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Birthweight of babies born to Indigenous mothers

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Authoritative information and statistics to promote better health and wellbeing

Birthweight of babies born to Indigenous mothers

Australian Institute of Health and Welfare
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Abbreviations

ABS	Australian Bureau of Statistics
ACT	Australian Capital Territory
AIHW	Australian Institute of Health and Welfare
ICG	Indigenous and Children's Group
NACCHO	National Aboriginal Community Controlled Health Organisation
NAGATSIHID	National Advisory Group on Aboriginal and Torres Strait Islander Health Information and Data
NMDS	National Minimum Data Set
NPDC	National Perinatal Data Collection
NSW	New South Wales
NT	Northern Territory
Qld	Queensland
SA	South Australia
SEIFA	Socio-Economic Indexes for Areas
Tas	Tasmania
Vic	Victoria
WA	Western Australia

Symbols

*	statistically significant difference at $p<0.05$
–	nil or rounded to zero
. .	not applicable
n.a.	not available
n.p.	not publishable because of small numbers, confidentiality or other concerns about the quality of the data

Summary

Almost 4% of all babies born in 2011 were to Indigenous mothers

In 2011, a total of 11,729 Indigenous mothers gave birth to 11,895 babies according to data from the National Perinatal Data Collection. These babies represented 3.9% of all births in 2011. Nearly all (99%) births to Indigenous mothers in 2011 were live births (rather than stillborn); this is the same proportion as for births to non-Indigenous mothers.

Newborns of Indigenous mothers were twice as likely to be of low birthweight

In 2011 and considering liveborn babies only:

- 12.6% of babies born to Indigenous mothers were of low birthweight (less than 2,500 grams), 86.0% were of normal birthweight (between 2,500 grams and 4,499 grams) and 1.4% were of high birthweight (4,500 grams or more)
- Indigenous mothers were twice as likely as non-Indigenous mothers to have babies of low birthweight (12.6% and 6.0% respectively)
- excluding multiple births, 11.2% of singleton babies born to Indigenous mothers were of low birthweight—2.5 times the rate for non-Indigenous mothers (4.6%)
- on average, the birthweight of singleton babies of Indigenous mothers (3,215 grams) was 191 grams lower than that of babies born to non-Indigenous mothers (3,406 grams).

Gap in birthweight has narrowed over a decade

Between 2000 and 2011, there was a statistically significant decrease in the low birthweight rate among liveborn singleton babies of Indigenous mothers, with the rate declining by 9% over the period (or by 0.1 low birthweight babies per 100 live births annually).

In contrast, there was no significant change in the corresponding rate for non-Indigenous mothers. As such, there was a statistically significant narrowing of the gap in the rate for Indigenous and non-Indigenous mothers between 2000 and 2011.

Decline in rate of pre-term births to Indigenous mothers and smoking during pregnancy

A wide range of factors are associated with birthweight, including pre-term births and maternal smoking during pregnancy. In 2011, 12.5% of liveborn babies of Indigenous mothers were born pre-term, as were 7.5% of babies born to non-Indigenous mothers. Between 2000 and 2011, the rate of pre-term births among liveborn singleton babies of Indigenous mothers declined (by 7%), and the Indigenous to non-Indigenous gap in the pre-term birth rate narrowed significantly.

Half (50%) of all Indigenous mothers who gave birth in 2011 reported smoking during pregnancy, as did 12% of non-Indigenous mothers. Smoking during pregnancy declined between 2005 and 2011, but improvement was greater among non-Indigenous mothers (25% drop) than Indigenous mothers (6% drop).

Indigenous babies

While the focus of this paper is on national data about the birthweight of babies born to Indigenous *mothers*, data about Indigenous *babies* are available for 6 jurisdictions for 2011. Of all liveborn Indigenous babies born in 2011 in the 6 jurisdictions, 11.5% were of low birthweight. National data about Indigenous babies will be available from 2012 onwards.

1 Introduction

Aboriginal and Torres Strait Islander babies are more likely than other babies to be of low birthweight. Low birthweight is associated with a range of short- and long-term adverse health outcomes, including fetal and neonatal death and morbidity, inhibited growth and cognitive development, and the development of chronic diseases later in life (Goldenberg & Culhane 2007; UNCF & WHO 2004; Wilcox 2001). For this reason, low birthweight is a commonly used public health indicator.

Many factors are known to affect fetal growth and the duration of the pregnancy and, in turn, the risk of low birthweight. These include factors related to the parents—particularly the mother (for example, maternal age, nutritional status and smoking) (Basso et al. 1999; Shah 2009; UNCF & WHO 2004). Other factors associated with low birthweight include the number of fetuses (singleton or multiple), characteristics of the infant (for example, sex), and medical care (such as antenatal care) (Ohlsson & Shah 2008; UNCF & WHO 2004).

Relatively high birthweight also carries risks. It is associated with:

- a number of maternal complications, such as a higher risk of requiring an emergency caesarean section
- perinatal complications—including damage to nerves around the shoulder (brachial plexus injury), a fractured collarbone (clavicular fracture) and birth asphyxia
- a higher rate of neonatal mortality (that is, death during the first 28 days of life) (Hong et al. 2009).

There is also evidence that high birthweight is associated with some adverse long-term health outcomes, including certain types of chronic diseases (Hadfield et al. 2009). Risk factors for high birthweight include maternal obesity and diabetes (both gestational and pre-gestational) (Ellerbe et al. 2013; Ng et al. 2010; Ray et al. 2001).

1.1 Categorising birthweight

According to the World Health Organization, a low birthweight baby is one with a weight of less than 2,500 grams (UNCF & WHO 2004). This cut-off is based on research that indicates that babies weighing less than 2,500 grams at birth are at least 20 times as likely to die within their first year of life than those who weighed at least 2,500g (MacDorman & Atkinson 1999).

The cut-off for high birthweight has been set variously at: 4,000 grams, 4,200 grams, 4,500 grams and 5,000 grams (AIHW 2014b; Henriksen 2008; Hong et al. 2009). While there is no international consensus on which cut-off should be used, a birthweight of 4,500 grams or more has been widely adopted because research suggests substantially increased risk of adverse outcomes for babies with this birthweight (Hong et al. 2009). This is the cut-off indicated in the National Health Data Dictionary standard for birthweight (AIHW 2012).

Birthweight categories used in this paper are outlined in Box 1.1. Note that these categories do not take into account gestational age. Low birthweight babies may:

- have been born pre-term (that is, before 37 weeks of gestation)
- be smaller than expected given the duration of the pregnancy—which is referred to as 'small-for-gestational age', or
- a combination of the two.

Pre-term births and small-for-gestational age births have different causes and some of the consequences for the health of infants also differ (Kramer 2003).

Similarly, high birthweight babies can be either large-for-gestational age or large but of an appropriate weight for their gestational age.

Birthweight percentiles provide a reference that incorporates weight and gestational age of infants at birth, with small-for-gestational age and large-for-gestational age typically defined as a birthweight below/above the 90th percentile for gestation, respectively. Updated Australian birthweight percentiles have recently been published (Dobbins et al. 2012). However, there is currently no agreed national indicator of either low or high birthweight standardised according to gestational age.

Box 1.1: Categorising birthweight

In this paper, birthweight is categorised as follows:

- very low birthweight: less than 1,500 grams
- low birthweight: less than 2,500 grams
- normal birthweight: 2,500 to 4,499 grams
- high birthweight: 4,500 grams or more.

Sources: AIHW 2012; WHO 1992.

1.2 Purpose and structure of this paper

The purpose of this paper is to provide an overview of the birthweight of babies born to Indigenous mothers, including recent trends and factors associated with birthweight variation. This paper focuses on low birthweight because of its increased risk of infant morbidity and mortality, and its relatively high occurrence among the Indigenous population. Nonetheless, some information about high birthweight is also provided.

Section 2 presents an overview of the number of births in Australia, with a focus on births to Indigenous mothers.

Section 3 presents information on the birthweight of babies born to Indigenous mothers and, for comparison purposes, to non-Indigenous mothers, including:

- distribution of birthweight in 2011 for all live births and for singleton (as opposed to twin or other multiple) live births (Section 3.1)
- trends in low, high and average birthweight over the period 2000 to 2011 (Section 3.2).

While the focus of this paper is babies born to Indigenous *mothers*, Section 3 also provides some information about the birthweight of Indigenous *babies*. (See Section 1.3 for information on what data are available about the birthweight of Indigenous babies.)

Section 4 presents information on selected risk factors for low birthweight including: pre-term births, maternal smoking, antenatal care, and other factors (for example, age of the mother and socioeconomic status).

1.3 Data source

The data in this report come from the National Perinatal Data Collection (NPDC)—a national collection of pregnancy and childbirth data. The data in the collection are sourced from notification forms filled out for each birth by midwives and other staff, using information obtained from mothers and from hospital or other records. This information is collated within the perinatal collection maintained in each state and territory. An extract from each jurisdictional data collection is supplied to the Australian Institute of Health and Welfare (AIHW) to form the NPDC. This extract consists of an agreed set of standardised data items as specified in the Perinatal National Minimum Data Set (NMDS), as well as additional data items.

The NPDC includes information about the Indigenous status of *mothers* who gave birth in the reporting period. It does not contain any information about the Indigenous status of the *father*. According to Australian Bureau of Statistics (ABS) data on birth registrations in 2011, 73% of Indigenous births (defined as births where either one or both parents are Indigenous) were to Indigenous mothers (ABS 2013b). Data presented on Indigenous mothers are influenced by the quality and completeness of Indigenous identification, which may vary over time and across jurisdictions.

In addition to information about the birthweight of babies born to Indigenous *mothers*, there is interest in the birthweight of Indigenous *babies*. A data item on the Indigenous status of the baby was added to the Perinatal NMDS for collection from 1 July 2012 and national data about Indigenous babies will be available from 2012 onwards. However, some jurisdictions collected this information prior to this time. For 2011, data on the baby's Indigenous status are available for 6 jurisdictions—New South Wales, Victoria, Queensland, Tasmania, the Australian Capital Territory and the Northern Territory. Some information based on those data is shown in Section 3 (see Box 3.1).

Further details about the NPDC, as well as related technical notes, are provided at Appendix A.

2 Births

2.1 Total births

In 2011, a total of 297,126 women in Australia gave birth to 301,810 babies, according to data reported to the NPDC (Table 2.1). Of all births, 99% were live births (299,588), while 1% (2,220) were stillborn babies (fetal deaths) (Appendix Table C2.1).

Table 2.1: Women who gave birth, live births and total births, by Indigenous status of the mother, 2011

Indigenous status of the mother	Mothers		Live births		Total births[(a)]	
	Number	Per cent	Number	Per cent	Number	Per cent
Indigenous	11,729	3.9	11,737	3.9	11,895	3.9
Non-Indigenous	284,711	95.8	287,149	95.8	289,206	95.8
Not stated	686	0.2	702	0.2	709	0.2
Total	**297,126**	**100.0**	**299,588**	**100.0**	**301,810**	**100.0**

(a) Includes live births and fetal deaths. Also includes births for which information on whether the birth was a live birth or fetal death was not available—this applied to 2 babies who were born to non-Indigenous mothers.

Note: Proportions in this table—and in all subsequent tables—may not sum to the total due to rounding.

Source: Li et al. 2013: tables 2.1, 3.2 and 4.3.

In addition to the births data presented in this section (as sourced from the NPDC), estimates of the annual numbers of *live* births in Australia are also available from ABS birth registrations data. In 2011, the number of live births reported to the NPDC was 1.9% larger than that recorded in the ABS births registration data—a difference of 5,516 births. Data from the two collections should be compared with caution (see Appendix B for details).

2.2 Indigenous mothers who gave birth

According to the NPDC, 11,729 women who gave birth in 2011 were identified as being of Aboriginal or Torres Strait Islander origin—this represents 3.9% of all mothers who gave birth in that year (Table 2.1). These Indigenous women gave birth to 11,895 babies—nearly all (99%) of these babies were liveborn while 158 were stillborn (Appendix Table C2.1).

In 2011, 31% of Indigenous mothers gave birth in Queensland (3,646 mothers), 25% in New South Wales (2,974), and 14% in Western Australia (1,685) (see Table 2.2).

The Northern Territory had the highest representation of Indigenous mothers who gave birth in 2011—of all mothers who gave birth in the Northern Territory, 36% (1,414 mothers) were Indigenous (Table 2.2). The proportion of mothers who were Indigenous in the other jurisdictions ranged from 1.3% (in Victoria) to 6.0% (in Queensland).

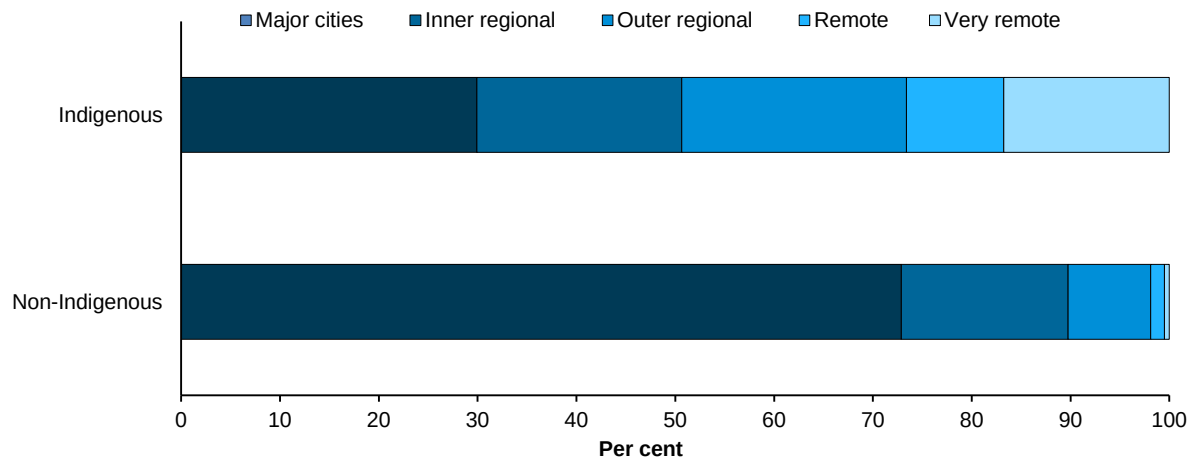
Table 2.2: Women who gave birth, by Indigenous status, and state and territory[(a)], 2011

	NSW	Vic	Qld	WA	SA	Tas	ACT	NT	Australia
					Number				
Indigenous	2,974	920	3,646	1,685	693	294	103	1,414	11,729
Non-Indigenous	92,604	71,505	57,453	30,062	19,350	5,802	5,479	2,456	284,711
Not stated	241	302	13	—	—	124	2	4	686
Total	**95,819**	**72,727**	**61,112**	**31,747**	**20,043**	**6,220**	**5,584**	**3,874**	**297,126**
					Per cent				
Indigenous	3.1	1.3	6.0	5.3	3.5	4.7	1.8	36.5	3.9
Non-Indigenous	96.6	98.3	94.0	94.7	96.5	93.3	98.1	63.4	95.8
Not stated	0.3	0.4	—	—	—	2.0	—	0.1	0.2
Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**

(a) Based on the state or territory in which the birth occurred (rather than the state or territory of the usual residence of the mother). With the exception of the Australian Capital Territory, most women (98% or more in 2011) give birth in the jurisdiction where they live. In the Australian Capital Territory, 28% of Indigenous women who gave birth in 2011 lived elsewhere, as did 15% of all women who gave birth in this jurisdiction (Li et al. 2013).

Source: Li et al. 2013: Table 3.2.

Considering differences by remoteness, 30% of Indigenous mothers who gave birth in 2011 lived in *Major cities*, 43% lived in *Inner regional* or *Outer regional* areas combined, and 27% lived in *Remote* or *Very remote* areas (Figure 2.1). This differs somewhat from the distribution of Indigenous females aged 15–49 in the general population—in 2011, 36% of Indigenous females aged 15–49 were living in *Major cities*, 42% in regional areas, and 22% in remote areas (AIHW analyses of ABS 2014). Among non-Indigenous women who gave birth in 2011, 73% lived in *Major cities*, 25% in regional areas and 2% in remote areas.



Notes

1. Remoteness areas are based on the Australian Statistical Geography Standard (ABS 2013a).
2. Data for this figure are shown in Appendix Table C2.2.

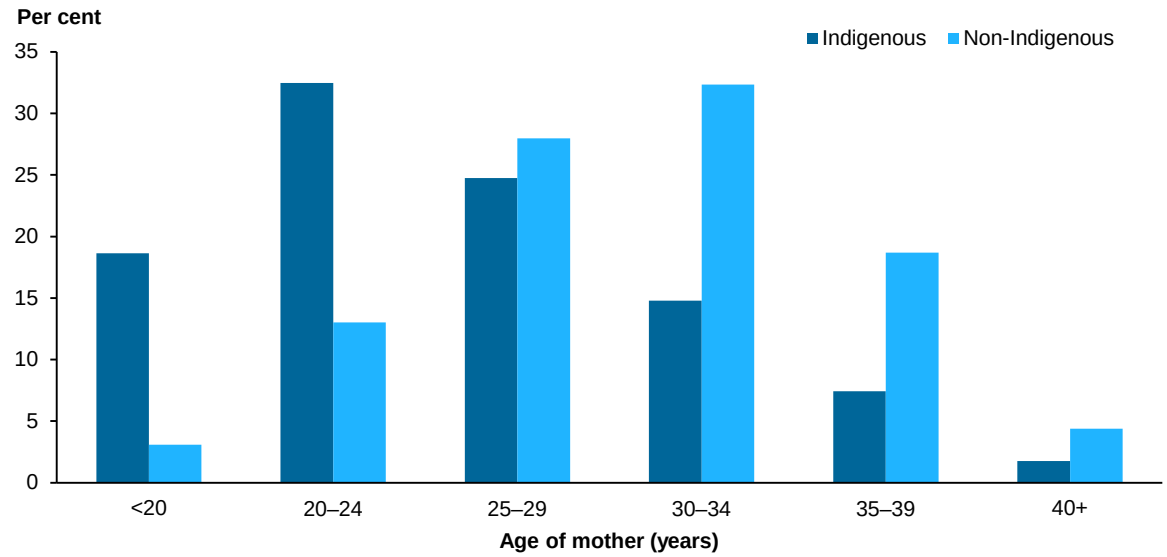
Source: Li et al. 2013.

Figure 2.1: Women who gave birth, by remoteness of usual residence and Indigenous status, 2011

Of Indigenous women who gave birth in 2011, one-third (33%) had their first baby, 4 in 10 (42%) had given birth once or twice previously, while about one-quarter (25%) had given birth three or more times previously (Li et al. 2013). By comparison, 43% of all women who gave birth in 2011 had their first baby, 48% had given birth once or twice previously, and 9% had given birth three or more times previously.

Compared with non-Indigenous mothers, Indigenous mothers are more likely to have their babies at a younger age. In 2011:

- almost 1 in 5 (19%) Indigenous mothers were teenagers compared with 3% of non-Indigenous mothers (Figure 2.2)
- 9% of Indigenous mothers were aged 35 and over compared with 23% of non-Indigenous mothers (Figure 2.2)
- the average maternal age was 25.3 for Indigenous women compared with 30.2 for non-Indigenous women (Li et al. 2013)
- the average age of first-time Indigenous mothers was substantially lower than that for their non-Indigenous counterparts (21.5 and 28.6, respectively) (Li et al. 2013).



Note: Data for this figure are shown in Appendix Table C2.3.

Source: Li et al. 2013.

Figure 2.2: Women who gave birth, by maternal age and Indigenous status, 2011

3 Birthweight

Birthweight is a key indicator of infant health and a principal determinant of a baby's chance of survival and good health, with low birthweight of particular concern. In this paper, low birthweight is defined as less than 2,500 grams, while high birthweight is defined as 4,500 grams or more (see Box 1.1).

All data in this section pertain to live births only and, with the exception of data in Box 3.1, relate to the birthweight of babies born to Indigenous (and non-Indigenous) *mothers*. In contrast, Box 3.1 provides some data about the birthweight of Indigenous (and non-Indigenous) *babies*.

3.1 Birthweight in 2011

All live births

As shown in Figure 3.1, the distribution of birthweight for liveborn babies of Indigenous mothers differs from that for babies born to non-Indigenous mothers. In 2011, babies born to Indigenous mothers were twice as likely as those born to non-Indigenous mothers to be of low birthweight—12.6% of babies born to Indigenous mothers weighed less than 2,500 grams compared with 6.0% of babies born to non-Indigenous mothers.

In 2011, 2.0% of liveborn babies born to Indigenous mothers were of a very low birthweight (weighing less than 1,500 grams), compared with 1.0% of babies born to non-Indigenous mothers. The relative contribution of very low birthweight babies to the low birthweight rate was similar (both 16%) in babies born to both Indigenous and non-Indigenous mothers.

At the other end of the spectrum, 1.4% of babies born to Indigenous mothers were of high birthweight, as were 1.7% of babies born to non-Indigenous mothers.

Overall, 86% of liveborn babies born to Indigenous mothers in 2011 were within the 'normal' birthweight range of 2,500 to 4,499 grams, compared with 92% of singleton babies born to non-Indigenous mothers. A higher proportion of babies born to Indigenous mothers were at the lower end of the normal weight range—22% of babies born to Indigenous mothers weighed 2,500–2,999 grams compared with 15% of babies born to non-Indigenous mothers.

The mean birthweight for babies born to Indigenous mothers in 2011 was 3,187 grams, which is lighter (by 187 grams) than the mean birthweight of 3,375 grams for babies born to non-Indigenous mothers.

Box 3.1: Data about Indigenous babies

In addition to information about the birthweight of babies born to Indigenous *mothers*, data are available about the birthweight of Indigenous *babies* for all jurisdictions except Western Australia and South Australia for 2011 (see Section 1.3 for more details). Information on Indigenous status was missing for 6% of babies in the 6 jurisdictions for which data were available.

In 2011, 4.8% of babies with known Indigenous status were identified as being of Aboriginal or Torres Strait Islander origin in the 6 jurisdictions (Appendix Table C3.1). These data indicate that almost three-quarters (73%) of Indigenous babies had an Indigenous mother (Appendix Table C3.2). This is consistent with ABS data on birth registrations which similarly indicate that 73% of Indigenous births in 2011 were to Indigenous mothers (either with or without an Indigenous father) (ABS 2013b).

In ABS births registrations data, a birth is recorded as being an Aboriginal and Torres Strait Islander birth where at least one parent reported themselves as being Indigenous on the birth registration form. In the NPDC data, about 8% of babies born to Indigenous mothers were recorded as being non-Indigenous (Appendix Table C3.2). It is unclear if this is an identification choice and/or a data quality issue.

Birthweight of Indigenous babies

Of all liveborn Indigenous babies born in 2011 in the 6 jurisdictions for which data are available, 11.5% were of low birthweight (Table 3.1). This is somewhat lower than:

- the national proportion of liveborn babies of Indigenous mothers that were of low birthweight (12.6%)
- the proportion of liveborn babies of Indigenous mothers that were of low birthweight in the same 6 jurisdictions (12.4%).

Compared with liveborn non-Indigenous babies born in 2011 in the 6 jurisdictions, Indigenous babies were 1.9 times as likely to be of low birthweight (11.5% of Indigenous babies and 6.2% of non-Indigenous babies). Among babies born in 2011 in the 6 jurisdictions, 1.6% of Indigenous babies were of high birthweight, as were 1.8% of non-Indigenous babies.

When only singleton births are considered, the data show that Indigenous babies were more than twice as likely to be of low birthweight than non-Indigenous babies (10.1% and 4.6%, respectively).

Table 3.1: Births, by Indigenous status of the baby and birthweight, selected jurisdictions[(a)], 2011 (per cent)

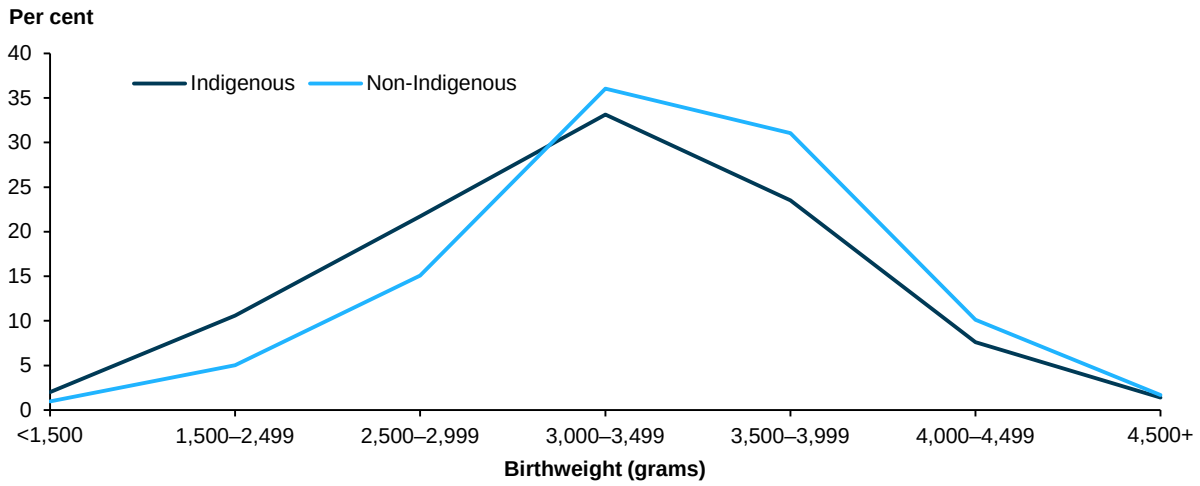
	Singleton births		All live births	
Birthweight (grams)	**Indigenous**	**Non-Indigenous**	**Indigenous**	**Non-Indigenous**
Less than 2,500	10.1	4.6	11.5	6.2
2,500–4,499	88.2	93.6	86.9	92.1
4,500 and over	1.6	1.8	1.6	1.8
Total[(b)]	**100.0**	**100.0**	**100.0**	**100.0**
Mean	*3,249*	*3,407*	*3,222*	*3,374*

(a) Excludes women who gave birth in Western Australia and South Australia since data on the Indigenous status of the baby were not available in these states.

(b) Babies with unknown birthweight were excluded before calculating proportions.

Note: Additional data on birthweight according to the Indigenous status of the baby can be found in Appendix Table C3.3.

Source: AIHW National Perinatal Data Collection.



Note: Data for this figure are shown in Appendix Table C3.4.

Source: AIHW National Perinatal Data Collection.

Figure 3.1: Distribution of birthweight of liveborn babies, by Indigenous status of the mother, 2011

Differences by sex

In 2011, there were roughly equal proportions of male and female babies born to Indigenous mothers: 51% of live births were male babies and 49% were female babies. The birthweight of babies born to Indigenous mothers varied according to the sex of the baby (Table 3.2). In 2011, of live babies born to Indigenous mothers:

- on average, female babies weighed 125 grams less than male babies (mean birthweight of 3,123 grams compared with 3,248 grams, respectively)
- 13.7% of female babies were of a low birthweight compared with 11.6% of male babies—a difference of 2.1 percentage points
- 1.9% of male babies were of high birthweight compared with 0.9% of females—a difference of 1.0 percentage point.

Table 3.2: Birthweight of liveborn babies, by Indigenous status of the mother and sex of the baby, 2011

	Indigenous			Non-Indigenous		
Birthweight (grams)	**Males**	**Females**	**Total[a]**	**Males**	**Females**	**Total[a]**
Less than 2,500 (%)	11.6	13.7	12.6	5.6	6.5	6.0
2,500–4,499 (%)	86.5	85.4	86.0	92.2	92.4	92.3
4,500 and over (%)	1.9	0.9	1.4	2.3	1.1	1.7
Total births (%)	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**
Total births (number)[b]	**6,026**	**5,711**	**11,737**	**147,545**	**139,525**	**287,149**
Mean	*3,248*	*3,123*	*3,187*	*3,432*	*3,314*	*3,375*

(a) Includes babies with unknown sex. Information on sex was missing for 79 babies born to non-Indigenous mothers.

(b) Total number includes babies for whom information on birthweight was not available. These babies were excluded before calculating proportions. This applied to 1 female baby born to an Indigenous mother, 19 female babies born to non-Indigenous mothers, and 30 male babies born to non-Indigenous mothers.

Note: Additional data on birthweight according to sex, including data pertaining to singleton live births, can be found in Appendix Table C3.5.

Source: AIHW National Perinatal Data Collection.

Similarly among babies born to non-Indigenous mothers, females tended to weigh less than males and were more likely to be of low birthweight (see Table 3.2). On average, female babies born to non-Indigenous mothers weighed 3,314 grams compared with 3,432 grams for male babies (a difference of 118 grams).

Differences by jurisdiction

The birthweight of babies born to Aboriginal and Torres Strait Islander mothers varied by jurisdiction (Table 3.3). Note, however, that the data presented on Indigenous mothers are influenced by the quality and completeness of Indigenous identification, which may vary among jurisdictions; thus these data should be interpreted with caution.

Table 3.3: All live births of Indigenous mothers, by birthweight, and state and territory[(a)], 2011

Birthweight (grams)	NSW	Vic	Qld	WA	SA	Tas	ACT[(b)]	NT	Australia
Less than 2,500 (%)	11.6	12.6	11.2	13.0	15.2	13.2	27.2	15.6	12.6
2,500–4,499 (%)	86.8	85.9	87.4	86.0	83.4	85.8	72.8	82.6	86.0
4,500 and over (%)	1.5	n.p.	1.4	1.0	1.4	n.p.	—	1.8	1.4
Total births (%)	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**
Total births (number)[(c)]	**2,981**	**924**	**3,657**	**1,667**	**693**	**n.p.**	**n.p.**	**1,416**	**11,737**
Mean	*3,229*	*3,246*	*3,215*	*3,144*	*3,116*	*3,206*	*2,929*	*3,089*	*3,187*

(a) Based on the state or territory in which the birth occurred (rather than the state or territory of the usual residence of the mother). Birthweight data on babies born to Indigenous mothers residing in the Australian Capital Territory and Tasmania should be viewed with caution as they are based on small numbers of births.

(b) Care must be taken when interpreting data for the Australian Capital Territory because a relatively large proportion of mothers who gave birth in the Australian Capital Territory lived in another jurisdiction—28% of Indigenous mothers and 15% of all mothers in 2011. Women with high-risk and multi-fetal pregnancies may be more likely to be transferred from smaller centres in New South Wales to the Australian Capital Territory to give birth; such pregnancies are associated with poorer perinatal outcomes (Li et al. 2013). The proportion of liveborn babies who were of low birthweight who were born in the Australian Capital Territory to Indigenous women who also lived in that jurisdiction was 16%—considerably less than the 27% of births to all Indigenous mothers who gave birth in the Australian Capital Territory.

(c) The number of total births includes babies for whom information on birthweight was not available. These babies were excluded before calculating proportions. This applied to 1 baby born in New South Wales.

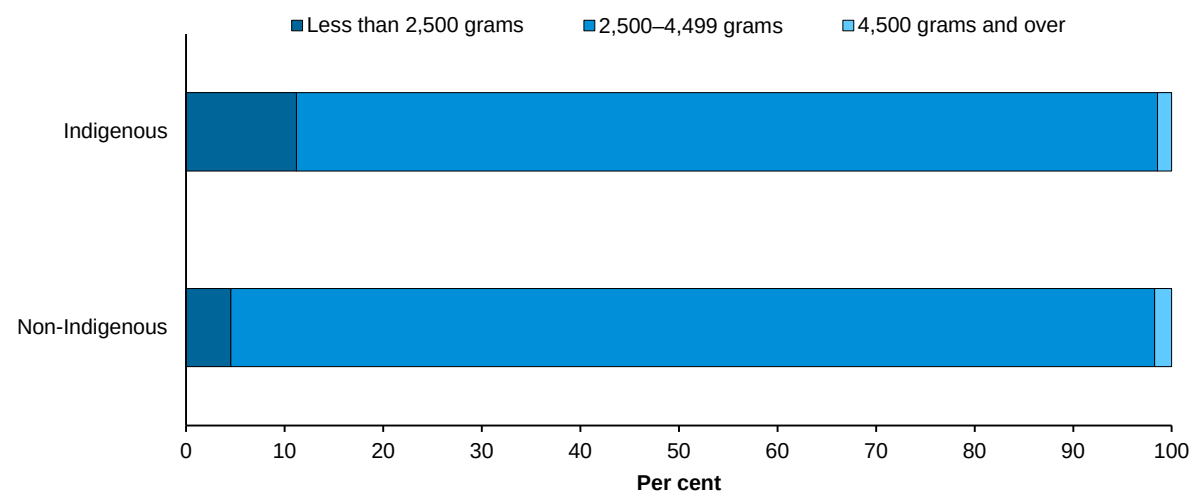
Source: Li et al. 2013: Table 4.10.

Queensland had the lowest proportion of low birthweight babies among liveborn babies of Indigenous mothers (11%), followed by New South Wales (12%), while the Australian Capital Territory had the highest proportion (27%), followed by the Northern Territory (16%). Note that a relatively large proportion of mothers who gave birth in the Australian Capital Territory lived in another jurisdiction (28% of Indigenous mothers and 15% of all mothers in 2011). As noted in Table 3.3, this is thought to contribute to the relatively high rate of low birthweight babies in that jurisdiction.

Singleton live births

When multiple births are excluded, NPDC data indicate that of liveborn singleton babies born to Indigenous mothers in 2011:

- 11.2% were of low birthweight—2.5 times as many as the proportion born to non-Indigenous mothers (4.6%)
- 87% were of normal birthweight compared with 94% of births of non-Indigenous mothers
- 1.5% were of high birthweight, as were 1.8% of babies born to non-Indigenous mothers (Figure 3.2).



Note: Data for this figure are shown in Appendix Table C3.4.

Source: AIHW National Perinatal Data Collection.

Figure 3.2: Birthweight of liveborn singleton babies, by Indigenous status of the mother, 2011

In 2011, the average birthweight of liveborn singleton babies of Indigenous mothers was 191 grams lower than that of such babies born to non-Indigenous mothers—3,215 grams compared with 3,406 grams, respectively.

3.2 Trends in birthweight

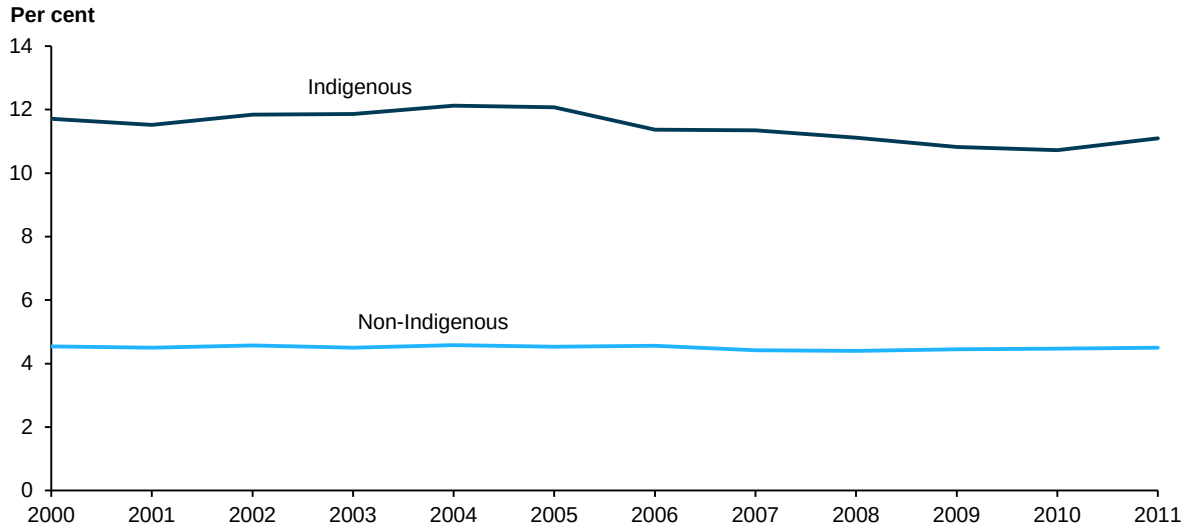
In this section, trends in the birthweight of liveborn singleton babies are shown for 6 states and territories—New South Wales, Victoria, Queensland, Western Australia, South Australia and the Northern Territory. The perinatal collections for these jurisdictions have been assessed as having adequate identification of Indigenous mothers from 1991 onwards (AIHW: Leeds et al. 2007). Time series analyses presented throughout this paper have used linear regression to determine whether there have been significant changes over time in the observed rates, rate differences and rate ratios (see Appendix A for details on the method used).

Singleton births are the focus of this section. Low birthweight is associated with multiple births and, over time, multiple births have become more common due to factors such as increased use of fertility treatment, delay in child bearing and a higher proportion of older mothers (Li et al. 2013). Thus, the inclusion of multiple births in trend analyses could confound the results. Nonetheless, information on trends among all births is provided in the tables at Appendix C. In 2011, nearly all live births to both Indigenous and non-Indigenous mothers were singleton live births (both 97%).

Low birthweight

Trend data suggest that the rate of babies of low birthweight born to Indigenous mothers is decreasing (Figure 3.3). Over the period 2000 to 2011, the low birthweight rate among singleton babies born to Indigenous mothers decreased significantly—with an average yearly decrease of 0.1 low birthweight babies per 100 live births, which is equivalent to a 9% decrease over the period (Appendix Table C3.6). For non-Indigenous mothers, there was no significant change in the rate of singleton low birthweight babies over this period.

While babies born to Indigenous mothers remained substantially more likely to be of low birthweight than babies born to non-Indigenous mothers over the period 2000 to 2011, there was a small statistically significant narrowing of the gap in this period, with the rate ratio declining by 7% and the rate difference by 13% (Appendix Table C3.6).



(a) Excludes data for Tasmania and the Australian Capital Territory as these data are not considered stable enough to be included in trend analyses.

Note: Data for this figure are shown in Appendix Table C3.6.

Source: AIHW National Perinatal Data Collection.

Figure 3.3: Low birthweight among liveborn singleton babies, by Indigenous status of the mother, selected jurisdictions[(a)], 2000 to 2011

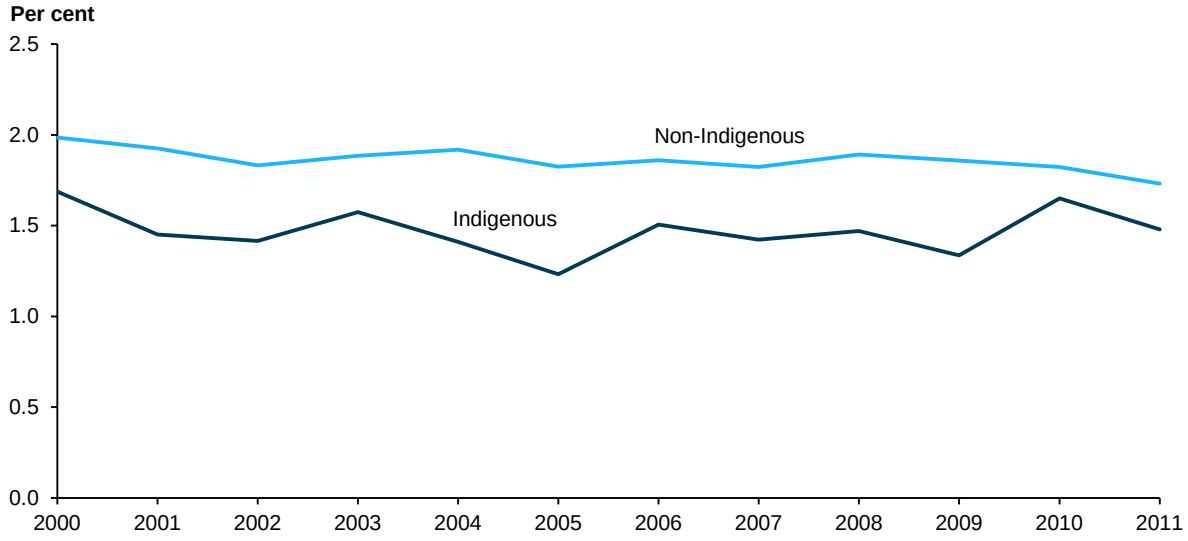
High birthweight

Between 2000 and 2011, there was no significant change in the proportion of singleton babies weighing 4,500 grams or more who were born to Indigenous mothers (Figure 3.4). Meanwhile, there was a statistically significant decline in the proportion of singleton babies of high birthweight who were born to non-Indigenous mothers (an average annual decrease of 0.01 per 100 live births, or 7% over the period).

As discussed previously, babies born to Indigenous mothers are less likely to have a high birthweight than babies born to non-Indigenous mothers; trend data for the period 2000 to 2011 indicate no statistically significant change in the rate ratio or rate difference over this time (Appendix Table C3.7).

Average birthweight

Between 2000 and 2011, the mean birthweight of singleton babies born to Indigenous mothers increased significantly by an average of 2.8 grams per year, corresponding to an increase of 1% over the period (Figure 3.5). In contrast, there was small but statistically significant decrease of an average of 0.6 grams per year among singleton babies born to non-Indigenous mothers. As a consequence, the gap in mean birthweight between singleton babies born to Indigenous and non-Indigenous mothers narrowed between 2000 and 2011 by 16%.

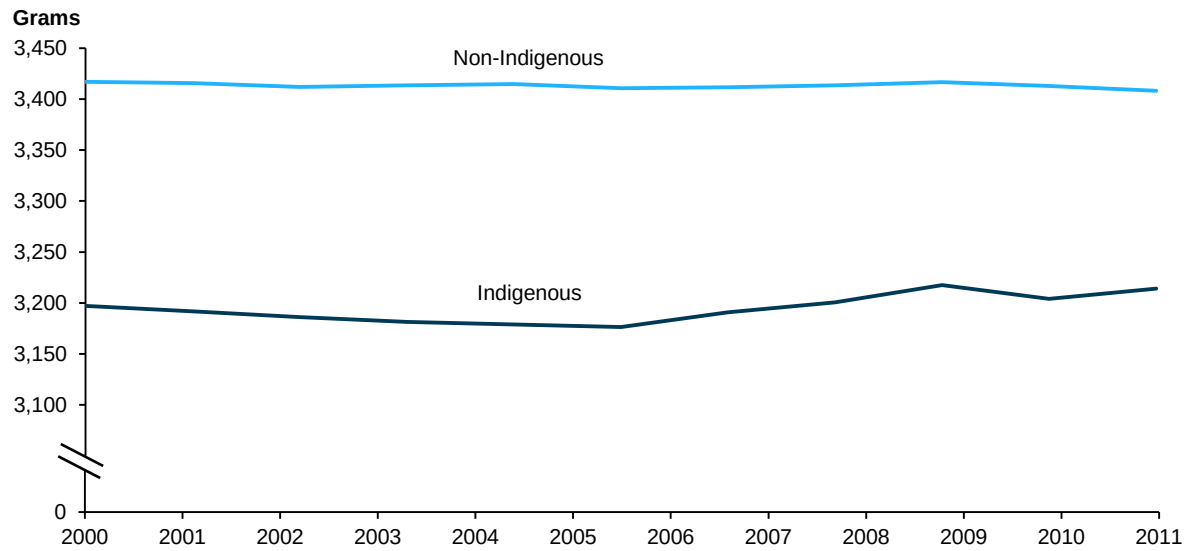


(a) Excludes data for Tasmania and the Australian Capital Territory as these data are not considered stable enough to be included in trend analyses.

Note: Data for this figure are shown in Appendix Table C3.7.

Source: AIHW National Perinatal Data Collection.

Figure 3.4: High birthweight among liveborn singleton babies, by Indigenous status of the mother, selected jurisdictions[(a)], 2000 to 2011



(a) Excludes data for Tasmania and the Australian Capital Territory as these data are not considered stable enough to be included in trend analyses.

Note: Data for this figure are shown in Appendix Table C3.8.

Source: AIHW National Perinatal Data Collection.

Figure 3.5: Average birthweight of liveborn singleton babies, by Indigenous status of the mother, selected jurisdictions[(a)], 2000 to 2011

4 Factors associated with birthweight variation

Many factors are known to affect fetal growth and the duration of gestation and, in turn, birthweight. These include a range of socio-demographic, biological and behavioural characteristics related to the parents (especially the mother), characteristics of the infant and medical care. Given the association of low birthweight with health outcomes—in particular paediatric morbidity and mortality—preventing low birthweight in Indigenous newborns is a high priority.

Some of the key determinants for low birthweight are:

- maternal characteristics: birthweight is affected by the mother's diet and nutritional status at conception and during the pregnancy; low birthweight is more common among younger mothers (aged less than 20) and older mothers (aged 35 and over)
- antenatal care: such care can reduce the chance of low birthweight due to early diagnosis and treatment of pregnancy complications, with the World Health Organization recommending that women receive antenatal care at least four times during pregnancy
- smoking: babies born to mothers who smoke are more likely to be of low birthweight than other babies
- socioeconomic status: mothers in more disadvantaged socioeconomic conditions are more likely to have low birthweight babies (with this potentially related to factors such as nutrition, maternal health and behavioural characteristics such as smoking)
- characteristics of the infant: on average, firstborns weigh less than subsequent babies, girls weigh less than boys, and twins are each lighter than singletons (controlling for gestational age) (AIHW 2013; Comino et al. 2012; Kramer 1987; UNCF &WHO 2004; WHO 2011).

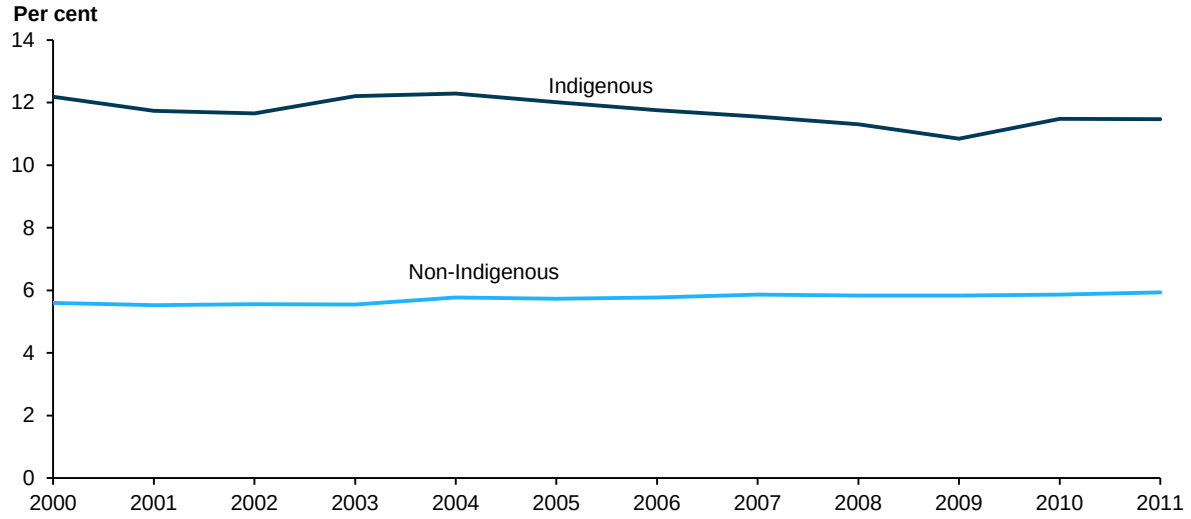
This section presents data on some selected risk factors for low birthweight; consideration is also given to change in these factors over time. Note that the ways in which these factors moderate birthweight, and the ways in which birthweight influences short- and long-term health, are not well understood. As well, trends in birthweight distribution are a function of changes not only in these factors but also in the way these factors affect birthweight over time (You & Hummer 2013).

4.1 Pre-term births

Babies who are born pre-term (defined as before 37 weeks of gestation) are at a higher risk of adverse neonatal outcomes including death, disability and other health issues throughout life (Howson et al. 2012). In 2011, most (82%) stillbirths were pre-term, compared with 8% of live births (Li et al. 2013). Although the causes of pre-term birth are not well understood, factors associated with pre-term births include multiple pregnancies, infections and chronic conditions (for example, diabetes and high blood pressure) (Howson et al. 2012).

In 2011, a higher proportion of babies of Indigenous mothers (12.5% of all live births) than non-Indigenous mothers (7.5%) were born pre-term (analyses of the AIHW NPDC). Babies born preterm are more likely to be of low birthweight.

Figure 4.1 shows the change in the pre-term birth rate between 2000 and 2011 among liveborn singleton babies for 6 jurisdictions (excluding Tasmania and the Australian Capital Territory). Analysis of these data suggests a statistically significant decline of 7% (0.08 per 100 live births) in the rate of pre-term births among babies born to Indigenous mothers in these jurisdictions (Appendix Table C4.1). In contrast, among liveborn singleton babies born to non-Indigenous mothers, there was a significant annual increase of 7% (0.04 per 100 live births) over the period.



(a) Excludes data for Tasmania and the Australian Capital Territory as these data are not considered stable enough to be included in trend analyses.

Note: Data for this figure are shown in Appendix Table C4.1.

Source: AIHW National Perinatal Data Collection.

Figure 4.1: Liveborn singleton babies born pre-term, by Indigenous status of the mother, selected jurisdictions(a), 2000 to 2011

In 2011, the pre-term birth rate among liveborn singleton babies of Indigenous mothers was around twice that of babies born to non-Indigenous mothers. Analysis of trend data shows that between 2000 and 2011, there was a slight narrowing of this gap. In particular, over this period, there were statistically significant decreases of:

- 14% in the rate ratio
- 19% in the rate difference (Appendix Table C4.1).

The narrowing of the gap in singleton pre-term births between babies born to Indigenous and non-Indigenous mothers is consistent with the trend seen in regard to birthweight where a statistically significant narrowing of the gap was also evident (as discussed in Section 3.2).

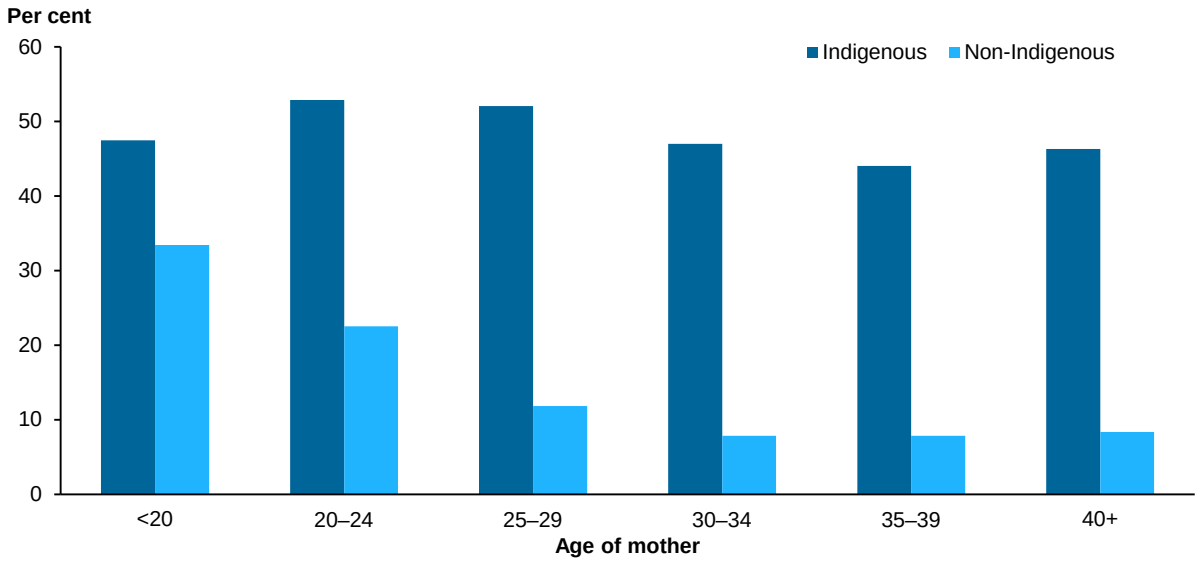
4.2 Maternal smoking

Tobacco smoking while pregnant is considered a leading preventable risk factor for adverse birth outcomes including low birthweight (AIHW 2013; Bernstein et al. 2005; Cnattingius 2004; Kramer 1987; Laws et al. 2006). Passive exposure to smoke is also associated with lower birthweight (Crane et al. 2011; Rubin et al. 1986).

Indigenous mothers have higher rates of smoking than non-Indigenous mothers. In 2011, half (50%) of Indigenous mothers who gave birth reported smoking during pregnancy, compared with 12% of non-Indigenous mothers (Li et al. 2013).

In general, rates of smoking during pregnancy by Indigenous and non-Indigenous mothers vary by age (Figure 4.2). In 2011:

- Indigenous mothers aged 20–24 were most likely to smoke during pregnancy (53%), followed by those aged 25–29 (52%), while those aged 35–39 were least likely to smoke during pregnancy (44%)
- non-Indigenous mothers aged under 20 were most likely to smoke during pregnancy (33%), while the lowest proportion was for mothers in the 30–34, 35–39 and 40 and over age groups (all 8%).



Note: Data for this figure are shown in Appendix Table C4.2.

Source: AIHW National Perinatal Data Collection.

Figure 4.2: Proportion of mothers who smoked during pregnancy, by Indigenous status and maternal age, 2011

When age differences between the two Indigenous and non-Indigenous women are taken into account, the rates show that Indigenous mothers were 4 times as likely to have smoked during pregnancy as non-Indigenous mothers (age-standardised rates of 49% and 12%, respectively) (Li et al. 2013).

The rates of smoking during pregnancy vary by remoteness. Among Indigenous women who gave birth in 2011, smoking rates during pregnancy were:

- highest in *Very remote* areas (53%)
- lowest in *Major cities* (46%)
- just over 50% in the other areas (51% in *Remote* areas and 52% in both *Inner regional* and *Outer regional* areas) (COAG Reform Council 2014).

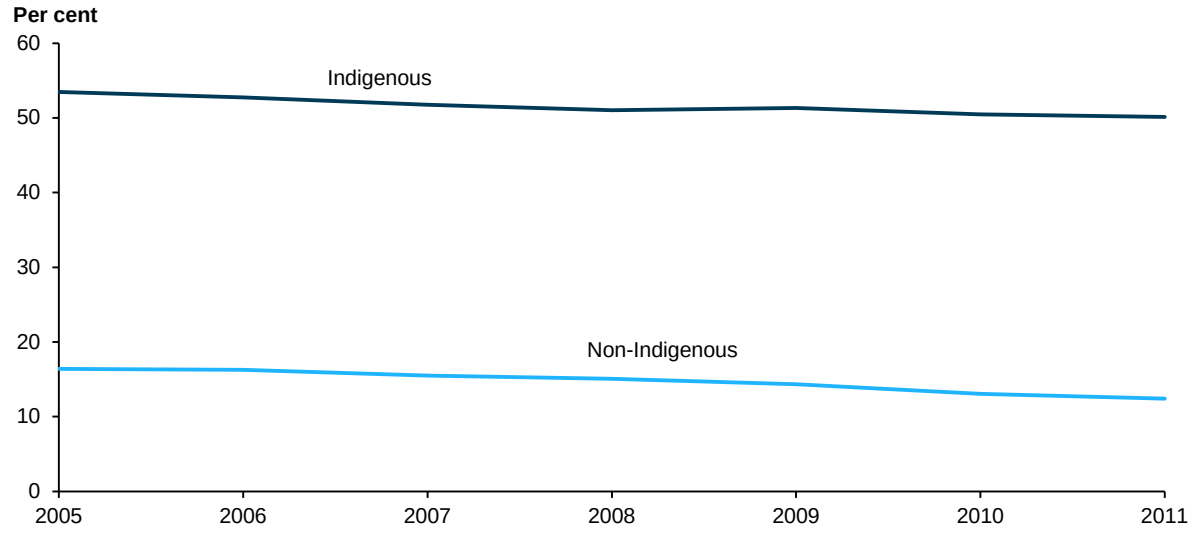
There were also marked differences between jurisdictions in the rate of smoking among Indigenous mothers. South Australia had the highest proportion of Indigenous mothers who gave birth in 2011 who smoked during pregnancy (60%), followed by New South Wales

and the Australian Capital Territory (both 52%), the Northern Territory (51%) and Queensland (50%) (COAG Reform Council 2014). The lowest proportions were in Victoria (42%), Tasmania (46%) and Western Australia (46%).

Indigenous women were also less likely to quit smoking during pregnancy. Of Indigenous women who gave birth in 2011, 48% reported smoking during the first 20 weeks of pregnancy, compared with 12% of non-Indigenous mothers (AIHW 2014a). Among those who smoked during pregnancy, 11% of Indigenous mothers who reported smoking in the first 20 weeks of pregnancy reported not smoking during the second 20 weeks (Li et al. 2013). This was about half the rate of smoking cessation among non-Indigenous mothers (22%).

Trends in maternal smoking

As shown in Figure 4.3, smoking during pregnancy may be on the decline. Between 2005 and 2011, there was a statistically significant decline (of 6%) in the age-standardised proportion of Indigenous mothers who smoked during pregnancy. This may partly reflect the impact of anti-smoking initiatives, such as those funded through the Australian Government's Indigenous Chronic Disease Package (see AIHW 2014c). The reduction in smoking during pregnancy among Indigenous mothers may be a contributing factor to the observed fall in the rate of low birthweight babies born to these mothers.



Notes

1. Excludes data for Victoria, as these data were not available before 2009.
2. Data for this figure are shown in Appendix Table C4.3.

Source: AIHW National Perinatal Data Collection.

Figure 4.3: Age-standardised proportion of mothers who smoked during pregnancy, by Indigenous status of the mother, selected jurisdictions, 2005 to 2011

Compared with Indigenous mothers, there was a considerably larger decline (of 25%) between 2005 and 2011 in the smoking rate among non-Indigenous mothers. As a consequence, the gap between smoking rates for Indigenous and non-Indigenous mothers (as measured by the rate ratio) increased significantly between 2005 and 2011 (with rate ratios of 3.3 and 4.0, respectively) (Appendix Table C4.3).

4.3 Antenatal care

Antenatal care (also referred to as prenatal care) relates to care provided by skilled birth attendants for reasons related to pregnancy. Such care has been found to have a positive effect on health outcomes for both mother and baby and may reduce the risk of low birthweight (Eades 2004; Taylor et al. 2013). The purpose of antenatal visits is to monitor the health of both the mother and the baby, provide health advice, identify complications and provide intervention if needed. Antenatal care may be especially important for Indigenous women, as they are at higher risk of giving birth to low birthweight babies and have greater exposure to other risk factors such as anaemia, poor nutritional status, hypertension, diabetes, genital and urinary tract infections, and smoking (de Costa & Wenitong 2009). An earlier AIHW analysis of the relationship between antenatal care and low birthweight found that as the number of antenatal care visits increased, the likelihood of mothers (both Indigenous and non-Indigenous) giving birth to low birthweight babies decreased (AHMAC 2012a).

Recognising the importance of antenatal care, national evidence-based antenatal care guidelines have been developed by the Australian Government in collaboration with state and territory governments (see AHMAC 2012b). These guidelines include specific information about antenatal care for Indigenous women.

In addition, a large number of targeted programs and interventions have been introduced in order to improve antenatal care for Indigenous mothers. Available data suggest that these programs have had some success (AIHW 2014c). Two national examples of such programs (both funded by the Australian Government) are:

- the New Directions: Mothers and Babies program (introduced in 2008)
- the Healthy for Life program (introduced in 2007–08).

State-wide initiatives include the New South Wales Aboriginal Maternal and Infant Health Service and the Aboriginal Midwifery Access program run by an Aboriginal community-controlled health organisation. Both of these initiatives were introduced in 2001. In addition, a large number of non-government antenatal care initiatives have been implemented in community-based settings which target Indigenous mothers and their babies (see AIHW 2014c for further information).

Antenatal care during pregnancy

Data for 2011 on the number of antenatal visits at any time during pregnancy are available for 6 jurisdictions: New South Wales, Queensland, South Australia, Tasmania, the Australian Capital Territory and the Northern Territory. These data show that Indigenous mothers had fewer antenatal visits than non-Indigenous mothers (Table 4.1). In 2011, 99% of Indigenous mothers who gave birth had a least 1 antenatal session, and 83% had 5 or more. In comparison, nearly all (99.9%) non-Indigenous mothers had at least 1 antenatal session, and 95% had 5 or more. These differences were virtually unchanged when differences in the age distribution of Indigenous and non-Indigenous women were taken into account (Table 4.1).

Table 4.1: Use of antenatal services by mothers, by Indigenous status, selected jurisdictions[a], 2011

Number of sessions attended	Indigenous			Non-Indigenous		
	Number	Crude rate[b]	Age-standardised rate[b][c]	Number	Crude rate[b]	Age-standardised rate[b][c]
None	112	1.3	1.3	136	0.1	0.1
1	223	2.5	2.5	1,381	0.8	0.8
2 to 4	1,149	13.0	12.9	7,185	4.1	4.1
5 or more	7,346	83.2	83.4	166,209	95.0	95.0
At least 1	*8,718*	*98.7*	*98.7*	*174,775*	*99.9*	*99.9*

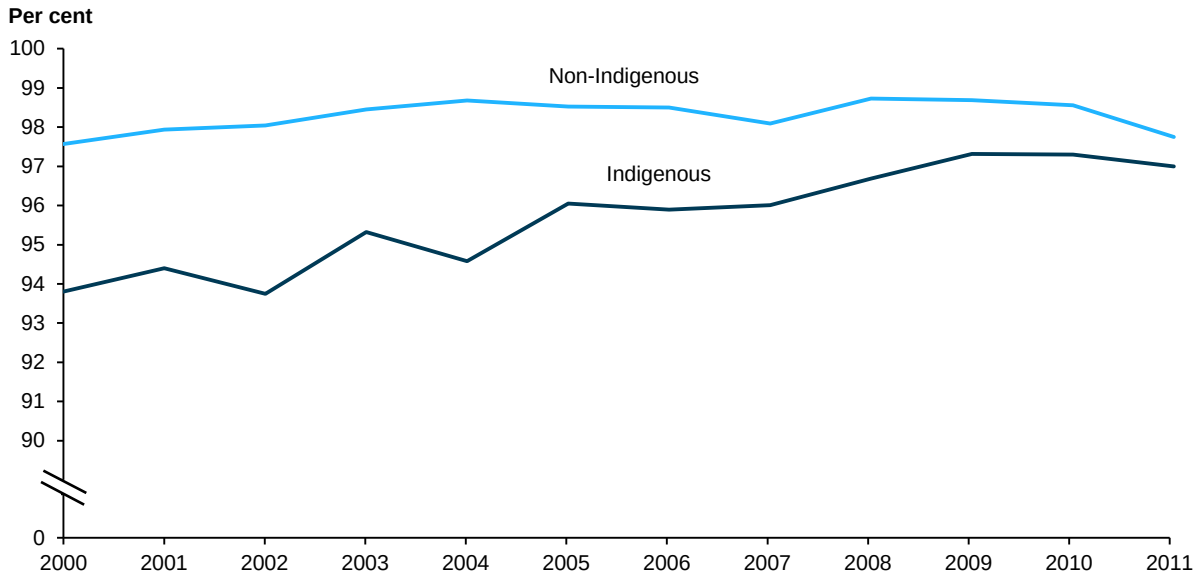
(a) Data are for New South Wales, Queensland, South Australia, Tasmania, the Australian Capital Territory and the Northern Territory.

(b) Rate per 100 women who gave birth in 2011. Rates were calculated after excluding mothers with no information about antenatal care.

(c) Data were directly age-standardised using the Australian female population who gave birth in 2011.

Source: AIHW National Perinatal Data Collection.

Data on antenatal care at any time during pregnancy for three states—New South Wales, South Australia and Queensland—for the period 2000 to 2011 are shown in Figure 4.4. Between 2000 and 2011 in these three states combined, there was a statistically significant increase in the rate of Indigenous mothers attending at least 1 antenatal care session during pregnancy, but no significant change among non-Indigenous women (Appendix Table C4.4). Among Indigenous mothers in New South Wales, South Australia and Queensland combined, there was an average annual increase of 0.3 mothers attending at least 1 antenatal care session per 100 women who gave birth, which is equivalent to a 4% increase over the period.



Note: Data for this figure are shown in Appendix Table C4.4.

Source: AIHW National Perinatal Data Collection.

Figure 4.4 Age-standardised proportion of mothers who attended at least 1 antenatal care session, by Indigenous status, New South Wales, Queensland and South Australia combined, 2000 to 2011

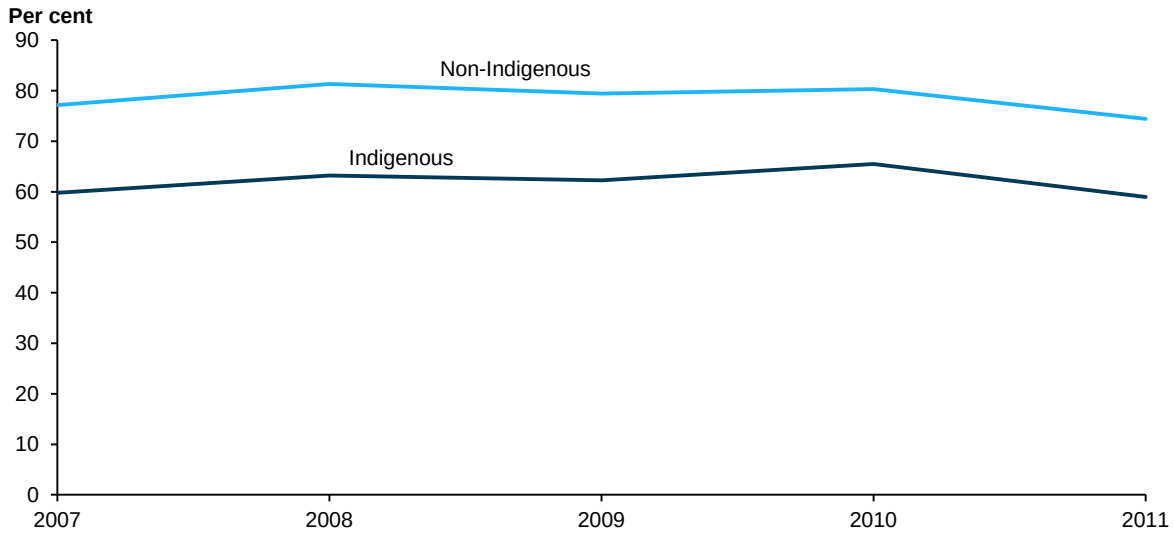
This resulted in a narrowing of the gap between Indigenous and non-Indigenous mothers in these three jurisdictions (with statistically significant changes in both the rate difference and

rate ratio between 2000 and 2011) (Appendix Table C4.4). For example, in 2000, the age-standardised rate at which non-Indigenous mothers attended at least 1 antenatal care session during pregnancy was 4 percentage points higher than that for Indigenous mothers (98% compared with 94%, respectively). In contrast, in 2011, the difference between the rates for non-Indigenous mothers and Indigenous mothers was 1 percentage point (98% compared with 97%, respectively).

Antenatal care during first trimester

Research indicates that antenatal care in the first trimester may be particularly important (AHMAC 2012b). In 2011, data on gestational age at the first antenatal visit were available for all states and territories. Among Indigenous mothers who gave birth in 2011, half (50%) attended at least 1 antenatal visit in the first trimester (that is, before 14 weeks gestation) (COAG Reform Council 2014). Considering age-standardised rates, Indigenous mothers were less likely than non-Indigenous mothers to have attended care in the first trimester (51% and 66%, respectively)

Comparable data on antenatal care in the first trimester are available for 2007 to 2011 for 3 jurisdictions: New South Wales, South Australia and the Northern Territory (Figure 4.5). Between 2007 and 2011 and based on age-standardised rates, there was no significant change in the proportion of Indigenous mothers or non-Indigenous mothers who attended at least 1 antenatal care visit in the first trimester of their pregnancy in these jurisdictions (Appendix Table C4.5).



Notes

1. Data for this figure are shown in Appendix Table C4.5.
2. The noticeable drop between 2010 and 2011 for both Indigenous and non-Indigenous mothers attending at least 1 antenatal care session is likely due in part to a change in the question used in New South Wales about gestational age for first antenatal visit (see footnotes of Appendix Table C4.5 for further details).

Source: AIHW National Perinatal Data Collection.

Figure 4.5: Age-standardised proportion of mothers who attended at least one antenatal care session in the first trimester, by Indigenous status, New South Wales, South Australia and the Northern Territory combined, 2007 to 2011

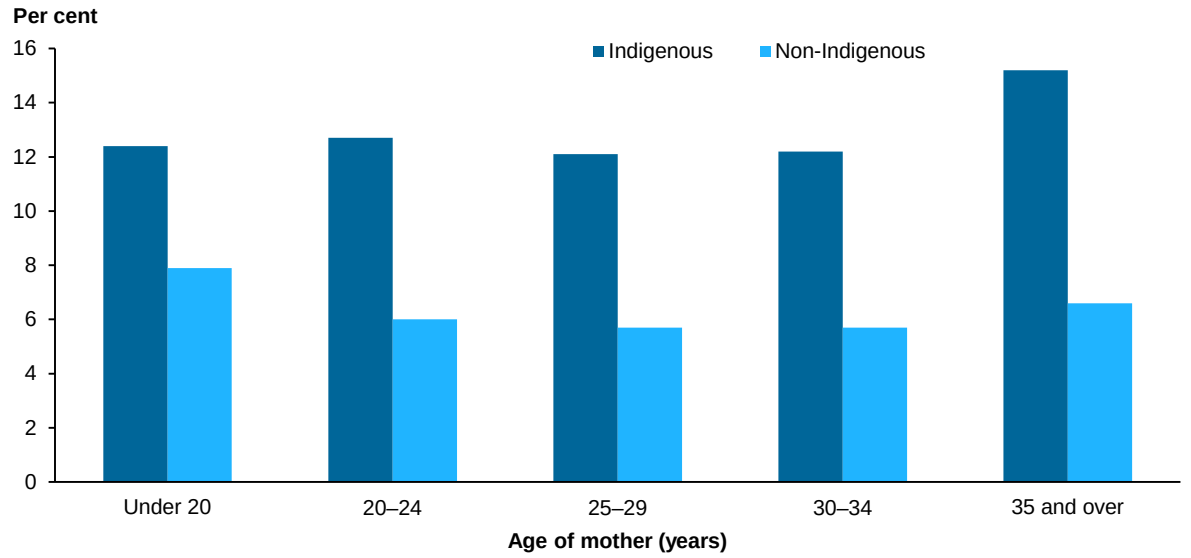
4.4 Other factors

The birthweight of newborns to both Indigenous and non-Indigenous mothers varies considerably by the age of the mother and across various socioeconomic strata and geographic areas.

Age of mother

The rate of low birthweight varies according to the age of the mother. Among Indigenous mothers in 2011, those aged 35 and over had the highest rate of low birthweight babies (15%) followed by mothers aged 20–24 (13%) (Figure 4.6). Among non-Indigenous mothers, those aged under 20 had the highest rate of low birthweight births (8%) followed by those aged 35 and over (7%).

Indigenous mothers aged under 20 were about 1.6 times as likely to have low birthweight babies as non-Indigenous mothers in this age group. In all other age groups, Indigenous mothers were around twice as likely to have low birthweight babies as non-Indigenous mothers (rate ratios ranged from 2.1 to 2.3).



Note: Data for this figure are shown in Appendix Table C4.6.

Source: AIHW National Perinatal Data Collection.

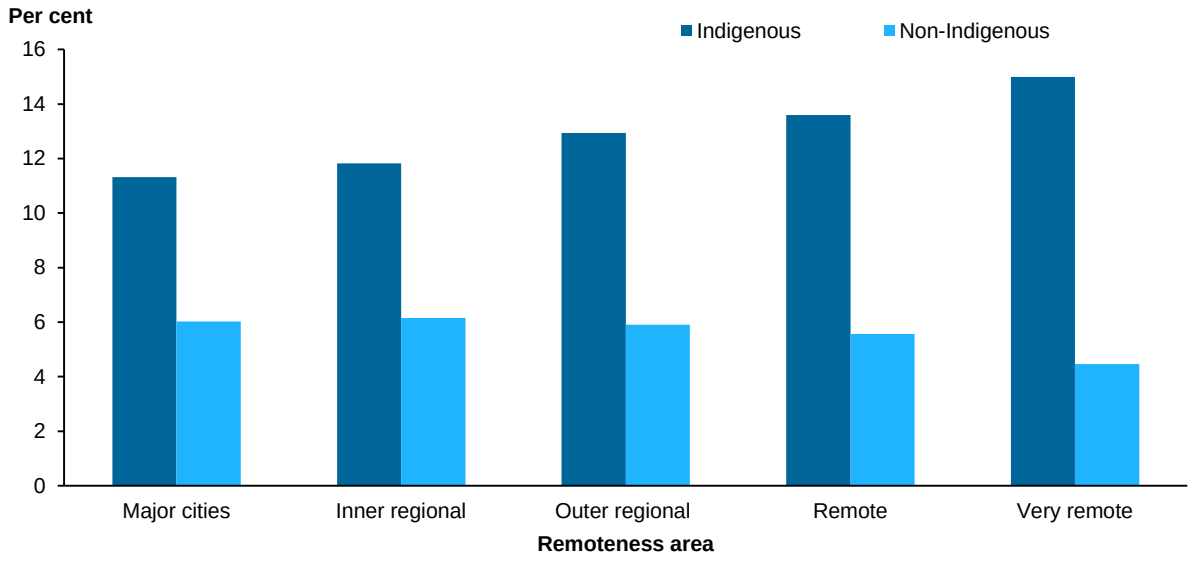
Figure 4.6: Liveborn low birthweight babies, by Indigenous status of the mother and maternal age, 2011

Socioeconomic status

In 2011, 13.3% of liveborn babies of Indigenous mothers who were living in areas that were the lowest quintile of socioeconomic status (that is, the most disadvantaged) were of low birthweight (Appendix Table C4.6). In comparison, 10.2% of babies in the least disadvantaged areas were of low birthweight. For babies born to non-Indigenous mothers, low birthweight rates were similarly highest among those in the most disadvantaged areas (6.5%). However, across all quintiles, low birthweight rates for babies born to Indigenous mothers were around twice as high as the rates for babies born to non-Indigenous mothers.

Geographic variation

Low birthweight rates also vary according to the remoteness of the usual residence of the mother (Figure 4.7). In 2011, the low birthweight rate among babies born to Indigenous mothers generally increased with increasing remoteness, ranging from 11% in *Major cities* to 15% in *Very remote* areas (Appendix Table C4.6). In contrast, for babies born to non-Indigenous mothers, the low birthweight rate was slightly lower for mothers in *Very remote* areas (4.5%) than in the other areas (ranging from 5.6% in *Remote* areas to 6.1% in *Inner regional* areas).



Note: Data for this figure are shown in Appendix Table C4.6.

Source: AIHW National Perinatal Data Collection.

Figure 4.7: Liveborn low birthweight babies, by Indigenous status of the mother and remoteness, 2011

The difference in the low birthweight rate between babies born to Indigenous and non-Indigenous mothers was greatest in *Very remote* areas—babies born to Indigenous mothers in these areas were around 3 times as likely as babies born to non-Indigenous mothers (rate ratio of 3.4) to be of low birthweight (Appendix Table C4.6).

Appendix A: Data source and technical notes

Data in this paper are sourced from the AIHW NPDC which is managed by the National Perinatal Epidemiology and Statistics Unit. The NPDC is a national population-based cross-sectional data collection about pregnancy and childbirth.

The data in the NPDC are based on information on births reported to the perinatal data collection in each state and territory in Australia. Midwives or other staff complete notification forms for each birth, using information obtained from mothers and from hospital or other records. All births in Australia—whether they occurred in hospitals, birth centres or the community—are included. The information collected includes records of antenatal care, the care provided during labour, and the delivery and care provided after the birth.

Each jurisdiction has its own form and/or electronic system for collecting data, which are forwarded to the relevant health department to form the state or territory perinatal data collection. An extract of these data is then provided to, and collated by, the National Perinatal Epidemiology and Statistics Unit to form the national collection. Data supplied for the NPDC consist of the Perinatal NMDS and a series of additional data items.

For all but one jurisdiction, information is included in the NPDC for births of at least 20 weeks gestation or for babies weighing at least 400 grams at birth (the weight expected of a baby at 20 weeks gestational age), whether born alive or stillborn. The one exception is Western Australia where births of at least 20 weeks gestation or, if gestation was unknown, a birthweight of at least 400 grams is included. Babies not weighed at birth and whose gestational age *and* birthweight were not recorded are not included in the NPDC.

The NPDC includes data about live births and stillborn babies (that is, fetal deaths). Live births are defined as the complete expulsion or extraction from the mother of a baby (irrespective of the duration of the pregnancy) who breathes or shows any other evidence of life after birth.

Identifying babies of Indigenous mothers

Data collected as part of the Perinatal NMDS include information about the Indigenous status of women who gave birth in the reporting period. No information is available on the Indigenous status of the father. Thus, these particular data do not provide a total count of Indigenous babies.

Information on the Indigenous status of the mother has been part of the Perinatal NMDS since its inception in 1997. However, the 'not stated' category of Indigenous status was added to the NPDC only in 2000; before that time, 'not stated' responses were included in the number of births to non-Indigenous mothers. As well, before 2005, Tasmania included the 'not stated' Indigenous category with the 'non-Indigenous' category. Since 2005, all jurisdictions have collected information on Indigenous status of the mother in accordance with the NMDS.

Data presented on Indigenous mothers are influenced by the quality and completeness of Indigenous identification, which may vary across jurisdictions and over time. No formal national assessment of the Perinatal NMDS has been undertaken to determine completeness of the coverage or validity of the Indigenous identifier of mothers.

In 2011, information on Indigenous status was provided for nearly all mothers (99.8%) of liveborn babies. In this paper, data on mothers for whom Indigenous status was 'not stated' have been excluded from the analyses, unless otherwise stated.

Identifying Indigenous babies

A data item on Indigenous status of the *baby* was added to the Perinatal NMDS for collection from 1 July 2012 onward. However, before its addition to the NMDS, some jurisdictions already collected this information. For 2011, data on the baby's Indigenous status are available for 6 jurisdictions: New South Wales, Victoria, Queensland, Tasmania, the Australian Capital Territory and the Northern Territory. In these 6 jurisdictions, information on Indigenous status was missing for 6% of all liveborn babies in 2011. Note that this is a relatively new data item in most state and territory perinatal data collections.

Trend analyses

Perinatal trend data presented in this paper are limited to 6 states and territories—New South Wales, Victoria, Queensland, Western Australia, South Australia and the Northern Territory. These have been assessed by the AIHW as having adequate identification of Indigenous mothers in their perinatal collections from 1991 onwards (AIHW: Leeds et al. 2007).

Various statistical methods can be used to model trend data and to determine if there is a statistically significant trend. For the time series analyses presented in this paper, linear regression were used to determine whether there has been a significant change in the observed rates over the period.

The simple linear regression line $Y=a + bX$ was used to determine the average annual change in the data over the period (represented by b). The 95% confidence intervals for the standard error of the slope estimate (average annual change) were used to determine whether any apparent increases or decreases in the data were statistically significant at the $p<0.05$ level. The per cent change estimates were calculated using start and end points derived from the regression line (rather than the actual start and end points), thereby overcoming some of the volatility in the data.

Regression modelling has the advantage of jointly considering the information contained in the series of rates (that is, taking into account volatility from year to year), rather than considering each time point separately. However, care should be taken when assessing apparent changes over time, particularly those involving small numbers and a small number of data points. Trend data on the birthweight of babies born to Indigenous mothers are also influenced by the quality and completeness of Indigenous identification which may vary over time and across jurisdictions.

In the tables that show the results of the regression analyses (for example, Appendix Table C3.6), statistically significant differences in rates, rate ratios and rate differences at the $p<0.05$ level are indicated with an asterisk (*). In the text, a *statistically significant difference*, for example between Indigenous and non-Indigenous mothers or over time, is denoted as 'significant'. The word 'significant' (or 'significantly') is not used outside this statistical context.

Further information

Further information about the NPDC (including the Data Quality Statement) is in the report Australia's *Mothers and Babies 2011* (Li et al. 2013).

Appendix B: Comparison of NPDC and ABS data on live births

Estimates of the annual numbers of live births in Australia are available from two collections: the NPDC and ABS birth registrations data. The two collections differ in regard to the collecting and reporting of the data. A number of the key differences between the two collections are described in Table B1.

While both collections provide information about births to Indigenous mothers, the ABS births collection also provides information about births where either one or both parents are Indigenous—with these births referred to as Aboriginal and Torres Strait Islander births by the ABS. The NPDC collection does not include information about the Indigenous status of the fathers.

Table B1: Differences between the collecting and reporting of data on live births: NPDC and the ABS births collection

	NPDC	ABS
Collection method	An epidemiological data collection of births reported to the perinatal data collection in each state and territory in Australia. Midwives and other staff, using information obtained from mothers and from hospital or other records, complete notification forms for each birth.	A vital statistics data collection about births registered in Australia by state and territory Registrars of Births, Deaths and Marriages. The registration of births by the registrars is based on data provided on the birth registration form completed by the parents(s) of the child.
Reporting method of birth year	Based on year of birth (that is, year of occurrence).	Data are predominantly released based on year of registration of the birth. Some data are also published based on year of occurrence but such data are not published according to Indigenous status.
Indigenous status	National data are available based on the Indigenous status of the mother. For 2011, information on the Indigenous status of the babies was available for selected jurisdictions. The mandatory national collection of data on the Indigenous status of the baby began on 1 July 2012 following the inclusion of this data item in the Perinatal NMDS, but these data are not yet available.	An Indigenous birth is defined as a liveborn child where at least one parent reported as being Indigenous. Data are also released based only on the Indigenous status of the mother.

Sources: ABS 2013b; Laws et al. 2007; Li et al. 2013.

Over the past decade, the number of live births reported to the NPDC has been consistently larger than that recorded in the births registration data (based on year of occurrence), with the difference ranging from a low of 1.1% in 2008 to a high of 2.5% in 2006 (Table B2). In 2011, the number of births reported to the NPDC was 1.9% larger than that recorded in the ABS births registration data—a difference of 5,516 births.

While data about all births are published by the ABS according to both year of occurrence and year of registration of the birth, births to Indigenous women are only published according to year of registration. The number of live births to Indigenous mothers in 2011 reported to the NPDC is 9% smaller (1,137 fewer births) than the number registered by the ABS in that year (Table B3). By comparison, the number of all live births reported to the NPDC was 0.7% smaller (2,029) than the number registered.

Table B2: Live births: comparison of data from the NPDC and ABS births registration data, 2001 to 2011

	Number of births			% difference: NPDC compared with ABS	
	NPDC	ABS: year of occurrence	ABS: year of registration	Based on year of occurrence	Based on year of registration
2001	252,572	248,875	246,394	1.5	2.5
2002	253,388	250,454	250,988	1.2	1.0
2003	255,099	251,046	251,161	1.6	1.6
2004	255,286	251,622	254,246	1.5	0.4
2005	270,440	266,273	264,493	1.6	2.2
2006	280,078	273,325	270,849	2.5	3.4
2007	292,027	288,058	292,152	1.4	0.0
2008	294,737	291,482	302,272	1.1	–2.5
2009	296,791	293,259	301,253	1.2	–1.5
2010	297,357	292,758	303,318	1.6	–2.0
2011	299,588	294,072	301,617	1.9	–0.7

Note: The ABS publishes births data based predominantly on the year the birth was registered by state and territory Registrars of Births, Deaths and Marriages. Some data are also published based on year of occurrence of the birth but such data are not published according to Indigenous status.

Sources: ABS 2012, 2013b; Laws et al. 2006; Laws et al. 2007; Laws et al. 2010; Laws & Hilder 2008; Laws & Sullivan 2004a, 2004b, 2005, 2009; Li et al. 2011; Li et al. 2012, 2013.

Since there is usually a lag between the birth of a child and the registration of the birth, some births occurring in one year are not registered by the ABS until the following year (or possibly even later) (ABS 2013b). Thus the NPDC data about births are not directly comparable with data by year of registration as published by the ABS. It is likely that delays in registration are balanced by the late registration of births from the previous year, to some degree. However, as shown in Table B2, the extent to which this is true varies over time, at least when considering total live births.

Table B3: Live births, by Indigenous status of the parent(s), 2011

Live births	NPDC	ABS: based on year of occurrence of birth	ABS: based on year of registration of birth
Indigenous			
Births to Indigenous mothers	11,737	n.a.	12,874
Births to Indigenous parent(s)	. .	n.a.	17,621
Total births	**299,588**	**294,072**	**301,617**

Sources: ABS 2013b: tables 1.9, 7.9 and 11.8; Li et al. 2013: tables 2.1 and 4.3.

Due to differences in collection methodology, definitions and reporting, comparisons between these collections should be made with caution.

Appendix C: Additional tables

Table C2.1: Births, by Indigenous status of the mother and birth status, 2011

	Indigenous		Non-Indigenous		Total[a]	
Birth status	**Number**	**Per cent**	**Number**	**Per cent**	**Number**	**Per cent**
Live birth	11,737	98.7	287,149	99.3	299,588	99.3
Fetal death	158	1.3	2,055	0.7	2,220	0.7
Total[b]	**11,895**	**100.0**	**289,206**	**100.0**	**301,810**	**100.0**

(a) Includes mothers whose Indigenous status was not reported.

(b) Includes births for which information on the 'birth status' (that is, whether it was a live birth or fetal death) was not available. This applied to 2 babies who were both born to non-Indigenous mothers.

Note: Proportions in this table—and in all subsequent tables—may not sum to the total due to rounding.

Source: Li et al. 2013: Table 4.3.

Table C2.2: Women who gave birth, by remoteness[a] and Indigenous status, 2011

Remoteness area	Indigenous	Non-Indigenous	Not stated	Total
Number				
Major cities	3,463	206,096	424	209,983
Inner regional	2,399	47,747	161	50,307
Outer regional	2,632	23,666	80	26,378
Remote	1,139	3,864	9	5,012
Very remote	1,941	1,446	3	3,390
Total	**11,574**	**282,820**	**676**	**295,070**
Per cent				
Major cities	29.9	72.9	62.7	71.2
Inner regional	20.7	16.9	23.8	17.0
Outer regional	22.7	8.4	11.8	8.9
Remote	9.8	1.4	1.3	1.7
Very remote	16.8	0.5	0.5	1.1
Total	**100.0**	**100.0**	**100.0**	**100.0**

(a) Based on place of usual residence. Excludes mothers not usually resident in Australia and those for whom information on the remoteness of their usual residence was not available.

Note: Remoteness areas are based on the Australian Statistical Geography Standard (ABS 2013a).

Source: Li et al. 2013: Table 3.6.

Table C2.3: Women who gave birth, by maternal age and Indigenous status, 2011

	Number		Per cent	
Age group (years)	**Indigenous**	**Non-Indigenous**	**Indigenous**	**Non-Indigenous**
Under 20	2,185	8,765	18.6	3.1
20–24	3,810	37,050	32.5	13.0
25–29	2,904	79,673	24.8	28.0
30–34	1,734	92,091	14.8	32.3
35–39	872	53,226	7.4	18.7
40 and over	206	12,460	1.8	4.4
Not stated	18	1,446	0.2	0.5
Total	**11,729**	**284,711**	**100.0**	**100.0**
Mean age	*25.3*	*30.2*	*. .*	*. .*

Source: Li et al. 2013: Table 3.3.

Table C3.1: Liveborn babies[(a)], by Indigenous status of the baby, selected jurisdictions[(b)], 2011

Indigenous status of the baby	Number	Per cent[(c)]
Indigenous	11,095	4.8
Non-Indigenous	221,326	95.2
Not stated	15,038	. .
Total	**247,459**	**100.0**

(a) Data on Indigenous status of the baby were not part of the Perinatal NMDS for the 2011 NPDC collection and the question used was not consistent across jurisdictions.

(b) Excludes women who gave birth in Western Australia and South Australia since data on the Indigenous status of the baby were not available in these states.

(c) Babies with unknown Indigenous status were excluded before calculating proportions.

Source: AIHW National Perinatal Data Collection.

Table C3.2: Liveborn babies, by Indigenous status of the baby[(a)] and Indigenous status of the mother, selected jurisdictions[(b)], 2011

Indigenous status of the baby	Number				Per cent			
	Indigenous mother	Non-Indigenous mother	Not stated	Total	Indigenous mother	Non-Indigenous mother	Not stated	Total
Singleton births								
Indigenous	7,894	2,898	10	10,802	73.1	26.8	0.1	100.0
Non-Indigenous	756	213,297	285	214,338	0.4	99.5	0.1	100.0
Not stated	457	13,870	361	14,688	3.1	94.4	2.5	100.0
Total	**9,107**	**230,065**	**656**	**239,828**	**3.8**	**95.9**	**0.3**	**100.0**
All live births								
Indigenous	8,120	2,963	12	11,095	73.2	26.7	0.1	100.0
Non-Indigenous	778	220,240	308	221,326	0.4	99.5	0.1	100.0
Not stated	479	14,177	382	15,038	3.2	94.3	2.5	100.0
Total	**9,377**	**237,380**	**702**	**247,459**	**3.8**	**95.9**	**0.3**	**100.0**

(a) Data on Indigenous status of the baby were not part of the Perinatal NMDS for the 2011 NPDC collection and the question used was not consistent across jurisdictions.

(b) Excludes women who gave birth in Western Australia and South Australia since data on the Indigenous status of the baby were not available in these states.

Source: AIHW National Perinatal Data Collection.

Table C3.3: Birthweight of liveborn babies, by Indigenous status of the baby[(a)], selected jurisdictions[(b)], 2011

	Number		Per cent	
Birthweight (grams)	**Indigenous**	**Non-Indigenous**	**Indigenous**	**Non-Indigenous**
Singleton births				
Low birthweight				
Less than 1,500	164	1,641	1.5	0.8
1,500–2,499	932	8,206	8.6	3.8
Total low birthweight	*1,096*	*9,847*	*10.1*	*4.6*
Normal birthweight				
2,500–2,999	2,193	30,888	20.3	14.4
3,000–3,499	3,694	78,615	34.2	36.7
3,500–3,999	2,764	68,508	25.6	32.0
4,000–4,499	879	22,544	8.1	10.5
Total normal birthweight	*9,530*	*200,555*	*88.2*	*93.6*
High birthweight				
4,500 and over	175	3,893	1.6	1.8
Total high birthweight	*175*	*3,893*	*1.6*	*1.8*
Not stated	1	43	. .	. .
Total[(c)]	**10,802**	**214,338**	**100.0**	**100.0**
Mean birthweight	*3,249*	*3,407*	*. .*	*. .*
All live births				
Low birthweight				
Less than 1,500	196	2,332	1.8	1.1
1,500–2,499	1,084	11,225	9.8	5.1
Total low birthweight	*1,280*	*13,557*	*11.5*	*6.1*
Normal birthweight				
2,500–2,999	2,267	33,235	20.4	15.0
3,000–3,499	3,722	79,460	33.5	35.9
3,500–3,999	2,769	68,589	25.0	31.0
4,000–4,499	881	22,549	7.9	10.2
Total normal birthweight	*9,639*	*203,833*	*86.9*	*92.1*
High birthweight				
4,500 and over	175	3,893	1.6	1.8
Total high birthweight	*175*	*3,893*	*1.6*	*1.8*
Not stated	1	43	. .	. .
Total[(c)]	**11,095**	**221,326**	**100.0**	**100.0**
Mean birthweight	*3,222*	*3,374*	*. .*	*. .*

(a) Data on Indigenous status of the baby were not part of the Perinatal NMDS for the 2011 NPDC collection and the question used was not consistent across jurisdictions.

(b) Excludes women who gave birth in Western Australia and South Australia since data on the Indigenous status of the baby were not available in these states.

(c) Babies with unknown birthweight were excluded before calculating proportions.

Source: AIHW National Perinatal Data Collection.

Table C3.4: Birthweight of liveborn babies, by Indigenous status of the mother, 2011

	Number		Per cent[a]	
Birthweight (grams)	**Indigenous**	**Non-Indigenous**	**Indigenous**	**Non-Indigenous**
Singleton births				
Low birthweight				
Less than 1,500	197	1,963	1.7	0.7
1,500–2,499	1,079	10,705	9.5	3.8
Total low birthweight	*1,276*	*12,668*	*11.2*	*4.6*
Normal birthweight				
2,500–2,999	2,470	40,325	21.6	14.5
3,000–3,499	3,854	102,386	33.8	36.8
3,500–3,999	2,755	89,010	24.1	32.0
4,000–4,499	891	29,109	7.8	10.5
Total normal birthweight	*9,970*	*260,830*	*87.4*	*93.7*
High birthweight				
4,500 and over	166	4,873	1.5	1.8
Total high birthweight	*166*	*4,873*	*1.5*	*1.8*
Not stated	1	49	. .	. .
Total[a]	**11,413**	**278,420**	**100.0**	**100.0**
Mean birthweight	*3,215*	*3,406*	*. .*	*. .*
All live births				
Low birthweight				
Less than 1,500	237	2,819	2.0	1.0
1,500–2,499	1,245	14,441	10.6	5.0
Total low birthweight	*1,482*	*17,260*	*12.6*	*6.0*
Normal birthweight				
2,500–2,999	2,550	43,326	21.7	15.1
3,000–3,499	3,887	103,419	33.1	36.0
3,500–3,999	2,759	89,105	23.5	31.0
4,000–4,499	892	29,116	7.6	10.1
Total normal birthweight	*10,088*	*264,966*	*86.0*	*92.3*
High birthweight				
4,500 and over	166	4,873	1.4	1.7
Total high birthweight	*166*	*4,873*	*1.4*	*1.7*
Not stated	1	50	. .	. .
Total[a]	**11,737**	**287,149**	**100.0**	**100.0**
Mean birthweight	*3,187*	*3,375*	*. .*	*. .*

(a) Babies with unknown birthweight were excluded before calculating proportions.

Source: AIHW National Perinatal Data Collection.

Table C3.5: Birthweight of liveborn babies, by Indigenous status of the mother and sex of the baby, 2011

	Number			Per cent[a]		
Birthweight (grams)	**Males**	**Females**	**Total[b]**	**Males**	**Females**	**Total[b]**
Singleton births						
Indigenous						
Less than 2,500	611	665	1,276	10.4	12.0	11.2
2,500–4,499	5,155	4,815	9,970	87.7	87.0	87.4
4,500 and over	113	53	166	1.9	1.0	1.5
Not stated	—	1	1	—	—	—
Total	**5,879**	**5,534**	**11,413**	**100.0**	**100.0**	**100.0**
Mean birthweight	*3,272*	*3,154*	*3,215*			
Non-Indigenous						
Less than 2,500	6,021	6,642	12,668	4.2	4.9	4.6
2,500–4,499	133,770	126,997	260,830	93.5	93.9	93.7
4,500 and over	3,323	1,548	4,873	2.3	1.1	1.8
Not stated	19	29	49	. .	. .	. .
Total	**143,133**	**135,216**	**278,420**	**100.0**	**100.0**	**100.0**
Mean birthweight	*3,464*	*3,345*	*3,406*	*. .*	*. .*	*. .*
All live births						
Indigenous						
Less than 2,500	699	783	1,482	11.6	13.7	12.6
2,500–4,499	5,214	4,874	10,088	86.5	85.4	86.0
4,500 and over	113	53	166	1.9	0.9	1.4
Not stated	—	1	1	. .	. .	. .
Total	**6,026**	**5,711**	**11,737**	**100.0**	**100.0**	**100.0**
Mean birthweight	*3,248*	*3,123*	*3,187*	*. .*	*. .*	*. .*
Non-Indigenous						
Less than 2,500	8,205	9,047	17,260	5.6	6.5	6.0
2,500–4,499	135,998	128,900	264,966	92.2	92.4	92.3
4,500 and over	3,323	1,548	4,873	2.3	1.1	1.7
Not stated	19	30	50	. .	. .	. .
Total	**147,545**	**139,525**	**287,149**	**100.0**	**100.0**	**100.0**
Mean birthweight	*3,432*	*3,314*	*3,375*	*. .*	*. .*	*. .*

(a) Babies with unknown birthweight were excluded before calculating proportions.

(b) Total includes babies with unknown sex—information on sex was missing for 79 babies born to non-Indigenous mothers (including 71 singleton babies); there was no missing information on sex for babies born to Indigenous mothers.

Source: AIHW National Perinatal Data Collection.

Table C3.6: Low birthweight liveborn babies, by Indigenous status of the mother, selected jurisdictions[a][b], 2000 to 2011

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	Annual change[c]	Per cent change[c]
Singleton births														
Rate[d]														
Indigenous	11.7	11.5	11.8	11.9	12.1	12.1	11.4	11.3	11.1	10.8	10.7	11.1	–0.10*	–8.9*
Non-Indigenous	4.5	4.5	4.6	4.5	4.6	4.5	4.6	4.4	4.4	4.4	4.5	4.5	–0.01	–2.0
Rate ratio[e]	2.6	2.6	2.6	2.6	2.6	2.7	2.5	2.6	2.5	2.4	2.4	2.5	–0.02*	–7.1*
Rate difference[f]	7.2	7.0	7.3	7.4	7.5	7.5	6.8	6.9	6.7	6.4	6.3	6.6	–0.09*	–13.1*
All live births														
Rate[d]														
Indigenous	12.7	12.8	12.9	12.9	13.1	13.3	12.4	12.6	12.2	11.9	12.0	12.5	–0.08*	–6.4*
Non-Indigenous	6.1	6.0	6.1	6.0	6.1	6.1	6.2	5.9	5.9	5.9	5.9	6.0	–0.02	–2.9
Rate ratio[e]	2.1	2.1	2.1	2.1	2.2	2.2	2.0	2.1	2.1	2.0	2.0	2.1	–0.01	–3.7
Rate difference[f]	6.6	6.8	6.8	6.8	7.0	7.2	6.3	6.7	6.4	6.0	6.1	6.5	–0.06*	–9.6*

* Indicates results with a statistically significant difference at the $p < 0.05$ level over the period 2000 to 2011.

(a) Excludes data for Tasmania and the Australian Capital Territory as these data are not considered stable enough to be included in trend analyses (AIHW: Leeds et al. 2007).

(b) Data are by place of usual residence of the mother. Non-residents, mothers in external territories and those with 'not stated' state/territory of residence are excluded.

(c) Determined using linear regression analyses (see Appendix A for details).

(d) Per 100 live births.

(e) Rate ratio is the Indigenous rate divided by the non-Indigenous rate.

(f) Rate difference is the Indigenous rate minus the non-Indigenous rate.

Source: AIHW National Perinatal Data Collection.

Table C3.7: High birthweight liveborn babies, by Indigenous status of the mother, selected jurisdictions, 2000 to 2011[a][b]

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	Annual change[c]	Per cent change[c]
Singleton births														
Rate[d]														
Indigenous	1.7	1.5	1.4	1.6	1.4	1.2	1.5	1.4	1.5	1.3	1.7	1.5	—	–3.3
Non-Indigenous	2.0	1.9	1.8	1.9	1.9	1.8	1.9	1.8	1.9	1.9	1.8	1.7	–0.01*	–7.4*
Rate ratio[e]	0.9	0.8	0.8	0.8	0.7	0.7	0.8	0.8	0.8	0.7	0.9	0.9	<0.01	5.1
Rate difference[f]	–0.3	–0.5	–0.4	–0.3	–0.5	–0.6	–0.4	–0.4	–0.4	–0.5	–0.2	–0.3	0.01	–21.6
All live births														
Rate[d]														
Indigenous	1.7	1.4	1.4	1.5	1.4	1.2	1.5	1.4	1.4	1.3	1.6	1.4	—	–3.6
Non-Indigenous	1.9	1.9	1.8	1.8	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.7	–0.01*	–7.2*
Rate ratio[e]	0.9	0.8	0.8	0.8	0.7	0.7	0.8	0.8	0.8	0.7	0.9	0.9	<0.01	4.4
Rate difference[f]	–0.3	–0.4	–0.4	–0.3	–0.5	–0.6	–0.3	–0.4	–0.4	–0.5	–0.2	–0.2	0.01	–20.0

* Indicates results with a statistically significant difference at the $p < 0.05$ level over the period 2000 to 2011.

(a) Excludes data for Tasmania and the Australian Capital Territory as these data are not considered stable enough to be included in trend analyses (AIHW: Leeds et al. 2007).

(b) Data are by place of usual residence of the mother. Non-residents, mothers in external territories and those with 'not stated' state/territory of residence are excluded.

(c) Determined using linear regression analyses (see Appendix A for details).

(d) Per 100 live births.

(e) Rate ratio is the Indigenous rate divided by the non-Indigenous rate.

(f) Rate difference is the Indigenous rate minus the non-Indigenous rate.

Source: AIHW National Perinatal Data Collection.

Table C3.8: Mean birthweight of liveborn babies, by Indigenous status of the mother, selected jurisdictions[a][b], 2000 to 2011

	Mean birthweight (grams)		
Year	Indigenous	Non-Indigenous	Difference (grams)
Singleton births			
2000	3,197	3,417	–220
2001	3,192	3,416	–224
2002	3,186	3,412	–226
2003	3,181	3,414	–232
2004	3,179	3,415	–236
2005	3,176	3,411	–235
2006	3,191	3,412	–221
2007	3,201	3,413	–213
2008	3,218	3,417	–199
2009	3,204	3,413	–209
2010	3,214	3,408	–194
2011	3,216	3,406	–190
Annual change[c]	2.8*	–0.6*	3.4*
Per cent change[c]	1.0*	–0.2*	–15.7*
All live births			
2000	3,176	3,384	–207
2001	3,168	3,382	–215
2002	3,165	3,378	–213
2003	3,160	3,380	–219
2004	3,159	3,381	–222
2005	3,155	3,376	–222
2006	3,168	3,377	–210
2007	3,178	3,382	–204
2008	3,196	3,384	–189
2009	3,183	3,381	–198
2010	3,189	3,376	–188
2011	3,189	3,375	–186
Annual change[c]	2.5*	–0.4	2.8*
Per cent change[c]	0.9*	–0.1	–14.0*

* Indicates results with a statistically significant difference at the $p < 0.05$ level over the period 2000 to 2011.

(a) Excludes data for Tasmania and the Australian Capital Territory as these data are not considered stable enough to be included in trend analyses (AIHW: Leeds et al. 2007).

(b) Data are by place of usual residence of the mother. Non-residents, mothers in external territories and those with 'not stated' state/territory of residence are excluded.

(c) Determined using linear regression analyses (see Appendix A for details).

Source: AIHW National Perinatal Data Collection.

Table C4.1: Pre-term liveborn births, by Indigenous status of the mother, selected jurisdictions[a], 2000 to 2011

	2000[b]	2001[b]	2002[b]	2003[b]	2004	2005	2006	2007	2008	2009	2010	2011	Annual change[c]	Per cent change[c]
Singleton births														
Rate[d]														
Indigenous	12.2	11.7	11.7	12.2	12.3	12.0	11.8	11.6	11.3	10.8	11.5	11.5	–0.08*	–7.2*
Non-Indigenous	5.6	5.5	5.6	5.6	5.8	5.7	5.8	5.9	5.8	5.8	5.9	5.9	0.04*	7.3*
Rate ratio[e]	2.2	2.1	2.1	2.2	2.1	2.1	2.0	2.0	1.9	1.9	2.0	1.9	–0.03*	–13.6*
Rate difference[f]	6.6	6.2	6.1	6.7	6.5	6.3	6.0	5.7	5.5	5.0	5.6	5.5	–0.12*	–19.4*
All live births														
Rate[d]														
Indigenous	13.6	13.4	13.2	13.7	13.5	13.2	12.9	12.9	12.4	12.1	12.8	12.8	–0.10*	–8.3*
Non-Indigenous	7.9	7.8	7.9	7.9	7.4	7.4	7.4	7.4	7.4	7.4	7.4	7.5	–0.05*	–6.7*
Rate ratio[e]	1.7	1.7	1.7	1.7	1.8	1.8	1.7	1.7	1.7	1.6	1.7	1.7	<0.01	–1.9
Rate difference[f]	5.7	5.5	5.3	5.8	6.1	5.9	5.4	5.5	5.0	4.7	5.4	5.4	–0.06	–10.6

* Indicates results with a statistically significant difference at the $p < 0.05$ level over the period 2000 to 2011.

(a) Excludes data for Tasmania and the Australian Capital Territory as these data are not considered stable enough to be included in trend analyses (AIHW: Leeds et al. 2007). Data are by place of usual residence of the mother. Non-residents, mothers in external territories and those with 'not stated' state/territory of residence are excluded.

(b) For multiple births, the gestational age of the first born baby was used.

(c) Determined using linear regression analyses (see Appendix A for details).

(d) Per 100 live births.

(e) Rate ratio is the Indigenous rate divided by the non-Indigenous rate.

(f) Rate difference is the Indigenous rate minus the non-Indigenous rate.

Source: AIHW National Perinatal Data Collection.

Table C4.2 Tobacco smoking during pregnancy, by Indigenous status and maternal age, 2011 (per cent)

Age group (years)	Indigenous	Non-Indigenous
Under 20	47.5	33.4
20–24	52.9	22.5
25–29	52.1	11.9
30–34	47.0	7.8
35–39	44.0	7.8
40 and over	46.3	8.4
Total[(a)]	**50.0**	**11.7**

(a) Includes mothers for whom maternal age was not stated.

Source: AIHW 2013.

Table C4.3: Tobacco smoking during pregnancy, by Indigenous status of the mother, selected jurisdictions[(a)]**, 2005 to 2011**[(b)(c)]

	2005[(d)]	2006	2007	2008	2009	2010	2011	Annual change[(e)]	Per cent change over period[(e)]
Indigenous									
Crude[(f)]	54.8	53.8	53.0	52.5	52.4	51.8	50.7	–0.60*	–6.6*
Age-standardised[(f)(g)]	53.5	52.7	51.8	51.0	51.3	50.5	50.1	–0.54*	–6.1*
Non-Indigenous									
Crude[(f)]	15.8	15.8	14.9	14.5	13.7	12.4	11.7	–0.72*	–26.5*
Age-standardised[(f)(g)]	16.4	16.3	15.5	15.1	14.3	13.1	12.4	–0.70*	–24.9*
Rate ratio[(h)]	3.3	3.2	3.3	3.4	3.6	3.9	4.0	0.14*	26.2*
Rate difference[(i)]	37.1	36.5	36.3	35.9	37.0	37.4	37.7	0.16	2.6

* Indicates results with a statistically significant difference at the $p < 0.05$ level over the period referenced.

(a) Excludes data for Victoria, as these data were not available before 2009. Data are based on state/territory of birth.

(b) Excludes mothers for whom smoking status was not stated.

(c) Smoking status during pregnancy was not part of the Perinatal NMDS for the 2005 to 2009 collection periods. The Perinatal NMDS includes two standardised data items on smoking during pregnancy for births from July 2010: smoking during the first 20 weeks of pregnancy, and smoking after 20 weeks of pregnancy. In 2010, standardised data were implemented by Victoria, Queensland, Western Australia, South Australia, and the Australian Capital Territory for the whole year and partially implemented by Tasmania and the Northern Territory. In 2011, standardised data were available for all jurisdictions except for Tasmania (which partially implemented the standard data items). Data from non-standard smoking items made available as part of the NPDC have been used when data from standardised items were not available; therefore, caution should be used when interpreting these data.

(d) For Queensland, smoking status data were collected from 1 July 2005; therefore, data for 2005 include only 6 months of data for Queensland (July–December 2005). For the other jurisdictions (New South Wales, Western Australia, South Australia, Tasmania, the Australian Capital Territory and the Northern Territory), 12 months of data were available for all years shown in the table.

(e) Determined using linear regression analyses (see Appendix A for details).

(f) Per 100 women who gave birth in the relevant period.

(g) Directly age-standardised using the Australian female population who gave birth in 2001.

(h) Rate ratio is the Indigenous rate divided by the non-Indigenous rate.

(i) Rate difference is the Indigenous rate minus the non-Indigenous rate.

Source: AIHW National Perinatal Data Collection.

Table C4.4: Mothers who attended at least 1 antenatal visit, by Indigenous status, New South Wales, Queensland and South Australia combined[a], 2000 to 2011[b]

	Indigenous			Non-Indigenous				
	Number	Crude rate[c]	Age-standardised rate[c][d]	Number	Crude rate[c]	Age-standardised rate[c][d]	Rate Ratio[e]	Rate Difference[f]
2000	5,010	93.6	93.8	143,582	97.6	97.6	0.96	–3.8
2001	4,912	94.4	94.4	142,465	97.9	97.9	0.96	–3.5
2002	4,985	93.7	93.7	142,118	98.0	98.0	0.96	–4.3
2003	5,236	95.4	95.3	144,264	98.5	98.5	0.97	–3.1
2004	5,272	94.8	94.6	144,046	98.7	98.7	0.96	–4.1
2005	5,806	96.3	96.1	152,936	98.5	98.5	0.97	–2.5
2006	5,856	96.1	95.9	156,521	98.5	98.5	0.97	–2.6
2007	6,396	96.4	96.0	163,251	98.1	98.1	0.98	–2.1
2008	6,744	96.7	96.7	165,508	98.7	98.7	0.98	–2.0
2009	6,654	97.2	97.3	166,422	98.7	98.7	0.99	–1.4
2010	7,035	97.5	97.3	165,754	98.5	98.6	0.99	–1.3
2011	7,095	97.0	97.0	165,491	97.7	97.7	0.99	–0.7
Annual change[g]	226.2*	0.35*	0.34*	2,755.8*	0.04	0.04	<0.01*	0.30*
Per cent change over period[g]	53.2*	4.1*	4.0*	21.8*	0.4	0.5	3.5*	–77.1*

* Indicates results with a statistically significant difference at the $p < 0.05$ level over the period referenced.

(a) These data are for New South Wales, Queensland and South Australia combined only and cannot be generalised to all of Australia. The data are based on place of birth.

(b) The collection of data on the number of antenatal visits is not part of the Perinatal NMDS. The current question is not consistent across jurisdictions; therefore, caution should be used when interpreting these data.

(c) Per 100 women who gave birth in the relevant period.

(d) Directly age-standardised using the Australian female population who gave birth in 2001.

(e) Rate ratio is the standardised rate for Indigenous Australians divided by the standardised rate for non-Indigenous Australians.

(f) Rate difference is the standardised rate for Indigenous Australians minus the standardised rate for non-Indigenous Australians.

(g) Determined using linear regression (see Appendix A for details).

Sources: AIHW National Perinatal Data Collection; unpublished data provided by jurisdictional perinatal data collections.

Table C4.5: Mothers who attended at least 1 antenatal visit in the first trimester[a], by Indigenous status, New South Wales, South Australia and Northern Territory combined, 2007 to 2011[b]

	2007	2008	2009	2010	2011[c]	Annual change 2007 to 2010[d]	Per cent change 2007 to 2010[d]	Annual change 2007 to 2011[d]	Per cent change 2007 to 2011[d]
Indigenous									
Crude[e]	57.5	61.0	60.7	64.4	58.2	2.05	10.6	0.49	3.3
Age-standardised[e][f]	59.8	63.2	62.3	65.5	59.0	1.61	8.0	0.07	0.4
Non-Indigenous									
Crude[e]	77.6	81.7	79.8	80.6	75.1	0.73	2.8	–0.61	–3.0
Age-standardised [e][f]	77.2	81.4	79.4	80.3	74.4	0.75	2.9	–0.65	–3.2
Rate ratio[g]	0.8	0.8	0.8	0.8	0.8	0.01	5.0	0.01	3.8
Rate difference[h]	–17.4	–18.2	–17.2	–14.9	–15.5	0.86	–14.2	0.72	–15.9

(a) First trimester is up to and including 13 completed weeks. Gestation at first antenatal visit was added to the Perinatal NMDS in July 2010. For births before July 2010, data collection about this data item is not consistent across jurisdictions; therefore, caution should be used when interpreting these data.

(b) These data are for New South Wales, South Australia and the Northern Territory only and cannot be generalised to all of Australia. The data are based on place of birth.

(c) For both Indigenous and non-Indigenous mothers, there was a relatively large decrease in the rate of women who attended at least 1 antenatal visit in the first trimester between 2010 and 2011. This decrease pertained largely to a decrease in the rate of women attending antenatal care in New South Wales (see COAG Reform Council 2014: Table 9.2; SCRGSP 2012: Table 9.4), which may be partly due to a change in the question used in that jurisdiction. Specifically, the question about gestational age at first antenatal visit was changed from 'duration of pregnancy at first contact for care' to 'duration of pregnancy at first comprehensive booking or assessment by a clinician'. However, even when excluding data for 2011—that is, considering the period from 2007 to 2010 only—there was no significant change in the age-standardised rates for either Indigenous or non-Indigenous mothers.

(d) Determined using linear regression analyses.

(e) Per 100 women who gave birth in the relevant period.

(f) Data were directly age-standardised using the female population who gave birth in Australia in 2001.

(g) Rate ratio is the standardised rate for Indigenous Australians divided by the standardised rate for non-Indigenous Australians.

(h) Rate difference is the standardised rate for Indigenous Australians minus the standardised rate for non-Indigenous Australians.

Source: AIHW National Perinatal Data Collection.

Table C4.6: Liveborn low birthweight babies, by Indigenous status of the mother and selected maternal characteristics, 2011

	Number		Rate[a]			
Maternal characteristic	**Indigenous**	**Non-Indigenous**	**Indigenous**	**Non-Indigenous**	**Rate ratio[b]**	**Rate difference[c]**
Age group (years)						
Less than 20	270	690	12.4	7.9	1.6	4.5
20–24	483	2,215	12.7	6.0	2.1	6.7
25–29	352	4,552	12.1	5.7	2.1	6.4
30–34	213	5,307	12.2	5.7	2.1	6.5
35 and over	164	4,405	15.2	6.6	2.3	8.6
Quintile of socioeconomic disadvantage[d]						
1st quintile (most disadvantaged)	764	3,823	13.3	6.5	2.0	6.8
2nd quintile	326	3,592	12.2	6.2	2.0	6.0
3rd quintile	214	3,547	12.2	6.0	2.0	6.2
4th quintile	110	3,350	11.7	5.8	2.0	5.9
5th quintile (least disadvantaged)	49	2,865	10.2	5.5	1.9	4.7
Remoteness[e]						
Major cities	393	12,532	11.3	6.0	1.9	5.3
Inner regional	285	2,958	11.8	6.1	1.9	5.7
Outer regional	338	1,406	12.9	5.9	2.2	7.0
Remote	154	216	13.6	5.6	2.4	8.0
Very remote	291	65	15.0	4.5	3.4	10.5
Total[f]	**1,482**	**17,260**	**12.6**	**6.0**	**2.1**	**6.6**

(a) Per 100 live births. Babies with unknown birthweight were excluded before calculating rates.

(b) The rate ratio is the Indigenous rate divided by the non-Indigenous rate.

(c) The rate difference is the Indigenous rate minus the non-Indigenous rate.

(d) Quintile of disadvantage is based on the SEIFA Index of Socioeconomic Advantage and Disadvantage 2011 (ABS 2013c), population-based, using Australian cut-offs.

(e) Remoteness areas are based on the Australian Statistical Geography Standard (ABS 2013a).

(f) Total applies to all three characteristics and includes mothers with missing data on age, quintile of socioeconomic disadvantage and remoteness.

Source: AIHW National Perinatal Data Collection.

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Birthweight of babies born to Indigenous mothers provides an overview of the birthweight of babies born to Indigenous mothers, including recent trends and information on factors associated with birthweight variation.

According to data from the National Perinatal Data Collection, 3.9% of all births in 2011 were to Indigenous mothers. Excluding multiple births, 11.2% of liveborn singleton babies born to Indigenous mothers were of low birthweight—2.5 times the rate for non-Indigenous mothers (4.6%). Between 2000 and 2011, there was a statistically significant decline in the low birthweight rate among Indigenous mothers, and the gap in birthweight between babies born to Indigenous and non-Indigenous mothers declined significantly over this period.