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Reducing preterm birth among Aboriginal and Torres Strait Islander women: key findings and implications

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Contents

Key message

- Most preterm babies will survive and go on to lead normal and healthy lives but, for many, being born too early creates challenges to neonatal life that persist into adulthood, resulting in lifelong disability and ongoing health issues, such as respiratory problems, neurodevelopmental delay, hearing and visual loss, and learning and behavioural problems.
- Preterm birth is also a significant contributor to perinatal and neonatal mortality, accounting for up to 70% of total neonatal mortality and up to 75% of neonatal morbidity in developed countries.
- Reducing preterm births among Aboriginal and Torres Strait Islander (First Nations) babies is consistent with Target 2 of the *National Agreement on Closing the Gap*, which enjoins parties to the Agreement to 'increase the proportion of Aboriginal and Torres Strait Islander babies with a healthy birthweight to 91 per cent' by 2031 (Joint Council on Closing the Gap 2020).
- The preterm birth rate among babies born to First Nations mothers has changed very little over the past 2 decades; it was 13.9% in 2005 and 13.8% in 2023.
- The preterm birth among non-Indigenous women has also remained unchanged at just over 8% during the past 2 decades. As a result, the gap in preterm birth rates between First Nations and non-Indigenous women has not closed.
- Between 2004 and 2023, the average annual rate of change (AARC) in preterm birth rates was -0.14% for First Nations women and +0.09% for non-Indigenous women.
- An evaluation of the recent and current national preterm birth prevention program, funded by the Commonwealth Department of Health, Disability and Ageing, however, appears to show a reduction in preterm birth rates by 6.4% between 2018 and 2021 (Newnham et al. 2025).
- Socioeconomic circumstances affect preterm birth through a number of mediators or intervening factors, such as poverty; high levels of stress; low levels of education; unemployment; job insecurity; low incomes; inadequate health infrastructure and health services; poor housing; poor nutrition; underweight, overweight and obesity; teenage pregnancy; short inter-birth intervals; health issues such as hypertension, diabetes and infections; and risky health behaviour such as smoking and substance use.
- First Nations women living in remote and very remote areas had about a 10% higher risk of having a preterm birth than First Nations women living in major cities.
- First Nations women with the following conditions had greater odds of having a preterm birth than First Nations women without these conditions (*Table 4.2*):
  - had pre-existing diabetes mellitus (5.2 times greater odds of having a preterm birth)
  - did not attend the recommended minimum number of antenatal care visits (2.7 times greater odds)
  - had pre-existing hypertension (2.3 times greater odds)
  - were underweight (1.6 times greater odds)
  - had gestational hypertension (1.6 times greater odds)
  - had 4 or more previous pregnancies (1.5 times greater odds)

  - smoked at any time during pregnancy (1.4 times greater odds)
  - were aged 35–39 or 40 years and over when they gave birth (1.2 and 1.6 times, greater odds, respectively)
  - had gestational diabetes (1.2 times greater odds).
- Population Attributable Fractions (PAF) or estimates of the percentage of preterm births that could be prevented if certain health risk factors were eliminated among First Nations women (*Table 5.1*) are:
  - not meeting the recommended minimum number of antenatal care visits (38%)
  - smoking at any time during pregnancy (13%)
  - having pre-existing diabetes (8.4%).

Strategies to reduce preterm birth

Many women who have a preterm birth do not have any obvious risk factors. As a result, the strategies recommended in this report for reducing preterm births are based not only on the analysis of data carried out on the National Perinatal Data Collection but also on successful strategies and initiatives from Australia and elsewhere in the world (*see Chapter 7*).

- **Pre-conception primary strategies** are aimed at all First Nations women before they become pregnant.
- **Post-conception primary strategies** are aimed at First Nations women who are already pregnant. The effectiveness of these strategies could be enhanced if they are developed, implemented and led by First Nations community organisations including Aboriginal Community-Controlled Health Organisations.
- These strategies could be modelled after successful First Nations-led programs such as iSISTAQUIT the *Gulibaa* project, the Tackling Indigenous Smoking (TIS) program, *Mums and Bubs* programs around Australia, the *Australia Family Partnership Program (AFPP),* and the *Birthing in Our Country Service* programmes.

Lessons learnt from the Western Australian and Australian Capital Territory preterm birth prevention initiatives

Evaluation of the Western Australian Preterm Birth Prevention Initiative showed that a comprehensive preterm birth prevention program encompassing new clinical guidelines, an outreach program for health care practitioners, a public health program for women and their families based on print and social media, and a new clinic at the state's sole tertiary level perinatal center for referral of those pregnant women at highest risk could safely lower the preterm birth rate.

The Australian Capital Territory (ACT) Preterm Birth Prevention Initiative which was modelled on the West Australian program showed that the initiative safely lowered the rates of preterm birth in the ACT context.

The West Australian initiative has now been scaled up to the national level, and is the model on which the National Preterm and Early Term Birth Prevention Program is based.

Lessons learnt from the National Preterm and Early Term Birth Prevention Program

Like the West Australian initiative, the National Preterm and Early Term Birth Prevention Program relies on seven core, evidence-based practices implemented across participating maternity hospitals. These practices include delaying early deliveries, cervical length scanning, progesterone use, cervical cerclage, smoking cessation, and midwifery continuity of care.

The results of the national preterm birth prevention programme suggest that, in the context of a highly resourced setting, multifaceted preterm birth prevention projects applying existing knowledge and conducted at scale might produce meaningful benefits at a population level (*see Section 7.5.6*).

Lessons learnt from COVID-19 lockdown and mitigation measures

Infection and stress are risk factors for preterm birth. Observational studies from various countries around the world have shown that measures implemented to stem the spread of COVID-19 during the pandemic (2020 and 2021) might have contributed to a decline in preterm births during the period. Some of these measures could be adapted to current strategies to prevent preterm birth (*see Chapter 6*).

Lessons learnt from the Birthing in Our Country (BiOC) service

Evaluation of the BiOC service has shown that when First Nations people are involved in the design and implementation of health care services or when they have leadership roles in the delivery of the service, the impact of the service is more positive than when First Nations people have no role in how it is designed and delivered.

Three out of four pre-specified primary outcomes significantly improved within the BiOC service. Women receiving the service were more likely to attend 5 or more antenatal visits; less likely to have an infant born preterm (OR 0.62: 95% CI [0.42–0.93]) and more likely to exclusively breastfeed on discharge from hospital than those who received standard care (*see Section 7.5.7*).

1

Background

1 Background

A preterm birth is a birth before 37 completed weeks of gestation. Most babies are born at term, but worldwide, preterm birth occurs in about 10% of all live births. Most preterm babies will survive and go on to lead normal and healthy lives but, for many, being born too early creates challenges to neonatal life that persist into adulthood, resulting in lifelong disability (Newnham et al. 2017b; Hubbard et al. 2023). AIHW analysis of the National Perinatal Data Collection (NPDC) data shows that, in Australia, just over 8% of all babies and nearly 14% of babies born to Aboriginal and Torres Strait Islander (First Nations) women during 2004–2023 were preterm.

An evaluation of the current national preterm birth prevention program, funded by the Commonwealth Department of Health, Disability and Ageing, however, appears to show a slight reduction in preterm birth rates between 2018 and 2021 by about 6.4% (Newnham et al. 2025).

Preterm birth is a major contributor to perinatal morbidity and mortality, as well as to short-term and long-term disability. In Australia, spontaneous preterm labour or rupture of membranes alone was the cause of about 35% and 34%, respectively, of neonatal mortality in 2021 and 2022, and about 40% of neonatal mortality among babies born to First Nations women in 2020–2021 (AIHW 2025). The aetiology of premature birth is multifaceted and linked to a wide range of sociodemographic, medical, obstetric, fetal, psychosocial and environmental factors (Hedermann et al. 2021). Medium-to-long-term morbidity and disability experienced by survivors of preterm birth include neurodevelopmental delays, respiratory problems, cardiovascular disease (CVD) (Sixtus et al. 2024), vision impairment and cerebral palsy (Howson et al. 2013; Keelan and Newnham 2017; Di Renzo et al. 2018; da Fonseca et al. 2020; Hubbard et al. 2023).

Newnham and colleagues (2022) estimated that the cost differential to the Australian Government alone of preterm birth, relative to term birth up to age 18, based on a cohort of all births in Australia in 2016, was $1.413 billion – or $236,036 for an extremely preterm birth, $89,709 for a moderately preterm birth and $25,417 for a later preterm birth.

Reducing the proportion of First Nations babies that are born preterm is consistent with Target 2 of the *National Agreement on Closing the Gap* (see https://www.closingthegap.gov.au/national-agreement). This Agreement enjoins signatory parties to 'increase the proportion of Aboriginal and Torres Strait Islander babies with a healthy birthweight to 91 per cent by 2031' (Joint Council on Closing the Gap 2020). This is to ensure that Aboriginal and Torres Strait Islander children are born healthy and strong. Although this target does not specifically mention preterm birth, there is a close association between birthweight and preterm birth. Most preterm births are also of low birthweight, and one cannot reduce the incidence of one without reducing the incidence of the other. Babies are born with low birthweight because of prematurity, poor intrauterine growth, or both. Almost all very low birthweight babies are premature or extremely premature (Jin 2015).

Analysis of the NPDC data shows that between 2018 and 2023, nearly 70% of low birthweight babies born to First Nations mothers in Australia were preterm, while nearly 2-in-3 (64%) preterm babies born to First Nations mothers were of low birthweight. On the other hand, of all babies born at or after full term, fewer than 5% were of low birthweight. On the flip side, of all babies born with a healthy birthweight, only 5.6% were born preterm.

1.1 Gestational age of preterm births

Preterm birth can be subdivided into the following 4 gestational age classes (World Health Organization 2012):

- Extremely preterm (under 28 weeks of gestation)
- Very preterm (28 weeks to less than 32 weeks of gestation)
- Moderately preterm (32 weeks to less than 34 weeks of gestation)
- Late preterm (34 weeks to less than 37 weeks of gestation).

There is a strong relationship between gestational age at preterm birth and the adverse outcomes associated with preterm birth. Decreasing gestational age at birth is associated with increasing mortality, morbidity and intensity of neonatal care – and hence increasing costs – with infants born at the lowest gestational ages experiencing the worst outcomes (Lawn 2012; Blencowe et al. 2013; Fritz et al. 2018; Kamphuis et al. 2018; Newnham et al. 2022).

1.2 Labour onset: subtypes of preterm birth

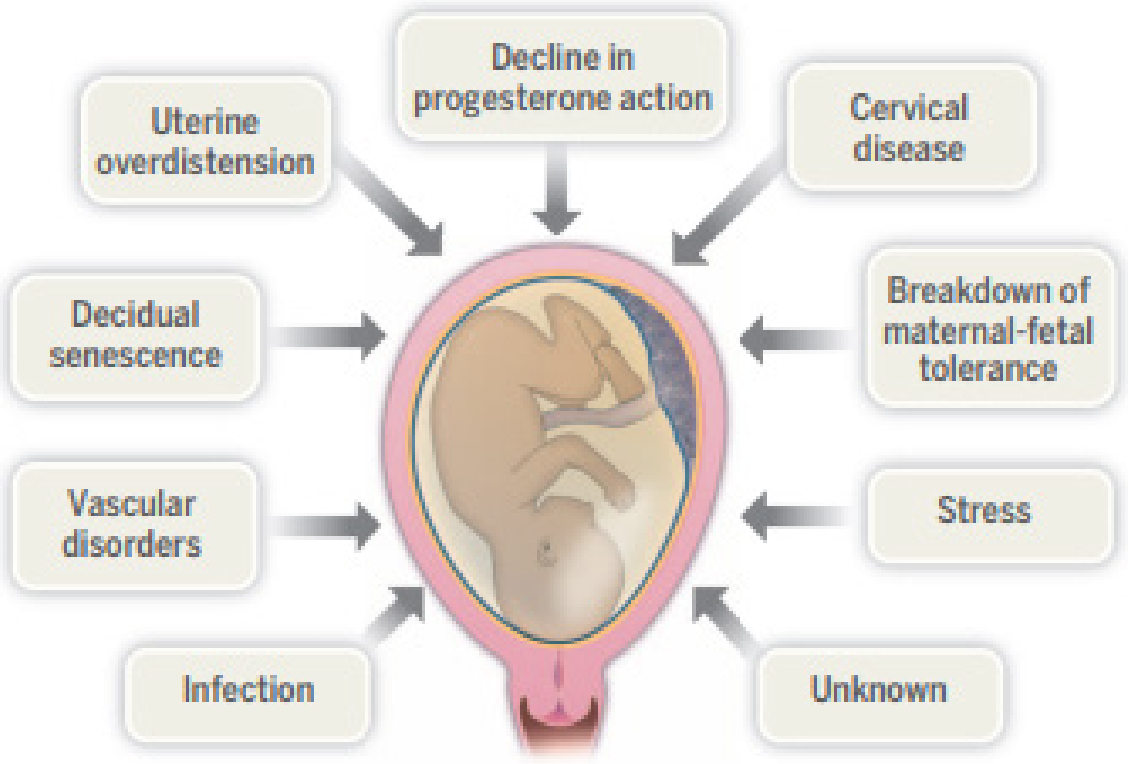
Preterm birth can also be divided into 2 subtypes, spontaneous or iatrogenic (induced), depending on the type of onset of labour – that is, whether it is spontaneous or initiated by the doctor or provider of maternity care (Aughey et al. 2023). Spontaneous and induced preterm births have different risk factors, and understanding the variations in these risk factors is key to developing effective strategies to reduce preterm birth.

Iatrogenic preterm birth is the result of induced labour or a caesarean section before labour and/or rupture of membranes, often due to maternal conditions or fetal complications. A doctor or health-care professional intervenes to induce early labour to protect the fetus or mother. The maternal conditions occasioning induced preterm labour or caesarean delivery include maternal illness and pregnancy complications (such as hypertension, pre-eclampsia, eclampsia, intercurrent disease, bleeding and maternal stress). Fetal complications include intrauterine growth restriction, fetal distress and other conditions signalling fetal compromise (Kamphuis et al. 2018; Aughey et al. 2023).

Spontaneous preterm birth is considered a syndrome resulting from multiple pathologic processes, and leads to about 70% of preterm births (Romero et al. 2014). It starts with either a preterm labour or a preterm prelabour rupture of membranes that could be triggered by infection, inflammation or vascular disease (Steer 2005; Goldenberg et al. 2009; Romero et al. 2014; Fritz et al. 2018; Aughey et al. 2023). Intrauterine inflammation or intrauterine infection appears to be a common mechanism underpinning multiple aetiologies associated with spontaneous preterm birth (Keelan and Newnham 2017).

Figure 1.1 is a representation by Romero et al. (2014) of the mechanism by which multiple medical, obstetric and psycho-social problems interact to trigger spontaneous preterm birth. Among these problems are infection, stress and unknown factors. Romero and colleagues believe that genetic and environmental factors are likely contributors to each mechanism.

Figure 1.1: Proposed mechanisms of disease implicated in spontaneous preterm labour



Note: Genetic and environmental factors are likely contributors to each mechanism.

Source: Romero et al. (2014).

Both induced and spontaneous preterm births are associated with previous preterm birth, extremes of maternal age, socioeconomic deprivation, and smoking; however, induced preterm births have overlapping but different patterns of maternal demographic and clinical risk factors from spontaneous preterm births. Induced preterm births, for instance, may be associated with higher maternal body mass index (BMI) and previous caesarean section (Aughey et al. 2023). Spontaneous preterm births, on the other hand, are less common in women with a higher maternal BMI and in women with a previous caesarean (Steer 2005; Goldenberg et al. 2009; Aughey et al. 2023).

Induced and spontaneous preterm births should therefore be measured and monitored separately, as well as in aggregate, to facilitate different prevention strategies (Aughey et al. 2023).

It has also been argued that 'from an evolutionary perspective, the onset of preterm labour in the context of infection can be considered to have survival value, because it allows the mother to expel infected tissue and maintain reproductive fitness' (Romero et al. 2014).

1.3 Risk factors for preterm birth

Worldwide, preterm birth tends to vary according to maternal socioeconomic status, which may incorporate ethnicity, race, level of education, occupation, income, and geographical location, with the latter serving as a proxy for place-based advantage or disadvantage.

In the relationship between maternal socioeconomic status and preterm birth, maternal socioeconomic status is considered a distal factor as it does not affect preterm birth directly. The relationship between maternal socioeconomic status and preterm birth is mediated by a number of proximate factors that may include maternal modifiable health risk factors (such as tobacco smoking, alcohol and drug use, pre-pregnancy body weight and antenatal care) as well as maternal health characteristics (including pregnancy history and whether a pregnant woman is suffering from diabetes, hypertension, some infections, anaemia or stress/depression) (Aughey et al. 2023; Biggio 2020; Lackritz et al. 2013; McHale et al. 2022; Shapiro-Mendoza 2016; Vitner et al. 2020; Zierden et al. 2021).

Some infections are known to be associated with preterm birth. They include *Group B Streptococcus* (GBS) maternal rectovaginal colonisation during pregnancy, which is known to disproportionately infect First Nations women (Alizzi 2022; Australasian Study Group for Neonatal Infections 1995; Bianchi-Jassir et al. 2017; Furfaro 2019).

Other infections associated with preterm birth and pregnancy loss include *bacterial vaginosis* (BV), *Ureaplasma spp*. and *nontypeable haemophilus influenzae* (NTHi) bacteraemia whose isolation occurs more commonly in First Nations than in non-Indigenous women and neonates (Daskalakis et al. 2019; Keelan and Newnham 2017; Porter et al. 2016).

Regarding other infections associated with preterm birth, it was observed during the COVID-19 pandemic, for instance, that women with SARS-COV-2 had a higher risk of preterm birth and caesarean section, especially if they had other medical conditions or comorbidities (Bahado-Singh et al. 2023; Karasek et al. 2021; Perelli et al. 2025; Wei et al. 2021).

1.4 Objectives of the study

The objectives of this study are 3-fold. They are to:

- determine the incidence, trends and subtypes of preterm birth among First Nations women and babies between 2004 and 2023 and the risk factors associated with them
- identify mediators of the relationship between maternal socioeconomic status and preterm birth and assess the strength of evidence
- identify pathways that have been used worldwide to combat preterm birth and how they can be adapted to reduce the incidence of preterm birth among First Nations babies in Australia.

1.5 Data

This report is based on the NPDC, which the AIHW compiles from perinatal data collections received from each of the 6 states and 2 territories in Australia. Each jurisdictional perinatal data collection covers all pregnancies that result in a live birth or a stillbirth of at least 20 weeks' gestation, or with a birthweight of at least 400 grams – except in Victoria and Western Australia, where births are included if gestational age is at least 20 weeks or (if gestation is unknown) birthweight is at least 400 grams. Live births and stillbirths include termination of pregnancy after 20 weeks (see the Data Quality Statement on the NPDC at https://meteor.aihw.gov.au/content/799298).

Box 1.1: What are the causes of preterm birth?

'Premature birth can have many causes which include problems with the fetus, the mother, or both. However, about fifty percent of the time, the cause or causes of a premature birth are unknown …

'If you had a previous premature labour, your chance of having another premature labour increases two and a half times …

'Another major risk factor for premature labour and delivery is being pregnant with twins or multiple babies. The rate of twins and multiple babies has increased over the past few years, mostly because of the use of fertility drugs and other assisted reproduction techniques … One important risk factor is infection. Some types of infection that can result in premature birth [include] untreated urinary infections … and bacterial vaginosis …

'There are several other risk factors for premature labour and delivery. Some of these risks, such as anemia, slow maternal weight gain, stressful work habits, smoking, drinking alcohol, and using drugs like cocaine, can be rectified during pregnancy' (Australian Preterm Birth Prevention Alliance 2024a).

'… the aetiology of preterm birth is complex and treating it as a single outcome may hinder appropriately targeted interventions' (Aughey et al. 2023).

'Due to the diversity of preterm birth causes, identifying women at risk for preterm birth has become increasingly difficult, ultimately resulting in an overall increase in [the] preterm birth rate over the last several years. For such a complex and critical issue, interdisciplinary efforts are needed to better understand the underlying biology of preterm birth in order to create novel diagnostics and therapeutics' (Zierden et al. 2021).

'The aetiology of spontaneous preterm birth, which accounts for roughly two-thirds of all preterm births, is largely obscure and probably multifactorial, hampering effective prevention' (Been et al. 2020).

'There are many risk factors for preterm birth, both individual maternal factors and broader sociodemographic ones …

'Seventy to eighty percent [of preterm births] are spontaneous in origin and are assumed to be caused by multiple possible pathologic processes; including microbial-induced inflammation, decidual haemorrhage and vascular disease, decline in progesterone action, and more. The remaining cases result from iatrogenic delivery, mainly due to maternal or fetal indications …' (Vitner et al. 2020).

'Preterm parturition is a syndrome, which can be induced by various factors such as infection, cervical pathology, uterine overdistension, progesterone deficiency, vascular alterations (utero-placental ischemia, decidual haemorrhage), maternal and foetal stress, allograft reaction, allergic phenomena, and probably other several unknown factors' (Di Renzo et al. 2018).

'Preterm labor is a syndrome caused by multiple pathologic processes' (Romero et al. 2014).

(continued)

'The etiology of preterm labor is poorly understood; prevailing theories include infectious and inflammatory processes … Intrauterine infection and inflammation might account for up to 40% of preterm births, but in many instances, the cause might be subclinical and difficult to detect' (Shapiro-Mendoza 2016).

'Our understanding of the underlying drivers for preterm birth or the potential effect of preventive interventions remains poor …' (Chang et al. 2014).

This study uses information from the NPDC from 4 key areas: (1) Demographics and geography, (2) Antenatal period, (3) Labour and birth and (4) Baby outcomes.

The demographic and geographic information includes Indigenous status of the baby and mother, state or territory of mother's usual residence, state or territory of baby's birth, socioeconomic index of mother's geographic location (SEIFA), mother's Accessibility/Remoteness Index of Australia (ARIA), and individual-level characteristics, such as maternal age, marital status, total number of pregnancies and previous stillbirths.

Data available in the remaining 3 key areas include maternal health characteristics and modifiable health risk factors, such as pre-pregnancy BMI, self-reported smoking and alcohol consumption during pregnancy, pre-existing diabetes, chronic hypertension, antenatal care and pregnancy complications (including gestational diabetes, pregnancy-induced hypertensive disorders and labour complications), as well as labour onset, and baby outcomes.

Information on the Indigenous status of the mother has been included in the NPDC since 1997, while information on the Indigenous status of the baby has been included only from July 2012, with usable data becoming available only from January 2013.

1.6 Methods

This study uses descriptive statistics to show the levels and trends in preterm birth rates in Australia, and statistical modelling to identify the risk factors for preterm birth. The descriptive statistics are based on all births irrespective of birth status (live birth or stillbirth) and plurality (singleton or multiple birth) but exclude births of less than 20 weeks gestation or birthweight of less than 400 grams, as well as births with missing information on gestational age and birthweight. Estimates based on the modelling are restricted to singleton births.

Multivariate logistic regression was used to model the risk factors or the predictors associated with the outcome variable (for example, preterm birth) at the individual level. The model estimated the adjusted odds of a preterm birth occurring at each category of a risk factor, after adjusting for all the other risk factors in the model. The initial list of risk factors was selected based on evidence from the scientific literature (Biggio 2020; Lackritz et al. 2013; Newnham et al. 2017b; Shapiro-Mendoza 2016; Utz 2014; Vitner et al. 2020) and the availability of data on the NPDC. Bivariate analysis was then carried out to test the statistical significance of each of the selected risk factors in relation to the outcome variable.

The analysis of risk factors focused on the years 2018 to 2023. Within this timeframe, some women experienced multiple confinements. However, the NPDC considered each confinement as an independent event, without linking multiple confinements to the same woman. This approach made it impossible to identify or analyse births from different confinements associated with a single individual. Consequently, a multivariate logistic regression model was chosen for this study instead of Generalized Estimating Equations (GEE).

Following Utz (2014) and adopting a modification of the 'mediation approach' used by McHale and colleagues (2022), multivariate analysis was caried out using a nested approach. The risk factors or predictors were organised into 4 groups and modelled sequentially or in 'steps', as described below, according to the chronological order in which they were expected to impact the pregnancy (see an example of the results of this approach in Table 4.1). Such an approach, as demonstrated by Utz (2014), allows each set of predictors or risk factors to be assessed before and after the inclusion of other predictors:

- Step 1: distal or contextual factors, or the underlying characteristics of the mother: Indigenous status, SEIFA, ARIA and maternal age
- Step 2: factors likely to be present at the onset of the pregnancy, including maternal health characteristics and health risk factors (BMI, smoking, alcohol consumption, pre-existing diabetes, chronic hypertension and pregnancy history)
- Step 3: factors likely to arise during the pregnancy, including pregnancy complications (gestational diabetes, pregnancy-induced hypertensive disorders), gestational age at first antenatal care visit, smoking, alcohol consumption
- Step 4: factors that are determined at the end of the pregnancy, including birth status (live birth/stillbirth), gestational age, birthweight and number of antenatal visits.

Table 1.1 sets out the risk factors identified broadly as being associated with preterm birth, including those identified in the NPDC. These risk factors are organised into 4 categories according to the scheme proposed by Utz (2014) and the steps just described.

Table 1.1: Risk factors for preterm birth and complications

1. **Distal or contextual factors**
   a. Ethnicity or race (proxy for racism, discrimination and inherited disadvantage)
   b. Low socioeconomic status (socioeconomic area where women live [e.g. SEIFA])
   c. Remoteness location
   d. Maternal age (very young or advanced maternal age (e.g. <18 or 40 years and over)
2. **Factors likely to be present at the onset of pregnancy**
   a. Modifiable health risk factors
      – Tobacco use
      – Alcohol and drug use
      – Low or high pre-pregnancy BMI
   b. Maternal medical disorders
      – Pre-existing diabetes
      – Pre-existing or chronic hypertension
      – Thyroid disease
      – Asthma

- Anaemia
- Some infections (e.g. urinary tract infection; lower genital tract infection etc.)

c. Pregnancy history
- Short inter-pregnancy interval
- Previous preterm delivery/preterm pre-labour rupture of membranes
- Previous stillbirth/recurrent mid-term pregnancy loss
- Multiple gestations
- Fertility treatments (assisted reproductive technology, dilation and curettage etc.)

d. Mental health
- Stress (physical and emotional stress) and anxiety
- Depression

3. Factors likely to arise during pregnancy
- Pregnancy/obstetric complications
- Gestational diabetes
- Pregnancy-induced hypertensive disorders
- Placental abruption/placenta praevia
- Threatened abortion/antepartum haemorrhage
- Intrauterine infection
- Other pregnancy/obstetric complications (e.g. polyhydramnios; oligohydramnios)

4. Factors likely to arise at the end of the pregnancy

a. Late or inadequate antenatal care

b. Non-medically indicated interventions
- Non-medically indicated caesarean deliveries or labour induction

Adapted from: (Lackritz et al. 2013; Utz 2014; Shapiro-Mendoza 2016; Newnham et al. 2017b; Biggio 2020; Vitner et al. 2020).

Box 1.2: How risk factors may impact preterm birth

Overall, poorer countries have higher preterm birth rates than richer countries, and low socioeconomic status communities have higher preterm birth rates than higher socioeconomic status communities. Similarly, individuals living in low socioeconomic areas and individuals of low socioeconomic status have higher preterm birth rates than individuals living in higher socioeconomic areas. Low socioeconomic status includes ethnicity, socioeconomic index for area of usual residence (SEIFA) and remoteness location (ARIA).

Socioeconomic status does not, however, affect preterm birth directly. The relationship between socioeconomic status and preterm births is mediated by several demographic and health risk factors among which are:

- maternal age
- teenage pregnancies, previous short or frequent inter-pregnancy intervals
- smoking or alcohol consumption or alcohol and drug use during pregnancy
- diet/nutrition, anaemia, pre-pregnancy body weight
- health status (pre-existing diabetes, chronic hypertension, various infections)
- access to health care, attendance at antenatal care, history of dilation and curettage procedures, multiple gestation and so on.

(continued next page)

These may, in turn, affect preterm birth directly through the path of:

- infections that may trigger spontaneous preterm birth
- intercurrent disease that may trigger spontaneous preterm birth or that may necessitate physician intervention in the form of labour induction or caesarean birth
- maternal ill-health affecting the fetus that may necessitate physician intervention in the form of labour induction or caesarean birth
- poor diet/nutrition leading to a small-for-gestation-age fetus, which is a risk factor for preterm birth
- toxins in cigarette/tobacco affecting the growth, health and viability of the fetus through blood exchange with the mother
- stress/anxiety/depression, which is known to affect maternal neuroendocrine and immune pathways, resulting in increased susceptibility to infection or inflammation and an increased risk of preterm birth
- pregnancy complications (placenta abruption, placenta praevia, pre-eclampsia, eclampsia, gestational diabetes and so on).
- unknown factors

Sources: Aughey et al. (2023); Biggio (2020); (Romero et al. 2014; Shapiro-Mendoza 2016; Biggio 2020; Vitner et al. 2020; Aughey et al. 2023).

1.7 Organisation of this report

This report is organised into 7 chapters of which this is the first. The remaining chapters are organised as follows:

Using data from the NPDC, Chapter 2 examines trends in preterm birth rates among First Nations women in Australia and in selected states and territories according to various classifications of preterm birth. This analysis helped to identify some of the issues that have been identified as complicit in preterm rates not being able to be reduced.

Chapter 3 describes variations in preterm birth rates among First Nations women according to their demographic, socioeconomic and health characteristics, based on data from the NPDC. This analysis informed the modelling in Chapter 4 to identify the risk factors associated with preterm birth.

Chapter 4 presents the results of logistic regression modelling to identify the risk factors associated with preterm birth and the nature of the relationship between specified risk factors and preterm birth. Analysis was carried out for various classifications of preterm birth, such as preterm subtype (spontaneous and induced preterm birth) and gestational age. The results of this analysis contributed to the recommendations and strategies for reducing preterm births proposed in Chapter 7.

Chapter 5 uses a complementary measure, the Population Attributable Fraction (PAF), to examine the contribution of specified risk factors to reducing preterm birth at the population level. The PAF is based on the results of the logistic regression modelling described in Chapter 4. Although some women who have a preterm birth do not have any obvious risk factors, the PAF analysis attempted to estimate the percentage of preterm birth that could be prevented if certain risk factors (for example, smoking during pregnancy, pre-existing diabetes) were eliminated.

Based on anecdotal evidence that preterm birth rates declined during the COVID-19 lockdowns and mitigation measures, Chapter 6 examines observational studies conducted in Australia and in several countries around the world to establish the veracity of these claims and to identify the factors that would have contributed to the decline in preterm births. Lessons learnt from this analysis could provide opportunities to identify novel strategies for preventing preterm birth.

Chapter 7 discusses strategies for preventing preterm birth among First Nations women in Australia based on:

1. results of the analysis of risk factors in chapters 4 and 5
2. the experience of countries around the world that succeeded in reducing preterm birth rates
3. factors that may have contributed to the decline in preterm births during the COVID-19 lockdowns
4. results of programs in Australia, such as the Western Australia Preterm Prevention Initiative, the ACT Preterm Prevention Initiative the National Preterm and Early Term Birth Prevention Program and the First Nations-specific 'Birthing in Our Country' or BiOC service.

Data from Tasmania and the Australian Capital Territory have not been included in the jurisdiction-specific analysis in Chapter 2 to avoid highly variable trend data due to the small First Nations population in these jurisdictions. Data from Tasmania and the Australian Capital Territory have however been included in all national-level analyses (Chapters 4 and 5).

2

Trends in preterm birth rates

2 Trends in preterm birth rates

Over the past 20 years, trends in preterm birth rates in developed countries, including Australia, have been mixed, with rates increasing in some countries and declining or remaining stable in others (Lucovnik et al. 2016; Richards et al. 2016). Worldwide, 9.9% of babies were born preterm in 2020 compared with 9.8% in 2010, a decline of about 0.14% per year, or about 1.4% between 2010 and 2020 (Ohuma et al. 2023; World Health Organization 2023). In fact, of 65 countries with estimated time trends, only 3 (Croatia, Ecuador and Estonia) had reduced preterm birth rates between 1990 and 2010 (Blencowe et al. 2013).

Analysis of the NPDC data shows that, in Australia, the proportion of all babies born preterm hardly changed between 2010 (8.3%) and 2023 (8.4%), while among First Nations women, the preterm rate remaianed nearly unchanged at 13.5% in 2010 and 13.8% in 2023 (AIHW 2025). Trends in preterm birth rates in Australia as observed from state-specific studies mirror global trends. Between 2007 and 2017, for instance, annual preterm birth rates among all live births in the Northern Territory were consistently close to 10%, with First Nations women experiencing more than twice the risk of preterm birth (16%) than other women (7.0%) (Brown et al. 2024).

In South Australia, between 1986 and 2014, overall preterm birth rates increased from 5.1% to 7.1%, while the preterm birth rate among singletons increased by 40%, with induced preterm birth being responsible for 80% of this increase (Verburg et al. 2018).

Other studies have shown that trends in preterm birth rates depend on the composition of preterm subtypes (induced or spontaneous) and gestational age (extremely preterm, very preterm, moderate preterm or late preterm) (Farrant et al. 2019). The results of a retrospective cohort study in Western Australia between 1986 and 2010 showed that:

- the extremely preterm birth rate, including medical terminations and birth defects, significantly increased over time whereas the extremely preterm birth rate, excluding medical terminations and birth defects, did not change
- after medical terminations and birth defects were excluded, the rate of medically indicated extremely preterm births significantly increased over time whereas the rate of preterm pre-labour rupture of membranes extremely preterm births significantly reduced, while the rate of spontaneous extremely preterm births did not significantly change (Farrant et al. 2019).

2.1 Trends in preterm birth rates by gestational age

Table 2.1 provides details of the distribution of preterm births by gestational age at birth and by type of labour onset. (*Due to specific exclusions implemented in this report, these figures may not exactly match figures already published elsewhere by the AIHW.*)

About 8.4% of all births that occurred in Australia between 2004 and 2023 were preterm; that is, they occurred before 37 completed weeks of gestation. About 13.8% of births to First Nations women were preterm, while about 8.1% of births to non-Indigenous women were preterm. About 1.7% of births to First Nations women were extremely preterm (occurred between 20 weeks to less than 28 completed weeks of gestation). Very preterm births (28 weeks to less than 32 completed weeks of gestation) and moderately preterm births (32 weeks to less than 34 completed weeks of gestation) were 1.5% and 1.7%, respectively. About 8.9% were late preterm (34 weeks to less than 37 completed weeks of gestation).

Of all births to First Nations women:

- 1.7% were extremely preterm (occurred between 20 weeks to less than 28 completed weeks of gestation)
- 1.5% were very preterm births (28 weeks to less than 32 completed weeks of gestation) and
- 1.7% were moderately preterm births (32 weeks to less than 34 completed weeks of gestation), and
- 8.9% were late preterm (34 weeks to less than 37 completed weeks of gestation).

Of all preterm births to First Nations women:

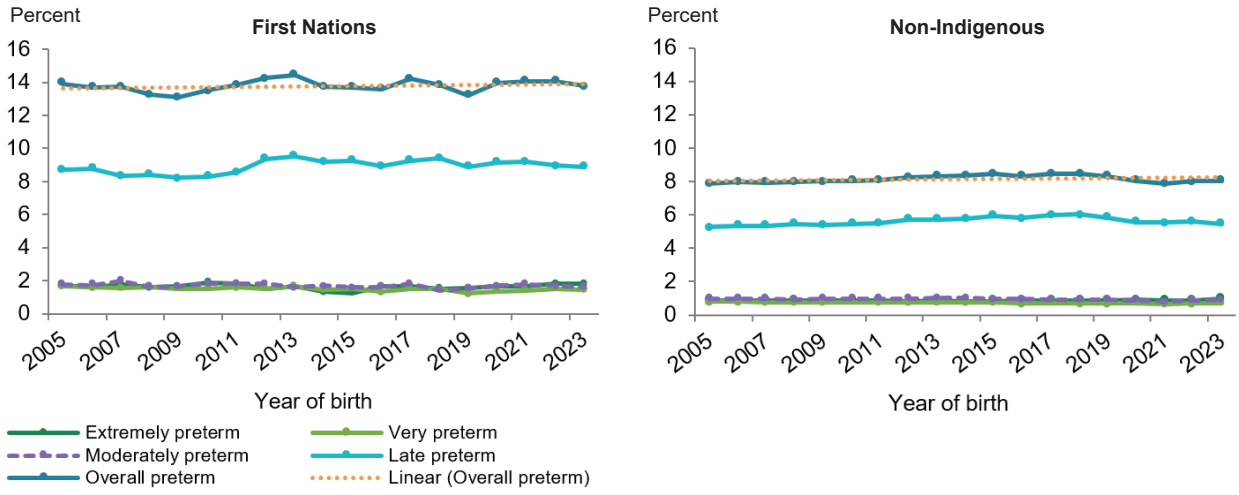
- 12.0% were extremely preterm;
- 10.9% were very preterm and
- 12.3% were, respectively, very preterm and moderately preterm, ; and
- 64.8% were late preterm births.

Thus, a little over one-third of all preterm births to First Nations women were extremely preterm to moderately preterm births while nearly two-thirds were late preterm.

Figure 2.1 shows trends in preterm birth rates by gestational age among births to First Nations and non-Indigenous women in Australia during the period 2005–2023. Despite the fluctuations in the overall preterm birth rates as well as in the gestational age categories of preterm birth during this period, the long-term trend in the overall preterm birth rate as well as in the various preterm birth categories has been stable.

Table 2.1 shows that preterm births occurred much earlier among First Nations women than among non-Indigenous women. The proportion of late preterm births was slightly smaller among First Nations women (64.8%) than among non-Indigenous women (68.9%). On the other hand, the proportion of extremely preterm to moderately preterm births was slightly higher among First Nations women (35.2%) than among non-Indigenous women (31.1%).

Figure 2.1: Preterm birth (PTB) rates (%)[(a)] among all births to First Nations and non-Indigenous mothers, by gestational age, Australia, 2005–2023[(b)]



(a) Estimates are based on all births that occurred in Australia (excluding 'Other Territories'), between 2005 and 2023, irrespective of birth status (live birth or stillbirth) and plurality (singleton or multiple birth). They exclude births of less than 20 weeks gestation or birthweight of less than 400 grams, as well as births with missing information on gestational age and birthweight. Births within the scope of the NPDC (from 20 weeks gestation or of at least 400 grams birthweight) include terminations of pregnancy.

(b) Data for births occurring during the 2022 calendar year are based on complete data for 7 jurisdictions and a compilation of data for the ACT. The ACT's data consist of its 2022 data for January to October, supplemented by its 2021 data for November and December (see 'Technical notes, Data quality and availability' for more information: https://meteor.aihw.gov.au/content/808591).

Source: AIHW analysis of National Perinatal Data Collection.

Table 2.1: Distribution of preterm births[a], by gestational age and type of onset of labour, Australia, 2004–2023

Classification of birth	Births to First Nations women			Births to non-Indigenous women			Births to all women		
	No. of births	% of all births	% of preterm births	No. of births	% of all births	% of preterm births	No. of births	% of all births	% of preterm births
Preterm birth status									
All births	255,721	100.0	n.a.	5,675,448	100.0	n.a.	5,931,169	100.0	n.a.
Preterm	35,299	13.8	100.0	461,479	8.1	100.0	496,778	8.4	100.0
Not preterm	220,330	86.2	n.a.	5,212,086	91.8	n.a.	5,432,416	91.6	n.a.
Not stated	92	0.0	n.a.	1,883	0.0	n.a.	1,975	0.0	n.a.
Gestational age[b]									
All births	255,721	100.0	n.a.	5,675,448	100.0	n.a.	5,931,169	100.0	n.a.
Extremely preterm	4,229	1.7	12.0	48,096	0.8	10.4	52,325	0.9	10.5
Very preterm	3,852	1.5	10.9	41,752	0.7	9.0	45,604	0.8	9.2
Moderately preterm	4,355	1.7	12.3	53,539	0.9	11.6	57,894	1.0	11.7
Late preterm	22,863	8.9	64.8	318,092	5.6	68.9	340,955	5.7	68.6
Not preterm	220,330	86.2	n.a.	5,212,086	91.8	n.a.	5,432,416	91.6	n.a.
Not stated	92	0.0	n.a.	1,883	0.0	n.a.	1,975	0.0	n.a.
Type of onset of labour[c]									
All births	255,721	100.0	n.a.	5,675,448	100.0	n.a.	5,931,169	100.0	n.a.
Induced preterm	15,565	6.1	44.1	248,147	4.4	53.8	263,712	4.4	53.1
Spontaneous preterm	19,718	7.7	55.9	212,908	3.8	46.2	232,626	3.9	46.9
Not preterm	220,330	86.2	n.a.	5,212,086	91.8	n.a.	5,432,416	91.6	n.a.
Not stated	108	0.0	n.a.	2,307	0.0	n.a.	2,415	0.0	n.a.

Notes for Table 2.1

n.a. = not applicable.

(a) Estimates are based on all births that occurred in Australia (excluding 'Other Territories'), between 2005 and 2023, irrespective of birth status (live birth or stillbirth) and plurality (singleton or multiple birth). They exclude births of less than 20 weeks gestation or birthweight of less than 400 grams, as well as births with missing information on gestational age and birthweight. Births within the scope of the NPDC (from 20 weeks gestation or of at least 400 grams birthweight) include terminations of pregnancy.

(b) Gestational age at birth is classified as: (1) 'Extremely preterm' = less than 28 completed weeks of gestation; (2) Very preterm' = 28 weeks to less than 32 completed weeks of gestation; (3) 'Moderately preterm' 32 weeks to less than 34 completed weeks of gestation; (4) 'Late preterm' = 34 weeks to less than 37 completed weeks of gestation.

(c) May include cases where induction of labour was attempted but labour did not result. Comprises preterm births that could not be classified as either 'induced' or 'spontaneous' because of missing information on type of onset of labour.

Notes

1. Due to specific exclusions implemented in this report, these figures may not exactly match figures published elsewhere by the AIHW.
2. Data for births occurring during the 2022 calendar year are based on complete data for 7 jurisdictions and a compilation of data for the ACT. The ACT's data consist of its 2022 data for January to October, supplemented by its 2021 data for November and December (see 'Technical notes, Data quality and availability' for more information: https://meteor.aihw.gov.au/content/808591).

Source: AIHW analysis of National Perinatal Data Collection.

Figure 2.2 shows trends in preterm birth rates by gestational age among births to First Nations and non-Indigenous women in 6 selected jurisdictions during the period 2005–2023. The data for these graphs are also shown in Appendix Tables A2.2.1–A2.2.6.

Figure 2.2 shows that during the period 2005–2023, overall preterm birth rates were lowest in New South Wales, Victoria and Queensland, with rates fluctuating between 12% and 13% in most years. Overall preterm birth rates were higher in South Australia than in New South Wales, Victoria and Queensland, but lower than in Western Australia and the Northern Territory and fluctuated between 15% and 17% in most years, with slightly lower rates of 13%–14% observed in some years.

The highest overall preterm birth rates were in Western Australia and the Northern Territory, where rates were between 16% and 19% or higher in most years, with the highest rates in Western Australia occurring in 2019–2023, while in the Northern Territory, the highest rates were observed in 2017–2022.

Despite the yearly fluctuations in the overall preterm birth rates, there are clear signs of rates increasing in both Western Australia and the Northern Territory but remaining relatively stable in New South Wales, Victoria, Queensland and South Australia.

Although there were yearly fluctuations in preterm birth rates, the average annual rate of change (AARC) in preterm birth rates was very low. Between 2004 and 2023, the AARC in preterm birth rates for Australia was -0.14% for First Nations women and +0.09% for non-Indigenous women. In terms of specific states and territories, the AARC was +0.57% in New South Wales, -0.68% in Victoria and -0.16 in Queensland.

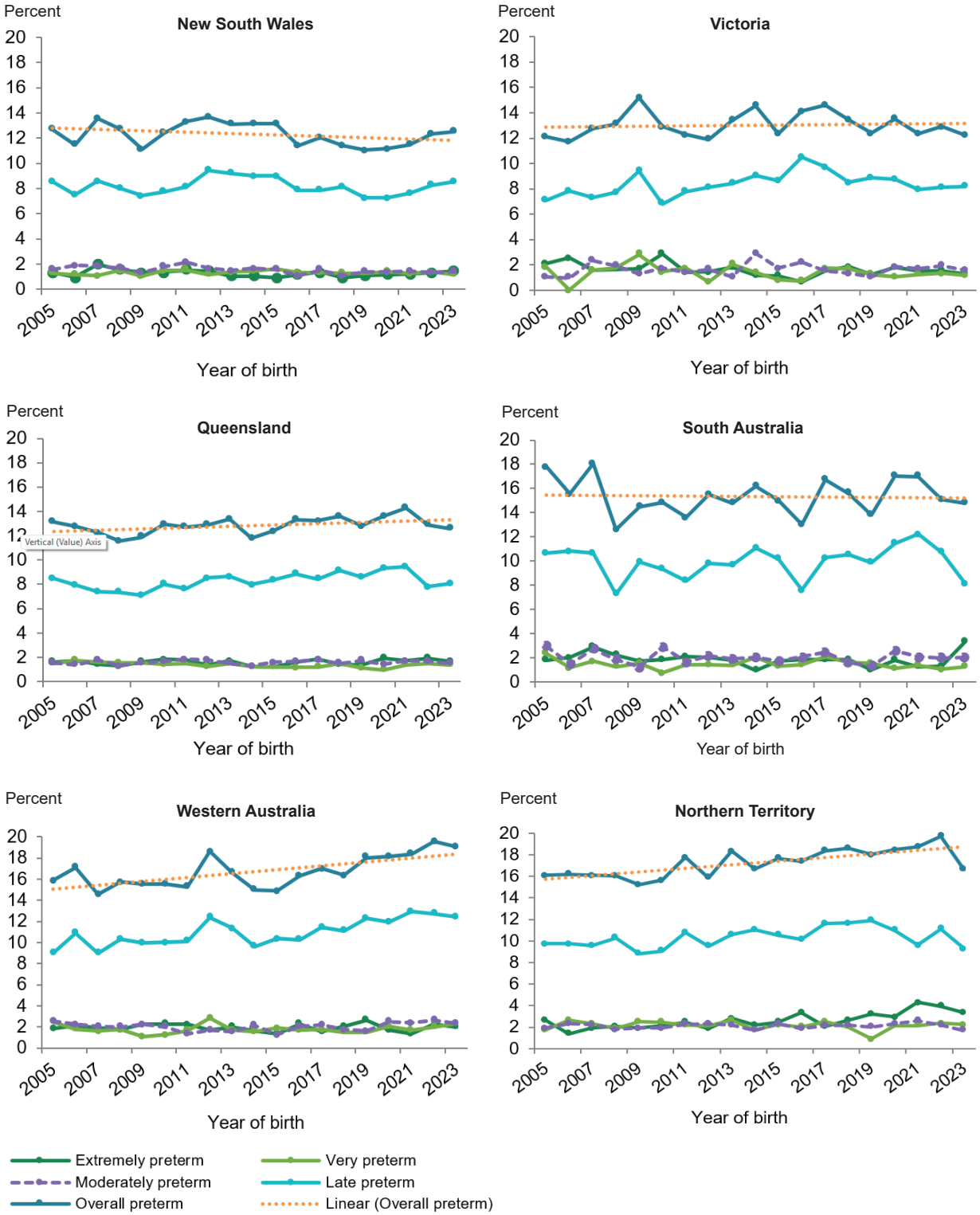
The AARC in preterm birth rates for First Nations women was however higher in South Australia (+0.96%) and Western Australia (+1.10%). Despite what appears to be an increasing trend in preterm birth rates for First Nations women in the Northern Territory, the AARC was only +0.15%, most likely influenced by the apparent reduction in preterm birth rates for First Nations women from 19.7% in 2022 to 16.6% in 2023.

Figure 2.2 shows that relative to late preterm birth rates, extremely preterm, very preterm, and moderately preterm birth rates were consistently low across all six jurisdictions, with New South Wales, Victoria, and Queensland showing the lowest rates. In these jurisdictions, most rates ranged from 1.5% to 2.0% each, except for some years in Victoria where rates occasionally exceeded 2.5% for some gestational age classes. Yearly fluctuations likely reflect both the small number of births in these gestational age categories and possible data quality concerns.

Extremely preterm, very preterm and moderately preterm birth rates were each consistently higher in Western Australia and the Northern Territory than in the remaining 4 jurisdictions. Extremely preterm, very preterm and moderately preterm birth rates in Western Australia and the Northern Territory were mostly about 2.0%– 2.5% each, with some rates exceeding 2.5% in some years.

In New South Wales, Victoria, and Queensland, late preterm births typically ranged from 7% to 9%. South Australia reported rates between 9% and 11%, while Western Australia and the Northern Territory had rates from 10% to 12%. Within each jurisdiction, the trends for late preterm birth rates closely matched those for overall preterm births. This similarity exists because late preterm births make up around 65% of all preterm births nationally, as shown in Table 2.1, significantly influencing overall preterm birth rates.

Figure 2.2: Preterm birth rates (%)[a,b] among all births to First Nations women, by gestational age and selected jurisdictions of usual residence, 2005–2023



(a) Estimates are based on all births that occurred to First Nations women in Australia (excluding 'Other Territories'), between 2005 and 2023, irrespective of birth status (live birth or stillbirth) and plurality (singleton or multiple birth). They exclude births of less than 20 weeks gestation or birthweight of less than 400 grams, as well as births with missing information on gestational age and birthweight. Births within the scope of the NPDC (from 20 weeks gestation or of at least 400 grams birthweight) include terminations of pregnancy.

(b) Data from Tasmania and the Australian Capital Territory have been excluded from this analysis to avoid highly variable trend data due to the small First Nations population in these 2 jurisdictions.

Source: AIHW analysis of National Perinatal Data Collection.

2.2 Trends in preterm birth rates by type of labour onset

During the period 2004–2023, about 6.1% of all births to First Nations women were iatrogenic or doctor-induced while 7.7% were spontaneous preterm. Of all preterm births to First Nations women, 44.1% were induced while about 55.9% were spontaneous.

Figure 2.3 shows trends in the percentage of induced and spontaneous preterm births among babies born to First Nations and non-Indigenous women in Australia during the period 2005–2023. Details of preterm births among non-First Nations women are also available in Table 2.1. Although the percentages of overall preterm births among babies born to First Nations women were variable between 2005 and 2023, they appear to have remained relatively stable, from about 13.9% in 2005 to about 14.0% in 2022 and 13.8% in 2023 (see the trend line in Figure 2.3).

Despite some fluctuations in the percentage of preterm births among babies born to First Nations women between 2005 and 2023, the long-term trend has remained relatively stable – at around 13.9% in 2005, 14.0% in 2022, and 13. 8% in 2023 (s*ee the trend line in Figure 2.3*).

Overall preterm birth rates among babies born to non-Indigenous women appear to have remained nearly the same in 2005–2010 (7.9–8.0%) as in 2020–2023 (7.9–8.0%). Rates, however, appear to have increased steadily from around 7.9% in 2005 to about 8.5% in 2018 before falling again to the current level of about 7.9–8.0% in 2021–2023. In relation to specific time periods, however, the highest percentage of overall preterm births among non-Indigenous babies (8.4–8.5%) occurred during the period 2014–2018.

Figure 2.3 shows that in 2005 the spontaneous preterm birth rate of 9.5% among births to First Nations women was 5 percentage points higher than the corresponding induced preterm birth rate of 4.5%. Between 2005 and 2023, the spontaneous preterm birth rate among First Nations women fell from about 9.5% in 2005 to about 6.7% in 2023 while the induced preterm birth rate rose from 4.5% in 2005 to 7.0% in 2023.

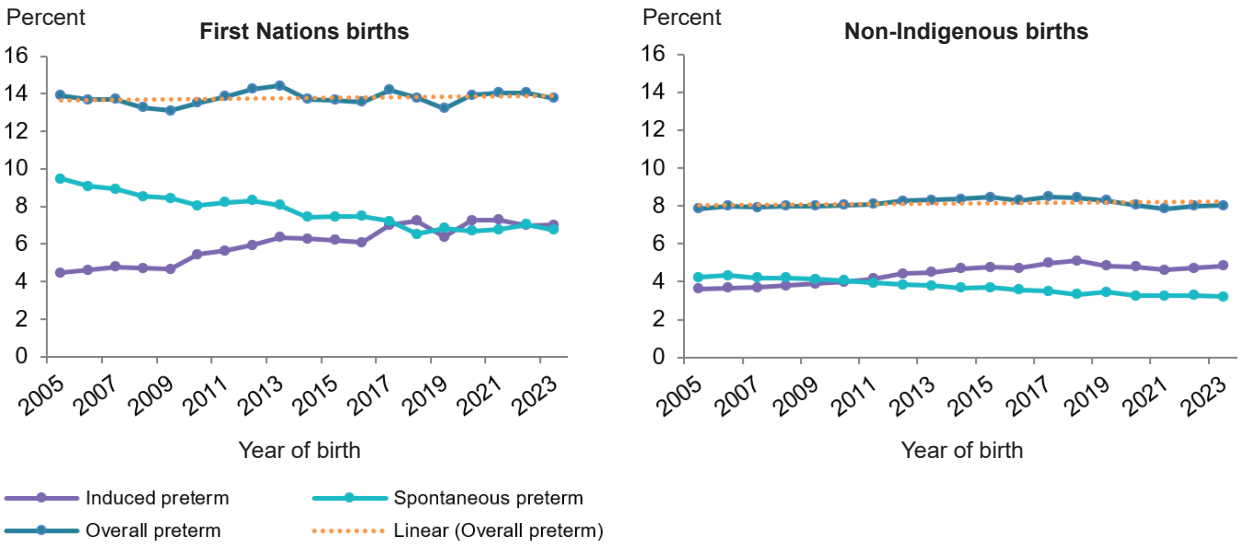
Before 2018, spontaneous preterm births accounted for a higher proportion of all births to First Nations women than induced preterm births. The gap between these two subtypes was widest in 2005 (5.0 percentage points), with 9.5% of births classified as spontaneous and 4.5% as induced (Figure 2.3). This gap narrowed each year until around 2018, when the proportion of induced preterm births appeared to slightly exceed that of spontaneous preterm births.

A similar trend is also apparent among non-Indigenous births, although the gap between the 2 subtypes of preterm birth rates was smaller than that among First Nations births. The crossover among non-Indigenous births also occurred earlier, at around 2011, compared with at around 2018 among First Nations births. From 2011, induced preterm birth rates became higher than spontaneous preterm birth rates among births to non-Indigenous women.

The national trend of relatively steady overall preterm birth rates, increasing induced preterm birth rates and declining spontaneous preterm birth rates shown in Figure 2.3 was also observed in each of the jurisdictions shown in Figure 2.4. Figure 2.4 shows that most of the jurisdictions experienced either unchanging or slightly increasing overall preterm birth rates, with 2 jurisdictions (Western Australia and the Northern Territory) showing clear signs of an increase in overall preterm birth rates.

In Western Australia, the overall preterm birth rate rose from 15.9% in 2009 to 19.1% in 2023. During this period, the spontaneous preterm birth rate fell from 10.2% in 2005 to 9.8% in 2023 while the induced preterm birth rate rose from 5.7% in 2005 to 9.3% in 2023, although both rates fluctuated during the 18-year period from 2005 to 2023.

Figure 2.3: Induced[(a)] and spontaneous preterm birth rates (%) among all births[(b)] to First Nations and non-Indigenous women, Australia, 2005–2023[(c)]



(a) May include cases where induction of labour was attempted but labour did not result.

(b) Estimates are based on all births that occurred in Australia between 2005 and 2023 (excluding 'Other Territories'), irrespective of birth status (live birth or stillbirth) and plurality (singleton or multiple birth). They exclude births of less than 20 weeks gestation or birthweight of less than 400 grams, as well as births with missing information on gestational age and birthweight. Births within the scope of the NPDC (from 20 weeks gestation or of at least 400 grams birthweight) include terminations of pregnancy.

(c) Data for births occurring during the 2022 calendar year are based on complete data for 7 jurisdictions and a compilation of data for the ACT. The ACT's data consist of its 2022 data for January to October, supplemented by its 2021 data for November and December (see 'Technical notes, Data quality and availability' for more information: https://meteor.aihw.gov.au/content/808591).

Source: AIHW analysis of National Perinatal Data Collection.

In the Northern Territory, the overall preterm birth rate rose from 16.1% in 2005 to 19.7% in 2022 before appearing to fall back to 16.6% in 2023. During the same period, the spontaneous preterm birth rate fell from 11.2% in 2005 to 7.7% in 2023 while the induced preterm birth rate doubled, from 5.0% in 2005 to 10.2% in 2022, before falling back to 9.0% in 2023.

In New South Wales, where the overall preterm birth rate changed only marginally (12.7–12.5%) during 2005–2023, the spontaneous preterm birth rate declined from 9.0% in 2005 to 5.7% in 2023, but the induced preterm birth rate nearly doubled, from 3.7% to 6.7% during the same period.

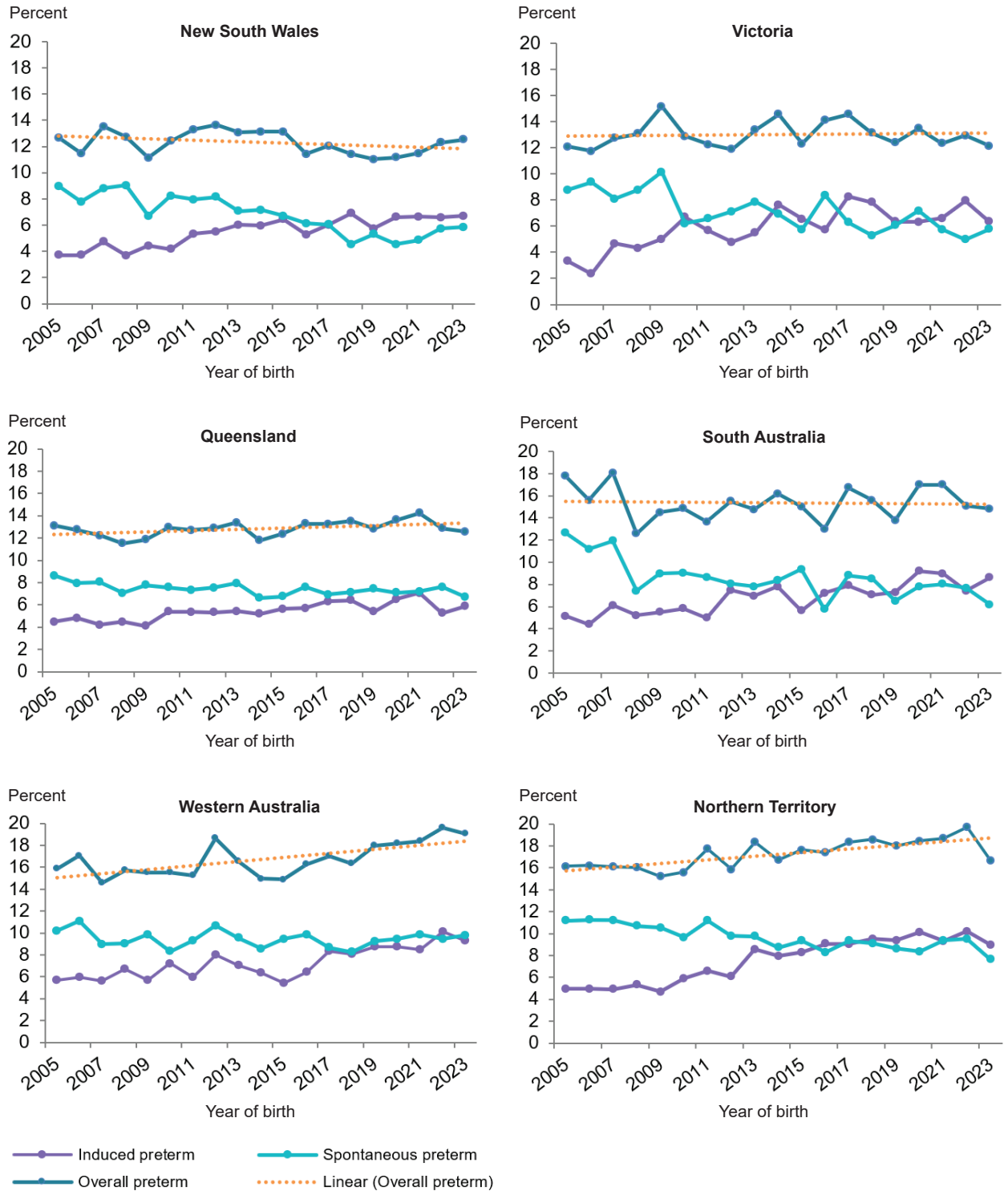
In Queensland, where the overall preterm birth rate declined marginally from 13.1% in 2005 to 12.6% in 2023, the spontaneous preterm birth rate declined from 8.6% to 6.7%, but the induced preterm birth rate increased from 4.5% to 5.9%.

The decline in spontaneous preterm birth rates accompanied by a concomitant increase in induced preterm birth rates has been observed in other developed countries as well, and has been cited as one of the reasons why overall preterm birth rates are not declining despite improvements in the risk factors associated with preterm birth (Lucovnik et al. 2016).

This phenomenon has been attributed to the increasing trend among medical professionals, particularly in high-income countries, to intervene in cases of maternal illness and fetal compromise, either by undertaking caesarean delivery or by inducing early delivery. This trend has the effect of potentially limiting progress towards reducing overall rates of preterm birth (Lucovnik et al. 2016; Aughey et al. 2023).

This phenomenon is important and will be explored further in Chapter 7 when pathways for reducing preterm birth rates are examined.

Figure 2.4: Induced[(a)], spontaneous and overall preterm birth rates (%) among births[(b)] to First Nations women, by selected jurisdictions of usual residence, 2005–2023[(c)]



(a) May include cases where induction of labour was attempted but labour did not result.

(b) Estimates are based on all births that occurred to First Nations women in Australia (excluding 'Other Territories') between 2005 and 2023, irrespective of birth status (live birth or stillbirth) and plurality (singleton or multiple birth). They exclude births of less than 20 weeks gestation or birthweight of less than 400 grams, as well as births with missing information on gestational age and birthweight. Births within the scope of the NPDC (from 20 weeks gestation or of at least 400 grams birthweight) include terminations of pregnancy.

(c) Data from Tasmania and the Australian Capital Territory have been excluded from this analysis to avoid highly variable trend data due to the small First Nations population in these 2 jurisdictions

Source: AIHW analysis of National Perinatal Data Collection.

3

Variations in preterm birth rates

3 Variations in preterm birth rates

There are wide variations in preterm birth rates between countries and within countries, with low-income and middle-income countries often experiencing the highest preterm birth rates (Walani 2020). Within countries, preterm birth rates tend to vary along socioeconomic and geographic divides, with the geographic disparities often associated with place-based social inequities (Khan et al. 2023).

The NPDC contains information on several of these distal and mediating factors, including Indigenous status of the mother and, from 2013, useable information on the Indigenous status of the baby. Indigenous status could serve as a proxy for racism, discrimination and inherited disadvantage (Life Course Centre 2024). Tables 3.1 and 3.2 show the number and percentage of preterm births among babies born to First Nations women and among all babies identified as First Nations on the NPDC during the period 2018–2023.

About 13.8% of babies born to First Nations women were preterm compared with 12.8% of babies classified as First Nations babies. Irrespective of whether the study population is First Nations babies or babies born to First Nations mothers, preterm birth rates tended to vary by remoteness location (ARIA) and socioeconomic status (SEIFA). During 2018–2023, preterm birth rates were lower in major cities and inner and outer regional areas than in remote and very remote areas. Preterm birth rates were also lowest in the highest SEIFA areas (deciles 8–10) compared with the mid-SEIFA areas (deciles 4–7) and the lowest SEIFA areas (deciles 1–3).

Preterm birth rates were highest among First Nations babies born to women with missing ARIA or SEIFA information. Key information used in allocating women to ARIA and SEIFA categories is address of usual residence. It is likely that women with missing ARIA or SEIFA information were probably mobile or itinerant women, women who could not provide an address of usual residence or women who provided an incomplete or incorrect address.

Table 3.1 shows that preterm birth rates among First Nations babies were much higher in the Northern Territory and Western Australia than in the remaining states and the Australian Capital Territory. Preterm birth rates were about 33–35% and 30–33% higher in the Northern Territory and Western Australia, respectively, than the average for Australia. Overall, the jurisdictions with the highest preterm birth rates also contained the highest proportions of First Nations people living in remote and very remote areas, as Appendix Table A1 shows.

The Department of Health and Ageing (2020) has recommended at least 10 antenatal care visits for first-time mothers, and at least 7 visits for mothers who have previously given birth and for subsequent uncomplicated pregnancies.

First-time mothers who attended less than the recommended 10 antenatal care visits and women who have previously given birth, but who attended less than the recommended minimum of 7 antenatal care visits are deemed to have not met the recommended minimum antenatal care attendance requirements.

Table 3.2 shows that preterm birth rates were higher among babies born to women who did not meet the recommended minimum antenatal care attendance requirements compared with babies born to women who met these requirements. As the modelling in Table 4.2b shows, this is true even if the analysis is limited to women with a pregnancy duration of 32 weeks or more.

Table 3.1: Percentage of preterm births[a] among First Nations babies and babies born to First Nations women, by mother's socioeconomic characteristics, Australia 2018–2023

	Babies born to First Nations mothers[b]		All First Nations babies[c]	
Mother's characteristics	**No. of births**	**% preterm**	**No. of births**	**% preterm**
Australia	**90,360**	**13.8**	**112,514**	**12.8**
ARIA/Remoteness location[d]				
Major city	33,632	13.1	43,281	12.0
Inner & Outer Regional	40,580	13.1	51,596	12.1
Remote & Very Remote	15,693	16.9	17,103	16.1
ARIA not stated	455	29.0	534	27.7
SEIFA[e]				
Highest SEIFA (deciles 8–10)	7,284	11.6	9,792	10.7
Mid-SEIFA (deciles 4–7)	30,326	13.1	39,167	12.0
Lowest SEIFA (deciles 1–3)	52,275	14.4	62,992	13.4
SEIFA not stated	475	28.4	563	27.4
State of usual residence[f]				
New South Wales	29,686	11.7	35,038	10.8
Victoria	6,743	12.8	9,507	11.5
Queensland	27,513	13.3	35,283	12.4
South Australia	4,866	15.6	6,815	13.6
Western Australia	11,485	18.3	14,406	16.7
Tasmania	2,063	11.2	2,153	11.3
Northern Territory	7,255	18.4	8,247	17.3
Australian Capital Territory	749	9.5	1,065	9.9

(a) Based on all First Nations births and births to First Nations women that occurred in Australia (excluding 'Other territories') during 2018–2023. They exclude births of less than 20 weeks gestation or birthweight of less than 400 grams as well as births with missing information on gestational age and birthweight.

(b) These are births to First Nations mothers irrespective of the Indigenous status of the baby's father or the stated Indigenous status of the baby. These births may exclude babies with First Nations fathers but whose mothers are non-Indigenous.

(c) These are babies identified as First Nations babies irrespective of the Indigenous status of their mother or father. These babies may include babies born to First Nations fathers and non-Indigenous mothers and First Nations mothers and non-Indigenous fathers.

(d) Between 2018 and 2021, remoteness area was derived by applying the Australian Bureau of Statistics' (ABS's) 2016 Australian Statistical Geography Standard (ASGS). For 2022, remoteness area was derived by applying the ABS's 2016 ASGS to WA, SA, NT and November and December for the ACT, and applying the ABS's Third Edition ASGS to NSW, Vic, Qld, Tas and January to October for the ACT. For 2023, remoteness area was derived by applying the ABS's Third Edition ASGS. For the numerator, remoteness area was calculated only where geographic area of usual residence was provided. The denominator includes mothers with a known state or territory of usual residence, but whose remoteness area was unknown. Estimates exclude mothers not usually resident in Australia and those whose state or territory of usual residence was 'Not stated'. Data may not add to the total due to rounding.

(e) Between 2018 and 2021, socioeconomic status was derived by applying the ABS's 2016 SEIFA Index of Relative Socio-economic Disadvantage (IRSD). For 2022, socioeconomic status was derived by applying the ABS's 2016 SEIFA IRSD to WA, SA, NT and November and December for the ACT, and applying the ABS's Third Edition SEIFA IRSD to NSW, Vic, Qld, Tas and January to October for the ACT. For 2023, socioeconomic status was derived by applying the ABS's Third Edition SEIFA IRSD. Socioeconomic status was calculated only where geographic area of usual residence was provided.

Notes

1. Data for births occurring during the 2022 calendar year are based on complete data for 7 jurisdictions and a compilation of data for the ACT. The ACT's data consist of its 2022 data for January to October, supplemented by its 2021 data for November and December (see 'Technical notes, Data quality and availability' for more information: https://meteor.aihw.gov.au/content/808591).
2. Data are by usual residence of the mother. Excludes mothers not usually resident in Australia and those whose state or territory of usual residence was 'Not stated'.

Source: AIHW analysis of National Perinatal Data Collection.

Preterm birth rates were also higher among babies born to women aged 35 and older, were underweight, reported smoking during pregnancy, had pre-existing diabetes, or developed hypertensive disorders during pregnancy, compared with women without these conditions.

Table 3.2: Percentage of First Nations births[(a)] that are preterm, by their mother's demographic and health characteristics, Australia 2018–2023

	Babies born to First Nations mothers[(b)]		All First Nations babies[(c)]	
Mother's characteristics	**No. of births**	**% preterm**	**No. of births**	**% preterm**
Total births	**90,360**	**13.8**	**112,514**	**12.8**
Maternal age (years)				
Under 18	2,920	14.5	3,421	13.6
18–24	33,537	12.8	40,665	11.9
25–34	44,210	13.6	55,793	12.4
35–39	8,602	17.9	11,209	16.3
40 & over	1,084	20.7	1,421	18.7
Not stated	7	0.0	6	0.0
Marital status[(d)]				
Never married	37,770	13.7	44,684	12.9
Currently married	32,861	12.3	43,479	11.3
Widowed/divorced/separated	1,665	14.1	2,094	13.1
Not stated	6,578	14.1	7,851	12.7
Sub-total	*78,874*	*13.2*	*98,108*	*12.2*
Body Mass Index				
Underweight	5,212	19.1	6,216	18.3
Normal weight	30,440	13.9	39,020	12.7
Overweight/Obese	49,847	11.8	61,930	10.9
Not stated	4,861	28.8	5,348	28.4

(continued)

Table 3.2 (continued): Percentage of First Nations births[a] that are preterm, by their mother's demographic and health characteristics, Australia 2018–2023

	Babies born to First Nations mothers[b]		All First Nations babies[c]	
Mother's characteristics	No. of births	% preterm	No. of births	% preterm
Parity				
0	30,534	12.6	39,149	11.5
1	23,946	11.7	30,438	10.9
2	15,860	14.2	19,450	13.2
3	9,410	16.6	11,237	15.6
4+	10,514	19.0	12,138	18.2
Not stated	96	20.0	102	15.7
Pre-existing diabetes mellitus				
No	87,522	13.2	109,204	12.2
Yes	2,111	38.4	2,283	38.0
Not stated	727	14.9	1,027	13.2
Pre-existing hypertension				
No	88,548	13.6	110,239	12.6
Yes	1,024	28.4	1,157	27.5
Not stated	788	16.0	1,118	14.3
Gestational age at first antenatal visit				
1st trimester	62,379	12.3	78,977	11.5
2nd trimester	22,340	15.3	27,166	14.0
3rd trimester or no care	4,283	20.8	4,883	19.7
Not stated	1,358	36.1	1,488	33.5
Whether mother made recommended number of antenatal care visits				
No	32,260	20.9	38,309	19.6
Yes	56,950	9.3	72,926	8.7
Not stated	1,150	40.0	1,279	37.1
Smoked at any time during pregnancy[e]				
No	51,488	11.2	67,406	10.2
Yes	37,118	16.9	43,050	16.2
Not stated	1,754	27.3	2,058	25.9

(continued)

Table 3.2 (continued): Percentage of First Nations births[a] that are preterm, by their mother's demographic and health characteristics, Australia 2018–2023

	Babies born to First Nations mothers[b]		All First Nations babies[c]	
Mother's characteristics	No. of births	% preterm	No. of births	% preterm
Consumed alcohol during pregnancy[f]				
No	34,651	13.7	45,507	12.6
Yes	3,010	18.5	3,523	17.7
Not stated	3,152	26.1	3,582	24.9
Sub-total	*40,813*	*15.1*	*52,612*	*13.8*
Gestational diabetes				
No	76.826	14.0	95,781	12.8
Yes	12,807	12.9	15,706	12.3
Not stated	727	14.9	1,027	13.2
Gestational hypertension				
No	86,685	13.6	107,881	12.6
Yes	2,887	18.6	3,515	16.8
Not stated	788	16.0	1,118	14.3

(a) Based on all First Nations babies and babies born to First Nations women that occurred in Australia (excluding 'Other Territories') during 2018–2023, irrespective of birth status (live birth or stillbirth) and plurality (singleton or multiple birth). They exclude births of less than 20 weeks gestation or birthweight of less than 400 grams as well as births with missing information on gestational age and birthweight. Births within the scope of the NPDC (from 20 weeks gestation or of at least 400 grams birthweight) include terminations of pregnancy.

(b) These are births to First Nations mothers irrespective of the Indigenous status of the baby's father or the stated Indigenous status of the baby. These births may exclude babies with First Nations fathers, but whose mothers are non-Indigenous.

(c) These are babies identified as First Nations babies irrespective of the Indigenous status of their mother or father. These babies may include babies born to First Nations fathers and non-Indigenous mothers and First Nations mothers and non-Indigenous fathers.

(d) Information on marital status is missing for the whole of Western Australia. As a result, the marital status figures exclude Western Australia and do not add up to the total for Australia.

(e) Data for smoking during pregnancy are self-reported. Data for 'Smoking status at any time during pregnancy' exclude ACT in 2023.

(f) Data for alcohol consumption during pregnancy are self-reported. Information on alcohol consumption is unavailable for New South Wales and the ACT, and is only available for most jurisdictions from 2020. The data on alcohol consumption are therefore from 2020 and exclude New South Wales and the ACT.

(g) All estimates also exclude ACT data for 2023 except for maternal age and parity. Care should be taken when comparing data across time

Source: AIHW analysis of National Perinatal Data Collection.

Preterm birth rates were also higher among First Nations babies whose mothers did not attend antenatal care or who attended their first antenatal care later than the first trimester of their pregnancy compared with babies born to women who attended their first antenatal care during the first trimester of their pregnancy.

There are slight differences in how the trimesters of pregnancies are defined. However, for purposes of the modelling carried out in this report the trimesters of pregnancy are defined as follows:

- first trimester: the first 12 weeks of pregnancy
- second trimester: 13–27 weeks of pregnancy
- third trimester: from 28 weeks of pregnancy until birth.

Women who attended their first antenatal care later than the first trimester of their pregnancy would be unlikely to be able to meet the recommended minimum number of 10 antenatal care visits for first-time mothers, and at least 7 visits for mothers who have previously given birth and for subsequent uncomplicated pregnancies (Department of Health and Aged Care 2020). This may partly explain why preterm birth rates were twice as high among babies born to women who did not meet the recommended minimum number of antenatal care attendance requirements compared with babies born to women who did.

The role of these socioeconomic, demographic and health characteristics as distal and mediating risk factors for preterm are explored further in Chapter 4.

It is noted however, that there is a bi-directional or interactive relationship between preterm birth and the number of antenatal visits a woman can make during her pregnancy. Women who do not meet the recommended minimum number of antenatal care visits have been known to have an elevated risk of having a preterm birth. On the other hand, women who have a preterm birth would have their attendance at antenatal care truncated due to the preterm birth and would not be able to meet the recommended minimum number of antenatal care attendance requirements.

Chapter 4, Table 4.2b explores the bi-directional relationship between gestational age and antenatal care attendance by examining the adjusted log odds of risk factors associated with preterm birth among all women and among women whose pregnancies lasted 32 weeks or longer.

4

Drivers of preterm birth among First Nations women

4 Drivers of preterm birth among First Nations women

In Chapter 3, variations in preterm birth rates according to the socioeconomic, demographic and health characteristics of First Nations women were described. This chapter discusses the results of using logistic regression to model the risk of preterm birth among First Nations women with these characteristics. The results of the analysis will be used to identify the drivers of preterm birth among First Nations women, as well as to inform the identification of modifiable risk factors and pathways for reducing preterm birth among First Nations women.

It has been observed elsewhere that preterm birth varies by socioeconomic status, including race and ethnicity (Braveman et al. 2015; McHale et al. 2022; Khan et al. 2023). Race and ethnicity are, however, proxies for socioeconomic differences relating to discrimination and inherited disadvantage (Life Course Centre 2024). Earlier work by the AIHW (2021) also showed that, during 2016–2018, the preterm birth rate among babies born to First Nations women was nearly 1.7 times the rate among babies born to non-Indigenous women. Taking these differences into account, the Indigenous status of the baby and of the baby's mother were included in some of the models as covariates.

There is interest in whether analysis of health issues involving First Nations babies should include all babies identified as First Nations or whether the analysis should be based on only babies born to First Nations women. For instance, a baby identified as a First Nations baby in a data set may have a non-Indigenous mother but a First Nations father, and vice-versa.

Since mid-2012, information on the Indigenous status of the baby has been included in the NPDC, with useable data available from 2013. As the analysis in this chapter is based on babies born between 2018 and 2023, it is possible to examine preterm births both among babies identified as First Nations in the NPDC as well as among babies born to First Nations women. The results of this analysis are shown in tables 4.1 and 4.2 and figures 4.1 and 4.2.

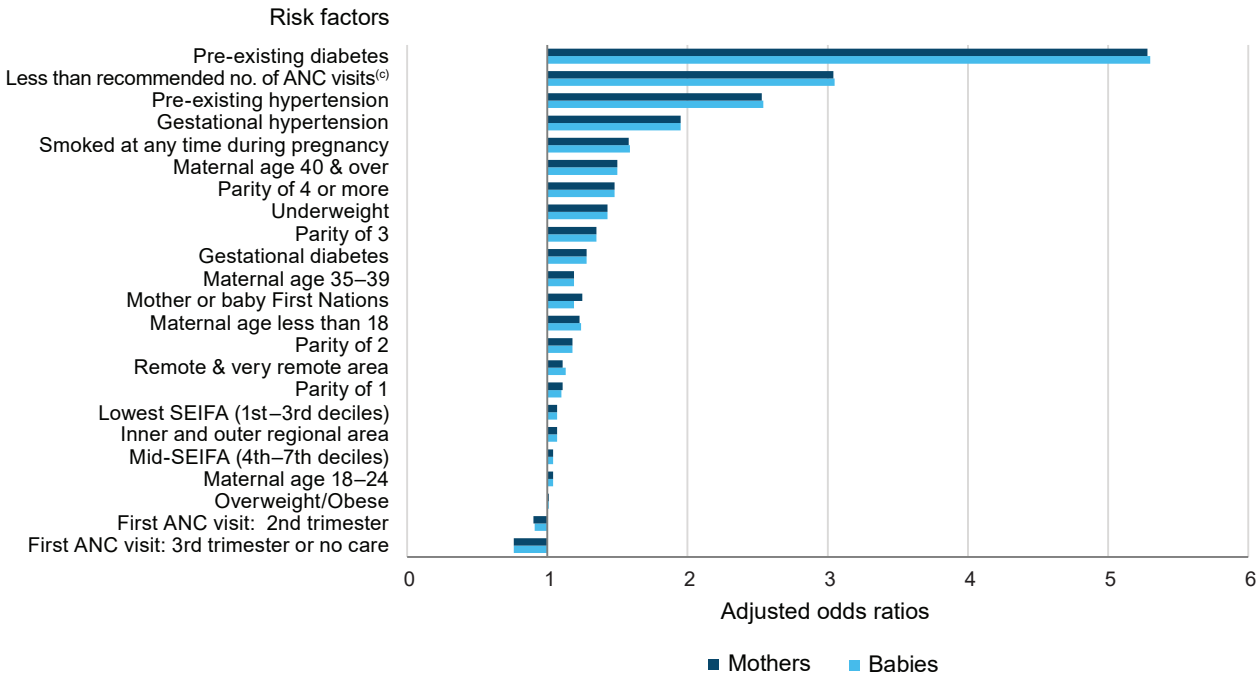
4.1 Drivers of preterm birth among all women

Figure 4.1 shows adjusted odds ratios of the risk factors for preterm birth among all women who gave birth in Australia between 2018 and 2023, with Indigenous status included as a covariate. Figure 4.1 presents 2 sets of adjusted odds ratios – one set based on the Indigenous status of the mother as a covariate and the other on the Indigenous status of the baby as a covariate. Figure 4.2, on the other hand, shows results for only First Nations babies and babies born to First Nations women. These results are also shown in tables 4.1 and 4.2, while the full results of this analysis, including confidence intervals of the estimates, are shown in Appendix tables A3, A3a, A4 and A4a.

The adjusted odds ratios shown in figures 4.1 and 4.2 represent the likelihood that a woman with a given characteristic (for example, had diabetes or smoked during pregnancy) will experience a preterm birth after adjusting for all her other socioeconomic, demographic and health characteristics and any complications that she may have developed during pregnancy.

An adjusted odds ratio close to or equal to 1 means that exposure to the covariate or risk factor (for example, smoking during pregnancy) has little or no effect on the odds of the outcome (preterm birth) occurring, after adjusting for the effects of all other risk factors in the model. An odds ratio greater than 1 means that exposure to the risk factor increases the odds of the outcome's (preterm birth) occurring, while an odds ratio less than 1 means that exposure to the risk factor decreases the odds of the outcome's occurring (*see Figure 4.1*).

Figure 4.1: Adjusted odds ratios of maternal risk factors for preterm birth[(a)] among all births that occurred in Australia, 2018–2023[(b)], irrespective of First Nations Status of mother or baby, with the First Nations status of mother or baby as a covariate



ANC = Antenatal care.

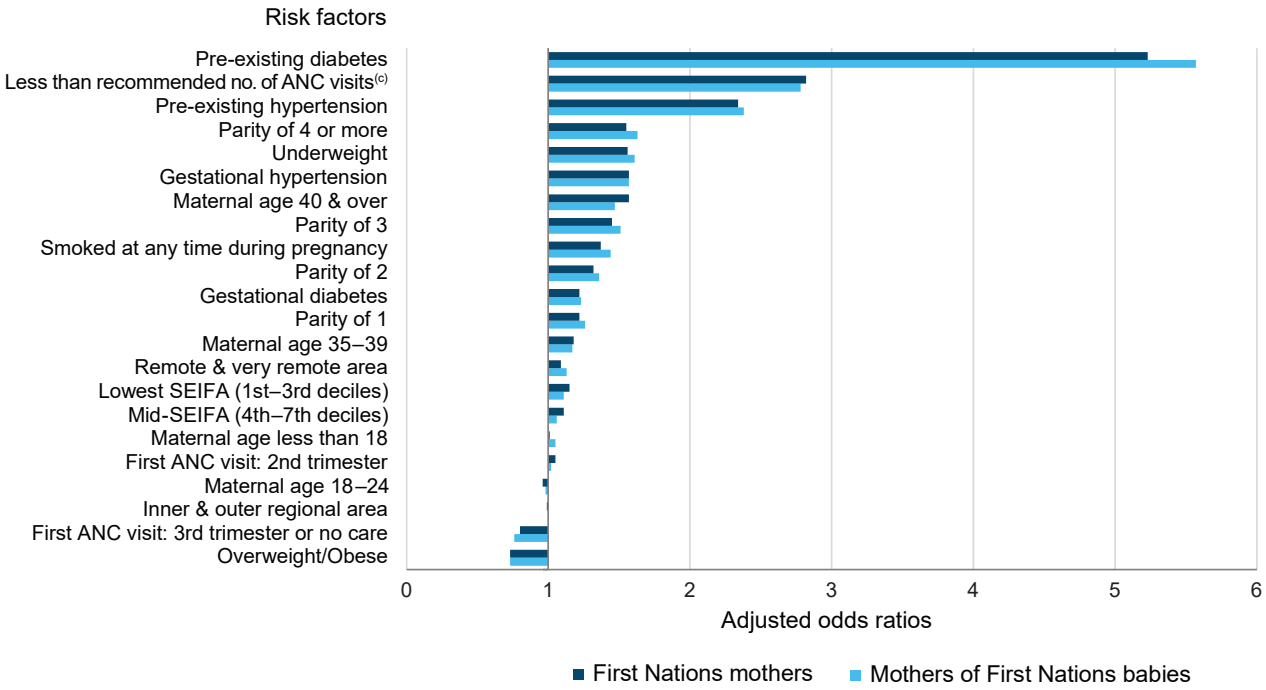
(a) Estimates are based on singleton births that occurred in Australia (excluding 'Other Territories'), during 2018–2023, irrespective of birth status (live birth or stillbirth). They exclude births of less than 20 weeks gestation or birthweight of less than 400 grams, as well as births with missing information on gestational age and birthweight. Births within the scope of the NPDC (from 20 weeks gestation or of at least 400 grams birthweight) include terminations of pregnancy.

(b) Data for births occurring during the 2022 calendar year are based on complete data for 7 jurisdictions and a compilation of data for the ACT. The ACT's data consist of its 2022 data for January to October, supplemented by its 2021 data for November and December (see 'Technical notes, Data quality and availability' for more information: https://meteor.aihw.gov.au/content/808591).

(c) The Department of Health has recommended a minimum number of 10 antenatal care (ANC) visits for first-time mothers, and at least 7 visits for mothers who had previously given birth and for subsequent uncomplicated pregnancies (Department of Health and Aged Care 2020).

Source: AIHW analysis of National Perinatal Data Collection.

Figure 4.2: Adjusted odds ratios of maternal risk factors for preterm birth[a] among mothers of First Nations babies and among First Nations women, Australia, 2018–2023[b]



ANC = Antenatal care.

(a) Estimates are based on singleton births that occurred in Australia (excluding 'Other Territories'), during 2018–2023, irrespective of birth status (live birth or stillbirth). They exclude births of less than 20 weeks gestation or birthweight of less than 400 grams, as well as births with missing information on gestational age and birthweight. Births within the scope of the NPDC (from 20 weeks gestation or of at least 400 grams birthweight) include terminations of pregnancy.

(b) Data for births occurring during the 2022 calendar year are based on complete data for 7 jurisdictions and a compilation of data for the ACT. The ACT's data consist of its 2022 data for January to October, supplemented by its 2021 data for November and December (see 'Technical notes, Data quality and availability' for more information: https://meteor.aihw.gov.au/content/808591).

(c) The Department of Health has recommended a minimum number of 10 antenatal care (ANC) visits for first-time mothers, and at least 7 visits for mothers who had previously given birth and for subsequent uncomplicated pregnancies (Department of Health and Aged Care 2020).

Source: AIHW analysis of National Perinatal Data Collection.

Both figures 4.1 and 4.2 show that, while Indigenous status and maternal socioeconomic factors (residence in a regional, remote or a low socioeconomic area) were associated with the risk of preterm birth, they were not the most important factors. Maternal health and socioeconomic factors as well as complications experienced during pregnancy were more important. The adjusted odds ratios for the maternal health risk factors and pregnancy complications were much higher than those for the distal or socioeconomic and demographic factors.

Among these maternal health risk factors are maternal pre-existing diabetes and/or hypertension, not meeting the recommended minimum number of antenatal care attendance requirements, being underweight, developing gestational hypertension and/or diabetes (during pregnancy) and smoking during pregnancy.

The socioeconomic, demographic and health characteristics and pregnancy complications identified in Figure 4.1 as the risk factors for preterm birth among all women were the same risk factors among First Nations women and First Nations babies, as shown in Figure 4.2. While the proportions of First Nations and non-Indigenous women with these risk factors may vary, the risk factors themselves are not specific to First Nations mothers or babies.

Both figures 4.1 and 4.2 also show that, irrespective of whether the analysis is based on 'First Nations babies' or 'babies born to First Nations mothers', the identified risk factors for preterm birth as well as the size and direction of the adjusted odds ratios are nearly the same. Thus, one can base this analysis either on 'First Nations babies' or on 'First Nations women' without risking definitional bias. To capture all First Nations women in our analysis, subsequent analyses are therefore based on First Nations women.

Tables 4.1 and 4.2 provide more details on the role of maternal health risk factors and pregnancy complications in mediating the relationship between maternal socioeconomic factors and preterm birth. As mentioned in Chapter 1, the maternal risk factors were incorporated into the logistic regression model using a nested approach. Four groups of risk factors were entered into the model sequentially or in 'steps' according to the chronological order in which they were expected to impact the pregnancy and birth outcomes.

The first group of distal factors (Indigenous status, SEIFA, ARIA and maternal age [at the time of birth]) were the first to be entered into the model to assess the likelihood that a woman with certain distal characteristics would experience a preterm birth. The results demonstrate that assuming only these distal factors were considered, then, as shown in Table 4.1, a First Nations woman having a baby between 2018 and 2023 had about 68% greater odds of having a preterm birth (adjusted odds ratio: 1.68 [1.63–1.72]) than a non-Indigenous woman with the same characteristics.

Women resident in medium-to-low socioeconomic and remote areas were more likely to have a preterm birth than women in the reference categories (*see Appendix Table A2 for the reference categories*). Table 4.1 also shows, for instance, that in terms of reducing the risk of having a preterm birth, the optimum age for having a non-preterm baby appears to be 25–34. The adjusted odds ratios of a preterm birth were higher than unity (1.00) outside the 25–34 age group (reference category).

Although the distal or socioeconomic factors remain important risk factors for preterm birth, Table 4.1 shows the extent to which the Stage 2 or maternal health risk factors mediate the relationship between the distal factors and preterm birth. Stage 2 factors were in existence at the onset of the pregnancy, and include smoking, maternal BMI, pre-existing diabetes and hypertension and number of previous pregnancies. The results show that the importance of each of the distal factors was reduced when the Stage 2 factors were introduced. For example, the likelihood that a First Nations woman would have a preterm birth reduced from an adjusted odds ratio of 1.68 to 1.34 when the Stage 2 factors were introduced.

The results demonstrate that the Stage 2 factors assume some of the risks of preterm birth lost by the Stage 1 factors. Women who smoked during pregnancy, were underweight, and had pre-existing diabetes or hypertension had, respectively, 70%, 42%, 356% and 131% greater odds of having a preterm birth than women without these characteristics.

In Stage 3, additional risk factors were introduced into the model – namely factors that were likely to arise during the pregnancy, such as antenatal care, gestational diabetes and gestational hypertension. The results highlight the relationship between the timing at first antenatal care and the risk of preterm birth. Compared with women who received their first antenatal care during the first trimester of their pregnancy (reference category), women who received their first antenatal care during the second trimester had about 3% greater odds of having a preterm birth, while women who received their first antenatal care after the second trimester or not at all, had about 28% greater odds of having a preterm birth.

Even after the introduction of stages 2 and 3 risk factors, pre-existing diabetes and pre-existing hypertension continued to be very important risk factors for preterm birth. First Nations women who developed pregnancy complications, such as gestational diabetes and/or gestational hypertension during pregnancy, also increased their risk of having a preterm birth.

An additional risk factor was introduced in Stage 4: whether a woman made the recommended minimum number of 10 antenatal care visits for first-time mothers, and at least 7 visits for mothers who had previously given birth and for subsequent uncomplicated pregnancies (Department of Health and Aged Care 2020).

There is a strong relationship between how early in a pregnancy a woman received her first antenatal care and whether she was able to meet the minimum number of antenatal care attendance requirements recommended by the Department of Health (formerly the Department of Health and Aged Care).

The relationship between pregnancy duration and whether a woman meets the recommended minimum antenatal care attendance requirements is bi-directional. Women who have a preterm birth or experience early pregnancy loss may not remain pregnant long enough to complete the recommended minimum number of antenatal care visits.

The following analyses explore this relationship in more detail. Tables 4.1, 4.2 and 4.2a examine how gestational age at first antenatal care is associated with meeting the recommended minimum antenatal care attendance requirements. Table 4.2b further assesses the role of early pregnancy loss by restricting the analysis to women whose pregnancies lasted 32 weeks or longer.

Women who received their first antenatal care during the first trimester of their pregnancy were more likely to be able to meet the recommended antenatal care attendance requirements than women who received their first antenatal care later in their pregnancy. However, receiving antenatal care early during a pregnancy does not necessarily mean that a woman would continue to receive antenatal care throughout her pregnancy.

As a result, in Stage 4, the 2 antenatal care variables (gestational age at first antenatal care and meeting the minimum number of recommended antenatal care visits) were combined into a composite variable involving when in the pregnancy a woman received her first antenatal care and whether she met the recommended minimum number of antenatal care attendance requirements. The composite variable was categorised as follows:

- Group 1: Women who received their first antenatal care during the first trimester of their pregnancy and also ***met*** the recommended minimum attendance requirements (reference category).
- Group 2: Women who received their first antenatal care during the second trimester of their pregnancy and also ***met*** the recommended minimum attendance requirements.
- Group 3: Women who received their first antenatal care during the first trimester of their pregnancy but ***did not meet*** the recommended minimum attendance requirements.
- Group 4 (residual group): women who attended their first antenatal care after the first trimester or not at all and ***did not meet*** the minimum attendance requirements. This group excludes women with missing information on attendance at antenatal care.

These results underscore the importance of meeting the recommended minimum antenatal care attendance requirements. Women who did not meet these requirements had greater adjusted odds of having a preterm birth than those who met the antenatal care attendance requirements, regardless of when they first received antenatal care during pregnancy.

Table 4.1: Adjusted odds ratios of risk factors associated with preterm birth[a] among all women who gave birth in Australia, 2018–2023[b]

Maternal characteristics	Maternal socioeconomic status	Mediators of maternal socioeconomic status		
	Stage 1: Distal and contextual factors	Stage 2: Factors likely present before onset of pregnancy + Stage 1 factors	Stage 3: Factors likely to arise during pregnancy + Stages 1 & 2 factors	Stage 4: Factors likely to arise at end of pregnancy + Stages 1, 2 & 3 factors
First Nations mother	**1.68***	**1.34***	**1.33***	**1.25***
SEIFA (Ref. = Highest SEIFA deciles 8–10)				
Mid-SEIFA (deciles 4–7)	1.12*	1.09*	1.08*	1.04*
Lowest SEIFA (deciles 1–3)	1.25*	1.14*	1.13*	1.07*
Location (Ref. = Major city)				
Regional	1.02*	1.00	1.00	1.07*
Remote	1.12*	1.05*	1.05*	1.11*
Maternal age (years) (Ref. = 25–34)				
Under 18	1.41*	1.24*	1.25*	1.23*
18–24	1.13*	1.07*	1.08*	1.04*
35–39	1.18*	1.18*	1.16*	1.19*
40 and over	1.57*	1.48*	1.43*	1.50*
Smoked during pregnancy		1.70*	1.70*	1.57*
Maternal BMI (Ref. = Normal weight)				
Underweight		1.42*	1.43*	1.43*
Overweight		1.04*	1.00	1.01
Pre-existing diabetes: Yes		4.56*	4.65*	5.27*w
Pre-exiting hypertension: Yes		2.31*	2.36*	2.53*
Parity (Ref. = Nulliparous)				
1		0.77*	0.79*	1.10*
2		0.85*	0.86*	1.17*
3		1.01	1.03	1.33*
4+		1.17*	1.18*	1.45*
Gestational age at first ANC visit (Ref. = 1st trimester)				
2nd trimester			1.03*	n.c.
3rd trimester or no care			1.28*	n.c.

(continued)

Table 4.1 (continued): Adjusted odds ratios of risk factors associated with preterm birth[(a)] among all women who gave birth in Australia, 2018–2023[(b)]

Maternal characteristics	Maternal socioeconomic status	Mediators of maternal socioeconomic status		
	Stage 1: Distal and contextual factors	Stage 2: Factors likely present before onset of pregnancy + Stage 1 factors	Stage 3: Factors likely to arise during pregnancy + Stages 1 & 2 factors	Stage 4: Factors likely to arise at end of pregnancy + Stages 1, 2 & 3 factors
Gestational diabetes: Yes			1.20*	1.27*
Gestational hypertension: Yes			1.87*	1.95*
Antenatal care (Ref. = Group 1: Attended first ANC during 1st trimester and met the recommended minimum ANC attendance requirements)[(c)]				
Group 2: Attended first ANC during 2nd trimester and met the recommended minimum ANC attendance requirements				0.86*
Group 3: Attended first ANC during 1st trimester and did not meet the recommended minimum ANC attendance requirements				2.98*
Group 4: No ANC or attended first ANC during or after 2nd trimester and did not meet the minimum ANC attendance requirements				2.63*

ANC = antenatal care; n.c. = not calculated; gestational age at first antenatal visit has been combined with recommended number of ANC visits.

* = statistically significant at the 95% confidence level. Please see Appendix Table A3 for full table including confidence intervals.

(a) Estimates are based on all women who gave birth to a singleton baby in Australia (excluding 'Other Territories'), during 2018–2023, irrespective of birth status (live birth or stillbirth). They exclude births of less than 20 weeks gestation or birthweight of less than 400 grams, as well as births with missing information on gestational age and birthweight. Births within the scope of the NPDC (from 20 weeks gestation or of at least 400 grams birthweight) include terminations of pregnancy.

(b) Data for births occurring during the 2022 calendar year are based on complete data for 7 jurisdictions and a compilation of data for the ACT. The ACT's data consist of its 2022 data for January to October, supplemented by its 2021 data for November and December (see 'Technical notes, Data quality and availability' for more information: https://meteor.aihw.gov.au/content/808591).

(c) The Department of Health has recommended a minimum number of 10 antenatal care (ANC) visits for first-time mothers, and at least 7 visits for mothers who had previously given birth and for subsequent uncomplicated pregnancies (Department of Health and Aged Care 2020).

Source: AIHW analysis of National Perinatal Data Collection.

For example, compared with the reference category or Group 1 women who met the recommended minimum antenatal care attendance requirements, the adjusted odds ratio of having a preterm baby was 3 times higher for Group 3 women who received their first antenatal care during the first trimester of their pregnancy but did not meet the minimum antenatal care attendance requirements (adjusted odds ratio: 2.98 [2.93–3.03]).

Similarly, compared with Group 1 women, the adjusted odds ratio of having a preterm birth was over 2.6 times higher for Group 4 women who also did not meet the recommended minimum antenatal care attendance requirements (adjusted odds ratio: 2.63 [2.58–2.69]), irrespective of when they received their first antenatal care.

On the other hand, the adjusted odds ratio of the risk of a preterm birth was lower (adjusted odds ratio: 0.86 [0.83–0.88]) for Group 2 women who received their first antenatal care during the second trimester but met the recommended minimum antenatal care attendance requirements than it was for women in the reference category.

Despite several socioeconomic, demographic and health characteristics being included as covariates in stages 2–4 of the logistic regression model, being a First Nations woman still emerged as an independent risk factor for preterm birth. After considering all her socioeconomic, demographic and health characteristics, a First Nations woman still had a higher risk of having a preterm birth than a non-Indigenous woman with the same characteristics. A First Nations woman had about 25% greater odds of having a preterm birth than a non-Indigenous woman with the same demographic, socioeconomic and health characteristics (adjusted odds ratio: 1.25 [1.22–1.29]).

This suggests the possible existence of other characteristics and experiences unique to First Nations women that are not captured in the NPDC, and which have not been measured in the model. Other studies have pointed out that these 'other characteristics and experiences' may include structural and cultural barriers such as racism, discrimination and inherited disadvantage (Life Course Centre 2024), historical marginalisation and disadvantage (Elder Jr 1992; Mayer 2009), life course socioeconomic experiences, racism-related stress (Braveman et al. 2015) and place-based disadvantage (Khan et al. 2023).

Examples of the possible effect of structural and cultural barriers, including racism, on preterm birth include First Nations women avoiding antenatal care and mainstream health services due to lack of cultural safety, persistent fear of child removal, race-based surveillance, and mistrust within maternity services. First Nations women from remote localities are also concerned that they might be sent to larger regional centres for childbirth, which would distance them from their families and familiar surroundings. This fear is rooted in historical and ongoing child protection issues (Sivertsen et al., 2020, Sivertsen et al. 2025, Williams et al. 2026) (see Section 7.4.4 'Antenatal Care). Lack of adequate antenatal care has a strong statistically association with a high risk of preterm birth.

Reducing the socioeconomic gap between First Nations and non-Indigenous people in Australia could be one of the pathways for reducing preterm birth among First Nations women. Efforts to reduce preterm birth should therefore also include efforts to address these historical, inherited and life-course inequities.

4.2 Drivers of preterm birth among First Nations women

Table 4.2 shows the results of modelling to identify the risk factors associated with preterm birth specifically among First Nations women. Assuming that only the distal factors in Stage 1 (Indigenous status, socioeconomic, geographic and demographic factors) are considered, then residence in a remote or in a medium to the lowest socioeconomic area increased the risk of having a preterm birth among First Nations women by up to 38%. This socioeconomic and place-based risk could be related to problems of access to critical health-care infrastructure, health-care services and antenatal care services as well as to issues relating to general health and welfare, including education, employment, income, housing, transportation and social services.

First Nations women resident in the lowest SEIFA areas (SEIFA deciles 1–3) and in remote areas had, respectively, about 35% (adjusted odds ratio: 1.35 [1.23–1.49]) and 28% (adjusted odds ratio: 1.28 [1.20–1.37]) greater odds of having a preterm birth than the reference category of First Nations women living in the highest socioeconomic areas (SEIFA deciles 8–10) and in major cities.

There is also an increased risk of preterm birth among First Nations women aged 35 and over. The odds of having a preterm birth were about 34% greater among First Nations women aged 35–39 (adjusted odds ratio: 1.34 [1.23–1.45]) and nearly two times greater among First Nations women aged 40 and over (adjusted odds ratio: 1.86 [1.62–2.14]) than among First Nations women aged 25–34 (reference category).

While socioeconomic and demographic factors were undoubtedly important risk factors for preterm birth among First Nations women, the introduction of stages 2, 3 and 4 factors had an impact on the importance and size of the odds ratios for the socioeconomic factors at each stage. This shows that the impact of socioeconomic factors on preterm birth is mediated by several maternal health risk factors.

At Stage 4, after all the maternal health risk factors and pregnancy complications were included in the model, First Nations women with the following characteristics had greater odds of having a preterm birth compared to First Nations women without these characteristics:

- had pre-existing diabetes mellitus (5.2 times greater odds – adjusted odds ratio: 5.23[4.67–5.85])
- received first antenatal care during first trimester and did not meet the recommended minimum number of antenatal care attendance requirements (2.7 times greater odds – adjusted odds ratio: 2.72[2.56–2.89])
- received first antenatal care during second trimester or later, and did not meet the recommended minimum number of antenatal care attendance requirements (2.7 times greater odds – adjusted odds ratio: 2.34[1.96–2.79])
- had pre-existing hypertension (2.3 times greater odds – adjusted odds ratio: 2.34[1.96–2.79])
- was underweight (1.6 times greater odds – adjusted odds ratio: 1.57[1.44–1.71])
- had gestational hypertension (1.6 times greater odds – adjusted odds ratio: 1.56[1.38–1.76])
- had 4 or more previous pregnancies (1.5 times greater odds – adjusted odds ratio: 1.52[1.39–1.66])
- had 3 previous pregnancies (1.4 times greater odds – adjusted odds ratio: 1.43[1.30–1.56]))
- smoked at any time during pregnancy (1.4 times greater odds – adjusted odds ratio: 1.37[1.30–1.44])
- was aged 35–39 at time of birth (1.2 times greater odds – adjusted odds ratio: 1.18[1.09–1.29])
- was aged 40 or older at time of birth (1.6 times greater odds – adjusted odds ratio: 1.56[1.34–1.81])
- had gestational diabetes (1.2 times greater odds – adjusted odds ratio:1.22[1.14–1.31]).

In terms of the relationship between socioeconomic status and preterm birth, women living in remote and regional areas and in the lowest SEIFA areas (SEIFA deciles 1–3) still had greater odds of having a preterm birth than women living in major cities and in the highest socioeconomic areas (SEIFA deciles 8–10), even after adjusting for all of their demographic characteristics, health risk factors and complications experienced during pregnancy.

First Nations women living in the lowest socioeconomic areas (SEIFA deciles 1–3), in medium socioeconomic areas (SEIFA deciles 4–7) and in remote areas had, respectively, about 15%, 11% and 10% greater odds of having a preterm birth than First Nations women living in the highest socioeconomic areas (SEIFA deciles 8–10) or in major cities.

In a modification of the model shown in Table 4.2a, gestational age at first antenatal care and attending the recommended number of antenatal care visits were treated as separate variables rather than as a combined single composite variable. The results at Stage 3 of the model show that, compared with First Nations women who made their first antenatal visit during the first trimester of their pregnancy, had their first antenatal care during the second trimester and 29% greater (adjusted odds ratio: 1.29 [1.15–1.45]) for women who had their first antenatal care during the third trimester or not at all.

Table 4.2: Adjusted odds ratios of risk factors associated with preterm birth[a] among First Nations women who gave birth in Australia, 2018–2023[b]

Maternal characteristics	Maternal socioeconomic status	Mediators of maternal socioeconomic status		
	Stage 1: Distal and contextual factors	Stage 2: Factors likely present before onset of pregnancy + Stage 1 factors	Stage 3: Factors likely to arise during pregnancy + Stages 1 & 2 factors	Stage 4: Factors likely to arise at end of pregnancy + Stages 1, 2 & 3 factors
SEIFA (Ref. = Highest SEIFA deciles 8–10)				
Mid-SEIFA (deciles 4–7)	1.21*	1.16*	1.15*	1.11*
Lowest SEIFA (deciles 1–3)	1.35*	1.20*	1.19*	1.15*
Location (Ref. = Major city)				
Regional	1.00	0.96	0.96	0.99
Remote	1.28*	1.10*	1.09*	1.10*
Maternal age (years) (Ref. = 25–34)				
Under 18	1.12	1.11	1.08	1.01
18–24	0.95	1.01	1.01	0.95
35–39	1.34*	1.17*	1.16*	1.8*
40 & over	1.87*	1.54*	1.50*	1.56*
Smoked during pregnancy		1.52*	1.50*	1.37*
Maternal BMI (Ref. = Normal weight)				
Underweight		1.55*	1.57*	1.57*
Overweight		0.72*	0.71*	0.72*
Pre-existing diabetes: Yes		4.61*	4.72*	5.23*
Pre-exiting hypertension: Yes		2.12*	2.17*	2.34*
Parity (Ref. = Nulliparous)				
1		0.94	0.95	1.20*
2		1.07	1.07	1.30*
3		1.24*	1.22*	1.43*
4+		1.39*	1.35*	1.52*
Gestational age at first ANC visit (Ref. = 1st trimester)				
2nd trimester			1.22*	n.c.
3rd trimester or no care			1.29*	n.c.
Gestational diabetes: Yes			1.11*	1.22*
Gestational hypertension: Yes			1.52*	1.56*

(continued)

Table 4.2 (continued): Adjusted odds ratios of risk factors associated with preterm birth[(a)] among First Nations women who gave birth in Australia, 2018–2023[(b)]

Maternal characteristics	Maternal socioeconomic status	Mediators of maternal socioeconomic status		
	Stage 1: Distal and contextual factors	Stage 2: Factors likely present before onset of pregnancy + Stage 1 factors	Stage 3: Factors likely to arise during pregnancy + Stages 1 & 2 factors	Stage 4: Factors likely to arise at end of pregnancy + Stages 1, 2 & 3 factors
Antenatal care (Ref. = Group 1: Attended first ANC during 1st trimester and met the recommended minimum ANC attendance requirements)[(c)]				
Group 2: Attended first ANC during 2nd trimester and met the recommended minimum ANC attendance requirements				0.98
Group 3: Attended first ANC during 1st trimester and did not meet the recommended minimum ANC attendance requirements				2.72*
Group 4: No ANC or attended first ANC during or after 2nd trimester and did not meet the minimum ANC attendance requirements				2.71*

ANC = antenatal care; n.c. = not calculated; Gestational age at first antenatal visit has been combined with recommended number of ANC visits.

* = statistically significant at the 95% confidence level. Please see Appendix Table A4 for full table including confidence intervals

(a) Estimates are based on First Nations women who gave birth to a singleton baby in Australia (excluding 'Other Territories'), during 2018–2023, irrespective of birth status (live birth or stillbirth). They exclude births of less than 20 weeks gestation or birthweight of less than 400 grams, as well as births with missing information on gestational age and birthweight. Births within the scope of the NPDC (from 20 weeks gestation or of at least 400 grams birthweight) include terminations of pregnancy.

(b) Data for births occurring during the 2022 calendar year are based on complete data for 7 jurisdictions and a compilation of data for the ACT. The ACT's data consist of its 2022 data for January to October, supplemented by its 2021 data for November and December (see 'Technical notes, Data quality and availability' for more information: https://meteor.aihw.gov.au/content/808591).

(c) The Department of Health has recommended a minimum number of 10 antenatal care (ANC) visits for first-time mothers, and at least 7 visits for mothers who had previously given birth and for subsequent uncomplicated pregnancies (Department of Health and Aged Care 2020).

Source: AIHW analysis of National Perinatal Data Collection.

Table 4.2a: Adjusted odds ratios of risk factors associated with preterm birth[(a)] among First Nations women who gave birth in Australia, 2018–2023[(b)] – modified model

Maternal characteristics	Stage 3	Stage 4
Gestational age at first ANC visit (Ref. = 1st trimester)[(c)]		
2nd trimester	1.22 (1.16–1.29)*	1.05 (0.99–1.10)
3rd trimester or no care	1.29 (1.15–1.45)*	0.80 (0.71–0.91)*
Did not make the recommended number of antenatal care visits		2.82 (2.68–2.97)*

ANC = antenatal care; * = statistically significant at the 95% confidence level.

(a) Estimates are based on First Nations women who gave birth to a singleton baby in Australia, excluding 'Other Territories', during 2018–2023, irrespective of birth status (live birth or stillbirth). They exclude births of less than 20 weeks gestation or birthweight of less than 400 grams, as well as births with missing information on gestational age and birthweight.

(b) Data for births occurring during the 2022 calendar year are based on complete data for 7 jurisdictions and a compilation of data for the ACT. The ACT's data consist of its 2022 data for January to October, supplemented by its 2021 data for November and December (see 'Technical notes, Data quality and availability' for more information: https://meteor.aihw.gov.au/content/808591).

(c) The Department of Health has recommended a minimum number of 10 antenatal care (ANC) visits for first-time mothers, and at least 7 visits for mothers who had previously given birth and for subsequent uncomplicated pregnancies (Department of Health and Aged Care 2020).

Source: AIHW analysis of National Perinatal Data Collection.

However, when the variable 'attending the recommended minimum number of antenatal care visits' was included in the model at Stage 4, the importance of gestational age at first antenatal care declined and appeared to have been replaced by the new composite variable. First Nations women who did not attend the recommended minimum number of antenatal care visits had about 2.8 times greater odds (adjusted odds ratio: 2.82[2.68–2.97]) of having a preterm birth compared to First Nations women who met the minimum number of antenatal care visits. In fact, the duration of the pregnancy when antenatal care was first received became statistically insignificant when modelled together with the variable 'attending the minimum number of antenatal care visits' recommended by the Department of Health and Aged Care (2020). This result provides additional strong evidence that meeting the recommended minimum number of antenatal care attendance requirements is crucial for preventing preterm births.

As noted earlier, women who experience early pregnancy loss may not have enough time to meet the recommended minimum antenatal care attendance requirements. For this reason, the analysis in Table 4.2b is restricted to pregnancies lasting 32 weeks or longer. This restriction helps assess whether the relationship between preterm birth risk factors – particularly antenatal care attendance – and preterm birth is influenced by gestational age or pregnancy duration.

The results show that the risk factors for preterm birth are broadly similar whether the analysis includes all women or is restricted to women with a pregnancy duration of 32 weeks or longer. Table 4.2b reinforces the importance of meeting the recommended minimum number of antenatal care visits as a key factor in reducing the risk of preterm birth.

Table 4.2b: Adjusted odds ratios of risk factors associated with preterm birth[(a)] among First Nations women who gave birth in Australia, 2018–2023[(b)]: restricted to women whose pregnancies had a gestation age of 32 weeks or longer

	Maternal socioeconomic status	Mediators of maternal socioeconomic status		
Maternal characteristics	Stage 1: Distal and contextual factors	Stage 2: Factors likely present before onset of pregnancy + Stage 1 factors	Stage 3: Factors likely to arise during pregnancy + Stages 1 & 2 factors	Stage 4: Factors likely to arise at end of pregnancy + Stages 1, 2 & 3 factors
SEIFA (Ref. = Highest SEIFA deciles 8–10)				
Mid-SEIFA (deciles 4–7)	1.24*	1.18*	1.17*	1.14*
Lowest SEIFA (deciles 1–3)	1.40*	1.22*	1.21*	1.18*
Location (Ref. = Major city)				
Regional	0.98	0.94*	0.94*	0.97
Remote	1.24*	1.05	1.04	1.04
Maternal age (years) (Ref. = 25–34)				
Under 18	0.97	1.00	0.98	0.93
18–24	0.93*	1.00	1.00	0.96
35–39	1.35*	1.17*	1.15*	1.17*
40 & over	1.98*	1.59*	1.52*	1.59*

(continued)

Table 4.2b (continued): Adjusted odds ratios of risk factors associated with preterm birth[a] among First Nations women who gave birth in Australia, 2018–2023[b]: restricted to women whose pregnancies had a gestation age of 32 weeks or longer

Maternal characteristics	Maternal socioeconomic status	Mediators of maternal socioeconomic status		
	Stage 1: Distal and contextual factors	Stage 2: Factors likely present before onset of pregnancy + Stage 1 factors	Stage 3: Factors likely to arise during pregnancy + Stages 1 & 2 factors	Stage 4: Factors likely to arise at end of pregnancy + Stages 1, 2 & 3 factors
Smoked during pregnancy		1.53*	1.52*	1.41*
Maternal BMI (Ref. = Normal weight)				
Underweight		1.57*	1.59*	1.58*
Overweight		0.70*	0.68*	0.69*
Pre-existing diabetes: Yes		4.90*	5.16*	5.56*
Pre-exiting hypertension: Yes		1.98*	2.01*	2.13*
Parity (Ref. = Nulliparous)				
1		0.99	0.99	1.20*
2		1.13*	1.12*	1.32*
3		1.30*	1.29*	1.46*
4+		1.45*	1.41*	1.55*
Gestational age at first ANC visit (Ref. = 1st trimester)				
2nd trimester			1.20*	n.c.
3rd trimester or no care			1.49*	n.c.
Gestational diabetes: Yes			1.24*	1.34*
Gestational hypertension: Yes			1.60*	1.63*
Antenatal care (Ref. = Group 1: Attended first ANC during 1st trimester and met the recommended minimum ANC attendance requirements)[c]				
Group 2: Attended first ANC during 2nd trimester and met the recommended minimum ANC attendance requirements				0.99
Group 3: Attended first ANC during 1st trimester and did not meet the recommended minimum ANC attendance requirements				2.24*
Group 4: No ANC or attended first ANC during or after 2nd trimester and did not meet the minimum ANC attendance requirements				2.34*

ANC = antenatal care; n.c. = not calculated; Gestational age at first antenatal visit has been combined with recommended number of ANC visits.

* = statistically significant at the 95% confidence level. Please see Appendix Table A4b for full table including confidence intervals

(a) Estimates are based on First Nations women who gave birth to a singleton baby in Australia (excluding 'Other Territories'), during 2018–2023, irrespective of birth status (live birth or stillbirth). They exclude births of less than 20 weeks gestation or birthweight of less than 400 grams, as well as births with missing information on gestational age and birthweight. Births within the scope of the NPDC (from 20 weeks gestation or of at least 400 grams birthweight) include terminations of pregnancy.

(b) Data for births occurring during the 2022 calendar year are based on complete data for 7 jurisdictions and a compilation of data for the ACT. The ACT's data consist of its 2022 data for January to October, supplemented by its 2021 data for November and December (see 'Technical notes, Data quality and availability' for more information: https://meteor.aihw.gov.au/content/808591).

(c) The Department of Health has recommended a minimum number of 10 antenatal care (ANC) visits for first-time mothers, and at least 7 visits for mothers who had previously given birth and for subsequent uncomplicated pregnancies (Department of Health and Aged Care 2020).

Source: AIHW analysis of National Perinatal Data Collection.

4.2.1 Risk factors for spontaneous and induced preterm birth

Several studies have shown that spontaneous and induced preterm birth subtypes have different aetiologies and should therefore be measured and monitored separately, as well as in aggregate, to facilitate different prevention strategies (Goldenberg et al. 2009; Romero et al. 2014; Fritz et al. 2018; Aughey et al. 2023).

As a result, the maternal risk factors for spontaneous and induced preterm births among First Nations women were modelled separately to identify those risk profiles common to both subtypes of preterm birth, and those unique to each subtype. The results are shown in Table 4.3 as well as in Appendix Table A5.

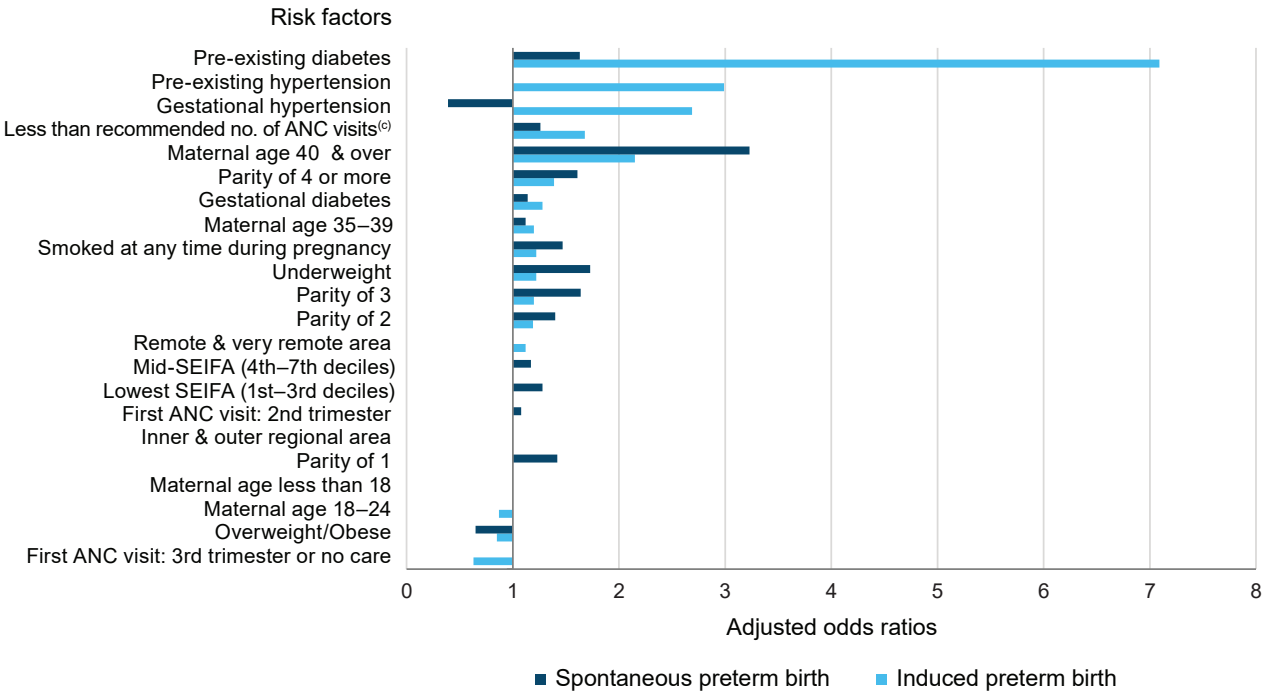
In Table 4.3, several risk factors common to both spontaneous and induced preterm births are identified. These include having pre-existing diabetes, not meeting the recommended minimum number of antenatal care attendance requirements, smoking at any time during pregnancy and being underweight. Other risk factors were unique to each type of preterm labour onset. Older maternal age, pre-existing hypertension, high order parity, gestational diabetes, gestational hypertension and remoteness of usual residence were key risk factors that were mostly unique to induced preterm birth. On the other hand, socioeconomic area of usual residence was a key risk factor for spontaneous preterm birth, although it shared several common risk factors with induced preterm birth.

Risk factors like remoteness area, maternal age and gestational diabetes were found to be statistically significant for induced but not spontaneous preterm birth. Even where a risk factor like pre-existing diabetes or pre-existing hypertension was statistically significant for both spontaneous and induced preterm births, the size and direction of the adjusted odds ratios differed between the 2 preterm subtypes.

The divide in the risk factors for induced and spontaneous preterm birth is much clearer in the graphical representation in Figure 4.3 which shows values for only the risk factors with adjusted odds ratios that were statistically significant at the 95% confidence level. Table 4.3 should therefore be examined concurrently with Figure 4.3.

With respect to spontaneous preterm birth, for example, the socioeconomic area of usual residence of a First Nations mother was a more important risk factor than her geographic or remoteness location, while, for induced preterm birth, residence in a remote area, rather than the socioeconomic status of area of usual residence, was a statistically significant risk factor. First Nations women resident in remote areas had about 12% greater odds of having an induced preterm birth (adjusted odds ratio: 1.12 [1.02–1.23]) than First Nations women resident in a major city.

Figure 4.3: Adjusted odds ratios of maternal risk factors for preterm birth[(a)] among First Nations mothers, by type of onset of labour, Australia, 2018–2023[(b)]



ANC = antenatal clinic.

(a) Estimates are based on singleton births that occurred in Australia (excluding 'Other Territories'), during 2018–2023, irrespective of birth status (live birth or stillbirth). They exclude births of less than 20 weeks gestation or birthweight of less than 400 grams, as well as births with missing information on gestational age and birthweight. Births within the scope of the NPDC (from 20 weeks gestation or of at least 400 grams birthweight) include terminations of pregnancy.

(b) Data for births occurring during the 2022 calendar year are based on complete data for 7 jurisdictions and a compilation of data for the ACT. The ACT's data consist of its 2022 data for January to October, supplemented by its 2021 data for November and December (see 'Technical notes, Data quality and availability' for more information: https://meteor.aihw.gov.au/content/808591).

(c) The Department of Health has recommended a minimum number of 10 antenatal care (ANC) visits for first-time mothers, and at least 7 visits for mothers who had previously given birth and for subsequent uncomplicated pregnancies (Department of Health and Aged Care 2020).

Source: AIHW analysis of National Perinatal Data Collection.

The socioeconomic status of area of usual residence was observed to be more strongly associated with spontaneous preterm birth than with induced preterm birth. First Nations women living in medium (adjusted odds ratio: 1.28 [1.11–1.48]) and the lowest socioeconomic areas (adjusted odds ratio: 1.28 [1.11–1.48]) were, respectively, about 17% and 28% more likely to have a spontaneous preterm birth than First Nations women living in the highest socioeconomic areas.

Table 4.3: Adjusted odds ratios of risk factors associated with preterm birth[(a)] among births to First Nations women, by type of onset of labour, Australia, 2018–2023[(b)]

Maternal risk factors	Spontaneous preterm birth	Induced preterm birth
Location (Ref. = Major city)		
Regional	1.01	0.97
Remote	1.06	1.12*
SEIFA (Ref. = Highest SEIFA deciles 8–10)		
Mid-SEIFA (deciles 4–7)	1.17*	1.05
Lowest SEIFA (deciles 1–3)	1.28*	1.03
Maternal age (years) (Ref. = 25–34)		
Under 18	1.12	0.90
18–24	1.04	0.87*
35–39	1.13*	1.24*
40 and over	1.28	1.72*
Smoked during pregnancy	1.47*	1.25*
Maternal BMI (Ref. = Normal weight)		
Underweight	1.72*	1.22*
Overweight	0.65*	0.85*
Had pre-existing diabetes	1.63*	7.09*
Had pre-existing hypertension	1.04	3.00*
Parity (Ref. = Nulliparous)		
1	1.42*	1.00*
2	1.40*	1.19*
3	1.64*	1.20*
4 & over	1.61*	1.39*
Gestational age at first ANC visit (Ref. = 1st trimester)		
2nd trimester	1.08*	1.00
3rd trimester or no care	0.98	0.63*
Had gestational diabetes	1.14*	1.28*
Had gestational hypertension	0.39*	2.70*
Did not make recommended number of antenatal care visits[(c)]	3.23*	2.15*

ANC = antenatal clinic; * = statistically significant at the 95% confidence level. Please see Appendix Table A5 for full table including confidence intervals.

(a) Estimates are based on First Nations women who gave birth to a singleton baby in Australia (excluding 'Other Territories'), during 2018–2023, irrespective of birth status (live birth or stillbirth). They exclude births of less than 20 weeks gestation or birthweight of less than 400 grams, as well as births with missing information on gestational age and birthweight. Births within the scope of the NPDC (from 20 weeks gestation or of at least 400 grams birthweight) include terminations of pregnancy.

(continued)

(b) Data for births occurring during the 2022 calendar year are based on complete data for 7 jurisdictions and a compilation of data for the ACT. The ACT's data consist of its 2022 data for January to October, supplemented by its 2021 data for November and December (see 'Technical notes, Data quality and availability' for more information: https://meteor.aihw.gov.au/content/808591).

(c) The Department of Health has recommended a minimum number of 10 antenatal care (ANC) visits for first-time mothers, and at least 7 visits for mothers who had previously given birth and for subsequent uncomplicated pregnancies (Department of Health and Aged Care 2020).

Source: AIHW analysis of National Perinatal Data Collection.

Being underweight increased the risk of having either a spontaneous or induced preterm birth, while being overweight or obese tended to be protective of both subtypes of preterm birth. Being overweight or obese should not, however, be taken as a strategy for preventing preterm birth as maternal overweight and obesity themselves carry substantial risks for the mother and baby.

The risks for the mother of being overweight or obese include an increased risk for the development of gestational diabetes mellitus, hypertensive disorders of pregnancy, urinary and genital tract infection, postpartum haemorrhage, induction of labour, and delivery by emergency caesarean section. For the baby, the risks include stillbirth, birth trauma, macrosomia, respiratory distress, hypoglycaemia and admission to the neonatal intensive care unit (D'Souza et al. 2019; Khashan and Kenny 2009; Melchor et al. 2019; Sebire et al. 2001).

The association between obesity and preterm birth remains a subject of debate, as current evidence is inconclusive. Several studies suggest that this relationship may be influenced by factors such as gestational age, the specific phenotype of preterm birth, and mediating conditions including gestational diabetes mellitus (GDM) and preeclampsia (Liu et al. 2022, Parker et al. 2014, Sobczyk et al. 2022).

Judging from their very high and statistically significant adjusted odds ratios, pre-existing diabetes (adjusted odds ratio: 7.09 [6.26–8.03]) and gestational diabetes (adjusted odds ratio: 1.28 [1.17–1.41]) – as well as pre-existing hypertension (adjusted odds ratio: 2.99 [2.46–3.63]) and gestational hypertension (adjusted odds ratio: 2.69 [2.36–3.07]) – were key risk factors for induced preterm birth but less so for spontaneous preterm birth, as observed from their much lower adjusted odds ratios of 1.63 [1.32–2.00], 1.14 [1.03–1.26], 1.04 [0.75–1.45] and 0.39 [0.29–0.53], respectively.

With a statistically significant adjusted odds ratio of 1.63, pre-existing diabetes also appears to be a major risk factor for spontaneous preterm birth. First Nations women who had pre-existing diabetes before their pregnancy were about 1.6 times as likely to have a spontaneous preterm birth as First Nations women who did not.

Gestational age at first antenatal care was not as important a risk factor for either subtype of preterm birth as meeting the recommended minimum number of antenatal care attendance requirements. First Nations women who did not make the recommended minimum number of antenatal care visits had about 3.2 times greater odds (adjusted odds ratio: 3.23: [3.01–3.47]) of experiencing a spontaneous preterm birth and about 2.2 times greater odds of experiencing an induced preterm birth (adjusted odds ratio: 2.15 [2.00–2.30]) than an induced preterm birth as First Nations women who made the recommended minimum number of antenatal care visits.

5

Role of key risk factors in reducing preterm birth among First Nations women

5 Role of key risk factors in reducing preterm birth among First Nations women

In Chapter 4, key risk factors associated with preterm birth among individual First Nations women were modelled and examined, using information available in the NPDC. Logistic regression modelling was used to determine the odds of a First Nations woman with a given characteristic (for example, smoked during pregnancy) experiencing a preterm birth compared with a First Nations woman without that characteristic, after accounting for confounding factors in the model or all of a woman's other characteristics.

The results showed that a First Nations woman with certain risk factors, such as smoking during pregnancy or not attending the recommended number of antenatal care visits, was more likely to have a preterm birth than a First nations woman without these risk factors.

5.1 Population attributable fractions

This chapter uses a complementary measure, the Population Attributable Fraction (PAF), to examine the contribution of specified risk factors to preterm birth at the population level. The PAF is a measure of the proportional reduction in an outcome (for example, preterm birth) that would occur if exposure to a given risk factor (such as smoking at any time during pregnancy) were reduced to an alternative ideal exposure scenario (for example, no smoking at any time during pregnancy).

The PAF can be interpreted as the estimated fraction of an outcome (for example, preterm birth) that would not have occurred if there had been no exposure to a specified risk factor (smoking during pregnancy) (Mansournia and Altman 2018; WHO 2020; AIHW 2021). Thus, while the adjusted odds ratios are measures of risk at the individual-woman level, the PAF is a population-level measure.
It takes into account the proportion of the population exposed to a specified risk as well as the relative risk of exposure to that specified risk after accounting for the effects of all other risk factors included in the logistic regression model (AIHW 2021), both of which are estimated by implementing the logistic regression model. Many outcomes (for example, preterm birth or a particular disease) are caused by multiple risk factors, and individual risk factors may interact in their impact on the overall risk of the outcome. As a result, PAFs for individual risk factors often overlap and may add up to more than 100.

Figure 5.1 shows the PAFs for all the maternal risk factors that were examined. Table 5.1 shows the unadjusted and adjusted odds ratios and corresponding PAFs for selected risk factors among First Nations women who gave birth between 2018 and 2023, together with the percentage of First Nations women in each exposure or risk category. The unadjusted estimates measure the relationship between individual risk factors and the outcome (preterm birth) without accounting for the effects of other risk factors. The adjusted estimates are the modelled estimates after accounting for the effects of other risk factors.

Table 5.1: Estimated percentage of preterm births among First Nations women that could be prevented (PAF) if key maternal risk factors are eliminated, Australia, 2018–2023

Mother's characteristics	% of women with given characteristic	Unadjusted estimates		Adjusted estimates	
		Odds ratio	PAF (%)	Odds ratio	PAF (%)
Smoked during pregnancy	40.6	1.60	19.6	1.37	13.0
Lived in a low-to-mid socio-economic area	c	c	19.9	c	11.2
• Lived in the highest socioeconomic area (SEIFA deciles 8–10)	8.1	1.00	Ref.	1.00	Ref.
• Lived in a medium-socioeconomic area (SEIFA deciles 4–7)	34.0	1.18	(5.8)	1.11	(3.6)
• Lived in the lowest socioeconomic area (SEIFA deciles 1–3)	57.9	1.32	(15.7)	1.15	(8.1)
Had pre-existing diabetes	2.2	3.49	5.1	5.23	8.4
Had pre-existing hypertension	1.1	2.36	1.5	2.34	1.5
Developed gestational diabetes	14.5	0.96	-0.1	1.25	3.1
Developed gestational hypertensive disorders	3.2	1.33	1.1	1.48	1.8
Number of previous pregnancies resulting in a live birth or stillbirth	c	c	7.0	c	18.1
• 0	34.2	1.00	Ref.	1.00	Ref.
• 1	26.8	0.93	(-2.0)	1.22.	(5.6)
• 2	17.4	1.08	(1.4)	1.32	(5.3)
• 3	10.3	1.27	(2.6)	1.45	(4.4)
• 4 & over	11.2	1.49	(5.1)	1.55	(5.7)
Did not attend the recommended number of antenatal care visits	34.1	2.40	32.4	2.82	38.4
Total contribution (%)	**c**	**c**	**86.5**	**c**	**94.6**

c = not estimated; Ref. = Reference category for the specified risk factor; PAF = population attributable fraction.

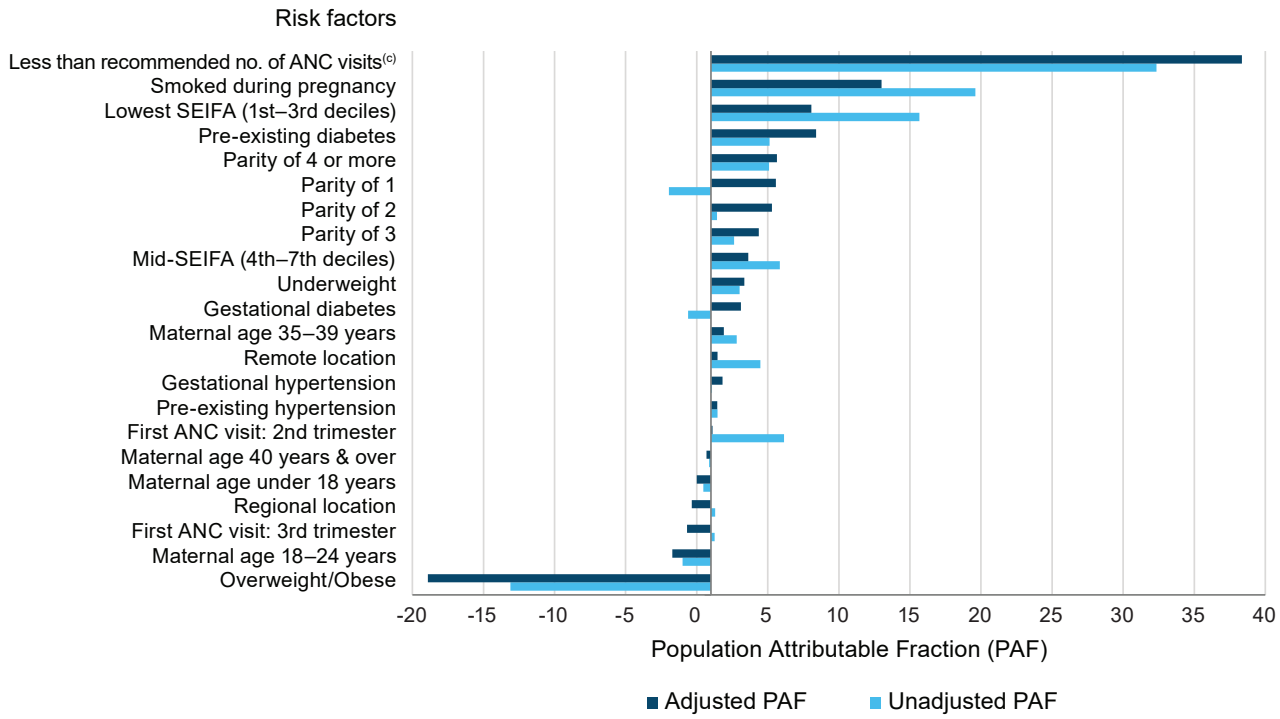
(a) Estimates are based on First Nations women who gave birth to a singleton baby in Australia (excluding 'Other Territories'), during 2018–2023, irrespective of birth status (live birth or stillbirth). They exclude births of less than 20 weeks gestation or birthweight of less than 400 grams, as well as births with missing information on gestational age and birthweight. Births within the scope of the NPDC (from 20 weeks gestation or of at least 400 grams birthweight) include terminations of pregnancy.

(b) Data for births occurring during the 2022 calendar year are based on complete data for 7 jurisdictions and a compilation of data for the ACT. The ACT's data consist of its 2022 data for January to October, supplemented by its 2021 data for November and December (see 'Technical notes, Data quality and availability' for more information: https://meteor.aihw.gov.au/content/808591).

(c) The Department of Health has recommended a minimum number of 10 antenatal care (ANC) visits for first-time mothers, and at least 7 visits for mothers who had previously given birth and for subsequent uncomplicated pregnancies (Department of Health and Aged Care 2020).

Source: Analysis of National Perinatal Data Collection.

Figure 5.1: Estimated percentage of preterm births[a] among First Nations women that could be prevented (PAF) if specified maternal risk factors are eliminated, Australia, 2018–2023[b]



ANC = antenatal clinic; PAF = population attributable fraction.

(a) Estimates are based on First Nations women who gave birth to a singleton baby in Australia, excluding ('Other Territories'), during 2018–2023, irrespective of birth status (live birth or stillbirth). They exclude births of less than 20 weeks gestation or birthweight of less than 400 grams, as well as births with missing information on gestational age and birthweight. Births within the scope of the NPDC (from 20 weeks gestation or of at least 400 grams birthweight) include terminations of pregnancy.

(b) Data for births occurring during the 2022 calendar year are based on complete data for 7 jurisdictions and a compilation of data for the ACT. The ACT's data consist of its 2022 data for January to October, supplemented by its 2021 data for November and December (see 'Technical notes, Data quality and availability' for more information: https://meteor.aihw.gov.au/content/808591).

(c) The Department of Health has recommended a minimum number of 10 antenatal care (ANC) visits for first-time mothers, and at least 7 visits for mothers who had previously given birth and for subsequent uncomplicated pregnancies (Department of Health and Aged Care 2020).

Source: AIHW analysis of National Perinatal Data Collection.

The PAF estimates are the percentages of preterm birth that could be prevented if certain key risk factors were eliminated. It is cautioned, however, that the risk factors inputted into the model were not exhaustive and could not have included all possible risk factors. The PAFs would likely be different if all possible risk factors associated with preterm birth were inputted into the model. Data on infections, nutrition, stress, sleep quality and overall health are not available, and would likely have influenced the PAF estimates if included in the modelling. Furthermore, some women who have a preterm birth have no obvious risk factors, so the PAF estimates in Table 5.1 likely do not reflect these women.

Based on the available data, smoking at any time during pregnancy, residence in a low socioeconomic area, having pre-existing diabetes, high parity and not attending the recommended number of antenatal care visits were the key risk factors whose elimination could contribute to reducing preterm birth among First Nations women. While it is not being suggested that First Nations women relocate

to high socioeconomic areas to reduce their risk of having a preterm birth, the estimates underline the key role that access to the health, economic and social facilities available in high socioeconomic areas may play in reducing preterm birth among First Nations women.

Even though a First Nations woman with pre-existing diabetes and hypertension was several times as likely to have a preterm birth (adjusted odds ratios of 5.23 and 2.34, respectively) as a First Nations woman without these risk factors, the corresponding PAFs are relatively low (8.4% and 1.5%, respectively). This is because the percentage of First Nations women with pre-existing diabetes and hypertension was low (2.2% and 1.1%, respectively).

While eliminating pre-existing diabetes and hypertension among First Nations women could likely have a big impact on the risk of preterm birth among individual women, these 2 risk factors are not the pivotal risk factors whose elimination would lead to a substantial reduction in preterm birth among First Nations women at the population level, as only a small fraction of First Nations women had these risk factors. Despite the small percentage of First Nations women who had pre-existing diabetes before their pregnancy, the PAFs show, nevertheless, that eliminating pre-existing diabetes among First Nations women could reduce preterm birth by over 8%.

Based on the adjusted odds ratios, PAFs and the relatively large proportions of First Nations women with other risk profiles, 4 risk factors whose elimination would have the biggest impact on reducing preterm birth rates among First Nations women overall are living in low socioeconomic areas, smoking during pregnancy, not attending the recommended minimum number of antenatal care visits and having pre-existing diabetes.

SEIFA (or socioeconomic index for areas) comprises a wide range of conditions, such as education, employment, income, housing, nutrition, community recreational facilities, transport and communication, and access to health care. Despite its usefulness, however, SEIFA is only a summary of aspects of the socioeconomic conditions for people living in an area. It does not represent the individual situation of each person. It is thus only a proxy for the actual socioeconomic circumstances of individuals living in particular areas.

Table 5.1 shows that 34.1% of First Nations women did not meet the recommended minimum antenatal care attendance requirements and likely missed out on some of the benefits of antenatal care, with concerning results. Indeed, First Nations women who did not meet the recommended minimum antenatal care attendance requirements were 2.8 times more likely to have a preterm birth (adjusted odds ratio 2.77) than First Nations women who did meet these requirements. The reverse is also true, however. Women who had a preterm birth were unlikely to have carried the baby long enough to have been able to meet the recommended minimum number of antenatal care visits.

Antenatal care serves several purposes, such as monitoring a pregnancy to ensure that the pregnant woman is healthy and the pregnancy is proceeding in a healthy manner, as well as coordinating with other care providers, including referral to preterm birth prevention centres. Meeting the recommended minimum antenatal care attendance requirements means that there would be adequate opportunity for health-care professionals to screen women for various categories of risk to the pregnancy (including infections, multiple gestation, multiple pregnancies, history of recurrent preterm birth and stillbirth) and to provide counselling on nutrition, smoking, stress management and other health and pregnancy risks.

Table 5.1 shows that because of the large percentage of First Nations women who did not meet the

minimum antenatal care attendance requirements (34.1%) and the corresponding high adjusted odds ratio of 2.8, the resulting PAF is very high. Preterm birth among First Nations women could be reduced by nearly 38% if First Nations women were able to meet the recommended minimum antenatal care attendance requirements. In fact, meeting these requirements could be the single largest factor that could contribute to reducing preterm birth rates among First Nations women. As mentioned earlier, however, for some women, not meeting the recommended minimum antenatal care attendance requirements was due to a preterm birth and not the reverse. A woman would not be able to meet the recommended minimum antenatal care visits if her pregnancy was truncated by a preterm birth.

Nearly 41% of First Nations women who gave birth between 2018 and 2023 smoked at some time during pregnancy. With an adjusted odds ratio of 1.4, the PAF analysis shows that preterm birth among First Nations women could be reduced by about 13% if smoking at any time during pregnancy were eliminated among First Nations women.

Parity (number of previous pregnancies resulting in a live birth or stillbirth) is considered one of the potential risk factors for adverse pregnancy outcomes, including low birthweight and preterm birth, although the biological mechanism of how this occurs is not clearly understood (Shah and Knowledge Synthesis Group on Determinants of LBW/PT births 2010). (For simplicity this source is cited hereafter as [Shah 2010]).

Table 5.1 also shows the various contributions of parity to preterm birth among First Nations women. The unadjusted PAFs show that the risk of preterm birth reduced after a woman has had her first baby but subsequently increased with each additional child that is born. On the other hand, the adjusted PAFs indicate that the risk of preterm birth increased with increasing parity and, consequently, every additional child that a woman does not have appears to decrease the risk of having a preterm birth by about 5%. There is no consensus in the research literature about this relationship, however, and neither is the relationship between parity and preterm birth a simple one.

A review by Aliyu and colleagues (2005a) on high parity and adverse birth outcomes cited by Shah (2010) identified conflicting reports of association (and lack thereof) between preterm birth on the one hand, and grand multiparity (5–8 births) and great-grand multiparity (>8 births) on the other. Shah's own review showed that nulliparity (having no previous births) was associated with increased unadjusted risk of low birthweight and small for gestational age (SGA) babies but not preterm birth, and that grand multiparity and great-grand multiparity, although associated with reduced birthweight, were not associated with low birthweight or preterm birth.

Koullali and colleagues (2020) observed an increased risk for spontaneous preterm birth in nulliparous women and women in their fifth pregnancy compared with women in their second pregnancy, while Aliyu and colleagues (2005b) observed that the adjusted odds ratios for low birthweight, preterm and very early preterm delivery increased consistently and 'in a dose-effect fashion with ascending parity'. Kashani-Ligumski and colleagues (2024) also found that primiparas were more likely to have a spontaneous late preterm birth than multiparas.

Ytterberg and colleagues (2023) observed, however, that parity interacts with other risk factors, notably previous preterm delivery, to affect preterm birth, where 'the magnitude of its effect increases with parity'. In explaining the biological mechanism by which parity interacts with preterm birth, Shah (2010) noted that the higher incidences of pre-eclampsia and younger age of nulliparous

women may reduce fetal growth and duration of pregnancy. By contrast, multipara mothers are more likely to have additional medical problems, such as chronic anaemia, diabetes mellitus and/or hypertension, which are known to influence fetal growth. Shah (2010) noted further that the incidences of placenta previa, placental abruption, abnormal presentation, and haemorrhagic complications occur with increased frequency in grand multiparous and great-grand multiparous mothers, which may predispose them to preterm birth or low birthweight.

Higher parity may also be associated with older age, more stress, heavier economic burden, accumulation of health issues, short inter-pregnancy intervals and low birthweight, which, together, may increase the risk of preterm birth among higher parity First Nations women. Ready access to reproductive care services, including contraception, may reduce teenage pregnancies, short inter-pregnancy and inter-birth intervals and give more reproductive control to First Nations women.

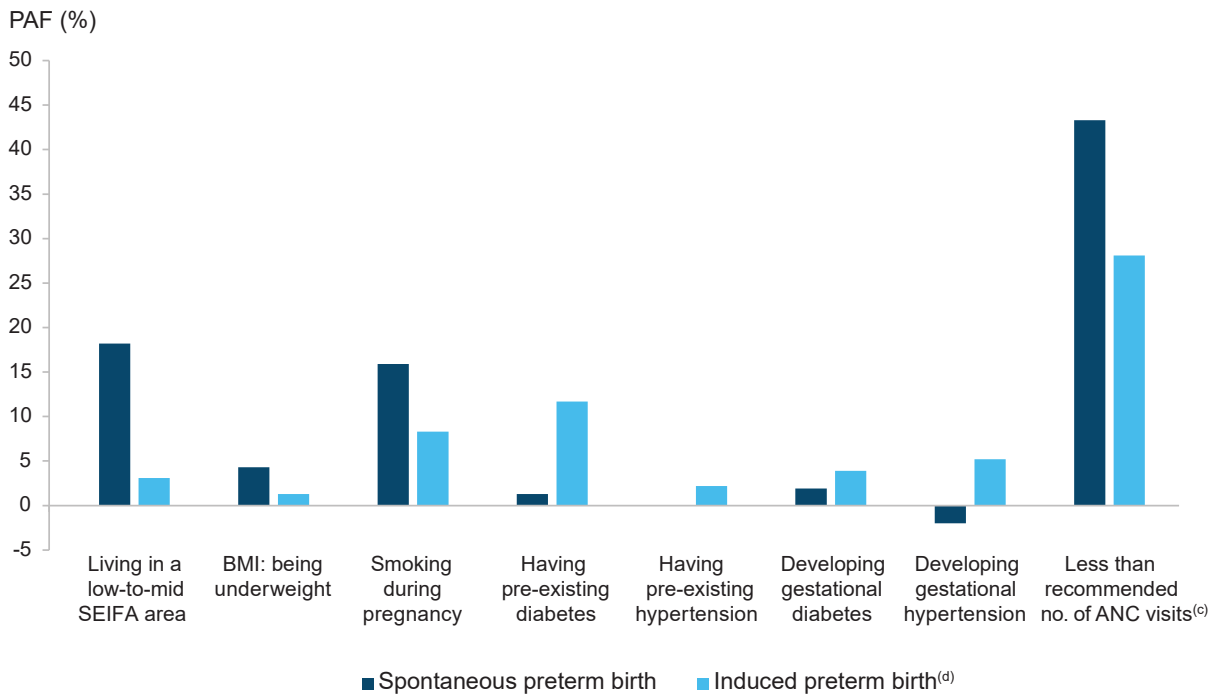
In conclusion, the analysis shows that eliminating 4 main risk factors may help to reduce preterm birth among First Nations women. The most important of these is improving the socioeconomic circumstances of First Nations women, including community development, access to education, skills training, employment, housing, recreational facilities and health care. The other 3 risk factors are eliminating smoking during pregnancy, meeting the recommended minimum antenatal care attendance requirements recommended by the Department of Health (Department of Health and Aged Care 2020) and preventing pre-existing diabetes. While the evidence is mixed, lower parity may reduce the biological load on mothers and may contribute to the reduction in preterm birth.

5.1.1 Population attributable fractions for spontaneous and induced preterm births

It was observed in Table 4.3 and Figure 4.3 that spontaneous and iatrogenic or induced preterm births had different risk factors, and that even when they had common risk factors, the impact of the risk factors was different. Figure 5.2 presents PAF estimates of selected key risk factors associated with spontaneous and induced preterm births among First Nations mothers. The estimates show what percentage of spontaneous and induced preterm births could be prevented if specified risk factors were eliminated.

The estimates show that the risk factors that contribute most to the risk of spontaneous preterm births are living in mid-to-low socioeconomic areas, being underweight, smoking during pregnancy and not meeting the recommended minimum antenatal care attendance requirements. The risk factors that contribute most to the risk of induced preterm birth are smoking during pregnancy, having pre-existing diabetes, developing gestational diabetes and gestational hypertension during pregnancy, and not meeting the recommended minimum antenatal care attendance requirements.

Figure 5.2: Percentage of spontaneous and induced preterm births that could be prevented[a] among First Nations women by eliminating selected risk factors, Australia, 2018–2023[b]



(a) Estimates are based on First Nations women who gave birth to a singleton baby in Australia (excluding 'Other Territories'), during 2018–2023, irrespective of birth status (live birth or stillbirth). They exclude births of less than 20 weeks gestation or birthweight of less than 400 grams, as well as births with missing information on gestational age and birthweight. Births within the scope of the NPDC (from 20 weeks gestation or of at least 400 grams birthweight) include terminations of pregnancy.

(b) Data for births occurring during the 2022 calendar year are based on complete data for 7 jurisdictions and a compilation of data for the ACT. The ACT's data consist of its 2022 data for January to October, supplemented by its 2021 data for November and December (see 'Technical notes, Data quality and availability' for more information: https://meteor.aihw.gov.au/content/808591).

(c) The Department of Health has recommended a minimum number of 10 antenatal care (ANC) visits for first-time mothers, and at least 7 visits for mothers who had previously given birth and for subsequent uncomplicated pregnancies (Department of Health and Aged Care 2020).

(d) Induced preterm births may include cases where induction of labour was attempted but labour did not result.

Source: AIHW analysis of National Perinatal Data Collection.

As outlined in Chapter 4, for a woman to be able to attend the recommended minimum number of antenatal care visits, she must not only make her first antenatal care visit very early during her pregnancy (and preferably during the first trimester of her pregnancy), but also keep up with the recommended schedule of antenatal care attendance. This will ensure that any risks to the pregnancy and to the health of the pregnant woman are identified early and the necessary treatment and counselling are offered, and she is regularly monitored to ensure that she is in good health, and the pregnancy is proceeding in a healthy manner. About 43% of spontaneous preterm birth and 28% of induced preterm birth among First Nations women could be prevented if the recommended minimum antenatal care attendance requirements were met.

As many women who have a preterm birth do not have any obvious risk factors, early screening through early and regular attendance at antenatal care is crucial to identifying risks to the pregnancy that may not be immediately obvious.

With regard to socioeconomic status, Figure 5.2 shows that if First Nations mothers lived in the highest socioeconomic areas (SEIFA deciles 8–10), the risk of having a spontaneous preterm birth could be reduced by about 18.2% for First Nations mothers living in medium-to-low socioeconomic areas, or by about 14% for First Nations mothers specifically living in the lowest socioeconomic areas (SEIFA deciles 1–3), and by 6% for First Nations mothers specifically living in medium socioeconomic areas (SEIFA deciles 4–7).

The PAF estimates emphasise the importance of improved socioeconomic conditions as key to reducing preterm birth. The estimates show that even after considering all other risk factors, the risk of preterm birth among First Nations women could be reduced by more than 18% if First Nations women lived in safe, connected and integrated communities where they had access to goods and services (including good education, housing, employment, recreational services and culturally appropriate health services).

Tables 4.2 and 4.3 (in Chapter 4) as well as Figure 5.2 also identified smoking at any time during pregnancy as a major risk factor not only for overall preterm birth, but also for both spontaneous and iatrogenic preterm birth. The PAF estimates show that nearly 16% of spontaneous preterm birth and more than 8% of iatrogenic preterm birth could be prevented if smoking among First Nations women was eliminated.

6

Reduction in preterm births during COVID-19 lockdown: lessons learnt

6 Reduction in preterm births during COVID-19 lockdown: lessons learnt

Women who contracted COVID-19 during pregnancy had an elevated risk of preterm birth and cesarean section, particularly among women with medical comorbidities. (Bahado-Singh et al. 2023; Karasek et al. 2021; Perelli et al. 2025; Wei et al. 2021). These studies recommended "close monitoring and tailored interventions for infected pregnant women, particularly those in later trimesters and with comorbidities", as imperative for reducing "the risk of preterm birth and improve maternal-fetal outcomes" (Perelli et al. 2025).

At the same time, there were anecdotal reports from around the world that preterm birth rates declined during the COVID-19 restrictions. As a result of these reports, several studies were conducted in Australia, Europe and the United States to examine the veracity of these claims (Been et al. 2020; De Curtis et al. 2021; Gallo et al. 2022; Hedermann et al. 2021; Jasper et al. 2022; Khalil et al. 2020; Matheson et al. 2021; Philip et al. 2020).

The AIHW (AIHW 2024b), for example, reported that during the COVID-19 lockdowns in 2020 and 2021 combined, there were:

- 2,390 fewer low birthweight babies
- 1,050 more women giving birth at home
- 4,260 fewer babies requiring specialised care (that is, fewer babies admitted to a special care nursery or neonatal intensive care unit)
- 2,330 fewer babies born pre-term
- 15,380 more women giving birth without labour being induced (AIHW 2024c).

With few exceptions, the COVID-19 mitigation measures in most countries were observed mostly during March–December 2020 and involved some or most of the following:

- working from home if possible; staying at home/staying in place except to go to work (essential services only), to shop for groceries, to exercise or to seek medical help
- closure of schools and resorting to online rather than face-to-face learning
- limitations on how far one can leave one's home
- physical distancing; cancellation of large gatherings; limitation of crowd sizes
- ban on interstate and international travel, and self-isolation for international arrivals
- wearing of masks if outside one's home; wearing of masks in enclosed spaces
- personal and public health hygiene and sanitation measures, such as washing of hands with hand sanitisers and antibacterial handwashes, and sneezing into one's elbow
- hands-free transactions; enhancement of online shopping; home delivery of groceries.

While the findings from these studies were mixed, several studies noted that rates of overall preterm births, particularly planned or iatrogenic preterm births, as well as moderate-to-late preterm births, fell during the COVID-19 lockdowns without a concomitant rise in related adverse pregnancy and birth outcomes, such as stillbirths and neonatal mortality. This occurred despite a reduction in hospital attendance, routine health screening and antenatal care by pregnant women during the lockdowns.

A few of these studies are discussed in this chapter to find out if there are any lessons to be learnt about additional pathways and strategies for reducing preterm birth. Reasons proposed by the various studies for the decline in preterm birth could provide opportunities to identify novel strategies for preventing preterm birth (Gallo et al. 2022).

6.1 Australian studies

Australian studies reported broadly consistent reductions in preterm birth during COVID-19 restrictions, particularly for moderate-to-late or medically indicated births, without clear evidence of worsening adverse outcomes. At Mater Mothers' Hospital in Brisbane, while planned moderate-to-late preterm birth rates declined during the COVID-19 restriction periods, this decline did not have any effect on extremely or very preterm birth rates and on spontaneous births or stillbirth rates (Gallo et al. 2022). At Sunshine Coast University Hospital, overall preterm birth fell by about 40% during lockdown, driven mainly by moderate-to-late preterm births, although the decline for Queensland overall was not statistically significant (Jasper et al. 2022). In Monash Health's maternity hospitals in Melbourne, prematurity before 28, 34 and 37 weeks was lower during lockdown than in the corresponding 2019 period, with the strongest effect seen for medically indicated prematurity without this decline being accompanied by an increase in stillbirths or small-for-gestational-age births (Matheson et al. 2021; AIHW 2024b).

Across these Australian studies, the suggested explanations were similar: reduced infection exposure due to hygiene and physical distancing measures, lower work and social stress, more rest and sleep, healthier behaviours, improved air quality, and possible reductions in non-essential intervention or care-seeking for antenatal concerns that would normally be grounds for a planned preterm birth (Gallo et al. 2022; Jasper et al. 2022; Matheson et al. 2021). These findings suggest that behavioural, environmental and service-related changes during lockdown may have contributed to lower preterm birth, especially for planned or medically indicated births.

6.2 International studies

International evidence was more mixed, although several studies also reported declines in preterm or related adverse birth outcomes during implementation of the COVID-19 mitigation measures in 2019 and 2020. In the Netherlands, substantial reductions in preterm birth followed the first national mitigation measures, with proposed explanations for the decline including reduced infection exposure, working from home, lower physical demands, reduced stress, better sleep and improved air quality; however, the benefits appeared concentrated in higher socioeconomic areas, raising equity concerns (Been et al. 2020;). In Ireland, the lockdown coincided with marked reductions in very low birthweight and extremely low birthweight births, outcomes closely linked to prematurity, with these declines being similarly attributed to socio-environmental and behavioural changes such as more rest, less work strain, greater support at home and reduced infection exposure (Philip et al. 2020). Denmark, by contrast, found overall preterm birth rates remained broadly stable despite reduced routine care, including routine health screening and antenatal care. Increased focus on personal hygiene, strict physical distancing and reduced work and travel demands may still have helped prevent any increase in preterm births (Hedermann et al. 2021).

Not all international findings were favourable. In Italy, lockdown was associated with a decrease in late preterm births, a slight increase in term and late term births, but also a three-fold increase

in stillbirths, possibly reflecting delayed care-seeking due to fear of infection (De Curtis et al. 2021). Similarly, St George's University Hospital in London reported no clear change in preterm birth, but a significantly higher stillbirth rate during the pandemic period (Khalil et al. 2020). Taken together, these studies suggest that while lockdown-related changes may have reduced some preterm births, especially later or less severe births, the effects were not uniform and could vary according to context, health-service access and population vulnerability.

6.3 Conclusion

With very few exceptions, efforts to reduce the rate of preterm births over the past 10 to 20 years, not only in Australia but elsewhere in the world, have been largely fruitless. Analysis of the NPDC shows that the proportion of all babies born preterm in Australia remained steady between 2010 (8.3%) and 2023 (8.4%), with a peak of 8.7% reached most recently in 2018 while the proportion of preterm babies born to First Nations women also remained steady at 13.9% in 2005 and 13.8% in 2023.

Outside Australia, available data show that despite extensive research, professional recommendations, policy changes and investments in health and other services by various countries, national professional health bodies and international health organisations, there has been no measurable change in preterm birth rates over the last decade at a global level (Ohuma et al. 2023), and until recently, prevention of preterm birth seemed to be an elusive goal (da Fonseca et al. 2020).

Anecdotal evidence, backed by observational and comparative studies around the world, has shown that preterm births declined in several countries during the COVID-19 lockdowns, even in the face of reductions in various health services, such as routine pregnancy screening services, antenatal care and elective surgery. The declines in preterm births that occurred serendipitously point to both novel and known strategies that can be used to reduce preterm birth among First Nations women in Australia. These strategies include various personal, public health and work-related mitigation measures that contributed to:

- infection control; awareness of personal hygiene; improvement in health messaging
- reduction in physical and emotional stress as well as in work-related and social-related stress
- reduction in the physical demands associated with work and travel for work; reductions in minor accidents or other traumas associated with work and travel for work
- optimisation of sleep duration and sleep quality; improved nutrition and diet
- reduction in non-medically indicated intervention in the occurrence of preterm birth through either early birth induction or caesarean delivery
- improvement in ambient air quality as a result of reduced vehicular traffic and industrial pollution
- increased social support.

The various mitigation measures led to overall improvement to pregnancy health and a reduced requirement for planned (iatrogenic) or induced preterm birth. Preterm birth, including both induced and spontaneous preterm birth, declined without a concomitant increase in stillbirths or other adverse pregnancy and birth outcomes, such as low birthweight or neonatal deaths. The COVID-19 experience shows that there are novel ways to reduce preterm birth rates without resorting to clinical or medical measures.

7

Strategies for reducing preterm births

7 Strategies for reducing preterm births

7.1 Can preterm birth rates be reduced?

Preterm birth rates in Australia have changed very little over nearly the past 2 decades. Among all babies born, the preterm birth rate was 8.4% in 2023, similar to the rate in 2010 (8.4%), with a peak of 8.7% reached most recently in 2018 (AIHW 20125). Among babies born to First Nations mothers, the preterm birth rate fluctuated between 14.3% in 2004 and 14.0% in 2022, before declining to 13.8% in 2023 (Figure 2.1).

Despite the burden of preterm birth, few effective prevention strategies are available for clinicians, policy-makers and program managers (Lawn et al. 2013). However, over the past decade, several pathways and strategies have been developed and implemented in Australia and elsewhere in the world to reduce preterm birth and its complications.

These strategies and pathways are based on the understanding that there are personal or individual risk factors (for example, maternal age, pre-pregnancy BMI, smoking during pregnancy, stress/depression), community risk factors (for example, socioeconomic status, social cohesion), and biological and clinical factors (for example, previous preterm births, infections, and susceptibility to pre-eclampsia during pregnancy) associated with preterm birth.

This understanding has led to the development of strategies based on 'whole of health' and 'whole of community' approaches aimed at addressing the low socioeconomic conditions of communities, improving public health and community knowledge about preterm birth, and providing dedicated clinical services to improve pregnancy outcomes (Iams et al. 2008; Chang et al. 2014; Barfield et al. 2015; Shapiro-Mendoza 2016; Newnham et al. 2017b; Kildea et al. 2021; Orefice et al. 2021).

Iams et al. (2008), Goldenburg et al. (2009) and Daskalakis and colleagues (2019) have grouped these strategies into these 3 classes:

- primary: (when they apply to the general population)
  - pre-conceptional (before a woman becomes pregnant)
  - post-conceptional (during pregnancy or after a woman has become pregnant)
- secondary: (when they target women at risk of having a preterm birth)
- tertiary: (prioritising neonatal outcomes when preterm birth can no longer be prevented).

Despite the failure of past efforts to reduce preterm births, evidence from COVID-19 mitigation measures suggests that preterm birth rates fell in several developed countries across most gestational age groups and across preterm birth subclasses (induced and spontaneous). Preterm birth rates fell despite a reduction in antenatal care, routine health screening and overall health care during the lockdowns.

Reasons proposed for the reduced preterm birth rates included improved awareness and focus on personal hygiene (leading to reduced infections), reduced work- and social-related stress, improved sleep quality and/or diet, improved air quality, and overall improvement in pregnancy health (Been et al. 2020; De Curtis et al. 2021; Gallo et al. 2022; Hedermann et al. 2021; Jasper et al. 2022; Khalil et al. 2020; Matheson et al. 2021; Philip et al. 2020).

Indeed, an evaluation of the national preterm birth prevention program, launched in 2018, and funded by the Commonwealth Department of Health, Disability and Ageing, reported a reduction in the national overall preterm birth rate by about 6.4% between 2018 and 2021 (Newnham et al. 2025), although the rate has increased by about 0.2 percentage points since 2021.

7.2 Overarching strategy: improved data and knowledge on preterm birth

A key strategy for reducing preterm birth is to strengthen the epidemiological data and research needed to understand its risk factors and causal pathways. Researchers have noted that the causes of preterm birth are diverse and still poorly understood, and that more work is needed to identify risk factors and determine how they should be addressed (Newnham et al. 2017b; Australian Preterm Birth Prevention Alliance 2024b).

Research is needed to explain how socioeconomic, demographic, biological and pathological factors contribute to preterm birth and how women at risk can be identified for care and treatment (Chang et al. 2014; Lackritz et al. 2013).

This requires an overarching strategy to improve the collection and compilation of epidemiological data for surveillance, risk modelling and monitoring of disparities in preterm birth. The strategy should support:

- building datasets that support research on risk factors for preterm birth
- investigating how these risk factors affect preterm birth and through which pathways
- developing monitoring and evaluation tools to assess the impact of prevention policies, programs and strategies.

Australia has more than 30 years of perinatal data in the AIHW's National Perinatal Data Collection (NPDC), which is compiled annually from state and territory perinatal data collections. The NPDC contains detailed information in 4 key areas: (1) Demographics and geography, (2) Antenatal period, (3) Labour and birth and (4) Baby outcomes. While this provides a strong foundation for surveillance, the NPDC does not contain all the data items needed to fully track, model and understand preterm birth risk factors. To this end, linking the NPDC with an external data set that contains demographic and socioeconomic information not available on the NPDC will be invaluable.

The AIHW has developed a national data linkage system, the National Health Data Hub (NHDH), containing personal data across several demographic, health, and socioeconomic domains. These domains include death registrations, housing, homelessness, immunisation, hospital, mental health, family, domestic and sexual violence, primary health, child wellbeing, aged care, home care, cancer and various clinical quality registries. Negotiations are ongoing between the AIHW and various data custodians to include other data sets into the NHDH (National Health Data Hub - Australian Institute of Health and Welfare).

AIHW is working with jurisdictional data custodians to pilot the linkage of perinatal data to the NHDH. Once fully established, such data could be used to develop better tools for monitoring and surveillance of preterm birth. These tools could assist in identifying women at risk of preterm birth, and contribute to a better understanding of pregnancy and birth outcomes, including strategies to reduce preterm birth among First Nations mothers and babies.

In section 7.1, primary, secondary and tertiary strategies for reducing preterm birth based on the 'whole of health' and 'whole of community' approaches were identified. These strategies are now discussed.

7.3 Primary strategies (pre-conception period)

Primary strategies target the whole population. They comprise interventions directed at women and their socioeconomic and health circumstances before they become pregnant (Iams et al. 2008).

7.3.1 Community or socioeconomic component

The community or socioeconomic strategy is multi-sectoral. It aims to create safe, connected and well-serviced communities with access to quality housing, education, employment, health care and other essential services. Chapter 4 shows that the risk of preterm birth is higher among First Nations women, particularly those living in remote and socioeconomically disadvantaged areas. These patterns indicate that preterm birth is shaped not only by individual behaviours, but also by broader structural factors such as poverty, racism, poor housing, weak labour market opportunities, limited services and chronic stress. Reducing these inequities is therefore fundamental to reducing disparities in preterm birth (Howson et al. 2013; Iams et al. 2008; Lacritz et al. 2013; Shapiro-Mendoza 2016; Zierden et al. 2021).

7.3.2 Public health component

The public health component focuses on reducing modifiable pre-conception risks. Priorities include smoking reduction, improving nutrition, strengthening preconception care, reducing teenage and unintended pregnancies, improving access to effective contraception, reducing short inter-pregnancy intervals, and promoting a healthy pre-pregnancy BMI.

Smoking

Smoking is a major risk factor for poor health and adverse pregnancy outcomes, including preterm birth. NPDC analysis shows that First Nations women who smoked during pregnancy had substantially higher odds of preterm birth than those who did not. Population-wide tobacco control measures and community-led First Nations programs such as iSISTAQUIT, the Gulibaa Project and the Tackling Indigenous Smoking (TIS) program are important programs to support First Nations women to quit smoking.

Nutrition, reproductive health and BMI

Women planning on becoming pregnant may benefit from preconception care, including advice on nutrition, nutritional supplements where clinically indicated, contraception and birth spacing. Poor nutrition and being underweight are associated with poorer pregnancy outcomes. Our analysis shows that underweight First Nations women had markedly higher odds of preterm birth than women with a normal BMI.

Improving access to reproductive health services can also help reduce teenage pregnancies, unintended pregnancies and short inter-pregnancy intervals, all of which are associated with elevated risk of preterm birth.

7.3.3 Educational and policy component

Preterm birth remains relatively invisible in public discourse, despite its health, social and economic consequences. Public education campaigns by government, professional bodies and community associations can improve awareness of risk factors, consequences and prevention strategies, including the importance of avoiding non-medically indicated early birth, understanding the risks

associated with some reproductive technologies, and challenging the misconception that improved neonatal care has resolved the problem of preterm birth.

Policy measures can reinforce public education and may have faster effects than public education alone. Examples include discouraging non-medically indicated delivery before 39 weeks, reducing higher-order multiple gestations associated with assisted reproductive technology, and improving workplace conditions during pregnancy. International and Australian experience shows that coordinated public advocacy, clinical leadership and policy reform can reduce unnecessary early birth and improve outcomes. These are all key components of the West Australian, The Australian Capital Territory and the National Preterm Birth Prevention Initiatives (sections 7.5.4, 7.5.5 and 7.5.6)

7.4 Primary strategies (post-conception period)

Post-conception primary strategies are directed broadly at all women who are already pregnant and are receiving post-conception care from their family doctor or antenatal clinic. The strategies involved are described below.

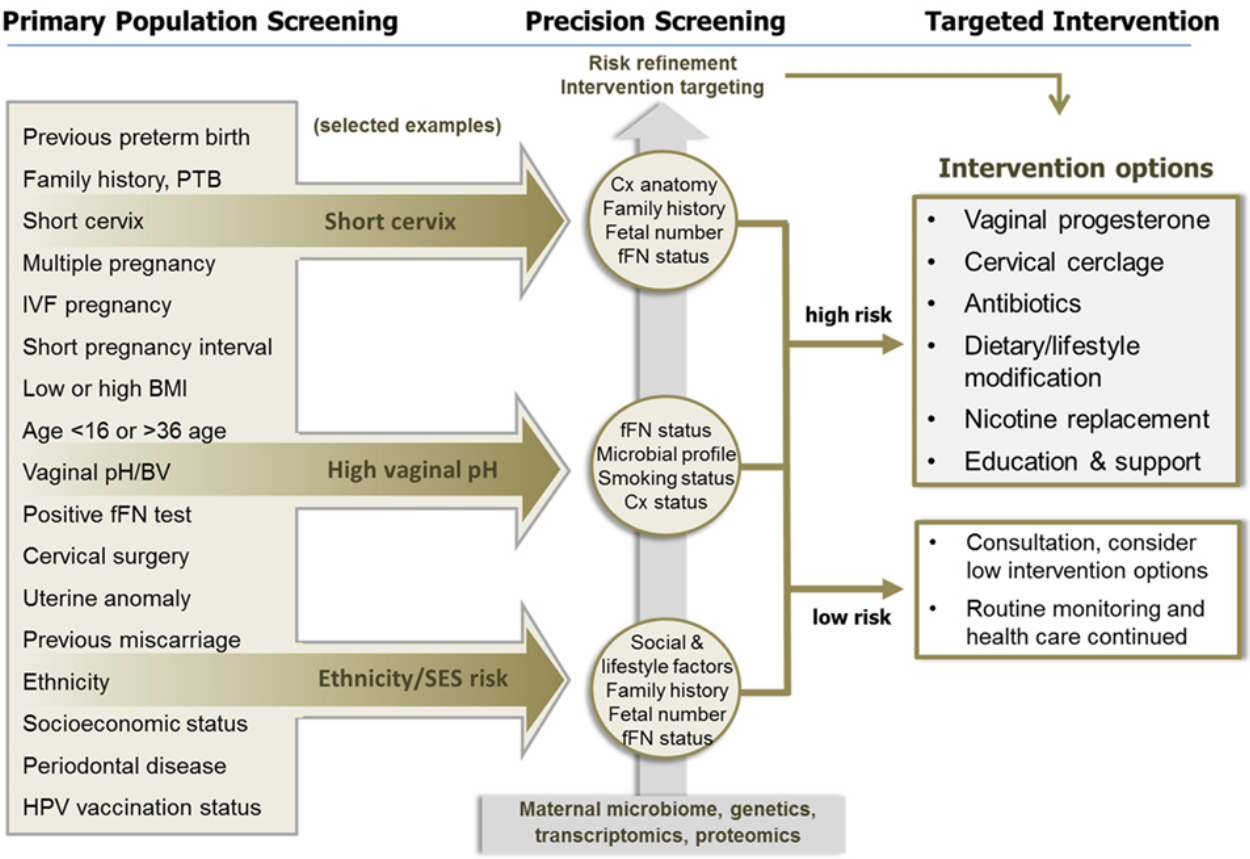
7.4.1 Risk assessment

All pregnant women should be assessed for their risk of preterm birth and offered counselling, treatment or referral where needed. Women at high risk should be referred to a dedicated preterm birth prevention service for specialised care. Risk assessment should include screening for infection, chronic conditions such as diabetes and hypertension, multiple gestation, and a history of recurrent preterm birth or stillbirth.

Standard risk assessment tools for preterm birth are additive scoring systems based on present and suspected risk factors, including epidemiological, historical and clinical risk factors. Although they are useful, they do not identify all women at risk because many women who have a preterm birth have no obvious prior risk factors. This limits the predictive value of additive scoring systems (Vitner et al. 2020; Biggio 2020).

To address this limitation, Newnham and colleagues (2017a) proposed a precision public health approach. This involves broad initial screening using known epidemiological, social and obstetric risk factors – such as previous preterm birth, family history, socioeconomic disadvantage, maternal age, IVF pregnancy and uterine anomaly – followed by more targeted assessment for women with specific risks. This second stage may include more refined testing, including emerging 'omic' technologies, to identify women most likely to benefit from prevention or treatment. The aim is to improve efficiency, reduce unnecessary intervention and make better use of clinical resources (see Figure 7.1).

Figure 7.1: Application of precision population health principles to preterm birth prevention



BMI = body mass index; BV = bacterial vaginosis; Cx = cervix; fFN = fetal fibronectin; HPV = human papillomavirus; PTB = preterm birth.

Note: Primary population screening using a number of known epidemiological, social and obstetric factors can identify women with increased risk of PTB, but it has poor predictive value. In the 3 examples illustrated, women identified with a specific risk factor are then further evaluated using precision screening, aided by the application of various 'omic' technologies, to identify those at greater risk of PTB associated with specific aetiologies. This precision risk profile is then used to target treatment and prevention strategies at those most likely to benefit. Women who are unlikely to benefit from treatment are also identified through this process. This approach will enhance efficacy, reduce unnecessary interventions, and make optimal use of clinical resources.

Source: (Newnham et al. 2017a), Figure 1.

7.4.2 Nutritional supplementation during pregnancy

Good nutrition during pregnancy supports fetal growth and may reduce preterm birth risk through pathways linked to infection, inflammation, oxidative stress and muscle contractility (Best et al. 2021; Vitner et al. 2020). Antenatal dietary education, nutritional supplementation where clinically indicated, and access to dietitians and nutritionists should therefore be part of antenatal and maternal–fetal care. Community-based programs and home visiting models may also support healthier nutrition and other protective behaviours during pregnancy.

7.4.3 Smoking cessation during pregnancy

Smoking during pregnancy is a major modifiable risk factor for preterm birth and other adverse outcomes, including low birthweight, stillbirth and neonatal death. AIHW analyses show consistently higher odds of preterm birth among First Nations women who smoke, and indicate that a substantial proportion of preterm births could be prevented if smoking during pregnancy were eliminated. Pregnant women who smoke should be supported and be provided with resources, including information and counselling, by their care givers, to quit smoking.

First Nations-led, community-based programs such as iSISTAQUIT, the Gulibaa Project and Tackling Indigenous Smoking show the value of culturally safe approaches. These programs combine education, practical cessation support and community leadership, and may be particularly effective where they also address second-hand smoke and broader stressors that sustain smoking.

However, because not all First Nations women access these programs and services, these programs could be scaled up to the national level, and be made available across all antenatal care settings.

7.4.4 Antenatal care

Analysis of the NPDC showed that inadequate access to antenatal care is one of the most important risk factors associated with preterm birth among First Nations women. All pregnant women should therefore be encouraged to attend antenatal care early and regularly. Recommended care includes at least 10 visits for first-time mothers and at least 7 visits for women with previous uncomplicated pregnancies (Department of Health and Aged Care 2020).

Analysis of the NPDC shows however that about 36% of First Nations mothers who gave birth during 2018–2023 did not attend the recommended minimum number of visits. This relationship is partly bi-directional, because having a preterm birth may itself reduce the number of visits a woman can complete.

There are several barriers to adequate antenatal care attendance by First Nations women. These barriers include distrust of the health system, lack of cultural safety, fear of child removal, lack of continuity of care, remoteness, transport and financial barriers, and broader socioeconomic disadvantage (AIHW 2025; Sivertsen et. 2025; Stuart-Buttler et al. 2024; Williams et al. 2026.

Improving participation therefore requires culturally safe, continuity of care and ‘wrap around’ care models such as Midwifery Group Practice, community-based integrated services, better access in regional and remote areas, and stronger First Nations-led approaches such as Birthing on Country and Mums and Bubs programs. National and state initiatives have shown that flexible funding, qualified staff, quality improvement and continuity of care can improve outcomes.

7.4.5 Social support

Stress, anxiety and difficult life circumstances are associated with poor pregnancy outcomes, including preterm birth. Antenatal care should therefore incorporate stress-reduction strategies, emotional support and, where needed, home visiting or other wrap-around supports. Support from family, community and trusted health professionals may improve health behaviours, reduce stress and strengthen engagement with care.

7.5 Post-conception secondary strategies

Post-conception secondary strategies focus on identifying women at increased risk of preterm birth and providing targeted care to prevent early birth. These strategies generally address 2 pathways: preventing indicated (iatrogenic) preterm birth among women at risk of complications such as pre-eclampsia, diabetes or chronic hypertension; and preventing spontaneous preterm birth among women with a previous spontaneous preterm birth, a major current risk factor (for example, multiple gestation), or both a previous preterm birth and a current clinical risk factor such as a shortened cervix or infection.

7.5.1 Referral to a dedicated preterm birth prevention program

Dedicated preterm birth prevention programs identify women at high risk, manage modifiable risk factors and provide targeted treatment. These programs typically include maternal–fetal medicine specialists, midwives, nurses, nutritionists and social workers, and often operate through a specialist clinic linked to a tertiary hospital. Women are referred for high-risk management and then returned to their usual care provider once the high-risk period has passed. This is consistent with the key strategy of continuity of care proposed by the Australian Preterm Birth Alliance (2024a). Australian examples include the Western Australian Preterm Birth Prevention Initiative, the ACT Preterm Birth Prevention Initiative and the Birthing in Our Community (BiOC) service (*see section 7.5.4–7.5.7*).

7.5.2 Modification of maternal activity

Women at risk of preterm birth may also be advised to modify daily activities to reduce stress, improve nutrition and lower exposure to infection. Common recommendations include improving personal hygiene, reducing strenuous or hazardous work, improving sleep, increasing rest and, in some cases, limiting physical activity or having bed rest, although evidence for bed rest itself remains limited. These measures aim to reduce pathways linked to infection, stress and poor maternal wellbeing.

7.5.3 Lessons from COVID-19 mitigation measures

Studies reviewed in Chapter 6 suggest that preterm birth rates fell in several countries during COVID-19 mitigation periods despite a reduction in hospital attendance, and routine health screening, including antenatal care. Suggested contributors included better personal hygiene, reduced exposure to non-COVID infections, lower work and social stress, better sleep, more time at home and, in some places, improved air quality. These findings reinforce the potential importance of stress reduction, infection prevention, rest and nutrition in preventing preterm birth. They also raise questions about whether some planned preterm births may be avoidable.

7.5.4 Western Australian Preterm Birth Prevention Initiative

Launched in 2014, the Western Australian Preterm Birth Prevention Initiative aimed to safely reduce preterm birth through 3 linked components: statewide clinical guidelines, an outreach education program for health professionals, and a public health campaign, supported by a multidisciplinary preterm birth prevention clinic at the state's tertiary referral centre. The guidelines covered risk screening, management of shortened cervix, smoking cessation support and avoidance of non-

medically indicated birth before 38 weeks. Early evaluations reported a significant reduction in preterm birth, particularly at the tertiary centre, demonstrating the potential of a coordinated, system-wide prevention program (Newnham et al. 2017b).

7.5.5 Australian Capital Territory Preterm Birth Prevention Initiative

The ACT initiative, launched in 2019 and modelled on the Western Australian program, combined new clinical guidelines, outreach education for clinicians and a specialist preterm birth prevention clinic at Canberra Hospital. The program promoted risk screening, targeted treatment, smoking cessation, avoidance of non-medically indicated early birth and multidisciplinary care. After 16 months, preterm births at Canberra Hospital had fallen by 10%, and planned early term births without medical indication had also declined, showing that a multifaceted prevention model can produce measurable gains (Orefice et al. 2021).

7.5.6 Australian Preterm and Early Term Birth Prevention Program

The National Preterm and Early Term Birth Prevention Program was established in Australia in June 2018 with Commonwealth funding, through the creation of the Australian Preterm Birth Prevention Alliance (Newnham et al. 2025).

The program aims to improve outcomes for women and babies by supporting participating maternity services to safely reduce preterm and early term births by 20% across Australia. It also seeks to support women to make informed decisions about pregnancy and birth (Every Week Counts: The Australian Preterm and Early Term Birth Prevention Program – Women's Healthcare Australasia).

The initiative builds on the successful Western Australian program launched in 2014. To extend its reach nationally, the program partnered with Women's Healthcare Australasia and the Institute for Healthcare Improvement in 2022 to establish the "Every Week Counts" collaborative. A second expanded phase commenced in early 2025 with further Australian Government funding (Our Story - Preterm Alliance).

The program continues to operate as an ongoing partnership between the Australian Preterm Birth Prevention Alliance, Women's Healthcare Australasia, the Institute for Healthcare Improvement and jurisdictional partners across states and territories.

The program is underpinned by a core clinical bundle of 7 evidence-based strategies. These strategies are promoted through the "Every Week Counts" campaign, which aims to normalise allowing healthy pregnancies to continue to full term where clinically appropriate.

The primary clinical strategies deployed across participating maternity services include:

- Mid-Pregnancy Cervical Length Screening
- Progesterone Therapy
- Preventing Planned Early Term Births
- Smoking Cessation Support
- Promoting Midwifery Continuity of Care
  - **Model Integration**: Expanding access to **continuity-of-care models**, ensuring women see the same midwife or small team of midwives throughout their pregnancy, labour, and postnatal period. This model is clinically proven to lower preterm birth risks.

- Preeclampsia Screening and Aspirin Intervention
- Cultural Adaptations and Equitable Care
  - **First Nations Focus**: Partnering with Indigenous communities to create culturally safe, tailored care pathways. This specific strategic arm aims to reduce healthcare inequities and lower the high rates of preterm birth among First Nations babies.

Evaluation of the program by Newnham and others (2025) showed that between 1 January 2018 and 31 December 2021, the national singleton preterm birth rate fell by 6.8%, with the reduction limited to the gestational age group 32 weeks to less than 37 weeks. During the same period, the early-term birth rate (37 weeks to less than 39 weeks) increased by 5.2%.

In Phase 2 (October 1, 2022, to June 30, 2024), the early-term birth rate in participating hospitals decreased by 9.6% with no further decrease in preterm birth rates.

According to Newnham and others (2025), the results of the national preterm birth prevention programme in Australia "suggest that in the context of a highly resourced setting, multifaceted preterm birth prevention projects applying existing knowledge and conducted at scale might produce meaningful benefits at a population level".

Although this program is not specifically directed at First Nations women, the finding that the program may have contributed to a reduction in national preterm birth rates by about 6% is encouraging. This finding is particularly notable given that efforts to reduce preterm birth rates across populations have generally had limited success, with global rates remaining largely unchanged (Newnham et al. 2025).

7.5.7 Birthing in Our Community service

The Birthing in Our Community (BiOC) was created in 2013 in response to a 2012 evaluation of antenatal services for First Nations women birthing at the Mater Mothers' Hospital in Brisbane which identified a rising rate of preterm births among women using the service. There were also earlier concerns about 'unacceptable maternal and infant health disparities for Aboriginal and Torres Strait Islander … families in Australia', such as persistently high child mortality rates, and preterm rates about twice the rate for other Australians (14.2% and 8·5%, respectively), and which have remained static since targets addressing these issues were set in 2008 by the Closing the Gap framework (Kildea et al. 2021).

The BiOC service was designed, implemented and evaluated by a multi-agency partnership between 2 Aboriginal community-controlled health services and the Mater Mothers' Public Hospital. The aim of the service was to offer culturally safe, evidence-based models of care, in partnership with First Nations communities and underpinned by 'Birthing on Country' principles. Culturally safe maternity care encompasses the entirety of a woman's physical, psychosocial, spiritual, emotional and cultural needs (Kildea et al. 2021).

At the study hospital, women carrying First Nations babies were offered a choice between standard care and the BiOC service. Important components of the BiOC service included:

- multi-agency partnership involving First Nations leadership and governance
- caseload midwifery/continuity of midwifery carer across the maternity journey:
  - continuity of care throughout pregnancy, birth and up to 6 weeks postnatally
  - care in a community-based hub, the home and the hospital

- First Nations workforce, including family support workers, administration and transport workers, Hospital Liaison Officers and training and cadetships for midwives and nurses
- cultural safety framework, where front-line staff are provided with regular clinical and cultural supervision, orientation and cultural training through the partner organisations
- holistic wrap-around services consisting of:
  - a community-based hub that includes transport and activities to connect, interact, share and learn from each other
  - a strong focus on social and emotional health and wellbeing
  - ready access to social work, perinatal psychology, parenting support and education
  - access to hospital medical staff, a social worker, child safety officers and other professionals (for example, diabetic educator) if required.
- coordinated care integrating primary health network with tertiary service
  - a dedicated BiOC service manager to provide overarching service coordination and day-to-day management of the BiOC team and to be a single point of reference for communication with external stakeholders.

A total of 1,422 of the 1,867 babies born at the hospital between 1 January 2013 and 30 June 2019 were included in a study to evaluate the efficacy of the BiOC service in relation to 4 predetermined outcomes. The evaluation showed that reduction of preterm birth is possible if based around a service with Indigenous governance and leadership; continuity of care; and a relationship-based service that addresses not only the physical but also the social, cultural, spiritual and psychological wellbeing of the woman and her family.

It was observed from the evaluation that 3 of the 4 pre-specified primary outcomes significantly improved within the BiOC service. Women receiving the service were:

- more likely to attend 5 or more antenatal visits
- less likely to have an infant born preterm (OR 0.62: 95% CI [0.42–0.93])
- more likely to exclusively breastfeed on discharge from hospital than those who received standard care (Kildea et al. 2021).

The study (Kildea et al. 2021) confirms the findings from an earlier study of the BiOC service, based on data from January 2013 to December 2017 – namely, that First Nations women who received the BiOC service were less likely to give birth to a preterm baby than First Nations women who received standard care (6·9% compared with 11.6%) and, after controlling for confounders, were less likely to have a preterm birth than those who received standard care (OR 0·50: 95% CI [0·31–0·83]) (Kildea et al. 2019).

These are positive results, given past failures to reduce preterm birth rates, and 'the evidence gap on how best to reduce preterm birth and infant mortality internationally and in socially disadvantaged and vulnerable women in high-income countries (Kildea et al. 2021).

Both reviews (Kildea et al. 2019; Kildea et al. 2021) affirm that reducing preterm birth is possible. Key enablers of the success of the BiOC service are an increase in First Nations governance and control; a shared vision; committed leadership; continuity of midwifery care; and the relationship-based service that addresses not only the physical but also the social, cultural, spiritual and psychological wellbeing of the woman and her family.

Since not all First Nations women will access the BiOC service or any particular First Nations-specific services, Kildea and colleagues (2021) have recommended scaling up the BiOC model to ensure that all First Nations women have access to BiOC type services that are adapted to their specific needs.

7.6 Tertiary strategies

Tertiary strategies or interventions are directed at women at imminent risk of preterm birth. They are mostly clinical and are largely outside the scope of this report. Only a short description of these strategies is therefore provided. They include those described below

Clinical strategies to treat women at risk of preterm birth

Various clinical strategies for treating women at imminent risk of preterm birth have been developed and/or implemented worldwide although their use has met with mixed success. These clinical strategies are not the focus of this report, but a few are noted here: (ACOG Committee on Obstetric Practice 2013; Biggio 2020; Branch et al. 2023; McIntosh et al. 2016; Newnham et al. 2017b; Orefice et al. 2021; Vitner et al. 2020). They include the elements described below.

Early identification of women at risk of preterm birth

One important strategy is the early identification of women at high risk of preterm birth, based on their pregnancy history, specific clinical measurements and other risk factors. There are no obvious risk factors for many women who have preterm birth; thus, for these women, early screening for clinical signs of preterm birth is key to preventing preterm birth. Infections and a shortened cervix are 2 of the main risk factors for spontaneous preterm birth.

One of the most important methods for identifying women at risk of preterm birth is cervical length screening. The risk of preterm birth (PTB) increases as cervical length decreases. In women with a cervix length less than 15mm, the risk of spontaneous preterm birth approaches 50%. 'Measurement of the length of the cervix in mid-pregnancy using transvaginal ultrasound has been shown to be able to predict PTB with clinically useful reliability' (Keelan and Newnham 2017).

There are clinical strategies to manage a shortened cervix length.

Several infections, which disproportionately affect First Nations women, are known to be associated with preterm birth. These include *Group B Streptococcus* maternal rectovaginal colonisation during pregnancy (Alizzi 2022; Australasian Study Group for Neonatal Infections 1995; Bianchi-Jassir et al. 2017; Furfaro 2019), *nontypeable haemophilus influenzae* (NTHi) bacteraemia (Porter et al. 2016), *bacterial vaginosis* and *Ureaplasma spp.* (Daskalakis et al. 2019; Keelan and Newnham 2017).

Screening of women for the treatment, management and/or prevention of these infections may contribute to the reduction of preterm birth.

Other clinical strategies

Other clinical strategies to reduce the risk of preterm birth include those described below (Biggio 2020; Keelan and Newnham 2017; Shapiro-Mendoza 2016; Vitner et al. 2020):

- cervical cerclage (or suture): an operative procedure in which a suture is placed in purse-string fashion around the cervix; this procedure is most traditionally used to prevent recurrent cervical insufficiency (painless dilation) (Biggio 2020)
- progesterone therapy: used to prevent spontaneous preterm birth in women with singleton pregnancies. It is less effective in women with a multiple pregnancy
- antenatal corticosteroids: administered to all women at risk for preterm birth between 24 weeks and 34 weeks gestation and used to improve fetal lung maturity
- tocolytic therapy: used as a method to prolong gestation for at least 48 hours, so that the effect of corticosteroids may reach their peak and help to reduce neonatal morbidity and increasing survival in spontaneous preterm births
- antibiotic prophylaxis: used to protect against the adverse effects of inflammation in pregnancy. It includes (a) long-term prophylactic administration to limit excessive inflammation in at-risk women and (b) acute administration to women in preterm labour to mitigate the effects of inflammation on the fetus (Keelan and Newnham 2017).

7.7 Conclusion

Although preterm birth rates among First Nations women in Australia have remained persistently high, evidence from other countries and from reductions observed during COVID-19 lockdowns suggests that preterm birth can be reduced when the contributing pathways are identified and addressed. Differences in rates between and within countries also highlight the importance of socioeconomic conditions in shaping risk.

An evaluation of a recent and current national preterm birth prevention program, funded by the Commonwealth Department of Health, Disability and Ageing, however, has reported a reduction in preterm birth rates by about 6% between 2018 and 2021, although this reduction is not being attributed solely to the launch of the National Preterm and Early Term Prevention Program.

An overarching priority is to improve the collection and use of epidemiological data for surveillance, modelling and research. Better data would strengthen understanding of the pathways linking socioeconomic, demographic, clinical and biological factors to preterm birth, and improve identification of women most at risk.

The strategies identified in this chapter fall into 3 broad groups.

- **Primary strategies** focus on improving the social, behavioural and health conditions that influence risk before and during pregnancy, including better access to pre-conception care, reproductive health services, smoking cessation support, nutrition support, antenatal care and public health education.
- **Secondary strategies** focus on identifying women at increased risk and providing targeted screening, counselling, treatment and referral to dedicated prevention services.
- **Tertiary strategies** focus on clinical management for women at imminent risk of preterm birth, including interventions to prolong pregnancy and improve neonatal outcomes.

For First Nations women, these strategies are most likely to be effective when they are culturally safe, community-based and led in partnership with First Nations organisations. Evidence shows that services are more effective when First Nations people are involved in their design, leadership and delivery. Models such as Birthing in Our Community demonstrate the value of culturally safe, wrap-around care, continuity of care, and service delivery close to home and community.

Reducing preterm birth among First Nations women will therefore require both strong clinical care and broader action on the social and structural factors that shape maternal health. A coordinated approach that combines better data, prevention across the life course, targeted intervention during pregnancy, and community-led service models offers the strongest path forward.

Not all First Nations women access Indigenous-specific services or live in areas where these services are available. To ensure First Nations women can benefit regardless of where they live, services such as antenatal care, mums and bubs and smoking cessation programs should be scaled up nationally and delivered across all maternity care settings.

Many maternal risk factors for preterm birth – such as smoking, limited antenatal care attendance, diabetes and hypertension – are not solely individual behavioural issues. They are often shaped by the broader environments in which First Nations women live. As a result, it may not always be feasible for women to stop smoking or attend antenatal care without appropriate support. Environmental, logistical, cultural and economic barriers can affect behaviour change, as discussed in Section 7.4.4.

Service design should therefore take a holistic approach that addresses structural and cultural barriers such as racism, domestic violence, distrust of the health system, lack of cultural safety, fear of child removal, lack of continuity of care, remoteness, transport and financial barriers, and broader socioeconomic disadvantage.

Given the close association between socioeconomic disadvantage and preterm birth, targeted efforts to improve the socioeconomic circumstances of First Nations women and communities across domains such as education, employment, housing, recreation, transport, primary health care and internet connectivity are likely to improve maternal health and pregnancy and birth outcomes, including preterm birth.

These efforts are especially important in the Northern Territory, Western Australia and South Australia, where the highest preterm birth rates were observed.

Over the long term, improving these broader social determinants is likely to contribute to lower preterm birth rates in these jurisdictions and across Australia more broadly.

Investment in integrated data sets that span perinatal, demographic, health, economic, child welfare, social justice, substance use, and domestic, family and sexual violence domains is critical to improving monitoring and surveillance of preterm birth, its risk factors and prevention strategies.

Appendix A: Tables

Table A1: Percentage of babies born to First Nations women[a,b] during 2018–2023, by state/territory of usual residence, Accessibility/Remoteness location and Socio-Economic Index of their mothers

State/territory of usual residence[d]	No. of births	Accessibility/Remoteness Location[c]				
		Major city	Regional	Remote	Missing	Total
New South Wales	29,686	43.9	51.8	3.7	0.6	100.0
Victoria	6,743	48.7	51.2	n.p.	n.p.	100.0
Queensland	27,513	33.7	51.0	15.2	0.1	100.0
South Australia	4,866	53.8	32.6	12.2	1.3	100.0
Western Australia	11,485	40.8	20.7	38.2	0.3	100.0
Tasmania	2,063	0.0	98.0	2.0	0.0	100.0
Northern Territory	7,255	0.0	23.7	74.4	1.8	100.0
Australian Capital Territory	749	98.8	n.p.	0.0	n.p.	100.0
Australia	**90,360**	**37.2**	**44.9**	**17.4**	**0.5**	**100.0**

State/territory of usual residence[d]	No. of births	Socio-Economic Index for Areas (SEIFA)[e]				
		Highest SEIFA (deciles 8–10)	Mid-SEIFA (deciles 4–7)	Lowest SEIFA (deciles 1–3)	Missing	Total
New South Wales	29,686	7.1	35.1	57.2	0.6	100.0
Victoria	6,743	11.3	41.5	47.2	0.1	100.0
Queensland	27,513	6.9	31.4	61.6	0.1	100.0
South Australia	4,866	3.4	23.3	72.0	1.3	100.0
Western Australia	11,485	9.2	43.3	47.2	0.3	100.0
Tasmania	2,063	5.0	21.7	73.3	0.0	100.0
Northern Territory	7,255	8.9	24.0	65.2	2.0	100.0
Australian Capital Territory	749	73.4	24.2	0.4	2.0	100.0
Australia	**90,360**	**8.1**	**33.6**	**57.8**	**0.5**	**100.0**

n.p. = not published.

(a) These comprise all births that occurred to First Nations women in Australia during 2018–2023. They exclude births of less than 20 weeks gestation or birthweight of less than 400 grams, as well as births with missing information on gestational age and birthweight. Births within the scope of the NPDC (from 20 weeks gestation or of at least 400 grams birthweight) include terminations of pregnancy.

(b) Data for births occurring during the 2022 calendar year are based on complete data for 7 jurisdictions and a compilation of data for the ACT. The ACT's data consist of the Territory's 2022 data for January to October, supplemented by its 2021 data for November and December (see 'Technical notes, Data quality and availability' for more information at https://meteor.aihw.gov.au/content/808591). Care should be taken if comparing data across time and jurisdictions.

(c) Between 2018 and 2021, remoteness area was derived by applying the ABS's 2016 ASGS. For 2022, remoteness area was derived by applying the ABS's 2016 ASGS to WA, SA, NT and November and December for the ACT, and applying the ABS's Third Edition ASGS to NSW, Vic, Qld, Tas and January to October for ACT. For 2023, remoteness area was derived by applying the ABS's Third Edition ASGS. For the numerator, remoteness area was only calculated where geographic area of usual residence was provided. Denominator includes mothers with a known state or territory of usual residence, but whose remoteness area was unknown. Estimates exclude mothers not usually resident in Australia and those whose state or territory of usual residence was 'Not stated'. Data may not add to the total due to rounding.

(d) Data are by state or territory of usual residence of the mother. Excludes mothers not usually resident in Australia and those whose state or territory of usual residence was 'Not stated'.

(e) Between 2018 and 2021, socioeconomic status was derived by applying the ABS's 2016 SEIFA IRSD. For 2022, socioeconomic status was derived by applying the ABS's 2016 SEIFA IRSD to WA, SA, NT and November and December for the ACT, and applying the ABS's Third Edition SEIFA IRSD to NSW, Vic, Qld, Tas and January to October for the ACT. For 2023, socioeconomic status was derived by applying the ABS's Third Edition SEIFA IRSD. Socioeconomic status was only calculated where geographic area of usual residence was provided. Estimates exclude mothers not usually resident in Australia and those whose state or territory of usual residence was 'Not stated'.

Source: AIHW analysis of National Perinatal Data Collection.

Table A2.1: Preterm birth rates (%) among First Nations women, by gestational age at birth, Australia, 2004–2023

		Gestational age at birth[(a)]				
Year of birth	No. of births	Extremely preterm	Very preterm	Moderately preterm	Late preterm	Overall preterm
2004	9,133	1.9	1.7	1.7	8.9	14.2
2005	9,982	1.7	1.7	1.8	8.7	13.9
2006	10,309	1.6	1.6	1.7	8.8	13.7
2007	11,005	1.8	1.6	2.0	8.4	13.7
2008	11,331	1.6	1.6	1.6	8.4	13.3
2009	11,388	1.7	1.5	1.7	8.2	13.1
2010	11,627	1.9	1.5	1.8	8.3	13.5
2011	11,891	1.9	1.6	1.8	8.6	13.9
2012	12,447	1.5	1.5	1.8	9.4	14.3
2013	12,540	1.7	1.7	1.6	9.5	14.4
2014	12,974	1.3	1.5	1.7	9.2	13.7
2015	13,198	1.3	1.5	1.6	9.3	13.7
2016	13784	1.7	1.4	1.6	8.9	13.6
2017	13,752	1.7	1.5	1.8	9.2	14.2
2018	13,950	1.5	1.5	1.4	9.4	13.8
2019	14,458	1.5	1.2	1.5	8.9	13.2
2020	14,593	1.7	1.4	1.7	9.2	13.9
2021	15,679	1.7	1.4	1.8	9.2	14.1
2022	15,638	1.8	1.5	1.7	9.0	14.0
2023	16,042	1.8	1.5	1.6	8.9	13.8

(a) Gestational age at birth is classified as follows: (1) 'Extremely preterm' = less than 28 completed weeks of gestation; (2) Very preterm' = 28 weeks to less than 32 completed weeks of gestation; (3) 'Moderately preterm' = 32 weeks to less than 34 completed weeks of gestation; (4) 'Late preterm' = 34 weeks to less than 37 completed weeks of gestation.

Notes

1. These comprise all births that occurred to First Nations women in Australia during 2018–2023, excluding 'Other Territories', irrespective of birth status (live birth or stillbirth) and plurality (singleton or multiple birth). They exclude births of less than 20 weeks gestation or birthweight of less than 400 grams, as well as births with missing information on gestational age and birthweight. Births within the scope of the NPDC (from 20 weeks gestation or of at least 400 grams birthweight) include terminations of pregnancy.
2. Data for births occurring during the 2022 calendar year are based on complete data for 7 jurisdictions and a compilation of data for the ACT. The ACT's data consist of the Territory's 2022 data for January to October, supplemented by its 2021 data for November and December (see 'Technical notes, Data quality and availability for more information at https://meteor.aihw.gov.au/content/808591). Care should be taken if comparing data across time and jurisdictions.

Source: AIHW analysis of National Perinatal Data Collection.

Table A2.1.1: Preterm birth rates (%)[a,b,c] among First Nations women, by gestational age at birth, New South Wales, 2004–2023

Year of birth	No. of births	Gestational age at birth[d]				
		Extremely preterm	Very preterm	Moderately preterm	Late preterm	Overall preterm
2004	2,398	1.5	1.4	1.3	7.8	11.9
2005	2,616	1.3	1.3	1.6	8.5	12.7
2006	2,754	1.0	1.1	1.9	7.5	11.5
2007	3,022	2.0	1.1	1.9	8.6	13.5
2008	3,121	1.5	1.5	1.7	8.0	12.7
2009	3,020	1.3	1.1	1.3	7.4	11.1
2010	3,261	1.4	1.5	1.8	7.8	12.4
2011	3,142	1.5	1.5	2.1	8.1	13.3
2012	3,509	1.5	1.1	1.7	9.4	13.7
2013	3,683	1.1	1.4	1.5	9.2	13.1
2014	3,938	1.0	1.4	1.7	9.0	13.1
2015	4,010	0.9	1.6	1.6	9.1	13.1
2016	4,289	1.2	1.3	1.1	7.9	11.4
2017	4,382	1.4	1.3	1.5	7.9	12.0
2018	4,409	0.9	1.3	1.1	8.2	11.4
2019	4,640	1.1	1.3	1.4	7.2	11.0
2020	4,743	1.1	1.4	1.4	7.3	11.2
2021	5,248	1.2	1.2	1.4	7.6	11.5
2022	5,198	1.3	1.4	1.3	8.3	12.3
2023	5,448	1.4	1.1	1.4	8.6	12.5

(a) These comprise all births that occurred to First Nations women in Australia during 2018–2023. They exclude births of less than 20 weeks gestation or birthweight of less than 400 grams, as well as births with missing information on gestational age and birthweight. Births within the scope of the NPDC (from 20 weeks gestation or of at least 400 grams birthweight) include terminations of pregnancy.

(b) Data for births occurring during the 2022 calendar year are based on complete data for 7 jurisdictions and a compilation of data for the ACT. The ACT's data consist of the Territory's 2022 data for January to October, supplemented by its 2021 data for November and December (see 'Technical notes, Data quality and availability' for more information at https://meteor.aihw.gov.au/content/808591). Care should be taken if comparing data across time and jurisdictions.

(c) Data are by state or territory of usual residence of the mother. Excludes mothers not usually resident in Australia and those whose state or territory of usual residence was 'Not stated'.

(d) Gestational age at birth is classified as follows: (1) 'Extremely preterm' = less than 28 completed weeks of gestation; (2) Very preterm' = 28 weeks to less than 32 completed weeks of gestation; (3) 'Moderately preterm' = 32 weeks to less than 34 completed weeks of gestation; (4) 'Late preterm' = 34 weeks to less than 37 completed weeks of gestation.

Source: AIHW analysis of National Perinatal Data Collection.

Table A2.1.2: Preterm birth rates (%)[a,b,c] among First Nations women, by gestational age at birth, Victoria, 2004–2023

Year of birth	No. of births	Gestational age at birth[d]				Overall preterm
		Extremely preterm	Very preterm	Moderately preterm	Late preterm	
2004	399	2.5	2.0	n.p.	10.8	15.5
2005	479	2.1	1.9	1.0	7.1	12.1
2006	511	2.5	n.p.	1.0	7.8	11.7
2007	643	1.6	1.6	2.3	7.3	12.8
2008	672	1.6	1.8	1.9	7.7	13.1
2009	777	1.7	2.8	1.3	9.4	15.2
2010	806	2.9	1.5	1.7	6.8	12.9
2011	864	1.4	1.7	1.4	7.8	12.3
2012	899	1.4	0.7	1.7	8.1	11.9
2013	926	1.8	2.1	1.1	8.4	13.4
2014	851	1.2	1.4	2.9	9.0	14.6
2015	974	1.1	0.8	1.7	8.6	12.3
2016	942	0.6	0.7	2.2	10.5	14.1
2017	967	1.6	1.8	1.6	9.7	14.6
2018	1057	1.9	1.7	1.3	8.5	13.4
2019	1039	1.3	1.3	1.1	8.9	12.4
2020	1059	1.8	1.0	1.9	8.8	13.5
2021	1197	1.5	1.3	1.7	7.9	12.4
2022	1182	1.5	1.4	1.9	8.1	12.9
2023	1209	1.3	1.2	1.6	8.2	12.2

n.p. = not published.

(a) These comprise all births that occurred to First Nations women in Australia during 2018–2023, excluding 'Other Territories', irrespective of birth status (live birth or stillbirth) and plurality (singleton or multiple birth). They exclude births of less than 20 weeks gestation or birthweight of less than 400 grams, as well as births with missing information on gestational age and birthweight. Births within the scope of the NPDC (from 20 weeks gestation or of at least 400 grams birthweight) include terminations of pregnancy.

(b) Data for births occurring during the 2022 calendar year are based on complete data for 7 jurisdictions and a compilation of data for the ACT. The ACT's data consist of the Territory's 2022 data for January to October, supplemented by its 2021 data for November and December (see 'Technical notes, Data quality and availability' for more information at https://meteor.aihw.gov.au/content/808591). Care should be taken if comparing data across time and jurisdictions.

(c) Data are by state or territory of usual residence of the mother. Excludes mothers not usually resident in Australia and those whose state or territory of usual residence was 'Not stated'.

(d) Gestational age at birth is classified as follows: (1) 'Extremely preterm' = less than 28 completed weeks of gestation; (2) Very preterm' = 28 weeks to less than 32 completed weeks of gestation; (3) 'Moderately preterm' = 32 weeks to less than 34 completed weeks of gestation; (4) 'Late preterm' = 34 weeks to less than 37 completed weeks of gestation.

Source: AIHW analysis of National Perinatal Data Collection.

Table A2.1.3: Preterm birth rates (%)[a,b,c] among First Nations women, by gestational age at birth, Queensland, 2004–2023

Year of birth	No. of births	Gestational age at birth[d]				
		Extremely preterm	Very preterm	Moderately preterm	Late preterm	Overall preterm
2004	2,787	1.9	1.7	1.7	8.1	13.3
2005	3,071	1.6	1.5	1.5	8.5	13.1
2006	2,949	1.7	1.8	1.4	7.9	12.8
2007	3,196	1.4	1.6	1.8	7.4	12.3
2008	3,407	1.3	1.6	1.3	7.3	11.5
2009	3,369	1.6	1.5	1.6	7.1	11.9
2010	3,529	1.9	1.4	1.7	8.0	12.9
2011	3,683	1.8	1.5	1.8	7.6	12.7
2012	3,878	1.3	1.2	1.8	8.5	12.9
2013	3,769	1.7	1.5	1.5	8.7	13.4
2014	3,932	1.2	1.3	1.3	8.0	11.8
2015	3,967	1.2	1.2	1.6	8.4	12.4
2016	4,207	1.6	1.2	1.7	8.8	13.3
2017	4,174	1.8	1.2	1.8	8.4	13.2
2018	4,230	1.4	1.5	1.5	9.2	13.6
2019	4,481	1.4	1.1	1.7	8.6	12.8
2020	4,424	1.9	1.0	1.4	9.3	13.6
2021	4,735	1.7	1.4	1.7	9.5	14.3
2022	4,800	1.9	1.5	1.7	7.8	12.9
2023	4,843	1.7	1.4	1.5	8.0	12.6

(a) These comprise all births that occurred to First Nations women in Australia during 2018–2023, excluding 'Other Territories', irrespective of birth status (live birth or stillbirth) and plurality (singleton or multiple birth). They exclude births of less than 20 weeks gestation or birthweight of less than 400 grams, as well as births with missing information on gestational age and birthweight. Births within the scope of the NPDC (from 20 weeks gestation or of at least 400 grams birthweight) include terminations of pregnancy.

(b) Data for births occurring during the 2022 calendar year are based on complete data for 7 jurisdictions and a compilation of data for the ACT. The ACT's data consist of the Territory's 2022 data for January to October, supplemented by its 2021 data for November and December (see 'Technical notes, Data quality and availability' for more information at https://meteor.aihw.gov.au/content/808591). Care should be taken if comparing data across time and jurisdictions.

(c) Data are by state or territory of usual residence of the mother. Excludes mothers not usually resident in Australia and those whose state or territory of usual residence was 'Not stated'.

(d) Gestational age at birth is classified as follows: (1) 'Extremely preterm' = less than 28 completed weeks of gestation; (2) Very preterm' = 28 weeks to less than 32 completed weeks of gestation; (3) 'Moderately preterm' = 32 weeks to less than 34 completed weeks of gestation; (4) 'Late preterm' = 34 weeks to less than 37 completed weeks of gestation.

Source: AIHW analysis of National Perinatal Data Collection.

Table A2.1.4: Preterm birth rates (%)[a,b,c] among First Nations women, by gestational age at birth, South Australia, 2004–2023

Year of birth	No. of births	Gestational age at birth[d]				
		Extremely preterm	Very preterm	Moderately preterm	Late preterm	Overall preterm
2004	521	2.5	2.5	2.3	7.9	15.2
2005	506	1.8	2.4	3.0	10.7	17.8
2006	590	2.0	1.2	1.5	10.8	15.6
2007	620	2.9	1.8	2.7	10.6	18.1
2008	635	2.2	1.3	1.9	7.2	12.6
2009	635	1.7	1.6	1.3	9.9	14.5
2010	653	1.8	0.8	2.9	9.3	14.9
2011	704	2.1	1.4	1.7	8.4	13.6
2012	683	2.0	1.5	2.2	9.8	15.5
2013	731	1.8	1.4	1.9	9.7	14.8
2014	729	1.0	2.1	2.1	11.1	16.2
2015	746	1.7	1.3	1.7	10.2	15.0
2016	761	1.8	1.4	2.1	7.6	13.0
2017	759	1.8	2.1	2.5	10.3	16.7
2018	750	1.9	1.6	1.6	10.5	15.6
2019	768	1.0	1.6	1.3	9.9	13.8
2020	770	1.8	1.2	2.6	11.4	17.0
2021	859	1.3	1.4	2.1	12.2	17.0
2022	848	1.3	1.1	2.0	10.7	15.1
2023	871	3.3	1.3	2.1	8.2	14.8

(a) These comprise all births that occurred to First Nations women in Australia during 2018–2023, excluding 'Other Territories', irrespective of birth status (live birth or stillbirth) and plurality (singleton or multiple birth). They exclude births of less than 20 weeks gestation or birthweight of less than 400 grams, as well as births with missing information on gestational age and birthweight. Births within the scope of the NPDC (from 20 weeks gestation or of at least 400 grams birthweight) include terminations of pregnancy.

(b) Data for births occurring during the 2022 calendar year are based on complete data for 7 jurisdictions and a compilation of data for the ACT. The ACT's data consist of the Territory's 2022 data for January to October, supplemented by its 2021 data for November and December (see 'Technical notes, Data quality and availability' for more information at https://meteor.aihw.gov.au/content/808591). Care should be taken if comparing data across time and jurisdictions.

(c) Data are by state or territory of usual residence of the mother. Excludes mothers not usually resident in Australia and those whose state or territory of usual residence was 'Not stated'.

(d) Gestational age at birth is classified as follows: (1) 'Extremely preterm' = less than 28 completed weeks of gestation; (2) Very preterm' = 28 weeks to less than 32 completed weeks of gestation; (3) 'Moderately preterm' = 32 weeks to less than 34 completed weeks of gestation; (4) 'Late preterm' = 34 weeks to less than 37 completed weeks of gestation.

Source: AIHW analysis of National Perinatal Data Collection.

Table A2.1.5: Preterm birth rates (%)[a,b,c] among First Nations women, by gestational age at birth, Western Australia, 2004–2023

Year of birth	No. of births	Gestational age at birth[d]				
		Extremely preterm	Very preterm	Moderately preterm	Late preterm	Overall preterm
2004	1,536	2.0	2.1	2.3	10.2	16.5
2005	1,638	1.8	2.5	2.6	9.0	15.9
2006	1,788	2.1	1.8	2.2	10.9	17.1
2007	1,799	1.9	1.6	2.1	9.0	14.6
2008	1,728	1.7	1.7	2.0	10.3	15.7
2009	1,778	2.2	1.1	2.2	10.0	15.5
2010	1,718	2.3	1.3	2.0	10.0	15.5
2011	1,728	2.3	1.6	1.3	10.1	15.3
2012	1,677	1.7	2.9	1.7	12.3	18.7
2013	1,780	2.0	1.7	1.6	11.3	16.6
2014	1,819	1.6	1.5	2.1	9.6	15.0
2015	1,747	1.4	1.9	1.3	10.4	14.9
2016	1,854	2.3	1.7	2.0	10.2	16.3
2017	1,822	1.6	1.8	2.2	11.5	17.0
2018	1,841	2.1	1.5	1.7	11.1	16.3
2019	1,880	2.7	1.5	1.6	12.3	18.0
2020	1,925	1.7	2.0	2.5	11.9	18.2
2021	1,894	1.4	1.7	2.4	12.9	18.4
2022	1,954	2.3	2.0	2.6	12.7	19.6
2023	1,991	2.0	2.4	2.4	12.4	19.1

(a) These comprise all births that occurred to First Nations women in Australia during 2018–2023, excluding 'Other Territories', irrespective of birth status (live birth or stillbirth) and plurality (singleton or multiple birth). They exclude births of less than 20 weeks gestation or birthweight of less than 400 grams, as well as births with missing information on gestational age and birthweight. Births within the scope of the NPDC (from 20 weeks gestation or of at least 400 grams birthweight) include terminations of pregnancy.

(b) Data for births occurring during the 2022 calendar year are based on complete data for 7 jurisdictions and a compilation of data for the ACT. The ACT's data consist of the Territory's 2022 data for January to October, supplemented by its 2021 data for November and December (see 'Technical notes, Data quality and availability' for more information at https://meteor.aihw.gov.au/content/808591). Care should be taken if comparing data across time and jurisdictions.

(c) Data are by state or territory of usual residence of the mother. Excludes mothers not usually resident in Australia and those whose state or territory of usual residence was 'Not stated'.

(d) Gestational age at birth is classified as follows: (1) 'Extremely preterm' = less than 28 completed weeks of gestation; (2) Very preterm' = 28 weeks to less than 32 completed weeks of gestation; (3) 'Moderately preterm' = 32 weeks to less than 34 completed weeks of gestation; (4) 'Late preterm' = 34 weeks to less than 37 completed weeks of gestation.

Source: AIHW analysis of National Perinatal Data Collection.

Table A2.1.6: Preterm birth rates (%)[a,b,c] among First Nations women, by gestational age at birth, Northern Territory, 2004–2023

Year of birth	No. of births	Gestational age at birth[d]				
		Extremely preterm	Very preterm	Moderately preterm	Late preterm	Overall preterm
2004	1,303	2.4	1.5	1.8	11.4	17.0
2005	1,369	2.6	1.8	2.0	9.8	16.2
2006	1,419	1.4	2.7	2.3	9.8	16.2
2007	1,420	2.0	2.3	2.3	9.6	16.1
2008	1,390	2.1	1.9	1.8	10.3	16.0
2009	1,454	1.9	2.5	1.9	8.8	15.2
2010	1,366	2.1	2.5	2.0	9.1	15.6
2011	1,396	2.4	2.2	2.3	10.8	17.8
2012	1,399	1.9	2.1	2.4	9.5	15.9
2013	1,270	2.8	2.7	2.2	10.6	18.3
2014	1,305	2.2	1.8	1.7	11.0	16.7
2015	1,327	2.5	2.3	2.3	10.6	17.6
2016	1,311	3.4	2.0	1.9	10.1	17.4
2017	1,219	2.1	2.5	2.1	11.6	18.4
2018	1,232	2.7	2.0	2.2	11.7	18.6
2019	1,204	3.2	0.9	2.0	11.9	18.0
2020	1,246	3.0	2.2	2.3	11.0	18.5
2021	1,245	4.3	2.2	2.6	9.6	18.7
2022	1,167	3.9	2.4	2.2	11.1	19.7
2023	1,161	3.4	2.2	1.7	9.3	16.7

(a) These comprise all births that occurred to First Nations women in Australia during 2018–2023, excluding 'Other Territories', irrespective of birth status (live birth or stillbirth) and plurality (singleton or multiple birth). They exclude births of less than 20 weeks gestation or birthweight of less than 400 grams, as well as births with missing information on gestational age and birthweight. Births within the scope of the NPDC (from 20 weeks gestation or of at least 400 grams birthweight) include terminations of pregnancy.

(b) Data for births occurring during the 2022 calendar year are based on complete data for 7 jurisdictions and a compilation of data for the ACT. The ACT's data consist of the Territory's 2022 data for January to October, supplemented by its 2021 data for November and December (see 'Technical notes, Data quality and availability' for more information at https://meteor.aihw.gov.au/content/808591). Care should be taken if comparing data across time and jurisdictions.

(c) Data are by state or territory of usual residence of the mother. Excludes mothers not usually resident in Australia and those whose state or territory of usual residence was 'Not stated'.

(d) Gestational age at birth is classified as follows: (1) 'Extremely preterm' = less than 28 completed weeks of gestation; (2) Very preterm' = 28 weeks to less than 32 completed weeks of gestation; (3) 'Moderately preterm' = 32 weeks to less than 34 completed weeks of gestation; (4) 'Late preterm' = 34 weeks to less than 37 completed weeks of gestation.

Source: AIHW analysis of National Perinatal Data Collection

Table A2.2: Preterm birth rates (%)[a,b,c] among First Nations women, by type of onset of labour, Australia during 2004–2023

Year of birth	No. of births	Type of onset of labour		Overall preterm
		Induced preterm	Spontaneous preterm	
2004	9,133	4.6	9.6	14.2
2005	9,982	4.5	9.5	13.9
2006	10,309	4.6	9.1	13.7
2007	11,005	4.8	8.9	13.7
2008	11,331	4.7	8.5	13.3
2009	11,388	4.7	8.4	13.1
2010	11,627	5.5	8.1	13.5
2011	11,891	5.7	8.2	13.9
2012	12,447	5.9	8.3	14.3
2013	12,540	6.4	8.1	14.4
2014	12,974	6.3	7.4	13.7
2015	13,198	6.2	7.5	13.7
2016	13,784	6.1	7.5	13.6
2017	13,752	7.0	7.2	14.2
2018	13,950	7.2	6.5	13.8
2019	14,458	6.4	6.8	13.2
2020	14,593	7.3	6.7	13.9
2021	15,679	7.3	6.8	14.1
2022	15,638	7.0	7.0	14.0
2023	16,042	7.0	6.7	13.8

(a) These comprise all births that occurred to First Nations women in Australia during 2018–2023, excluding 'Other Territories', irrespective of birth status (live birth or stillbirth) and plurality (singleton or multiple birth). They exclude births of less than 20 weeks gestation or birthweight of less than 400 grams, as well as births with missing information on gestational age and birthweight. Births within the scope of the NPDC (from 20 weeks gestation or of at least 400 grams birthweight) include terminations of pregnancy.

(b) Data for births occurring during the 2022 calendar year are based on complete data for 7 jurisdictions and a compilation of data for the ACT. The ACT's data consist of the Territory's 2022 data for January to October, supplemented by its 2021 data for November and December (see 'Technical notes, Data quality and availability' for more information at https://meteor.aihw.gov.au/content/808591).

(c) Data are by state or territory of usual residence of the mother. Excludes mothers not usually resident in Australia and those whose state or territory of usual residence was 'Not stated'.

Source: AIHW analysis of National Perinatal Data Collection.

Table A2.2.1: Preterm birth rates (%)[a,b,c] among First Nations women, by type of onset of labour, New South Wales, 2004–2023

Year of birth	No. of births	Type of onset of labour		Overall preterm
		Induced preterm	Spontaneous preterm	
2004	2,398	3.4	8.5	11.9
2005	2,616	3.7	9.0	12.7
2006	2,754	3.7	7.8	11.5
2007	3,022	4.7	8.8	13.5
2008	3,121	3.7	9.0	12.7
2009	3,020	4.4	6.7	11.1
2010	3,261	4.2	8.2	12.4
2011	3,142	5.3	8.0	13.3
2012	3509,	5.5	8.2	13.7
2013	3,683	6.0	7.1	13.1
2014	3,938	6.0	7.2	13.1
2015	4,010	6.4	6.7	13.1
2016	4,289	5.3	6.1	11.4
2017	4,382	6.0	6.0	12.0
2018	4,409	6.9	4.5	11.4
2019	4,640	5.7	5.3	11.0
2020	4,743	6.6	4.6	11.2
2021	5,248	6.6	4.9	11.5
2022	5,198	6.6	5.7	12.3
2023	5448,	6.7	5.8	12.5

(a) These comprise all births that occurred to First Nations women in Australia during 2018–2023, excluding 'Other Territories', irrespective of birth status (live birth or stillbirth) and plurality (singleton or multiple birth). They exclude births of less than 20 weeks gestation or birthweight of less than 400 grams, as well as births with missing information on gestational age and birthweight. Births within the scope of the NPDC (from 20 weeks gestation or of at least 400 grams birthweight) include terminations of pregnancy.

(b) Data for births occurring during the 2022 calendar year are based on complete data for 7 jurisdictions and a compilation of data for the ACT. The ACT's data consist of the Territory's 2022 data for January to October, supplemented by its 2021 data for November and December (see 'Technical notes, Data quality and availability' for more information at https://meteor.aihw.gov.au/content/808591).

(c) Data are by state or territory of usual residence of the mother. Excludes mothers not usually resident in Australia and those whose state or territory of usual residence was 'Not stated'.

Source: AIHW analysis of National Perinatal Data Collection.

Table A2.2.2: Preterm birth rates (%)[a,b,c] among First Nations women by type of onset of labour, Victoria, 2004–2023

Year of birth	No. of births	Type of onset of labour		Overall preterm
		Induced preterm	Spontaneous preterm[d]	
2004	399	3.5	12.0	15.5
2005	479	3.3	8.8	12.1
2006	511	2.3	9.4	11.7
2007	643	4.7	8.1	12.8
2008	672	4.3	8.8	13.1
2009	777	5.0	10.2	15.2
2010	806	6.7	6.2	12.9
2011	864	5.7	6.6	12.3
2012	899	4.8	7.1	11.9
2013	926	5.5	7.9	13.4
2014	851	7.6	6.9	14.6
2015	974	6.6	5.7	12.3
2016	942	5.7	8.4	14.1
2017	967	8.3	6.3	14.6
2018	1,057	7.9	5.3	13.2
2019	1,039	6.4	6.1	12.5
2020	1,059	6.3	7.2	13.5
2021	1,197	6.6	5.8	12.4
2022	1,182	7.9	5.0	12.9
2023	1,209	6.4	5.8	12.2

(a) These comprise all births that occurred to First Nations women in Australia during 2018–2023, excluding 'Other Territories', irrespective of birth status (live birth or stillbirth) and plurality (singleton or multiple birth). They exclude births of less than 20 weeks gestation or birthweight of less than 400 grams, as well as births with missing information on gestational age and birthweight. Births within the scope of the NPDC (from 20 weeks gestation or of at least 400 grams birthweight) include terminations of pregnancy.

(b) Data for births occurring during the 2022 calendar year are based on complete data for 7 jurisdictions and a compilation of data for the ACT. The ACT's data consist of the Territory's 2022 data for January to October, supplemented by its 2021 data for November and December (see 'Technical notes, Data quality and availability' for more information at https://meteor.aihw.gov.au/content/808591).

(c) Data are by state or territory of usual residence of the mother. Excludes mothers not usually resident in Australia and those whose state or territory of usual residence was 'Not stated'.

Source: AIHW analysis of National Perinatal Data Collection.

Table A2.2.3: Preterm birth rates (%)[a,b,c] among First Nations women, by type of onset of labour, Queensland, 2004–2023

Year of birth	No. of births	Type of onset of labour		Overall preterm
		Induced preterm	Spontaneous preterm	
2004	2,787	4.4	8.9	13.3
2005	3,071	4.5	8.6	13.1
2006	2,949	4.8	7.9	12.8
2007	3,196	4.2	8.0	12.2
2008	3,407	4.5	7.0	11.5
2009	3,369	4.1	7.8	11.9
2010	3,529	5.4	7.6	12.9
2011	3,683	5.4	7.3	12.7
2012	3,878	5.3	7.6	12.9
2013	3,769	5.4	8.0	13.4
2014	3,932	5.2	6.6	11.8
2015	3,967	5.6	6.8	12.4
2016	4,207	5.7	7.6	13.3
2017	4,174	6.3	6.9	13.2
2018	4,230	6.4	7.1	13.5
2019	4,481	5.4	7.4	12.8
2020	4,424	6.5	7.1	13.6
2021	4,735	7.1	7.2	14.3
2022	4,800	5.3	7.6	12.9
2023	4,843	5.9	6.7	12.6

(a) These comprise all births that occurred to First Nations women in Australia during 2018–2023, excluding 'Other Territories', irrespective of birth status (live birth or stillbirth) and plurality (singleton or multiple birth). They exclude births of less than 20 weeks gestation or birthweight of less than 400 grams, as well as births with missing information on gestational age and birthweight. Births within the scope of the NPDC (from 20 weeks gestation or of at least 400 grams birthweight) include terminations of pregnancy.

(b) Data for births occurring during the 2022 calendar year are based on complete data for 7 jurisdictions and a compilation of data for the ACT. The ACT's data consist of the Territory's 2022 data for January to October, supplemented by its 2021 data for November and December (see 'Technical notes, Data quality and availability' for more information at https://meteor.aihw.gov.au/content/808591).

(c) Data are by state or territory of usual residence of the mother. Excludes mothers not usually resident in Australia and those whose state or territory of usual residence was 'Not stated'.

Source: AIHW analysis of National Perinatal Data Collection.

Table A2.2.4: Preterm birth rates (%)[(a,b,c)] among First Nations women, by type of onset of labour, South Australia, 2004–2023

Year of birth	No. of births	Type of onset of labour		Overall preterm
		Induced preterm	Spontaneous preterm	
2004	521	4.2	10.9	15.2
2005	506	5.1	12.6	17.8
2006	590	4.4	11.2	15.6
2007	620	6.1	11.9	18.1
2008	635	5.2	7.4	12.6
2009	635	5.5	9.0	14.5
2010	653	5.8	9.0	14.8
2011	704	5.0	8.7	13.7
2012	683	7.5	8.0	15.5
2013	731	7.0	7.8	14.8
2014	729	7.8	8.4	16.2
2015	746	5.6	9.4	15.0
2016	761	7.2	5.8	13.0
2017	759	7.9	8.8	16.7
2018	750	7.1	8.5	15.6
2019	768	7.3	6.5	13.8
2020	770	9.2	7.8	17.0
2021	859	9.0	8.0	17.0
2022	848	7.4	7.7	15.1
2023	871	8.6	6.2	14.8

(a) These comprise all births that occurred to First Nations women in Australia 2018–2023, excluding 'Other Territories', irrespective of birth status (live birth or stillbirth) and plurality (singleton or multiple birth). They exclude births of less than 20 weeks gestation or birthweight of less than 400 grams, as well as births with missing information on gestational age and birthweight. Births within the scope of the NPDC (from 20 weeks gestation or of at least 400 grams birthweight) include terminations of pregnancy.

(b) Data for births occurring during the 2022 calendar year are based on complete data for 7 jurisdictions and a compilation of data for the ACT. The ACT's data consist of the Territory's 2022 data for January to October, supplemented by its 2021 data for November and December (see 'Technical notes, Data quality and availability' for more information at https://meteor.aihw.gov.au/content/808591).

(c) Data are by state or territory of usual residence of the mother. Excludes mothers not usually resident in Australia and those whose state or territory of usual residence was 'Not stated'.

Source: AIHW analysis of National Perinatal Data Collection.

Table A2.2.5: Preterm birth rates (%)[a,b,c] among First Nations women, by type of onset of labour, Western Australia, 2004–2023

Year of birth	No. of births	Type of onset of labour		Overall preterm
		Induced preterm	Spontaneous preterm	
2004	1,536	6.7	9.8	16.5
2005	1,638	5.7	10.2	15.9
2006	1,788	6.0	11.1	17.1
2007	1,799	5.6	9.0	14.6
2008	1,728	6.7	9.0	15.7
2009	1,778	5.7	9.8	15.5
2010	1,718	7.2	8.3	15.5
2011	1,728	6.0	9.3	15.3
2012	1,677	8.0	10.7	18.7
2013	1,780	7.0	9.6	16.6
2014	1,819	6.4	8.6	15.0
2015	1,747	5.4	9.4	14.8
2016	1,854	6.4	9.9	16.3
2017	1,822	8.3	8.7	17.0
2018	1,841	8.1	8.3	16.4
2019	1,880	8.7	9.3	18.0
2020	1,925	8.7	9.5	18.2
2021	1,894	8.5	9.9	18.4
2022	1,954	10.1	9.5	19.6
2023	1,991	9.3	9.8	19.1

(a) These comprise all births that occurred to First Nations women in Australia during 2018–2023, excluding 'Other Territories', irrespective of birth status (live birth or stillbirth) and plurality (singleton or multiple birth). They exclude births of less than 20 weeks gestation or birthweight of less than 400 grams, as well as births with missing information on gestational age and birthweight. Births within the scope of the NPDC (from 20 weeks gestation or of at least 400 grams birthweight) include terminations of pregnancy.

(b) Data for births occurring during the 2022 calendar year are based on complete data for 7 jurisdictions and a compilation of data for the ACT. The ACT's data consist of the Territory's 2022 data for January to October, supplemented by its 2021 data for November and December (see 'Technical notes, Data quality and availability' for more information at https://meteor.aihw.gov.au/content/808591).

(c) Data are by state or territory of usual residence of the mother. Excludes mothers not usually resident in Australia and those whose state or territory of usual residence was 'Not stated'.

Source: AIHW analysis of National Perinatal Data Collection.

Table A2.2.6: Preterm birth rates (%)[a,b,c] among First Nations women, by type of onset of labour, Northern Territory, 2004–2023

Year of birth	No. of births	Type of onset of labour		Overall preterm
		Induced preterm	Spontaneous preterm	
2004	1,303	5.4	11.7	17.0
2005	1,369	5.0	11.2	16.2
2006	1,419	4.9	11.3	16.2
2007	1,420	4.9	11.2	16.1
2008	1,390	5.3	10.7	16.0
2009	1,454	4.7	10.5	15.2
2010	1,366	5.9	9.7	15.6
2011	1,396	6.6	11.2	17.8
2012	1,399	6.1	9.8	15.9
2013	1,270	8.6	9.7	18.3
2014	1,305	8.0	8.7	16.7
2015	1,327	8.3	9.3	17.6
2016	1,311	9.1	8.3	17.4
2017	1,219	9.0	9.4	18.4
2018	1,232	9.5	9.1	18.6
2019	1,204	9.4	8.6	18.0
2020	1,246	10.1	8.4	18.5
2021	1,245	9.3	9.4	18.7
2022	1,167	10.2	9.5	19.7
2023	1,161	9.0	7.7	16.7

(a) These comprise all births that occurred to First Nations women in Australia during 2018–2023, excluding 'Other Territories', irrespective of birth status (live birth or stillbirth) and plurality (singleton or multiple birth). They exclude births of less than 20 weeks gestation or birthweight of less than 400 grams, as well as births with missing information on gestational age and birthweight. Births within the scope of the NPDC (from 20 weeks gestation or of at least 400 grams birthweight) include terminations of pregnancy.

(b) Data for births occurring during the 2022 calendar year are based on complete data for 7 jurisdictions and a compilation of data for the ACT. The ACT's data consist of the Territory's 2022 data for January to October, supplemented by its 2021 data for November and December (see 'Technical notes, Data quality and availability' for more information at https://meteor.aihw.gov.au/content/808591).

(c) Data are by state or territory of usual residence of the mother. Excludes mothers not usually resident in Australia and those whose state or territory of usual residence was 'Not stated'.

Source: AIHW analysis of National Perinatal Data Collection.

Table A3: Adjusted odds ratios of risk factors for preterm birth[a,b,c] among all women who gave birth in Australia during 2018–2023

Mother's characteristics	Maternal socioeconomic status	Mediators of maternal socioeconomic status		
	Stage 1: Distal and contextual factors	Stage 2: Factors likely to be present before onset of pregnancy + Stage 1 factors	Stage 3: Factors likely to arise during pregnancy + Stages 1 & 2 factors	Stage 4: Factors likely to arise at end of pregnancy + Stages 1, 2 & 3 factors
Indigenous status of mother				
First Nations	1.68 [1.63–1.72]*	1.34 [1.31–1.38]*	1.33 [1.30–1.37]*	1.25 [1.22–1.29]*
Non-Indigenous (Ref.)	1.00	1.00	1.00	1.00
SEIFA				
Highest SEIFA (Ref.)	1.00	1.00	1.00	1.00
Mid-SEIFA	1.12 [1.10–1.14]*	1.09 [1.07–1.10]*	1.08 [1.06–1.10]*	1.04 [1.03–1.06]*
Lowest SEIFA	1.25 [1.22–1.27]*	1.14 [1.12–1.17]*	1.13 [1.11–1.15]*	1.07 [1.05–1.09]*
Location				
Major city (Ref.)	1.00	1.00	1.00	1.00
Regional	1.02 [1.01–1.04]*	1.00 [0.98–1.01]	1.00 [0.98–1.01]	1.07 [1.05–1.09]*
Remote	1.12 [1.08–1.17]*	1.05 [1.00–1.09]* [1.11]1.05].02–1.11]	1.05 [1.01–1.10]*	1.11 [1.06–1.16]*
Maternal age (years)	1.41 [1.30–1.53]*	1.24 [1.14–1.34]*	1.25 [1.15–1.36]*	1.23 [1.13–1.34]*
Under 18	1.13 [1.10–1.15]*	1.07 [1.04–1.09]*	1.08 [1.05–1.10]*	1.04 [1.02–1.06]*
18–24	1.00	1.00	1.00	1.00
25–34 (Ref.)	1.18 [1.16–1.20]*	1.18 [1.16–1.20]*	1.16 [1.14–1.18]*	1.19 [1.17–1.21]*
35–39	1.57 [1.52–1.61]*	1.48 [1.43–1.52]*	1.43 [1.39–1.47]*	1.50 [1.54–1.61]*
40 and over	1.00	1.00	1.00	1.00
Smoked during pregnancy				
Smoked		1.70 [1.67–1.74]*	1.70 [1.66–1.74]*	1.57 [1.54–1.61]*
Did not smoke (Ref.)		1.00	1.00	1.00
Maternal BMI				
Underweight		1.42 [1.37–1.47]*	1.43 [1.38–1.48]*	1.43 [1.38–1.47]*
Normal BMI (Ref.)		1.00	1.00	1.00
Overweight		1.04 [1.03–1.06]*	1.00 [0.98–1.01]	1.01 [0.99–1.02]
Pre-existing diabetes				
No (Ref.)		1.00	1.00	1.00
Yes		4.56 [4.39–4.73]*	4.65 [4.48–4.83]*	5.27 [5.07–5.48]*
Pre-existing hypertension				
No (Ref.)		1.00	1.00	1.00
Yes		2.31 [2.20–2.43]*	2.36 [2.25–2.48]*	2.53 [2.40–2.66]*

(continued)

Mother's characteristics	Maternal socioeconomic status	Mediators of maternal socioeconomic status		
	Stage 1: Distal and contextual factors	Stage 2: Factors likely to be present before onset of pregnancy + Stage 1 factors	Stage 3: Factors likely to arise during pregnancy + Stages 1 & 2 factors	Stage 4: Factors likely to arise at end of pregnancy + Stages 1, 2 & 3 factors
Parity				
0 (Ref.)		1.00	1.00	1.00
1		0.77 [0.76–0.79]*	0.79 [0.78–0.80]*	1.10 [1.08–1.12]*
2		0.85 [0.83–0.87]*	0.86 [0.85–0.88]*	1.17 [1.14–1.19]*
3		1.01 [0.98–1.04]	1.03 [1.00–1.06]*	1.33 [1.29–1.37]*
4 & over		1.17 [1.13–1.21]*	1.18 [1.14–1.22]*	1.45 [1.41–1.51]*
Gestational age at first antenatal care visit				
1st trimester (Ref.)			1.00	n.c.
2nd trimester			1.03 [1.00–1.06]*	n.c.
3rd & no care			1.28 [1.22–1.34]*	n.c.
Gestational Diabetes				
No (Ref.)			1.00	1.00
Yes			1.20 [1.18–1.23]*	1.27 [1.25–1.30]*
Gestational hypertension				
No (Ref.)			1.00	1.00
Yes			1.87 [1.82–1.93]*	1.95 [1.89–2.01]*
Antenatal care (Ref. = Group 1: Attended first ANC during 1st trimester and met the recommended minimum ANC attendance requirements)				1.00
Group 2: Attended first ANC during 2nd trimester and met the recommended minimum ANC attendance requirements				0.86 [0.83–0.88]*
Group 3: Attended first ANC during 1st trimester and did not meet the recommended minimum ANC attendance requirements				2.98 [2.93–3.03]*
Group 4: Attended first ANC during or after 2nd trimester and did not meet the minimum ANC attendance requirements				2.63 [2.58–2.69]*

ANC = antenatal care; n.c. = not calculated; gestational age at first antenatal visit has been combined with recommended number of antenatal care visits.
* = statistically significant at the 95% confidence level.

(a) Estimates are based on all women who had a singleton birth in Australia during 2018–2023, excluding 'Other Territories', irrespective of birth status (live birth or stillbirth). They exclude births of less than 20 weeks gestation or birthweight of less than 400 grams, as well as births with missing information on gestational age and birthweight. Births within the scope of the NPDC (from 20 weeks gestation or of at least 400 grams birthweight) include terminations of pregnancy.

(b) Data for births occurring during the 2022 calendar year are based on complete data for 7 jurisdictions and a compilation of data for the ACT. The ACT's data consist of the Territory's 2022 data for January to October, supplemented by its 2021 data for November and December (see 'Technical notes, Data quality and availability' for more information at https://meteor.aihw.gov.au/content/808591).

(c) Data are by state or territory of usual residence of the mother. Excludes mothers not usually resident in Australia and those whose state or territory of usual residence was 'Not stated'.

Source: AIHW analysis of National Perinatal Data Collection.

Table A3a: Adjusted odds ratios of risk factors for preterm birth[a,b,c] among all babies born in Australia during 2018–2023

Mother's characteristics	Maternal socioeconomic status	Mediators of maternal socioeconomic status		
	Stage 1: Distal and contextual factors	Stage 2: Factors likely to be present before onset of pregnancy + Stage 1 factors	Stage 3: Factors likely to arise during pregnancy + Stages 1 & 2 factors	Stage 4: Factors likely to arise at end of pregnancy + Stages 1, 2 & 3 factors
Indigenous status of baby				
First Nations	1.54 [1.50–1.58]*	1.25 [1.22–1.28]*	1.25 [1.22–1.28]*	1.19 [1.16–1.22]*
Non-Indigenous (Ref.)	1.00	1.00	1.00	1.00
SEIFA				
Highest SEIFA (Ref.)	1.00	1.00	1.00	1.00
Mid-SEIFA	1.12 [1.10–1.13]*	1.08 [1.06–1.10]*	1.08 [1.06–1.10]*	1.04 [1.02–1.06]*
Lowest SEIFA	1.25 [1.23–1.27]*	1.14 [1.12–1.17]*	1.13 [1.11–1.15]*	1.07 [1.05–1.10]*
Location				
Major city (Ref.)	1.00	1.00	1.00	1.00
Regional	1.02 [1.00–1.04]*	1.00 [0.98–1.01]	1.00 [0.98–1.01]	1.07 [1.05–1.09]*
Remote	1.15 [1.10–1.20]*	1.07 [1.03–1.12]* [1.11]1.05].02–1.11]	1.08 [1.03–1.12]*	1.13 [1.08–1.18]*
Maternal age (years)	1.42 [1.31–1.54]*	1.25 [1.15–1.36]*	1.26 [1.16–1.37]*	1.24 [1.14–1.35]*
Under 18	1.13 [1.11–1.15]*	1.07 [1.05–1.09]*	1.08 [1.06–1.10]*	1.04 [1.02–1.06]*
18–24	1.00	1.00	1.00	1.00
25–34 (Ref.)	1.18 [1.16–1.20]*	1.17 [1.16–1.19]*	1.16 [1.14–1.18]*	1.19 [1.17–1.21]*
35–39	1.57 [1.52–1.61]*	1.47 [1.43–1.52]*	1.30 [1.39–1.47]*	1.50 [1.46–1.54]*
40 and over	1.00	1.00	1.00	1.00
Smoked during pregnancy				
Smoked		1.71 [1.68–1.75]*	1.71 [1.68–1.75]*	1.58 [1.55–1.62]*
Did not smoke (Ref.)		1.00	1.00	1.00
Maternal BMI				
Underweight		1.42 [1.37–1.47]*	1.43 [1.39–1.48]*	1.43 [1.38–1.48]*
Normal BMI (Ref.)		1.00	1.00	1.00
Overweight		1.04 [1.03–1.06]*	1.00 [0.98–1.01]	1.01 [0.99–1.02]
Pre-existing diabetes				
No (Ref.)		1.00	1.00	1.00
Yes		4.57 [4.41–4.75]*	4.67 [4.50–4.85]*	5.28 [5.08–5.49]*
Pre-existing hypertension				
No (Ref.)		1.00	1.00	1.00
Yes		2.32 [2.21–2.44]*	2.36 [2.25–2.48]*	2.53 [2.41–2.67]*

(continued)

Mother's characteristics	Maternal socioeconomic status	Mediators of maternal socioeconomic status		
	Stage 1: Distal and contextual factors	Stage 2: Factors likely to be present before onset of pregnancy + Stage 1 factors	Stage 3: Factors likely to arise during pregnancy + Stages 1 & 2 factors	Stage 4: Factors likely to arise at end of pregnancy + Stages 1, 2 & 3 factors
Parity				
0 (Ref.)		1.00	1.00	1.00
1		0.77 [0.76–0.79]*	0.79 [0.78–0.80]*	1.10 [1.08–1.12]*
2		0.85 [0.83–0.87]*	0.87 [0.85–0.88]*	1.17 [1.14–1.20]*
3		1.01 [0.98–1.04]	1.03 [1.00–1.06]*	1.34 [1.30–1.38]*
4 & over		1.17 [1.14–1.21]*	1.18 [1.14–1.22]*	1.46 [1.42–1.51]*
Gestational age at first antenatal care visit				
1st trimester (Ref.)			1.00	n.c.
2nd trimester			1.03 [1.01–1.05]*	n.c.
3rd & no care			1.28 [1.22–1.34]*	n.c.
Gestational Diabetes				
No (Ref.)			1.00	1.00
Yes			1.21 [1.19–1.23]*	1.28 [1.25–1.30]*
Gestational hypertension				
No (Ref.)			1.00	1.00
Yes			1.87 [1.82–1.93]*	1.95 [1.89–2.01]*
Antenatal care (Ref. = Group 1: Attended first ANC during 1st trimester and met the recommended minimum ANC attendance requirements)				1.00
Group 2: Attended first ANC during 2nd trimester and met the recommended minimum ANC attendance requirements				0.86 [0.83–0.88]*
Group 3: Attended first ANC during 1st trimester and did not meet the recommended minimum ANC attendance requirements				2.98 [2.93–3.03]*
Group 4: Attended first ANC during or after 2nd trimester and did not meet the minimum ANC attendance requirements				2.64 [2.58–2.69]*

ANC = antenatal care; n.c. = not calculated; gestational age at first antenatal visit has been combined with recommended number of antenatal care visits.

* = statistically significant at the 95% confidence level.

(a) Estimates are based on all singleton babies born in Australia during 2018–2023, excluding 'Other Territories', irrespective of birth status (live birth or stillbirth). They exclude births of less than 20 weeks gestation or birthweight of less than 400 grams, as well as births with missing information on gestational age and birthweight. Births within the scope of the NPDC (from 20 weeks gestation or of at least 400 grams birthweight) include terminations of pregnancy.

(b) Data for births occurring during the 2022 calendar year are based on complete data for 7 jurisdictions and a compilation of data for the ACT. The ACT's data consist of the Territory's 2022 data for January to October, supplemented by its 2021 data for November and December (see 'Technical notes, Data quality and availability' for more information at https://meteor.aihw.gov.au/content/808591).

(c) Data are by state or territory of usual residence of the mother. Excludes mothers not usually resident in Australia and those whose state or territory of usual residence was 'Not stated'.

Source: AIHW analysis of National Perinatal Data Collection.

Table A4: Adjusted odds ratios of risk factors for preterm birth[a,b,c] among First Nations women, Australia, 2018–2023

Mother's characteristics	Maternal socioeconomic status	Mediators of maternal socioeconomic status		
	Stage 1: Distal and contextual factors	Stage 2: Factors likely to be present before onset of pregnancy + Stage 1 factors	Stage 3: Factors likely to arise during pregnancy + Stages 1 & 2 factors	Stage 4: Factors likely to arise at end of pregnancy + Stages 1, 2 & 3 factors
SEIFA				
Highest SEIFA (Ref.)	1.00	1.00	1.00	1.00
Mid-SEIFA	1.21 [1.10–1.34]*	1.16 [1.04–1.28]*	1.15 [1.04–1.27]*	1.11 [1.01–1.23]*
Lowest SEIFA	1.35 [1.23–1.49]*	1.19 [1.08–1.32]*	1.19 [1.07–1.31]*	1.15 [1.04–1.28]*
Location				
Major city (Ref.)	1.00	1.00	1.00	1.00
Regional	1.00 [0.95–1.05]	0.96 [0.91–1.01]	0.96 [0.91–1.01]	0.99 [0.94–1.05]
Remote	1.28 [1.20–1.37]*	1.10 [1.02–1.17]* [1.11]1.05].02–1.11]	1.09 [1.01–1.16]*	1.10 [1.02–1.18]*
Maternal age (years)	1.12 [0.98–1.27]	1.11 [0.97–1.27]	1.08 [0.94–1.24]	1.01 [0.88–1.16]
Under 18	0.95 [0.90–1.00]	1.01 [0.96–1.08]	1.01 [0.95–1.07]	0.95 [0.90–1.01]
18–24	1.00	1.00	1.00	1.00
25–34 (Ref.)	1.34 [1.23–1.45]*	1.17 [1.07–1.27]*	1.16 [1.06–1.26]*	1.18 [1.09–1.29]*
35–39	1.87 [1.63–2.15]*	1.54 [1.33–1.78]*	1.50 [1.43–1.58]*	1.56 [1.34–1.81]*
40 and over	1.00	1.00	1.00	1.00
Smoked during pregnancy				
Smoked		1.52 [1.48–1.60]*	1.50 [1.43–1.58]*	1.37 [1.30–1.44]*
Did not smoke (Ref.)		1.00	1.00	1.00
Maternal BMI				
Underweight		1.55 [1.43–1.69]*	1.57 [1.44–1.71]*	1.57 [1.44–1.71]*
Normal BMI (Ref.)		1.00	1.00	1.00
Overweight		0.72 [0.68–0.76]*	0.71 [0.67–0.74]*	0.72 [0.69–0.76]*
Pre-existing diabetes				
No (Ref.)		1.00	1.00	1.00
Yes		4.61 [4.13–5.14]*	4.72 [4.23–5.28]*	5.23 [4.67–5.85]*
Pre-existing hypertension				
No (Ref.)		1.00	1.00	1.00
Yes		2.12 [1.79–2.52]*	2.17 [1.83–2.58]*	2.34 [1.96–2.79]*

(continued)

Mother's characteristics	Maternal socioeconomic status	Mediators of maternal socioeconomic status		
	Stage 1: Distal and contextual factors	Stage 2: Factors likely to be present before onset of pregnancy + Stage 1 factors	Stage 3: Factors likely to arise during pregnancy + Stages 1 & 2 factors	Stage 4: Factors likely to arise at end of pregnancy + Stages 1, 2 & 3 factors
Parity				
0 (Ref.)		1.00	1.00	1.00
1		0.94 [0.88–1.01]	0.95 [0.89–1.01]	1.20 [1.12–1.28]*
2		1.07 [1.00–1.16]	1.07 [0.99–1.15]	1.30 [1.20–1.40]*
3		1.24 [1.13–1.35]*	1.22 [1.12–1.34]*	1.43 [1.30–1.56]*
4 & over		1.39 [1.28–1.52]*	1.35 [1.24–1.48]*	1.52 [1.39–1.66]*
Gestational age at first ANC				
1st trimester (Ref.)			1.00	n.c.
2nd trimester			1.22 [1.16–1.29]*	n.c.
3rd & no care			1.29 [1.15–1.45]*	n.c.
Gestational Diabetes				
No (Ref.)			1.00	1.00
Yes			1.11 [1.03–1.19]*	1.22 [1.14–1.31]*
Gestational hypertension				
No (Ref.)			1.00	1.00
Yes			1.52 [1.35–1.72]*	1.56 [1.38–1.76]*
Antenatal care (Ref. = Group 1: Attended first ANC during 1st trimester and met the recommended minimum ANC attendance requirements)				1.00
Group 2: Attended first ANC during 2nd trimester and met the recommended minimum ANC attendance requirements				0.98 [0.90–1.06]
Group 3: Attended first ANC during 1st trimester and did not meet the recommended minimum ANC attendance requirements				2.72 [2.56–2.89]*
Group 4: Attended first ANC during or after 2nd trimester and did not meet the minimum ANC attendance requirements				2.71 [2.54–2.89]*

ANC = antenatal care; n.c. = not calculated; gestational age at first antenatal visit has been combined with recommended number of antenatal care visits.

* = statistically significant at the 95% confidence level.

(a) Estimates are based on all First Nations women who had a singleton birth in Australia during 2018–2023, excluding 'Other Territories', irrespective of birth status (live birth or stillbirth). They exclude births of less than 20 weeks gestation or birthweight of less than 400 grams, as well as births with missing information on gestational age and birthweight. Births within the scope of the NPDC (from 20 weeks gestation or of at least 400 grams birthweight) include terminations of pregnancy.

(b) Data for births occurring during the 2022 calendar year are based on complete data for 7 jurisdictions and a compilation of data for the ACT. The ACT's data consist of the Territory's 2022 data for January to October, supplemented by its 2021 data for November and December (see 'Technical notes, Data quality and availability' for more information at https://meteor.aihw.gov.au/content/808591).

(c) Data are by state or territory of usual residence of the mother. Excludes mothers not usually resident in Australia and those whose state or territory of usual residence was 'Not stated'.

Source: AIHW analysis of National Perinatal Data Collection.

Table A4a: Adjusted odds ratios of risk factors for preterm birth[a,b,c] among First Nations babies born in Australia during 2018–2023

Mother's characteristics	Maternal socioeconomic status	Mediators of maternal socioeconomic status		
	Stage 1: Distal and contextual factors	Stage 2: Factors likely to be present before onset of pregnancy + Stage 1 factors	Stage 3: Factors likely to arise during pregnancy + Stages 1 & 2 factors	Stage 4: Factors likely to arise at end of pregnancy + Stages 1, 2 & 3 factors
SEIFA				
Highest SEIFA (Ref.)	1.00	1.00	1.00	1.00
Mid-SEIFA	1.16 [1.07–1.27]*	1.10 [1.00–1.20]*	1.09 [1.00–1.19]*	1.06 [0.97–1.16]
Lowest SEIFA	1.34 [1.23–1.46]*	1.15 [1.06–1.26]*	1.15 [1.05–1.25]*	1.12 [1.02–1.22]*
Location				
Major city (Ref.)	1.00	1.00	1.00	1.00
Regional	1.00 [0.96–1.05]	0.96 [0.91–1.01]	0.96 [0.91–1.01]	0.99 [0.95–1.05]
Remote	1.34 [1.25–1.42]*	1.13 [1.06–1.21]* [1.11]1.05].02–1.11]	1.12 [1.05–1.20]*	1.13 [1.06–1.21]*
Maternal age (years)				
Under 18	1.14 [1.01–1.29]*	1.13 [0.99–1.29]	1.11 [0.97–1.26]	1.05 [0.92–1.04]
18–24	0.97 [0.93–1.02]	1.03 [0.98–1.09]	1.03 [0.98–1.09]	0.98 [0.93–1.04]
25–34 (Ref.)	1.00	1.00	1.00	1.00
35–39	1.32 [1.22–1.42]*	1.16 [1.07–1.25]*	1.14 [1.06–1.23]*	1.17 [1.08–1.26]*
40 and over	1.77 [1.56–2.01]*	1.44 [1.26–1.65]*	1.41 [1.23–1.61]*	1.46 [1.28–1.68]*
Smoked during pregnancy				
Smoked		1.59 [1.52–1.66]*	1.57 [1.50–1.65]*	1.44 [1.37–1.51]
Did not smoke (Ref.)		1.00	1.00	1.00
Maternal BMI				
Underweight		1.61 [1.48–1.74]*	1.62 [1.50–1.75]*	1.61 [1.49–1.75]*
Normal BMI (Ref.)		1.00	1.00	1.00
Overweight		0.73 [0.70–0.76]*	0.71 [0.68–0.75]*	0.73 [0.70–0.77]*
Pre-existing diabetes				
No (Ref.)		1.00	1.00	1.00
Yes		4.93 [4.45–5.47]*	5.05 [4.54–5.61]*	5.57 [5.00–6.20]*
Pre-existing hypertension				
No (Ref.)		1.00	1.00	1.00
Yes		2.22 [1.89–2.62]*	2.26 [1.92–2.67]*	2.38 [2.02–2.82]*

Mother's characteristics	Maternal socioeconomic status	Mediators of maternal socioeconomic status		
	Stage 1: Distal and contextual factors	Stage 2: Factors likely to be present before onset of pregnancy + Stage 1 factors	Stage 3: Factors likely to arise during pregnancy + Stages 1 & 2 factors	Stage 4: Factors likely to arise at end of pregnancy + Stages 1, 2 & 3 factors
Parity				
0 (Ref.)		1.00	1.00	1.00
1		0.97 [0.91–1.03]	0.98 [0.92–1.04]	1.24 [1.16–1.31]*
2		1.09 [1.02–1.17]*	1.09 [1.02–1.17]*	1.33 [1.24–1.43]*
3		1.27 [1.18–1.38]*	1.27 [1.17–1.37]*	1.48 [1.36–1.61]*
4 & over		1.45 [1.34–1.57]*	1.42 [1.31–1.54]*	1.59 [1.47–1.73]*
Gestational age at first antenatal care visit				
1st trimester (Ref.)			1.00	n.c.
2nd trimester			1.18 [1.12–1.24]*	n.c.
3rd trimester & no care			1.22 [1.09–1.37]*	n.c.
Gestational diabetes				
No (Ref.)			1.00	1.00
Yes			1.12 [1.05–1.20]*	1.23 [1.15–1.31]*
Gestational hypertension				
No (Ref.)			1.00	1.00
Yes			1.54 [1.38–1.72]*	1.57 [1.40–1.75]*
Antenatal care (Ref. = Group 1: Attended first ANC during 1st trimester and met the recommended minimum ANC attendance requirements)				1.00
Group 2: Attended first ANC during 2nd trimester and met the recommended minimum ANC attendance requirements				0.97 [0.90–1.04]
Group 3: Attended first ANC during 1st trimester and did not meet the recommended minimum ANC attendance requirements				2.70 [2.55–2.85]*
Group 4: No ANC or attended first ANC during or after 2nd trimester and did not meet the recommended minimum ANC attendance requirements				2.57 [2.42–2.74]*

ANC = antenatal care; n.c. = not calculated; gestational age at first antenatal visit has been combined with recommended number of antenatal care visits.

* = statistically significant at the 95% confidence level.

(a) Estimates are based on all First Nations women who had a singleton birth in Australia during 2018–2023, excluding 'Other Territories', irrespective of birth status (live birth or stillbirth). They exclude births of less than 20 weeks gestation or birthweight of less than 400 grams, as well as births with missing information on gestational age and birthweight. Births within the scope of the NPDC (from 20 weeks gestation or of at least 400 grams birthweight) include terminations of pregnancy.

(b) Data for births occurring during the 2022 calendar year are based on complete data for 7 jurisdictions and a compilation of data for the ACT. The ACT's data consist of the Territory's 2022 data for January to October, supplemented by its 2021 data for November and December (see 'Technical notes, Data quality and availability' for more information at https://meteor.aihw.gov.au/content/808591).

(c) Data are by state or territory of usual residence of the mother. Excludes mothers not usually resident in Australia and those whose state or territory of usual residence was 'Not stated'.

Source: AIHW analysis of National Perinatal Data Collection.

Table A4b: Adjusted odds ratios of risk factors for preterm birth[a,b,c] among First Nations women who gave birth in Australia during 2018–2023: restricted to pregnancies with a gestation age of 32 weeks and over

	Maternal socioeconomic status	Mediators of maternal socioeconomic status		
Mother's characteristics	Stage 1: Distal and contextual factors	Stage 2: Factors likely to be present before onset of pregnancy + Stage 1 factors	Stage 3: Factors likely to arise during pregnancy + Stages 1 & 2 factors	Stage 4: Factors likely to arise at end of pregnancy + Stages 1, 2 & 3 factors
SEIFA				
Highest SEIFA (Ref.)	1.00	1.00	1.00	1.00
Mid-SEIFA	1.24 [1.11–1.39]*	1.18 [1.05–1.31]*	1.17 [1.05–1.30]*	1.14 [1.02–1.27]*
Lowest SEIFA	1.40 [1.26–1.55]*	1.22 [1.10–1.36]*	1.20 [1.09–1.35]*	1.18 [1.06–1.32]*
Location				
Major city (Ref.)	1.00	1.00	1.00	1.00
Regional	0.98 [0.93–1.04]	0.94 [0.89–1.00]	0.94 [0.89–1.00]	0.97 [0.91–1.03]
Remote	1.24 [1.15–1.34]*	1.05 [0.97–1.13]	1.04 [0.96–1.12]	1.04 [0.97–1.13]
Maternal age (years)				
Under 18	0.97 [0.84–1.13]	1.00 [0.85–1.17]	0.98 [0.84–1.14]	0.93 [0.79–1.09]
18–24	0.93 [0.88–0.98]*	1.00 [0.94–1.07]	1.00 [0.94–1.07]	0.96 [0.90–1.03]
25–34 (Ref.)	1.00	1.00	1.00	1.00
35–39	1.35 [1.25–1.47]*	1.17 [1.07–1.28]*	1.15 [1.05–1.25]*	1.17 [1.07–1.28]*
40 and over	1.98 [1.65–2.39]*	1.59 [1.31–1.93]*	1.52 [1.25–1.85]*	1.59 [1.30–1.93]*
Smoked during pregnancy				
Smoked		1.53 [1.46–1.62]*	1.52 [1.44–1.60]*	1.41 [1.33–1.49]*
Did not smoke (Ref.)		1.00	1.00	1.00
Maternal BMI				
Underweight		1.57 [1.43–1.72]*	1.59 [1.45–1.75]*	1.58 [1.44–1.74]*
Normal BMI (Ref.)		1.00	1.00	1.00
Overweight		0.70 [0.66–0.74]*	0.68 [0.64–0.72]*	0.69 [0.65–0.73]*
Pre-existing diabetes				
No (Ref.)		1.00	1.00	1.00
Yes		4.90 [4.37–5.50]*	5.16 [5.59–5.80]*	5.56 [4.94–6.26]*
Pre-existing hypertension				
No (Ref.)		1.00	1.00	1.00
Yes		1.98 [1.64–2.39]*	2.01 [1.66–2.43]*	2.13 [1.76–2.58]*

(continued)

Mother's characteristics	Maternal socioeconomic status	Mediators of maternal socioeconomic status		
	Stage 1: Distal and contextual factors	Stage 2: Factors likely to be present before onset of pregnancy + Stage 1 factors	Stage 3: Factors likely to arise during pregnancy + Stages 1 & 2 factors	Stage 4: Factors likely to arise at end of pregnancy + Stages 1, 2 & 3 factors
Parity				
0 (Ref.)		1.00	1.00	1.00
1		0.99 [0.92–1.06]	0.99 [0.93–1.07]	1.20 [1.12–1.29]*
2		1.13 [1.04–1.22]	1.12 [1.04–1.22]*	1.32 [1.21–1.43]*
3		1.30 [1.18–1.43]*	1.29 [1.17–1.42]*	1.46 [1.33–1.61]*
4 & over		1.45 [1.32–1.60]*	1.41 [1.28–1.55]*	1.55 [1.41–1.71]*
Gestational age at first antenatal care visit				
1st trimester (Ref.)			1.00	n.c.
2nd trimester			1.20 [1.13–1.27]*	n.c.
3rd trimester & no care			1.49 [1.32–1.68]*	n.c.
Gestational diabetes				
No (Ref.)			1.00	1.00
Yes			1.24 [1.15–1.33]*	1.23 [1.15–1.31]*
Gestational hypertension				
No (Ref.)			1.00	1.00
Yes			1.60 [1.41–1.82]*	1.57 [1.40–1.75]*
Antenatal care (Ref. = Group 1: Attended first ANC during 1st trimester and met the recommended minimum ANC attendance requirements)				1.00
Group 2: Attended first ANC during 2nd trimester and met the recommended minimum ANC attendance requirements				0.99 [0.91–1.08]
Group 3: Attended first ANC during 1st trimester and did not meet the recommended minimum ANC attendance requirements				2.22 [2.08–2.34]*
Group 4: No ANC or attended first ANC during or after 2nd trimester and did not meet the recommended minimum ANC attendance requirements				2.37 [2.21–2.54]*

ANC = antenatal care; n.c. = not calculated; gestational age at first antenatal visit has been combined with recommended number of antenatal care visits.

* = statistically significant at the 95% confidence level.

(a) Estimates are based on all First Nations women who had a singleton birth in Australia during 2018–2023, excluding 'Other Territories', irrespective of birth status (live birth or stillbirth). They exclude births of less than 20 weeks gestation or birthweight of less than 400 grams, as well as births with missing information on gestational age and birthweight. Births within the scope of the NPDC (from 20 weeks gestation or of at least 400 grams birthweight) include terminations of pregnancy.

(b) Data for births occurring during the 2022 calendar year are based on complete data for 7 jurisdictions and a compilation of data for the ACT. The ACT's data consist of the Territory's 2022 data for January to October, supplemented by its 2021 data for November and December (see 'Technical notes, Data quality and availability' for more information at https://meteor.aihw.gov.au/content/808591).

(c) Data are by state or territory of usual residence of the mother. Excludes mothers not usually resident in Australia and those whose state or territory of usual residence was 'Not stated'.

Source: AIHW analysis of National Perinatal Data Collection.

Table A5: Adjusted odds ratios of risk factors for preterm birth[a,b,c] among First Nations women, Australia, by type of onset of labour, 2018–2023

Mother's characteristics	Spontaneous preterm	Induced preterm[d]
SEIFA		
Highest SEIFA (Ref.)	1.00	1.00
Mid-SEIFA	1.17 [1.01–1.36]*	1.05 [0.92–1.20]
Lowest SEIFA	1.28 [1.11–1.48]*	1.03 [0.90–1.17]
Location		
Major city (Ref.)	1.00	1.00
Regional	1.01 [0.94–1.09]	0.97 [0.90–1.05]
Remote	1.06 [0.96–1.17]	1.12 [1.02–1.23]*
Maternal age (years)		
Under 18	1.12 [0.94–1.35]	0.90 [0.74–1.11]
18–24	1.04 [0.96–1.13]	0.87 [0.80–0.95]*
25–34 (Ref.)	1.00	1.00
35–39	1.12 [1.00–1.27]	1.20 [1.07–1.34]*
40 and over	1.26 [1.01–1.58]*	1.68 [1.40–2.02]*
Smoked during pregnancy		
Smoked	1.47 [1.37–1.57]*	1.22 [1.14–1.31]*
Did not smoke (Ref.)	1.00	1.00
Maternal BMI		
Underweight	1.73 [1.55–1.92]*	1.22 [1.07–1.39]*
Normal BMI (Ref.)	1.00	1.00
Overweight	0.65 [0.61–0.70]*	0.85 [0.79–0.92]*
Pre-existing diabetes		
No (Ref.)	1.00	1.00
Yes	1.63 [1.32–2.00]*	7.09 [6.26–8.03]*
Pre-existing hypertension		
No (Ref.)	1.00	1.00
Yes	1.04 [0.75–1.45]	2.99 [2.46–3.63]*
Parity		
Nulliparous (0) (Ref.)	1.00	1.00
1	1.42 [1.29–1.55]*	1.00 [0.91–1.10]
2	1.40 [1.26–1.56]*	1.19 [1.07–1.32]*
3	1.64 [1.45–1.85*]	1.20 [1.06–1.36]*
4 & over	1.61 [1.43–1.83]*	1.39 [1.24–1.57]*

(continued)

Mother's characteristics	Spontaneous preterm	Induced preterm[(d)]
Gestational age at first antenatal care visit		
1st trimester (Ref.)	1.00	1.00
2nd trimester	1.08 [1.01–1.17]*	1.00 [0.92–1.08]
3rd & no care	0.98 [0.84–1.13]	0.63 [0.52–0.76]*
Gestational diabetes		
No (Ref.)	1.00	1.00
Yes	1.14 [1.03–1.26]	1.28 [1.17–1.41]*
Gestational hypertension		
No (Ref.)	1.00	1.00
Yes	0.39 [0.29–0.53]*	2.69 [2.36–3.07]*
Made recommended no. of antenatal care visits		
No	3.23 [3.01–3.47]*	2.15 [2.00–2.30]*
Yes (Ref.)	1.00	

* = statistically significant at the 95% confidence level.

(a) Estimates are based on First Nations women who gave birth to a singleton baby in Australia (excluding 'Other Territories'), during 2018–2023, irrespective of birth status (live birth or stillbirth). They exclude births of less than 20 weeks gestation or birthweight of less than 400 grams, as well as births with missing information on gestational age and birthweight. Births within the scope of the NPDC (from 20 weeks gestation or of at least 400 grams birthweight) include terminations of pregnancy.

(b) Data for births occurring during the 2022 calendar year are based on complete data for 7 jurisdictions and a compilation of data for the ACT. The ACT's data consist of its 2022 data for January to October, supplemented by its 2021 data for November and December (see 'Technical notes, Data quality and availability' for more information: https://meteor.aihw.gov.au/content/808591).

(c) The Department of Health has recommended a minimum number of 10 antenatal care (ANC) visits for first-time mothers, and at least 7 visits for mothers who had previously given birth and for subsequent uncomplicated pregnancies Department of Health and Aged Care (2020).

(d) May include cases where induction of labour was attempted but labour did not result.

Source: AIHW analysis of National Perinatal Data Collection.

(continued)

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Data Quality Statement

The analysis in this report is based on the National Perinatal Data Collection (NPDC). The quality of data in the NPDC can be viewed from this link on the AIHW website: https://meteor.aihw.gov.au/content/808591

Abbreviations

ABS	Australian Bureau of Statistics
ACOG	American College of Obstetricians and Gynecologists
AIHW	Australian Institute of Health and Welfare
ANC	antenatal care
ARIA	Accessibility/Remoteness Index of Australia
ASGS	Australian Statistical Geography Standard
BiOC	Birthing in Our Community
BMI	body mass index
CDC	Centres for Disease Control
ELBW	extremely low birthweight
EUROPOP	European Programme of Occupational Risks and Pregnancy Outcomes
HPV	human papillomavirus
IRSD	Index of Relative Socio-Economic Disadvantage
IVF	*in vitro* fertilisation
NP	not published
NPDC	National Perinatal Data Collection
OR	odds ratio
PAF	Population Attributable Fractions
PTB	preterm birth
SCUH	Sunshine Coast University Hospital
SEIFA	Socio-Economic Indexes for Areas
SGA	small for gestational age
UMHL	University Maternity Hospital Limerick
United States	United States of America
VLBW	very low birthweight
WIC	Special Supplemental Nutrition Program for Women, Infants and Children

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List of Tables

List of Figures

Preterm birth rates among First Nations babies have hardly changed in 2 decades, fluctuating between 13.9% in 2005 and 13.8% in 2023.

Strategies to reduce preterm birth include timely access to antenatal care, elimination of smoking before or during pregnancy, prevention and/or management of pre-existing and gestational diabetes and hypertension, and improved nutrition to optimise body weight.

Improving First Nations women's socioeconomic circumstances would also contribute to reducing preterm births.

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