reported with a principal diagnosis of circulatory disease										
Additional diagnoses of hospitalisation	Ischaemic heart disease (I20–I25)	Acute myocardial infarction (I21)	Subsequent myocardial infarction (I22)	Pulmonary heart disease/ Other heart disease (I26–I52)	Cerebro-vascular disease (I60–I69)	Stroke (I60–I64)	Acute rheumatic fever /chronic rheumatic heart disease (I00–I09)	Hypertensive disease (I10–I15)	Other circulatory diseases (I70–I99) <sup>(e)</sup>	All circulatory diseases
Per cent										
Diseases of the circulatory system (I00–I99)	79.8	81.8	85.3	67.6	71.3	72.2	46.0	16.6	32.3	67.0
Contact with health services & factors influencing health status (includes dialysis) (Z00–Z99)	75.3	77.2	79.4	63.8	65.9	66.3	44.6	48.0	54.3	66.7
Endocrine, nutritional & metabolic diseases (E00–E90)	61.4	60.4	67.6	53.4	53.6	54.6	18.7	26.2	25.9	51.6
Diseases of the genitourinary system (N00–N99)	16.9	20.1	29.4	24.8	21.9	21.9	7.0	21.7	14.7	19.1
Diseases of the respiratory system (J00–J99)	10.8	14.1	23.5	21.9	14.4	14.7	12.8	6.8	6.3	13.9
Symptoms, signs & abnormal clinical & laboratory findings (R00–R99)	8.0	9.8	8.8	15.8	48.5	50.9	12.7	22.4	12.1	14.7

(continued)

Table 1.05.8 (continued): Hospitalisations of Indigenous persons for principal diagnosis of circulatory disease, by additional diagnoses of hospitalisation, NSW, Vic, Qld, WA, SA and NT, July 2006 to June 2008<sup>(a)(b)(c)(d)</sup>

Additional diagnoses of hospitalisation	Reported with a principal diagnosis of circulatory disease									
	Ischaemic heart disease (I20–I25)	Acute myocardial infarction (I21)	Subsequent myocardial infarction (I22)	Pulmonary heart disease/ Other heart disease (I26–I52)	Cerebro-vascular disease (I60–I69)	Stroke (I60–I64)	Acute rheumatic fever /chronic rheumatic heart disease (I00–I09)	Hypertensive disease (I10–I15)	Other circulatory diseases (I70–I99) <sup>(e)</sup>	All circulatory diseases
	Per cent									
Mental & behavioural disorders (F00–F99)	10.4	12.1	14.7	14.2	17.6	17.9	4.8	11.9	9.1	11.8
Diseases of the nervous system (G00–G99)	4.9	5.7	11.8	7.8	59.3	63.4	1.7	4.7	5.0	10.0
Diseases of the digestive system (K00–K93)	5.0	6.0	5.9	9.0	10.1	10.8	5.4	5.3	15.4	7.8
Certain infectious and parasitic diseases (A00–B99)	4.9	6.5	2.9	8.6	12.3	13.4	10.7	4.3	8.3	7.2
Diseases of the blood and disorders involving immune mechanism (D50–D89)	5.5	7.1	17.6	7.9	7.4	7.6	12.7	3.4	7.1	6.8
Diseases of the eye and adnexa (H00–H59)	3.9	4.5	14.7	5.2	12.9	13.7	0.7	4.3	3.4	4.8

(continued)

**Table 1.05.8 (continued): Hospitalisations of Indigenous persons for principal diagnosis of circulatory disease, by additional diagnoses of hospitalisation, NSW, Vic, Qld, WA, SA and NT, July 2006 to June 2008<sup>(a)(b)(c)(d)</sup>**

Additional diagnoses of hospitalisation	Reported with a principal diagnosis of circulatory disease									
	Ischaemic heart disease (I20–I25)	Acute myocardial infarction (I21)	Subsequent myocardial infarction (I22)	Pulmonary heart disease/ Other heart disease (I26–I52)	Cerebro-vascular disease (I60–I69)	Stroke (I60–I64)	Acute rheumatic fever /chronic rheumatic heart disease (I00–I09)	Hypertensive disease (I10–I15)	Other circulatory diseases (I70–I99) <sup>(e)</sup>	All circulatory diseases
	Per cent									
Injury & poisoning and other consequences of external causes (S00–T98)	4.2	5.4	2.9	3.8	7.0	7.2	6.1	2.6	5.7	4.5
Other <sup>(f)</sup>	5.7	6.8	11.8	11.6	13.5	13.3	16.1	10.4	12.9	9.5
<b>Total number</b>	<b>7,212</b>	<b>2,871</b>	<b>34</b>	<b>4,985</b>	<b>1,329</b>	<b>1,160</b>	<b>702</b>	<b>469</b>	<b>1,833</b>	<b>16,530</b>

(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 I00–I99.

(c) Financial year reporting.

(d) Indigenous 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 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) Includes diseases of arteries, arterioles and capillaries, diseases of veins, lymphatic vessels and lymph nodes and other unspecified disorders of the circulatory system.

(f) Includes diseases of the musculoskeletal system and connective tissue; diseases of the skin and subcutaneous tissue; neoplasms; congenital malformations, deformations and chromosomal abnormalities; diseases of the ear and mastoid process; pregnancy, childbirth and the puerperium; and certain conditions originating in the perinatal period.

*Notes*

1. Sum of components may exceed 100% as more than one additional diagnosis can be reported for each hospitalisation.

2. Care types 7.3, 9 and 10 (Newborn – unqualified days only; organ procurement; hospital boarder) excluded from analysis.

Source: AIHW analysis of National Hospital Morbidity Database.

## Time series analysis

Time series data from 2001–02 to 2007–08 are presented for the four jurisdictions that have been assessed as having adequate identification of Indigenous hospitalisations over this period – Queensland, Western Australia, South Australia and the Northern Territory. These four jurisdictions represent approximately 60% of the Indigenous Australian population.

Additional trend analysis has also been presented for New South Wales, Victoria, Queensland, Western Australia, South Australia and the Northern Territory combined, from 2004–05 to 2007–08 for Indigenous and other Australians. New South Wales and Victoria have been assessed as having adequate identification of Indigenous hospitalisations from 2004–05. These six jurisdictions represent approximately 96% of the Indigenous population of Australia.

### Circulatory disease – 2001–02 to 2007–08

Hospitalisation rates, rate ratios and rate differences between Indigenous and other Australians for diseases of the circulatory system over the 7-year period 2001–02 to 2007–08 are presented in Table 1.05.9 and Figure 1.05.3.

- In Queensland, Western Australia, South Australia and the Northern Territory combined, there was a non-significant increase in hospitalisation rates for circulatory diseases among Indigenous Australians during the period 2001–02 to 2007–08. The fitted trend implies an average yearly increase in the rate of 0.04 per 1,000 which is equivalent to an increase of 1% over the period.
- There were significant declines in hospitalisation rates among other Australians during the same period, with an average yearly decrease in the rate of around 0.3 per 1,000 population. This is equivalent to an 8% decline over the period.
- There was a significant increase in the hospitalisation rate ratio and a non-significant increase in the rate differences between Indigenous and other Australians for circulatory diseases over the period 2001–02 to 2007–08. The fitted trend implies an average yearly increase of 0.03 in the rate ratio (10% increase over the period) and 0.3 per 1,000 in the rate difference between Indigenous and other Australians (13% increase) for the period 2001–02 to 2007–08. This reflects a relative and absolute increase in the gap between hospitalisation rates for Indigenous and other Australians for circulatory diseases.

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, as will changes in access, hospital policies and practices 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 also reflect increased use of admitted patient hospital services rather than a worsening of health.

**Table 1.05.9: Age-standardised hospitalisation rates, rate ratios and rate differences from circulatory diseases, Qld, WA, SA and NT, 2001–02 to 2007–08<sup>(a)</sup>**

	2001–02	2002–03	2003–04	2004–05	2005–06	2006–07	2007–08	Annual change <sup>(b)</sup>	Per cent change over period <sup>(c)</sup>
<b>Indigenous separations</b>									
Males	2,383	2,507	2,678	2,687	2,979	2,803	2,999	98*	24.6*
Females	2,359	2,276	2,354	2,635	2,658	2,672	2,770	83*	21.2*
Persons	4,742	4,783	5,032	5,322	5,637	5,475	5,769	181*	22.9*
<b>Other Australian separations</b>									
Males	88,311	88,697	89,412	91,043	92,278	96,094	98,009	1,670*	11.3*
Females	66,943	66,061	66,072	67,742	66,961	69,119	70,201	599*	5.4*
Persons	155,254	154,758	155,484	158,785	159,239	165,213	168,210	2,269*	8.8*
<b>Indigenous rate (separations per 1,000)</b>									
Males	39.7	41.3	43.4	39.1	43.1	39.4	42.4	0.1	2.0
Females	34.8	34.0	32.3	35.0	35.0	33.6	34.0	0.0	-0.4
Persons	37.1	37.4	37.2	37.0	38.8	36.2	37.7	0.0	0.6
<b>Other Australian<sup>(d)</sup> rate (separations per 1,000)</b>									
Males	27.0	26.3	25.7	25.4	24.9	25.2	24.9	-0.3*	-7.4*
Females	17.7	17.0	16.6	16.6	16.0	16.1	15.9	-0.3*	-9.5*
Persons	22.1	21.4	20.9	20.8	20.3	20.5	20.3	-0.3*	-8.0*
<b>Rate ratio<sup>(e)</sup></b>									
Males	1.5	1.6	1.7	1.5	1.7	1.6	1.7	0.0	10.5
Females	2.0	2.0	1.9	2.1	2.2	2.1	2.1	0.03*	10.0*
Persons	1.7	1.7	1.8	1.8	1.9	1.8	1.9	0.03*	9.6*

(continued)

**Table 1.05.9 (continued): Age-standardised hospitalisation rates, rate ratios and rate differences from circulatory diseases, Qld, WA, SA and NT, 2001–02 to 2007–08<sup>(a)</sup>**

	2001–02	2002–03	2003–04	2004–05	2005–06	2006–07	2007–08	Annual change <sup>(b)</sup>	Per cent change over period <sup>(c)</sup>
<b>Rate difference<sup>(f)</sup></b>									
Males	12.7	15.0	17.7	13.7	18.2	14.2	17.5	0.5	22.1
Females	17.1	17.0	15.7	18.4	19.0	17.5	18.0	0.3	8.9
Persons	15.0	16.0	16.3	16.2	18.5	15.8	17.5	0.3	13.4

\* Represents results with statistically significant increases or declines at the  $p < 0.05$  level over the period 2001–02 to 2007–08.

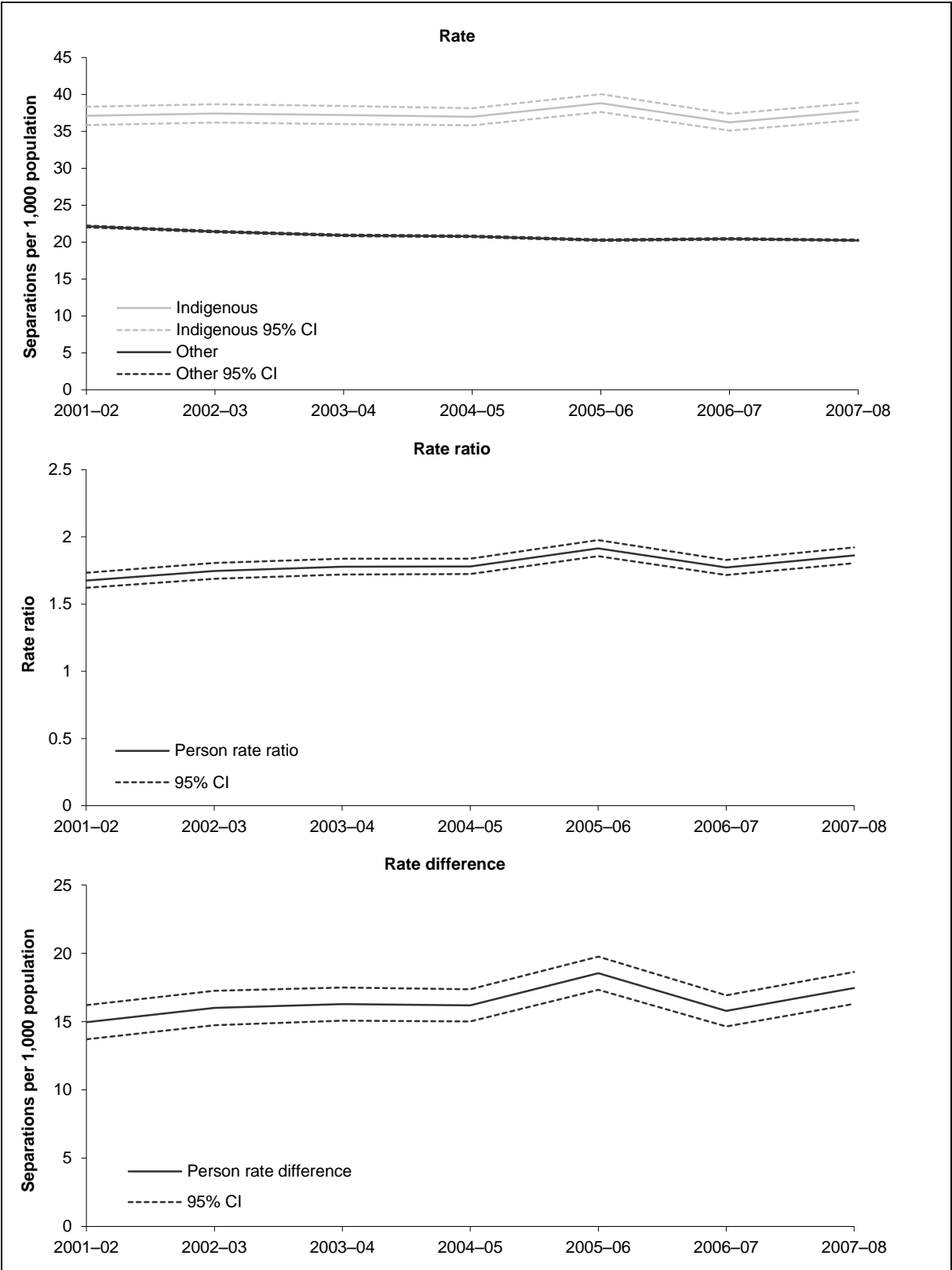
- (a) Data are from public and most private hospitals. Data exclude private hospitals in the Northern Territory.
- (b) Average annual change in rates, rate ratios and rate differences determined using linear regression analysis.
- (c) Per cent change between 2001–02 and 2007–08 based on the average annual 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.

*Notes*

1. Rates have been directly age-standardised using the 2001 Australian standard population.
2. Population estimates are based on 2006 Census.
3. Care types 7.3, 9 and 10 (Newborn – unqualified days only; organ procurement; hospital boarder) excluded from analysis because of changes in coding since earlier years.

Source: AIHW analysis of National Hospital Morbidity Database.





Source: AIHW analysis of National Hospital Morbidity Database.

**Figure 1.05.3: Hospitalisation rates, rate ratios and rate differences between Indigenous and other Australians from circulatory diseases, Qld, WA, SA and NT, 2001-02 to 2007-08**

### **Circulatory disease – 2004–05 to 2007–08**

Hospitalisation rates, rate ratios and rate differences between Indigenous and other Australians for diseases of the circulatory system over the three-year period 2004–05 to 2007–08 are presented in Table 1.05.10 and Figure 1.05.4.

- In New South Wales, Victoria, Queensland, Western Australia, South Australia and the Northern Territory combined, there was a non-significant increase in hospitalisation rates for circulatory diseases among Indigenous Australians during the period 2004–05 to 2007–08. The fitted trend implies an average yearly increase in the rate of 0.5 per 1,000 which is equivalent to an increase of 5% over the period.
- There were significant declines in hospitalisation rates among other Australians during the same period, with an average yearly decrease in the rate of around 0.1 per 1,000 population. This is equivalent to a 2% decline over the period.
- There were no significant changes in the hospitalisation rate ratio or rate differences between Indigenous and other Australians for circulatory diseases over the period 2004–05 to 2007–08. The fitted trend implies an average yearly increase of 0.04 in the rate ratio (7% increase over the period) and 0.7 per 1,000 in the rate difference between Indigenous and other Australians (18% increase) for the period 2004–05 to 2007–08. This reflects a relative and absolute increase in the gap between hospitalisation rates for Indigenous and other Australians for circulatory diseases.

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, as will changes in access, hospital policies and practices 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 also reflect increased use of admitted patient hospital services rather than a worsening of health.

**Table 1.05.10: Age-standardised hospitalisation rates, rate ratios and rate differences from circulatory diseases, NSW, Vic, Qld, WA, SA and NT, 2004–05 to 2007–08<sup>(a)</sup>**

	2004–05	2005–06	2006–07	2007–08	Annual change <sup>(b)</sup>	Per cent change over period <sup>(c)</sup>
<b>Indigenous separations</b>						
Males	3,860	4,181	4,170	4,460	179*	13.9*
Females	3,595	3,678	3,815	4,085	161*	13.4*
Persons	7,455	7,859	7,985	8,545	340*	13.7*
<b>Other Australian separations</b>						
Males	243,509	247,621	254,202	257,584	4,881*	6.0*
Females	182,350	183,610	188,363	190,060	2,788*	4.6*
Persons	425,875	431,232	442,570	447,645	7,665*	5.4*
<b>Indigenous rate (separations per 1,000)</b>						
Males	35.0	36.8	35.7	37.9	0.8	6.6
Females	29.8	30.2	29.8	31.3	0.4	4.1
Persons	32.2	33.4	32.5	34.3	0.5	5.1
<b>Other Australian<sup>(d)</sup> rate (separations per 1,000)</b>						
Males	26.3	26.1	26.1	25.8	–0.2*	–1.8*
Females	16.8	16.6	16.7	16.5	–0.1*	–1.8*
Persons	21.3	21.1	21.2	20.9	–0.1*	–1.7*
<b>Rate ratio<sup>(e)</sup></b>						
Males	1.3	1.4	1.4	1.5	0.0	8.6
Females	1.8	1.8	1.8	1.9	0.0	6.0
Persons	1.5	1.6	1.5	1.6	0.0	7.0
<b>Rate difference<sup>(f)</sup></b>						
Males	8.7	10.7	9.6	12.2	0.9	32.2
Females	12.9	13.6	13.1	14.8	0.5	11.8
Persons	10.9	12.3	11.3	13.5	0.7	18.4

\* Represents results with statistically significant increases or declines at the  $p < 0.05$  level over the period 2004–05 to 2007–08.

(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 2004–05 and 2007–08 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.

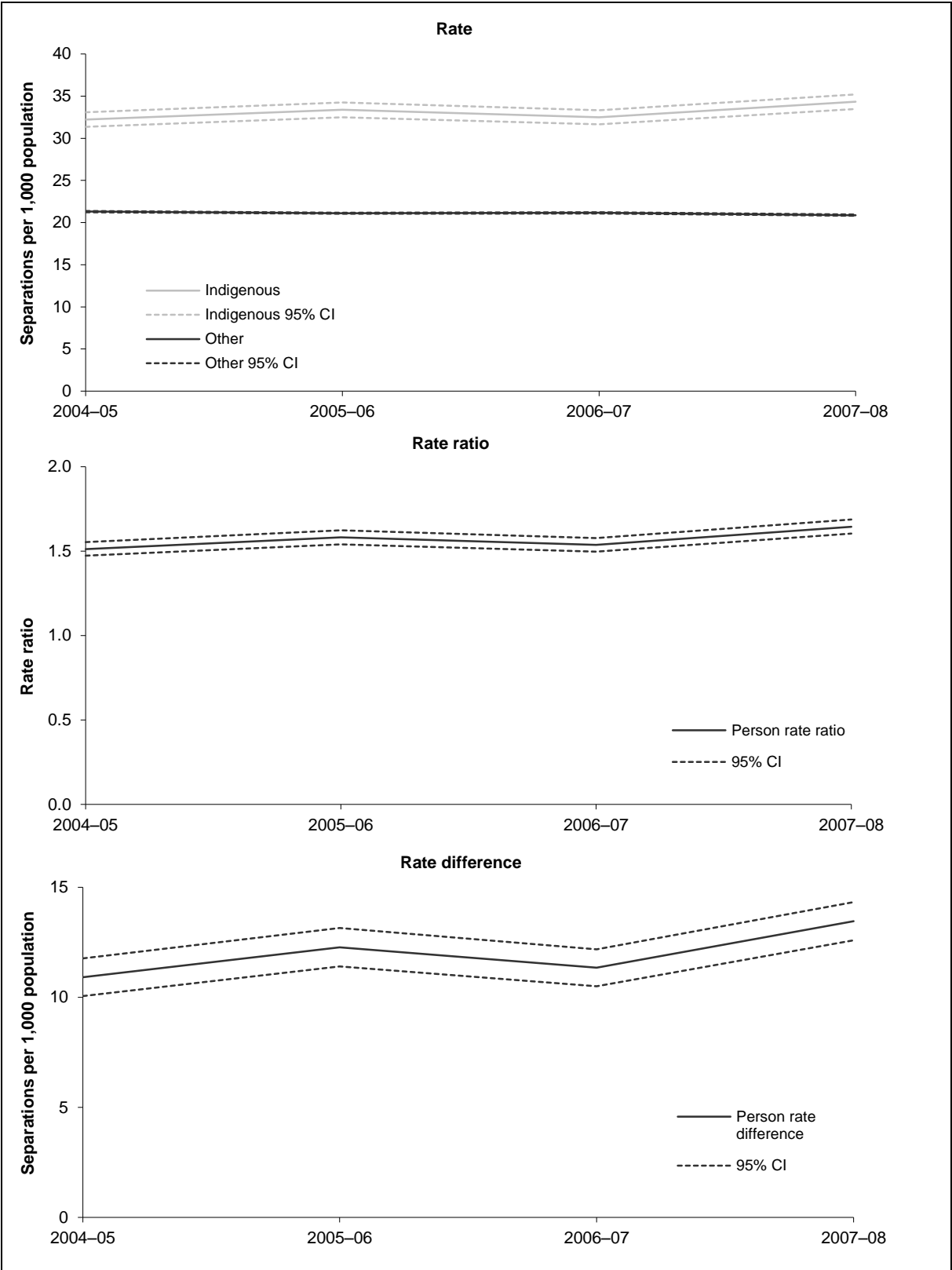
**Notes**

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

2. Population estimates are based on 2006 Census.

3. Care types 7.3, 9 and 10 (Newborn – unqualified days only; organ procurement; hospital boarder) excluded from analysis.

Source: AIHW analysis of National Hospital Morbidity Database.



Source: AIHW analysis of National Hospital Morbidity Database.

**Figure 1.05.4: Hospitalisation rates, rate ratios and rate differences between Indigenous and other Australians from circulatory diseases, NSW, Vic, Qld, WA, SA and NT, 2004-05 to 2007-08**

## General practitioner encounters

Information about general practitioner (GP) encounters is available from the BEACH survey. Data for the 5-year period April 2004–March 2005 to April 2008–March 2009 are presented below. Circulatory problems are among the five most common types of problems managed at GP encounters with Indigenous patients.

- In the period April 2004–March 2005 to April 2008–March 2009, there were a total of 6,137 GP encounters with Aboriginal and Torres Strait Islander patients recorded in the survey, at which 9,305 problems were managed. Of these, 8.6% (802) were circulatory problems (Table 1.05.11).
- Circulatory problems were managed at a rate of around 13 per 100 encounters among Indigenous patients.
- After adjusting for differences in age distribution:
  - Circulatory problems were managed at similar rates during GP encounters with Indigenous patients and other patients.
  - There were almost three times as many GP encounters for heart failure and twice as many GP encounters for ischaemic heart disease with Indigenous patients than with other patients over the BEACH 5-year reporting period.

**Table 1.05.11: Circulatory problems<sup>(a)</sup> managed by general practitioners, by Indigenous status of the patient, BEACH survey years April 2004–March 2005 to April 2008–March 2009 inclusive<sup>(b)(c)</sup>**

Problem managed	Indigenous	Other <sup>(e)</sup>	Indigenous	Other <sup>(e)</sup>	Indigenous	95% LCL <sup>(f)</sup>	95% UCL <sup>(g)</sup>	Other	95% LCL <sup>(f)</sup>	95% UCL <sup>(g)</sup>	Indigenous	Other <sup>(e)</sup>	Ratio <sup>(h)</sup>
	Number		Per cent		Crude rate (no. per 100 encounters)						Age-standardised rate (no. per 100 encounters) <sup>(d)</sup>		
Hypertension (K86, K87)	405	46,025	4.4	6.3	6.6	5.7	7.5	9.6	9.4	9.8	10.6	9.5	1.1
Ischaemic heart disease (K74, K76)	84	5,784	0.9	0.8	1.4	1.0	1.7	1.2	1.2	1.3	2.5	1.2	2.1
Heart failure (K77)	53	3,283	0.6	0.4	0.9	0.6	1.2	0.7	0.7	0.7	1.8	0.7	2.6
Cardiac check-up (K30, K31)	40	5,825	0.4	0.8	0.7	0.4	0.9	1.2	1.1	1.3	0.9	1.2	0.8
Atrial fibrillation/flutter (K78)	31	4,904	0.3	0.7	0.5	0.3	0.7	1.0	1.0	1.1	0.8	1.0	0.8
<i>Total circulatory problems (K00–K99)</i>	<i>802</i>	<i>84,270</i>	<i>8.6</i>	<i>11.5</i>	<i>13.1</i>	<i>11.9</i>	<i>14.2</i>	<i>17.5</i>	<i>17.2</i>	<i>17.9</i>	<i>20.2</i>	<i>17.3</i>	<i>1.2</i>
Other problems managed	8,503	648,738	91.4	88.5	138.6	134.6	142.5	135.1	134.4	135.8	140.7	134	1.1
<b>Total problems</b>	<b>9,305</b>	<b>733,008</b>	<b>100.0</b>	<b>100.0</b>	<b>151.6</b>	<b>147.3</b>	<b>155.9</b>	<b>152.6</b>	<b>151.8</b>	<b>153.5</b>	<b>160.9</b>	<b>151.3</b>	<b>1.1</b>

(a) Classified according to ICPC-2 chapter codes (Classification Committee of the World Organization of Family Doctors (WICC) 1998).

(b) Data from five combined BEACH years April 2004–March 2005 to April 2008–March 2009 inclusive.

(c) Data for Indigenous and other Australians have not been weighted.

(d) Directly age-standardised rate (no. per 100 encounters). Figures do not add to 100 as more than one problem can be managed at each encounter.

(e) 'Other' includes non-Indigenous patients and patients for whom Indigenous status was not stated.

(f) LCL = lower confidence interval.

(g) UCL = upper confidence interval.

(h) Rate ratio Indigenous: other.

Source: AIHW analysis of BEACH survey of general practice, Australian General Practice Statistics and Classification Centre (AGPSCC).

## **Data quality issues**

### **National Aboriginal and Torres Strait Islander Health Survey (NATSIHS)**

The NATSIHS uses the standard Indigenous status question. The NATSIHS sample was specifically designed to select a representative sample of Aboriginal and Torres Strait Islander Australians. It therefore overcomes the problem inherent in most national surveys with small and unrepresentative Indigenous samples. As with other surveys, the NATSIHS is subject to sampling and non-sampling errors. Calculations of standard errors and significance testing help to identify the accuracy of the estimates and differences.

Information recorded in this survey is essentially 'as reported' by respondents. The Australian Bureau of Statistics (ABS) makes every effort to collect accurate information from respondents, particularly through careful questionnaire design, pre-testing of questionnaires, use of trained interviewers and assistance from Indigenous facilitators. Nevertheless, imperfect recall or individual interpretation of survey questions may affect some responses.

Non-Indigenous comparisons are available through the National Health Survey (NHS). The NHS was conducted in *Major cities, Inner and Outer regional* areas and *Remote and Very remote* areas, but *Very remote* areas were excluded from the sample. Time series comparisons are available through the 1995 and 2001 NHS.

In *Remote* and *Very remote* communities there were some modifications to the NATSIHS content in order to accommodate language and cultural appropriateness in traditional communities and help respondents understand the concepts. Some questions were excluded and some reworded. Also, paper forms were used in communities in remote areas and computer-assisted interview (CAI) instruments were used in non-remote areas. The CAI process included built-in edit checks and sequencing.

Further information on NATSIHS data quality issues can be found in the NATSIHS 2004–05 publication (ABS 2006).

### **General Practitioner data (BEACH)**

Information about general practitioner (GP) encounters is available from the Bettering the Evaluation and Care of Health (BEACH) survey. The BEACH data on Indigenous Australians should be treated with care. First, the sample frame has not been designed to produce statistically significant results for population subgroups such as Indigenous Australians. Second, the identification of Indigenous Australians is not complete. In the BEACH survey, 'not stated' responses to the Indigenous identification question are often higher than the 'yes' responses. It can be assumed, therefore, that the survey consistently undercounts the number of Indigenous Australians visiting GPs, but the extent of this undercount is not measurable.

### **Hospital separations data**

#### **Separations**

Differing admission practices among the jurisdictions and from year to year, and differing levels and patterns of service delivery can affect the number and pattern of hospitalisations.

The proportion of Aboriginal and Torres Strait Islander separations in public hospitals increased over the 11-year period 1996–97 to 2007–08, from 3.7% to 5.4%. In private hospitals, it stayed around 0.2% to 0.3% until 2003–04, when there was a modest increase to 0.5%.

### **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).

'Not stated' responses to the Indigenous status question were around 1% in public hospitals and 4% in private hospitals in 2007-08. This is a reduction from 1998-99 when 2% of responses in public hospitals and 8% of responses in private hospitals had a 'not stated' Indigenous status (AIHW 2009).

### **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 people. An estimated 89% of Indigenous patients were correctly identified in Australian public hospital admission records in 2007-08. In other words, 11% of Indigenous patients were not identified, and the 'true' number of hospital admissions for Indigenous persons was about 12% higher than reported.

For several years, Queensland, South Australia, Western Australia and the Northern Territory reported that Indigenous status in their hospital separations data were 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 (80% or higher overall levels of Indigenous identification in public hospitals only) in their hospital separations data. For Tasmania and the Australian Capital Territory, the levels of Indigenous identification were not considered acceptable for analysis purposes. It has therefore been recommended that reporting of Indigenous hospital separations data be limited to information from New South Wales, Victoria, Queensland, Western Australia, South Australia and the Northern Territory, individually or in aggregate. The proportion of the Indigenous population that these six jurisdictions cover is 96%. The following caveats have also been recommended for analysis of hospitalisation data from selected jurisdictions (AIHW 2010):

- 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 New South Wales and South Australia, and relatively marked Indigenous under-identification in data from Queensland and Victoria).
- Interpretation of time series analysis should take into account the possible contribution of changes over time in ascertainment of Indigenous status. This will be reflected in Indigenous patient changes in hospitalisation rates for Indigenous people.
- 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 other jurisdictions.

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.



### **Remoteness areas**

There were acceptable levels of Indigenous identification for all remoteness areas, ranging from 80% in *Major cities* to 97% in *Remote* and *Very remote* areas. The quality of data supports analyses by remoteness areas, in aggregate, across states and territories. However, the sample size was insufficient to allow assessment of the quality of Indigenous identification by remoteness area within jurisdictions.

### **Numerator and denominator**

Rate and ratio calculations rely on good numerator and denominator data. There are changes in the completeness of identification of Indigenous people in hospital records. These may take place at different rates from changes in the identification of Indigenous people in other administrative collections and population Censuses. Denominators used in this analysis are sourced from *Experimental estimates and projections: Aboriginal and Torres Strait Islander Australians 1991 to 2021* (ABS 2009).

### **Data sources for injury emergency episodes**

The National Non-admitted Patient Emergency Department Care Database is a national collection of de-identified data on emergency department episodes based on the Non-admitted Emergency Department Care National Minimum Data Set. This data set includes the standard Indigenous status question but does not include injury coding (for example, ICD-10). The Injury Surveillance National Minimum Data Set includes injury coding (components of ICD-10) but does not include demographic details such as Indigenous status. Therefore, there is currently no national minimum data set containing both Indigenous status and injury coding.

## **List of symbols used in tables**

- n.a. not available
- rounded to zero (including null cells)
- 0 zero
- .. not applicable
- n.e.c. not elsewhere classified
- n.f.d. not further defined
- n.p. not available for publication but included in totals where applicable, unless otherwise indicated

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