Indigenous mothers and their babies, Australia 2001–2004

The Australian Institute of Health and Welfare (AIHW) is Australia's national health and welfare statistics and information agency. The Institute's mission is *better information and statistics for better health and wellbeing*.

The AIHW National Perinatal Statistics Unit (NPSU) is a collaborating unit of the AIHW, established in 1979. The NPSU aims at improving the health of Australian mothers and babies through the collection, analysis and reporting of information on reproductive, perinatal and maternal health. It maintains national collections on perinatal health, maternal deaths, congenital anomalies and assisted reproduction technology. The NPSU is located at the Sydney Children's Hospital and is part of the School of Women's and Children's Health, Faculty of Medicine, University of New South Wales.

The AIHW and NPSU recognise the unique position of Aboriginal and Torres Strait Islander peoples, and acknowledge the land that we work on as belonging to Aboriginal and Torres Strait Islander peoples. We acknowledge that the work we do includes every Aboriginal and Torres Strait Islander person of this nation. We pay our respects to elders of past and present Aboriginal and Torres Strait Islander peoples.

Please note that as with all statistical reports there is the potential for minor revisions of data in *Indigenous mothers and their babies, Australia 2001–2004*. Please refer to the online version at <www.npsu.unsw.edu.au>.

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Indigenous mothers and their babies, Australia 2001–2004

Kate Leeds
Michelle Gourley
Paula Laws
Jessica Zhang
Fadwa Al-Yaman
Elizabeth A Sullivan

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Author affiliations: KL Leeds, PJ Laws and EA Sullivan, AIHW National Perinatal Statistics Unit; M Gourley, J Zhang and F Al-Yaman, Aboriginal and Torres Strait Islander Health and Welfare Unit, AIHW.

Any enquiries about or comments on this publication should be directed to:

AIHW National Perinatal Statistics Unit

Sydney Children's Hospital

Level 2, McNevin Dickson Building

Randwick Hospitals Campus

Randwick NSW 2031

AUSTRALIA

Phone: (02) 9382 1014

Fax: (02) 9382 1025

Email: npsu@unsw.edu.au

Website: <www.npsu.unsw.edu.au>

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Abbreviations

ABS	Australian Bureau of Statistics
ACT	Australian Capital Territory
AHLO	Aboriginal Hospital Liaison Officer
AIHW	Australian Institute of Health and Welfare
ASGC	Australian Standard Geographical Classification
g	gram
HDSC	Health Data Standards Committee
NHDD	National Health Data Dictionary
NMDS	National Minimum Data Set
NPDC	National Perinatal Data Collection
NPSU	AIHW National Perinatal Statistics Unit
NSW	New South Wales
NT	Northern Territory
Qld	Queensland
SA	South Australia
SEIFA	Socioeconomic Indexes for Areas
Tas	Tasmania
VAED	Victorian Admitted Episodes Dataset
Vic	Victoria
WA	Western Australia
WHO	World Health Organization

n.a.	Not available
n.p.	Not published
. .	Not applicable

Key findings

This is the third report published by the AIHW on Indigenous mothers and their babies in Australia. Data from the National Perinatal Data Collection are used to form the most recent picture of health and other outcomes for Indigenous mothers and their babies in Australia.

Between 2001 and 2004, 35,264 women who identified as being of Aboriginal or Torres Strait Islander origin gave birth to 35,682 babies—3.6% of all babies born to all women during this period.

Indigenous mothers

In 2001–2004, compared with non-Indigenous mothers, Indigenous mothers:

- were younger—mean age of 24.8 years compared with 29.7 years
- were less likely to be first-time mothers—30% compared with 42%
- were much less likely to give birth in private hospitals—3% compared with 32%
- had a higher proportion of spontaneous onset of labour—70% compared with 57%
- had a lower proportion of induced labours—17% compared with 26%
- were less likely to have a caesarean section—22% compared with 28%
- were three times as likely to have smoked during pregnancy—51% compared with 17%.

Babies born to Indigenous mothers

In 2001–2004, compared with babies born to non-Indigenous mothers, babies born to Indigenous mothers:

- were almost twice as likely to be born preterm—14% compared with 8%
- were twice as likely to be of low birthweight—13% compared with 6% of live births
- had a shorter median length of stay in hospital—3 days compared with 4 days
- had almost twice the fetal death rate—12 compared with 7 per 1,000 births
- had twice the neonatal death rate—6 compared with 3 per 1,000 live births.

What is changing over time for Indigenous mothers and their babies?

Over the period 1991–2004:

- There was a decrease in Indigenous teenage mothers from 10 to 8 per 100 women and an increase in the proportion of Indigenous mothers aged 35 years and over—from 1.4 to 2.3 per 100 women.
- The caesarean section rate increased from 20% to 26% among Indigenous women compared with an increase from 19% to 29% among non-Indigenous mothers.
- The proportion of low birthweight babies increased significantly for babies born to both Indigenous and non-Indigenous mothers. This increase was greater among babies born to Indigenous mothers—from 11% to 12% compared with from 2.5% to 2.6% for non-Indigenous mothers.

- The fetal death rate of babies born to Indigenous mothers declined significantly from 16 to 11 per 1,000 births, and remained stable among babies born to non-Indigenous mothers at around 6 per 1,000 births.

Indigenous status data quality

Results of the assessment of the quality of Indigenous status in perinatal data in each state and territory over the period 1991–2004 showed that:

- data from New South Wales, Victoria, Queensland, Western Australia, South Australia and the Northern Territory are suitable for trends analysis from 1991 onwards
- data from the Australian Capital Territory and Tasmania are not considered stable enough to be included in trends analyses mainly because of small population size and some issues with data quality over the reporting period.

1 Introduction

Indigenous mothers and their babies, Australia 2001–2004 has been prepared by the Australian Institute of Health and Welfare's (AIHW) National Perinatal Statistics Unit (NPSU) in collaboration with the AIHW's Aboriginal and Torres Strait Islander Health and Welfare Unit (ATSIHWU). It has been funded by the Office for Aboriginal and Torres Strait Islander Health (OATSIH) of the Australian Government Department of Health and Ageing.

This report follows *Indigenous mothers and their babies, Australia 1994–1996* (Day et al. 1999). It provides national information on the pregnancy and childbirth of Indigenous mothers, and the characteristics and outcomes of their babies. It also presents trends data on Indigenous mothers and their babies over the period 1991–2004. The report is based mainly on data from the National Perinatal Data Collection (NPDC). Chapter 5 of this report contains information on the ascertainment and quality of Indigenous data in the NPDC.

The purpose of *Indigenous mothers and their babies, Australia 2001–2004* is to provide Australia with epidemiological information including statistics on the Indigenous women who gave birth to liveborn or stillborn babies in 2001–2004, and on their babies. Some data on non-Indigenous women who gave birth and their babies are presented for comparison. The report also examines the quality of Indigenous data in the NPDC and changes over time in various maternal demographic characteristics and maternal and perinatal outcomes.

This report will be helpful to researchers, academics, students, policy makers and health service planners, and those providing services in reproductive health. The information presented can be used in developing policies and health services for Indigenous mothers and their babies and can assist in evaluating the impact of those policies and health service initiatives.

Key maternal factors and perinatal outcomes

Women who identified as being Aboriginal or Torres Strait Islander represented 3.6% of women who gave birth in Australia in 2004 (Laws et al. 2006a). In general, Indigenous mothers have fewer interventions during labour and birth compared with non-Indigenous women. However, the maternal and perinatal outcomes of Indigenous mothers and their babies have consistently been shown to be poorer than those of non-Indigenous mothers. Some factors influencing these outcomes in Indigenous women who give birth include maternal age, remoteness, socioeconomic status, nutrition and smoking during pregnancy.

Indigenous mothers are, on average, 5 years younger than their non-Indigenous counterparts, and are more likely to give birth during their teenage years (Laws et al. 2006a; Powell & Dugdale 1999). In addition, Indigenous women generally have higher parity (number of previous births), are more often single, and have been shown to have poorer attendance for antenatal care (Panaretto et al. 2002).

Healthy babies are less likely to be born to Indigenous mothers who reside in remote areas, compared with women in city or regional areas (Graham et al. 2007). Approximately half of Indigenous mothers report smoking during their pregnancy and the proportion increases in more remote areas (Laws et al. 2006b). Maternal smoking during pregnancy has been shown to be associated with poor perinatal outcomes such as low birthweight, preterm birth and babies that are small for their gestational age (Chan et al. 2001).

Low birthweight, a key indicator of health status, is more common in babies born to Indigenous mothers, compared with babies born to non-Indigenous mothers (Panaretto et al. 2002; Powell & Dugdale 1999). Babies of Aboriginal mothers have been found more likely to be born preterm (Mohsin et al. 2003) and small for gestational age (DHS 2007). Reported fetal and neonatal death rates are higher in babies of Indigenous mothers compared with babies of non-Indigenous mothers (ABS & AIHW 2005).

The Perinatal National Minimum Data Set

A National Minimum Data Set (NMDS) is a core set of data elements agreed to by the Statistical Information Management Committee and endorsed by the National Health Information Management Principal Committee for mandatory collection and reporting at a national level. An NMDS depends on a national agreement to collect uniform data and to supply it as part of a national collection (HDSC 2006). Definitions of all data elements included in National Minimum Data Sets are included in the AIHW's online metadata registry, METeOR.

The Perinatal NMDS is a specification for data collected on all births in Australia in hospitals, birth centres and the community. Data are collected from perinatal administrative and clinical record systems and forwarded regularly to the relevant state or territory health authority. Data for the year ending 31 December are then provided annually to the NPSU for national collation.

The Perinatal NMDS was first specified in 1997. It includes data items relating to the mother, including demographic characteristics and factors relating to the pregnancy, labour and birth, and data items relating to the baby, including birth status, sex and birthweight. Indigenous status is included in the Perinatal NMDS. Current definitions are available in the *National health data dictionary* (NHDD), Version 13 (HDSC 2006) and on METeOR online at <http://meteor.aihw.gov.au>.

Key data sources

National Perinatal Data Collection

The national data on births are based on notifications to the perinatal data collection in each state and territory. Midwives and other staff, using information obtained from mothers and from hospital or other records, complete notification forms for each birth in each jurisdiction. Information is included in the NPDC for all live births and stillbirths of at least 400 grams birthweight or at least 20 weeks gestation.

Each state and territory collects more information than is specified on the Perinatal NMDS, and the NPSU requests some of these additional items. The information includes characteristics of the mother, such as previous pregnancies and smoking during pregnancy, and information about the baby, such as neonatal death.

The state and territory health authorities undertake data processing, analysis and publication of reports. Each state and territory provided data in an electronic format to the NPSU. Because of data editing and subsequent updates of state and territory databases, the numbers in this report may differ slightly from those in reports published by the states and territories.

Australian Bureau of Statistics

The Australian Bureau of Statistics (ABS) compiles statistics and publishes reports on registrations of live births and perinatal deaths from data made available by the Registrar of Births, Deaths and Marriages in each state and territory. These data are used to compile vital statistics, and are administrative data collections that are routinely reported on year of registration rather than year of birth or year of death.

Data quality

The data received from states and territories are checked for completeness, validity and logical errors. Changes are made as necessary in consultation with the state and territory perinatal data providers.

The Australian Capital Territory data include a high proportion of New South Wales residents who gave birth in the Australian Capital Territory (15.1% in 2001–2004). It is important to recognise that health services in the Australian Capital Territory provide high-level perinatal care for high-risk and multiple pregnancies to residents of the surrounding regions of New South Wales. This results in larger proportions of associated poorer perinatal outcomes in relation to the number of births in the Australian Capital Territory, therefore inflating percentages and rates for preterm births, low birthweight births and perinatal deaths. In relation to Indigenous mothers, the percentage of non-ACT residents who identified as Indigenous (2.6%) was double the rate for ACT residents who identified as Indigenous (1.3%) during the period 2001–2004.

Quality of Indigenous status data

All states and territories have a data item to record Indigenous status on their perinatal form, although there are some differences among the jurisdictions. According to the NHDD, Indigenous status is a measure of whether a person identifies as being of Aboriginal or Torres Strait Islander origin (NHDC 2003). This separately identifies mothers as those of Aboriginal and Torres Strait Islander origin, and non-Indigenous mothers. No information is collected about the father's or baby's Indigenous status.

All jurisdictions are working towards improving the ascertainment of Indigenous status in their perinatal collections. The AIHW's Aboriginal and Torres Strait Islander Health and Welfare Unit has conducted a project to assess the data quality and ascertainment of Indigenous data in Australia which is outlined in Chapter 5 of this report.

Data on Indigenous status for Tasmania from the NPDC are not presented in this report because of quality issues. There are large fluctuations from year to year in the number of Indigenous mothers reported. In addition, in the extract provided to the NPSU, the 'Not stated' category for Indigenous status was not able to be distinguished from the 'Neither Aboriginal nor Torres Strait Islander origin' category. In the Council of Obstetric and Paediatric Mortality and Morbidity (Tasmania) annual report for 2004, only 0.7% of mothers were reported as having a 'Not stated' Indigenous status, 97% were reported as being of neither Aboriginal nor Torres Strait Islander origin, and 2.4% as Aboriginal or Torres Strait Islander (DHHS 2006:42). For 2003, 44% of mothers had a 'Not stated' Indigenous status (DHHS 2005:47). The Department of Health and Human Services in Tasmania is actively pursuing improvements in the collection and provision of Indigenous status data and more complete data are expected for 2005 births.

Western Australian data for Indigenous status is drawn from two sources. Western Australia has supplied Indigenous status for 2001, 2002 and 2004 mainly from their hospital morbidity system in which Indigenous status is collected using the NHDD data element. If data are missing or the mother did not give birth in hospital, Indigenous status is taken from the Notification of Case Attended form, completed by the midwife. This differs from the data source for 2003, where Indigenous status data provided to the NPSU were collected via the Western Australian perinatal form in the categories of 'Caucasian', 'Aboriginal/Torres Strait Islander' and 'Other'.

There are a small number of Aboriginal and Torres Strait Islander mothers who give birth in the Australian Capital Territory, and the proportion fluctuates from year to year, making this jurisdiction less comparable to other jurisdictions. In 2004, 54 of the 73 Aboriginal or Torres Strait Islander women who gave birth in the Australian Capital Territory were ACT residents.

Structure of this report

This report is divided into six chapters:

Chapter 1 (Introduction) provides background information, describes the data sources and briefly discusses their overall limitations.
Chapter 2 (Summary data) contains summary information on the Indigenous population and Indigenous mothers and their babies. It also includes a comparison of the NPDC with birth registration data from the ABS.
Chapter 3 (Indigenous mothers) contains information on Indigenous women who gave birth in 2001–2004, including their demographic profile (e.g. maternal age), maternal characteristics (e.g. parity), and characteristics of the labour, birth and puerperium (e.g. onset of labour, method of birth).
Chapter 4 (Babies of Indigenous mothers) contains information on the characteristics and outcomes of babies born to Indigenous mothers including birth status, birthweight, gestational age, sex ratios and length of stay in hospital.
Chapter 5 (Data ascertainment and quality) contains information on the ascertainment and quality of Indigenous status data in the NPDC.
Chapter 6 (Trends) presents data on various characteristics of Indigenous mothers and their birth outcomes over the period 1991–2004. This chapter looks specifically at data on caesarean sections, maternal age, fetal deaths, birthweight and gestational age.

The Appendix consists of technical notes describing methods and calculations used in the report and explanatory notes regarding the data and terminology used. Tabulated data in this report are based on births in each state and territory in 2001–2004, meeting the criteria for inclusion in the NPDC. Each state and territory has developed its own form and/or electronic system for collecting perinatal data, often to maintain compatibility with its other data collections. Unless otherwise stated, the data in this report relate to the state or territory of occurrence of births in 2001–2004 rather than to the state or territory of usual residence of the mother. Data are presented for all states and territories except Tasmania. Although the perinatal collections are based on an NMDS, in some jurisdictions the data are collected in different categories. Where data are not available from all states and territories in the required format, this is indicated in the footnotes of tables or figures. For additional information on the presentation of data in this report see Appendix: Technical and explanatory notes.

2 Summary data

Summary

For 2001–2004, 35,264 women who identified as being Aboriginal or Torres Strait Islander were reported as giving birth to 35,682 babies in the National Perinatal Data Collection (NPDC) (Table 2.1). Babies born to Indigenous mothers represented 3.6% of all births in the period 2001–2004.

Live births to Indigenous mothers increased and fetal deaths decreased over the period 2001–2004. There was an average annual increase in liveborn babies born to Indigenous mothers of around 1%, and an annual average decrease in fetal deaths of around 5% (Table 2.2).

A comparison of the NPDC with the Australian Bureau of Statistics (ABS) birth registration data, which include paternal Indigenous status, showed that during the period 2001–2003, almost 5,700 more Indigenous births were identified in the ABS data collection than in the NPDC. When only live births to Indigenous mothers were considered, the NPDC contained 13% more live births (Table 2.3).

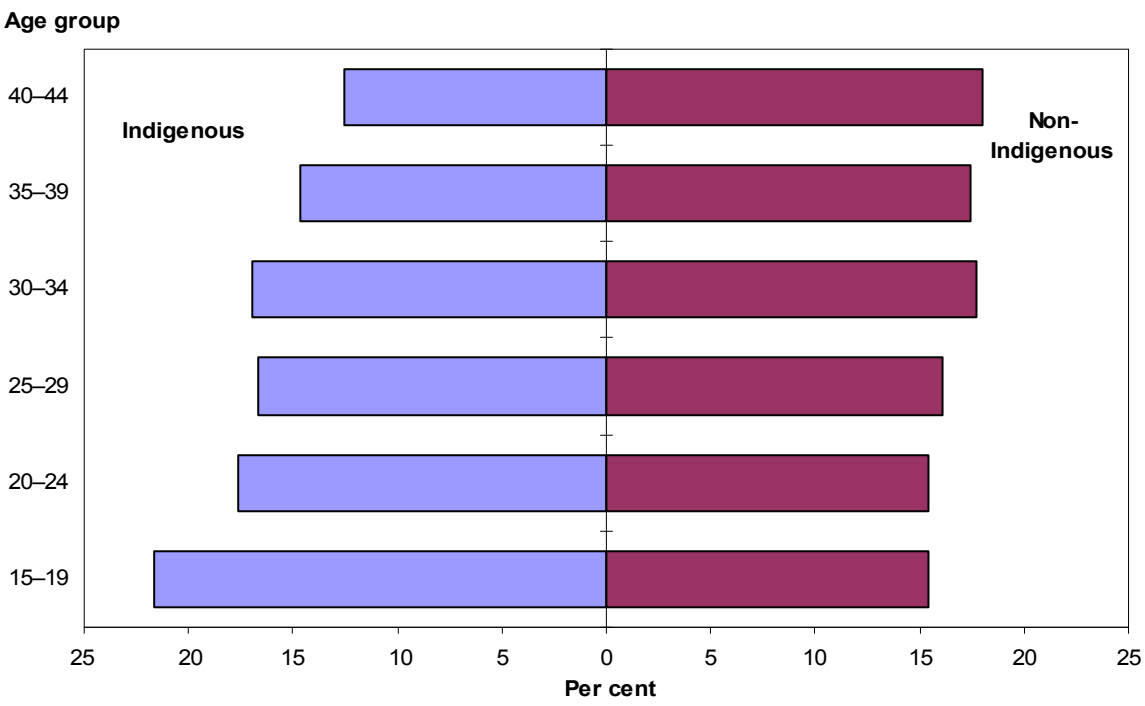
Age-standardised rate ratios for selected summary variables comparing Indigenous with non-Indigenous mothers and their babies showed that the proportion of Indigenous mothers who smoked during pregnancy was three times the proportion observed among non-Indigenous mothers. Compared with non-Indigenous mothers, Indigenous mothers had fewer instrumental vaginal deliveries in 2001–2004. The proportions of preterm birth and liveborn low birthweight babies of Indigenous mothers were twice the proportion in babies of non-Indigenous mothers (Table 2.4).

Indigenous population

The estimated resident Aboriginal or Torres Strait Islander population in Australia was 458,500 as of 30 June 2001, or 2.4% of the total Australian population (ABS 2004). The Indigenous population has been growing over time with an average annual growth rate of 2.0% over the period from 1996 to 2001. According to a 'low series projection', this population is expected to grow to 528,600 in 2009. This 'low series projection' does not reflect unexplained increases in the population and assumes that all changes in population over time are a result of natural increase (ABS 2004).

The age structure of the Indigenous population is considerably younger than the age structure of the Australian population. At 30 June 2001, the median age of the Indigenous population (20.5 years) was 16 years younger than the median age of the Australian population (36.1 years). There were 108,686 Indigenous women in the reproductive age group of 15–44 years in 2001, accounting for 47% of the total Indigenous female population (ABS 2004).

Of Indigenous women in the population of reproductive age in 2001–2004, the highest percentage were aged 15–19 years (22%), followed by 18% aged 20–24 years, 17% aged 25–29 and 30–34 years, and 15% aged 35–39 years. Only 13% were aged 40–44 years (Figure 2.1).



Source: ABS Australian population and Indigenous-specific low series population estimates and projections based on the 2001 Census of Population and Housing.

Figure 2.1: Age profile of women in the reproductive population by Indigenous status, 2001–2004

Non-Indigenous women in the reproductive population had an older age structure. The highest proportions of non-Indigenous women of reproductive age were 30–34 years and 40–44 years (both 18%), and the proportions in the other age groups ranged from 15% to 17%.

Indigenous women and births

In 2001–2004, 35,264 women who identified as being Aboriginal or Torres Strait Islander gave birth in Australia, resulting in 35,682 Indigenous births. Of these births, 35,258 were live births and 424 were fetal deaths (Table 2.1). There were 948,573 non-Indigenous mothers who gave birth in 2001–2004 resulting in 965,043 births. Of these, 958,472 were live births and 6,571 were fetal deaths. Indigenous mothers represented 3.5% of all women who gave birth in 2001–2004.

Queensland had the highest number of births to Indigenous mothers in 2001–2004 (11,170) followed by New South Wales (8,843), Western Australia (6,251) and the Northern Territory (5,665). The Australian Capital Territory had the least, with only 284 births. In percentage terms, the Northern Territory had the highest proportion of Indigenous women who gave birth during 2001–2004 (39%), followed by Western Australia (6%) and Queensland (6%) (Figure 2.2).

Indigenous data were not available for Tasmania over this period. In total there were 22,086 reported women who gave birth and 22,462 babies born in this state.

Table 2.1: Women who gave birth and births by Indigenous status and state and territory, 2001–2004

Indigenous status	NSW	Vic	Qld	WA	SA	ACT[(a)]	NT	Total
Indigenous mothers	8,734	1,633	11,041	6,164	1,793	277	5,622	35,264
Births to Indigenous mothers	8,843	1,655	11,170	6,251	1,814	284	5,665	35,682
Live births	8,752	1,627	11,049	6,167	1,784	277	5,602	35,258
Fetal deaths	91	28	121	84	30	7	63	424
Non-Indigenous mothers	329,386	246,418	185,723	92,116	67,800	18,357	8,773	948,573
Births to non-Indigenous mothers	334,893	250,850	188,960	93,681	69,000	18,763	8,896	965,043
Live births	332,848	248,842	187,736	93,052	68,541	18,613	8,840	958,472
Fetal deaths	2,045	2,008	1,224	629	459	150	56	6,571
All births[(b)]	**343,736**	**252,505**	**200,130**	**99,932**	**70,814**	**19,047**	**14,561**	**1,000,725**

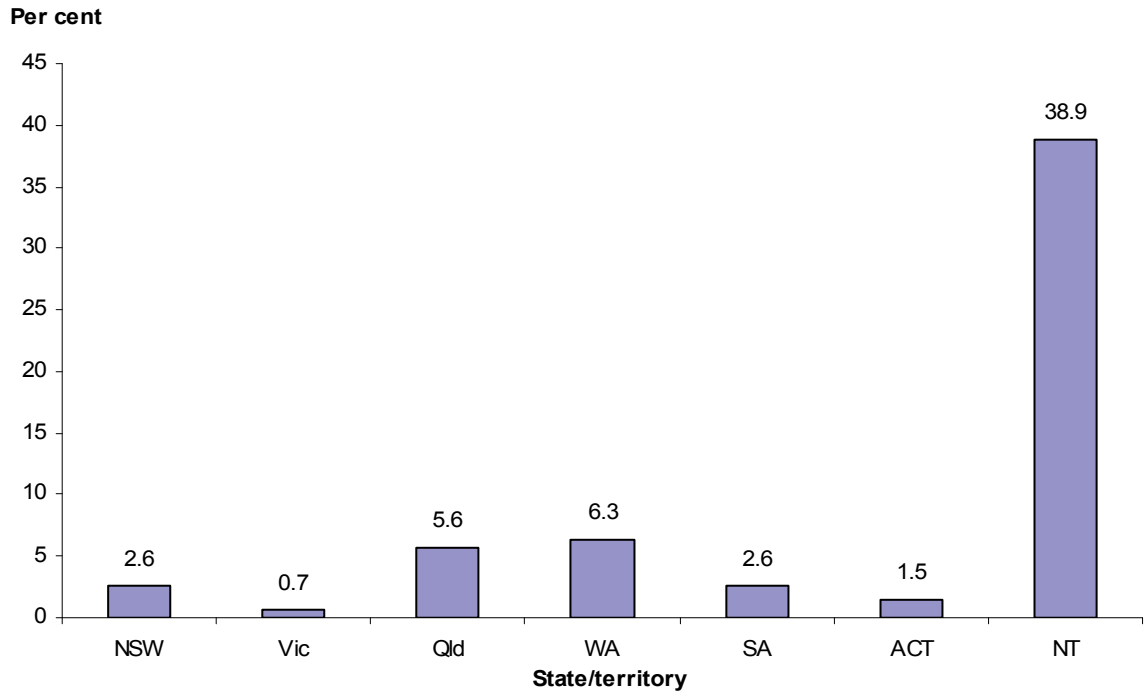
(a) Care must be taken when interpreting the 2001–2004 ACT numbers as they include non-ACT-resident Indigenous mothers who gave birth in the ACT (2.6%). This is double the percentage for ACT-resident Indigenous mothers (1.3%).

(b) Does not include births to mothers whose Indigenous status was unknown.

Notes

1. Data for Tasmania were not available.
2. Data for Victoria may differ slightly from those reported in Victorian Perinatal Data Collection Unit (PDCU) reports because of updates in the data.

Source: AIHW NPSU National Perinatal Data Collection 2007.



Note: Data for Tasmania were not available.

Source: AIHW NPSU National Perinatal Data Collection 2007.

Figure 2.2: Proportion of women who gave birth who were Indigenous by state and territory, 2001–2004

Live births to Indigenous mothers increased and fetal deaths decreased over the period 2001–2004 (Table 2.2). There were 8,675 live babies born to Indigenous mothers in 2001 and 8,905 in 2004, an average annual increase of around 1%. Despite a slight increase in Indigenous fetal deaths between 2002 and 2003, fetal deaths decreased by an annual average of around 5%, from 116 in 2001 to 99 in 2004.

Table 2.2: Births to Indigenous mothers by birth status and year, 2001–2004

Birth status	2001	2002	2003	2004	2001–2004	Average annual % change
Live births	8,675	8,827	8,851	8,905	35,258	0.9
Fetal deaths	116	102	107	99	424	–4.9
All births	**8,791**	**8,929**	**8,958**	**9,004**	**35,682**	0.8

Source: AIHW NPSU National Perinatal Data Collection 2007.

The National Perinatal Data Collection and the Australian Bureau of Statistics birth registration data: a comparison

Table 2.3 provides a comparison between the NPDC and the ABS birth registration data. During the period 2001–2003, the NPDC reported 26,353 live births to Indigenous mothers (Table 2.3). Almost 5,700 more Indigenous births were identified in the ABS data collection than in the NPDC over this same period (32,005 births).

One explanation for this difference is that ABS birth registrations provide information on the Indigenous status of both parents whereas the NPDC includes information on the mother only. However, when comparing the NPDC data with the ABS data where the mother or both parents were identified as Indigenous, differences are still evident. There were 22,975 births to Indigenous mothers in the ABS data collection, compared with 26,353 in the NPDC, a difference of 13%. Such differences in the two data collections may also reflect the different methods and timing of the data collections. The NPDC is an epidemiological dataset collected at birth for the purpose of monitoring pregnancy. The information is usually collected by midwives, who may or may not ask a direct question regarding Indigenous status, or may obtain Indigenous status information from antenatal or hospital records. In comparison, the birth registration data is a vital statistics collection that relies on reporting by the parents or guardians, with requirements for reporting specified by individual states and territories. The differences between the two data collections are partly due to delays in the registration of, or failure to register, some live births. However, delays in registration are likely to be balanced by the late registration of births from the previous year.

Data in Table 2.3 report over the period 2001–2003 as data were not available for births that occurred in 2004 but were registered in 2005. Therefore, presenting data from 2001 to 2003 allows for the inclusion of births that occurred late in 2003 and were registered in 2004 and also includes late registrations of births in earlier years.

Of the states and territories, Queensland had the highest number of births where either or both parents were Indigenous in 2001–2003 (9,317), followed by 8,579 Indigenous births in New South Wales. The Indigenous live birth rate per 1,000 live Australian births was highest in the Northern Territory during 2001–2003 (443 per 1,000 births). This was followed by Tasmania (70 per 1,000 births) and Queensland (66 per 1,000 births. The lowest Indigenous birth rate was observed in Victoria (10 per 1,000 births) (Table 2.3).

Table 2.3: Live births by Indigenous status and state and territory, 2001–2003

Indigenous status	NSW	Vic	Qld	WA	SA	Tas	ACT	NT	Total
					Number				
NPDC									
Indigenous mothers	6,439	1,194	8,278	4,661	1,301	n.a.	204	4,276	26,353
ABS									
Both parents Indigenous	1,706	285	2,919	1,974	501	106	54	1,995	9,540
Mother only Indigenous[(a)]	3,642	803	3,742	1,284	633	550	117	2,664	13,435
All Indigenous mothers	5,348	1,088	6,661	3,258	1,134	656	171	4,659	22,975
Father only Indigenous[(b)]	3,231	768	2,656	963	504	522	101	285	9,030
Total	**8,579**	**1,856**	**9,317**	**4,221**	**1,638**	**1,178**	**272**	**4,944**	**32,005**
					Rate per 1,000 live births				
NPDC									
Indigenous mothers	25.1	6.4	55.8	63.1	24.6	n.a	14.5	386.8	35.4
ABS									
Both parents Indigenous	7.0	1.6	20.8	27.8	9.7	6.2	3.9	178.9	13.0
Mother only Indigenous[(a)]	14.9	4.4	26.7	18.1	12.2	32.4	8.4	238.9	18.4
All Indigenous mothers	21.8	6.0	47.5	46.0	21.9	38.7	12.2	417.7	31.4
Father only Indigenous[(b)]	13.2	4.2	18.9	13.6	9.7	30.8	7.2	25.6	12.3
Total	**35.0**	**10.2**	**66.4**	**59.5**	**31.6**	**69.5**	**19.5**	**443.3**	**43.7**

(a) Includes paternity not acknowledged and Indigenous status of father not stated.

(b) Includes Indigenous status of mother not stated.

n.a. Data for Tasmania were not available in the NPDC.

Note: ABS and NPDC data both refer to year of birth, not year of registration.

Source: AIHW NPSU National Perinatal Data Collection 2007; ABS Births Database 2007.

Summary measures of perinatal health

Table 2.4 presents summary perinatal health information for Indigenous mothers and their babies derived from the NPDC for births in 2001–2004. It also includes age-standardised rate ratios for these summary variables, comparing Indigenous and non-Indigenous mothers and their babies. Data include measures of pregnancy-related interventions, maternal risk factors and birth outcomes.

Over half of Indigenous mothers smoked at some time during their pregnancy in 2001–2004 (Table 2.4) The age-standardised rate ratio indicates that the proportion of Indigenous mothers who smoked during pregnancy was three times the proportion observed among non-Indigenous mothers.

Compared with non-Indigenous mothers, Indigenous mothers had fewer instrumental vaginal deliveries in 2001–2004. Almost 5% of Indigenous mothers who gave birth had an instrumental vaginal delivery. The age-standardised rate ratio of 0.3 indicated that this proportion was 30% of the proportion observed among non-Indigenous mothers.

Thirteen percent of liveborn babies of Indigenous mothers were of low birthweight (i.e. less than 2,500 grams). The age-standardised rate ratio was 2.1, indicating that the proportion of

liveborn low birthweight babies of Indigenous mothers was more than double the proportion of liveborn low birthweight babies of non-Indigenous mothers. The age-standardised proportions of preterm birth and low Apgar scores at 5 minutes for live births were also higher for babies of Indigenous mothers (Table 2.4).

Table 2.4: Summary measures of perinatal health for Indigenous and non-Indigenous mothers and babies, 2001–2004

Variable	Description of measure	Indigenous value (per cent)	Indigenous/non-Indigenous age-standardised rate ratio[a]
Smoking	Percentage of women smoking at all during pregnancy[b]	50.9	3.0
Hospital sector	Percentage of women who gave birth in hospital who were in public hospitals	97.3	1.4
Multiple pregnancy	Multiple pregnancies per 1,000 mothers	11.7	0.9
Spontaneous onset of labour	Percentage of mothers who had a spontaneous onset of labour	69.7	1.1
Induction of labour	Percentage of mothers who had an induced onset of labour	19.0	0.8
Instrumental vaginal deliveries	Percentage of mothers who had an instrumental (forceps or vacuum extraction) delivery[c]	4.8	0.3
Caesarean section	Percentage of mothers who had a caesarean section[b]	22.4	0.9
Preterm birth	Percentage of births that were less than 37 weeks gestation	13.9	1.9
Low birthweight	Percentage of liveborn babies weighing less than 2,500 grams at birth	13.0	2.1
Apgar scores	Percentage of liveborn babies with an Apgar score of less than 7 at 5 minutes	2.5	1.7
Perinatal death rate	Perinatal deaths per 1,000 births[d]	17.9	1.8

(a) Standardised to the 2001–2004 population of women who gave birth.

(b) Excludes Victoria and Queensland.

(c) For multiple births, the method of birth of the firstborn baby was used.

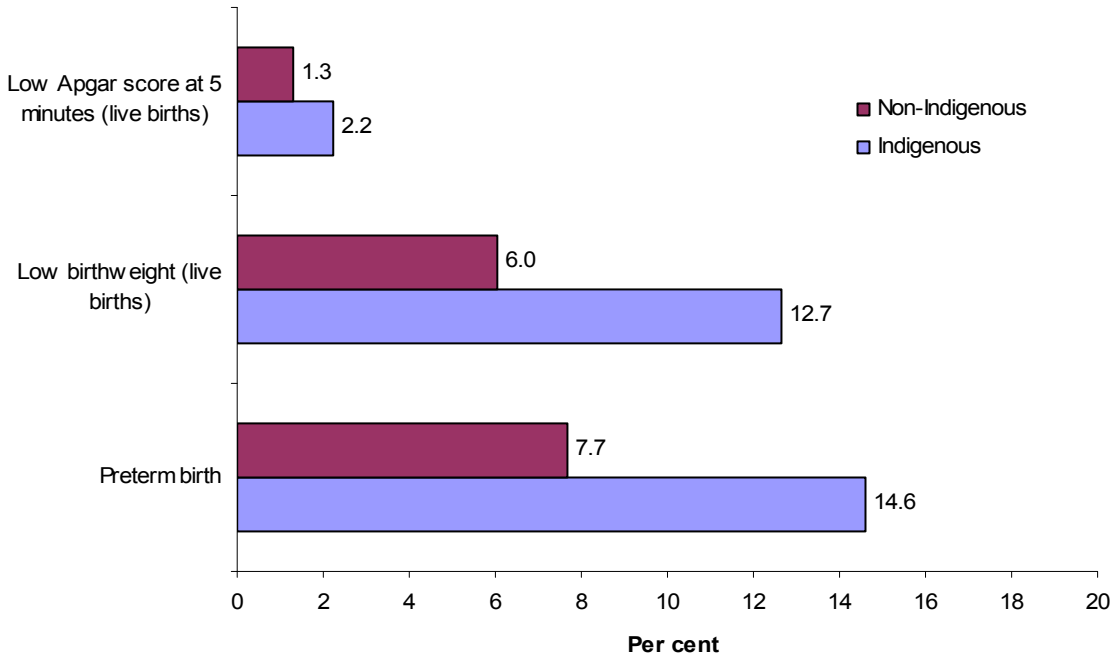
(d) Excludes neonatal deaths in the Northern Territory.

Note: Data for Tasmania were not available.

Source: AIHW NPSU National Perinatal Data Collection 2007.

Apgar scores

Apgar scores are clinical indicators of the baby's condition shortly after birth, based on assessment of the heart rate, breathing, colour, muscle tone and reflex irritability. Between 0 and 2 points are given for each of these five characteristics, and the total score is between 0 and 10. An Apgar score of less than 7 at 5 minutes after birth is considered to be an indicator of compromise for the baby.



Notes

1. Data for Tasmania were not available.
2. Standardised to the 2001–2004 population of women who gave birth.

Source: AIHW NPSU National Perinatal Data Collection 2007.

Figure 2.3: Age-standardised proportions for selected perinatal outcomes by maternal Indigenous status, 2001–2004

3 Indigenous mothers

Summary

During the period 2001–2004, Indigenous mothers were, on average, younger than non-Indigenous mothers, with mean ages of 24.8 years and 29.7 years respectively. Younger maternal age in Indigenous mothers was associated with residing in remote areas and socioeconomic disadvantage (Tables 3.2 and 3.3).

Almost one-third of Indigenous mothers were first-time mothers (30%), with over half of first-time Indigenous mothers aged less than 20 years (53%). Of Indigenous mothers who gave birth in 2001–2004, 16% had given birth to their fifth baby or more (Table 3.4). Of non-Indigenous mothers, 42% were having their first baby. The mean age of first-time Indigenous mothers was 20.6 years (Table 3.5) compared with 27.7 years for non-Indigenous mothers. Indigenous mothers living in regional and remote areas had more babies than those living in major cities (Table 3.6). Parity was also greater for Indigenous mothers residing in areas of greater socioeconomic disadvantage (Table 3.7).

In the five states and territories for which smoking status data were available, 51% of Indigenous mothers reported smoking during their pregnancy (Table 3.8). This was considerably higher than the crude smoking rate for non-Indigenous mothers (17%). The prevalence of smoking during pregnancy was lower in remote areas and higher in regional areas and was higher among mothers with increased socioeconomic disadvantage (Tables 3.9 and 3.10). For the three states and territories where smoking quantity data were available, of those who smoked during pregnancy, half (50%) smoked more than 10 cigarettes per day (Table 3.12). The quantity of cigarettes smoked among Indigenous mothers increased with maternal age (Table 3.13).

Indigenous mothers had fewer interventions at the onset of labour than non-Indigenous mothers, with 70% of Indigenous mothers having a spontaneous onset of labour compared with 57% of non-Indigenous mothers. Of Indigenous mothers, 19% had an induced onset of labour (Table 3.14) compared with 26% of non-Indigenous mothers. Indigenous mothers were also less likely to have instrumental vaginal deliveries (5%) and caesarean sections (22%) (Table 3.16) when compared with non-Indigenous mothers (11% and 28%, respectively). Among Indigenous mothers, spontaneous vaginal deliveries were less common in major cities and areas of greater socioeconomic advantage (Tables 3.17 and 3.18).

The majority of Indigenous women gave birth in hospital (98%) (Table 3.19). The median length of postnatal stay for these women was 3 days (Table 3.22). Of Indigenous women who gave birth in hospital, 3% were in private hospitals (Table 3.20). For non-Indigenous women, the median length of stay in hospital was 4 days and 32% gave birth in a private hospital.

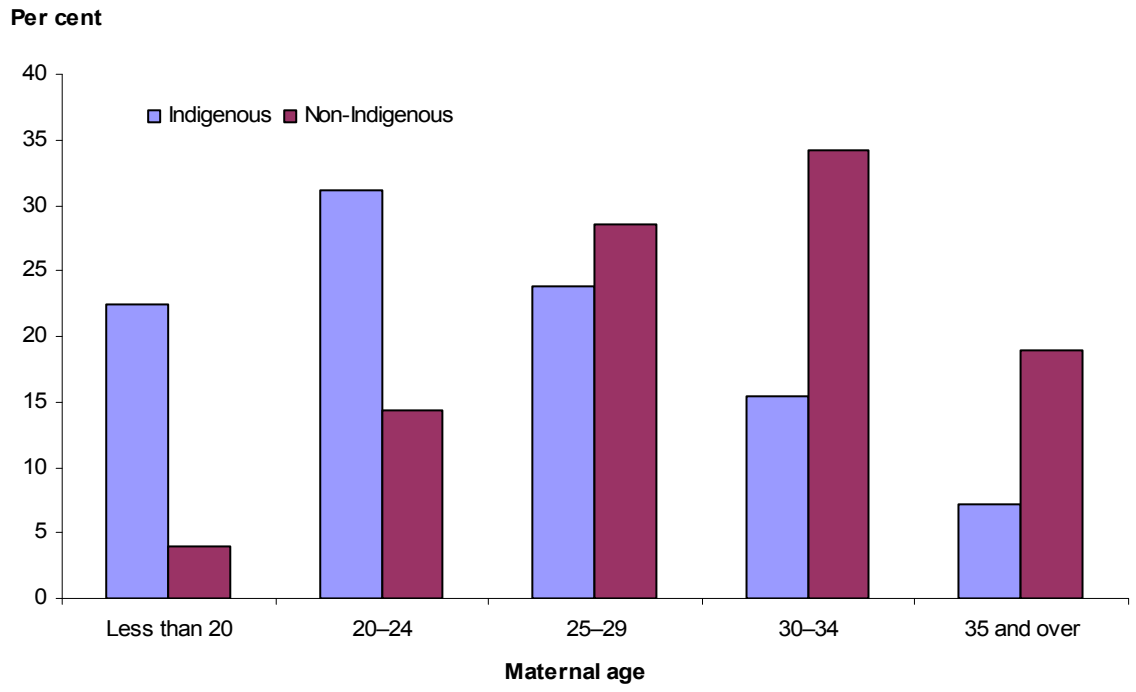
Demographics

Maternal age

Maternal age is an important risk factor for both obstetric and perinatal outcomes, with adverse outcomes more likely to occur in younger and older mothers. In 2001–2004, 35,264 Indigenous women gave birth (Table 3.1). The mean age over this period was 24.8 years, younger than the 29.7 years for non-Indigenous mothers.

The average age of Indigenous mothers varied among the states and territories in 2001–2004. Indigenous mothers in the Australian Capital Territory were considerably older than the national average, with a mean of 26.7 years. Indigenous mothers were younger on average in the Northern Territory (23.8 years) and Western Australia (24.4 years).

There were 7,924 Indigenous mothers aged less than 20 years (23%) in 2001–2004, compared with 4% of non-Indigenous mothers (Figure 3.1). Among the states and territories, the proportion of Indigenous mothers aged less than 20 years ranged from 15% in the Australian Capital Territory to 29% in the Northern Territory.



Source: AIHW NPSU National Perinatal Data Collection 2007.

Figure 3.1: Maternal age of Indigenous and non-Indigenous mothers, 2001–2004 (per cent)

There were 2,541 Indigenous mothers aged 35 years and over, accounting for 7% of all Indigenous mothers. This proportion was 19% in non-Indigenous mothers. The proportion of Indigenous mothers aged 35 years and over ranged from 6% in the Northern Territory and Western Australia to 9% in the Australian Capital Territory.

The overall proportion of non-Indigenous mothers in the 20–24 year age group was lower than for Indigenous mothers (14% compared with 31%). In the remaining age groups, there

was a larger proportion of non-Indigenous than Indigenous mothers (29% aged 25–29 years and 34% aged 30–34 years).

Table 3.1: Indigenous mothers by maternal age and state and territory, 2001–2004

Age group (years)	NSW	Vic	Qld	WA	SA	ACT	NT	Total
Mean	25.0	25.1	25.1	24.4	24.7	26.7	23.8	24.8
				Number				
Less than 20	1,868	360	2,161	1,467	391	41	1,636	7,924
20–24	2,716	475	3,409	1,973	566	69	1,751	10,959
25–29	2,033	373	2,810	1,463	459	69	1,195	8,402
30–34	1,437	291	1,801	873	244	72	706	5,424
35 and over	672	133	860	388	133	26	329	2,541
Not stated	8	1	—	—	—	—	5	14
Total	**8,734**	**1,633**	**11,041**	**6,164**	**1,793**	**277**	**5,622**	**35,264**
				Per cent				
Less than 20	21.4	22.0	19.6	23.8	21.8	14.8	29.1	22.5
20–24	31.1	29.1	30.9	32.0	31.6	24.9	31.1	31.1
25–29	23.3	22.8	25.5	23.7	25.6	24.9	21.3	23.8
30–34	16.5	17.8	16.3	14.2	13.6	26.0	12.6	15.4
35 and over	7.7	8.1	7.8	6.3	7.4	9.4	5.9	7.2
Not stated	0.1	0.1	—	—	—	—	0.1	—
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**

Notes

1. Data for Tasmania were not available.
2. Data for Victoria may differ slightly from those reported in Victorian PDCU reports because of updates in the data.

Source: AIHW NPSU National Perinatal Data Collection 2007.

Remoteness area of mother's usual residence

Data on the geographical location of the usual residence of the mother were mapped to levels of remoteness in the Australian Standard Geographical Classification (ASGC) remoteness structure. The area of usual residence of Indigenous mothers was quite evenly spread across remoteness categories (Table 3.2). Over one in four Indigenous mothers resided in outer regional areas (28%) in 2001–2004. There were 8,321 Indigenous mothers residing in major cities (24%), and one in five (21%) lived in very remote areas. Almost one-third of Indigenous mothers lived in either remote or very remote areas. There were 5,819 Indigenous mothers (17%) residing in inner regional areas in 2001–2004.

The average age of Indigenous mothers was lower in remote (24.2 years) and very remote (24.1 years) areas when compared with major cities (25.4 years), inner regional (25.0 years) and outer regional (24.7 years) areas. Of all mothers in remote areas, 26% were aged less than 20 years compared with 20% in major cities. In contrast, the proportion of older Indigenous mothers decreased with increased remoteness—17% of Indigenous mothers in major cities were aged 30–34 years compared with 13% in very remote areas.

Table 3.2: Indigenous mothers by maternal age and remoteness area of usual residence, 2001–2004

Age group (years)	Major cities	Inner regional	Outer regional	Remote	Very remote	Total[(a)]
Mean	25.4	25.0	24.7	24.2	24.1	24.7
			Number			
Less than 20	1,655	1,218	2,116	1,071	1,857	7,917
20–24	2,450	1,802	3,097	1,245	2,359	10,953
25–29	2,040	1,405	2,454	870	1,627	8,396
30–34	1,440	974	1,492	580	936	5,422
35 and over	736	417	635	280	470	2,538
Not stated	—	3	3	6	2	14
Total	**8,321**	**5,819**	**9,797**	**4,052**	**7,251**	**35,240**
			Per cent			
Less than 20	19.9	20.9	21.6	26.4	25.6	22.5
20–24	29.4	31.0	31.6	30.7	32.5	31.1
25–29	24.5	24.1	25.0	21.5	22.4	23.8
30–34	17.3	16.7	15.2	14.3	12.9	15.4
35 and over	8.8	7.2	6.5	6.9	6.5	7.2
Not stated	—	0.1	—	0.1	—	—
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**

(a) Excludes mothers not usually resident in Australia and those whose area of usual residence was 'Not stated'.

Source: AIHW NPSU National Perinatal Data Collection 2007.

Socioeconomic status

Socioeconomic Indexes for Areas (SEIFA) provide a summary measure for the socioeconomic conditions within an area. The index of advantage/disadvantage was used.

More Indigenous women who gave birth were in the most disadvantaged quintile (38%) compared with other quintiles in 2001–2004, with the number of Indigenous mothers decreasing with increasing quintile of socioeconomic advantage (Table 3.3). There were only 1,160 Indigenous mothers (3%) in the least disadvantaged quintile.

Maternal age for Indigenous mothers increased with socioeconomic advantage. The average age of Indigenous mothers in the two most disadvantaged quintiles was 24.5 years, compared with 25.0 years in the third quintile, 25.5 years in the fourth quintile and 26.2 years in the fifth and least disadvantaged quintile.

Table 3.3: Indigenous mothers by maternal age and socioeconomic status, 2001–2004

	Quintile of socioeconomic disadvantage[(a)]						
Age group (years)	1st quintile (most disadvantaged)	2nd quintile	3rd quintile	4th quintile	5th quintile (least disadvantaged)	Not stated	Total
Mean	24.5	24.5	25.0	25.5	26.2	23.3	24.7
				Number			
Less than 20	3,138	2,278	1,371	739	213	185	7,924
20–24	4,233	3,043	2,085	1,122	284	192	10,959
25–29	3,062	2,333	1,641	963	278	125	8,402
30–34	1,909	1,450	1,062	684	253	66	5,424
35 and over	902	633	500	345	131	30	2,541
Not stated	6	4	3	—	1	—	14
Total	**13,250**	**9,741**	**6,662**	**3,853**	**1,160**	**598**	**35,264**
				Per cent			
Less than 20	23.7	23.4	20.6	19.2	18.4	30.9	22.5
20–24	31.9	31.2	31.3	29.1	24.5	32.1	31.1
25–29	23.1	24.0	24.6	25.0	24.0	20.9	23.8
30–34	14.4	14.9	15.9	17.8	21.8	11.0	15.4
35 and over	6.8	6.5	7.5	9.0	11.3	5.0	7.2
Not stated	—	—	—	—	0.1	—	—
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**

(a) Socioeconomic status quintiles are determined by postcode of usual residence based on the Australian Bureau of Statistics SEIFA . The advantage/disadvantage index was used.

Source: AIHW NPSU National Perinatal Data Collection 2007.

Maternal characteristics and risk factors

Parity

Parity is the number of previous pregnancies that resulted in live births or stillbirths. Primiparous women are those who have had no previous pregnancy resulting in a live birth or stillbirth and multiparous women are those who have had at least one previous pregnancy resulting in a live birth or stillbirth.

During the 2001–2004 period, there were 10,608 Indigenous mothers who gave birth to their first baby (30%), 8,455 (24%) who gave birth to their second baby, and 6,227 (18%) who gave birth for the third time (Table 3.4). Only 12% of Indigenous women gave birth to their fourth baby, but 16% gave birth for the fifth (or more) time. The figures for non-Indigenous women who gave birth were 42% having their first baby, 34% their second, 15% their third, 5% their fourth and only 3% gave birth for the fifth time or more.

Indigenous mothers in Western Australia were more likely than mothers in others states and territories to have a parity of three or more. In Western Australia, 13% of Indigenous mothers had given birth three times previously and 19% four or more times, compared with 12% and 16% respectively for Australia.

Table 3.4: Indigenous mothers by parity and state and territory, 2001–2004

Parity	NSW	Vic	Qld	WA	SA	ACT	NT	Total
				Number				
None	2,725	585	3,155	1,720	568	106	1,749	10,608
One	2,142	436	2,558	1,379	437	76	1,427	8,455
Two	1,524	263	1,992	1,090	295	34	1,029	6,227
Three	974	164	1,362	794	217	26	646	4,183
Four or more	1,339	185	1,974	1,181	276	35	765	5,755
Not stated	30	—	—	—	—	—	6	36
Total	**8,734**	**1,633**	**11,041**	**6,164**	**1,793**	**277**	**5,622**	**35,264**
				Per cent				
None	31.2	35.8	28.6	27.9	31.7	38.3	31.1	30.1
One	24.5	26.7	23.2	22.4	24.4	27.4	25.4	24.0
Two	17.4	16.1	18.0	17.7	16.5	12.3	18.3	17.7
Three	11.2	10.0	12.3	12.9	12.1	9.4	11.5	11.9
Four or more	15.3	11.3	17.9	19.2	15.4	12.6	13.6	16.3
Not stated	0.3	—	—	—	—	—	0.1	0.1
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**

Notes

1. Data for Tasmania were not available.
2. Data for Victoria may differ slightly from those reported in Victorian PDCU reports because of updates in the data.

Source: AIHW NPSU National Perinatal Data Collection 2007.

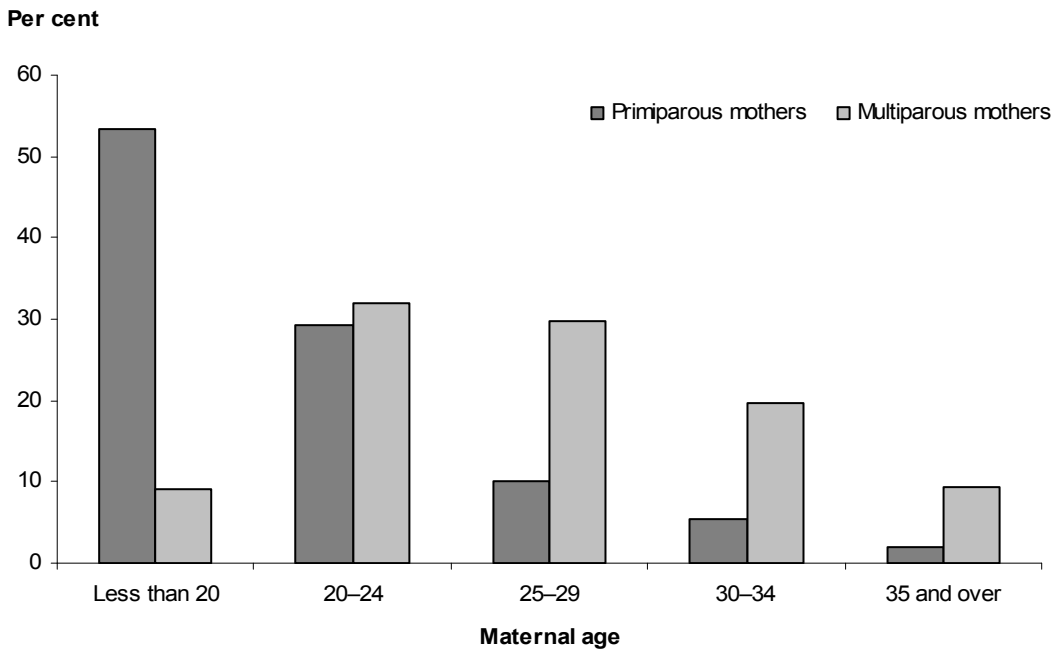
The average age of first-time Indigenous mothers was 20.6 years in 2001–2004 (Table 3.5). This was considerably younger than the average age of non-Indigenous first-time mothers (27.7 years). The average age of Indigenous mothers rose with higher parity. For each additional parity the average age increased approximately 2 to 3 years.

Table 3.5: Indigenous mothers by maternal age and parity, 2001–2004

	Parity						
Age group (years)	**None**	**One**	**Two**	**Three**	**Four or more**	**Not stated**	**Total**
Mean	20.6	23.5	25.8	27.7	30.7	30.6	24.7
				Number			
Less than 20	5,662	1,890	330	33	4	5	7,924
20–24	3,099	3,739	2,552	1,108	458	3	10,959
25–29	1,067	1,659	2,005	1,698	1,969	4	8,402
30–34	568	853	957	954	2,078	14	5,424
35 and over	207	312	380	387	1,245	10	2,541
Not stated	5	2	3	3	1	—	14
Total	**10,608**	**8,455**	**6,227**	**4,183**	**5,755**	**36**	**35,264**
				Per cent			
Less than 20	53.4	22.4	5.3	0.8	0.1	13.9	22.5
20–24	29.2	44.2	41.0	26.5	8.0	8.3	31.1
25–29	10.1	19.6	32.2	40.6	34.2	11.1	23.8
30–34	5.4	10.1	15.4	22.8	36.1	38.9	15.4
35 and over	2.0	3.7	6.1	9.3	21.6	27.8	7.2
Not stated	—	—	—	0.1	—	—	—
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**

Source: AIHW NPSU National Perinatal Data Collection 2007.

Over half of first-time Indigenous mothers were aged less than 20 years (53%) (Table 3.5; Figure 3.2). Nine percent of multiparous Indigenous mothers were also in this age group. The proportion of primiparous Indigenous mothers decreased with advancing age, to 5% for those aged 30–34 years and 2% for those aged 35 years and over. The proportion of multiparous Indigenous mothers peaked in the 20–24 year age group (32%) and then decreased slightly in the 25–29 year age group (30%), down to 9% in those aged 35 years and over.



Source: AIHW NPSU National Perinatal Data Collection 2007.

Figure 3.2: Primiparous and multiparous Indigenous mothers by maternal age, 2001–2004 (per cent)

Indigenous mothers living in regional and remote areas had a greater number of babies than Indigenous mothers living in major cities in 2001–2004 (Table 3.6). One-third of Indigenous mothers living in major cities were first-time mothers compared with 29% in outer regional and 27% in very remote areas. Indigenous mothers in outer regional, remote and very remote areas were more likely to have a parity of four or more (17% to 18%) compared with mothers who lived in major cities and inner regional areas (15%).

Table 3.6: Indigenous mothers by parity and remoteness area of usual residence, 2001–2004

Parity	Major cities	Inner regional	Outer regional	Remote	Very remote	Total[(a)]
			Number			
None	2,776	1,779	2,841	1,279	1,924	10,599
One	2,109	1,420	2,257	919	1,744	8,449
Two	1,318	1,044	1,779	709	1,372	6,222
Three	867	666	1,256	472	921	4,182
Four or more	1,244	898	1,657	669	1,284	5,752
Not stated	7	12	7	4	6	36
Total	**8,321**	**5,819**	**9,797**	**4,052**	**7,251**	**35,240**
			Per cent			
None	33.4	30.6	29.0	31.6	26.5	30.1
One	25.3	24.4	23.0	22.7	24.1	24.0
Two	15.8	17.9	18.2	17.5	18.9	17.7
Three	10.4	11.4	12.8	11.6	12.7	11.9
Four or more	15.0	15.4	16.9	16.5	17.7	16.3
Not stated	0.1	0.2	0.1	0.1	0.1	0.1
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**

(a) Excludes mothers not usually resident in Australia and those whose area of usual residence was 'Not stated'.

Source: AIHW NPSU National Perinatal Data Collection 2007.

In 2001–2004, Indigenous mothers living in areas of greater disadvantage had more babies than those living in more advantaged areas (Table 3.7). Almost one fifth of Indigenous women who gave birth in the most disadvantaged quintile had a parity of four or more (18%), compared with 14% of Indigenous mothers in the least disadvantaged quintile. The proportion of Indigenous mothers having their second baby was evenly distributed across the areas of socioeconomic disadvantage (around 24%). The proportion of Indigenous mothers having their third baby was evenly distributed between the lowest four quintiles (around 18%), but the proportion dropped markedly in the least disadvantaged quintile (13%). In the least disadvantage quintile, 41% of Indigenous mothers had their first baby compared with 33% in the fourth quintile, 30% in the second and third quintiles, and 29% in the most disadvantaged quintile.

Table 3.7: Indigenous mothers by parity and socioeconomic status, 2001–2004

Parity	Quintile of socioeconomic disadvantage[(a)]						
	1st quintile (most disadvantaged)	2nd quintile	3rd quintile	4th quintile	5th quintile (least disadvantaged)	Not stated	Total
				Number			
None	3,772	2,914	1,996	1,261	479	186	10,608
One	3,094	2,421	1,585	936	273	146	8,455
Two	2,373	1,740	1,187	666	155	106	6,227
Three	1,645	1,180	787	416	92	63	4,183
Four or more	2,352	1,473	1,104	570	160	96	5,755
Not stated	14	13	3	4	1	1	36
Total	**13,250**	**9,741**	**6,662**	**3,853**	**1,160**	**598**	**35,264**
				Per cent			
None	28.5	29.9	30.0	32.7	41.3	31.1	30.1
One	23.4	24.9	23.8	24.3	23.5	24.4	24.0
Two	17.9	17.9	17.8	17.3	13.4	17.7	17.7
Three	12.4	12.1	11.8	10.8	7.9	10.5	11.9
Four or more	17.8	15.1	16.6	14.8	13.8	16.1	16.3
Not stated	0.1	0.1	—	0.1	0.1	0.2	0.1
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**

(a) Socioeconomic status quintiles are determined by postcode of usual residence based on the Australian Bureau of statistics SEIFA. The advantage/disadvantage index was used.

Source: AIHW NPSU National Perinatal Data Collection 2007.

Smoking during pregnancy

Smoking is a risk factor for pregnancy complications, and is associated with poorer perinatal outcomes such as low birthweight, preterm birth, babies who are small for their gestational age and perinatal death (Laws et al. 2006b).

There is no national data element for the collection of data on smoking during pregnancy, but a program of national data development has been under way in 2006 and 2007. Data were available for five states and territories: New South Wales, Western Australia, South Australia, the Australian Capital Territory and the Northern Territory. In 2001–2004 over half of Indigenous women in the five states and territories reported smoking during pregnancy (51%) (Table 3.8). This was considerably higher than the crude rate of smoking among non-Indigenous mothers (17%).

The proportion of Indigenous women who smoked while pregnant ranged from 40% in the Northern Territory to 59% in South Australia. However, note that the smoking status for 18% of Indigenous mothers in the Northern Territory was not stated. Consequently, this may not be an accurate representation of the true proportion of Indigenous women in the Northern Territory who did smoke during their pregnancy. Of stated responses for the Northern Territory, 49% were recorded as reporting smoking during pregnancy.

When only stated responses are considered for all five states and territories, the percentage of Indigenous mothers recorded as smoking during pregnancy was 54%. For non-Indigenous mothers, the comparable percentage remained at 17%.

Table 3.8: Indigenous mothers by tobacco smoking status during pregnancy and state and territory, 2001–2004

Smoking status	NSW	WA	SA[(a)]	ACT	NT[(b)]	Total
			Number			
Smoked	5,028	3,037	1,056	126	2,249	11,496
Did not smoke	3,697	3,127	649	150	2,370	9,993
Not stated	9	—	88	1	1,003	1,101
Total	**8,734**	**6,164**	**1,793**	**277**	**5,622**	**22,590**
			Per cent			
Smoked[(c)]	57.6	49.3	58.9	45.5	40.0	50.9
Did not smoke	42.3	50.7	36.2	54.2	42.2	44.2
Not stated	0.1	—	4.9	0.4	17.8	4.9
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**

(a) For South Australia, 'Smoked' includes women who quit before the first antenatal visit.

(b) For the Northern Territory, smoking status was recorded at the first antenatal visit.

(c) If the Not stated responses are proportioned out, the percentages of Indigenous mothers recorded as smoking were: 57.6% in New South Wales, 49.3% in Western Australia, 61.9% in South Australia, 45.7% in the Australian Capital Territory, 48.7% in the Northern Territory and 53.5% overall.

Note: Data on tobacco smoking during pregnancy were not available for Victoria, Queensland or Tasmania.

Source: AIHW NPSU National Perinatal Data Collection 2007.

The proportion of Indigenous women who smoked while pregnant in 2001–2004 was highest in regional areas and lowest in remote areas (Table 3.9). In inner regional and outer regional areas, 56% and 55% respectively of Indigenous mothers reported smoking, compared with 49% in remote areas and 45% in very remote areas. In major cities, 51% of Indigenous mothers smoked during their pregnancy.

Again, care needs to be taken when interpreting these data given the large proportion of women whose smoking status was not stated, particularly in very remote (12%) and remote (7%) areas. When only stated responses are considered, the percentages of smokers recorded in these regions are higher, at 52% and 51%, respectively.

Figure 3.3 presents proportions of Indigenous and non-Indigenous mothers reporting smoking during pregnancy by remoteness area. For non-Indigenous mothers, the lowest rate of smoking in pregnancy was reported among those living in major cities (14%) and the highest was among those living in outer regional areas (24%). In the other three remoteness categories, 23% of non-Indigenous women reported smoking during pregnancy.

Table 3.9: Indigenous mothers by tobacco smoking status during pregnancy and remoteness area of usual residence, 2001–2004

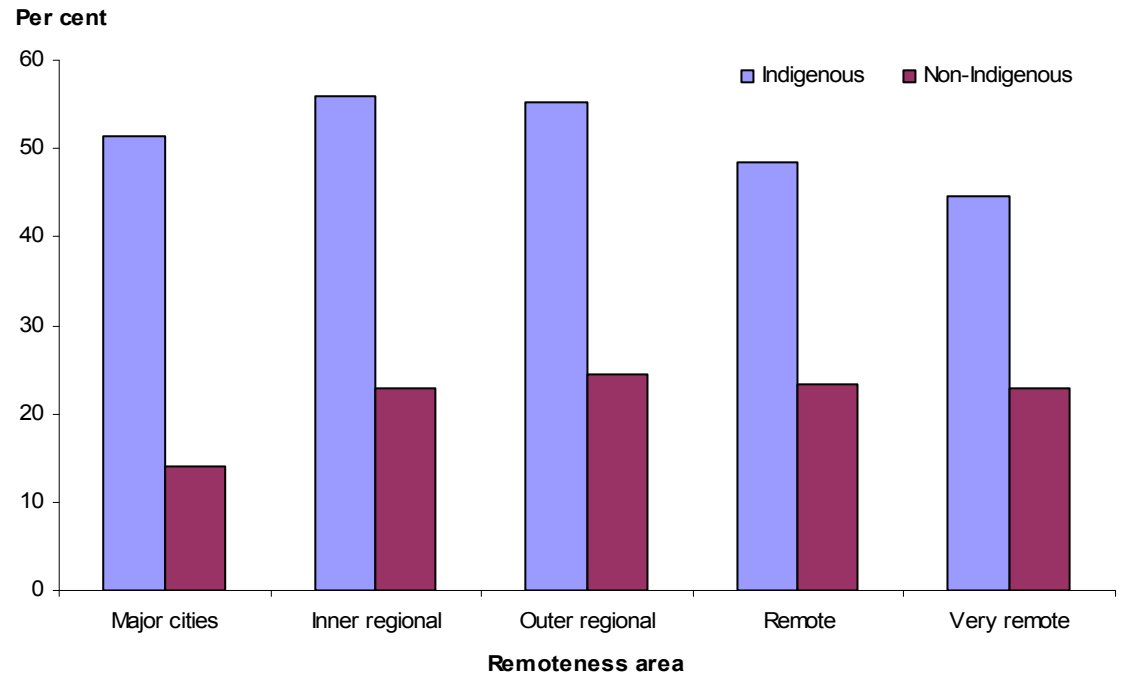
Smoking status	Major cities	Inner regional	Outer regional	Remote	Very remote	Total[a]
			Number			
Smoked	3,011	1,965	2,639	1,459	2,411	11,485
Did not smoke	2,832	1,542	1,935	1,326	2,350	9,985
Not stated	23	7	196	220	651	1,097
Total[b]	**5,866**	**3,514**	**4,770**	**3,005**	**5,412**	**22,567**
			Per cent			
Smoked[c]	51.3	55.9	55.3	48.6	44.5	50.9
Did not smoke	48.3	43.9	40.6	44.1	43.4	44.2
Not stated	0.4	0.2	4.1	7.3	12.0	4.9
Total[b]	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**

(a) Excludes mothers not usually resident in Australia and those whose area of usual residence was 'Not stated'.

(b) Data on tobacco smoking during pregnancy were not available for Victoria, Queensland or Tasmania.

(c) If the 'Not stated' responses are proportioned out, the percentages of Indigenous mothers recorded as smoking were: 51.5% in Major cities, 56.0% in Inner regional areas, 57.7% in Outer regional areas, 52.4% in Remote areas, 50.6% in Very remote areas, and 53.5% overall.

Source: AIHW NPSU National Perinatal Data Collection 2007.



Notes

1. Data on tobacco smoking during pregnancy were not available for Victoria, Queensland or Tasmania.
2. Excludes mothers not usually resident in Australia and those whose area of usual residence was 'Not stated'.

Source: AIHW NPSU National Perinatal Data Collection 2007.

Figure 3.3: Smoking during pregnancy of Indigenous and non-Indigenous mothers, by remoteness area of usual residence, 2001–2004 (per cent)

The proportion of Indigenous mothers who smoked during pregnancy in 2001–2004 generally increased with increased socioeconomic disadvantage (Table 3.10). The highest proportion of Indigenous mothers who smoked was in the most disadvantaged quintile (55%) and the lowest proportion was in the least disadvantaged quintile (43%). Interestingly, smoking rates for Indigenous mothers were higher in the third most disadvantaged quintile (54%), compared with rates in the second most disadvantaged quintile (47%). Forty-six percent of Indigenous mothers in the fourth quintile smoked during pregnancy.

Table 3.10: Indigenous mothers by tobacco smoking status during pregnancy and socioeconomic status, 2001–2004

	Quintile of socioeconomic disadvantage[(a)]						
Smoking status	**1st quintile (most disadvantaged)**	**2nd quintile**	**3rd quintile**	**4th quintile**	**5th quintile (least disadvantaged)**	**Not stated**	**Total**
				Number			
Smoked	4,825	2,825	1,927	1,368	380	171	11,496
Did not smoke	3,464	2,852	1,557	1,451	480	189	9,993
Not stated	488	292	100	127	20	74	1,101
Total[(b)]	**8,777**	**5,969**	**3,584**	**2,946**	**880**	**434**	**22,590**
				Per cent			
Smoked	55.0	47.3	53.8	46.4	43.2	39.4	50.9
Did not smoke	39.5	47.8	43.4	49.3	54.5	43.5	44.2
Not stated	5.6	4.9	2.8	4.3	2.3	17.1	4.9
Total[(b)]	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**

(a) Socioeconomic status quintiles are determined by postcode of usual residence based on the Australian Bureau of statistics SEIFA. The advantage/disadvantage index was used.

(b) Data on tobacco smoking during pregnancy were not available for Victoria, Queensland or Tasmania.

Source: AIHW NPSU National Perinatal Data Collection 2007.

Smoking during pregnancy varied little across age groups for Indigenous mothers. The percentage of smokers reported ranged from 49% in those aged less than 20 years to 52% in those aged 20–24 years (Table 3.11).

Table 3.11 Indigenous mothers by tobacco smoking status during pregnancy and maternal age, 2001–2004

Smoking status	Age group (years)						
	Less than 20	20–24	25–29	30–34	35 and over	Not stated	Total
				Number			
Smoked	2,671	3,669	2,684	1,683	781	8	11,496
Did not smoke	2,399	3,044	2,316	1,526	704	4	9,993
Not stated	333	362	219	123	63	1	1,101
Total[(a)]	**5,403**	**7,075**	**5,219**	**3,332**	**1,548**	**13**	**22,590**
				Per cent			
Smoked	49.4	51.9	51.4	50.5	50.5	61.5	50.9
Did not smoke	44.4	43.0	44.4	45.8	45.5	30.8	44.2
Not stated	6.2	5.1	4.2	3.7	4.1	7.7	4.9
Total[(a)]	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**

(a) Data on tobacco smoking during pregnancy were not available for Victoria, Queensland or Tasmania.

Source: AIHW NPSU National Perinatal Data Collection 2007.

Data on the average number of cigarettes smoked per day in the second half of pregnancy were available for New South Wales, South Australia and the Australian Capital Territory. Half of Indigenous mothers (50%) who reported smoking during their pregnancy reported smoking an average of more than 10 cigarettes per day (Table 3.12). Only 2% of Indigenous mothers who reported smoking at some time during their pregnancy said that they did not smoke any cigarettes during the second half of pregnancy. Around 43% reported smoking an average of 10 or less cigarettes per day.

Of Indigenous mothers who reported that they smoked during their pregnancy, New South Wales had the highest proportion who smoked an average of more than 10 cigarettes per day (54%), followed by the Australian Capital Territory (46%) and South Australia (33%). In South Australia, 6% of Indigenous mothers who smoked during pregnancy reported that they did not smoke during the second half of pregnancy compared with around 2% in New South Wales. In the Australian Capital Territory, none of the Indigenous mothers who smoked during pregnancy reported smoking during the second half of pregnancy.

Table 3.12: Indigenous mothers who smoked, by average number of cigarettes per day during the second half of pregnancy and state and territory, 2001–2004

Average no. cigarettes per day	NSW	SA	ACT	Total[(a)]
		Number		
None	81	66	—	147
10 or less	2,051	532	64	2,647
More than 10	2,730	344	58	3,132
Not stated	166	114	4	284
Total	**5,028**	**1,056**	**126**	**6,210**
		Per cent		
None	1.6	6.3	—	2.4
10 or less	40.8	50.4	50.8	42.6
More than 10	54.3	32.6	46.0	50.4
Not stated	3.3	10.8	3.2	4.6
Total	**100.0**	**100.0**	**100.0**	**100.0**

(a) Data on the average daily number of cigarettes smoked during the second half of pregnancy were available only for New South Wales, South Australia and the Australian Capital Territory.

Source: AIHW NPSU National Perinatal Data Collection 2007.

In 2001–2004, for those states and territories where smoking quantity data were available, the average daily number of cigarettes smoked increased with maternal age among Indigenous mothers. Almost two thirds of Indigenous mothers aged 35 years and over (64%) who smoked at some time during their pregnancy reported smoking an average of more than 10 cigarettes per day during the second half of pregnancy (Table 3.13). This compared with 42% of Indigenous mothers aged less than 20 years. Over half of Indigenous mothers aged less than 20 years (51%) who smoked during pregnancy reported smoking a daily average of 10 or less cigarettes per day in the second half of pregnancy. The proportion smoking 10 or less cigarettes per day gradually decreased with age to 29% in those aged 35 years and over.

Table 3.13: Indigenous mothers who smoked during the second half of pregnancy by average number of cigarettes per day and maternal age, 2001–2004

Average no. cigarettes per day	Age group (years)						
	Less than 20	20–24	25–29	30–34	35 and over	Not stated	Total
				Number			
None	46	45	30	20	6	—	147
10 or less	707	913	551	336	140	—	2,647
More than 10	576	910	797	537	308	4	3,132
Not stated	51	94	58	51	29	1	284
Total[(a)]	**1,380**	**1,962**	**1,436**	**944**	**483**	**5**	**6,210**
				Per cent			
None	3.3	2.3	2.1	2.1	1.2	—	2.4
10 or less	51.2	46.5	38.4	35.6	29.0	—	42.6
More than 10	41.7	46.4	55.5	56.9	63.8	80.0	50.4
Not stated	3.7	4.8	4.0	5.4	6.0	20.0	4.6
Total[(a)]	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**

(a) Data on the average daily number of cigarettes smoked during the second half of pregnancy were available only in New South Wales, South Australia and the Australian Capital Territory.

Source: AIHW NPSU National Perinatal Data Collection 2007.

Labour and birth characteristics

Onset of labour

Onset of labour is defined as spontaneous, induced, or no labour. When examining the rates of spontaneous, induced and no labour among Indigenous mothers it becomes evident that, when compared with non-Indigenous mothers, Indigenous mothers have fewer interventions at the onset of labour (induction) and during labour (augmentation).

In 2001–2004, 70% of Indigenous mothers who gave birth had a spontaneous labour (Table 3.14). This proportion was higher than the proportion of spontaneous labour among non-Indigenous mothers (57%). Spontaneous births for Indigenous mothers were more common in the Northern Territory (72%) and Western Australia (71%) and less common in the Australian Capital Territory (63%) and South Australia (63%). Of Indigenous mothers, 23% had their labour augmented, and almost half had a spontaneous labour with no augmentation (46%).

Nineteen per cent of Indigenous mothers giving birth in Australia in 2001–2004 had an induced labour. Over one quarter of non-Indigenous mothers (26%) had an induced labour over the same period. For Indigenous mothers, induced labour was more common in the Australian Capital Territory (24%) and less common in the Northern Territory (17%).

Eleven per cent of Indigenous mothers had no labour in 2001–2004 compared with 16% of non-Indigenous mothers. The proportion of Indigenous mothers who did not have a labour varied across the states and territories from 10% in Victoria and Western Australia to 15% in South Australia.

Table 3.14: Indigenous mothers by onset of labour, type of augmentation or induction and state and territory, 2001–2004

Onset of labour/type of augmentation or induction	NSW	Vic	Qld	WA	SA	ACT	NT	Total
				Number				
Spontaneous	6,043	1,114	7,666	4,387	1,132	175	4,057	24,574
No augmentation	4,378	773	4,557	3,003	763	93	2,804	16,371
Medical only	391	70	453	324	87	23	284	1,632
Surgical only	985	209	2,379	816	231	40	743	5,403
Combined	283	62	275	241	51	19	200	1,131
Other/not stated	6	—	2	3	—	—	26	37
Induced	1,749	353	2,044	1,146	391	66	936	6,685
Medical	571	122	807	299	166	18	400	2,383
Surgical only	116	20	308	85	42	5	128	704
Combined	1,041	211	911	750	183	43	399	3,538
Other/not stated	21	—	18	12	—	—	9	60
No labour	940	166	1,331	631	270	36	629	4,003
Not stated	2	—	—	—	—	—	—	2
Total	**8,734**	**1,633**	**11,041**	**6,164**	**1,793**	**277**	**5,622**	**35,264**
				Per cent				
Spontaneous	69.2	68.2	69.4	71.2	63.1	63.2	72.2	69.7
No augmentation	50.1	47.3	41.3	48.7	42.6	33.6	49.9	46.4
Medical only	4.5	4.3	4.1	5.3	4.9	8.3	5.1	4.6
Surgical only	11.3	12.8	21.5	13.2	12.9	14.4	13.2	15.3
Combined	3.2	3.8	2.5	3.9	2.8	6.9	3.6	3.2
Other/not stated	0.1	—	—	—	—	—	0.5	0.1
Induced	20.0	21.6	18.5	18.6	21.8	23.8	16.6	19.0
Medical	6.5	7.5	7.3	4.9	9.3	6.5	7.1	6.8
Surgical only	1.3	1.2	2.8	1.4	2.3	1.8	2.3	2.0
Combined	11.9	12.9	8.3	12.2	10.2	15.5	7.1	10.0
Other/not stated	0.2	—	0.2	0.2	—	—	0.2	0.2
No labour	10.8	10.2	12.1	10.2	15.1	13.0	11.2	11.4
Not stated	—	—	—	—	—	—	—	—
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**

Note: Data for Tasmania were not available.

Source: AIHW NPSU National Perinatal Data Collection 2007.

Presentation at birth

Data are included in this section by mother; for multiple births, the presentation at birth of the firstborn baby is used.

In 2001–2004, the predominant presentation at birth was vertex, occurring in 95% of Indigenous women who gave birth (Table 3.15). The proportion of vertex presentations was the same for non-Indigenous mothers during the same period (95%). Breech presentations occurred in 4% of Indigenous women who gave birth. The proportion varied across the states and territories from 3% in Victoria to 5% in the Northern Territory and South Australia. Breech presentations occurred in 5% of non-Indigenous mothers. Face and brow presentations occurred in 0.3% and other presentations in 0.8% of Indigenous women who gave birth.

Table 3.15: Indigenous mothers by presentation of birth and state and territory, 2001–2004

Presentation	NSW	Vic	Qld	WA	SA	ACT	NT	Total
				Number				
Vertex	8,293	1,558	10,490	5,856	1,679	265	5,285	33,426
Breech	344	47	437	255	82	10	259	1,434
Face and brow	22	6	17	23	6	—	15	89
Other	71	18	94	30	22	2	44	281
Not stated	4	4	3	—	4	—	19	34
Total	**8,734**	**1,633**	**11,041**	**6,164**	**1,793**	**277**	**5,622**	**35,264**
				Per cent				
Vertex	95.0	95.4	95.0	95.0	93.6	95.7	94.0	94.8
Breech	3.9	2.9	4.0	4.1	4.6	3.6	4.6	4.1
Face and brow	0.3	0.4	0.2	0.4	0.3	—	0.3	0.3
Other	0.8	1.1	0.9	0.5	1.2	0.7	0.8	0.8
Not stated	—	0.2	—	—	0.2	—	0.3	0.1
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**

Notes

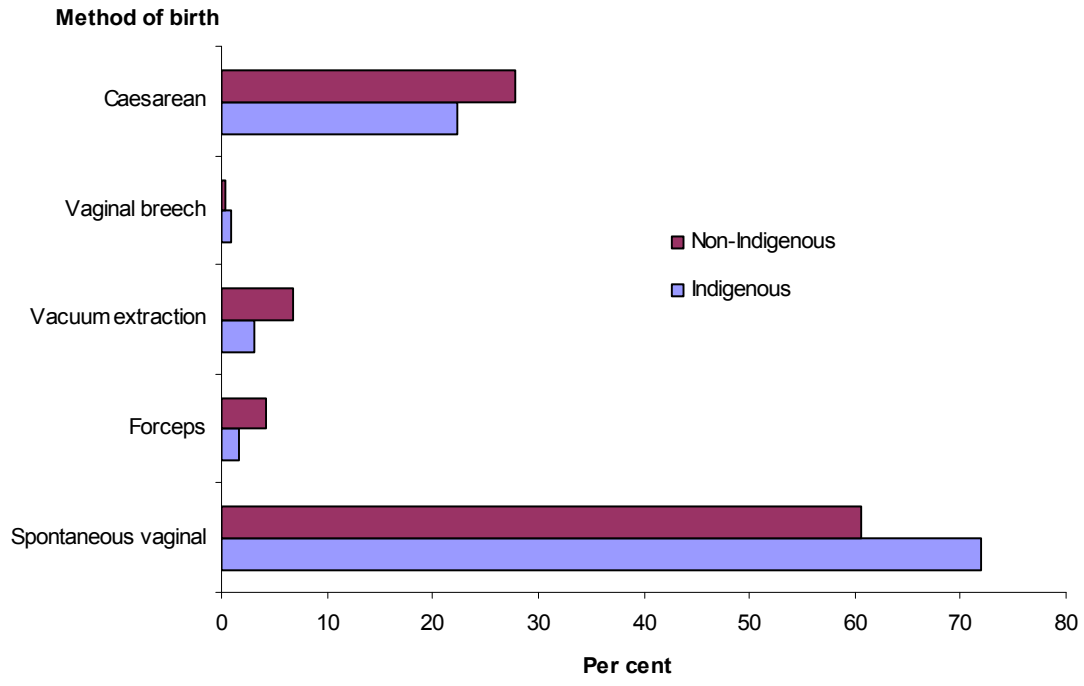
1. Data for Tasmania were not available.
2. For multiple births, the presentation of the firstborn baby was used.

Source: AIHW NPSU National Perinatal Data Collection 2007.

Method of birth

Data are presented in this section by mother; for multiple births, the method of birth of the firstborn baby is presented.

Of all Indigenous women who gave birth in 2001–2004, 72% had a spontaneous vaginal birth (Table 3.16). This was higher than the proportion of non-Indigenous mothers who had a spontaneous vaginal birth (61%). Compared with non-Indigenous mothers, Indigenous mothers were less likely to have forceps or vacuum extraction deliveries (11% compared with 5%) and more likely to have a vaginal breech birth (0.8% compared with 0.4%) (Figure 3.4). The caesarean section rate for Indigenous mothers (22%) was less than the rate for non-Indigenous mothers (28%).



Note: For multiple births, the method of birth of the firstborn baby was used.

Source: AIHW NPSU National Perinatal Data Collection 2007.

Figure 3.4: Method of birth for Indigenous and non-Indigenous mothers, 2001–2004 (per cent)

There was some variation in the method of birth proportions among states and territories for Indigenous mothers in 2001–2004. Spontaneous vaginal births were most common in New South Wales, Queensland and Western Australia (all 73%) and least common in South Australia (64%). In contrast, caesarean sections were most common in South Australia (29%) and least common in New South Wales, Victoria and Western Australia (all 21%).

Table 3.16: Indigenous mothers by method of birth and state and territory, 2001–2004

Method of birth	NSW	Vic	Qld	WA	SA	ACT	NT	Total
				Number				
Spontaneous vaginal	6,392	1,150	8,059	4,488	1,143	182	3,932	25,346
Forceps	164	59	119	95	44	13	87	581
Vacuum extraction	275	61	275	242	60	19	183	1,115
Vaginal breech	55	16	90	67	22	3	45	298
Caesarean section	1,848	346	2,491	1,272	524	60	1,367	7,908
Other	—	—	7	—	—	—	—	7
Not stated	—	1	—	—	—	—	8	9
Total	**8,734**	**1,633**	**11,041**	**6,164**	**1,793**	**277**	**5,622**	**35,264**
				Per cent				
Spontaneous vaginal	73.2	70.4	73.0	72.8	63.7	65.7	69.9	71.9
Forceps	1.9	3.6	1.1	1.5	2.5	4.7	1.5	1.6
Vacuum extraction	3.1	3.7	2.5	3.9	3.3	6.9	3.3	3.2
Vaginal breech	0.6	1.0	0.8	1.1	1.2	1.1	0.8	0.8
Caesarean section	21.2	21.2	22.6	20.6	29.2	21.7	24.3	22.4
Other	—	—	0.1	—	—	—	—	—
Not stated	—	0.1	—	—	—	—	0.1	—
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**

Notes

1. Data for Tasmania were not available.
2. For multiple births, the method of birth of the firstborn baby was used.

Source: AIHW NPSU National Perinatal Data Collection 2007.

The method of birth for Indigenous mothers varied across remoteness areas within Australia. Spontaneous vaginal births were less common in major cities and remote areas (both 71%) when compared with regional and very remote areas; assisted vaginal births were more common in major cities (Table 3.17). Vacuum extraction was the method of birth for approximately 4% of Indigenous mothers who lived in major cities, compared to around 3% in remote and very remote areas.

The proportion of caesarean sections among Indigenous mothers did not vary greatly by remoteness area (between 22% and 23%).

Table 3.17: Indigenous mothers by method of birth and remoteness area of usual residence, 2001–2004

Method of birth	Major cities	Inner regional	Outer regional	Remote	Very remote	Total[(a)]
			Number			
Spontaneous vaginal	5,865	4,197	7,152	2,890	5,223	25,327
Forceps	158	124	146	76	77	581
Vacuum extraction	346	173	287	103	205	1,114
Vaginal breech	46	51	91	38	72	298
Caesarean section	1,901	1,274	2,119	943	1,667	7,904
Other	4	—	2	—	1	7
Not stated	1	—	—	2	6	9
Total	**8,321**	**5,819**	**9,797**	**4,052**	**7,251**	**35,240**
			Per cent			
Spontaneous vaginal	70.5	72.1	73.0	71.3	72.0	71.9
Forceps	1.9	2.1	1.5	1.9	1.1	1.6
Vacuum extraction	4.2	3.0	2.9	2.5	2.8	3.2
Vaginal breech	0.6	0.9	0.9	0.9	1.0	0.8
Caesarean section	22.8	21.9	21.6	23.3	23.0	22.4
Other	—	—	—	—	—	—
Not stated	—	—	—	—	0.1	—
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**

(a) Excludes mothers not usually resident in Australia and those whose area of usual residence was 'Not stated'.

Note: For multiple births, the method of birth of the firstborn baby was used.

Source: AIHW NPSU National Perinatal Data Collection 2007.

The method of birth for Indigenous mothers varied across areas of socioeconomic disadvantage within Australia, with Indigenous mothers in the least disadvantaged quintile more likely to have interventions during the birth than Indigenous mothers in more disadvantage quintiles (Table 3.18).

Spontaneous vaginal births were less likely to occur in the least disadvantaged quintile (66%) when compared with other quintiles of disadvantage, which ranged from 71% in the second most disadvantaged quintile to 73% in the middle quintile and most disadvantaged quintile. Indigenous mothers in the least disadvantaged quintile were also more likely to have a birth requiring forceps (3%) or vacuum extraction (5%) and were less likely to have a vaginal breech birth (0.5%) when compared with Indigenous mothers in the other disadvantage quintiles. Indigenous mothers in the least disadvantaged quintile were more likely to have a caesarean section (25%) than Indigenous mothers in other quintiles, where proportions ranged between 22% and 23%.

Table 3.18: Indigenous mothers by method of birth and socioeconomic status, 2001–2004

Method of birth	Quintile of socioeconomic disadvantage[(a)]						
	1st quintile (most disadvan-taged)	2nd quintile	3rd quintile	4th quintile	5th quintile (least disadvan-taged)	Not stated	Total
				Number			
Spontaneous vaginal	9,623	6,919	4,842	2,766	769	427	25,346
Forceps	212	164	94	67	34	10	581
Vacuum extraction	364	320	201	150	62	18	1,115
Vaginal breech	117	81	58	30	6	6	298
Caesarean section	2,930	2,252	1,464	838	289	135	7,908
Other	2	3	1	1	—	—	7
Not stated	2	2	2	1	—	2	9
Total	**13,250**	**9,741**	**6,662**	**3,853**	**1,160**	**598**	**35,264**
				Per cent			
Spontaneous vaginal	72.6	71.0	72.7	71.8	66.3	71.4	71.9
Forceps	1.6	1.7	1.4	1.7	2.9	1.7	1.6
Vacuum extraction	2.7	3.3	3.0	3.9	5.3	3.0	3.2
Vaginal breech	0.9	0.8	0.9	0.8	0.5	1.0	0.8
Caesarean section	22.1	23.1	22.0	21.7	24.9	22.6	22.4
Other	—	—	—	—	—	—	—
Not stated	—	—	—	—	—	0.3	—
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**

(a) Socioeconomic status quintiles are determined by postcode of usual residence based on the Australian Bureau of Statistics SEIFA . The advantage/disadvantage index was used.

Note: For multiple births, the method of birth of the first baby born was used.

Source: AIHW NPSU National Perinatal Data Collection 2007.

Place of birth

Most births in Australia occur in conventional hospital labour-ward settings or in birth centres. There were 34,461 Indigenous women who gave birth in hospital in 2001–2004 (98%) (Table 3.19). The proportion of Indigenous mothers giving birth in hospital ranged from 95% in the Northern Territory to 99% in Queensland. Indigenous women were less likely to give birth in birth centres (0.5%) compared with non-Indigenous women (2.2%). There were 35 Indigenous women (0.1%) who gave birth at home in 2001–2004 and 590 (1.7%) who gave birth in other settings. Almost half of the Indigenous women giving birth in other settings did so in the Northern Territory, with the majority of these births occurring in remote community health centres.

Table 3.19: Indigenous mothers by actual place of birth and state and territory, 2001–2004

Place of birth	NSW	Vic	Qld	WA	SA	ACT	NT	Total
				Number				
Hospital	8,555	1,595	10,902	6,064	1,719	268	5,358	34,461
Birth centre	80	n.p.	21	8	54	<5	—	178
Home	4	<4	8	9	<4	—	11	35
Other	95	26	110	83	n.p.	n.p.	[(a)]253	590
Not stated	—	—	—	—	—	—	—	—
Total	**8,734**	**1,633**	**11,041**	**6,164**	**1,793**	**277**	**5,622**	**35,264**
				Per cent				
Hospital	98.0	97.7	98.7	98.4	95.9	96.8	95.3	97.7
Birth centre	0.9	n.p.	0.2	0.1	3.0	n.p.	—	0.5
Home	—	n.p.	0.1	0.1	n.p.	—	0.2	0.1
Other	1.1	1.6	1.0	1.3	n.p.	n.p.	[(a)]4.5	1.7
Not stated	—	—	—	—	—	—	—	—
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**

(a) The majority of these births occurred in remote community health centres.

Notes

1. Data for Tasmania were not available.
2. For multiple births, the place of birth of the firstborn baby was used.

n.p. Data not published to maintain confidentiality of small numbers.

Source: AIHW NPSU National Perinatal Data Collection 2007.

Indigenous women who gave birth in hospital

Hospital sector

'Hospital sector' indicates whether a patient was admitted to a public or private hospital. Of Indigenous mothers who gave birth in hospital in 2001–2004, the proportion in private hospitals was approximately 3% (Table 3.20). This was substantially lower than the proportion of non-Indigenous mothers who gave birth in private hospitals (32%).

There was variation in the proportion of Indigenous women who gave birth in private hospitals among the states and territories; ranging from 1.1% in the Northern Territory to 11% in the Australian Capital Territory. Indigenous women who gave birth in private hospitals were older, with a mean age of 29.0 years compared with 24.6 years for Indigenous women who gave birth in public hospitals.

Table 3.20: Indigenous mothers who gave birth in hospital by hospital sector, 2001–2004

Hospital sector	NSW	Vic	Qld	WA	SA	ACT	NT	Total
				Number				
Public	8,198	1,501	10,673	5,921	1,689	239	5,298	33,519
Private	357	94	229	143	30	29	60	942
Total	**8,555**	**1,595**	**10,902**	**6,064**	**1,719**	**268**	**5,358**	**34,461**
				Per cent				
Public	95.8	94.1	97.9	97.6	98.3	89.2	98.9	97.3
Private	4.2	5.9	2.1	2.4	1.7	10.8	1.1	2.7
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**

Source: AIHW NPSU National Perinatal Data Collection 2007.

Indigenous women who gave birth in public hospitals in 2001–2004 had a higher proportion of spontaneous vaginal birth (72%) than those giving birth in private hospitals (50%) (Table 3.21). Instrumental vaginal births (i.e. forceps and vacuum extraction) were more common among Indigenous women who gave birth in private hospitals (12%) compared with those who gave birth in public hospitals (5%). Caesarean sections were also more common among Indigenous women giving birth in private hospitals (37%) than public hospitals (23%).

Table 3.21: Indigenous mothers who gave birth in hospital by method of birth and hospital sector, 2001–2004

Method of birth	Public	Private	Total
		Number	
Spontaneous vaginal	24,103	472	24,575
Forceps	521	59	580
Vacuum extraction	1,058	57	1,115
Vaginal breech	266	5	271
Caesarean section	7,559	348	7,907
Other	7	—	7
Not stated	5	1	6
Total	**33,519**	**942**	**34,461**
		Per cent	
Spontaneous vaginal	71.9	50.1	71.3
Forceps	1.6	6.3	1.7
Vacuum extraction	3.2	6.1	3.2
Vaginal breech	0.8	0.5	0.8
Caesarean section	22.6	36.9	22.9
Other	—	—	—
Not stated	—	—	—
Total	**100.0**	**100.0**	**100.0**

Note: For multiple births, the method of birth of the firstborn baby was used.

Source: AIHW NPSU National Perinatal Data Collection 2007.

Postnatal length of stay

The median length of stay in hospital for Indigenous women who gave birth in 2001–2004 was 3 days overall and for all age groups (Table 3.22). The median length of stay for non-Indigenous mothers who gave birth over this same period was 4 days.

Almost one-quarter of Indigenous mothers who gave birth in hospital had a length of stay of 2 days (23%) and one-fifth stayed for 3 days (21%). Older mothers were generally more likely to stay in hospital for longer periods after giving birth.

Table 3.22: Indigenous mothers who gave birth in hospital[(a)] by postnatal length of stay and maternal age, 2001–2004

	Age group (years)						
Length of stay	**Less than 20**	**20–24**	**25–29**	**30–34**	**35 and over**	**Not stated**	**Total**
Median length of stay	3.0	3.0	3.0	3.0	3.0	4.5	3.0
				Number			
Less than 1 day	156	364	270	132	66	1	989
1 day	871	1,544	1,281	702	283	—	4,681
2 days	1,310	2,048	1,461	913	389	—	6,121
3 days	1,278	1,715	1,252	822	365	—	5,432
4 days	847	1,076	808	632	304	—	3,667
5 days	560	611	549	443	219	—	2,382
6 days	268	288	298	204	126	—	1,184
7–13 days	412	411	326	245	160	1	1,555
14–20 days	26	27	16	20	23	—	112
21–27 days	2	2	5	3	1	—	13
28 or more days	1	1	4	3	2	—	11
Not stated	68	115	84	61	31	5	364
Total	**5,799**	**8,202**	**6,354**	**4,180**	**1,969**	**7**	**26,511**
				Per cent			
Less than 1 day	2.7	4.4	4.2	3.2	3.4	14.3	3.7
1 day	15.0	18.8	20.2	16.8	14.4	—	17.7
2 days	22.6	25.0	23.0	21.8	19.8	—	23.1
3 days	22.0	20.9	19.7	19.7	18.5	—	20.5
4 days	14.6	13.1	12.7	15.1	15.4	—	13.8
5 days	9.7	7.4	8.6	10.6	11.1	—	9.0
6 days	4.6	3.5	4.7	4.9	6.4	—	4.5
7–13 days	7.1	5.0	5.1	5.9	8.1	14.3	5.9
14–20 days	0.4	0.3	0.3	0.5	1.2	—	0.4
21–27 days	—	—	0.1	0.1	0.1	—	—
28 or more days	—	—	0.1	0.1	0.1	—	—
Not stated	1.2	1.4	1.3	1.5	1.6	71.4	1.4
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**

(a) Only mothers who were discharged home are included.

Source: AIHW NPSU National Perinatal Data Collection 2007.

4 Babies of Indigenous mothers

Summary

The perinatal outcomes of babies born to Indigenous mothers were poor when compared with babies born to non-Indigenous mothers during 2001–2004. Fourteen per cent of births to Indigenous mothers were preterm (Table 4.2) compared with 8% of babies born to non-Indigenous mothers. Older Indigenous mothers were more likely to give birth to a preterm baby (Table 4.4).

Thirteen per cent of liveborn babies of Indigenous mothers were low birthweight over the 2001–2004 period (Table 4.5). This was more than double the proportion observed among liveborn babies of non-Indigenous mothers (6%). The proportion of low birthweight babies among babies born to Indigenous mothers was highest in older mothers (15% in those aged 35 years and over) (Table 4.8). The mean birthweight of babies born to Indigenous mothers decreased with increased remoteness and socioeconomic disadvantage (Tables 4.6 and 4.7).

Of liveborn babies of Indigenous mothers, approximately 3% had a low Apgar score at 5 minutes (Table 4.10). This was higher than the proportion observed among liveborn babies of non-Indigenous mothers (1.3%). The proportion of babies born to Indigenous mothers who had a low Apgar score at 5 minutes increased with increased remoteness (Table 4.11).

The median length of stay in hospital for babies of Indigenous mothers was 3 days (Table 4.12), shorter than the median length of stay observed among babies born to non-Indigenous mothers (4 days). The median length of stay among babies born to Indigenous mothers was higher in very remote areas and in the most advantaged socioeconomic quintile (both 4 days) (Tables 4.13 and 4.14).

There were 424 fetal deaths and 201 neonatal deaths reported among babies born to Indigenous mothers for 2001–2004. This equated to a fetal death rate of 12 per 1,000 births and a neonatal death rate of 6 per 1,000 live births (Table 4.15). This was considerably higher than the fetal and neonatal death rates observed among babies born to non-Indigenous mothers (7 and 3 per 1,000 births respectively).

Demographic profile

Birth status

Babies are recorded as liveborn or stillborn (fetal deaths) on perinatal notification forms. A live birth is defined by the World Health Organisation (WHO) as the complete expulsion or extraction from the mother of a baby which, after such separation, breathes or shows any other evidence of life. A fetal death is defined as a death occurring before the complete expulsion or extraction from the mother of a product of conception of 20 or more completed weeks gestation or 400 grams or more birthweight (NHDC 2003). The same criteria are applied to live births for inclusion in the NPDC; that is, live births must also be at least 20 weeks gestation or at least 400 grams birthweight.

There were 35,258 live births and 424 fetal deaths to Indigenous mothers in Australia in 2001–2004, giving a total of 35,682 births to Indigenous mothers reported to the NPDC (Table 2.1).

Sex

Male live births to Indigenous mothers exceeded female live births in all states and territories, except Victoria and the Australian Capital Territory, and accounted for 51% of live births to Indigenous mothers in 2001–2004 (Table 4.1). The sex ratio (defined as the number of male liveborn babies per 100 female liveborn babies) for babies born to Indigenous mothers was 105 nationally and ranged from 95 in the Australian Capital Territory to 109 in the Northern Territory. For live births to non-Indigenous mothers, the sex ratio was 106 males per 100 females.

Table 4.1: Live births to Indigenous mothers by sex and state and territory, 2001–2004

Sex of baby	NSW	Vic	Qld	WA	SA	ACT	NT	Total
Sex ratio (M:F)	104.4	96.3	107.9	100.7	101.7	95.1	108.8	104.9
				Number				
Males	4,469	798	5,735	3,094	899	135	2,918	18,048
Females	4,281	829	5,314	3,073	884	142	2,683	17,206
Indeterminate/ not stated	2	—	—	—	1	—	1	4
Total	**8,752**	**1,627**	**11,049**	**6,167**	**1,784**	**277**	**5,602**	**35,258**
				Per cent				
Males	51.1	49.0	51.9	50.2	50.4	48.7	52.1	51.2
Females	48.9	51.0	48.1	49.8	49.6	51.3	47.9	48.8
Indeterminate/ not stated	—	—	—	—	0.1	—	—	—
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**

Note: Data for Tasmania were not available.

Source: AIHW NPSU National Perinatal Data Collection 2007.

Outcomes

Gestational age

Preterm birth (before 37 weeks gestation) is associated with neonatal problems that cause significant morbidity and mortality in newborn babies. Preterm births were classified according to the criteria of the WHO into groups of 20–27 weeks, 28–31 weeks and 32–36 weeks.

In 2001–2004 there were 4,962 preterm births to Indigenous mothers, accounting for 14% of all births to Indigenous mothers (Table 4.2). This was almost double the proportion of preterm births to non-Indigenous mothers (8%) (Figure 4.1). There was variation in the proportion of preterm births to Indigenous mothers among the states and territories, ranging

from 12% of all births in New South Wales to 22% in the Australian Capital Territory. A large proportion of Indigenous women who gave birth in the Australian Capital Territory were residents of New South Wales, therefore, preterm births appear high when based on births to Indigenous women who gave birth in the Australian Capital Territory. Note that there are a small number of Aboriginal and Torres Strait Islander mothers who give birth in the Australian Capital Territory, and the proportion fluctuates from year to year, making this jurisdiction less comparable to other jurisdictions.

For 2001–2004, the mean gestational age of preterm births to Indigenous mothers was 32.9 weeks and the mean gestational age for babies of Indigenous mothers was 33.2 weeks.

Table 4.2: Preterm births to Indigenous mothers by gestational age and state and territory, 2001–2004

Gestational age (weeks)	NSW	Vic	Qld	WA	SA	ACT[(a)]	NT	Total
Mean	33.2	32.6	32.8	32.9	32.2	31.2	33.1	32.9
				Number				
20–27[(b)]	106	38	193	115	53	16	104	625
28–31	132	24	171	120	51	13	85	596
32–36	830	171	1,067	728	222	33	690	3,741
Total	**1,068**	**233**	**1,431**	**963**	**326**	**62**	**879**	**4,962**
				Per cent[(c)]				
20–27[(b)]	1.2	2.3	1.7	1.8	2.9	5.6	1.8	1.8
28–31	1.5	1.5	1.5	1.9	2.8	4.6	1.5	1.7
32–36	9.4	10.3	9.6	11.6	12.2	11.6	12.2	10.5
Total	**12.1**	**14.1**	**12.8**	**15.4**	**18.0**	**21.8**	**15.5**	**13.9**

(a) Care must be taken when interpreting the ACT rates as these rates include babies born in the Australian Capital Territory to Indigenous mothers who were non-ACT residents. For example, the percentage of preterm births among babies who were born in the Australian Capital Territory to ACT-resident Indigenous mothers from 2001 to 2004 was 14.9%.

(b) Includes two babies of less than 20 weeks gestation.

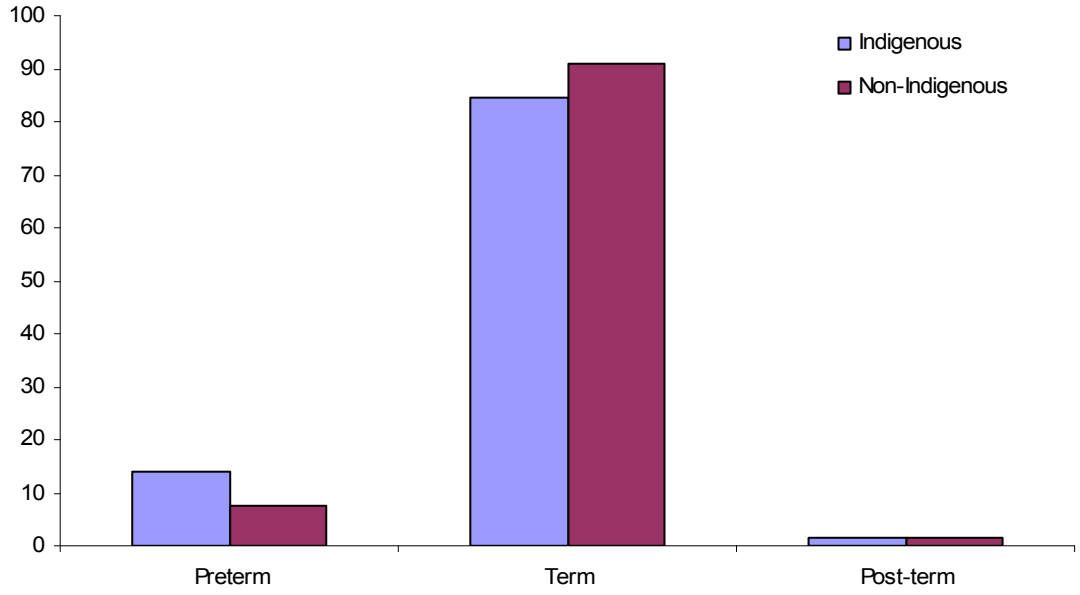
(c) Percentage of all births to Indigenous mothers.

Notes

1. Data for Tasmania were not available.
2. For multiple births the gestational age of the firstborn baby was used for all babies.

Source: AIHW NPSU National Perinatal Data Collection 2007.

Of births to Indigenous mothers, 85% were at term compared with 91% of births to non-Indigenous mothers. Only around 2% of births to Indigenous mothers and non-Indigenous mothers were post-term.



Note: For multiple births the gestational age of the firstborn baby was used for all babies.

Source: AIHW NPSU National Perinatal Data Collection 2007.

Figure 4.1: Gestational age group of babies born to Indigenous and non-Indigenous mothers, 2001–2004 (per cent)

The proportion of preterm multiple births to Indigenous mothers in 2001–2004 was substantially higher than the proportion of preterm singleton births (Table 4.3). Thirteen per cent of singleton births to Indigenous mothers were preterm compared with almost two-thirds of twins (61%). There were 21 higher order multiple births to Indigenous mothers and these births were all preterm.

Table 4.3: Births to Indigenous mothers by gestational age and plurality, 2001–2004

Gestational age (weeks)	Plurality			
	One	Two	Three or more	Total
		Number		
20–27[(a)]	555	64	6	625
28–31	511	76	9	596
32–36	3,381	354	6	3,741
37–41	29,826	316	—	30,142
42 and over	560	—	—	560
Not stated	18	—	—	18
Total	**34,851**	**810**	**21**	**35,682**
20–36[(a)]	*4,447*	*494*	*21*	*4,962*
		Per cent		
20–27[(a)]	1.6	7.9	28.6	1.8
28–31	1.5	9.4	42.9	1.7
32–36	9.7	43.7	28.6	10.5
37–41	85.6	39.0	—	84.5
42 and over	1.6	—	—	1.6
Not stated	0.1	—	—	0.1
Total	**100.0**	**100.0**	**100.0**	**100.0**
20–36[(a)]	*12.8*	*61.0*	*100.0*	*13.9*

(a) Includes two babies of less than 20 weeks gestation.

Note: For multiple births the gestational age of the firstborn baby was used for all babies.

Source: AIHW NPSU National Perinatal Data Collection 2007.

Older Indigenous mothers (i.e. those aged 35 years and over) were more likely to have a preterm birth than mothers in the younger age groups during 2001–2004 (Table 4.4). Almost one-fifth of babies born to Indigenous mothers aged 35 years and over were preterm (18%), compared with only 13% of babies born to Indigenous mothers aged 20–24 years and 25–29 years. Around 15% of babies born to Indigenous mothers aged 30–34 years and 14% of babies born to Indigenous mothers aged less than 20 years were preterm.

Indigenous mothers aged 35 years and over had the lowest proportion of births at term (81%). The highest proportion of post-term births was seen in teenage Indigenous mothers.

Table 4.4: Births to Indigenous mothers by gestational age and maternal age, 2001–2004

Gestational age (weeks)	Maternal age						
	Less than 20	20–24	25–29	30–34	35 and over	Not stated	Total
				Number			
20–27[(a)]	149	200	139	88	48	1	625
28–31	140	149	141	100	66	—	596
32–36	823	1,100	846	619	352	1	3,741
37–41	6,711	9,458	7,244	4,620	2,097	12	30,142
42 and over	153	161	134	84	28	—	560
Not stated	5	6	3	2	2	—	18
Total	**7,981**	**11,074**	**8,507**	**5,513**	**2,593**	**14**	**35,682**
20–36[(a)]	*1,112*	*1,449*	*1,126*	*807*	*466*	*2*	*4,962*
				Per cent			
20–27[(a)]	1.9	1.8	1.6	1.6	1.9	7.1	1.8
28–31	1.8	1.3	1.7	1.8	2.5	—	1.7
32–36	10.3	9.9	9.9	11.2	13.6	7.1	10.5
37–41	84.1	85.4	85.2	83.8	80.9	85.7	84.5
42 and over	1.9	1.5	1.6	1.5	1.1	—	1.6
Not stated	0.1	0.1	—	—	0.1	—	0.1
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**
20–36[(a)]	*13.9*	*13.1*	*13.2*	*14.6*	*18.0*	*14.3*	*13.9*

(a) Includes 2 babies of less than 20 weeks gestation.

Note: For multiple births the gestational age of the firstborn baby was used for all babies.

Source: AIHW NPSU National Perinatal Data Collection 2007.

Birthweight

A baby's birthweight is a key indicator of health status. Babies are defined as low birthweight if their weight at birth is less than 2,500 grams. Within this category, those weighing less than 1,500 grams are defined as very low birthweight (WHO 1992).

In 2001–2004, 86% of liveborn babies to Indigenous mothers had a birthweight in the range of 2,500–4,499 grams (Table 4.5). The mean birthweight was 3,162 grams. Thirteen per cent of liveborn babies to Indigenous mothers fell within the low birthweight range. This proportion was considerably higher than the proportion of liveborn babies to non-Indigenous mothers who had a birthweight of less than 2,500 grams (6%). The mean birthweight of liveborn babies of non-Indigenous mothers was 3,381 grams.

The proportion of low birthweight liveborn babies born to Indigenous mothers varied among the states and territories; from 12% in both New South Wales and Queensland to 19% in the Australian Capital Territory. A large proportion of Indigenous women who gave birth in the Australian Capital Territory were residents of New South Wales, therefore, the proportion of low birthweight babies appears high when based on births to Indigenous women who gave birth in the Australian Capital Territory.

Table 4.5: Live births to Indigenous mothers by birthweight and state and territory, 2001–2004

Birthweight (g)	NSW	Vic	Qld	WA	SA	ACT[(a)]	NT	Total
Mean	3,193	3,158	3,200	3,124	3,064	3,085	3,117	3,162
				Number				
Less than 1,500	165	38	255	160	78	18	127	841
1,500 – 2,499	903	184	1,020	732	236	35	627	3,737
2,500 – 4,499	7,560	1,375	9,586	5,199	1,445	223	4,781	30,169
4,500 and over	120	29	185	75	n.p.	<5	66	501
Not stated	4	1	3	1	n.p.	n.p.	1	10
Total	**8,752**	**1,627**	**11,049**	**6,167**	**1,784**	**277**	**5,602**	**35,258**
Less than 2,500	*1,068*	*222*	*1,275*	*892*	*314*	*53*	*754*	*4,578*
				Per cent				
Less than 1,500	1.9	2.3	2.3	2.6	4.4	6.5	2.3	2.4
1,500 – 2,499	10.3	11.3	9.2	11.9	13.2	12.6	11.2	10.6
2,500 – 4,499	86.4	84.5	86.8	84.3	81.0	80.5	85.3	85.6
4,500 and over	1.4	1.8	1.7	1.2	n.p.	n.p.	1.2	1.4
Not stated	—	0.1	—	—	n.p.	n.p.	—	—
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**
Less than 2,500	*12.2*	*13.6*	*11.5*	*14.5*	*17.6*	*19.1*	*13.5*	*13.0*

(a) Care must be taken when interpreting the ACT rates as these rates include babies born in the Australian Capital Territory to Indigenous mothers who were non-ACT residents. For example, the percentage of low birthweight among babies who were born in the Australian Capital Territory to ACT-resident Indigenous mothers from 2001 to 2004 was 12.3%.

Note: Data for Tasmania were not available.

n.p. Data not published to maintain confidentiality of small numbers.

Source: AIHW NPSU National Perinatal Data Collection 2007.

In 2001–2004, the mean birthweight of live babies born to Indigenous mothers decreased with increased remoteness of the mothers' usual place of residence (Table 4.6). The mean birthweight was highest among babies born to Indigenous mothers residing in major cities

(3,188 grams), decreasing with increased remoteness to 3,169 grams in outer regional areas and 3,123 grams in very remote areas.

The proportion of liveborn babies to Indigenous mothers who had a birthweight of less than 2,500 grams was similar across all remoteness areas (between 13% and 14%).

Table 4.6: Live births to Indigenous mothers by birthweight and remoteness area of usual residence, 2001–2004

Birthweight (g)	Major cities	Inner regional	Outer regional	Remote	Very remote	Total[(a)]
Mean	3,188	3,175	3,169	3,146	3,123	3,163
			Number			
Less than 1,500	196	134	236	99	174	839
1,500 – 2,499	866	607	991	471	794	3,729
2,500 – 4,499	7,159	5,002	8,431	3,388	6,177	30,157
4,500 and over	126	88	123	73	91	501
Not stated	—	1	8	—	1	10
Total	**8,347**	**5,832**	**9,789**	**4,031**	**7,237**	**35,236**
Less than 2,500	*1,062*	*741*	*1,227*	*570*	*968*	*4,568*
			Per cent			
Less than 1,500	2.3	2.3	2.4	2.5	2.4	2.4
1,500 – 2,499	10.4	10.4	10.1	11.7	11.0	10.6
2,500 – 4,499	85.8	85.8	86.1	84.0	85.4	85.6
4,500 and over	1.5	1.5	1.3	1.8	1.3	1.4
Not stated	—	—	0.1	—	—	—
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**
Less than 2,500	*12.7*	*12.7*	*12.5*	*14.1*	*13.4*	*13.0*

(a) Excludes mothers not usually resident in Australia and those whose area of usual residence was 'Not stated'.

Source: AIHW NPSU National Perinatal Data Collection 2007.

The mean birthweight of live babies born to Indigenous mothers in 2001–2004 was lowest in the first and most disadvantaged quintile (3,140 grams) and highest in the fourth and fifth quintiles of socioeconomic disadvantage (around 3,200 grams) (Table 4.7).

The proportion of live babies born to Indigenous mothers who had a birthweight of less than 2,500 grams did not vary greatly by quintile of socioeconomic disadvantage (between 12% and 13%).

Table 4.7: Live births to Indigenous mothers by birthweight and socioeconomic status, 2001–2004

	Quintile of socioeconomic disadvantage[(a)]						
Birthweight (g)	1st quintile (most disadvantaged)	2nd quintile	3rd quintile	4th quintile	5th quintile (least disadvantaged)	Not stated	Total
Mean	3,140	3,159	3,184	3,206	3,200	3,103	3,162
				Number			
Less than 1,500 g	334	211	155	99	29	13	841
1,500 – 2,499 g	1,445	1,028	670	398	113	83	3,737
2,500 – 4,499 g	11,301	8,325	5,770	3,290	1,001	482	30,169
4,500 g and over	173	141	81	78	18	10	501
Not stated	6	4	—	—	—	—	10
Total	**13,259**	**9,709**	**6,676**	**3,865**	**1,161**	**588**	**35,258**
Less than 2,500 g	*1,779*	*1,239*	*825*	*497*	*142*	*96*	*4,578*
				Per cent			
Less than 1,500 g	2.5	2.2	2.3	2.6	2.5	2.2	2.4
1,500 – 2,499 g	10.9	10.6	10.0	10.3	9.7	14.1	10.6
2,500 – 4,499 g	85.2	85.7	86.4	85.1	86.2	82.0	85.6
4,500 g and over	1.3	1.5	1.2	2.0	1.6	1.7	1.4
Not stated	—	—	—	—	—	—	—
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**
Less than 2,500	*13.4*	*12.8*	*12.4*	*12.9*	*12.2*	*16.3*	*13.0*

(a) Socioeconomic status quintiles are determined by postcode of usual residence based on the Australian Bureau of Statistics SEIFA .

Source: AIHW NPSU National Perinatal Data Collection 2007.

In 2001–2004 the mean birthweight of live babies born to Indigenous mothers was lowest among teenage mothers (3,094 grams) and highest in mothers aged 25–29 years (3,200 grams and 30–34 years (3,210 grams) (Table 4.8).

The proportion of liveborn low birthweight births to Indigenous mothers was highest in older mothers (i.e. those aged 35 years and over) at 15%, and lowest among mothers aged 25–29 years (12%).

Table 4.8: Live births to Indigenous mothers by birthweight and maternal age, 2001–2004

	Maternal age						
Birthweight	**Less than 20**	**20–24**	**25–29**	**30–34**	**35 and over**	**Not stated**	**Total**
Mean	3,094	3,157	3,200	3,210	3,165	3,200	3,162
				Number			
Less than 1,500	183	259	183	136	80	—	841
1,500 – 2,499	868	1,108	863	587	311	—	3,737
2,500 – 4,499	6,776	9,447	7,241	4,595	2,097	13	30,169
4,500 and over	49	130	130	133	59	—	501
Not stated	2	3	2	2	1	—	10
Total	**7,878**	**10,947**	**8,419**	**5,453**	**2,548**	**13**	**35,258**
Less than 2,500	*1,051*	*1,367*	*1,046*	*723*	*391*	—	*4,578*
				Per cent			
Less than 1,500	2.3	2.4	2.2	2.5	3.1	—	2.4
1,500 – 2,499	11.0	10.1	10.3	10.8	12.2	—	10.6
2,500 – 4,499	86.0	86.3	86.0	84.3	82.3	100.0	85.6
4,500 and over	0.6	1.2	1.5	2.4	2.3	—	1.4
Not stated	—	—	—	—	—	—	—
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**
Less than 2,500	*13.3*	*12.5*	*12.4*	*13.3*	*15.3*	—	*13.0*

Source: AIHW NPSU National Perinatal Data Collection 2007.

For those states and territories where smoking status data were available, the mean birthweight of live babies born to Indigenous mothers in 2001–2004 was considerably lower among mothers who smoked during pregnancy compared with mothers who did not smoke (Table 4.9). The mean birthweight of live babies born to Indigenous mothers who smoked during pregnancy was 3,037 grams, 253 grams lighter than the mean birthweight of babies of Indigenous mothers who did not smoke (3,290 grams). For live births of non-Indigenous mothers who smoked the mean birthweight was 3,210 grams, compared with 3,416 grams for babies of non-Indigenous mothers who did not smoke.

The mean birthweight of live babies born to Indigenous mothers who smoked at all during pregnancy varied among the states and territories, from 2,872 grams in the Australian Capital Territory to 3,061 grams in New South Wales.

Table 4.9: Mean birthweight (g) of live births to Indigenous mothers by tobacco smoking status during pregnancy and state and territory, 2001–2004

Smoking status	NSW	WA	SA[(a)]	ACT	NT[(b)]	Total
Smoked	3,061	3,015	2,955	2,872	3,057	3,037
Did not smoke	3,371	3,230	3,290	3,261	3,243	3,290
Total[(c)]	**3,193**	**3,124**	**3,064**	**3,085**	**3,117**	**3,144**

(a) For South Australia, 'Smoked' includes women who quit before the first antenatal visit.

(b) For the Northern Territory, smoking status was recorded at the first antenatal visit.

(c) Includes records where smoking status was not stated.

Note: Data on tobacco smoking during pregnancy were not available for Victoria, Queensland or Tasmania.

Source: AIHW NPSU National Perinatal Data Collection 2007.

The proportion of low birthweight among liveborn babies of Indigenous mothers who smoked was 16%, compared with 10% among babies of Indigenous mothers who did not smoke. For non-Indigenous mothers, these figures were 10% and 5%, respectively.

Apgar scores

Apgar scores are clinical indicators of the baby's condition shortly after birth, based on assessment of the heart rate, breathing, colour, muscle tone and reflex irritability. Between 0 and 2 points are given for each of these five characteristics, and the total score is between 0 and 10. An Apgar score of less than 7 at 5 minutes after birth is considered to be an indicator of compromise for the baby.

In 2001–2004, around 3% of liveborn babies to Indigenous mothers had a low Apgar score (between 0 and 6) at 5 minutes (Table 4.10). This proportion was greater than the proportion in non-Indigenous mothers (1.3%).

Among the states and territories, the distribution of low Apgar scores at 5 minutes for live babies born to Indigenous mothers ranged from 2% in New South Wales, Victoria, Queensland and Western Australia to 4% in the Northern Territory.

Table 4.10: Live births to Indigenous mothers by Apgar score at 5 minutes and state and territory, 2001–2004

Apgar score	NSW	Vic	Qld	WA	SA	ACT	NT	Total
				Number				
0–6	196	34	229	139	44	7	216	865
7–10	8,516	1,587	10,792	5,998	1,732	269	5,370	34,264
Not stated	40	6	28	30	8	1	16	129
Total	**8,752**	**1,627**	**11,049**	**6,167**	**1,784**	**277**	**5,602**	**35,258**
				Per cent				
0–6	2.2	2.1	2.1	2.3	2.5	2.5	3.9	2.5
7–10	97.3	97.5	97.7	97.3	97.1	97.1	95.9	97.2
Not stated	0.5	0.4	0.3	0.5	0.4	0.4	0.3	0.4
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**

Note: Data for Tasmania were not available.

Source: AIHW NPSU National Perinatal Data Collection 2007.

In 2001–2004, the proportion of live babies born to Indigenous mothers who had a low Apgar score at 5 minutes increased with increased remoteness of the mothers' usual place of residence (Table 4.11). Apgar scores of less than 7 at 5 minutes after birth were lower among live babies born to Indigenous mothers residing in major cities and inner regional areas (around 2%) than among live babies born to Indigenous mothers residing in outer regional, remote or very remote areas (around 3%).

Table 4.11: Live births to Indigenous mothers by Apgar score at 5 minutes and remoteness area of usual residence, 2001–2004

Apgar score	Major cities	Inner regional	Outer regional	Remote	Very remote	Total[(a)]
			Number			
0–6	145	127	246	115	232	865
7–10	8,174	5,684	9,507	3,905	6,972	34,242
Not stated	28	21	36	11	33	129
Total	**8,347**	**5,832**	**9,789**	**4,031**	**7,237**	**35,236**
			Per cent			
0–6	1.7	2.2	2.5	2.9	3.2	2.5
7–10	97.9	97.5	97.1	96.9	96.3	97.2
Not stated	0.3	0.4	0.4	0.3	0.5	0.4
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**

(a) Excludes mothers not usually resident in Australia and those whose area of usual residence was 'Not stated'.

Source: AIHW NPSU National Perinatal Data Collection 2007.

Hospital births

Length of stay

The majority of babies are discharged from hospital at the same time as their mothers; however, some babies experience morbidity and require hospitalisation. A baby's gestation and birthweight are two factors that influence the duration of hospitalisation. Twins and higher order multiple births usually have longer stays in hospital than singleton babies.

In 2001–2004, the median length of stay for babies born to Indigenous mothers in hospital who were discharged home was 3 days (Table 4.12). The majority of babies born to Indigenous mothers remained in their hospital of birth for less than 6 days (84%), and nearly two-thirds stayed in hospital for less than 4 days (61%). Length of stay in hospital for babies born to Indigenous mothers was generally shorter when compared with babies born to non-Indigenous mothers. Only 45% of babies born in hospital to non-Indigenous mothers had a length of stay of less than 4 days.

There was some variation among the states and territories in the length of stay for babies born to Indigenous mothers who were discharged from hospital in 2001–2004. Over one-fifth of babies born to Indigenous mothers in hospital in the Northern Territory had a length of stay of 7 days or more (21%) compared with only 10% in Victoria. The proportion of babies born to Indigenous mothers who had a length of stay of less than 4 days ranged from 43% in the Northern Territory to 71% in Victoria.

Table 4.12: Live births to Indigenous mothers in hospital[(a)] by length of stay and state and territory, 2001–2004

Length of stay	NSW	Vic	Qld	WA	SA	ACT	NT	Total
Median length of stay	3.0	3.0	2.0	3.0	3.0	3.0	4.0	3.0
				Number				
Less than 1 day	228	39	441	113	45	8	43	917
1 day	1,222	189	2,385	753	166	31	279	5,025
2 days	1,763	343	2,552	1,175	330	44	736	6,943
3 days	1,640	357	1,800	1,087	305	37	890	6,116
4 days	1,077	216	1,105	901	238	34	712	4,283
5 days	695	136	594	578	137	31	583	2,754
6 days	327	51	320	283	77	11	318	1,387
7–13 days	492	82	536	468	127	17	610	2,332
14–27 days	171	44	277	123	60	6	201	882
28 or more days	86	23	154	65	39	9	145	521
Not stated	7	—	—	—	—	—	—	7
Total	**7,708**	**1,480**	**10,164**	**5,546**	**1,524**	**228**	**4,517**	**31,167**
				Per cent				
Less than 1 day	3.0	2.6	4.3	2.0	3.0	3.5	1.0	2.9
1 day	15.9	12.8	23.5	13.6	10.9	13.6	6.2	16.1
2 days	22.9	23.2	25.1	21.2	21.7	19.3	16.3	22.3
3 days	21.3	24.1	17.7	19.6	20.0	16.2	19.7	19.6
4 days	14.0	14.6	10.9	16.2	15.6	14.9	15.8	13.7
5 days	9.0	9.2	5.8	10.4	9.0	13.6	12.9	8.8
6 days	4.2	3.4	3.1	5.1	5.1	4.8	7.0	4.5
7–13 days	6.4	5.5	5.3	8.4	8.3	7.5	13.5	7.5
14–27 days	2.2	3.0	2.7	2.2	3.9	2.6	4.4	2.8
28 or more days	1.1	1.6	1.5	1.2	2.6	3.9	3.2	1.7
Not stated	0.1	—	—	—	—	—	—	—
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**

(a) Only babies who were discharged home are included.

Note: Data for Tasmania were not available.

Source: AIHW NPSU National Perinatal Data Collection 2007.

Compared with other remoteness areas, the length of stay for babies born to Indigenous mothers who were discharged from hospital was considerably higher where the mothers' usual place of residence was in very remote areas (Table 4.13). In 2001–2004, babies born to Indigenous mothers whose usual place of residence was in very remote areas accounted for almost one-fifth of babies discharged from hospital with a length of stay of 7 days or more (19%). This compared with 12% in remote areas, 12% in major cities, 9% in outer regional areas and 8% in inner regional areas. The proportion of babies born to Indigenous mothers who were discharged from hospital after a length of stay of less than 4 days ranged from 81% for mothers residing in very remote areas to 92% for mothers residing in inner regional areas.

Table 4.13: Live births to Indigenous mothers in hospital[a] by length of stay and remoteness area of usual residence, 2001–2004

Length of Stay	Major cities	Inner regional	Outer regional	Remote	Very remote	Total[b]
Median length of stay	3.0	3.0	3.0	3.0	4.0	3.0
			Number			
Less than 1 day	274	172	325	77	68	916
1 day	1,271	982	1,706	547	519	5,025
2 days	1,705	1,286	2,124	802	1,023	6,940
3 days	1,423	1,133	1,669	702	1,187	6,114
4 days	1,061	710	1,050	471	990	4,282
5 days	675	391	651	282	754	2,753
6 days	308	178	306	145	450	1,387
7–13 days	503	253	480	265	827	2,328
14–20 days	148	102	128	59	166	603
21–27 days	100	43	52	29	53	277
28 or more days	166	48	132	62	111	519
Not stated	2	1	2	1	1	7
Total	**7,636**	**5,299**	**8,625**	**3,442**	**6,149**	**31,151**
			Per cent			
Less than 1 day	3.6	3.2	3.8	2.2	1.1	2.9
1 day	16.6	18.5	19.8	15.9	8.4	16.1
2 days	22.3	24.3	24.6	23.3	16.6	22.3
3 days	18.6	21.4	19.4	20.4	19.3	19.6
4 days	13.9	13.4	12.2	13.7	16.1	13.7
5 days	8.8	7.4	7.5	8.2	12.3	8.8
6 days	4.0	3.4	3.5	4.2	7.3	4.5
7–13 days	6.6	4.8	5.6	7.7	13.4	7.5
14–20 days	1.9	1.9	1.5	1.7	2.7	1.9
21–27 days	1.3	0.8	0.6	0.8	0.9	0.9
28 or more days	2.2	0.9	1.5	1.8	1.8	1.7
Not stated	—	—	—	—	—	—
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**

(a) Only babies who were discharged home are included.

(b) Excludes mothers not usually resident in Australia and those whose area of usual residence was 'Not stated'.

Source: AIHW NPSU National Perinatal Data Collection 2007.

In 2001–2004, babies born to Indigenous mothers in the least disadvantaged quintile who were discharged from hospital had a longer median length of stay (4 days) compared with all other socioeconomic quintiles (3 days) (Table 4.14). Babies born to Indigenous mothers in the least disadvantaged quintile accounted for 16% of babies discharged from hospital with a length of stay of 7 days or more. The distribution of the proportion of babies in other socioeconomic quintiles with a length of stay of 7 days or more ranged from 10% in the

second most disadvantaged quintile (second quintile) to 13% in the second least disadvantaged quintile (fourth quintile).

Table 4.14: Live births to Indigenous mothers in hospitals[(a)], by length of stay and socioeconomic status, 2001–2004

	Quintile of socioeconomic disadvantage[(b)]						
Length of stay	1st quintile (most disadvantaged)	2nd quintile	3rd quintile	4th quintile	5th quintile (least disadvantaged)	Not stated	Total
Median length of stay	3.0	3.0	3.0	3.0	4.0	3.0	3.0
				Number			
Less than 1 day	332	265	192	97	27	4	917
1 day	1,701	1,418	1,193	556	116	41	5,025
2 days	2,367	2,034	1,466	755	210	111	6,943
3 days	2,287	1,800	1,116	656	172	85	6,116
4 days	1,541	1,163	806	528	169	76	4,283
5 days	1,077	701	487	325	123	41	2,754
6 days	589	346	228	128	70	26	1,387
7–13 days	936	554	410	263	113	56	2,332
14–20 days	224	151	122	71	26	10	604
21–27 days	97	58	60	38	14	11	278
28 or more days	176	129	99	83	23	11	521
Not stated	5	2	—	—	—	—	7
Total	**11,332**	**8,621**	**6,179**	**3,500**	**1,063**	**472**	**31,167**
				Per cent			
Less than 1 day	2.9	3.1	3.1	2.8	2.5	0.8	2.9
1 day	15.0	16.4	19.3	15.9	10.9	8.7	16.1
2 days	20.9	23.6	23.7	21.6	19.8	23.5	22.3
3 days	20.2	20.9	18.1	18.7	16.2	18.0	19.6
4 days	13.6	13.5	13.0	15.1	15.9	16.1	13.7
5 days	9.5	8.1	7.9	9.3	11.6	8.7	8.8
6 days	5.2	4.0	3.7	3.7	6.6	5.5	4.5
7–13 days	8.3	6.4	6.6	7.5	10.6	11.9	7.5
14–20 days	2.0	1.8	2.0	2.0	2.4	2.1	1.9
21–27 days	0.9	0.7	1.0	1.1	1.3	2.3	0.9
28 or more days	1.6	1.5	1.6	2.4	2.2	2.3	1.7
Not stated	—	—	—	—	—	—	—
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**

(a) Only babies who were discharged home are included.

(b) Socioeconomic status quintiles are determined by postcode of usual residence based on the Australian Bureau of Statistics SEIFA.

Source: AIHW NPSU National Perinatal Data Collection 2007.

Perinatal mortality

Definitions

There are different definitions in Australia for reporting and registering perinatal deaths. The NHDD specifies a definition of perinatal deaths to include all fetal and neonatal deaths of at least 400 grams birthweight or at least 20 weeks gestation (NHDC 2003). This definition is used in the NPDC.

Figure 4.1 shows the definitions of periods of perinatal and infant deaths used by the NPSU. Neonatal deaths are those occurring in live births up to 28 completed days after birth.

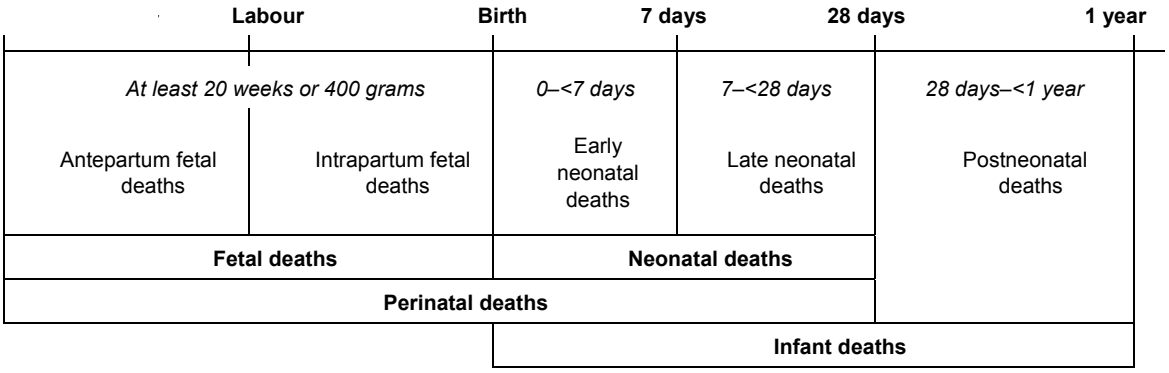


Figure 4.1: Perinatal and infant death periods

Fetal, neonatal and perinatal deaths

In 2001–2004 there were 424 fetal deaths and 201 neonatal deaths (excluding neonatal deaths from the Northern Territory) among babies born to Indigenous mothers (Table 4.15). This equated to 12 fetal deaths per 1,000 births and 6 neonatal deaths per 1,000 live births among babies born to Indigenous mothers. The perinatal death rate was 18 per 1,000 births. The fetal and neonatal death rates for babies born to non-Indigenous mothers (7 and 3 respectively) were almost half the rate of babies born to Indigenous mothers. The perinatal death rate of babies of Indigenous mothers was 10 per 1,000 births.

There was some variation in perinatal death rates among the states and territories for babies born to Indigenous mothers in 2001–2004. Of those states and territories where data were available, perinatal death rates were highest in the Australian Capital Territory (42 per 1,000 births) and lowest in New South Wales (14 per 1,000 births). Care should be taken, however, when interpreting the perinatal death rates in the Australian Capital Territory because the small number of perinatal deaths in this territory results in large fluctuations in the number of deaths over time.

Table 4.15: Fetal, neonatal and perinatal deaths of babies born to Indigenous mothers by state and territory, 2001–2004

Deaths	NSW	Vic	Qld	WA	SA	ACT[(a)]	NT	Total[(b)]
				Number				
Fetal deaths	91	28	121	84	30	7	63	424
Neonatal deaths	32	15	88	46	15	5	n.a.	201
Perinatal deaths	**123**	**43**	**209**	**130**	**45**	**12**	**n.a.**	**625**
				Rate per 1,000 births[(c)]				
Fetal deaths	10.3	16.9	10.8	13.4	16.5	24.6	11.1	11.9
Neonatal deaths	3.7	9.2	8.0	7.5	8.4	18.1	n.a.	5.7
Perinatal deaths	**13.9**	**26.0**	**18.7**	**20.8**	**24.8**	**42.3**	**n.a.**	**17.5**

(a) Care must be taken when interpreting these rates as the small number of perinatal deaths in the Australian Capital Territory will result in large fluctuations over time. ACT rates include babies born in the Australian Capital Territory to Indigenous mothers who were non-ACT residents. There were four fetal deaths (19.2 per 1,000 births), no neonatal deaths and a perinatal death rate of 19.2 per 1,000 births for babies born to ACT-resident Indigenous women in 2001–2004.

(b) Totals for neonatal and perinatal deaths exclude neonatal deaths in the Northern Territory.

(c) Fetal and perinatal death rates were calculated using all births (live births and still births). Neonatal death rates were calculated using all live births.

n.a. Data on neonatal deaths were not available for the Northern Territory for 2001–2003, therefore neonatal deaths in the Northern Territory have not been included.

Source: AIHW NPSU National Perinatal Data Collection 2007.

5 Assessment of Indigenous status data quality, 1991 to 2004

Summary

An assessment of the quality of Indigenous status information in perinatal data in each state and territory was undertaken. This involved a survey which was sent to the midwifery managers across Australia to determine how many hospitals in each jurisdiction obtain Indigenous status information of mothers giving birth from admission records and how many collect this information independently. The assessment also involved analysis of the variability in the number and proportion of mothers recorded as Indigenous in the perinatal data collection over time and across jurisdictions for the period 1991–2004 (Table 5.3).

The outcomes of this assessment showed that Indigenous status data from New South Wales, Victoria, Queensland, Western Australia, South Australia and the Northern Territory are suitable for trends analysis. Perinatal data from Tasmania, although improving, were deemed to be of insufficient quality. Although the most recent data in the Australian Capital Territory were of publishable quality, the data were not yet of sufficient stability to support trends analysis.

Introduction

This chapter examines the quality of information collected on Aboriginal and Torres Strait Islander mothers. It assesses the variability of the number of mothers by Indigenous status, by jurisdiction and over time in the National Perinatal Data Collection (NPDC). Combining information from a survey developed by the AIHW to assess the quality of Indigenous identification in perinatal data (Perinatal Survey), the aim of this analysis is to provide guidelines on the following areas:

1. jurisdictions with acceptable data quality
2. time periods for trend analysis
3. the treatment of cases for which Indigenous status is not stated.

Past assessments of Indigenous status data quality

There have been a number of studies that have examined the quality of Indigenous status in hospitalisation data and perinatal data. Some of these studies are outlined below.

Perinatal data

A study conducted at Mercy Hospital for Women in East Melbourne between May 2001 and June 2002 measured the percentage of patients asked about their Indigenous status, and that of their babies on admission in order to audit admission procedures. Initial results indicated that 34% of women interviewed were asked their Indigenous status at admission. Interviews

resumed after various problems were resolved including the addition of a specific question regarding the Indigenous status of the babies' fathers. The percentage of obstetric patients who reported being asked their Indigenous status improved markedly after the resumption of the study. The study also found that there were a number of inconsistencies in the group of women who identified themselves or their babies as Indigenous with the medical records (Middleton et al. 2003).

A similar study was conducted by the University of New South Wales between May and July 1999 (Jackson Pulver et al. 2003). The study attempted to determine the accuracy of routine identification of Aboriginal and Torres Strait Islander women admitted to King George V hospital in Sydney to give birth. Hospital records were compared with self-disclosure of Aboriginal and Torres Strait Islander status to a female Aboriginal health professional.

Of the 536 women surveyed, 29 (5%) self-disclosed as being Indigenous. Only a third of the patients were identified as Aboriginal and Torres Strait Islander in hospital records. The Indigenous women referred by another organisation were significantly more likely to be correctly identified than those who self-referred to the hospital (Jackson Pulver et al. 2003).

In New South Wales, the quality of Indigenous status in perinatal data has also been assessed through linking birth records reported to the NSW Midwives Data Collection (MDC) and birth registrations reported to the NSW Registry of Births, Deaths and Marriages in the period 1994–1998. Records using the two databases were matched using probabilistic linkage software. The results of the linkage found that the estimated percentage of births to Indigenous mothers which were recorded as Aboriginal or Torres Strait Islander in the MDC rose from 59% to 65% over the 5 year period 1994–1998 and reporting was better in rural hospitals than in urban hospitals (i.e. in 1998 47% of births to Indigenous mothers in urban hospitals were recorded compared with 87% in rural hospitals). The study was restricted to births to Indigenous mothers only and thus did not take into account paternal identification (Taylor & Lim 2000).

For the year 2005–06, an assessment of the identification of Indigenous babies recorded in Victorian hospitals which employed Aboriginal Hospital Liaison Officers (AHLOs) found that 77% of mothers recorded as Indigenous also had their baby recorded as Indigenous. In Victoria, all babies of women who identify as Indigenous should be recorded as Aboriginal or Torres Strait Islander. The under-reporting observed in 2005–06 was attributed to a system error in some hospitals, through which babies of Indigenous mothers were not automatically recorded as Indigenous. This error has since been rectified (DHS 2007).

Hospital data

In 2005, the AIHW compiled a report on improving the quality of Indigenous identification in hospital separations data which looked at studies undertaken in various jurisdictions to assess the quality of Indigenous identification in hospital data. As part of this report, a survey was also sent to each state and territory health authority in order to assess Indigenous status data quality for hospital admitted patients. In studies based on patient interviews, the proportions of Indigenous patients found to have been correctly identified in hospital records were:

- 93% overall for the five Northern Territory public hospitals in 1997
- 85% overall for 11 public hospitals in five jurisdictions (Victoria, Queensland, South Australia, Australian Capital Territory and Northern Territory) in 1998
- 86% overall for 26 public hospitals in Western Australia in 2000

- 74% overall for 2 metropolitan public hospitals in Queensland in 2000.

Relatively poor arrangements for ascertaining Indigenous status at private hospitals were confirmed in the analysis of national separations data. For both the public and the private sectors, the 'Not stated/inadequately described' category of Indigenous status had greater similarity with the non-Indigenous category than with the Indigenous category across a wide range of patient characteristics. In this report, four jurisdictions were assessed as having adequate levels of Indigenous identification in hospitalisation data in 2003–04: Queensland, Western Australia, South Australia and the Northern Territory) (AIHW 2005). A more comprehensive study undertaken in Queensland in 2005 showed a small increase in Indigenous identification compared with the 2000 study.

The AIHW is currently undertaking a project to reassess the extent of under-identification of Indigenous people in hospital data in all jurisdictions by comparing the results of interviews with hospital patients with information obtained from hospital records. This is expected to be completed by late-2007 and may result in a revision made to the four states and territories currently recommended for use in the analysis of hospitalisation data on Indigenous Australians.

Each financial year, the Victorian Department of Human Services produces a report as part of the Improving Care for Aboriginal and Torres Strait Islander Patients program which includes an assessment of the under-identification of Indigenous patients in hospital by comparing patient records in the Victorian Admitted Episodes Dataset (VAED) and patient records completed by an AHLO. In 2005–06, in hospitals that employed AHLOs, the number of patients recorded as Indigenous in the VAED was higher than the number of patients recorded as Indigenous by an AHLO (9,626 compared with 8,406). Some of this discrepancy was due to a temporary absence of an AHLO, or differences between counting admissions (AHLO) and counting separations (VAED); however, most of the discrepancies have not been resolved (DHS 2007).

Methods of assessment

Not all Indigenous mothers are recorded as Indigenous in perinatal data. The level of identification varies across jursidictions. This level can be assessed by examining the variability of data over time and the level and time period of records with Indigenous status 'not stated' in the data collection, and by looking into additional relevant information provided by the Perinatal Survey.

The AIHW developed a short questionnaire to assess the quality of Indigenous identification in the National Perinatal Data Collection. The questionnaire was developed as a result of information obtained from focus group discussions held with hospital staff and midwives in most states and territories between December 2006 and March 2007, as part of a project to improve Indigenous identification in health data. Based on the information obtained from midwives, it was concluded that, in order to adequately assess the quality of Indigenous identification in perinatal data collections, it would be necessary to determine how many hospitals in each jurisdiction obtain Indigenous status information of women giving birth from admission records and how many collect this information independently.

The questionnaire was sent in late March 2007 to the midwifery managers in each state/territory public hospital that normally admits patients for births with the exception of the Australian Capital Territory for which the survey was administered by telephone. The survey form included questions on how the Indigenous status of the mother is obtained and

whether Indigenous status is commonly checked and/or validated by midwives. Results of this survey can be used to assess the reliability of Indigenous status information in the perinatal data collection.

Smooth time trends in the number of Indigenous mothers indicate stable levels of Indigenous identification. With measures undertaken by health service providers and data collectors to improve identification of Indigenous people in perinatal data, smooth time trends can be viewed as indications that the relevant data have satisfactory qualities with stabilised levels of Indigenous identification over time. On the other hand, highly variable time trends suggest unstable identification levels and a need to improve the data quality or small number of cases in the data collection. Analyses of perinatal data should therefore be conducted only for jurisdictions with smooth trends in their data.

In this analysis the level of variability has been assessed by coefficient of variation. Coefficient of variation measures the amount of standard error as a percentage of the average number. The smaller the coefficient of variation, the less variable the underlying data. This analysis examines the coefficient of variation for data for every 5-year period from 1991–1995 to 2000–2004. A cut off point of 10% was used to pick out jurisdictions with satisfactorily small variability in their perinatal data collection.

The presence of a 'not stated' option for Indigenous status can indicate the efforts made to improve data quality by jurisdictions. Jurisdictions started to include this category of Indigenous status in their data collection in the late 1990s. Therefore, to enable comparisons of data over time, guidelines for time trend analysis should take into account whether the 'not stated' category should be included with the category for non-Indigenous or whether analysis should be undertaken only from a particular year onwards.

The AIHW survey to assess the quality of Indigenous identification in perinatal data

A total of 303 survey forms were sent out to Midwifery Managers across Australia and 205 forms were returned (response rate of 68%). The proportion of surveys returned varied by jurisdiction, being highest in Tasmania (100%—only 3 hospitals in Tasmania were surveyed), Victoria (83%) and South Australia (81%). Response rates in the other jurisdictions were 70% for Western Australia, 67% for New South Wales, 60% for the Northern Territory and 52% for Queensland. In the Australian Capital Territory, the survey was administered by telephone and responses were obtained from both public hospitals. These results should be interpreted with caution as they are based on only two respondents. Results of the survey are provided in Tables 5.1 and 5.2.

Two of the three respondent hospitals from Tasmania and 100% of the respondent hospitals from the Australian Capital Territory reported that Indigenous status information on women giving birth is obtained from the hospital database or admission form. In the Australian Capital Territory, the hospital admission forms are usually completed by the prospective mother.

Information on mothers whose babies are born before arrival at hospital and on homebirths is collected by a midwife at the time of birth, if possible, and is then recorded on a perinatal data collection form. This information is not recorded in a hospital database.

One of the respondent hospitals from Tasmania has Indigenous status information checked by midwives and no hospital in the Australian Capital Territory has the Indigenous status

information checked by midwives. The other six jurisdictions generally have more sources to obtain Indigenous status information, or more frequently have the information checked by midwives.

Table 5.1: How the Indigenous status of the mother is obtained, by state and territory, 2007

	NSW	Vic	Qld	WA	SA	Tas	ACT[(a)]	NT	Total
					Number				
Always from hospital database/admission form	21	25	8	5	13	2	2	1	77
Always independent from hospital database	32	11	22	6	6	1	—	2	80
Collected by midwife only if information is not recorded in hospital database	6	6	8	9	5	—	—	—	34
Other[(b)]	5	1	5	3	2	—	—	—	16
Total	**64**	**43**	**43**	**23**	**26**	**3**	**2**	**3**	**207**
					Per cent				
Always from hospital database/admission form	32.8	58.1	18.6	21.7	50.0	66.7	100.0	33.3	37.2
Always independent from hospital database	50.0	25.6	51.2	26.1	23.1	33.3	0.0	66.7	38.6
Collected by midwife only if information is not recorded in hospital database	9.4	14.0	18.6	39.1	19.2	0.0	0.0	0.0	16.4
Other[(b)]	7.8	2.3	11.6	13.0	7.7	0.0	0.0	0.0	7.7
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**

(a) Survey was administered by telephone in the Australian Capital Territory. Results should be interpreted with caution as these are based on only two respondents.

(b) Includes: collected from both the hospital database and by midwives (8 respondents); collected on booking in form; Indigenous status of both parents is recorded and checked at all of the above steps (in antenatal clinic, on admission to birth, after birth, from hospital database etc.); Indigenous status is collected at numerous stages (e.g. hospital database, pregnancy record, perinatal data form and Hep B consent form); known by Aboriginal Health Workers; all women assumed to be Aboriginal in the hospital as it is located among remote Aboriginal communities.

Table 5.2: Whether Indigenous status is commonly checked and/or validated by midwives, by state and territory, 2007

	NSW	Vic	Qld	WA	SA	Tas	ACT[(a)]	NT	Total
					Number				
Yes	47	22	36	16	13	1	—	1	136
No	14	21	4	5	11	2	2	2	61
Don't know/not stated	3	—	3	2	2	—	—	—	10
Total	**64**	**43**	**43**	**23**	**26**	**3**	**2**	**3**	**207**
					Per cent				
Yes	73.4	51.2	83.7	69.6	50.0	33.3	0.0	33.3	65.7
No	21.9	48.8	9.3	21.7	42.3	66.7	100.0	66.7	29.5
Don't know/not stated	4.7	0.0	7.0	8.7	7.7	0.0	0.0	0.0	4.8
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**

(a) Survey was administered by telephone in the Australian Capital Territory. Results should be interpreted with caution as these are based on only two respondents.

Note: In some states and territories, additional validation of Indigenous status data is undertaken by the state or territory health authority. For example, in South Australia, all discrepancies in mother's Indigenous status between Births, Deaths and Marriages data and perinatal data received from hospitals are checked by the South Australian perinatal data collection unit.

Analysis of the Indigenous status of mothers

This section presents analyses of the number and proportion of mothers in the National Perinatal Data Collection by Indigenous status, state and territory and over time. Data from all states and territories are presented with the exception of Tasmania. Data for Tasmania were not included because of systematic misclassification resulting from the way the Indigenous status item was collected. Before 2005, Indigenous status was collected in a way that non-Indigenous records could not be distinguished from those where Indigenous status was 'not stated'. There is currently a project to improve the quality of Indigenous status data in Tasmania. From 2005 births, Indigenous status data will be reported using the National Health Data Dictionary value domains.

Note that a range of factors can affect the number of Indigenous mothers reported over time including changes in the level of accuracy of Indigenous identification in perinatal data. Caution should be used when interpreting changes over time because it is not possible to ascertain whether a change in the reported number of Indigenous mothers is due to changes in the accuracy of Indigenous identification or to real changes in the number of Indigenous women who are giving birth each year.

1. Number of mothers

The number of women who gave birth in the period 1991–2004 by state and territory and Indigenous status is reported in Table 5.3.

The number of women giving birth who identified as Indigenous in the Australian Capital Territory fluctuated over time, partly because of small numbers and the variability in the number of non-resident women who gave birth in the Australian Capital Territory. An additional analysis was performed for the Australian Capital Territory to investigate the impact of Indigenous non-ACT residents who gave birth in the Australian Capital Territory

from 1993 to 2004. Table 5.4 shows the variability in the numbers and proportions of Indigenous non-residents from year to year, compared with little variability among Indigenous ACT residents who give birth in the Australian Capital Territory.

For the other jurisdictions, the number of mothers identified as Indigenous followed smooth trends over time, either increasing at a relatively steady rate (New South Wales, Queensland, and the Northern Territory), or remaining at a relatively stable level (Victoria, Western Australia and South Australia).

Jurisdictions generally started to record mothers with a 'not stated' Indigenous status in or after 1999. In Western Australia and South Australia, no mothers with a 'not stated' Indigenous status were recorded in the period 1991–2004.

In Western Australia, data for the mother's Indigenous status were drawn from two sources—(1) from the mother's record in the Hospital Morbidity Data Collection, and (2) if these data were missing on the inpatient record or the mother did not give birth in hospital, from the form completed by the midwife (Notification of Case Attended form). This form does not allow for a 'not stated' option and a valid response category must be recorded.

Table 5.3: Women who gave birth by Indigenous status[a] and state and territory, 1991 to 2004

	Indigenous status[a]	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
NSW															
	Indigenous	1,385	1,428	1,456	1,530	1,739	1,712	1,842	2,043	2,059	2,105	2,110	2,155	2,161	2,308
	Non-Indigenous	84,397	86,371	85,193	85,206	84,524	83,590	85,078	83,029	83,900	84,307	82,223	82,383	82,831	81,949
	Not stated	—	—	—	—	—	—	—	—	9	49	46	49	40	32
	Total	**85,782**	**87,799**	**86,649**	**86,736**	**86,263**	**85,302**	**86,920**	**85,072**	**85,968**	**86,461**	**84,379**	**84,587**	**85,032**	**84,289**
Vic															
	Indigenous	406	402	452	428	417	448	379	445	445	376	416	416	366	435
	Non-Indigenous	63,873	64,997	63,343	63,555	62,315	61,580	60,932	60,626	61,136	61,196	60,692	61,607	62,039	62,080
	Not stated	—	—	—	—	—	—	—	—	6	0	0	0	1	28
	Total	**64,279**	**65,399**	**63,795**	**63,983**	**62,732**	**62,028**	**61,311**	**61,071**	**61,587**	**61,572**	**61,108**	**62,023**	**62,406**	**62,543**
Qld															
	Indigenous	2,148	2,316	2,234	2,347	2,483	2,606	2,486	2,731	2,849	2,801	2,693	2,721	2,860	2,767
	Non-Indigenous	41,983	43,646	44,530	45,009	45,380	44,696	44,792	44,719	45,191	45,712	46,207	45,593	46,643	47,280
	Not stated	—	—	—	—	—	—	—	—	1	9	8	10	8	4
	Total	**44,131**	**45,962**	**46,764**	**47,356**	**47,863**	**47,302**	**47,278**	**47,450**	**48,041**	**48,522**	**48,908**	**48,324**	**49,511**	**50,051**
WA															
	Indigenous	1,460	1,418	1,442	1,433	1,446	1,411	1,539	1,504	1,545	1,498	1,527	1,606	1,526	1,505
	Non-Indigenous	23,219	23,552	23,531	23,638	23,644	23,781	23,317	23,787	23,833	23,320	22,967	22,790	22,753	23,606
	Not stated	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	Total	**24,679**	**24,970**	**24,973**	**25,071**	**25,090**	**25,192**	**24,856**	**25,291**	**25,378**	**24,818**	**24,494**	**24,396**	**24,279**	**25,111**

(continued)

Table 5.3 (continued): Women who gave birth by Indigenous status[a] and state and territory, 1991 to 2004

	Indigenous status[a]	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
SA															
	Indigenous	397	435	396	388	382	348	393	412	445	447	398	443	468	484
	Non-Indigenous	19,071	19,433	19,283	19,131	18,928	18,436	18,001	18,008	17,788	17,131	17,029	16,978	17,049	16,744
	Not stated	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	Total	**19,468**	**19,868**	**19,679**	**19,519**	**19,310**	**18,784**	**18,394**	**18,420**	**18,233**	**17,578**	**17,427**	**17,421**	**17,517**	**17,228**
ACT															
	Indigenous	20	11	48	44	63	80	58	63	59	53	52	72	80	73
	Non-Indigenous	4,459	4,632	4,664	4,686	4,767	4,621	4,650	4,582	4,522	4,625	4,353	4,610	4,683	4,711
	Not stated	—	—	—	—	—	—	—	—	5	6	9	26	21	15
	Total	**4,479**	**4,643**	**4,712**	**4,730**	**4,830**	**4,701**	**4,708**	**4,645**	**4,586**	**4,684**	**4,414**	**4,708**	**4,784**	**4,799**
NT															
	Indigenous	1,209	1,243	1,221	1,220	1,244	1,210	1,197	1,248	1,295	1,348	1,485	1,409	1,396	1,332
	Non-Indigenous	2,254	2,343	2,286	2,260	2,363	2,212	2,328	2,240	2,252	2,273	2,228	2,233	2,216	2,096
	Not stated	—	—	—	—	—	—	—	—	—	8	16	32	6	9
	Total	**3,463**	**3,586**	**3,507**	**3,480**	**3,607**	**3,422**	**3,525**	**3,488**	**3,547**	**3,629**	**3,729**	**3,674**	**3,618**	**3,437**
Australia[b]															
	Indigenous	**7,025**	**7,253**	**7,249**	**7,390**	**7,774**	**7,815**	**7,894**	**8,446**	**8,697**	**8,628**	**8,681**	**8,822**	**8,857**	**8,904**
	Non-Indigenous	**239,256**	**244,974**	**242,830**	**243,485**	**241,921**	**238,916**	**239,098**	**236,991**	**238,622**	**238,564**	**235,699**	**236,194**	**238,214**	**238,466**
	Not stated	**—**	**—**	**—**	**—**	**—**	**—**	**—**	**—**	**21**	**72**	**79**	**117**	**76**	**88**
	Total	**246,281**	**252,227**	**250,079**	**250,875**	**249,695**	**246,731**	**246,992**	**245,437**	**247,340**	**247,264**	**244,459**	**245,133**	**247,147**	**247,458**

(a) The categories used for recording Indigenous status are based on the National Health Data Dictionary value domains. From 1999 onwards the recording categories used were Indigenous: Aboriginal but not Torres Strait Islander origin, Torres Strait Islander origin but not Aboriginal origin, Both Aboriginal and Torres Strait Islander origin; Non-Indigenous: Neither Aboriginal nor Torres Strait Islander origin; Not stated: Not stated/inadequately described. Before 1999 the categories used were Aboriginal or Torres Strait Islander, and Other.

(b) Excludes data from Tasmania.

Source: AIHW NPSU National Perinatal Data Collection 2007.

Table 5.4: Resident and non-resident women who gave birth in the Australian Capital Territory by Indigenous status, 1993 to 2004

	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
ACT residents						**Number**						
Indigenous	53	50	59	67	51	47	50	38	40	50	58	54
Non-Indigenous	4,097	4,192	4,306	4,167	4,053	4,003	3,992	4,060	3,762	3,907	3,979	3,951
Total	**4,150**	**4,242**	**4,365**	**4,234**	**4,104**	**4,050**	**4,042**	**4,098**	**3,802**	**3,957**	**4,037**	**4,005**
						Per cent						
Indigenous	1.3	1.2	1.4	1.6	1.2	1.2	1.2	0.9	1.1	1.3	1.4	1.3
Non-Indigenous	98.7	98.8	98.6	98.4	98.8	98.8	98.8	99.1	98.9	98.7	98.6	98.7
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**
Non-ACT residents						**Number**						
Indigenous	10	6	5	14	7	16	9	15	12	22	22	19
Non-Indigenous	439	495	509	510	597	579	530	565	591	703	704	760
Total	**449**	**501**	**514**	**524**	**604**	**595**	**539**	**580**	**603**	**725**	**726**	**779**
						Per cent						
Indigenous	2.2	1.2	1.0	2.7	1.2	2.7	1.7	2.6	2.0	3.0	3.0	2.4
Non-Indigenous	97.8	98.8	99.0	97.3	98.8	97.3	98.3	97.4	98.0	97.0	97.0	97.6
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**

Notes

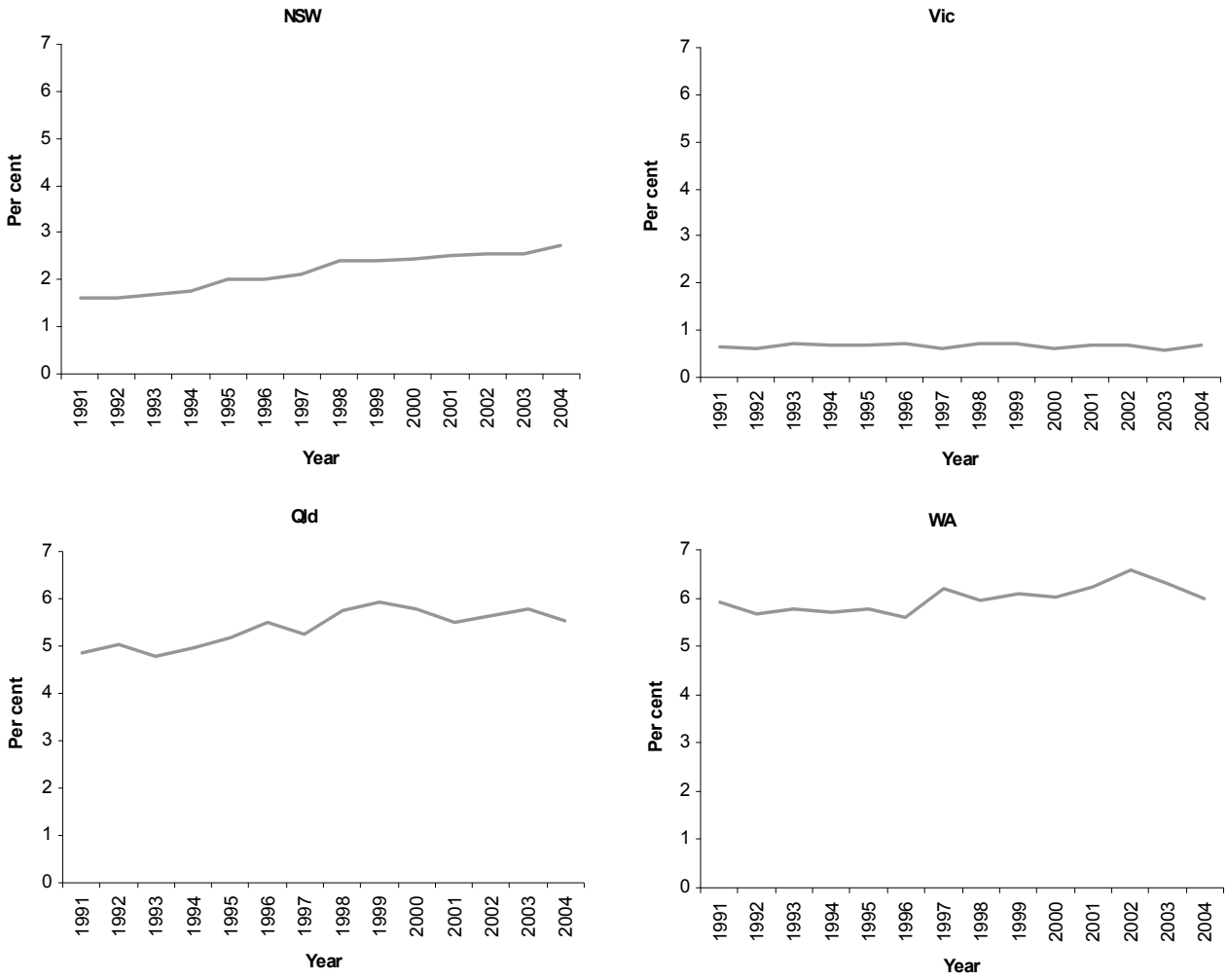
1. Excludes records where Indigenous status or state of usual residence were 'Not stated.'
2. Data before 1993 not available in the required format.

Source: ACT Maternal Perinatal Data Collection.

2. Proportion of Indigenous mothers

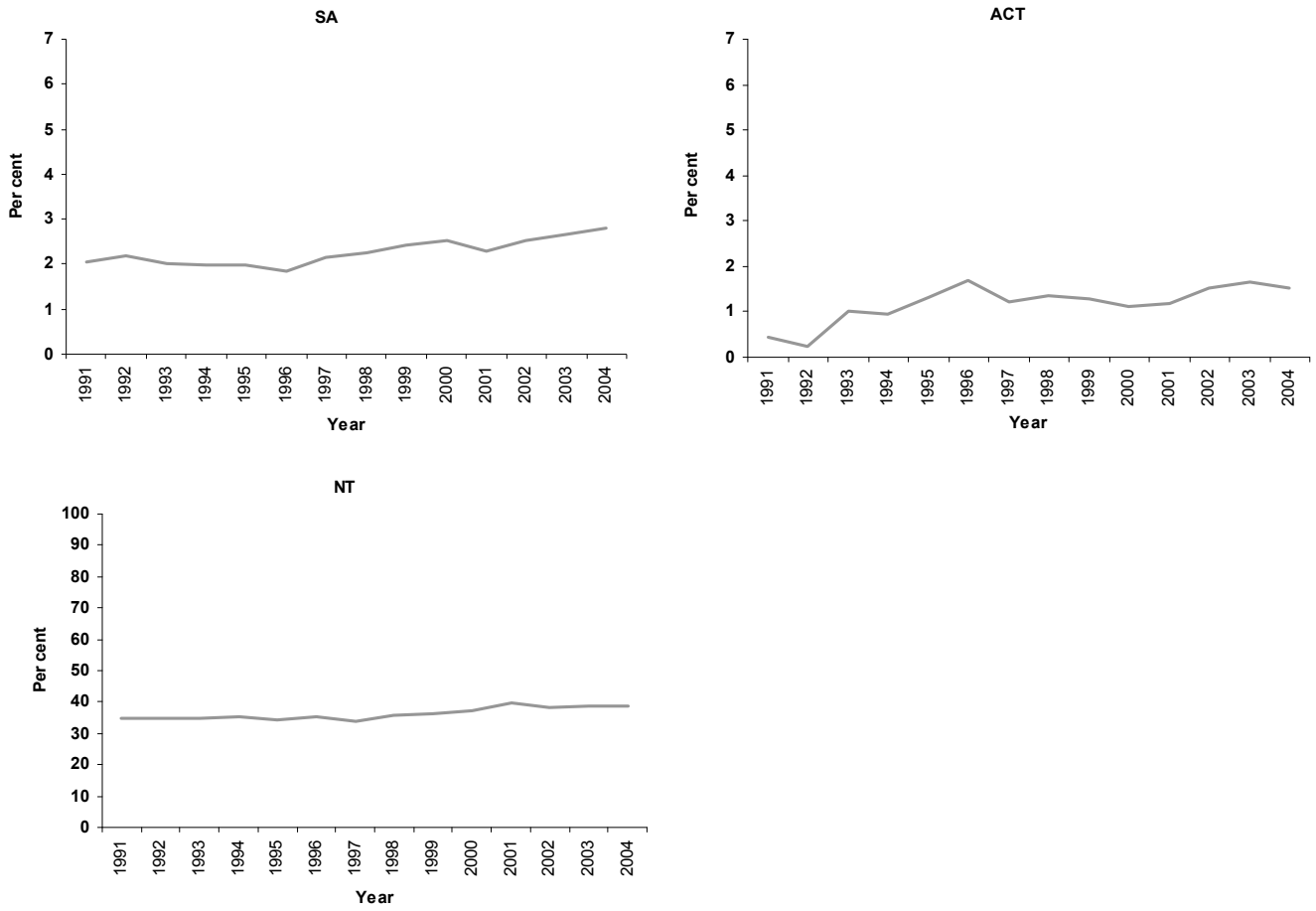
The proportion of women who gave birth and identified as Indigenous between 1991 and 2004 are presented by state and territory in Figures 5.1a and 5.1b.

Similar to the raw data provided in Table 5.3, the proportions of Indigenous mothers showed a variable pattern in the Australian Capital Territory over the period 1991–2004. There was less variation when only ACT-resident Indigenous mothers were considered (Table 5.4). In the other states and territories, the proportion of Indigenous mothers remained relatively stable over this period.



Source: AIHW NPSU National Perinatal Data Collection 2007.

Figure 5.1a: Proportions of Indigenous mothers, by state and territory, 1991 to 2004



Note: The scale used for the Northern Territory is different to that used for the other states and territories.

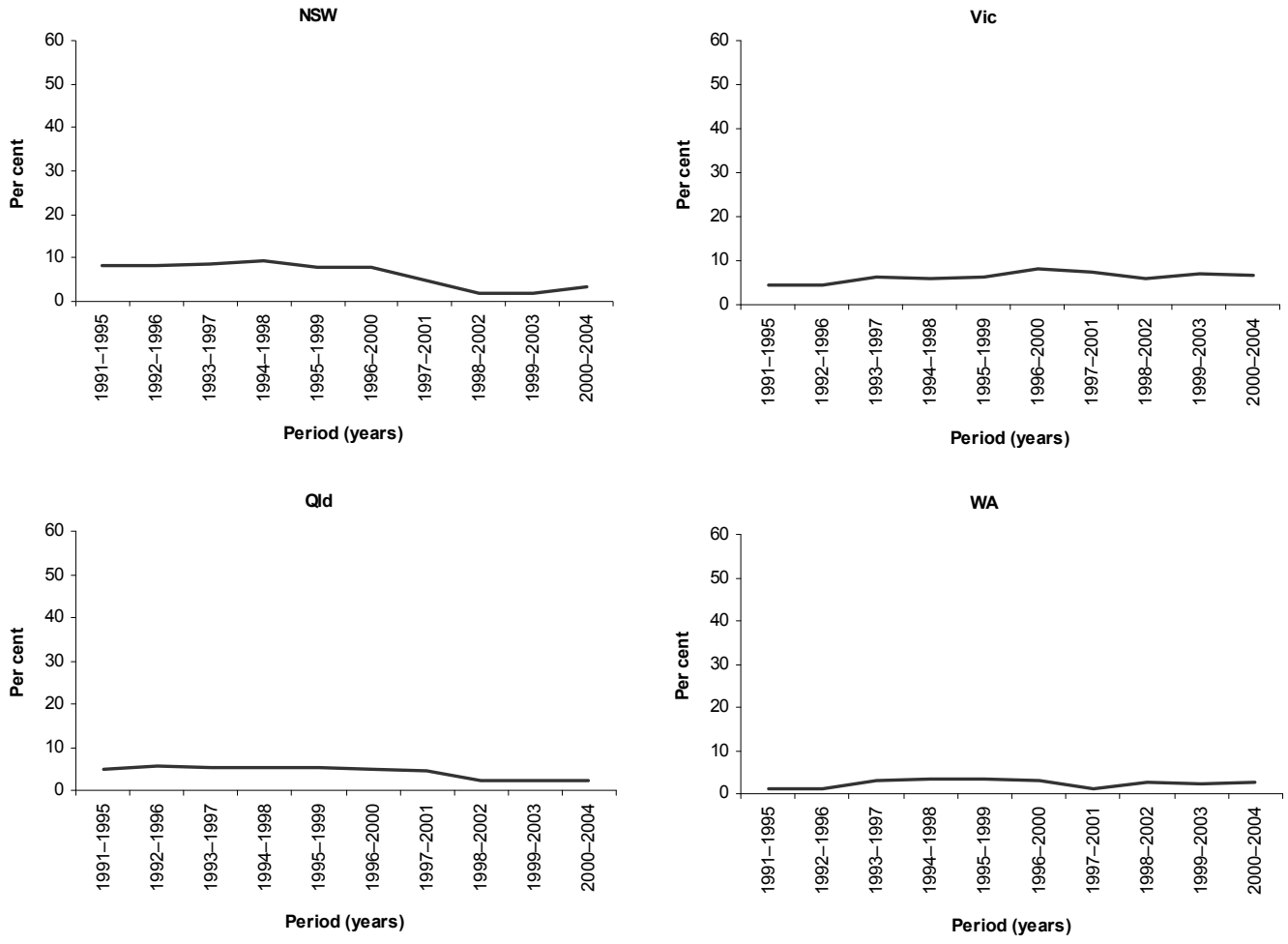
Source: AIHW NPSU National Perinatal Data Collection 2007.

Figure 5.1b: Proportions of Indigenous mothers, by state and territory, 1991 to 2004

3. Variability of the number of Indigenous mothers based on coefficient of variation

Over the period 1991–2004, the number of mothers identified as Indigenous was most variable in the Australian Capital Territory compared with other states and territories, although this has become more stable in later years. In Figure 5.2b, the coefficient of variation in the number of Indigenous mothers in the Australian Capital Territory decreased from 51% for the 5-year period 1991–1995 to 17% for the 5-year period 2000–2004. Among ACT resident mothers, the coefficient of variation was lower, remaining between 11% and 19% throughout the five-year periods between 1993–1997 and 2000–2004.

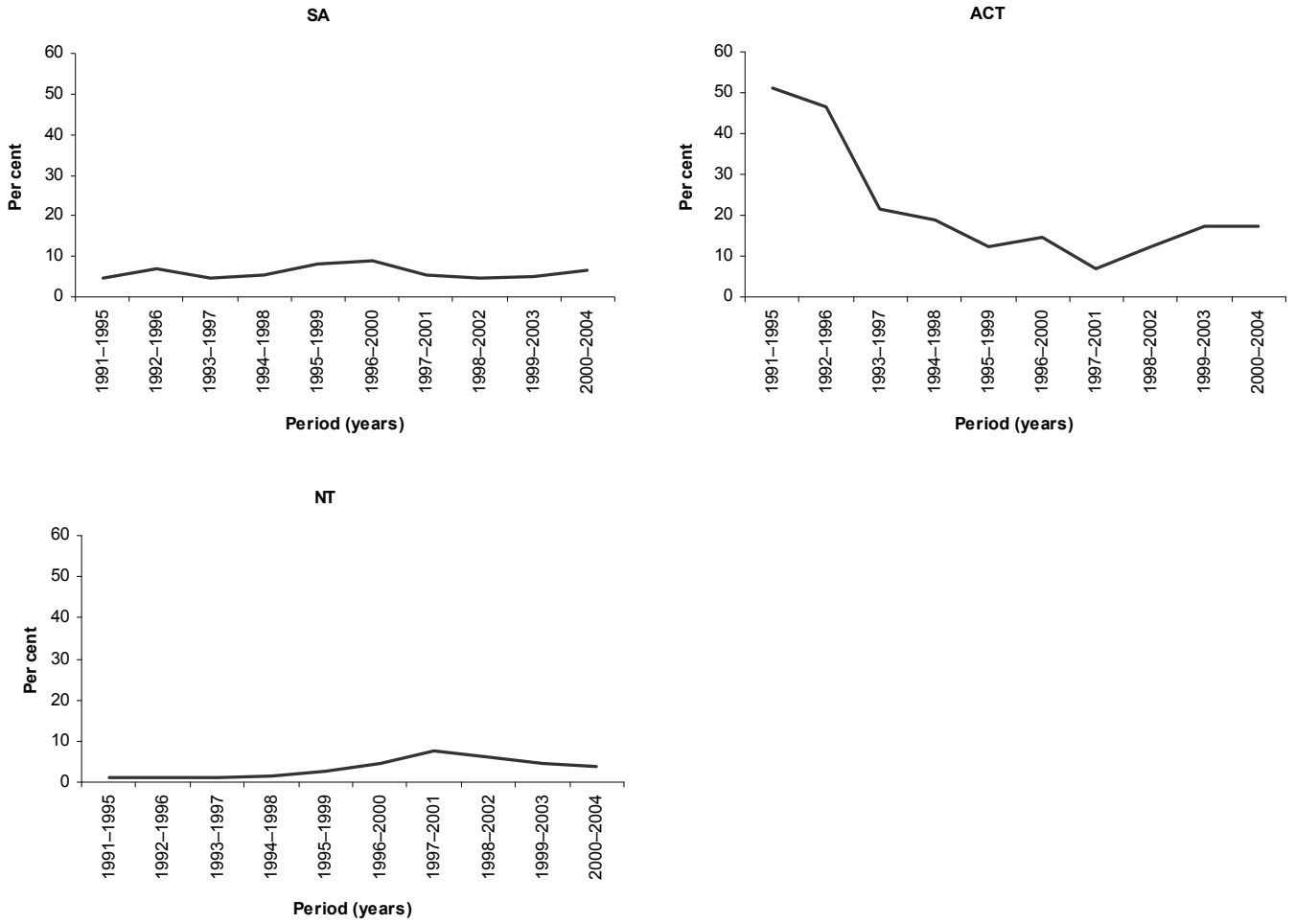
However, for the other six jurisdictions, the coefficient of variation stayed below 10%, showing stable time trends of the underlying data. Note that the small number of Indigenous women who gave birth in the Australian Capital Territory was likely to contribute to the high degree of variability observed from year to year in the Australian Capital Territory.



Note: Coefficient of variation was calculated based on the number of Indigenous mothers for every 5-year period from 1991–1995 to 2000–2004.

Source: AIHW NPSU National Perinatal Data Collection 2007.

Figure 5.2a: Coefficient of variation for the number of Indigenous mothers, by state and territory, 1991–1995 to 2000–2004



Note: Coefficient of variation was calculated based on the number of Indigenous mothers for every five-year period from 1991–1995 to 2000–2004.

Source: AIHW NPSU National Perinatal Data Collection 2007.

Figure 5.2b: Coefficient of variation for the number of Indigenous mothers, by state and territory, 1991–1995 to 2000–2004

Conclusions and recommendations on trend analysis of perinatal data

1. Choice of jurisdiction

Based on the analyses of the number and proportion of Indigenous mothers recorded over the period 1991–2004, perinatal data from New South Wales, Victoria, Queensland, Western Australia, South Australia and the Northern Territory showed little variability over this period. The Indigenous status of mothers recorded in the perinatal data collection in the Australia Capital Territory showed much greater variability than the other states and territories presented. Data for Tasmania were not included in this analysis because of data quality issues regarding the collection and recording of Indigenous status in the state's perinatal data collection. Tasmania also has great variability in its perinatal data, in terms of the proportion of mothers identified as Indigenous, over time (DHHS 2006).

Based on the analysis of the AIHW Perinatal Survey, Tasmania and the Australian Capital Territory rely heavily on the hospital database for obtaining the Indigenous status of women giving birth in hospital. According to an assessment of the quality of Indigenous status in hospitalisation data in 2005, Tasmania and the Australian Capital Territory do not have satisfactory Indigenous identification levels in their hospitalisation data (AIHW 2005). Findings from the Perinatal Survey also found that in these two jurisdictions, Indigenous status is not commonly checked or validated by midwives as is the case in most other states and in the Northern Territory.

It is therefore recommended that Tasmania and the Australian Capital Territory should be excluded from all trend analyses of Indigenous status in perinatal data. Only data from New South Wales, Victoria, Queensland, Western Australia, South Australia and the Northern Territory should be used.

2. Choice of time period

Based on analyses over the period 1991–2004, the number and proportion of Indigenous mothers recorded in the perinatal data collection were relatively stable over the entire period examined (i.e. there was no clear increase or decrease in the numbers from a specific year). It is therefore recommended that data from 1991 onwards may be used in the analyses of trends in perinatal data where Indigenous status is examined.

3. Analysis of perinatal data with 'not stated' Indigenous status

Over the period 1991–2004, mothers with a 'not stated' Indigenous status were included in the number of non-Indigenous mothers in, or before, 1999. Since the Indigenous status of a baby is determined by the Indigenous status of the mother, babies with a 'not stated' Indigenous status should be treated in the same way as mothers with a 'not stated' Indigenous status.

It is therefore recommended that to ensure comparability across time, perinatal data with a 'not stated' Indigenous status should be included in the 'non-Indigenous' category in time trend analysis for pre-1999 data when comparison between Indigenous and non-Indigenous

data is required. This recommendation will be reviewed after 2008, when 10 years of time series data are available where 'not stated' responses can be excluded.

Where to next

In order for the quality of Indigenous perinatal data to continue to improve in the future, midwives must ensure they ask all mothers their Indigenous status. If Indigenous status has already been recorded, such as when the data are taken from the hospital database or admission form, or the woman has given birth before, then this should be verified with the mother. Consistent validation of these data at a state/territory and national level will also assist in improving Indigenous status data quality in perinatal collections.

The Aboriginal and Torres Strait Islander Health and Welfare Unit within the AIHW is currently undertaking an audit of hospital data to assess the level of under-identification of Indigenous status in all jurisdictions. In addition, the unit is writing national best practice guidelines to improve the collection of Indigenous status information in six health data sets. The outcome of both projects should help improve the quality of information collected on the Indigenous population.

6 Trends

Summary

Although Indigenous mothers remain considerably younger than non-Indigenous mothers, there was a trend over the 1991–2004 period of increasing age of both Indigenous and non-Indigenous mothers (Table 6.1).

The age-standardised caesarean section rate increased significantly over time among both Indigenous and non-Indigenous mothers, but this increase was greater among non-Indigenous mothers. The caesarean section rate increased from 20% to 26% among Indigenous mothers compared with an increase from 19% to 29% among non-Indigenous mothers during the 1991–2004 period (Table 6.3).

The birth outcomes for babies born to Indigenous mothers continue to be poor when compared with babies born to non-Indigenous mothers. Although the proportion of low birthweight babies has been increasing over time for babies born to both Indigenous and non-Indigenous mothers, this increase has been greater among babies born to Indigenous mothers, with an average increase of around 1% per annum over the 1991–2004 period. In 2004, the proportion of low birthweight babies born to Indigenous mothers (12%) was more than double the proportion observed among babies born to non-Indigenous mothers (around 5%) (Table 6.4).

There was no change in the proportion of preterm babies born to both Indigenous and non-Indigenous mothers between 1991 and 2004. However, the proportion of preterm babies born to Indigenous mothers (between 10% and 12%) was consistently more than double the proportion seen among babies born to non-Indigenous mothers (around 5%) (Table 6.5).

The fetal death rate among babies born to Indigenous mothers decreased over the 1991–2004 period and remained stable among babies born to non-Indigenous mothers. Despite the decrease in Indigenous fetal deaths, in the period 2002–2004 the fetal death rate remained almost double among babies born to Indigenous mothers (11 per 1,000 births) when compared with babies born to non-Indigenous mothers (7 per 1,000 births) (Table 6.6).

Background

Based on the findings outlined in Chapter 5, data from six jurisdictions were considered to be of consistent quality for the analysis of Indigenous perinatal trends over the period 1991–2004. Data from New South Wales, Victoria, Queensland, Western Australia, South Australia and the Northern Territory were all assessed as suitable for inclusion in this analysis (see Chapter 5). Data from Tasmania and the Australian Capital Territory were excluded because of variation over time in Indigenous identification within these jurisdictions. Trends were analysed for maternal age, maternal age of first-time mothers, caesarean sections, low birthweight, preterm births and fetal deaths. These variables were selected because the data were of consistent quality over the reporting period. Perinatal death rates are not presented because the data are incomplete for neonatal deaths for some years.

Long-term trends for each of the variables presented in this chapter have been analysed by modelling trends throughout the period 1991–2004. A linear regression model has been used for the analysis of trends which takes into account all observations throughout the period and fits a line of best fit to the data. The average annual change occurring from year to year over the period has been calculated based on the fitted trend. When the 99% confidence intervals for the trend (p-value of less than 0.01) both lie above or below zero, the trend is characterised in subsequent text as a 'significant' increase or a 'significant' decline.

The trends analyses presented in this chapter on the proportion of mothers who have given birth by caesarean section have used age-standardised data. Age-standardisation allows for comparisons between populations which have different age structures, as is the case with Indigenous and non-Indigenous mothers. All age-standardised rates and rate ratios have been calculated using the direct standardisation method and 'all women who gave birth in Australia in 2001' has been used as the standard population. The Appendix contains further detail on these methods.

As discussed in Chapter 5, fluctuations in the proportion of Indigenous mothers over time may partly reflect changing levels of coverage of Indigenous mothers in the perinatal data. Therefore, caution should be used when assessing trends over time and when making comparisons with non-Indigenous mothers.

Maternal age

Table 6.1 presents the rate of Indigenous and non-Indigenous women who gave birth per 100 women in the reproductive population and the rate ratios of Indigenous and non-Indigenous mothers over the period 1991–2004.

The proportion of Indigenous women in the population who gave birth during the 1991–2004 period remained stable and the proportion of non-Indigenous women who gave birth over this period decreased significantly (Table 6.1). The fitted trend indicated an average yearly decrease of four non-Indigenous mothers per 10,000 population.

There was a trend towards increasing proportions of older mothers and decreasing proportions of younger mothers in both Indigenous and non-Indigenous mothers during the 1991–2004 period. Among Indigenous women, there was a significant decrease in the proportion of teenage mothers and a significant increase in the proportion of mothers aged 25–29 years, 30–34 years and 35 years and over.

Among non-Indigenous women, there was a significant decrease in teenage mothers and those aged 20–24 years and 25–29 years. There was a significant increase in the proportion of non-Indigenous mothers aged 30–34 years and 35 years and over.

The rate ratios between Indigenous and non-Indigenous mothers increased significantly for those aged less than 20 years, 20–24 years, 25–29 years and 30–34 years over the 1991–2004 period. The proportion of teenage mothers decreased among both Indigenous and non-Indigenous women; however, the decrease was greater for Indigenous teenage mothers (an average annual decrease of 0.13%) compared with non-Indigenous mothers (an average annual decrease of 0.04%). The proportion of Indigenous mothers aged 20–24 years did not change significantly over time but non-Indigenous mothers in this age group decreased significantly by a yearly average of 0.16%. The proportion of Indigenous mothers aged 25–29 years increased significantly (by an annual average of 14 mothers per 10,000

population) whereas the proportion of non-Indigenous mothers in this age group decreased (by an annual average of 24 mothers per 10,000 population).

The proportions of both Indigenous and non-Indigenous mothers aged 30–34 years increased significantly over the period; however, the increase was greater in Indigenous mothers.

Table 6.1: Rates (proportions)[(a)] and rate ratios of Indigenous and non-Indigenous mothers by maternal age, 1991 to 2004

Maternal age	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	Annual change[(b)]
								Indigenous rate per 100 women [(a)](%)							
Less than 20	10.0	9.9	9.4	10.2	9.9	9.5	9.8	9.3	9.5	9.4	8.9	8.7	8.5	8.1	–0.13
20–24	14.3	14.0	13.6	13.8	14.3	14.2	14.2	14.6	15.4	14.5	14.9	14.8	14.3	13.9	0.05
25–29	9.7	10.3	10.5	10.1	11.6	11.2	11.1	12.0	12.2	11.6	11.7	11.6	11.7	11.3	0.14*
30–34	5.6	6.0	6.1	5.8	5.8	6.3	6.3	7.5	7.2	7.4	7.5	7.2	7.2	7.5	0.16*
35 and over	1.4	1.6	1.5	1.5	1.6	1.7	1.7	2.0	2.0	2.2	1.9	2.2	2.1	2.3	0.07*
Total	**8.2**	**8.3**	**8.1**	**8.1**	**8.4**	**8.3**	**8.2**	**8.6**	**8.7**	**8.5**	**8.3**	**8.3**	**8.1**	**8.0**	**0.00**
								Non-Indigenous rate per 100 women [(a)](%)							
Less than 20	2.0	2.0	1.9	2.0	1.9	1.9	1.9	1.8	1.8	1.7	1.6	1.6	1.5	1.5	–0.04*
20–24	7.2	7.2	7.0	6.9	6.6	6.4	6.2	6.1	6.1	5.9	5.8	5.5	5.3	5.2	–0.16*
25–29	12.9	13.0	12.8	12.6	12.2	11.7	11.4	11.2	11.1	10.9	10.6	10.4	10.3	10.1	–0.24*
30–34	9.9	10.3	10.4	10.4	10.6	10.5	10.7	10.7	10.9	11.0	10.9	11.1	11.3	11.4	0.10*
35 and over	2.1	2.2	2.3	2.4	2.5	2.6	2.7	2.8	2.8	2.9	2.9	3.0	3.2	3.3	0.09*
Total	**6.2**	**6.3**	**6.2**	**6.2**	**6.2**	**6.0**	**6.0**	**6.0**	**6.0**	**5.9**	**5.8**	**5.8**	**5.8**	**5.8**	**–0.04***
								Rate ratio							
Less than 20	5.0	5.0	4.9	5.2	5.1	5.0	5.2	5.2	5.4	5.6	5.5	5.5	5.8	5.5	0.06*
20–24	2.0	1.9	1.9	2.0	2.2	2.2	2.3	2.4	2.5	2.5	2.6	2.7	2.7	2.7	0.07*
25–29	0.7	0.8	0.8	0.8	1.0	1.0	1.0	1.1	1.1	1.1	1.1	1.1	1.1	1.1	0.03*
30–34	0.6	0.6	0.6	0.6	0.5	0.6	0.6	0.7	0.7	0.7	0.7	0.6	0.6	0.7	0.01*
35 and over	0.7	0.7	0.7	0.6	0.6	0.6	0.6	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.00
Total	**1.3**	**1.3**	**1.3**	**1.3**	**1.4**	**1.4**	**1.4**	**1.4**	**1.5**	**1.4**	**1.4**	**1.4**	**1.4**	**1.4**	**0.01***

(a) Based on women aged 15–44 years in the population.

(b) Average annual change in number and proportion of mothers determined using linear regression analysis.

* Represents results with a statistically significant increase or decrease over the 1991–2004 period using 99% confidence intervals.

Note: Excludes data from Tasmania and the Australian Capital Territory.

Sources: AIHW NPSU National Perinatal Data Collection 2007; ABS population data.

Age of first-time mothers

Table 6.2 presents the rate of first-time Indigenous and non-Indigenous women who gave birth per 100 mothers and the rate ratios of Indigenous and non-Indigenous first-time mothers by maternal age, over the period 1991–2004.

The proportion of first-time Indigenous mothers did not change significantly over the 1991–2004 period. The proportion of first-time non-Indigenous mothers, however, increased significantly. The fitted trend indicated an average increase of 0.20 first-time non-Indigenous mothers per 100 mothers.

Analysing changes over time in the proportion of first-time mothers across the different age groups revealed a significant increase of Indigenous first-time teenage mothers between 1991 and 2004. The fitted trend implies an average increase of 0.36 first-time teenage Indigenous mothers per 100 Indigenous teenage mothers. First-time Indigenous mothers aged 20–24 years and 30–34 years also increased significantly between 1991 and 2004; an average increase of 0.26% and 0.17% per annum respectively.

Significant increases in the proportion of first-time mothers were also evident for older non-Indigenous mothers, as seen in the 25–29 year, 30–34 year and 35 years and over age groups. The fitted trends showed an average annual increase in these age groups of 0.48, 0.82 and 0.61 per 100 mothers respectively.

There was a significant increase in the rate ratios between Indigenous and non-Indigenous first-time mothers for those aged less than 20 years and 20–24 years over the 1991–2004 period, indicating that the proportion of Indigenous first-time mothers in these age groups has increased compared with the proportion of non-Indigenous mothers. The proportion of first-time teenage mothers increased significantly among Indigenous mothers (an average annual increase of 0.36%), but the increase was not significant for non-Indigenous teenage mothers. The proportion of non-Indigenous mothers aged 20–24 years did not change significantly over time, whereas Indigenous mothers in this age group increased significantly by a yearly average of 0.26%.

Table 6.2: Rates (proportions)[(a)] and rate ratios of Indigenous and non-Indigenous first-time mothers by maternal age, 1991 to 2004

Maternal age	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	Annual change[(b)]
								Indigenous rate per 100 women who gave birth (%)							
Less than 20	67.8	68.6	67.4	68.8	69.3	69.4	70.2	69.1	72.8	72.8	72.2	69.7	71.6	72.4	0.36*
20–24	25.6	25.4	24.7	25.9	25.7	26.2	28.1	25.8	27.2	24.9	26.8	27.6	28.8	29.6	0.26*
25–29	12.3	11.4	12.8	12.7	12.2	12.4	13.0	13.9	13.7	12.9	12.6	11.5	13.3	12.9	0.05
30–34	8.0	9.1	7.5	9.9	8.7	8.3	9.6	10.8	11.0	9.1	9.6	10.5	9.8	10.7	0.17*
35 and over	7.2	7.8	3.8	5.5	7.4	8.1	8.0	7.8	8.5	7.9	10.4	6.8	6.4	8.5	0.15
Total	**31.5**	**30.4**	**28.9**	**30.6**	**29.4**	**29.0**	**30.5**	**28.6**	**30.3**	**29.3**	**29.8**	**29.2**	**30.4**	**30.7**	**–0.03**
								Non-Indigenous rate per 100 women who gave birth (%)							
Less than 20	84.8	83.3	83.9	83.4	84.3	84.2	83.7	83.0	83.9	83.7	85.0	85.3	85.5	85.1	0.11
20–24	57.5	56.5	56.2	56.0	55.6	56.2	56.2	55.5	56.1	56.6	56.0	56.0	57.2	56.9	0.00
25–29	40.9	41.5	42.3	42.7	43.4	43.4	44.0	44.1	45.5	45.9	45.4	45.8	47.2	47.5	0.48*
30–34	26.4	27.0	27.9	28.7	29.2	29.6	30.6	31.3	32.5	33.6	34.4	34.9	35.9	37.0	0.82*
35 and over	19.8	19.9	20.0	21.0	21.1	21.5	22.5	23.5	24.0	24.9	25.4	25.8	26.5	27.3	0.61*
Total	**40.1**	**39.8**	**40.0**	**40.1**	**40.2**	**40.2**	**40.4**	**40.4**	**41.2**	**41.6**	**41.5**	**41.5**	**42.2**	**42.6**	**0.20***
								Rate ratio							
Less than 20	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.9	0.9	0.8	0.8	0.8	0.9	0.003*
20–24	0.4	0.4	0.4	0.5	0.5	0.5	0.5	0.5	0.5	0.4	0.5	0.5	0.5	0.5	0.005*
25–29	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	–0.002
30–34	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	–0.002
35 and over	0.4	0.4	0.2	0.3	0.4	0.4	0.4	0.3	0.4	0.3	0.4	0.3	0.2	0.3	–0.002
Total	**0.8**	**0.8**	**0.7**	**0.8**	**0.7**	**0.7**	**0.8**	**0.7**	**0.7**	**0.7**	**0.7**	**0.7**	**0.7**	**0.7**	**–0.004***

(a) Based on women who gave birth.

(b) Average annual change in number and proportion of mothers determined using linear regression analysis.

* Represents results with a statistically significant increase or decrease over the 1991–2004 period using 99% confidence intervals.

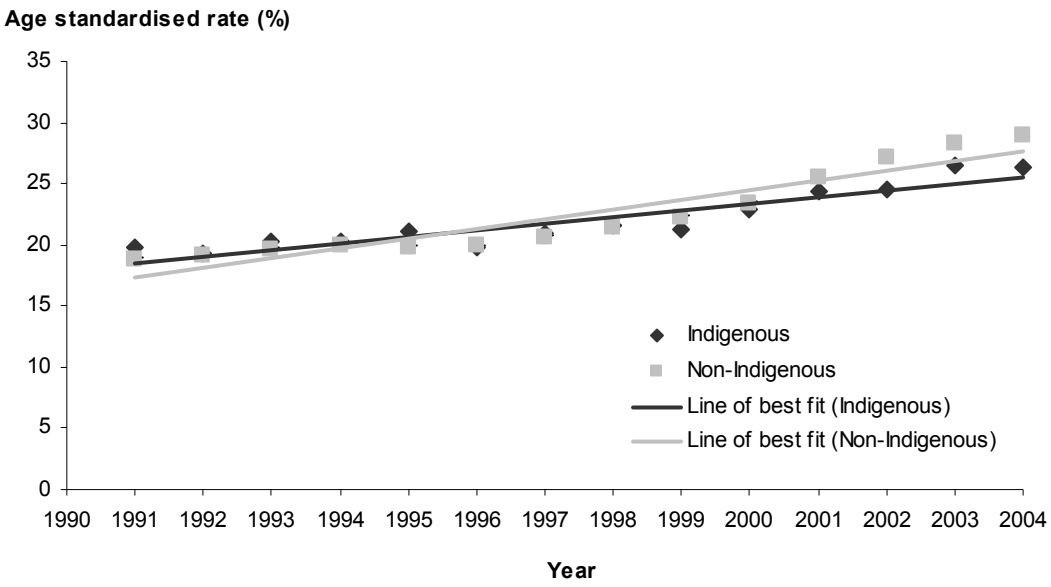
Note: Excludes data from Tasmania and the Australian Capital Territory.

Source: AIHW NPSU National Perinatal Data Collection 2007.

Caesarean sections

The caesarean section age-standardised rate has increased significantly over the 1991–2004 period among both Indigenous and non-Indigenous mothers (Figure 6.1). Rates were directly standardised to the 2001 population of women who gave birth in order to control for the effect of maternal age on the prevalence of caesarean sections.

The Indigenous age-standardised caesarean section rate increased from 20% in 1991 to 26% in 2004, an average annual increase of 0.54% per annum (Table 6.3). The caesarean section rate among non-Indigenous women increased at a greater rate over this same period. In 1991, 19% of non-Indigenous mothers had a caesarean section, increasing to 29% in 2004. This was an average annual increase of 0.8% per annum.



Notes

1. For multiple births, the method of birth of the first baby born was used.
2. Rates standardised to the population of women who gave birth in 2001.

Source: Table 6.3.

Figure 6.1: Age-standardised rate (proportion) of Indigenous and non-Indigenous women who gave birth by caesarean section, 1991 to 2004

Over the 1991–2004 period there was a significant decrease in the rate ratio between the age-standardised proportion of Indigenous and non-Indigenous mothers who had a caesarean section. This implies that the difference in the proportion of caesarean sections among Indigenous and non-Indigenous mothers has been significantly decreasing over time. The fitted trend shows an average annual decrease in the rate ratio of 0.01 per 100 mothers (Table 6.3).

Table 6.3: Age-standardised rate (proportion)[(a)] and rate ratios of Indigenous and non-Indigenous women who gave birth by caesarean section, 1991 to 2004

	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	Annual change[(b)]
Age-standardised rate per 100 women who gave birth (%)															
Indigenous	19.8	19.4	20.2	20.2	21.1	19.8	20.9	21.5	21.2	22.8	24.4	24.6	26.5	26.4	0.54*
Non-Indigenous	18.8	19.1	19.7	20.0	19.9	19.9	20.6	21.4	22.2	23.5	25.5	27.1	28.3	29.0	0.80*
Rate ratio	**1.1**	**1.0**	**1.0**	**1.0**	**1.1**	**1.0**	**1.0**	**1.0**	**1.0**	**1.0**	**1.0**	**0.9**	**0.9**	**0.9**	**–0.01***

(a) Standardised to the population of women who gave birth in 2001.

(b) Average annual change in number and proportion of mothers determined using linear regression analysis.

* Represents results with a statistically significant increase or decrease over the 1991–2004 period using 99% confidence intervals.

Note: Excludes data from Tasmania and the Australian Capital Territory.

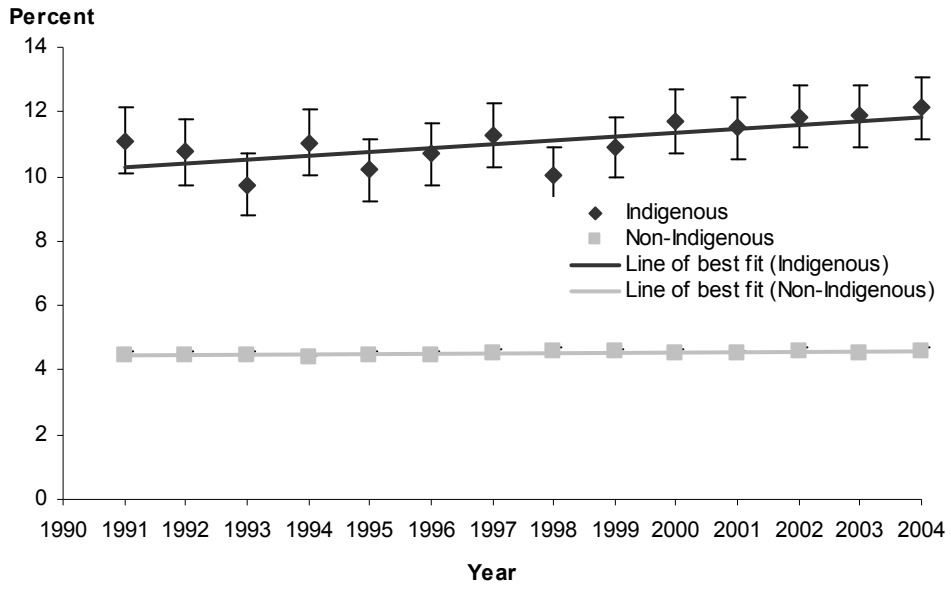
Source: AIHW NPSU National Perinatal Data Collection 2007.

Birthweight

Figure 6.2 shows the trend in low birthweight of singleton liveborn babies over the period 1991–2004 by Indigenous status. Over the 14-year period, the proportion of low birthweight babies (i.e. less than 2,500 grams) increased significantly for babies born to both Indigenous and non-Indigenous mothers.

The proportion of low birthweight babies born to non-Indigenous mothers increased slightly from 4.5% in 1991 to 4.6% in 2004; however, this increase was significant, with an average yearly increase of 0.01 per 100 live births (Table 6.4).

The proportion of low birthweight babies born to Indigenous mothers increased at a greater rate and remained more than double the proportion seen among babies born to non-Indigenous mothers over the 1991–2004 period. In 1991, 11% of babies born to Indigenous mothers were of low birthweight. This increased to 12% in 2004, an average yearly increase of 0.12 per 100 liveborn babies.



Note: Error bars represent 99% confidence intervals.

Source: Table 6.4.

Figure 6.2: Proportion of low birthweight singleton live babies born to Indigenous and non-Indigenous mothers, 1991 to 2004

Over the 1991–2004 period there was a significant increase in the rate ratio between the proportion of low birthweight babies born to Indigenous and non-Indigenous mothers. This implies that the proportion of low birthweight babies born to Indigenous mothers compared with non-Indigenous mothers has been increasing significantly over time. The fitted trend shows an average annual increase in the rate ratio of 0.02 (Table 6.4).

Table 6.4: Rates (proportion) and rate ratios of low birthweight babies[(a)] born to Indigenous and non-Indigenous mothers, 1991 to 2004

	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	Annual change[(b)]
Age-standardised rate per 100 births (%)															
Indigenous	11.1	10.8	9.7	11.0	10.2	10.7	11.3	10.0	10.9	11.7	11.5	11.8	11.9	12.1	0.12*
Non-Indigenous	4.5	4.4	4.5	4.4	4.5	4.5	4.5	4.6	4.6	4.5	4.5	4.6	4.5	4.6	0.01*
Rate ratio	**2.5**	**2.4**	**2.2**	**2.5**	**2.3**	**2.4**	**2.5**	**2.2**	**2.4**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**0.02***

(a) Includes liveborn singleton babies only.

(b) Average annual change in number and proportion of mothers determined using linear regression analysis.

* Represents results with a statistically significant increase or decrease over the 1991–2004 period using 99% confidence intervals.

Note: Excludes data from Tasmania and the Australian Capital Territory.

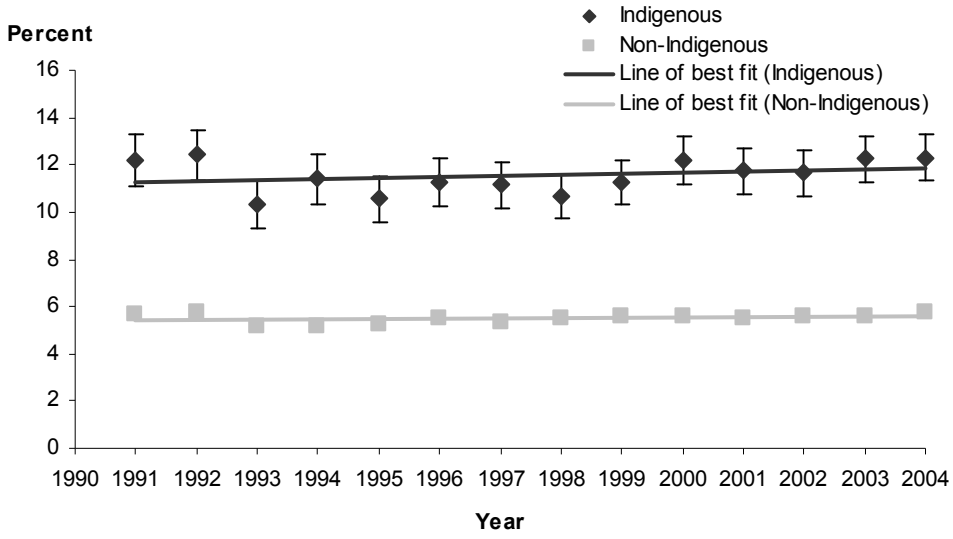
Source: AIHW NPSU National Perinatal Data Collection 2007.

Gestational age

Over the 14-year period 1991–2004, the proportion of liveborn singleton preterm babies (i.e. less than 37 weeks gestation) did not change for babies born to either Indigenous mothers or non-Indigenous mothers (Figure 6.3). The fitted trend implies an average annual increase of 0.05% for babies born to Indigenous mothers and 0.02% for babies born to non-Indigenous mothers, but neither increase was statistically significant (Table 6.5).

The proportion of preterm babies born to Indigenous mothers was consistently more than double the proportion of preterm babies born to non-Indigenous mothers over time. The proportion of preterm babies born to Indigenous mothers varied from 10% to 12% over the 1991–2004 period. The proportion of preterm babies born to non-Indigenous mothers remained between 5% and 6% over the 1991–2004 period (Table 6.5).

There was no change over time in the rate ratio between the proportion of preterm babies born to Indigenous and non-Indigenous mothers (Table 6.5)



Note: Error bars represent 99% confidence intervals.

Source: Table 6.5.

Figure 6.3: Rates (proportions) of preterm singleton live babies born to Indigenous and non-Indigenous mothers, 1991 to 2004

Table 6.5: Rates (proportion) and rate ratios of preterm babies[(a)] born to Indigenous and non-Indigenous mothers, 1991 to 2004

	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	Annual change[(b)]
Age-standardised rate per 100 births (%)															
Indigenous	12.2	12.4	10.3	11.4	10.6	11.2	11.2	10.7	11.2	12.2	11.7	11.7	12.2	12.3	0.05
Non-Indigenous	5.6	5.8	5.2	5.1	5.2	5.5	5.4	5.5	5.6	5.6	5.5	5.6	5.6	5.8	0.02
Rate ratio	**2.2**	**2.2**	**2.0**	**2.2**	**2.0**	**2.0**	**2.1**	**1.9**	**2.0**	**2.2**	**2.1**	**2.1**	**2.2**	**2.1**	**0.00**

(a) Includes liveborn singleton babies only.

(b) Average annual change in number and proportion of mothers determined using linear regression analysis.

Note: Excludes data from Tasmania and the Australian Capital Territory.

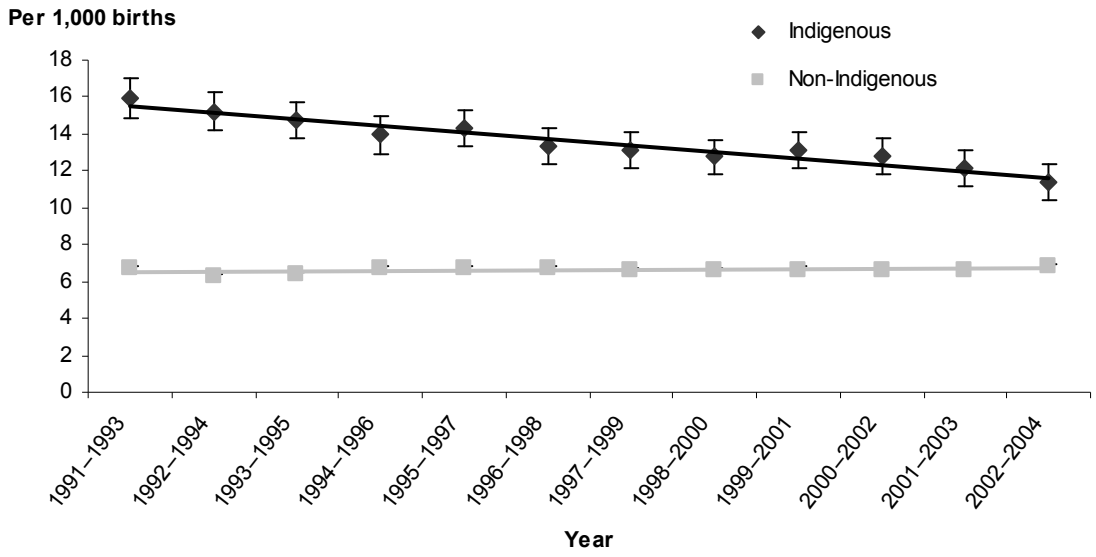
Source: AIHW NPSU National Perinatal Data Collection 2007.

Fetal deaths

Figure 6.4 shows the trend in fetal deaths per 1,000 births for babies born to Indigenous and non-Indigenous mothers over the 1991–1993 to 2002–2004 periods. Perinatal death rates have not been presented because the data are incomplete for neonatal deaths for some years. Because of the small number of fetal deaths among babies born to Indigenous mothers and the instability in these fetal deaths over time, 3-year moving averages were calculated. As year groupings overlapped, linear regression could not be used when analysing the fetal death trend.

Fetal death rates decreased over time among babies born to Indigenous mothers, from 16 deaths per 1,000 births in 1991–1993 to 11 deaths per 1,000 births in 2002–2004 (Table 6.6). Despite the decrease in fetal deaths among babies born to Indigenous mothers, the rate remained almost double that of the fetal death rate for babies born to non-Indigenous mothers in 2002–2004.

The fetal death rate decreased between 1991–1993 and 2002–2004 for babies born to Indigenous mothers; the rate for babies born to non-Indigenous mothers remained stable over time, at around 6 fetal deaths per 1,000 births.



Note: Error bars represent 99% confidence intervals.

Source: Table 6.6.

Figure 6.4: Fetal death rate (per 1,000 births) for babies born to Indigenous and non-Indigenous mothers, 1991–1993 to 2002–2004

Over the 1991–1993 to 2002–2004 period there was a decrease in the rate ratio between the rate of fetal deaths among babies born to Indigenous and non-Indigenous mothers. This implies that the rate of fetal deaths among babies born to Indigenous mothers compared with non-Indigenous mothers has been decreasing over time (Table 6.6).

Table 6.6: Fetal deaths per 1,000 births to Indigenous and non-Indigenous mothers, 1991–1993 to 2002–2004

	1991–1993	1992–1994	1993–1995	1994–1996	1995–1997	1996–1998	1997–1999	1998–2000	1999–2001	2000–2002	2001–2003	2002–2004	Average change[(a)]
Indigenous	15.9	15.2	14.8	14.0	14.3	13.3	13.1	12.7	13.1	12.8	12.1	11.4	-0.35*
Non-Indigenous	6.7	6.3	6.4	6.7	6.8	6.7	6.7	6.6	6.7	6.6	6.6	6.9	0.02
Rate ratio	**2.4**	**2.4**	**2.3**	**2.1**	**2.1**	**2.0**	**2.0**	**1.9**	**2.0**	**1.9**	**1.8**	**1.7**	**-0.06***

Note: Excludes data from Tasmania and the Australian Capital Territory.

Source: AIHW NPSU National Perinatal Data Collection 2007.

Appendix: Technical and explanatory notes

Technical notes

Age-standardised rate ratios

In this report, age-standardised rate ratios, using the direct method of standardisation, were reported in Table 2.4 and Table 6.3. The standard population used was all women who gave birth in Australia in 2001.

The direct age-standardised method involves the following steps:

1. Calculate the age-specific rates for each age group. This is done by dividing the number of cases in each specified age group by the corresponding population in that age group. Multiply by 100 to express as a rate per 100.
2. Multiply each age-specific rate by the corresponding standard population in that age group.
3. Sum the results for each age group from Step 2 and divide this sum by the total standard population to obtain the age-standardised rate per 100.

Age-standardised rate ratios were calculated by dividing the Indigenous age-standardised rate by the non-Indigenous age-standardised rate. An age-standardised rate ratio of 1.0 indicates that Indigenous mothers had a rate similar to that of non-Indigenous mothers. An age-standardised rate ratio of 1.2 indicates that Indigenous mothers had a rate that was 20% higher than the rate for non-Indigenous mothers. An age-standardised rate ratio of 0.8 indicates that Indigenous mothers had a rate that was 20% lower than the rate for non-Indigenous mothers.

Geographical location of usual residence

Data on remoteness area of usual residence are presented throughout Chapters 3 and 4. The data used in these tables were derived from data supplied by the states and territories on the area of usual residence of the mother. The area of usual residence is usually defined as the state or territory and Statistical Local Area (SLA, a small unit within the ABS's Australian Standard Geographical Classification (ASGC)). Although data for most mothers included the state or territory of usual residence, not all states and territories were able to provide this information in the form of an SLA code.

The AIHW NPSU mapped the supplied area of usual residence information for each mother to remoteness area categories in the ASGC remoteness structure using a concordance between postcode and ASGC remoteness structure developed by the ABS. Postcode was used because this was available for all states and territories. This was done on a probabilistic basis, as necessary, using ABS concordance information describing the distribution of the population by postcode and remoteness area. Because of the probabilistic nature of this

mapping, the remoteness area data for individual mothers may not be accurate; however, the overall distribution of mothers by geographical areas is considered useful.

Records for mothers not usually resident in Australia and those whose area of usual residence was 'Not stated' were excluded from the tables.

Socioeconomic status

Data on socioeconomic status are presented throughout Chapters 3 and 4. Socioeconomic Indexes for Areas (SEIFA) provide a summary measure for the socioeconomic conditions within an area. SEIFA were derived from the mother's postcode of usual residence because this was available for all states and territories. The index of advantage/disadvantage, which provides a continuum of advantage to disadvantage, was used. Low values indicate areas of disadvantage and high values indicate areas of advantage.

For 2001–2004, there were 598 records (1.7%) for which an index of advantage/disadvantage was not able to be assigned (Table 3.3). This was because the record was either missing a postcode or did not have a valid postcode.

Linear regression

Linear regression was used for the analysis of trends in Chapter 6. Linear regression uses the least squares method to calculate a straight line that best fits the data and returns an array that best describes the line.

The simple linear regression line, $Y = a + bX$, is normally determined as an estimate from a collection of sample data values consisting of X values in the scope of the experiment and the corresponding Y values observed. One common way of estimating the line is the method of least squares. The goal of this method is to create a line that minimizes the summation of the residual error squared. The residual error values are the distances of each sample data point from the resulting best fit line.

Let us use ei to represent each residual error squared, yi to represent each observed value of y, and $\hat{y}i$ to represent the value of Y on the estimated line for each yi. The method of least squares involves minimising $\Sigma ei = \Sigma(yi - \hat{y}i)^2$. This is done using partial derivatives, which yield the following formulas for a(y intercept estimate) and b(slope estimate):

$b = (n\Sigma xiyi - (\Sigma xi)(\Sigma yi)) / (n\Sigma xi2 - (\Sigma xi)^2)$

$a = (\Sigma yi - b\Sigma xi) / n$

The slope estimate is the average annual change in the data over the period and was used in this report to determine whether there was an increase or decrease in the observed trends in perinatal data over the period 1991–2004. The standard error of the slope estimate was used to determine whether the apparent increases or decreases in the data were statistically significant at the $p < 0.01$ level.

The formula used to calculate the slope estimate in Microsoft Excel is:

LINEST (known_y's, known_x's,, true) entered as an array formula.

Explanatory notes

This report does not publish cell sizes of three or less in state and territory tables. Exceptions to this are small numbers in 'Other' and 'Not stated' categories. The Australian Capital Territory requested that most cells where the number is less than 5 be suppressed. Where n.p. (not published) has been used to protect confidentiality, the suppressed numbers are included in the totals.

Throughout the report, for totals, percentages may not add up to 100, and for subtotals they may not add up to the sum of the percentages for the categories. This is due to rounding.

In this report the number of babies is marginally higher than the number of mothers because of multiple births. The terms 'mothers' or 'women who gave birth' have been used in this report when referring to maternal characteristics, whereas 'births' refers to babies.

For multiple pregnancies, items presented for mothers which may be different for each baby, such as place of birth and gestational age, are classified according to the characteristics of the firstborn baby. Where these items are presented for babies, each baby of a multiple birth is assigned the value of the firstborn baby.

Glossary

Aboriginal mothers: women who gave birth who identified themselves as being of Aboriginal origin. May also include mothers identified as being of both Aboriginal and Torres Strait Islander origin.

Aboriginal or Torres Strait Islander mothers: women who gave birth who identified themselves as being of Aboriginal or Torres Strait Islander origin, or both.

Apgar score: numerical score used to indicate the baby's condition at 1 minute and 5 minutes after birth.

Assisted vaginal/instrumental delivery: vaginal delivery using forceps or vacuum extraction.

Augmentation of labour: intervention during labour to assist the progress of labour.

Baby's length of stay: number of days between date of birth and date of separation from the hospital of birth (calculated by subtracting the date of birth from the date of separation).

Birth status: status of the baby immediately after birth.

Birthweight: the first weight of the baby (stillborn or liveborn) obtained after birth (usually measured to the nearest 5 grams and obtained within 1 hour of birth).

Caesarean section: operative birth by surgical incision through the abdominal wall and uterus.

Confidence interval: a range of values for a variable of interest with a specified probability of including the true value of the variable.

Fetal death (stillbirth): death before the complete expulsion or extraction from its mother of a fetus of 20 or more completed weeks of gestation or of 400 grams or more birthweight. The death is indicated by the fact that after such separation the fetus does not breathe or show any other evidence of life, such as beating of the heart, pulsation of the umbilical cord, or definite movement of voluntary muscles.

Forceps: metallic obstetric instrument used to assist birth.

Gestational age: the duration of pregnancy in completed weeks calculated from the date of the first day of a woman's last menstrual period and her baby's date of birth, or via ultrasound, or derived from clinical assessment during pregnancy or from examination of the baby after birth.

Indigenous mothers: women who gave birth who identified themselves as being of Aboriginal or Torres Strait Islander origin, or both.

Induction of labour: intervention to stimulate the onset of labour.

Live birth: the complete expulsion or extraction from its mother of a fetus, irrespective of the duration of the pregnancy, which, after such separation, breathes or shows any other evidence of life, such as beating of the heart, pulsation of the umbilical cord, or definite movement of voluntary muscles, whether or not the umbilical cord has been cut or the placenta is attached; each product of such a birth is considered liveborn (WHO definition).

Low birthweight: birthweight of less than 2,500 grams.

Maternal age: mother's age in completed years at the birth of her baby.

Mother's length of stay: number of days between admission date (during the admission resulting in a birth) and separation date (from the hospital where birth occurred). The interval is calculated by subtracting the date of admission from the date of separation.

Multipara: pregnant woman who has had at least one previous pregnancy resulting in a live birth or stillbirth.

Neonatal death: death of a liveborn baby within 28 days of birth.

Parity: number of previous pregnancies resulting in live births or stillbirths, excluding the current pregnancy.

Perinatal death: a fetal or neonatal death of at least 20 weeks gestation or at least 400 grams birthweight.

Plurality: the number of births resulting from a pregnancy.

Presentation at birth: the part of the fetus that appears first at the mouth of the uterus during labour.

Preterm birth: birth before 37 completed weeks of gestation.

Primipara: pregnant woman who has had no previous pregnancy resulting in a live birth or stillbirth.

Spontaneous vaginal: birth without intervention in which the baby's head is the presenting part.

Stillbirth: see Fetal death.

Teenage mother: mother aged less than 20 years at the birth of her baby.

Torres Strait Islander mothers: women who gave birth who identified themselves as being of Torres Strait Islander origin. May also include mothers identified as being of both Torres Strait Islander and Aboriginal origin.

Vacuum extraction: assisted birth using a suction cap applied to the baby's head.

Vaginal breech: vaginal birth in which the baby's buttocks or lower limbs are the presenting parts.

Vertex presentation: The most common and safest birth position where the baby's head is the presenting part.

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