

## 3.05 Differential access to key hospital procedures

The key hospital procedure differentials between Aboriginal and Torres Strait Islander peoples and other Australians as measured through standardised rates, ratios and rate differences in hospital separations with the same principal diagnosis

### Data sources

Data for this measure come from the AIHW's 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. 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in 2004–05 – New South Wales, Victoria, Queensland, Western Australia, South Australia and the Northern Territory (AIHW unpublished). These six jurisdictions represent approximately 96% of the Indigenous population of Australia. Data are presented by state/territory of usual residence of the patient.

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

Hospitalisation data are presented for the 2-year period from July 2004 to June 2006. 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, which can be a total hospital stay (from admission to discharge, transfer or death) or a portion of a hospital stay beginning or ending a change in a type of care (for example, from acute to rehabilitation). 'Separation' also means the process by which an admitted patient completes an episode of care by being discharged, dying, transferring to another hospital or changing type of care.

### Analyses

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

## Hospitalisations with a procedure recorded

Table 3.05.1 presents the proportion of hospitalisations with a procedure recorded in public hospitals between June 2004 and July 2006 by a number of demographic variables. This table includes all states and territories because the proportions are of those in hospital and not population rates and, as such, are not affected by Indigenous under-identification issues as are other data on hospital admissions.

- Between July 2004 and June 2006, there were around 11.6 million hospitalisations with a procedure reported in Australia, 2.9% (338,278) of which were hospitalisations recorded for Indigenous patients. Excluding hospitalisations for care involving dialysis, there were around 9.9 million hospitalisations with a procedure reported, 1.5% (146,315) of which were hospitalisations recorded for Indigenous patients. Over one-third (36%) of all hospitalisations of Indigenous Australians had more than one procedure performed.
- Although Indigenous Australians were more likely to be hospitalised than other Australians, they were less likely to undergo a procedure once admitted to hospital. Between July 2004 and June 2006, excluding hospitalisations for care involving dialysis, 55% of Indigenous hospitalisations had a procedure recorded, compared with 80% of other hospitalisations (Table 3.05.1).
- The proportion of hospitalisations with a procedure recorded was highest for Indigenous patients aged 55–64 years and 65 years and over (both 59%).
- Patients who were hospitalised in Remote or Very Remote areas were less likely to undergo a procedure (44% and 46% of Indigenous patients and 66% and 62% of other patients) compared with those hospitalised in Major Cities (69% and 82% for Indigenous and other patients, respectively).
- Both Indigenous and other patients hospitalised in private hospitals were much more likely to undergo a procedure (88% and 92%, respectively) than Indigenous and other patients hospitalised in public hospitals (54% and 70%, respectively).
- Indigenous patients hospitalised in Queensland and South Australia were least likely to receive a procedure (52% and 53%) and Indigenous patients hospitalised in Tasmania were most likely to receive a procedure (71%).
- For Indigenous Australians, 5% of hospitalisations with a procedure recorded occurred in private hospitals compared with 50% for non-Indigenous Australians.

**Table 3.05.1: Number and proportion of hospitalisations with a procedure recorded<sup>(a)</sup>, by Indigenous status, Australia, July 2004 to June 2006**

	Indigenous		Other <sup>(b)</sup>	
	No.	%	No.	%
<b>Overall</b>	146,315	55.3	9,770,726	79.6
<b>Sex</b>				
Males	61,582	54.8	4,443,619	79.9
Females	84,730	55.8	5,327,032	79.4
<b>Age group (years)</b>				
Under 1	7,345	43.0	130,753	51.3
1–14	20,687	49.3	480,341	64.6
15–34	50,392	50.8	1,726,711	73.3
35–54	42,133	52.4	2,399,282	82.0
55–64	13,272	58.6	1,555,140	85.9
65+	12,486	58.5	3,478,492	83.2
<b>State/territory of residence</b>				
<b>NSW</b>	36,459	54.6	3,003,963	79.0
<b>Vic</b>	7,544	64.9	2,699,089	79.4
<b>Qld</b>	37,239	51.5	1,922,453	78.9
<b>WA</b>	28,435	56.3	976,138	84.7
<b>SA</b>	9,784	53.1	803,636	79.6
<b>Tas</b>	2,645	70.7	196,827	76.1
<b>ACT</b>	877	67.9	112,090	81.6
<b>NT</b>	23,332	55.6	56,530	75.5
<b>Remoteness of residence</b>				
Major Cities	39,055	68.9	6,661,310	81.7
Inner Regional	27,065	62.6	2,062,589	78.0
Outer Regional	34,788	50.3	905,532	71.9
Remote	16,750	44.4	97,471	66.2
Very Remote	28,181	46.3	32,150	61.8
<b>Sector</b>				
Public	139,646	54.2	4,933,686	70.2
Private	6,669	87.7	4,837,040	92.2
<b>Same-day admission</b>				
Yes	41,810	57.2	5,166,717	85.0
No	104,505	54.4	4,604,009	74.3
<b>Patient accommodation</b>				
Public	136,056	54.4	4,263,895	69.5
Private	10,234	77.5	5,494,629	89.8

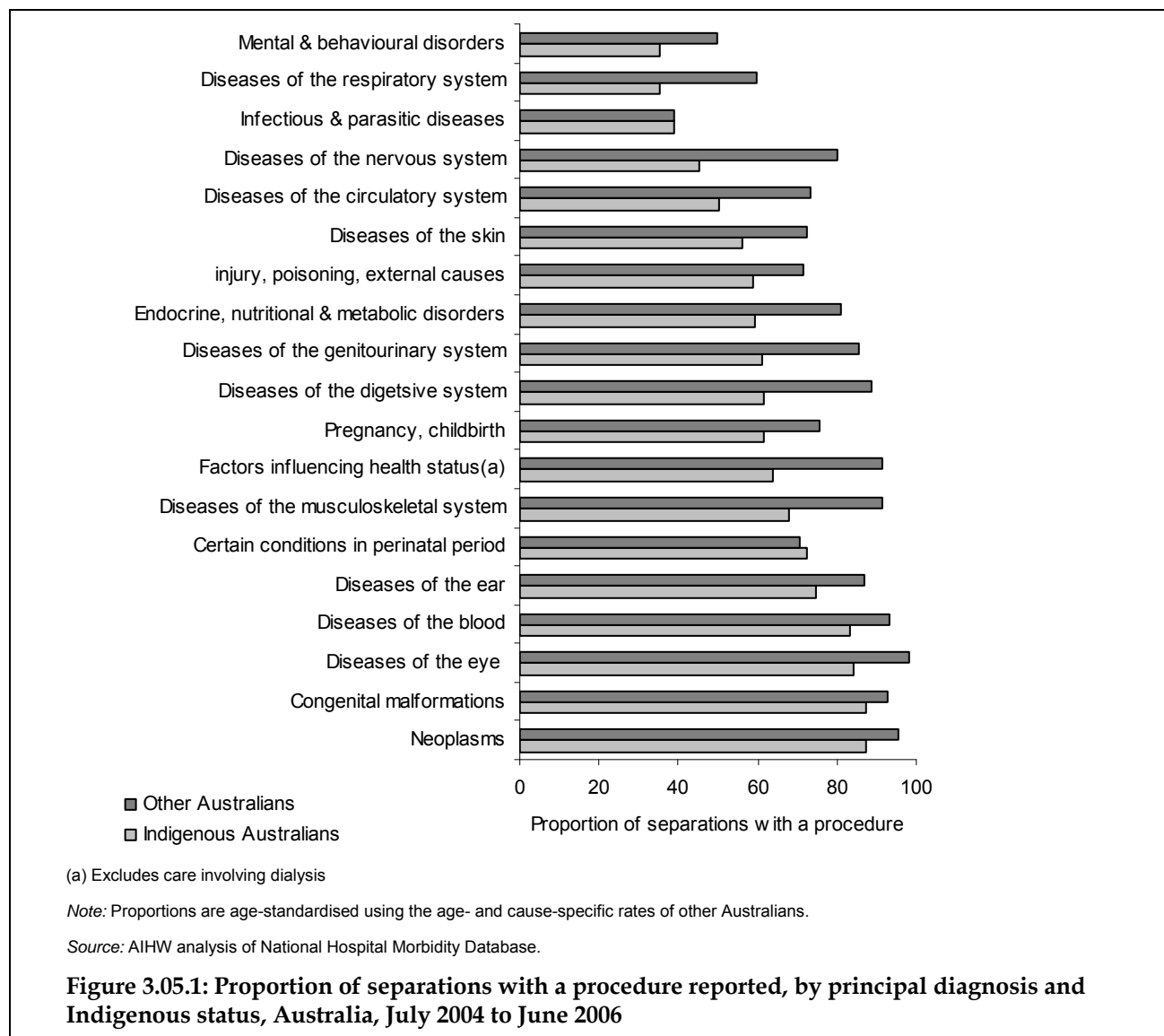
(a) Hospitalisations with a principal diagnosis of care involving dialysis (Z49) have been excluded.

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

Note: Proportions are age-standardised using the age-specific rates of other Australians.

Source: AIHW analysis of National Hospital Morbidity Database.

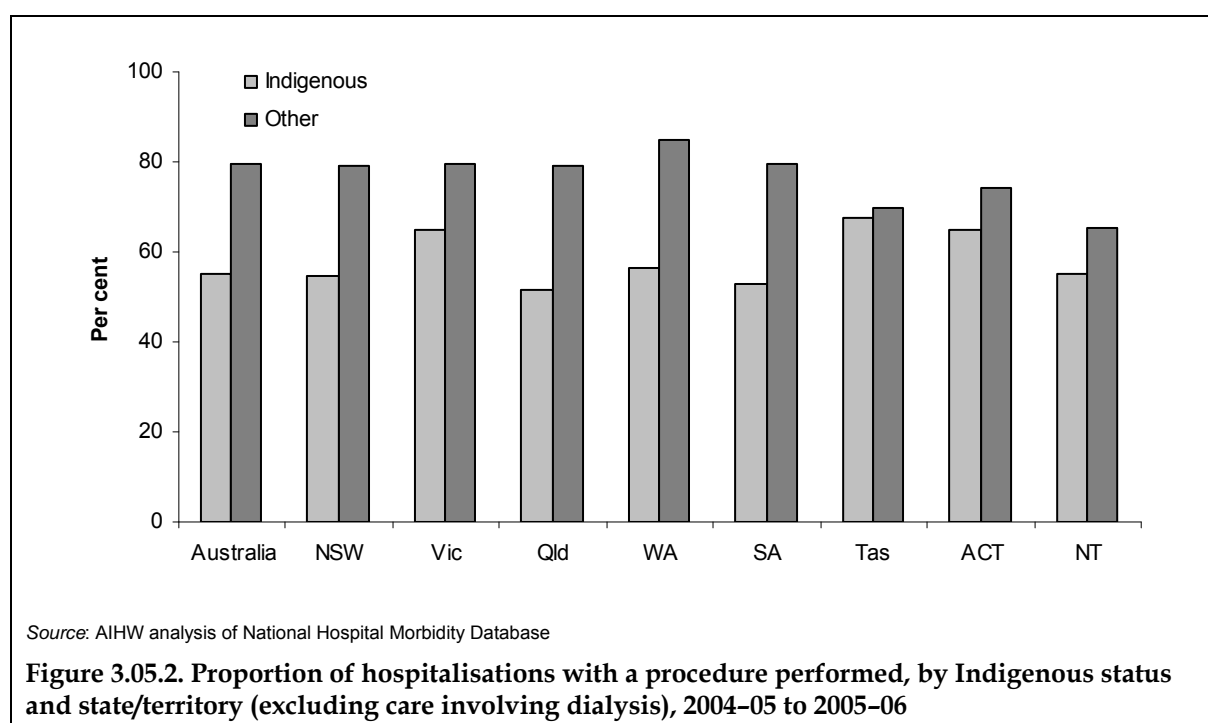
Figure 3.05.1 shows that between July 2004 and June 2006 in Australia, the proportion of separations with a procedure reported by principal diagnosis was lower for Indigenous patients than for other patients for almost all of the diagnosis chapters. For example, for diseases of the nervous system, 46% of separations for Indigenous patients had a procedure reported, compared with 80% of separations for other patients. Certain conditions originating in the perinatal period was the only chapter for which the proportion of separations with procedures was higher for Indigenous patients.



## Detailed analyses (univariate and multivariate regression) of hospitalisations with a procedure reported

In 2007–08, the AIHW undertook a series of univariate and multivariate regression analyses to examine the relative importance of selected variables, including Indigenous status, in affecting the outcome of whether a patient hospitalised underwent a procedure for the period 2004–05 to 2005–06 in Australia.

The first series of univariate analyses revealed that there were variations in the likelihood of receiving a procedure by state/territory and principal diagnosis chapter. As shown in Figure 3.05.2, in all states and territories, Indigenous Australians were less likely to receive a procedure than other Australians. For Indigenous Australians, the lowest proportions were in Queensland and South Australia, with the highest proportions in Tasmania, Victoria, and the ACT. The greatest disparities were observed in NSW, Qld, WA and SA – all with ratios of 0.7. There was little disparity between Indigenous patients and other patients in Tasmania.



The univariate analyses found that the principal diagnoses that had the lowest proportions of procedures reported for Indigenous patients were symptoms, signs, n.e.c. (31.1%), mental and behavioural disorders (35.1%), diseases of the respiratory system (35.5%), and infectious and parasitic diseases (38.8%). The highest proportions of procedures reported for Indigenous patients were factors involving health status (96.2%), neoplasms (87.3%), congenital malformations (87.3%) and diseases of the eye (84.2%).

The disease categories with the greatest levels of inequality in procedures reported between Indigenous Australians and other Australians were diseases of the nervous system, diseases of the respiratory system, and signs, symptoms, n.e.c. – all with ratios of 0.6. There was no disparity between Indigenous Australians and other Australians in procedures reported for infectious and parasitic diseases, certain conditions in perinatal period and factors influencing health status (ratio of 1.0).

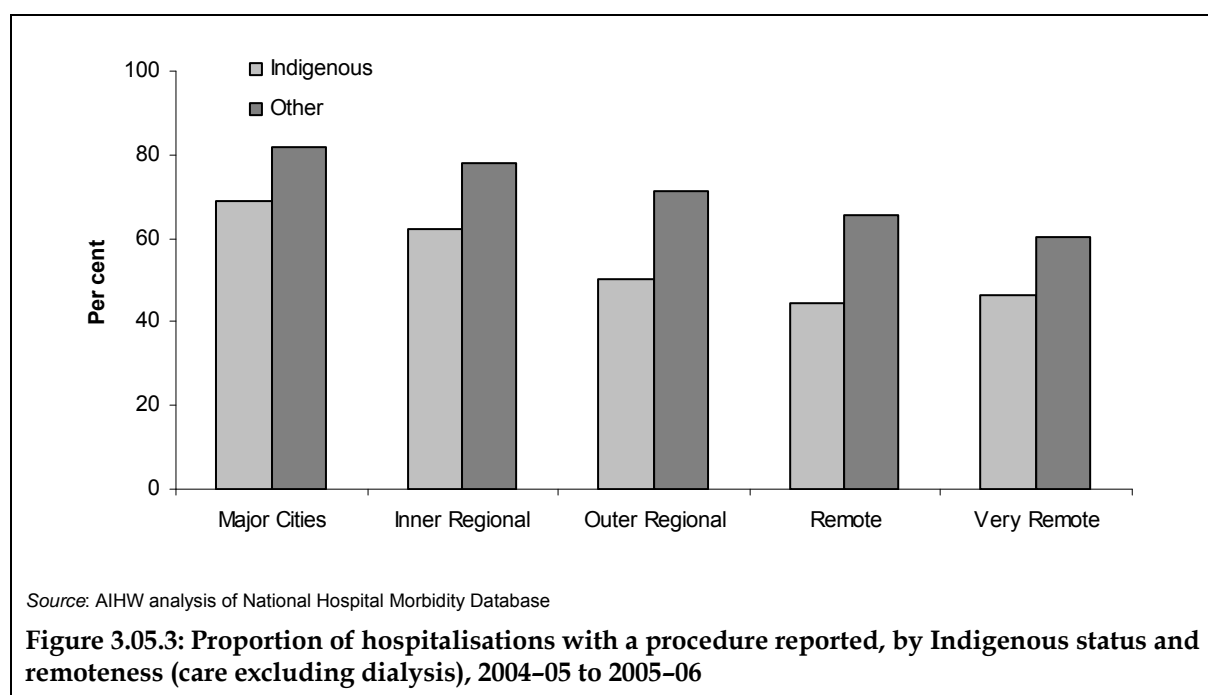
Further analyses by state/territory found that, across all states and territories, the proportion of separations for 'factors influencing health status and contact with health services' with a procedure recorded was higher for Indigenous patients or similar to the proportions for other Australians.

In South Australia and Victoria, separations for infectious and parasitic diseases and conditions originating in the perinatal period also had higher procedure rates for Indigenous patients than for other patients.

In the Northern Territory, several diagnosis chapters had a higher proportion of separations with a procedure reported for Indigenous patients, including mental and behavioural disorders, infectious and parasitic diseases, conditions originating in the perinatal period, diseases of the blood, and congenital malformations.

Tasmania and the ACT also had higher proportions of separations with a procedure reported for Indigenous patients than for other patients for numerous disease categories, including diseases of the blood and congenital malformations.

A second series of univariate analyses focused on differences by state/territory, diagnosis chapter, and remoteness category. Figure 3.05.3 demonstrates that the proportion of separations with a procedure reported is lower for Indigenous patients in all remoteness categories.



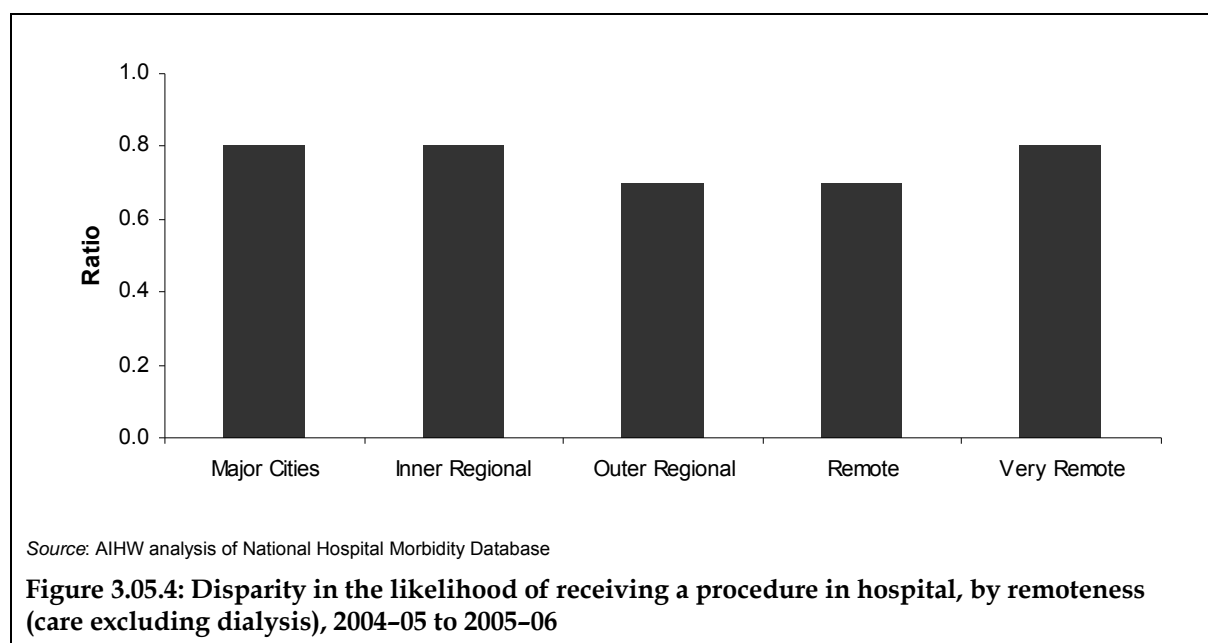
The lowest proportion of hospitalisations with procedures reported for Indigenous patients was in Remote areas, although for other patients the lowest proportion was in Very Remote areas.

The breakdown by state/territory shows that in Qld, NT, NSW and Tas, the overall proportions of separations with a procedure reported were lowest in Remote areas, followed by Very Remote areas. In WA and SA, the lowest proportions were in Very Remote areas, followed by Outer Regional and Remote areas. In Victoria, the proportions for Indigenous patients were lowest in Remote areas followed by Outer Regional areas.

In all states and territories, Indigenous patients were less likely to undergo a procedure across all remoteness categories, with the exception of Tasmania and the ACT where

proportions were similar for all relevant remoteness categories, and the Northern Territory where the proportion of hospitalisations with a procedure reported for Indigenous and other patients in Outer Regional areas was similar.

As shown in Figure 3.05.4, the greatest disparities between Indigenous Australians and other Australians were found in Outer Regional and Remote areas, with Indigenous Australians being 30% less likely to receive a procedure while in hospital.



In Qld, WA, SA and NSW, disparities were greatest in Outer Regional, Remote, and Very Remote areas (ratios of 0.6 to 0.7). In NT, disparities were greatest in Remote areas (0.8) and in Victoria, the ratio of Indigenous to other Australian separations with a procedure reported was similar in Major Cities, Inner Regional and Outer Regional areas (ratios of 0.8).

The data were further broken down by remoteness category and principal diagnosis. The proportions of separations for which Indigenous patients received procedures were lowest in Remote and Very Remote areas for most principal diagnoses.

The diagnostic chapters with the lowest proportions of Indigenous separations receiving a procedure were fairly consistent across remoteness categories. The same four principal diagnoses (symptoms, signs, n.e.c., mental and behavioural disorders, infectious and parasitic diseases, and diseases of the respiratory system) had the lowest proportion of Indigenous separations receiving a procedure in each remoteness category. *Within* each of the categories, the likelihood of receiving a procedure decreased with remoteness (Table 3.05.2).

**Table 3.05.2: Diagnosis chapters with the lowest proportions of Indigenous separations receiving a procedure, Australia, 2004–05 to 2005–06**

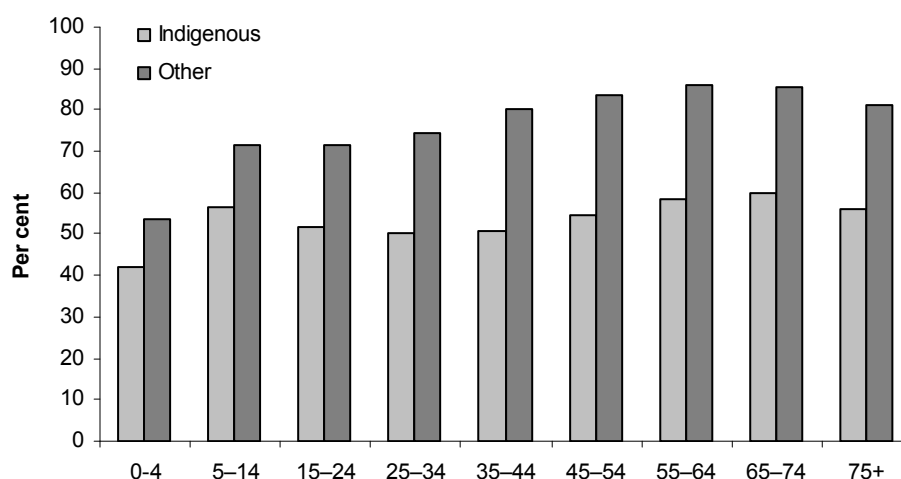
Remoteness category	Lowest proportion	Second lowest proportion	Third lowest proportion
Major Cities	Symptoms, signs, n.e.c. (45.3%)	Mental and behavioural disorders (48.2%)	Infectious and parasitic (50.5%)
Inner Regional	Symptoms, signs, n.e.c. (35.6%)	Infectious and parasitic (37.6%)	Mental and behavioural disorders (39.9%)
Outer Regional	Symptoms, signs, n.e.c. (24.7%)	Mental and behavioural disorders (29.1%)	Diseases of the respiratory system (30.8%)
Remote	Symptoms, signs, n.e.c. (21.5%)	Mental and behavioural disorders (22.1%)	Diseases of the respiratory system (27.3%)
Very Remote	Mental and behavioural disorders (17.3%)	Diseases of the respiratory system (25.7%)	Symptoms, signs, n.e.c. (25.9%)

Source: AIHW analysis of National Hospital Morbidity Database

A third series of more-detailed univariate analysis looked at the association between receiving a procedure once hospitalised and other variables aside from state/territory, remoteness and principal diagnosis such as age, sex, same day admission, sector of hospital, volume of procedures, diagnosis subcategory and procedure block.

This analysis showed that the proportion of Indigenous males and females who received a procedure once in hospital was similar (51% and 52%, respectively). The disparity between Indigenous males and other males and Indigenous females and other females in the proportion who received a procedure once in hospital was similar (ratios of 0.9 including separations for dialysis, and ratios of 0.7 excluding separations for dialysis).

Half of all Indigenous patients who received a procedure once in hospital were aged 15–44 years (50%). In comparison, only 29% of other patients aged 15–44 years received a procedure once in hospital. The majority of other patients who received a procedure once in hospital were aged 55 years and over (52%). Within each age group, the highest proportion of hospitalisations of Indigenous and other patients for which a procedure was reported were for those aged 55–64 and 65–74 years (59% to 60% for Indigenous and 86% for other patients) (Figure 3.05.5). Indigenous patients were less likely to receive a procedure once in hospital than other patients across all age groups. The greatest disparity was observed for 35–44 years (ratio of 0.6).

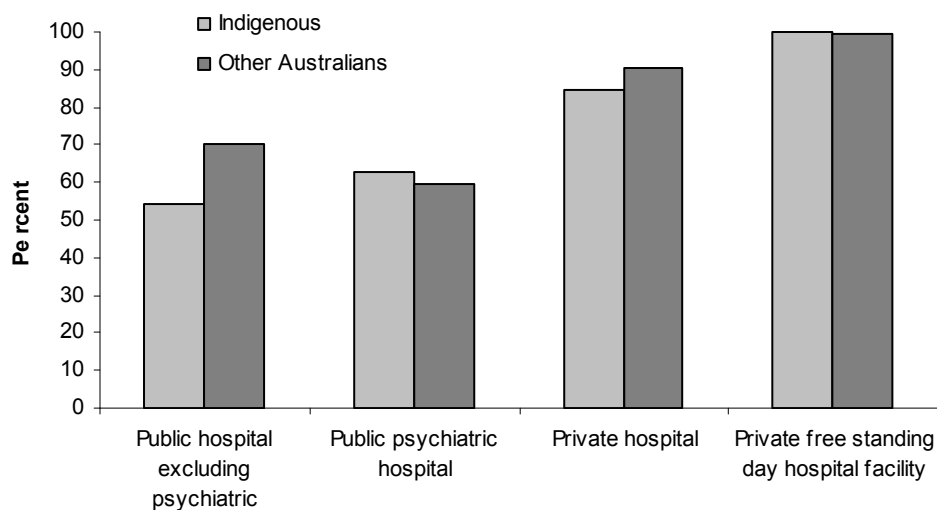


Source: AIHW analysis of National Hospital Morbidity Database

**Figure 3.05.5: Proportion of separations with a procedure reported (excluding care involving dialysis), by Indigenous status and age group, Australia, 2004-05 to 2005-06**

The proportion of separations with a procedure reported was slightly higher for Indigenous patients who were admitted to hospital for one day only (57%) compared with Indigenous patients who remained in hospital for more than one day (54%). The disparity between Indigenous and other Australians in the proportion of separations with a procedure reported was similar for those who had a same-day admission and those who were in hospital for more than one day (ratios of 0.7).

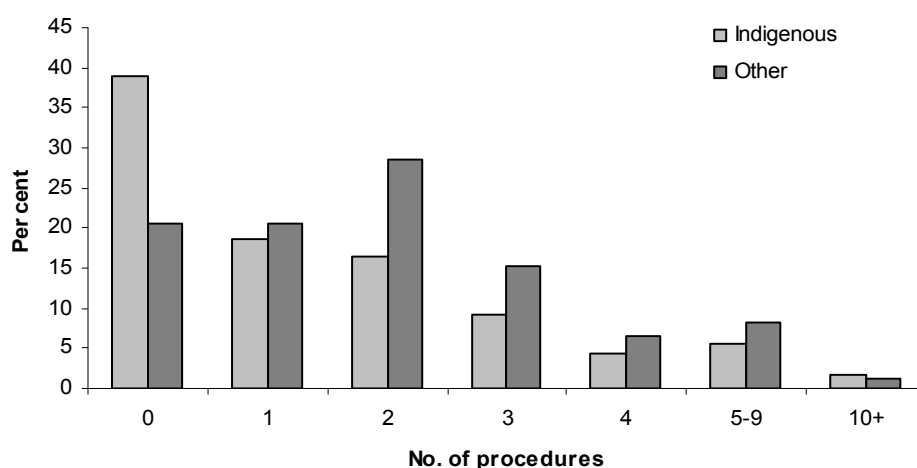
The proportion of separations with a procedure reported was much higher for Indigenous patients admitted to private hospitals than for Indigenous patients admitted to public hospitals (87% compared with 51%). The proportion of separations of Indigenous patients with a procedure reported was higher for public psychiatric hospitals than other public hospitals (62% compared with 51%). Although Indigenous and other patients admitted to private hospitals or public psychiatric hospitals were equally as likely to receive a procedure once in hospital, Indigenous patients admitted to public hospitals, excluding psychiatric hospitals were less likely to receive a procedure than other patients admitted to public hospitals (ratio of 0.8) (Figure 3.05.6).



Source: AIHW analysis of National Hospital Morbidity Database

**Figure 3.05.6: Proportion of separations with a procedure reported (excluding care involving dialysis), by Indigenous status and sector of hospital, Australia, 2004-05 to 2005-06**

Around 39% of all hospitalisations of Indigenous Australians did not have a procedure reported. Around 19% of Indigenous hospitalisations had one procedure reported, 16% had two procedures reported, 9% had three procedures reported and 12% had four or more procedures reported. Indigenous Australians were twice as likely as other Australians to have no procedures reported and less likely than other Australians to have 1 to 9 procedures reported. They were, however, more likely to have 10 or more procedures reported, which probably reflect the higher rates of comorbidities and more problematic hospitalisations (Figure 3.05.7).



Note: Data have been indirectly age-standardised.

Source: AIHW analysis of National Hospital Morbidity Database

**Figure 3.05.7: Proportion of separations with a procedure reported (excluding care involving dialysis), by Indigenous status and number of procedures reported, Australia, 2004-05 to 2005-06**

Indigenous males and females were equally or less likely to receive a procedure than other Australians if they were hospitalised for any of the top 20 most common disease categories. The greatest disparities in the proportion of separations with a procedure reported between Indigenous and other males among the top 20 most common diagnosis subcategories were for other forms of heart disease (ratio of 0.4), schizophrenia, schizotypal and delusional disorders (ratio of 0.5), and disorders related to length of gestation and fetal growth (ratio of 0.5). The greatest disparities in the proportion of separations with a procedure reported between Indigenous and other females among the top 20 most common diagnosis subcategories were for symptoms, signs involving the digestive system and abdomen (ratio of 0.5), and diseases of the oesophagus, stomach and duodenum (ratio of 0.6).

Whether a person hospitalised for each principal diagnosis chapter received a procedure corresponding to that principal diagnosis (based on related procedure block chapters) was also examined. For all of the 13 principal diagnosis chapters that had a corresponding procedure block chapter (diseases of the circulatory system; diseases of the digestive system; diseases of the respiratory system; diseases of the nervous system; diseases of the eye and adnexa; diseases of the ear and mastoid process; pregnancy, childbirth and the puerperium; diseases of the musculoskeletal system; diseases of the skin and subcutaneous tissue; neoplasms; diseases of the musculoskeletal system; diseases of the blood; and endocrine, metabolic and nutritional disorders), Indigenous males and females were less likely overall to receive a relevant procedure than other males and females except for neoplasms, where Indigenous males and females were slightly more likely to receive a radiation oncology procedure than other males and females. When specific procedures within the relevant procedure block corresponding to the principal diagnosis were analysed, the results showed that Indigenous Australians were more likely than other Australians to receive some specific procedures and less likely to receive others.

In order to test whether compositional differences between Indigenous Australians and other Australians were driving the differences in the likelihood of having a procedure reported, a series of multivariate analyses were run, which included sociodemographic characteristics, state and territory variables, remoteness, hospital sector (public or private), principal diagnosis, and total number of additional diagnoses.

After controlling for these other variables, Indigenous status was the twelfth most significant variable (third if the principal diagnosis chapters were not included) contributing to whether a patient would receive a procedure once in hospital. The probability of receiving a procedure for Indigenous Australians was about 39% less than the probability for other Australians.

The most significant variable contributing to whether a patient would receive a procedure once in hospital was hospital sector. The odds of a person in a private hospital receiving a procedure was more than 4 times the odds for a patient in a public hospital.

The second most significant variable was the number of additional diagnoses. Patients hospitalised with additional diagnoses recorded were more likely to receive a procedure than those without additional diagnoses recorded.

Of the diagnostic categories, neoplasms was the most significant in increasing the likelihood of receiving a procedure, followed by diseases of the skin, diseases of the eye and adnexa, diseases of the genitourinary system, diseases of the blood, pregnancy and childbirth, and diseases of the ear and mastoid process.

Remoteness of usual residence ranked after Indigenous status in terms of importance, and was more significant than state/territory of usual residence. The odds of receiving a procedure for patients residing in Remote and Very Remote areas were around half as great as the odds for patients residing in Major Cities.

Age group and sex were also significant variables in predicting whether a person would receive a procedure once in hospital.

A series of multivariate analyses also examined whether a person hospitalised for each principal diagnosis chapter underwent a procedure corresponding to that principal diagnosis. The results showed that after controlling for age, sex, sector, state/territory of usual residence, remoteness of usual residence, and number of additional diagnoses, Indigenous status was still significant except for diseases of the genitourinary system, diseases of the digestive system, and diseases of the ear and mastoid process.

For most principal diagnosis chapters, Indigenous status ranked after sector of hospital, number of additional diagnoses, sex, age group, and state/territory of usual residence. For eight of the 13 principal diagnosis chapters, Indigenous status ranked above remoteness of usual residence of the patient in terms of importance.

Given that the control variables did have a significant impact on the outcome variable, separate multivariate regressions were run for Indigenous and other Australians to test whether the impact of these variables was similar for both groups, such as whether living in a remote area has the same effect for other Australians that it does for Indigenous Australians.

Results from the overall analysis showed that after adjusting for age, sex, sector, state/territory of usual residence of patient, Remoteness of usual residence of patient, principal diagnosis and number of additional diagnoses, for both Indigenous and other Australians the four most significant variables contributing to whether a patient would receive a procedure once in hospital was the number of additional diagnoses, a principal diagnosis of neoplasms, principal diagnosis of diseases of the skin and hospital sector. The sector was the most significant variable for other Australians (it was the fourth most significant variable for Indigenous Australians).

Remoteness of usual residence of the patient was more significant in contributing to the outcome of whether a patient would receive a procedure than state/territory of usual residence of the patient for both Indigenous and other Australians. The likelihood of receiving a procedure for patients residing in Remote and Very Remote areas was around half the likelihood for patients residing in Major Cities. Remoteness of usual residence of the patient ranked higher in terms of importance for Indigenous Australians than for other Australians (sixth compared with thirteenth).

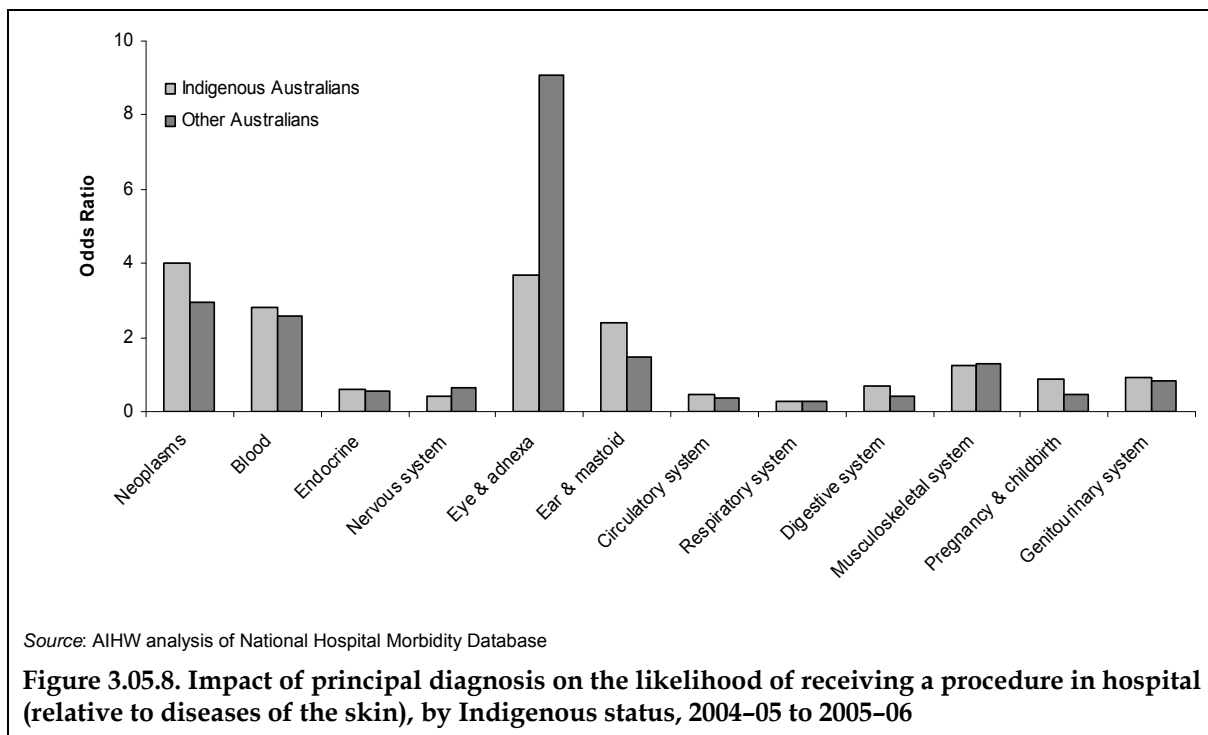
Age group and sex were both significant variables in affecting whether a patient would receive a procedure once in hospital for Indigenous and other Australians.

Results from the set of analyses that examined the outcome of whether a person hospitalised for each principal diagnosis chapter underwent a procedure corresponding to that principal diagnosis chapter, showed that for Indigenous Australians for most principal diagnosis chapters, the variables age, sector, remoteness of usual residence and number of additional diagnoses were most significant in affecting the outcome of whether a person underwent a procedure, and the variables sex and state/territory of usual residence were less significant.

Given the statistical and theoretical importance of principal diagnosis chapters on the likelihood of receiving a procedure once in hospital, a further set of analyses were conducted with the principal diagnosis chapters recoded as categorical variables in order to test their relative importance against the category of 'diseases of the skin'. The models – run separately for Indigenous Australians and other Australians – included the same set of variables (age group, sector of hospital, remoteness of usual residence, state/territory of usual residence, total number of additional diagnoses, and sex) as the previous analyses.

Results showed that after adjusting for these variables, principal diagnosis and number of additional diagnoses, the four most significant variables contributing to whether a patient would receive a procedure once in hospital was the number of additional diagnoses, hospital sector, remoteness of usual residence of the patient and principal diagnosis for both Indigenous and other Australians. The number of additional diagnoses was the most significant variable for Indigenous Australians and sector was the most significant variable for other Australians. Remoteness of usual residence of the patient was more significant in affecting the outcome of whether a patient would receive a procedure once in hospital than state/territory of usual residence for both Indigenous and other Australians.

Figure 3.05.8 shows the impact of the individual principal diagnosis categories on the likelihood of receiving a procedure in hospital for both Indigenous Australians and other Australians. All the results that are less than 1 indicate that patients with that principal diagnosis were less likely than those with diseases of the skin to receive a procedure. Figure 3.05.8 shows that for Indigenous Australians, patients with diseases of the respiratory system, nervous system, and circulatory system were the least likely to receive a procedure. Two of the same three chapters – diseases of the respiratory system and the circulatory system – were also among the lowest for other Australians, along with diseases of the digestive system. For Indigenous Australians and other Australians, patients with neoplasms and those with diseases of the eye and adnexa were the most likely to receive procedures.



Although these exploratory analyses have been critical in identifying some of the factors underlying the disparity between Indigenous and other Australians in the likelihood of receiving a procedure once in hospital, they were not able to fully account for the differences between Indigenous Australians and other Australians. Further research is needed to explore the mechanisms underlying these disparities.

## Hospital procedures

Procedures are clinical interventions that are surgical in nature, carry a procedural risk, carry an anaesthetic risk, require specialised training, and/or require special facilities or equipment that is only available in an acute-care setting. Procedures, therefore, encompass surgical procedures and non-surgical investigative and therapeutic procedures such as X-rays and chemotherapy. Client-support interventions that are neither investigative nor therapeutic (such as anaesthesia) are also included.

- Over the period July 2004 to June 2006, there were 591,135 hospital procedures performed on Indigenous patients in New South Wales, Victoria, Queensland, Western Australia, South Australia and the Northern Territory combined. Approximately one third (33%) of these procedures were for haemodialysis (Table 3.05.3).
- Procedures on the urinary system was the most frequently reported procedure chapter for Indigenous patients (200,703). The number of haemodialysis procedures per 1,000 population for persons identified as Indigenous was about 11 times that for other persons. For procedures on the respiratory system the rate for persons identified as Indigenous was twice that for other persons and for procedures on the cardiovascular system the rate was 1.2 times that of other persons.
- Procedures for which the rate for Indigenous persons was less than that for other persons included procedures on the nervous system; procedures on the nose, mouth and pharynx; procedures on the male genital organs; dental services; procedures on the digestive system; and gynaecological procedures.

**Table 3.05.3: Hospital procedures, by type of procedure reported and Indigenous status, NSW, Vic, Qld, WA, SA and NT, July 2004 to June 2006<sup>(a)(b)(c)(d)</sup>**

	Number		Per cent		No. per 1,000 <sup>(e)</sup>		Ratio <sup>(g)</sup>
	Indigenous	Other <sup>(f)</sup>	Indigenous	Other <sup>(f)</sup>	Indigenous	Other <sup>(f)</sup>	
Procedures on urinary system	200,703	2,015,370	34.0	7.5	423.2	50.3	8.4*
Haemodialysis	193,874	1,472,083	32.8	5.5	409.1	36.7	11.1*
Non-invasive, cognitive and other interventions, not elsewhere classified	187,142	12,550,102	31.7	47.0	290.7	317.1	0.9*
Obstetric procedures	26,382	888,929	4.5	3.3	23.5	23.9	0.98*
Dental services	26,087	929,743	4.4	3.5	18.8	25.0	0.8*
Imaging services	24,926	1,331,001	4.2	5.0	43.1	33.4	1.3*
Dermatological and plastic procedures	21,772	1,113,201	3.7	4.2	27.2	28.2	0.96*
Procedures on digestive system	21,426	2,496,615	3.6	9.3	37.2	62.8	0.6*
Procedures on musculoskeletal system	20,989	1,258,061	3.6	4.7	26.6	32.1	0.8*
Procedures on cardiovascular system	17,687	1,031,668	3.0	3.9	31.9	25.7	1.2*
Gynaecological procedures	13,164	937,983	2.2	3.5	16.1	24.6	0.7*
Procedures on respiratory system	11,485	332,840	1.9	1.2	15.8	8.5	1.9*
Procedures on nervous system	3,880	381,628	0.7	1.4	5.1	9.7	0.5*
Procedures on ear and mastoid process	3,826	109,780	0.6	0.4	3.0	3.0	1.0
Procedures on eye and adnexa	3,731	497,749	0.6	1.9	10.0	12.4	0.8*
Procedures on nose, mouth and pharynx	3,604	361,832	0.6	1.4	3.6	9.5	0.4*
Procedures on male genital organs	1,725	188,170	0.3	0.7	2.2	4.8	0.5*
Procedures on blood and blood-forming organs	1,012	96,497	0.2	0.4	1.7	2.4	0.7*
Procedures on breast	973	126,739	0.2	0.5	1.6	3.2	0.5*
Radiation oncology procedures	336	28,648	0.1	0.1	0.6	0.7	0.9
Procedures on endocrine system	280	25,337	—	0.1	0.5	0.6	0.8*
<b>Total (excluding haemodialysis)</b>	<b>397,256</b>	<b>25,229,810</b>	<b>67.2</b>	<b>94.5</b>	<b>573.3</b>	<b>641.1</b>	<b>0.9*</b>
<b>Total (including haemodialysis)<sup>(h)</sup></b>	<b>591,135</b>	<b>26,702,144</b>	<b>100.0</b>	<b>100.0</b>	<b>982.5</b>	<b>677.9</b>	<b>1.4*</b>

(continued)

**Table 3.05.3 (continued): Hospital procedures, by type of procedure reported and Indigenous status, NSW, Vic, Qld, WA, SA and NT, July 2004 to June 2006<sup>(a)(b)(c)(d)</sup>**

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

- (x) Data are from public and most private hospitals. Data exclude private hospitals in the Northern Territory.
- (y) Categories are based on the ICD-10-AM fifth edition (National Centre for Classification in Health 2006).
- (z) Financial year reporting.
- (aa) Data are presented by state/territory of usual residence of the patient and are reported for New South Wales, Victoria, Western Australia, South Australia, the Northern Territory and Queensland only. These six jurisdictions are considered to have adequate levels of Indigenous identification, although the level of accuracy varies by jurisdiction and hospital. Hospitalisation data for these six jurisdictions should not be assumed to represent the hospitalisation experience in the other jurisdictions.
- (bb) Directly age-standardised using the Australian 2001 standard population.
- (cc) Other includes hospitalisations of non-Indigenous people and those for whom Indigenous status was not stated.
- (dd) Rate ratio—Indigenous: other.
- (ee) Includes procedures where the category was not stated.

Source: AIHW analysis of National Hospital Morbidity Database.

### Time series analyses

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

Hospital procedure rates, rate ratios and rate differences between Indigenous and other Australians in Queensland, Western Australia, South Australia and the Northern Territory combined over the 7-year period 1998–99 to 2005–06, excluding haemodialysis procedures, are presented in Table 3.05.4 and Figure 3.05.9.

- Over the period 1998–99 to 2005–06, there were significant increases in hospital procedure rates, excluding dialysis for both Indigenous and other Australians. The fitted trend implies an average yearly increase in the rate of around 36 per 1,000 for Indigenous Australians (equivalent to a 65% increase over the period) and 35 per 1,000 for other Australians (equivalent to a 57% increase over the period).
- There were no significant changes in the hospitalisation rate ratios or rate differences between Indigenous and other Australians over the period.

Note that changes in the level of accuracy of Indigenous identification in hospital records will result in changes in the level of reported hospital procedures for Indigenous Australians. Also, changes in access, hospital policies and practices all have an impact on the level of hospitalisation over time. Caution should be used in interpreting changes over time because 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 procedures may reflect better access to hospitals/hospital procedures rather than a worsening of health.

**Table 3.05.4: Age-standardised hospital procedure rates, rate ratios and rate differences (excluding haemodialysis), Qld, WA, SA and NT, 1998-99 to 2005-06<sup>(a)</sup>**

	1998-99	1999-00	2001-01	2001-02	2002-03	2003-04	2004-05	2005-06	Annual change <sup>(b)</sup>	Per cent change over period <sup>(c)</sup>
<b>Indigenous no. per 1,000</b>										
Persons	389.1	406.4	504.0	519.1	561.4	599.7	595.9	641.5	36.2*	65.2
<b>Other Australian<sup>(d)</sup> no. per 1,000</b>										
Persons	432.4	413.6	560.5	580.2	624.4	630.9	641.9	654.0	35.1*	56.8
<b>Rate ratio<sup>(e)</sup></b>										
Persons	0.9	1.0	0.9	0.9	0.9	1.0	0.9	1.0	—	4.2
<b>Rate difference<sup>(f)</sup></b>										
Persons	-43.4	-7.2	-56.5	-61.1	-63.1	-31.2	-46.0	-12.5	1.1	18.4

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

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

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

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

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

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

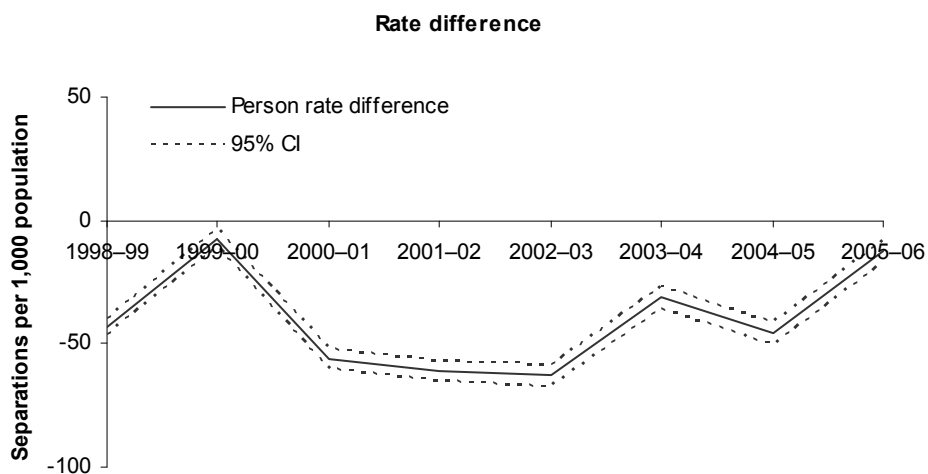
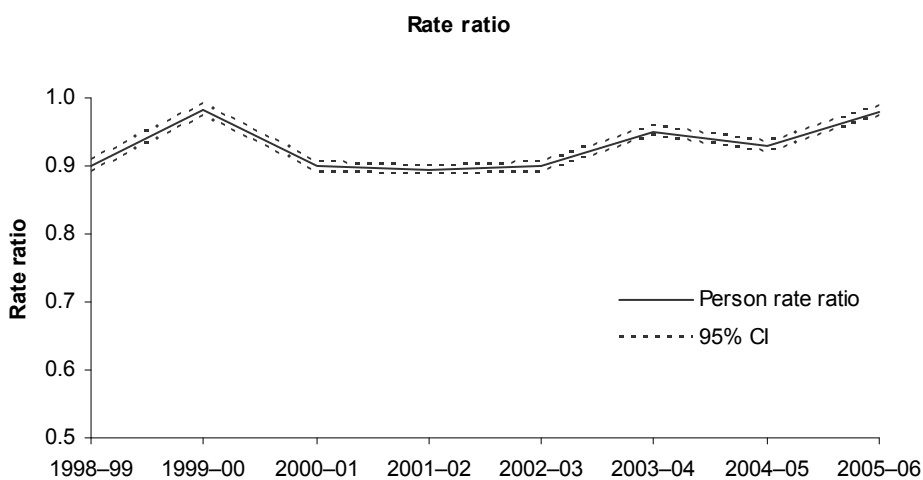
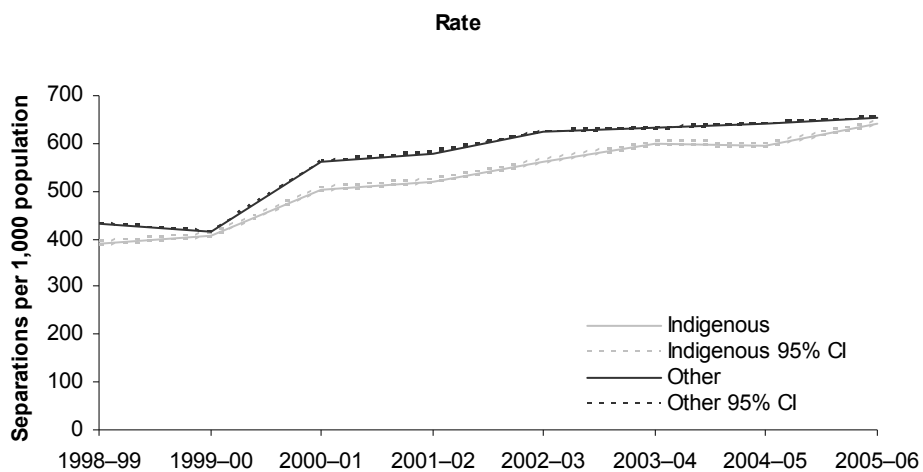
(f) Hospitalisation rates for Indigenous Australians minus hospitalisation rates for other Australians.

Notes:

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

b. Excludes procedures for haemodialysis (block no. 1060 for 2002-03 to 2005-06 and block no. 1059 for 1998-99 to 2001-02).

Source: AIHW analysis of National Hospital Morbidity Database.



Source: AIHW analysis of National Hospital Morbidity Database.

**Figure 3.05.9: Hospital procedure rates, rate ratios and rate differences (excluding haemodialysis) between Indigenous and other Australians, Qld, WA, SA and NT, 1998-99 to 2005-06**

## Additional information

### Coronary heart disease hospital procedures

The AIHW report *Aboriginal and Torres Strait Islander people with coronary heart disease: further perspectives on health status and treatment* (AIHW 2006) looked at the disparities between Aboriginal and Torres Strait Islander people and other Australians in the health status and treatment of coronary heart disease, including the use of coronary procedures in hospital. The key findings from this report are outlined below.

- In 2002–03, among those Australians hospitalised with coronary heart disease, Indigenous Australians were less likely to receive coronary procedures such as coronary angiography and revascularisation procedures than other Australians. This was evident across all age groups (Table 3.05.5). The detailed age-specific rates indicate that, in both relative and absolute terms, the largest differences for both angiography and revascularisation occurred in the 55–64 and 65–74 year age groups, where the rates for other Australians were around double that of Indigenous Australians and the rate difference was over 20 percentage points for angiography and over 10 percentage points for revascularisation. Revascularisation procedures include percutaneous coronary intervention (PCI) and coronary artery by-pass grafts (CABG).
- After taking the different population age structures into account, the angiography and revascularisation rate for Aboriginal and Torres Strait Islanders was 40% lower than the rate for other Australians (rate ratio of 0.6 for both).
- Similar results were observed when PCI and CABG were analysed separately, with Indigenous Australians generally less likely to receive these procedures than other Australians across all age groups for those hospitalised for coronary heart disease (Table 3.05.6). The age-adjusted procedure rate for PCI is around 40% lower than other Australians, although the age-adjusted rate for CABG is 20% lower (age-standardised rate ratio of 0.6 and 0.8, respectively).
- Indigenous Australians with coronary heart disease tended to have more complex cases (measured by the number of comorbidities). In 2002–03 Indigenous people with coronary heart disease were less likely to undergo a coronary procedure across all levels of complexity. The largest difference in procedure rates between Indigenous Australians and other Australians occurred in the least complex groups (no or 1–2 comorbidities present). In these groups, Indigenous Australians were just over half as likely to have a coronary procedure.
- The complexity of cases did not explain the lower procedure rate in Indigenous Australians compared with other Australians.

**Table 3.05.5: Use of coronary procedures for those hospitalised with coronary heart disease, by Indigenous status, Qld, WA, SA and NT, 2002–03**

Age group	Indigenous Australians		Other Australians		Inequality measures	
	Number	Per cent <sup>(a)</sup>	Number	Per cent <sup>(a)</sup>	Rate ratio <sup>(b)</sup>	Rate difference <sup>(c)</sup>
<b>Coronary angiography</b>						
25–34	53	23.8	222	39.2	0.6*	–15.4
35–44	241	27.7	1,664	39.5	0.7*	–11.8
45–54	344	26.1	6,746	44.8	0.6*	–18.6
55–64	247	24.4	11,905	45.9	0.5*	–21.6
65–74	100	20.7	13,081	42.5	0.5*	–21.7
75+	28	13.4	9,471	25.9	0.5*	–12.5
<b>All ages<sup>(d)</sup></b>						
Crude	1,016	24.6	43,106	38.1	0.6*	–13.5
ASR <sup>(e)</sup>	—	—	—	—	0.6*	—
<b>Revascularisation (PCI and CABG)</b>						
25–34	33	14.8	91	16.0	0.9	–1.3
35–44	135	15.5	954	22.7	0.7*	–7.1
45–54	211	16.0	4,036	26.8	0.6*	–10.8
55–64	160	15.8	7,153	27.6	0.6*	–11.8
65–74	58	12.0	7,688	25.0	0.5*	–12.9
75+	12	5.7	5,379	14.7	0.4*	–9.0
<b>All ages<sup>(d)</sup></b>						
Crude	609	14.8	25,306	22.4	0.7*	–7.6
ASR <sup>(e)</sup>	—	—	—	—	0.6*	—

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

- (a) Per cent refers to the proportion of hospitalisations with coronary heart disease as the principal diagnosis receiving either coronary angiography or coronary revascularisation.
- (b) Rate ratio—Indigenous: other.
- (c) Hospitalisation rates for Indigenous Australians minus hospitalisation rates for other Australians.
- (d) Includes those aged less than 25 years.
- (e) ASR refers to indirectly age-standardised rate using 'other Australians' population as the standard population.

Source: AIHW 2006.

**Table 3.05.6: Inequalities in the use of PCI and CABG procedures for those hospitalised with a principal diagnosis of coronary heart disease, Qld, WA, SA and NT, 2002–03**

	Age group (years)						All ages <sup>(a)</sup>	
	25–34	35–44	45–54	55–64	65–74	75+	Crude	ASR <sup>(b)</sup>
<b>PCI</b>								
Rate ratio <sup>(c)</sup>	0.9	0.6*	0.5*	0.5*	0.4*	0.4*	0.6*	0.6*
Rate difference <sup>(d)</sup> (%)	-2.0	-6.2	-9.6	-8.8	-9.2	-6.0	-5.3	—
<b>CABG</b>								
Rate ratio <sup>(c)</sup>	1.6	0.8	0.9	0.7*	0.7*	0.4	0.7*	0.8*
Rate difference <sup>(d)</sup> (%)	1.2	-0.9	-1.1	-3.1	-3.7	-3.0	-2.3	—

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

(a) Includes those aged less than 25 years.

(b) ASR refers to indirectly age-standardised rate using 'other Australians' population as the standard population.

(c) Rate ratio—Indigenous: other.

(d) Hospitalisation rates for Indigenous Australians minus hospitalisation rates for other Australians.

Source: AIHW 2006.

## Digestive system hospital procedures

A study looking at hospital procedures performed for diseases of the digestive tract between July 2003 to June 2006 showed that Aboriginal and Torres Islander peoples were significantly less likely to receive a corresponding procedure during hospital admissions for complicated or uncomplicated hernias, diseases of the extrahepatic biliary tree and non-neoplastic diseases of the anus or rectum. Aboriginal and Torres Strait Islander peoples were as likely as other Australians to receive an appendicectomy for a principal diagnosis recorded as appendicitis, and only marginally less likely to receive a large intestinal resection for admissions where a malignant neoplasm of the large intestine/rectum was recorded as the principal diagnosis (Table 3.05.7). These results were statistically adjusted for age, sex, hospital type, urgency of admission, remoteness of usual residence and several comorbidities (Moore et al. 2008)

**Table 3.05.7: Relative odds of receiving corresponding procedure for Aboriginal and Torres Strait Islander peoples versus other Australians for hospital admissions involving diagnoses of the digestive tract**

Principal Diagnoses	(Adjusted OR)	95% confidence interval	p value
Appendicitis	1.11	0.96 – 1.28	= 0.1677 not significant
Complicated and uncomplicated hernias	0.67	0.57 – 0.78	< 0.001
Diseases of extrahepatic biliary tree	0.81	0.73 – 0.89	< 0.001
Non-neoplastic anorectal disease	0.85	0.74 – 0.97	< 0.001
Malignant neoplasm of the large intestine/rectum	0.73	0.53 – 1.00	= 0.05 marginally significant

Source: Moore et al. 2008.

### **Cancer research work**

A recent study of 815 Indigenous and 810 non-Indigenous patients diagnosed with cancer in Queensland between 1997 and 2002 found that after adjustment for stage at diagnosis, treatment and comorbidities, non-Indigenous Australians had better survival than Indigenous patients (hazard ratio = 1.3, 95% CI 1.1-1.5). Indigenous patients were less likely to have had treatment for cancer (surgery, chemotherapy, radiotherapy) and waited longer for surgery (hazard ratio = 0.84, 95% CI 0.72-0.97) than non-Indigenous patients (Valery et al. 2006).

A study in Western Australian of patients who had a cancer registration in the state between 1982 and 2001 found that Indigenous people were less likely to receive surgery for lung cancer and prostate cancer, but not breast cancer (Hall et al. 2004).

## **Data quality issues**

### **Hospital separations data**

#### ***Separations***

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

#### ***Indigenous status question***

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

#### ***Under-identification***

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

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

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

#### ***Numerator and denominator***

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

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