

## 1.08 Diabetes

Prevalence of diabetes 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 National Aboriginal and Torres Strait Islander Health Survey, the Bettering the Evaluation and Care of Health survey and the (Australian Institute of Health and Welfare) AIHW National Hospital Morbidity Database.

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

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 2011–12. 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 the AIHW Australian General Practice Statistics and Classification Unit conducts.

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 1998–2008* (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 in the survey.

## **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. State and territory health departments provide information annually on the characteristics, diagnoses and care of admitted patients in public and private hospitals to the AIHW.

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 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

Data on the self-reported prevalence of diabetes were measured in the National Aboriginal and Torres Strait Islander Health Survey and are presented below.

#### Prevalence by age, sex and remoteness

- In 2004–05, after adjusting for differences in age structure, approximately 12% of Indigenous Australians reported diabetes/ high sugar levels compared with 4% of non-Indigenous Australians.
- The greatest difference in prevalence rates between Indigenous and non-Indigenous Australians was among those aged 25–34 years. Indigenous Australians were 6.8 times as likely to report diabetes as non-Indigenous Australians in this age group (Table 1.08.1; Figure 1.08.1).
- Prevalence of diabetes was highest among those aged 55 years and over for both Indigenous Australians (32%) and non-Indigenous Australians (12%) (Figure 1.08.1).
- Indigenous males were three times as likely, and Indigenous females four times as likely, as non-Indigenous males and females to report diabetes/high sugar levels (Table 1.08.2).
- Prevalence of diabetes was higher among Indigenous Australians in remote areas than among Indigenous Australians in non-remote areas (9% compared with 5%) (Table 1.08.3).
- There was no significant change in the prevalence of diabetes among Indigenous Australians between 1995, 2001 and 2004–05 (Table 1.08.3).

**Table 1.08.1: Persons reporting diabetes/high sugar levels, by Indigenous status and age group, 2004–05<sup>(a)</sup>**

Age group	Indigenous	Non-Indigenous	Ratio <sup>(b)</sup>
	Per cent	Per cent	
0–14	— <sup>(c)</sup>	— <sup>(d)</sup>	n.p.
15–24	1.0 <sup>(d)</sup>	0.5 <sup>(d)</sup>	1.9
25–34	4.3	0.6	6.8*
35–44	10.0	2.0	5.1*
45–54	20.7	4.0	5.2*
55 years and over	32.1	11.6	2.8*
<b>Total</b>	<b>6.0</b>	<b>4.0</b>	<b>1.5*</b>
<b>Total (age-standardised)<sup>(e)</sup></b>	<b>12.0</b>	<b>4.0</b>	<b>3.0*</b>

\* Represents 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.

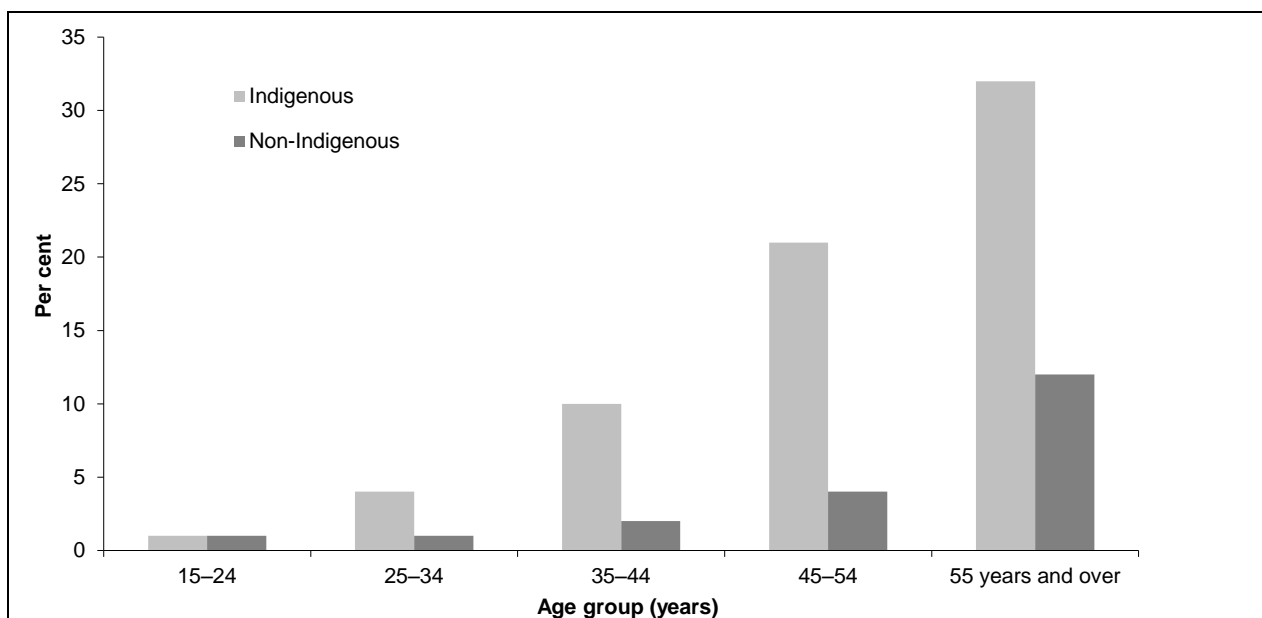
(b) Indigenous proportion divided by non-Indigenous proportion

(c) Estimate has a relative standard error greater than 50% and is considered too unreliable for general use.

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

(e) Total is a directly age-standardised proportion.

Source: ABS and AIHW analysis of 2004–05 NATSIHS and 2004–05 NHS.



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

**Figure 1.08.1: Proportion of persons reporting diabetes/high sugar levels, by Indigenous status and age group, 2004-05**

**Table 1.08.2: Persons reporting diabetes/high sugar levels, by Indigenous status, sex and remoteness, 2004-05**

	Males			Females			Persons		
	Indig.	Non-Indig.	Ratio	Indig.	Non-Indig.	Ratio	Indig.	Non-Indig.	Ratio
	Per cent	Per cent		Per cent	Per cent		Per cent	Per cent	
Remote	15	n.a.	n.a.	18	n.a.	n.a.	16	n.a.	n.a.
Non-remote	10	4	3	11	3	4	11	4	3
<b>Total</b>	<b>11</b>	<b>4</b>	<b>3</b>	<b>13</b>	<b>3</b>	<b>4</b>	<b>12</b>	<b>4</b>	<b>3</b>
<b>Total number</b>	<b>232,362</b>	<b>9,788,447</b>	..	<b>241,948</b>	<b>9,893,092</b>	..	<b>474,310</b>	<b>19,681,539</b>	..

Note: Data are age-standardised.

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

**Table 1.08.3: Indigenous persons reporting diabetes/high sugar levels, by remoteness, 1995, 2001 and 2004-05**

	1995	2001	2004-05
	Per cent		
Remote	n.a.	7	9
Non-remote	4	4	5
<b>Total</b>	<b>n.a.</b>	<b>5</b>	<b>6</b>
<b>Total number</b>	<b>265,416</b>	<b>442,995</b>	<b>474,310</b>

Sources: ABS and AIHW analysis of 1995 National Health survey (Indigenous supplement); 2001 National Health Survey (Indigenous supplement); ABS 2006.

## Prevalence by selected population and health characteristics

- In 2004–05, Indigenous Australians aged 15 years and over were more likely to report having diabetes if they were under financial stress (unable to raise \$2,000 within a week) (11% compared with 8%); if the highest year of school completed was Year 9 or below than if Year 12 was the highest year of school completed (17% compared with 14%); and if they were unemployed than if they were employed (22% compared with 13%). Among non-Indigenous Australians, those who were not in the labour force were more likely to report having diabetes than those who were unemployed or employed (Table 1.08.4).
- Indigenous Australians with reported fair/poor health status were much more likely to have diabetes than Indigenous Australians with excellent/very good health status (22% compared with 9%).
- Indigenous Australians aged 18 years and over were more likely to report having diabetes if they had experienced stressors in the last 12 months (12%) than if no stressors were experienced (9%); if they reported their exercise level as low or sedentary rather than high (14% compared with 11%); and if they were overweight and obese than if they were normal or underweight (18% compared with 9%).
- Indigenous Australians who drank at risky/high-risk levels in the last 12 months were less likely to report diabetes than those who did not drink at risky/high risk levels (8.1% compared to 17%).
- Indigenous people who smoked daily in the last 12 months reported a lower incidence of diabetes (13% and 19%).
- A lower proportion of Indigenous people reported diabetes who had used substances in the previous 12 months (4% and 11%).
- Indigenous Australians who reported that they did not eat vegetables daily (24%) were more likely to report having diabetes than those who did eat vegetables daily (15%). The reverse was true for non-Indigenous Australians.
- Similar proportions of Indigenous Australians who reported that they do and do not eat fruit daily had diabetes (16% and 13%).
- Indigenous Australians aged 15 years and over were much more likely to report having diabetes if they also reported hypertension, circulatory problems or high cholesterol (27%; 22%; and 30% respectively) than if they did not report these conditions (12%, 11% and 14% respectively). This was also the case for non-Indigenous Australians.

**Table 1.08.4: proportion<sup>(a)</sup> of Indigenous and non-Indigenous Australians aged 15 years and over with diabetes/high sugar levels, by selected population characteristics, 2004–05**

	Indigenous		Non-Indigenous		Ratio <sup>(b)</sup>
	Has diabetes	Does not have diabetes	Has diabetes	Does not have diabetes	Has diabetes
Per cent					
<b>Household income</b>					
1st quintile	17.9	82.1	6.0	94.0	3.0
5th quintile	16.3	83.7	3.4	96.6	4.8
<b>Financial stress—able to raise \$2,000 within a week for something important</b>					
Yes	7.7	92.3	n.a.	n.a.	n.a.
No	11.2	88.8	n.a.	n.a.	n.a.
<b>Highest year of school completed</b>					
Year 12	14.4	85.6	3.8	96.2	3.8
Year 9 or below	17.3	82.7	6.0	94.0	2.9
<b>Whether has non-school qualification</b>					
Has a non-school qualification	13.3	86.7	4.3	95.7	3.1
Does not have a non-school qualification	16.6	83.4	4.7	95.3	3.5
<b>Employment</b>					
Employed	12.5	87.5	3.2	96.8	3.9
Unemployed	22.2	77.8	3.7	96.3	6.0
Not in the labour force	17.3	82.7	5.5	94.5	3.1
<b>Housing</b>					
Owner	6.6	93.4	n.a.	n.a.	n.a.
Renter	10.9	89.1	n.a.	n.a.	n.a.
<b>Stressors in last 12 months<sup>(c)</sup></b>					
Serious illness or disability	12.2	87.8	n.a.	n.a.	n.a.
Total experienced stressors	11.7	88.3	n.a.	n.a.	n.a.
No stressors	8.8	91.2	n.a.	n.a.	n.a.
<b>Self-assessed health status</b>					
Excellent/very good	9.0	91.0	1.9	98.1	4.7
Good	14.2	85.8	5.0	95.0	2.8
Fair/poor	21.8	78.2	9.6	90.4	2.3
<b>Smoker status<sup>(c)</sup></b>					
Current daily smoker	12.7	87.3	3.5	96.5	3.6
Not current daily smoker	18.5	81.5	4.8	95.2	3.9
<b>Risky/high-risk alcohol consumption in last 12 months<sup>(c)</sup></b>					
Yes	8.1	91.9	2.9	97.1	2.8
No	17.4	82.6	5.0	95.0	3.5

(continued)

**Table 1.08.4 (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		Non-Indigenous		Ratio
	Has diabetes	Does not have diabetes	Has diabetes	Does not have diabetes	Has diabetes
Per cent					
<b>Whether used substances in last 12 months<sup>(c)(d)</sup></b>					
Yes	3.7	96.3	n.a.	n.a.	n.a.
No	10.7	89.3	n.a.	n.a.	n.a.
<b>Physical activity<sup>(d)</sup></b>					
Low/sedentary	13.6	86.4	4.8	95.2	2.8
Moderate	12.1	87.9	4.0	96.0	3.0
High	11.2	88.8	2.6	97.4	4.3
<b>Overweight/obesity</b>					
Yes	17.7	82.3	5.9	94.1	3.0
No	8.7	91.3	2.9	97.1	3.0
<b>Eats vegetables daily</b>					
Yes	14.9	85.1	4.5	95.5	3.3
No	23.7	76.3	3.4	96.6	7.0
<b>Eats fruit daily</b>					
Yes	15.5	84.5	4.5	95.5	3.4
No	12.6	87.4	3.5	96.5	3.6
<b>Hypertension</b>					
Yes	26.5	73.5	9.6	90.4	2.8
No	12.3	87.7	3.3	96.7	3.7
<b>Circulatory problems</b>					
Yes	21.9	78.1	7.2	92.8	3.0
No	11.3	88.7	2.5	97.5	4.5
<b>High cholesterol</b>					
Yes	29.6	70.4	10.3	89.7	2.9
No	13.9	86.1	3.6	96.4	3.9
<b>Total (age-standardised)</b>	<b>15.4</b>	<b>84.6</b>	<b>4.5</b>	<b>95.5</b>	<b>3.4</b>
<b>Total (crude)</b>	<b>9.8</b>	<b>90.2</b>	<b>4.6</b>	<b>95.4</b>	<b>2.1</b>
<b>Total number persons aged 15 years and over</b>	<b>28,703</b>	<b>264,938</b>	<b>720,634</b>	<b>14,811,743</b>	<b>..</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) Indigenous proportion divided by non-Indigenous proportion who have diabetes.

(c) Persons aged 18 years and over.

(d) Non-remote areas only.

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



## Mothers of Indigenous children

- In 2008, 8.5% Indigenous children aged 0–3 years had mothers who had diabetes or sugar problems during pregnancy. This proportion was lowest in Tasmania (2%), and highest in the Northern Territory (11%) (Table 1.08.5).
- In 2008, the proportion of Indigenous children age 0–3 years who had mothers who had diabetes or sugar problems during pregnancy was similar in non-remote (8.5%) and remote areas (8.4%) (Table 1.08.6).

**Table 1.08.5: Number and proportion of Indigenous children aged 0–3 years whose mother had diabetes or sugar problems during pregnancy, by state/territory, 2008**

	Number	Proportion
NSW/ACT	1,328 <sup>*</sup>	8.3 <sup>*</sup>
Vic	215	6.6
Qld	1,578 <sup>*</sup>	9.8 <sup>*</sup>
WA	519 <sup>*</sup>	8.2 <sup>*</sup>
SA	103 <sup>*</sup>	3.8 <sup>*</sup>
Tas	39 <sup>**</sup>	2.2 <sup>**</sup>
NT	577	11.1
<b>Total</b>	<b>4,361</b>	<b>8.5</b>

\* Estimate has a relative standard error between 25% and 50% and should be used with caution.

\*\* Estimate has a relative standard error greater than 50% and is considered too unreliable for general use.

Note: Proportions exclude not known and not collected responses.

Source: 2008 NATSISS.

**Table 1.08.6: Number and proportion of Indigenous children aged 0–3 years whose mother had diabetes or sugar problems during pregnancy, by Remoteness Area, 2008**

	Number	Proportion
Major cities	1,831 <sup>*</sup>	11.0 <sup>*</sup>
Inner regional	552 <sup>*</sup>	4.4 <sup>*</sup>
Outer regional	1,054 <sup>*</sup>	9.4 <sup>*</sup>
<i>Total non-remote</i>	<i>3,438</i>	<i>8.5</i>
Remote	279 <sup>*</sup>	6.6 <sup>*</sup>
Very remote	644	9.6
<i>Total remote</i>	<i>923</i>	<i>8.4</i>
<b>Total</b>	<b>4,361</b>	<b>8.5</b>

\* Estimate has a relative standard error between 25% and 50% and should be used with caution

Note: Proportions exclude not known and not collected responses.

Source: 2008 NATSISS.

## Hospitalisations

- In the 2-year period July 2006 to June 2008, there were 154,111 hospitalisations for diabetes in New South Wales, Victoria, Queensland, Western Australia, South Australia and the Northern Territory combined, of which 7,456 hospitalisations (4.8%) were of Aboriginal and Torres Strait Islander peoples (Table 1.08.8).

- Diabetes was the principal diagnosis in 1.4% of all hospital separations for Aboriginal and Torres Strait Islander Australians.

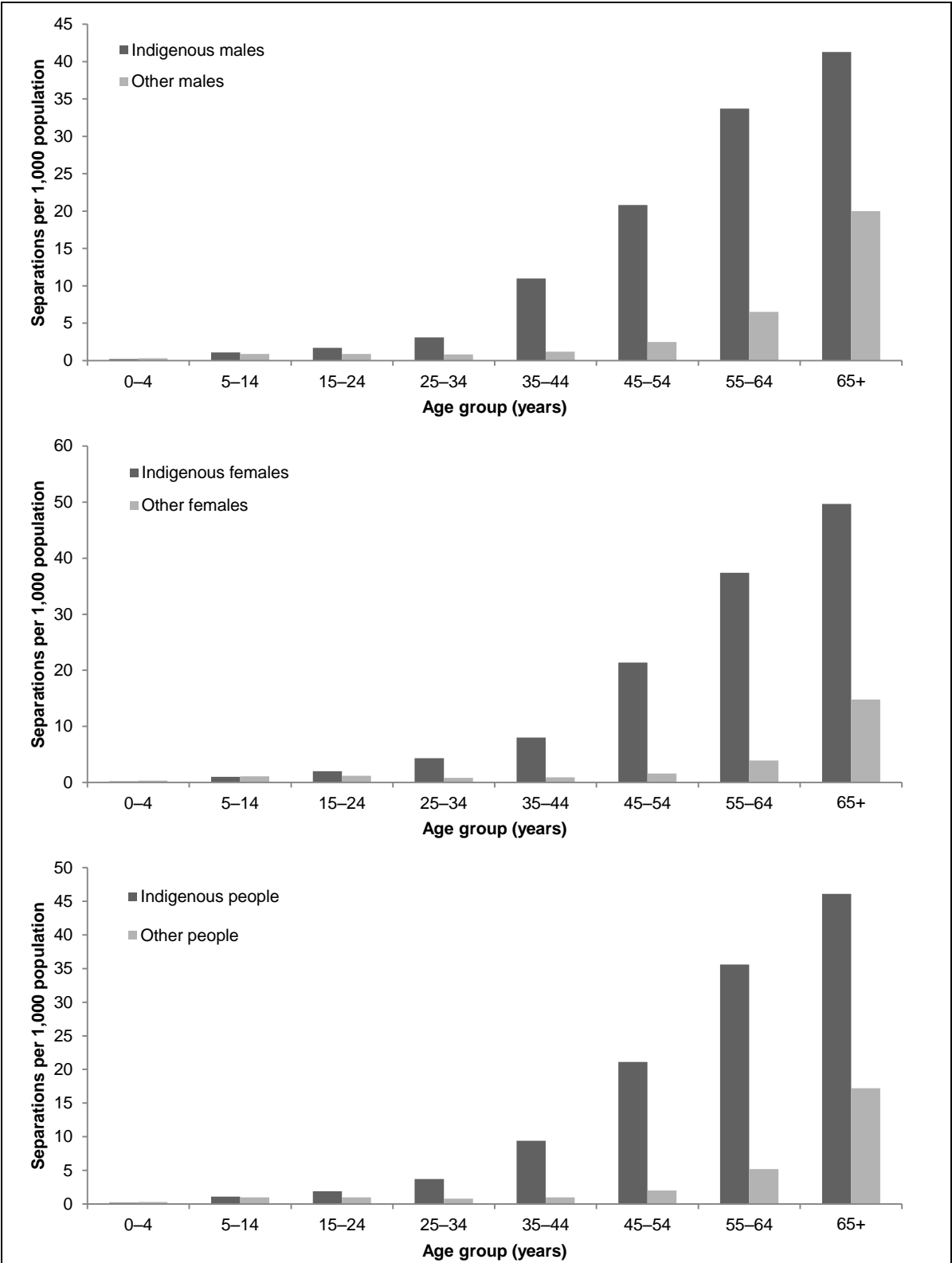
### Hospitalisations by age and sex

- For the 2-year period July 2006 to June 2008, in New South Wales, Victoria, Queensland, Western Australia, South Australia and the Northern Territory, Indigenous males and females had much higher hospitalisation rates for diabetes than other males and females in all age groups from 15–24 years onwards (Figure 1.08.2).
- The greatest difference in rates for males occurred in the 35–44 year age group, where Indigenous males were hospitalised at around 9 times the rate of other males. The greatest difference in rates for females occurred in the 45–54 year age group, where Indigenous females were hospitalised at around 13 times the rate of other females.
- For Indigenous males and females and other males and females, hospitalisation rates for diabetes were highest among those aged 65 years and over (Table 1.08.7).
- Approximately 46% of Indigenous Australians hospitalised for diabetes were males (3,430) and 54% were females (4,026) (Table 1.08.8).

**Table 1.08.7: Age-specific hospitalisation rates for a principal diagnosis of diabetes, 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>								
Indigenous	0.2	1.1	1.7	3.1	11.0	20.8	33.7	41.3
Other	0.3	0.9	0.9	0.8	1.2	2.5	6.5	20.0
<b>Females</b>								
Indigenous	0.2	1.0	2.0	4.3	8.0	21.4	37.4	49.7
Other	0.3	1.1	1.2	0.8	0.9	1.6	3.9	14.8
<b>Persons</b>								
Indigenous	0.2	1.1	1.9	3.7	9.4	21.1	35.6	46.1
Other	0.3	1.0	1.0	0.8	1.0	2.0	5.2	17.2

Source: AIHW analysis of National Hospital Morbidity Database.



Source: AIHW analysis of National Hospital Morbidity Database.

**Figure 1.08.2: Age-specific hospitalisation rates for a principal diagnosis of diabetes, by Indigenous status and sex, NSW, Vic, Qld, WA, SA and NT, July 2006 to June 2008**

### **Hospitalisations by state/territory**

Table 1.08.8 presents hospitalisations for a principal diagnosis of diabetes for the 2-year period July 2006 to June 2008 for New South Wales, Victoria, Queensland, Western Australia, South Australia, Northern Territory, Tasmania and the Australian Capital Territory.

- In New South Wales, Victoria, Queensland, Western Australia, South Australia and the Northern Territory combined, Indigenous males and females were hospitalised for diabetes at 3.4 and 5 times the rate of other Australian males and females respectively.
- In Western Australia, Indigenous females were hospitalised at almost 8 times the rate of other females, and in the Northern Territory, Indigenous females were hospitalised at 7 times the rate of other females.

**Table 1.08.8: Hospitalisations for principal diagnosis of diabetes mellitus, 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>NSW</b>									
Males	758	9.2	8.4	10.0	24,534	3.6	3.6	3.7	2.6*
Females	793	9.7	8.9	10.4	20,692	2.6	2.6	2.7	3.7*
Persons	1,551	9.5	8.9	10.1	45,226	3.1	3.1	3.1	3.1*
<b>Vic</b>									
Males	101	5.6	4.2	6.9	23,016	4.5	4.4	4.6	1.2
Females	169	7.8	6.5	9.2	19,607	3.3	3.3	3.4	2.4*
Persons	270	6.7	5.8	7.6	42,623	3.9	3.8	3.9	1.7*
<b>Qld</b>									
Males	1,008	14.4	13.3	15.6	16,808	4.3	4.2	4.3	3.4*
Females	1,147	16.5	15.4	17.6	13,704	3.2	3.1	3.2	5.2*
Persons	2,155	15.7	14.9	16.5	30,512	3.7	3.7	3.7	4.2*
<b>WA</b>									
Males	699	19.5	17.8	21.2	7,799	4.0	3.9	4.1	4.8*
Females	905	24.1	22.4	25.9	6,739	3.1	3.1	3.2	7.7*
Persons	1,604	22.1	20.9	23.4	14,538	3.6	3.5	3.6	6.2*
<b>SA</b>									
Males	326	22.3	19.4	25.1	6,782	4.1	4.0	4.2	5.5*
Females	294	17.5	15.3	19.7	5,965	3.0	3.0	3.1	5.8*
Persons	620	19.6	17.8	21.3	12,747	3.5	3.4	3.6	5.6*
<b>NT</b>									
Males	538	17.8	15.9	19.7	747	6.2	5.7	6.7	2.9*
Females	718	18.8	17.3	20.3	262	2.8	2.4	3.1	6.8*
Persons	1,256	18.2	17.1	19.4	1,009	4.7	4.3	5.0	3.9*
<b>NSW, Vic, Qld, WA, SA, NT<sup>(k)</sup></b>									
<b>Males</b>	<b>3,430</b>	<b>13.6</b>	<b>13.1</b>	<b>14.2</b>	<b>79,686</b>	<b>4.1</b>	<b>4.0</b>	<b>4.1</b>	<b>3.4*</b>
<b>Females</b>	<b>4,026</b>	<b>15.0</b>	<b>14.5</b>	<b>15.5</b>	<b>66,969</b>	<b>3.0</b>	<b>3.0</b>	<b>3.0</b>	<b>5.0*</b>
<b>Persons</b>	<b>7,456</b>	<b>14.4</b>	<b>14.1</b>	<b>14.8</b>	<b>146,655</b>	<b>3.5</b>	<b>3.5</b>	<b>3.5</b>	<b>4.1*</b>
<b>Tas</b>									
Males	18	2.0	0.9	3.1	1,613	3.1	2.9	3.2	0.6
Females	26	2.1	1.1	3.0	1,008	1.9	1.7	2.0	1.1
Persons	44	2.0	1.3	2.7	2,621	2.4	2.3	2.5	0.8

(continued)

**Table 1.08.8 (continued): Hospitalisations for principal diagnosis of diabetes mellitus, 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	6	3.7	0.0	8.1	614	2.2	2.0	2.4	1.7
Females	11	9.6	2.3	16.8	582	1.9	1.7	2.0	5.2*
Persons	17	7.0	2.5	11.5	1,196	2.0	1.9	2.1	3.5*

\* 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. Indigenous rates are calculated using 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 Australian Standard Geographical Classification

Hospitalisation rates for diabetes mellitus in New South Wales, Victoria, Queensland, Western Australia, South Australia and the Northern Territory are presented by Australian Standard Geographical Classification (ASGC) in Table 1.08.9, covering the period July 2007 to June 2009.

- Indigenous Australians in all geographic areas were more likely to be hospitalised for diabetes 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 head of population were highest for Indigenous people living in *Remote* areas, at 33 per 1,000. The rate was highest for other Australians who lived in *Very remote* areas, at 8.6 per 1,000. The lowest rates were observed in *Major cities* areas for both Indigenous people (9.4 per 1,000) and other Australians (2.5 per 1,000).
- Indigenous people were hospitalised for this condition at a rate of 12 times that of other Australians in *Remote* areas of Australia. In *Very remote* areas, where the lowest ratio was observed, Indigenous Australians were hospitalised at a rate of 2.5 times that of other Australians. Nationally, the rate was 5.5 times.

**Table 1.08.9: Hospitalisations for diabetes mellitus 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>(i)</sup>	Number	No. per 1,000 <sup>(h)</sup>	LCL 95% <sup>(i)</sup>	UCL 95% <sup>(i)</sup>	
Major cities	1,505	9.4	8.8	9.9	101,770	2.5	2.5	2.5	3.7*
Inner regional	1,202	12.9	12.1	13.8	33,170	3.9	3.8	3.9	3.3*
Outer regional <sup>(l)</sup>	1,996	18.8	17.8	19.7	16,015	4.2	4.2	4.3	4.4*
Remote	1,648	33.0	31.2	34.8	1,370	2.8	2.7	3.0	11.7*
Very remote	1,751	21.4	19.6	23.3	1,173	8.6	8.4	8.7	2.5*
Missing	3	..	..	..	62	..	..	..	..
<b>Total<sup>(m)</sup></b>	<b>8,105</b>	<b>16.6</b>	<b>16.1</b>	<b>17.0</b>	<b>153,560</b>	<b>3.0</b>	<b>3.0</b>	<b>3.0</b>	<b>5.5*</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 1.08.10 presents hospitalisations for a principal diagnosis of diabetes by type of diabetic condition for the 2-year period July 2006 to June 2008 for New South Wales, Victoria, Queensland, Western Australia, South Australia and the Northern Territory combined.

- For the period 2006–07 to 2007–08 in New South Wales, Victoria, Queensland, Western Australia, South Australia and the Northern Territory combined, of all hospitalisations with a principal diagnosis of diabetes, Type 2 diabetes was the most common, responsible for 84% of hospitalisations of Indigenous Australians for diabetes.
- In the six jurisdictions, Indigenous males and females were hospitalised for Type 2 non-insulin-dependent diabetes at much higher rates than other males and females (3.7 and 6.2 times respectively). Indigenous Australians were hospitalised for Type 1 diabetes at around twice the rate of other Australians.
- Indigenous males and females were hospitalised for other specified diabetes at 4.5 and almost six times the rate of other males and females respectively.
- Indigenous females were hospitalised for diabetes in pregnancy at 3.6 times the rate of other females.



**Table 1.08.10: Hospitalisations of Indigenous persons for principal diagnosis of diabetes mellitus, by type of diabetes 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>
Type 2—non-insulin-dependent diabetes (E11)	2,817	82.1	12.2	11.6	12.7	3.7*	3,442	85.5	13.8	13.3	14.3	6.2*	6,259	83.9	13.1	12.7	13.5	4.8*
Type 1—insulin-dependent diabetes (E10)	555	16.2	1.3	1.2	1.4	1.7*	537	13.3	1.1	1.0	1.2	1.5*	1,092	14.6	1.2	1.1	1.3	1.6*
Other specified diabetes (E13)	32	0.9	0.1	0.1	0.1	4.5*	22	0.5	0.1	0.0	0.1	5.8*	54	0.7	0.1	0.1	0.1	5.1*
Unspecified diabetes (E14)	26	0.8	0.1	0.0	0.1	3.3*	25	0.6	0.1	0.0	0.1	4.0*	51	0.7	0.1	0.1	0.1	3.6*
<b>Total<sup>(j)</sup></b>	<b>3,430</b>	<b>100.0</b>	<b>13.6</b>	<b>13.1</b>	<b>14.2</b>	<b>3.4*</b>	<b>4,026</b>	<b>100.0</b>	<b>15.0</b>	<b>14.5</b>	<b>15.5</b>	<b>5.0*</b>	<b>7,456</b>	<b>100.0</b>	<b>14.4</b>	<b>14.1</b>	<b>14.8</b>	<b>4.1*</b>
Diabetes in pregnancy (O24) <sup>(k)</sup>	—	—	—	—	—	—	1,554	27.8	3.1	2.9	3.2	3.6*	—	—	—	—	—	—
<b>Total incl. O24</b>	<b>3,430</b>	<b>100.0</b>	<b>13.6</b>	<b>13.1</b>	<b>14.2</b>	<b>3.4*</b>	<b>5,580</b>	<b>100.0</b>	<b>18.1</b>	<b>17.6</b>	<b>18.7</b>	<b>4.7*</b>	<b>7,456</b>	<b>100.0</b>	<b>14.4</b>	<b>14.1</b>	<b>14.8</b>	<b>4.1*</b>

(continued)

**Table 1.08.10 (continued): Hospitalisations of Indigenous persons for principal diagnosis of diabetes mellitus, by type of diabetes 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 E10–E14, O24.4.
- (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 five jurisdictions should not be assumed to represent the hospitalisation experience in the other jurisdictions.
- (e) Proportion of male, female and total hospitalisations of Indigenous people for diabetes (excluding diabetes in pregnancy) in the period 2006–07 to 2007–08. Proportions for diabetes in pregnancy are out of the total number of hospitalisations for diabetes, including diabetes in pregnancy.
- (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) Total excludes diabetes mellitus in pregnancy (O24).
- (k) Indigenous females with diabetes mellitus in pregnancy (including pre-existing diabetes mellitus, Type 1, in pregnancy (O24.0); pre-existing diabetes mellitus, Type 2, in pregnancy (O24.1); pre-existing diabetes mellitus, other specified type, in pregnancy (O24.2); pre-existing diabetes mellitus, unspecified, in pregnancy (O24.3); gestational diabetes (O24.4); pre-existing impaired glucose regulation in pregnancy (O24.5) and diabetes mellitus in pregnancy, unspecified onset (O24.9)). Proportion calculated out of those with Type 1, Type 2, other specified, unspecified or diabetes mellitus in pregnancy (E10–E14 and O24).

*Notes*

1. There were no hospitalisations with a principal diagnosis of malnutrition-related diabetes mellitus (E13).
2. Indigenous rates are calculated using population estimates based on the 2006 Census (SERIES B).
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.

### **Hospitalisations by additional diagnosis**

Table 1.08.11 presents hospitalisations with a principal diagnosis of diabetes by additional causes of hospitalisation for Aboriginal and Torres Strait Islander peoples in New South Wales, Victoria, Queensland, Western Australia, South Australia and the Northern Territory.

- For the 2-year period July 2006 to June 2008, aside from factors influencing health status and contact with health services for which 67% of Indigenous hospitalisations for diabetes had an additional diagnosis, hospitalisations of Indigenous Australians with a principal diagnosis of diabetes were commonly reported with an additional diagnosis of diseases of the circulatory system (60%), diseases of the genitourinary system (42%) and other endocrine, metabolic and nutritional disorders (33%).
- Aside from the diseases mentioned above, insulin-dependent diabetes was commonly reported with an additional diagnosis of diseases of the digestive system (13%), and non-insulin-dependent diabetes was commonly reported with an additional diagnosis of diseases of the eye and adnexa (30%).

**Table 1.08.11: Hospitalisations of Indigenous persons for principal diagnosis of diabetes mellitus, by additional diagnosis of hospitalisation, NSW, Vic, Qld, WA, SA and NT, July 2006 to June 2008<sup>(a)(b)(c)(d)</sup>**

Additional diagnosis of hospitalisation	Reported with a principal diagnosis of diabetes				Total
	Insulin-dependent diabetes (E10)	Non-insulin-dependent diabetes (E11)	Other specified diabetes (E13)	Unspecified diabetes (E14)	
	Per cent				
Factors influencing health status and contact with health services (includes dialysis) (Z00–Z99)	52.9	69.5	96.3	39.2	67.0
Diseases of the circulatory system (I00–I99)	17.3	68.2	48.1	19.6	60.2
Diseases of the genitourinary system (N00–N99)	20.6	45.8	25.9	11.8	41.7
Endocrine, nutritional & metabolic diseases (E00–E90) excluding (E10–E14)	20.1	34.9	33.3	11.8	32.6
Diseases of the eye & adnexa (H00–H59)	11.4	30.0	20.4	15.7	27.1
Certain infectious and parasitic diseases (A00–B99)	9.3	19.4	13.0	9.8	17.9
Diseases of the skin & subcutaneous tissue (L00–L99)	5.1	18.5	13.0	9.8	16.4
Diseases of the nervous system (G00–G99)	6.9	17.1	25.9	2.0	15.5
Symptoms, signs & abnormal clinical & laboratory findings (R00–R99)	10.7	14.6	11.1	3.9	13.9
Mental & behavioural disorders (F00–F99)	10.6	10.9	50.0	2.0	11.1
Diseases of the digestive system (K00–K93)	13.0	9.1	48.1	5.9	9.9
Neoplasms (C00–D48)	0.6	0.8	3.7	2.0	0.8
Injury & poisoning (S00–T98)	3.7	8.3	9.3	0.0	7.6
Diseases of the respiratory system (J00–J99)	4.9	7.8	7.4	0.0	7.3
Other <sup>(e)</sup>	6.6	17.7	11.1	5.9	15.9
<b>Total number</b>	<b>1,092</b>	<b>6,259</b>	<b>54</b>	<b>51</b>	<b>7,456</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).

(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 the musculoskeletal system and connective tissue; diseases of the ear and mastoid process; congenital malformations, deformations and chromosomal abnormalities; pregnancy, childbirth and the puerperium; certain conditions originating in the perinatal period; diseases of the blood and blood-forming organs; and certain disorders involving the immune system.

*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. This period has been used for analysis because coding changes were made to diabetes complications in July 1999 and July 2000. Coding for diabetes is consistent only from 2001–02 onwards and data for previous years should not be included in the analysis of diabetes trends.

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.

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.

### **Diabetes – 2001–02 to 2007–08**

Hospitalisation rates, rate ratios and rate differences between Indigenous and other Australians for diabetes over the period 2000–01 to 2007–08 are presented in Table 1.08.12 and Figure 1.08.3.

- In Queensland, Western Australia, South Australia and the Northern Territory combined, there were significant increases in hospitalisation rates for diabetes among Indigenous males and females during the period 2000–01 to 2007–08. The fitted trend implies an average yearly increase in the rate of around 0.5 per 1,000 population, which is equivalent to an increase of 20% in the hospitalisation rate over this period.
- There were also significant increases in hospitalisation rates among other Australians during the same period, with an average yearly increase in the rate of around 0.2 per 1,000 population. This is equivalent to a 45% increase in the hospitalisation rate between 2001–02 and 2007–08.
- There was a significant decrease in the hospitalisation rate ratio between Indigenous and other Australians for diabetes over the period 2000–01 to 2007–08 (a 23% decline over the period), but no significant change in the hospitalisation rate difference.

**Table 1.08.12: Age-standardised hospitalisation rates, rate ratios and rate differences from diabetes, 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	924	1,015	1,130	1,078	1,188	1,236	1,335	62*	40.2*
Females	1,084	1,118	1,245	1,278	1,440	1,527	1,537	85*	46.9*
Persons	2,009	2,133	2,375	2,356	2,628	2,763	2,872	147*	43.8*
<b>Other Australian separations</b>									
Males	10,417	11,045	11,985	12,994	14,010	15,143	16,993	1,070*	61.6*
Females	8,654	9,171	9,926	10,996	11,573	12,418	14,252	891*	61.7*
Persons	19,071	20,216	21,911	23,990	25,583	27,561	31,245	1,960*	61.7*
<b>Indigenous rate (separations per 1,000)</b>									
Males	14.8	14.4	16.9	14.9	16.6	17.1	17.1	0.4*	17.4*
Females	15.8	15.4	17.0	16.6	18.2	19.1	18.4	0.6*	22.4*
Persons	15.3	15.0	17.1	15.9	17.5	18.2	17.9	0.5*	20.3*
<b>Other rate (separations per 1,000)<sup>(d)</sup></b>									
Males	3.2	3.3	3.5	3.6	3.8	4.0	4.4	0.2*	37.0*
Females	2.3	2.4	2.6	2.8	2.8	3.0	3.3	0.2*	39.3*
Persons	2.7	2.8	2.0	3.2	3.3	3.4	3.8	0.2*	45.4*
<b>Rate ratio<sup>(e)</sup></b>									
Males	4.7	4.4	4.9	4.1	4.3	4.3	3.9	-0.1*	-14.3*
Females	6.8	6.3	6.6	6.0	6.4	6.4	5.6	-0.1*	-11.5*
Persons	5.6	5.3	8.4	5.0	5.3	5.3	4.7	-0.2	-22.7
<b>Rate difference<sup>(f)</sup></b>									
Males	11.6	11.2	13.5	11.3	12.8	13.1	12.7	0.2	12.1
Females	13.5	12.9	14.4	13.8	15.3	16.1	15.1	0.4*	19.5
Persons	12.6	12.2	15.0	12.7	14.2	14.8	14.1	0.3	14.9

\* 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.

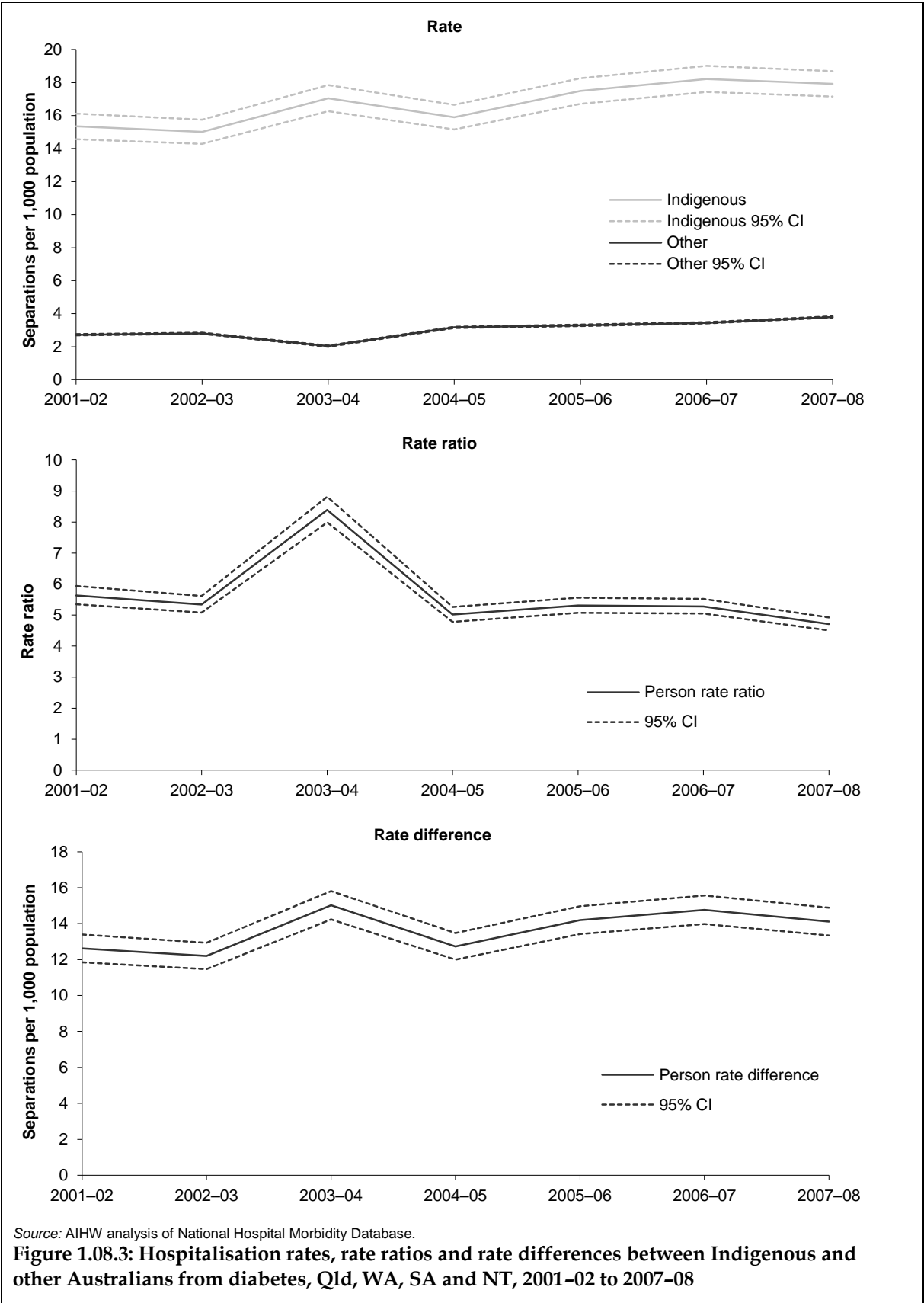
**Notes**

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

2. Population estimates are based on the 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.



### **Diabetes – 2004–05 to 2007–08**

Hospitalisation rates, rate ratios and rate differences between Indigenous and other Australians for diabetes over the period 2004–05 to 2007–08 are presented in Table 1.08.13 and Figure 1.08.4.

- In Queensland, Western Australia, South Australia and the Northern Territory combined, there were significant increases in hospitalisation rates for diabetes among Indigenous males and females during the period 2004–05 to 2007–08. The fitted trend implies an average yearly increase in the rate of around 0.7 per 1,000 population, which is equivalent to an increase of 17% in the hospitalisation rate over this period.
- There were also significant increases in hospitalisation rates among other Australian males and females during the same period, with an average yearly increase in the rate of around 0.2 per 1,000 population. This is equivalent to a 15% increase in the hospitalisation rate between 2004–05 and 2007–08.
- There was no change in the hospitalisation rate ratio between Indigenous and other Australians for diabetes over the period 2004–05 to 2007–08, but there was a significant increase in the hospitalisation rate difference (an 18% increase over the period).



**Table 1.08.13: Age-standardised hospitalisation rates, rate ratios and rate differences from diabetes, 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	1,384	1,585	1,677	1,753	120*	26.0
Females	1,614	1,815	2,014	2,012	139*	25.9
Persons	2,999	3,400	3,691	3,765	259*	25.9
<b>Other Australian separations</b>						
Males	33,100	35,589	38,381	41,305	2,741*	24.8
Females	28,556	30,651	32,370	34,599	1,985*	20.9
Persons	61,656	66,240	70,751	75,904	4,726*	23.0
<b>Indigenous rate (separations per 1,000)</b>						
Males	11.4	13.1	13.7	13.6	0.7*	18.8
Females	12.9	14.1	15.2	14.9	0.7*	16.2
Persons	12.3	13.7	14.5	14.4	0.7*	17.1
<b>Other rate (separations per 1,000)<sup>(d)</sup></b>						
Males	3.6	3.8	4.0	4.2	0.2*	15.8
Females	2.7	2.8	2.9	3.1	0.1*	13.5
Persons	3.1	3.3	3.4	3.6	0.2*	14.8
<b>Rate ratio<sup>(e)</sup></b>						
Males	3.2	3.5	3.4	3.3	0.0	2.4
Females	4.8	5.0	5.2	4.8	0.0	2.4
Persons	4.0	4.2	4.2	4.0	0.0	2.0
<b>Rate difference<sup>(f)</sup></b>						
Males	7.8	9.4	9.7	9.5	0.5	20.2
Females	10.2	11.2	12.2	11.8	0.6*	17.0
Persons	9.2	10.4	11.1	10.8	0.5*	17.9

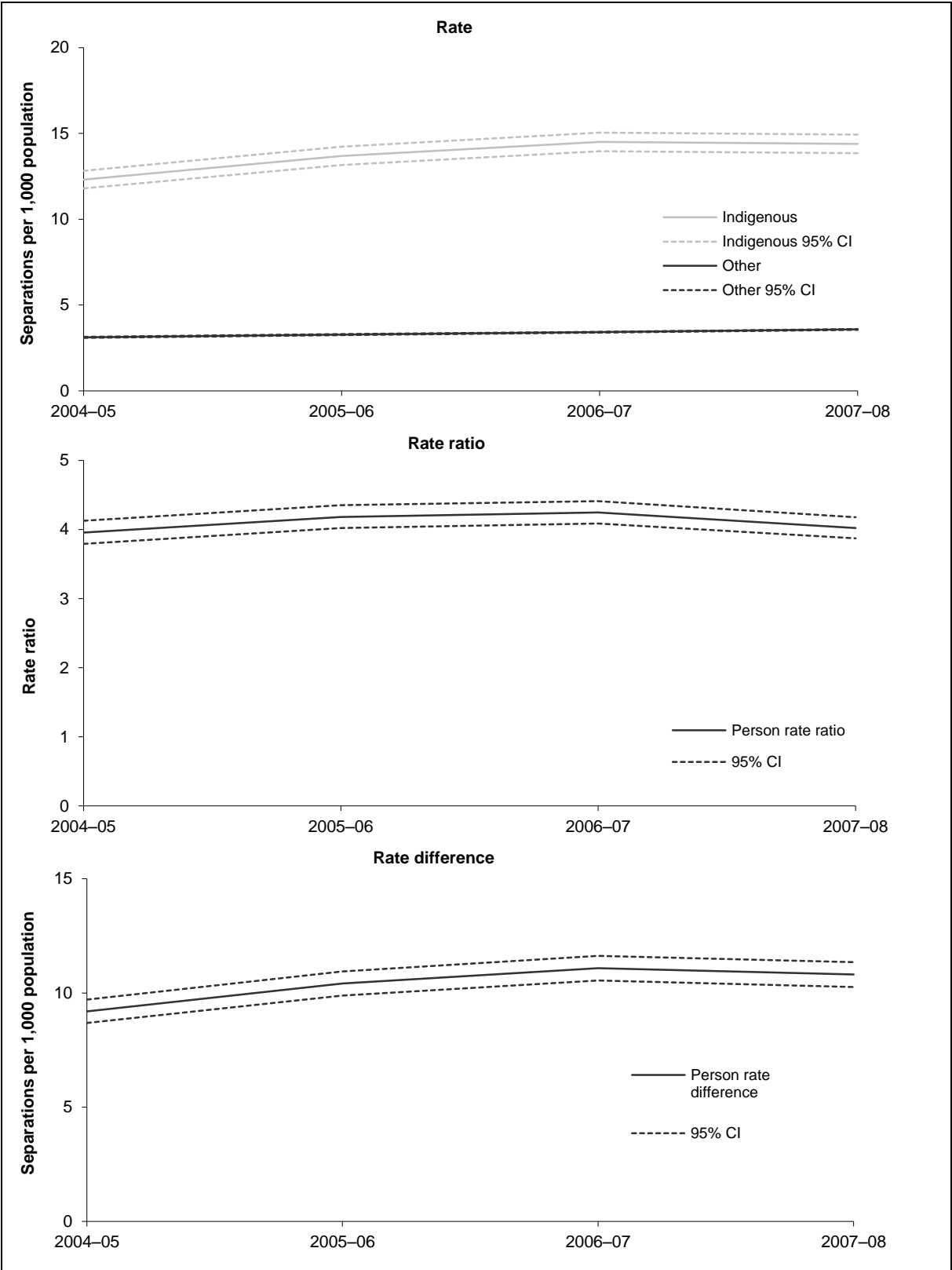
\* Represents results with statistically significant increases or declines at the  $p < 0.05$  level over the period 2004–05 to 2007–08.

- (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 the 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 1.08.4: Hospitalisation rates, rate ratios and rate differences between Indigenous and other Australians from diabetes, 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 BEACH reporting period April 2004–March 2005 to April 2008–March 2009 are presented in Table 1.08.14. Diabetes is the most common individual problem managed at GP encounters with Indigenous patients.

- In the period April 2004–March 2005 to April 2008–March 2009 there were 6,137 GP encounters with Aboriginal and Torres Strait Islander patients recorded in the survey, at which 9,305 problems were managed. Of these, 5.5% (516) of problems managed were for diabetes.
- Diabetes was managed at a rate of 8.4 per 100 GP encounters with Indigenous patients.
- After adjusting for differences in age distribution, diabetes was managed at encounters with Indigenous patients at over three times the rate of encounters with other patients.
- Non-insulin-dependent diabetes (Type 2) was the most common type of diabetes managed at encounters with Indigenous patients – at over three times the rate of encounters with other patients.
- Insulin-dependent diabetes (Type 1) was managed at encounters with Indigenous patients at around three times the rate of encounters with other patients.
- Gestational diabetes was managed at GP encounters with Indigenous females at around four times the management rate of encounters with other females.

**Table 1.08.14: Diabetes problems<sup>(a)</sup> managed by general practitioners, by Indigenous status of patient, BEACH years April 2004–March 2005 to April 2008–March 2009<sup>(b)(c)</sup>**

Problem managed	Number		Per cent		Crude rate (no. per 100 encounters)						Age-standardised rate (no. per 100 encounters) <sup>(d)</sup>		
	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>
Diabetes: non-insulin-dependent (T90)	484	15,467	5.2	2.1	7.9	6.8	9.0	3.2	3.1	3.3	10.8	3.2	3.4
Diabetes: insulin-dependent (T89)	25	1,335	0.3	0.2	0.4	0.2	0.6	0.3	0.3	0.3	0.8	0.3	2.9
<i>Total diabetes: non-gestational</i>	509	16,802	5.5	2.3	8.3	7.2	9.4	3.5	3.4	3.6	11.6	3.4	3.4
Gestational diabetes (W85) <sup>(i)</sup>	7	96	0.1	—	0.1	0.0	0.2	—	—	—	0.1	—	4.1
<i>All diabetes</i>	516	16,898	5.5	2.3	8.4	7.3	9.6	3.5	3.4	3.6	11.6	3.5	3.4
<b>Total problems</b>	<b>9,305</b>	<b>733,008</b>	<b>100</b>	<b>100</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 codes (Classification Committee of the World Organization of Family Doctors (WICC) 1998). ICPC-2 codes T90, T89, W85.

(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.

(i) Proportions, rates and ratios are for females only.

Source: AIHW analysis of BEACH survey of general practice, 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 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. Imperfect recall or individual interpretation of survey questions may nevertheless affect some responses.

Non-Indigenous comparisons are available through the National Health Survey (NHS). The NHS was conducted in *Major cities, Inner regional* 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).

### **National Hospital Morbidity data**

#### **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.

In all states and territories, 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.

#### **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 under-counts the number of Indigenous Australians visiting GPs, but the extent of this under-count is not measurable.

## **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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