3.4 Caesarean section20–34 years

Context

This data item examines rates of caesarean section for selected women aged 20–34 years giving birth for the first time based on their place of residence. A caesarean section is an operation in which a baby is born through an incision in the mother's abdomen and uterus (womb).¹ Caesarean section can be lifesaving, but is associated with small risks of serious adverse effects for the mother and the baby, and for subsequent births.² The vast majority of women in Australia who have had a caesarean section have one for a subsequent birth.³ This pattern has led to concern about the growing numbers of women at prime age for an uncomplicated vaginal birth (that is, 20-34 years) having their first baby by caesarean section for non-medical reasons.^{4,5} These women have a lower risk of obstetric complications than older and younger women, and are more likely than older women to give birth again. Exploring variation in caesarean section for first births in a subset of these women who, along with their babies, are potentially at low risk from vaginal birth (as defined in Box 3.1) is a logical first step in investigating the appropriate use of the procedure, and supporting women to make informed choices about their maternity care.

Box 3.1

Selected women are those who met all of these criteria:

- Gave birth for the first time over the three-year period 2012–2014
- Aged 20-34 years
- Gestational age of baby at birth, 37-41 completed weeks
- Pregnant with one baby (singleton)
- Presentation of the baby is vertex (baby's head at the cervix).

A caesarean section may be performed if labour is not progressing, or serious complications are developing in the mother or the baby (emergency caesarean). Alternatively, it may be planned before the mother goes into labour (elective caesarean).¹ Most caesarean sections are done before labour onset (about 61% of all caesarean sections in Australia in 2014^{3*}). Both emergency and planned caesarean sections are included in this data item.

* Based on the number of caesarean sections with no labour onset (62,562) and the total number of caesarean sections (101,896) in 2014.

Caesarean section can be a lifesaving procedure in some circumstances.² Other advantages of a planned caesarean section compared with a spontaneous vaginal birth include reduced risk of labour-related morbidities for the baby and reduced risk of vaginal injuries for the mother.² It is also associated with a reduced long-term risk of pelvic floor disorders, such as stress incontinence and pelvic organ prolapse^{6,7}, although pregnancy itself is a risk factor for these and caesarean section may not protect against them.⁸⁻¹¹

The most common reason for a caesarean section is a previous caesarean section.³ In a study of more than 14,000 planned caesarean births (1998-2009) at a Queensland hospital, 53% were performed because of a previous caesarean section.¹² Planned caesarean sections are also performed because of risks from vaginal birth to the mother or the baby, or because the mother requests one (that is, for non-medical purposes).^{1,12} These reasons made up about 28% and 15%, respectively, of all planned caesarean sections in the Queensland study.¹² Risks associated with vaginal birth include medical conditions of the mother (for example, pre-eclampsia, hypertension), medical conditions of the foetus, breech position of the baby, multiple pregnancy or placenta praevia (when the placenta covers the cervix).1

First-time mothers aged over 35 years – a population who more commonly require caesarean sections³ – have been excluded from this data item, but mothers with health conditions (for example, hypertension, pre-eclampsia) and obstetric complications have not. As a result, some variation in caesarean rates from maternal medical factors is expected.

Implications of caesarean section

The decision to have a caesarean section has implications for both the mother and the baby. These need to be weighed up against the benefits, taking into account the circumstances and the preference of the woman. For the baby, compared with a planned vaginal birth, planned caesarean before 39 weeks gestation is associated with an increased risk of neonatal respiratory morbidity (breathing difficulties).¹³⁻¹⁵ The most likely cause is a lack of lung surfactant and a failure to clear lung fluid – these processes are stimulated by labour.¹³

The likelihood of respiratory morbidity is greater for babies born close to term (37–38 weeks gestation) than for babies born at term (39–41 weeks).^{12,16} Because the risk falls as gestational age increases, Australian and international guidelines recommend planned caesarean at approximately 39 weeks gestation or later in uncomplicated singleton (one-baby) pregnancies.^{2,13,17}

Early planned birth (<39 weeks) has also been associated with increased risk of poor child development at school age, regardless of socioeconomic disadvantage and other demographic factors.¹⁸ In a study of more than 150,000 births of ≥32 weeks gestation in New South Wales from 2002 to 2007, the likelihood of a child being developmentally high risk by the first year of full-time school increased for every week the child was born before 39–40 weeks.¹⁸ Early-term birth has also been associated with increased odds of attention-deficit/ hyperactivity disorder (ADHD) compared with infants born at 39–41 weeks.¹⁹

Babies born by caesarean section are less likely to be breastfed in the first few hours after birth or by the time they leave the hospital than babies born vaginally.²⁰ Birth by caesarean section has been associated with higher childhood rates of asthma²¹ and obesity.²²

For the mother, compared with a planned vaginal birth, a planned caesarean section may result in a longer hospital stay and may increase the risk of some rare but serious conditions.² These include haematoma, postpartum infections, anaesthetic complications, hysterectomy due to haemorrhage after birth and venous thromboembolism.^{2,23} Having a caesarean section also increases the risk of serious but rare complications in future pregnancies. These include uterine rupture, placenta praevia and placenta accreta (abnormal placental attachment that can result in massive haemorrhage and the need for hysterectomy).²⁴ The risk of these complications increases with each caesarean birth.⁹

Australian rate of caesarean section for all women

Australia has a higher rate of caesarean section than the average reported for the Organisation for Economic Co-operation and Development (OECD) (32% versus 28% of live births, respectively, in 2013)²⁵ (Figure 3.22). The rate has risen steadily since the early 1990s²⁶, a trend seen in nearly all comparable OECD countries.²⁵ Potential contributors to the rise include increasing maternal age, increasing numbers of maternal requests, increased maternal obesity, reduced vaginal birth after caesarean section, and multiple births resulting from assisted reproduction.²⁷⁻²⁹

Rates of both emergency and elective caesarean section have increased in Australia, but the rise in elective caesarean sections appears to be greater. In two Australian studies that adjusted rates for maternal age as well as for pregnancy and obstetric complications, both the odds of having an elective caesarean section and the odds of having an emergency caesarean section were found to have increased in the decades up to 2005 and 2008, respectively.^{4,28} In unadjusted data from New South Wales, elective caesarean section accounted for most of the rise in caesarean section for selected women aged 20–34 years (the same criteria as this Atlas) over the period 2001–2015.³⁰ In these women, there was a 45% increase in elective caesarean over this period.³⁰

Caesarean section rates are higher in private hospitals (43% in 2011) than in public hospitals (30% in 2011). 26,31

In 1985, the World Health Organization (WHO) stated that the ideal rate for caesarean sections is 10–15%, and that increasing the rate of caesarean section above this level is no longer associated with reduced mortality.³² In 2015, WHO revised this statement to say that a specific population rate was no longer a useful target, and that examining rates and outcomes according to particular obstetric characteristics using the Robson classification would be more likely to lead to actions to improve care.³²



Figure 3.22: Caesarean section rates per 100 live births, 2013 (or nearest year), OECD Health at a Glance 2015²⁵

About the data

Data are sourced from the Australian Institute of Health and Welfare National Perinatal Data Collection, and include both public and private hospitals. Rates are described as the number of selected women who had a caesarean section per 1,000 selected women aged 20–34 years. Selected women are women aged 20–34 years who met all of these criteria: gave birth for the first time, singleton pregnancy (carried one baby), baby's head positioned at the cervix, and baby of gestational age 37–41 completed weeks at birth.

Data are aggregated over three years to provide sufficient numbers to support reporting at the local level. The number of caesarean sections and the number of selected women over three years are used to provide an average rate. This is comparable to a rate based on data collected over one year.

The analysis and maps are based on the residential address of the mother and not the location of the birth. Rates are age standardised to allow comparison between populations with different age structures. Data quality issues – for example, the recognition of Aboriginal and Torres Strait Islander status in datasets – could influence the variation seen.

What do the data show?

Magnitude of variation

Over the three-year period 2012–2014, 75,018 selected women aged 20–34 years had a caesarean section, representing an average rate of 268 caesarean sections per 1,000 selected women (the Australian rate).

The number of caesarean sections across 317⁺ local areas (Statistical Area 3 – SA3) ranged from 147 to 438 per 1,000 selected women. The rate was **3.0 times as high** in the area with the highest rate compared to the area with the lowest rate. The number of caesarean sections varied across states and territories, from 246 per 1,000 selected women in Tasmania to 300 in the Northern Territory (Figures 3.25–3.28).

After the highest and lowest 10% of results were excluded and 254 SA3s remained, the number of caesarean sections per 1,000 selected women was 1.5 times as high in the area with the highest rate compared to the area with the lowest rate.

Analysis by remoteness and socioeconomic status

Rates in outer regional and remote areas tended to be higher than those in other areas. There was no clear pattern according to socioeconomic disadvantage in any remoteness category (Figure 3.29).

† There are 333 SA3s. For this item, data were suppressed for 16 SA3s due to a small number of caesarean section and/or selected women in an area.

Analysis by Aboriginal and Torres Strait Islander status

The rate for Aboriginal and Torres Strait Islander women (322 per 1,000 selected women) was 1.2 times as high as the rate for non-Indigenous women (267 per 1,000 selected women). This difference was most pronounced in South Australia and the Northern Territory, where the rates for Aboriginal and Torres Strait Islander women were more than 1.3 times as high as the rates for non-Indigenous women (Figure 3.23).

Figure 3.23: Number of caesarean sections for selected women per 1,000 selected women, age standardised, by state and territory and Indigenous status, 2012-2014



Non-Indigenous women

The data for Figure 3.23 are available at www.safetyandquality.gov.au/atlas.

Analysis by patient funding status

Overall, the rate of caesarean section for privately funded patients (335 per 1,000 selected women) was 1.4 times as high as the rate for publicly funded patients (240 per 1,000 selected women). The difference was most pronounced in Queensland, where privately funded patients were 1.6 times as likely to have a caesarean as publicly funded patients (Figure 3.24).

Figure 3.24: Number of caesarean sections for selected women per 1,000 selected women, age standardised, by state and territory and patient funding status, 2012-2014



The data for Figure 3.24 are available at www.safetyandquality.gov.au/atlas.

Notes:

Rates are age standardised to the Australian female population aged 20-34 years in 2001.

Rates are based on the number of caesarean section for selected women (numerator) and number of selected women living in the

geographic area (denominator).

Deliveries involving public patients do not incur a charge to the patient or to a third-party payer - for example, a private health insurance fund.

- Deliveries involving private patients do incur a charge to the patient and/or a third-party payer.
- Data for ACT (Aboriginal and Torres Strait Islander Australians) have been suppressed.

Data by Indigenous status should be interpreted with caution as hospitalisations for Aboriginal and Torres Strait Islander patients are under-enumerated and there is variation in the under-enumeration among states and territories.

For further detail about the methods used, please refer to the Technical Supplement.

Analysis is based on the woman's area of usual residence, not the place of birth.

Interpretation

Potential reasons for the variation include differences in:

- Maternal comorbidities, such as obesity, diabetes, smoking and teenage pregnancy, particularly among Aboriginal and Torres Strait Islander women
- Maternal preference for elective caesarean
- Maternal awareness of risks and benefits of birth methods for current and subsequent births
- Obstetric complications
- The availability of midwives, obstetricians and operating theatres
- Clinicians' preferences
- Skills and skills development in instrumentassisted births (vacuum extraction or forceps)
- Access to maternity services in outer regional and remote areas
- The distance of maternity services from patient residence
- Models of care, including continuity of care models
- The level of antenatal care for Aboriginal and Torres Strait Islander women, and women who are socioeconomically disadvantaged
- Private health insurance coverage
- State and territory maternity health policies.

Because both emergency and planned caesarean sections were included in this data item, varying rates of these procedures within a local area may contribute to overall variation. Different factors may contribute to variation in emergency and elective caesarean sections. For example, variation in skills in instrument-assisted vaginal births are more likely to be associated with variation in emergency caesarean rates than planned caesarean rates. The lack of a relationship between caesarean section rates and socioeconomic disadvantage may be related to different factors for women at most and least socioeconomic advantage. For women at most socioeconomic advantage, private health insurance coverage and maternal preference are likely to be important contributors. For women at least socioeconomic advantage, higher rates of medical and obstetric complications are likely to drive rates of caesarean section; for women living in small rural areas, lack of access to maternity services for supporting higher-risk vaginal births is likely to be a factor.

The higher rate of caesarean section for Aboriginal and Torres Strait Islander women compared with non-Indigenous women may be due to higher rates of maternal risk factors, such as obesity and diabetes³, as well as a lack of culturally appropriate antenatal care. A recent study from the Northern Territory found that the likelihood of Aboriginal and Torres Strait Islander mothers having an emergency caesarean section for their first birth was 47% greater than for non-Indigenous mothers, regardless of demographic and obstetric risk factors. The authors hypothesised that this might reflect access to health services, health literacy and cultural preferences for midwifery-led care.³³

The strong relationship between private health funding and caesarean section rate is expected.²⁶ In datasets of all women, higher rates of caesarean section for privately funded patients compared with publicly funded patients is commonly attributed to differences in the populations. Women having a caesarean section in a private hospital are more likely to be older and less disadvantaged.³¹ The Atlas findings show that rates of caesarean section are also higher for younger women with privately funded care. During the early 2000s, the rate of caesarean section for first births increased more in private hospitals than in public hospitals.^{5,34} The difference was apparent among all women who gave birth³⁴, and also among selected women aged 20–34 years, adjusted for pre-existing pregnancy-related medical conditions (that is, women at low risk from vaginal birth).⁵ The greater rate of caesarean section in private hospitals for women at low risk did not appear to be accompanied by a reduction in perinatal deaths (deaths of babies from 20 weeks gestation to the first 28 days of life).³⁵ Whether private funding status has a net benefit for the morbidity of babies born by caesarean section is unclear.^{35,36}

Addressing variation

Focusing efforts on increasing the number of low-risk women aged 20-34 years who have a vaginal birth would be expected to help ensure the appropriate use of caesarean section. For the vast majority of women, having a caesarean section for the first birth sets the pattern for subsequent births.³ In 2014, 85% of women who had a previous caesarean section had a repeat caesarean section.³ Therefore, improving the appropriateness of caesarean section for first births in women at low risk from vaginal birth who may have subsequent births is likely to also reduce the rate of repeat caesarean section. Women at low risk may be defined as women who are pregnant with one baby, have an uncomplicated obstetric history, have no complications in the current pregnancy and have no medical conditions of concern for a vaginal birth.³⁷

Collaboration between midwives, obstetricians and general practitioners is a key element of providing safe and high-quality maternity care.³⁸ In Australia, a range of models of care exist for low-risk pregnant women.³⁸ Continuity-of-care models that include case-load midwifery have been found to be effective in reducing the rate of caesarean section in women at low risk from vaginal birth, with no change in perinatal deaths.³⁷ In case-load models, antenatal care and care during labour are provided by the same midwife or small group of midwives (for example, one to three midwives), who work in collaboration with obstetricians. These models work on the assumption

that women will labour more effectively, need to stay in hospital for less time, and feel a stronger sense of satisfaction and personal control if they get to know their midwife.³⁹

In the COSMOS trial of more than 2,300 low-risk women at a Victorian maternity hospital (2007–2010) case-load midwifery care, compared with standard care, reduced the risk of caesarean section by 22% (19.4% versus 24.9%). The difference was primarily related to a fall in unplanned caesareans.³⁷ Case-load midwifery may not be as effective in reducing the risk of caesarean section in women of higher risk. In the M@NGO trial of more than 1,700 pregnant women of any risk, case-load care did not affect the caesarean rate compared with standard care, but the rate of both groups decreased over the duration of the study.³⁹

Improving adherence to guidelines on planned caesarean sections before 39 weeks is likely to improve neonatal outcomes following a caesarean section. Planned caesarean sections before 39 weeks are common in Australia.^{12,18,40} In New South Wales, 35% of low-risk repeat planned caesarean sections during 2008–2011 were performed before 39 weeks.⁴⁰ Ensuring that policies and procedures are in place in both the public and private sectors is important – privately funded women have much higher rates of caesarean section than publicly funded women.

Providing women who are pregnant with their first child written evidence-based information on the benefits and risks of birth methods (vaginal birth, instrument-assisted vaginal birth and caesarean section), including the optimal duration of pregnancy, may help address fears and concerns, and enable them to make informed decisions about childbirth.^{2,9,18} Providing women who had a first birth by caesarean section with information on birth options if further children are planned may also help address their fears and concerns, and inform their decisions. Specific information should be included about the benefits and risks of vaginal birth after a caesarean section.⁴¹

Improving clinician training in vaginal birth after a caesarean section, and providing the opportunity for more women to be offered it, if appropriate, may help improve the birth options for women who had a caesarean section for their first birth, but may not require it for future births.⁴¹

Of the women who give birth in Australia, 1 in 4 are overweight, and 1 in 5 are obese.³ Providing women who are overweight or obese and are contemplating pregnancy with advice and interventions to reduce their weight is likely to reduce the increased morbidity and mortality associated with pregnancy for these women, and reduce their requirement for birth by caesarean section. In the absence of other obstetric or medical indications, obesity alone is not an indication for elective caesarean. There are added risks of obesity with both birth methods.² Developing and expanding culturally competent and high-quality maternity care for Aboriginal and Torres Strait Islander women is important for improving access to regular antenatal care.⁴² Aboriginal and Torres Strait Islander women were less likely to attend an antenatal visit in the first trimester (53%) than non-Indigenous women (60%) in Australia in 2014.³

Increasing the access of low-risk women living in remote areas to models of maternity care that support vaginal birth will help support these women. Twenty-four per cent of Aboriginal women who give birth each year live in remote and very remote Australia (versus 2% of non-Indigenous women), highlighting the importance of services in these areas.⁴³ Figure 3.25: Number of caesarean sections for selected women per 1,000 selected women, age standardised, by Statistical Area Level 3 (SA3), 2012-2014



Notes:

Rates are age standardised to the Australian female population aged 20–34 years in 2001.

Rates are based on the number of caesarean section for selected women (numerator) and number of selected women living in the geographic area (denominator).

Analysis is based on the woman's area of usual residence, not the place of birth. For further detail about the methods used, please refer to the Technical Supplement.

Sources: AIHW analysis of National Perinatal Data Collection 2012-2014.

Figure 3.26: Number of caesarean sections for selected women per 1,000 selected women, age standardised, by Statistical Area Level 3 (SA3), 2012–2014: Australia map



Notes:

Rates are age standardised to the Australian female population aged 20-34 years in 2001.

Rates are based on the number of caesarean section for selected women (numerator) and number of selected women living in the

geographic area (denominator). Analysis is based on the woman's area of usual residence, not the place of birth. For further detail about the methods used, please refer to the Technical Supplement. **Sources:** AlHW analysis of National Perinatal Data Collection 2012–2014.





Notes:

- Rates are age standardised to the Australian female population aged 20-34 years in 2001.
- Rates are based on the number of caesarean section for selected women (numerator) and number of selected women living in the
- geographic area (denominator).
- Analysis is based on the woman's area of usual residence, not the place of birth.

Sources: AIHW analysis of National Perinatal Data Collection 2012-2014.

For further detail about the methods used, please refer to the Technical Supplement.

Figure 3.28: Number of caesarean sections for selected women per 1,000 selected women, age standardised, by Statistical Area Level 3 (SA3), state and territory, 2012–2014



Notes:

Rates are age standardised to the Australian female population aged 20–34 years in 2001.

Rates are based on the number of caesarean section for selected women (numerator) and number of selected women living in the geographic area (denominator).

Analysis is based on the woman's area of usual residence, not the place of birth.

For further detail about the methods used, please refer to the Technical Supplement.

Sources: AIHW analysis of National Perinatal Data Collection 2012-2014.

Figure 3.29: Number of caesarean sections for selected women per 1,000 selected women, age standardised, by Statistical Area Level 3 (SA3), remoteness and socioeconomic status, 2012–2014



Notes:

- Rates are based on the number of caesarean section for selected women (numerator) and number of selected women living in the geographic area (denominator).
- Analysis is based on the woman's area of usual residence, not the place of birth.
- For further detail about the methods used, please refer to the Technical Supplement.

Sources: AIHW analysis of National Perinatal Data Collection 2012–2014.

Rates are age standardised to the Australian female population aged 20–34 years in 2001.

Resources

- Royal Australian and New Zealand College of Obstetricians and Gynaecologists.
 Timing of elective caesarean section at term.
 East Melbourne: RANZCOG; 2014.
- Royal Australian and New Zealand College of Obstetricians and Gynaecologists.
 Caesarean delivery on maternal request.
 East Melbourne: RANZCOG; 2010.
- Royal Australian and New Zealand College of Obstetricians and Gynaecologists.
 Caesarean section. Patient information pamphlet.
 East Melbourne: RANZCOG; 2016.
- Royal Australian and New Zealand College of Obstetricians and Gynaecologists. Birth after previous caesarean section. East Melbourne: RANZCOG; 2015.

Australian initiatives

The information in this chapter will complement work already under way to help ensure appropriate use of caesarean section in Australia. At a national level, this work includes:

- National Core Maternity Indicator of caesarean section for selected women giving birth for the first time; the full list of indicators and results from 2010–2013 are available at www.aihw.gov.au/ publication-detail/?id=60129555634
- National framework for maternity services (in development as an enduring framework).
 www.health.gov.au/internet/main/publishing.nsf/ Content/maternity-pubs
- Guiding Principles for Developing a Birthing on Country Service Model and Evaluation Framework, Phase 1. www.coaghealthcouncil.gov.au/Portals/0/ Birthing%20on%20country%20Framework.pdf

Many states and territory initiatives are also in place, including:

- Maternity: Towards Normal Birth in NSW, New South Wales Department of Health
- *Maternity: Timing of Planned or Pre-labour Caesarean Section at Term,* New South Wales Department of Health
- Type of birth (vaginal, caesarean, forceps, etc.), NSW Health Statistics
- South Australian Perinatal Practice Guidelines: Caesarean Section
- South Australian Perinatal Practice Guidelines: Birth Options after Caesarean Section
- The Continuity at Centenary Hospital (CatCH) program, Australian Capital Territory, which provides continuity of midwifery care during pregnancy, birth and postnatal care
- Caesarean sections, HealthStats ACT
- Queensland Maternity and Neonatal Clinical Guideline: Normal Birth
- Queensland Maternity and Neonatal Clinical
 Guideline: Vaginal Birth after Caesarean Section
- Queensland Maternity and Neonatal Clinical Guideline: Obesity in Pregnancy
- Queensland perinatal statistics
- 3 Centres Collaboration, Victoria
- Maternity and Newborn Clinical Network, Victoria
- Koori Maternity Services Program, Victoria
- Project Primip, Royal Women's Hospital Melbourne
- Rural Generalist program, Royal Australian
 College of General Practitioners, and Australian
 College of Rural and Remote Medicine
- Western Australian Preterm Birth Prevention Initiative.

References

- Royal Australian and New Zealand College of Obstetricians and Gynaecologists. Caesarean section. Patient information pamphlet. East Melbourne: RANZCOG; 2016 [cited 2016 Nov 28]. Available from: https://www.ranzcog.edu.au/RANZCOG_SITE/media/RANZCOG-MEDIA/Women%27s%20Health/ Patient%20information/Caesarean-section-pamphlet.pdf?ext=.pdf
- 2. National Institute for Health and Care Excellence. Caesarean section. Clinical guideline 132. London: NICE; 2011.
- Available from: https://www.nice.org.uk/guidance/cg132
- 3. Australia Institute of Health and Welfare. Australia's mothers and babies 2014: in brief. Canberra: AIHW; 2016.
- Available from: http://www.aihw.gov.au/WorkArea/DownloadAsset.aspx?id=60129557657
- O'Leary CM, de Klerk N, Keogh J, Pennell C, de Groot J, York L, et al. Trends in mode of delivery during 1984–2003: can they be explained by pregnancy and delivery complications? BJOG 2007;114(7):855–64.
- Dahlen HG, Tracy S, Tracy M, Bisits A, Brown C, Thornton C. Rates of obstetric intervention among low-risk women giving birth in private and public hospitals in NSW: a population-based descriptive study. BMJ Open 2012;2(5).
- Leijonhufvud A, Lundholm C, Cnattingius S, Granath F, Andolf E, Altman D. Risks of stress urinary incontinence and pelvic organ prolapse surgery in relation to mode of childbirth. Am J Obstet Gynecol 2011;204(1):70 e1–e7.
- MacArthur C, Glazener C, Lancashire R, Herbison P, Wilson D. Exclusive caesarean section delivery and subsequent urinary and faecal incontinence: a 12-year longitudinal study. BJOG 2011;118(8):1001–7.
- Glazener C, Elders A, Macarthur C, Lancashire RJ, Herbison P, Hagen S, et al. Childbirth and prolapse: long-term associations with the symptoms and objective measurement of pelvic organ prolapse. BJOG 2013;120(2):161–8.
- Royal Australian and New Zealand College of Obstetricians and Gynaecologists. Caesarean delivery on maternal request (CDMR). East Melbourne: RANZCOG; 2010 [cited 2017 Apr 10]. Available from: https://www.ranzcog.edu.au/RANZCOG_SITE/media/RANZCOG-MEDIA/Women's%20Health/ Statement%20and%20guidelines/Clinical-Obstetrics/Caesarean-Delivery-on-Maternal-Request-(C-Obs-39)-Review-Nov13.pdf?ext=.pdf
 National Institutes of Health state-of-the-science conference statement: cesarean delivery on maternal request March 27–29, 2006.
- National Institutes of Health state-of-the-science conference statement: cesarean delivery on maternal request March 27–29, 2006. Obstet Gynecol 2006;107(23 (1)):1–29.
- 11. Borello-France D, Burgio KL, Richter HE, Zyczynski H, Fitzgerald MP, Whitehead W, et al. Fecal and urinary incontinence in primiparous women. Obstet Gynecol 2006;108(4):863–72.
- Doan E, Gibbons K, Tudehope D. The timing of elective caesarean deliveries and early neonatal outcomes in singleton infants born 37–41 weeks' gestation. Aust N Z J Obstet Gynaecol 2014;54(4):340–7.
- Royal Australian and New Zealand College of Obstetricians and Gynaecologists. Timing of elective caesarean section at term. East Melbourne: RANZCOG; 2014. Available from: https://www.ranzcog.edu.au/RANZCOG_SITE/media/RANZCOG-MEDIA/Women%27s%20Health/Statement%20 and%20guidelines/Clinical-Obstetrics/Timing-of-elective-caesarean-section-(C-Obs-23)-Review-November-2014.pdf?ext=.pdf
- 14. Hansen ÄK, Wisborg K, Uldbjerg N, Henriksen TB. Risk of respiratory morbidity in term infants delivered by elective caesarean section: cohort study. BMJ 2008;336(7635):85–7.
- 15. De Luca R, Boulvain M, Irion O, Berner M, Pfister RE. Incidence of early neonatal mortality and morbidity after late-preterm and term cesarean delivery. Pediatrics 2009;123(6):e1064–e1071.
- Tita AT, Landon MB, Spong CY, Lai Y, Leveno KJ, Varner MW, et al. Timing of elective repeat cesarean delivery at term and neonatal outcomes. N Engl J Med 2009;360(2):111–20.
- American College of Obstetricians and Gynecologists. ACOG committee opinion no. 561: nonmedically indicated early-term deliveries. Obstet Gynecol 2013;121(4):911–15.
- Bentley JP, Roberts CL, Bowen JR, Martin AJ, Morris JM, Nassar N. Planned birth before 39 weeks and child development: a population-based study. Pediatrics 2016;138(6).
- 19. Lindstrom K, Lindblad F, Hjern A. Preterm birth and attention-deficit/hyperactivity disorder in schoolchildren. Pediatrics 2011;127(5):858–65.
- Prior E, Santhakumaran S, Gale C, Philipps LH, Modi N, Hyde MJ. Breastfeeding after cesarean delivery: a systematic review and meta-analysis of world literature. Am J Clin Nutr 2012;95(5):1113–35.
- 21. Huang L, Chen Q, Zhao Y, Wang W, Fang F, Bao Y. Is elective cesarean section associated with a higher risk of asthma? A meta-analysis. J Asthma 2015;52(1):16–25.
- Kuhle S, Tong OS, Woolcott CG. Association between caesarean section and childhood obesity: a systematic review and meta-analysis. Obes Rev 2015;16(4):295–303.
- 23. Liu S, Liston RM, Joseph KS, Heaman M, Sauve R, Kramer MS, et al. Maternal mortality and severe morbidity associated with low-risk planned cesarean delivery versus planned vaginal delivery at term. CMAJ 2007;176(4):455–60.
- 24. American College of Obstetricians and Gynecologists. ACOG committee opinion no. 559: cesarean delivery on maternal request. Obstet Gynecol 2013;121(4):904–7.
- Organisation for Economic Co-operation and Development. Health at a glance 2015: health care activities. Paris: OECD; 2015. Available from: http://www.oecd.org/health/health-systems/health-at-a-glance-19991312.htm
- Australia Institute of Health and Welfare. Australia's beatth 2014: caesarean section snashot. Canberra: AIHW; 2014.
- Available from: http://www.aihw.gov.au/WorkArea/DownloadAsset.aspx?id=60129547757
- 27. Robson SJ, Tan WS, Adeyemi A, Dear KB. Estimating the rate of cesarean section by maternal request: anonymous survey of obstetricians in Australia. Birth 2009;36(3):208–12.
- Stavrou EP, Ford JB, Shand AW, Morris JM, Roberts CL. Epidemiology and trends for caesarean section births in New South Wales, Australia: a population-based study. BMC Pregnancy Childbirth 2011;11:8.
- 29. Prosser SJ, Miller YD, Thompson R, Redshaw M. Why 'down under' is a cut above: a comparison of rates of and reasons for caesarean section in England and Australia. BMC Pregnancy Childbirth 2014;14:149.
- 30. Health Stats NSW. Type of birth (vaginal, caesarean, forceps etc) 2001-2015 [cited 2017 Apr 8].
- Available from: http://www.healthstats.nsw.gov.au/Indicator/mab_bth_cat/mab_bth_cat_trend
- 31. Australian Institute of Health and Welfare. National core maternity indicators stage 3 and 4: results from 2010–2013.
- Canberra: AIHW; 2016. (Cat. No. PER 84.) Available from: http://www.aihw.gov.au/publication-detail/?id=60129555634 32. World Health Organization. WHO statement on caesarean section rates. Geneva: WHO; 2015.
- Available from: http://apps.who.int/iris/bitstream/10665/161442/1/WHO_RHR_15.02_eng.pdf?ua=1
- Thompson F, Dempsey K, Mishra G. Trends in Indigenous and non-Indigenous caesarean section births in the Northern Territory of Australia, 1986–2012: a total population-based study. BJOG 2016;123(11):1814–23.
- Einarsdottir K, Haggar F, Pereira G, Leonard H, de Klerk N, Stanley FJ, et al. Role of public and private funding in the rising caesarean section rate: a cohort study. BMJ Open 2013;3(5).
- Dahlen HG, Tracy S, Tracy M, Bisits A, Brown C, Thornton C. Rates of obstetric intervention and associated perinatal mortality and morbidity among lowrisk women giving birth in private and public hospitals in NSW (2000–2008): a linked data population-based cohort study. BMJ Open 2014;4(5):e004551.
- 36. Einarsdottir K, Stock S, Haggar F, Hammond G, Langridge AT, Preen DB, et al. Neonatal complications in public and private patients: a retrospective cohort study. BMJ Open 2013;3(5).

References continued

- McLachlan HL, Forster DA, Davey MA, Farrell T, Gold L, Biro MA, et al. Effects of continuity of care by a primary midwife (caseload midwifery) on caesarean section rates in women of low obstetric risk: the COSMOS randomised controlled trial. BJOG 2012;119(12):1483–92.
- National Health and Medical Research Council. National guidance on collaborative maternity care. Canberra: NHMRC; 2010. Available from: https://www.nhmrc.gov.au/_files_nhmrc/publications/attachments/CP124.pdf
- Tracy SK, Hartz DL, Tracy MB, Allen J, Forti A, Hall B, et al. Caseload midwifery care versus standard maternity care for women of any risk: M@NGO, a randomised controlled trial. Lancet 2013;382(9906):1723–32.
- Schemann K, Patterson JA, Nippita TA, Ford JB, Matha D, Roberts CL. Variation in, and factors associated with, timing of low-risk, prelabour repeat caesarean section in NSW, 2008–2011. Public Health Res Pract 2016;26(1):e2611608.
- 41. Queensland Health. Vaginal birth after caesarean section (VBAC). Queensland clinical guidelines. Brisbane: Queensland Health; 2015. Available from: https://www.health.qld.gov.au/__data/assets/pdf_file/0022/140836/g-vbac.pdf
- 42. Kruske S. The characteristics of culturally competent maternity care for Aboriginal and Torres Strait women. Report prepared on behalf of the Maternity Services Inter-Jurisdictional Committee for the Australian Health Ministers' Advisory Council. Canberra: AHMAC; 2013; Available from: http://www.health.gov.au/internet/main/publishing.nsf/Content/77F5B09BC281577ACA257D2A001EE8CD/\$File/cultur.pdf
- Kildea S, Tracy S, Sherwood J, Magick-Dennis F, Barclay L. Improving maternity services for Indigenous women in Australia: moving from policy to practice. Med J Aust 2016;205(8):374–9.