# Maternal and Perinatal Mortality and Morbidity in Queensland

Queensland Maternal and Perinatal Quality Council Report 2013

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## Queensland Maternal and Perinatal Quality Council Report 2013

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# Preface

The primary purpose of the Queensland Maternal and Perinatal Quality Council is to provide advice and make recommendations to the Minister for Health and the Director-General of the Queensland Department of Health on matters relating to statewide and facility-specific morbidity and mortality. The Council functions under the quality assurance provisions of sections 81-92 of the *Hospital and Health Boards Act 2011*, which enables the Council to undertake confidential enquiries into maternal and perinatal morbidity and mortality while providing members with legislative protection.

This is the third report of the Council since it recommenced activity in mid-2009, after a three year period during which its purpose and functionality were reviewed. This report:

- Reviews maternal deaths in the period 2009 to 2011 in Queensland
- Reviews perinatal deaths in the period 2009 to 2011 in Queensland
- Examines pregnancy and newborn outcomes in the period 2010 to 2011 in Queensland.

The report highlights clinical areas which may benefit from review by practitioners in maternity and newborn facilities, to the ultimate benefit of future mothers and babies.

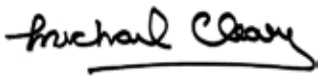
The report contains data obtained from the following sources:

- Perinatal Data Collection Team (PDCT)
- Health Statistics Unit (HSU)
- Australian Institute of Health and Welfare (AIHW)
- Registry of Births, Deaths and Marriages, Queensland
- Office of the State Coroner, Queensland.

The Council is grateful for the cooperation of the Registrar for Births, Deaths and Marriages and the State Coroner who have facilitated access to relevant data.

I would like to thank the Council members, and those who support them, for their commitment to improving maternal and perinatal outcomes. I trust that clinicians throughout Queensland will find this report helpful and ask that they give careful consideration to, in particular, the Council's recommendations and good practice points.

The Department of Health supports the work of the Queensland Maternal and Perinatal Quality Council with the realisation that sound health planning principles need to be based on the best available evidence including analyses of health outcomes by clinical experts such as form the contents of this report. Comments on the findings of this report are welcomed.



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# Foreword

The Queensland Maternal and Perinatal Quality Council (the Council) has completed its second two year term since being reconvened in 2009. In this report, the Council reviews statewide maternity and newborn outcomes between the calendar years 2009 and 2011.

The purpose of the Council is to:

- collect and analyse clinical information regarding maternal and perinatal mortality and morbidity in Queensland to identify statewide and facility-specific trends
- make recommendations to the Minister for Health on standards and quality indicators of maternal and perinatal clinical care to enable health providers in Queensland to improve safety and quality
- assist with the adoption of such standards in both Public and Private sectors.

The Council functions collaboratively with the Statewide Maternity and Neonatal Clinical Network (SMNCN) and a Private Hospitals Maternity Liaison Group (supported by the Private Hospitals Association of Queensland). For more information about the Terms of Reference of the Council visit **www.health.qld.gov.au**

This report examines

- the management of pregnancies, births and newborns in Queensland, including maternal deaths, perinatal deaths and apparent risk factors for such events, and attempts to identify areas of maternal and neonatal care where service providers might focus attention to prevent future deaths and adverse outcomes
- maternal deaths and perinatal deaths between 2009 and 2011, and statewide maternity and neonatal data from 2010 and 2011 with a comparative snapshot of the previous decade wherever those data are available. In Queensland, between 2000 and 2011, 658,105 women gave birth to 669,379 babies. Data regarding these mothers and babies is provided to the Perinatal Data Collection Team (PDCT), Health Statistics Unit (HSU), Department of Health, by midwives, under the Perinatal Statistics provisions of the *Public Health Act 2005* (Chapter 6, Part 1, s214–228). Data provided by PDCT for this report, has been analysed by the Council members.



Examination of issues relating to severe maternal morbidity continues to be challenging with limited resources, and the Council continues to support the Australian Maternity Outcomes Surveillance System (AMOSS) program as the most effective means of such review at this time.

I wish to acknowledge the commitment of Council members, and those who support them, to improving maternal and perinatal outcomes. The close and effective working relationship with the staff of the HSU, Department of Health, is particularly valuable. I trust that all involved in the provision of care to mothers and their babies throughout Queensland will find this report helpful and give careful consideration to the Council's recommendations.

**Professor Michael Humphrey**
**Chair, Queensland Maternal and Perinatal Quality Council**

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## Summary

The report focuses primarily on the 122,150 women who gave birth to 124,211 babies in Queensland between 2010 and 2011, with a comparative review of the previous decade depending upon data availability. To complete the 'catch-up phase' of the Queensland Maternal and Perinatal Quality Council's work after a period of inactivity prior to 2009, it examines maternal deaths and perinatal deaths between 2009 and 2011.

During this time:

- there were 18 deaths of women during pregnancy or within 42 days after their pregnancy—four of which were direct maternal deaths. A further 48 women died between 43 days and 365 days after their pregnancy. Using the International Classification of Diseases, Version 10 (ICD–10) definition of maternal death, the maternal mortality ratio (MMR) in Queensland for these years was 8.1 per 100,000 births. Suicide was the leading cause of death in women, both within 42 days after their pregnancy and between 43 days and 365 days after their pregnancy.
- there were 1954 perinatal deaths, giving a perinatal mortality rate of 10.5 per 1000 births (stillbirth rate 6.8 per 1000 births and neonatal mortality rate (NMR) 3.8 per 1000 live births). Comparison with most recently published Australian data cannot be made directly, as neonatal mortality data was missing from one state in the Australian report[1], and the definitions of perinatal death differ slightly. With those caveats in mind, the perinatal mortality rate (PNMR) for Queensland was close to the Australian rate—the stillbirth rate in Queensland was equivalent to the Australian rate, but the NMR for Queensland was higher than the Australian rate.

The deaths were classified using the Perinatal Society of Australia and New Zealand (PSANZ) perinatal (PSANZ-PDC) and neonatal (PSANZ-NDC) classifications. The most common cause of perinatal death in normally formed term infants was unexplained stillbirth (46.3%) followed by hypoxic peripartum death (16.1%) which includes deaths occurring either intrapartum or in the neonatal period without major pre-existing conditions. This group of deaths may benefit from closer review at both local and state level.

The risk factors for adverse pregnancy outcomes identified in this report, including smoking, overweight and obesity, and living in disadvantage are consistent with those reported in The Lancet Stillbirth Series[2 3]. This series made a specific call to action for high income countries to develop programs to address inequality of health outcomes for women of childbearing age[4].

Indigenous women continue to have higher rates of adverse pregnancy outcomes compared to non-Indigenous women. The overall PNMR is 80% higher for Indigenous women—the neonatal death component is 2.4 times the rate of non-Indigenous women. The main contributor to this disparity relates to preterm birth. However, the relatively higher incidence of neonatal deaths assigned to unknown or undetermined for Indigenous women indicates the need for improvement in data quality.

Smoking throughout pregnancy increases the likelihood of preterm and low birthweight birth, and is associated with a perinatal mortality risk of 14.5 per 1000 births for smokers versus a risk of 9.2 per 1000 births for non-smokers. Smoking throughout pregnancy is significantly more common in young women and Indigenous women.

Almost 50% of the women who gave birth between 2010 and 2011 were overweight or obese, and women in this group were more likely to have a:

- caesarean section birth
- baby weighing more than 4000 grams
- baby who died in the perinatal period.

The safety of interventions for weight loss when a woman is pregnant and obese, for the mother and her baby, is not clear[5]. Prenatal counselling must be seen as vital to this group of women, both for their future pregnancies and for their ongoing life and health expectancy.

1 Li Z, Zeki R, Hilder L & Sullivan EA. (2012). *Australia's mothers and babies 2010*. Perinatal statistics series no. 27. Cat. no. PER 57. Canberra: AIHW National Perinatal Epidemiology and Statistics Unit.

2 Flenady V, Middleton P, et al. (2011). *Stillbirths: the way forward in high-income countries*. Lancet 377(9778): 1703-1717.

3 Flenady V, Koopmans L, et al. (2011). *Major risk factors for stillbirth in high-income countries: a systematic review and meta-analysis*. Lancet 377(9774): 1331-1340.

4 Goldenberg RL, McClure EM, Bhutta ZA, Belizan JM, Reddy UM, Rubens CE, Mabeya H, Flenady V, Darmstadt GL, for The Lancet's Stillbirth Series steering committee. *Stillbirths: the vision for 2020*. Lancet 2011; published online April 14. DOI:10.1016/S0140-6736(10)62235-0).

5 Furber CM, McGowan L, Bower P, Kontopantelis E, Quenby S, Lavender T. (2013). *Antenatal interventions for reducing weight in obese women for improving pregnancy outcome*. Cochrane Database of Systematic Reviews 2013, Issue 1.

Attendance at more than five antenatal visits is less common in Indigenous women. Socio-economic disadvantage—as measured by Socio-economic Indexes for Areas (SEIFA) quintiles—is associated with an increased risk of perinatal death, preterm birth and low birthweight birth. These outcomes are more marked for Indigenous women and their babies. The influence of remoteness of residence of the mother—as measured by Accessibility/remoteness index of Australia (ARIA) score—was less clear.

Between 2000 and 2011, the rate of birth at gestations 37 to 39 weeks has increased significantly (from less than 43% to more than 53%). There has been a concomitant decrease in births at gestations of 40 weeks or more. Overall, there has been little change seen in the rate of birth at less than 37 weeks, though there has been a clear increase in the rate of birth at less than 37 weeks gestation in the private healthcare sector. There is a clear difference in the gestational patterns between public and private healthcare sectors with a marked preponderance for elective caesarean section and, to a lesser degree induction of labour, in the 37 to 39 week gestation period in the private healthcare sector. A significantly higher PNMR is shown for all gestations below 40 weeks in association with elective birth.

Between 2000 and 2011, 56% to 62% of multiple pregnancies ended before 37 weeks gestation. Approximately 4% of births in Queensland are from pregnancies conceived with the aid of assisted conception techniques—28% of multiple pregnancies have been conceived with the aid of assisted conception techniques. Improved extracorporeal techniques for assisted conception have resulted in a steady fall in the rate of multiple pregnancy in association with these techniques, but the same type of improvement has not been seen in relation to the use of ovulation induction and/or artificial insemination.

Since 2005, the frequency of elective caesarean section (20% to 21%) and induction of labour (22% to 23%) have remained steady with pregnancies ending in spontaneous labour in less than 60% of instances. Women being cared for in the public healthcare sector laboured spontaneously in 63% to 65% of pregnancies, while women being cared for in the private healthcare sector laboured spontaneously in 39% to 40% of pregnancies. This disparity between these modes of healthcare delivery is mirrored in the lower rates of induction of labour and elective caesarean section in the public healthcare sector.



Between 2000 and 2011 the rate of unassisted vaginal birth decreased from 65% to 56%, with a concomitant rise in the rate of caesarean section birth from 26% to 34%. A marked disparity is seen between care in the public and private healthcare sectors, with the likelihood of a woman giving birth in the public healthcare sector having an unassisted vaginal birth being approximately 50% higher than a woman in the private healthcare sector. By 2011, almost 50% of women giving birth in the private healthcare sector had a caesarean section birth, while less than one-third of women giving birth in the public healthcare sector had a caesarean section birth.

A small group of care indicators, chosen for relevance by the Council, are examined in this report, with comparison hospitals being grouped in clinically relevant 'hospital/facility' groupings. Women presenting to public hospitals which did not have an established maternity service often presented in preterm labour and the outcomes were often poor. Indicators examining 'selected primigravidae' showed that these women were most likely to have a caesarean section birth in a private facility or in a high-care level public facility. Spontaneous onset of labour and unassisted vaginal birth without major perineal damage (third/fourth degree tear or episiotomy) were less likely in these facilities and more likely in smaller provincial/rural facilities.

Future work and direction of the Council includes:

- implementation of an active Indigenous Perinatal Health Sub-Committee
- potential reporting of facility-specific public hospital indicator outcomes—the Council would be interested in dialogue regarding potential future maternity and newborn care clinical indicators and the manner in which they are reported
- review of 'contributing factors' by the Maternal and Perinatal Mortality Sub-Committees
- piloting of the revised National Maternal Mortality Advisory Committee's *Maternal Death Reporting form* by the Maternal Mortality Sub-Committee, subsequent to proposed changes to the *Public Health Act 2005* which will mandate reporting of maternal deaths[6]
- examination of the potential for development of a Queensland Congenital Anomaly Register by the Congenital Anomaly Sub-Committee.

6 Recommendation five, QMPQC report 2011: Legislative change to the Public Health Act 2005, with reference to a requirement for all deaths of women during pregnancy or within one year of the end of a pregnancy being reported via the PDCT, is necessary to improve the quality of information available for review of the causation of deaths and the possible presence of avoidable factors.

## Recommendations

The Council recommends (not in any order of priority):

1. all frontline clinicians (e.g. medical officers, nurses and bereavement support personnel) involved in Queensland hospital maternity and newborn services attend the IMPROVE program to enhance optimal clinical practice around the time of a perinatal death according to the PSANZ Perinatal Mortality Guidelines (see Section 1.3.4)
2. that the SMNCN seeks assistance from the Royal Australian and New Zealand College of Obstetricians and Gynaecologists (RANZCOG) and other relevant professional bodies to examine the possible development of a small number of obstetric services which retain, preserve and teach the obstetric skill of vaginal breech birth (see Section 2.8)
3. that the HSU considers progressing a recommendation through the appropriate mechanisms of government to Council of Australian Governments (COAG), to develop an indicator relating to gestation at birth (e.g. less than 37 weeks gestation) in addition to the indicator relating to Indigenous baby birthweight. The Indigenous baby birthweight indicator may be more valuable if calculated for gestation equal to 37 or more weeks, tracking near-term intrauterine growth restriction (see Section 2.9.1).
4. that the Department of Health ensures no further rural maternity services close, and actively seeks to open/re-open rural maternity services where possible (see Section 4).
5. that future Council reports examine clinical indicators, such as those in this report, by individual hospital/facility (see Section 4).

## Good practice points

The Council commends the following clinical practice improvement 'good practice points' to clinicians:

- Women with a history of serious mental illness (e.g. schizophrenia, bipolar affective disorder, schizoaffective disorder) should routinely be offered mental health follow-up for at least the first 12 months post-partum (see Section 1.2.7).
- Practitioners referring women for termination of pregnancy or undertaking termination of pregnancy should ensure adequate follow-up for such women, especially if the procedure is undertaken for mental health concerns (see Section 1.2.7).
- Mental health screening is performed almost universally in the public healthcare sector, but less so in the private healthcare sector. Use of the Edinburgh postnatal depression score (EPDS) in the private healthcare sector may help to identify women who warrant further follow-up (see Section 1.2.7).
- A rise in blood pressure during antenatal care needs careful evaluation and review. This is particularly important in women with gestational diabetes, who are at an increased risk of developing pre-eclampsia (see Section 1.2.8).
- Hypertension in labour needs to be actively managed, even if the aetiology of the hypertension is not clearly apparent (see Section 1.2.8).
- Vaginal bleeding in pregnancy warrants a careful history and examination, including visualising the cervix, rather than replacing these procedures with an ultrasound scan alone (see Section 1.2.9).
- Post-partum thromboprophylaxis in high risk women should be continued for six weeks. The finding of ovarian vein thrombosis is an indication for full anticoagulation in the post-partum period (see Section 1.2.9).
- Multiple presentations post-partum need to be thoroughly assessed and reviewed at a senior level even if the pregnancy and birth were uncomplicated (see Section 1.2.9).

**Good practice points** *continued*

- Autopsy should be undertaken whenever possible after a maternal death, even if a coronial autopsy is not ordered, because inheritable conditions may be discovered (see Section 1.2.11).
- All perinatal deaths should be investigated comprehensively according to the *PSANZ Perinatal Mortality Guidelines* despite the presence of a presumed cause of death (see Section 1.3.8).
- Following a perinatal death, all parents should be offered the option of an autopsy examination. The Council strongly encourages requesting placental histopathology in every case of stillbirth, neonatal death and high risk newborn according to the PSANZ Perinatal Mortality Guidelines. Placentas should be sent to pathology fresh and un-fixed (see Section 1.3.3).
- Determining the accuracy of completion of the death certificates, and submitting amendments when required, should be a routine part of local perinatal mortality committee review of all perinatal deaths. Parents should be informed of this outcome prior to receiving a revised death certificate (see Section 1.3.3).
- Elective repeat caesarean section and induction of labour before 39 weeks of gestation are common, yet are associated with respiratory and other adverse neonatal outcomes. Elective intervention in pregnancy before 39 weeks of gestation should be avoided wherever possible (see Section 2.3).
- Maternity care providers should provide clear information to women carrying multiple pregnancies regarding the risk of preterm labour, and steps that should be taken in the event that a woman carrying a multiple pregnancy suspects the onset of preterm labour (see Section 2.5).
- Given the unchanging risks of multiple pregnancy occurring in association with ovulation induction and the consequent risk of adverse outcomes due to the multiple pregnancies, the same attention to technique monitoring and quality improvement as has been seen with extracorporeal techniques is recommended to those prescribing ovulation induction (see Section 2.6).
- Smoking cessation programs as part of routine antenatal care reduce fetal exposure to cigarette smoke, low birthweight and preterm birth, and should form part of routine antenatal care. Specialised programs to assist Indigenous women to stop smoking before and during pregnancy should be prioritised (see Section 2.10.5).
- Where maternal risk factors, such as advanced maternal age, obesity and smoking are identified, clinicians should provide clear information to the woman regarding those risks and their implications. Whilst specific recommendations may be required regarding an appropriate level of facility care, such recommendations must be consistent with continuing provision of non-fragmented models of care with a defined primary care giver (see Section 2.10).
- Maternity services are encouraged to be continuously aware of their own performance by monitoring against relevant indicators and to readily make this information available to staff and to consumers of their care (see Section 4).

# 1. Maternal and perinatal mortality

## 1.1 Definitions

The Council uses the following definitions.

**Fetal deaths (known as stillbirth)**

Defined by the *Registration of Births, Deaths and Marriages Act 2003* as:

*a child who has shown no sign of respiration or heartbeat, or other sign of life, after completely leaving the child's mother; and who has been gestated for 20 weeks or more, or weighs 400 grams or more.*

**Livebirths**

Defined by the *Public Health Act 2005* as:
*a baby whose heart has beaten after delivery of the baby is completed.*

Birthweight and gestation are not included in this definition. Therefore, in this report, deaths of liveborn babies where both the birthweight is less than 400 grams and/or the gestation is less than 20 weeks, and deaths of liveborn babies when the birthweight and gestational age are unknown, are included as neonatal deaths.

**Neonatal deaths**

*Neonatal deaths are those occurring in live births within the first 28 days of life.*

**Mothers**

The number of mothers is defined as:
*the number of women having a pregnancy which resulted in a livebirth or fetal death.*

**Maternal death**

A maternal death is defined by the World Health Organization (WHO) as:
*the death of a woman while pregnant or within 42 days of termination of pregnancy, irrespective of the duration and the site of the pregnancy, from any cause related to or aggravated by the pregnancy or its management.*

This definition excludes deaths from accidental or incidental causes.

**Maternal mortality ratio**

The maternal mortality ratio (MMR) is defined as: $\frac{\textit{Number of maternal deaths}}{\textit{Number of mothers}} \times 100{,}000$

The definitions used by the Council in this report include, in addition to the WHO definition, incidental deaths and deaths occurring more than 42 days after termination of the pregnancy[7].

**Late maternal death**

*Death of a woman within one year of giving birth or otherwise ending a pregnancy.*

These deaths are not included in the calculation of the MMR.

**Classification of maternal deaths**

***Direct deaths** are those which result from obstetric complications of the pregnant state (pregnancy, labour and puerperium), including deaths from interventions, omissions, inappropriate treatment, or from a chain of events resulting from any of the above. They are complications of the pregnancy itself.*

***Indirect deaths** are those which result from pre-existing disease or disease that developed during pregnancy and was not due to direct obstetric causes, but which may have been aggravated by physiological effects of pregnancy.*

***Incidental deaths** are those due to conditions occurring during pregnancy, where the pregnancy is unlikely to have contributed significantly to the death, although it is sometimes possible to postulate a distant association.*

7 Maternal Mortality Working Party, NHMRC. Report on Maternal Deaths in Australia 1991-93. Canberra: NHMRC.

## 1.2 Maternal deaths

### 1.2.1 Maternal mortality ratio (MMR)

For comparison purposes, data presented in this section uses the ICD–10/WHO definition of maternal death.

Table 1: Maternal mortality ratios, Queensland and Australia 2000 to 2011
(ICD–10/WHO definition of maternal death—Australian MMR for 2006 to 2010)

| Trienium | Direct | Indirect | Number of women who gave birth | MMR Queensland | MMR Australia |
|---|---|---|---|---|---|
| 2000–02 | 8 | 10 | 145,756 | 12.3 | 11.1 |
| 2003–05 | 9 | 12 | 153,900 | 13.6 | 8.4 |
| 2006–08 | 6 | 7 | 175,275 | 7.4 | 6.8 |
| 2009–11 | 4 | 12 | 183,174 | 8.7 | |

The most recent maternal death data for Australia (2006 to 2010) shows a national MMR of 6.8 per 100,000 births[8]. The Queensland MMR for this same period is 8.1 per 100,000 births. The difference between these two rates is not statistically significant (The Queensland versus Australia risk ratio for maternal mortality RR = 1.18, 95% confidence limits = 0.76, 1.85).

### 1.2.2 Classification of cause of maternal deaths 2009 to 2011

In the remainder of this chapter (1.2 Maternal deaths) the broader Council definition of maternal death is used, including incidental and late maternal deaths.

Table 2: Classification of maternal deaths in Queensland, 2009 to 2011
*(includes incidental and late maternal deaths)*

| Maternal death timing | Total | Classification |
|---|---|---|
| Deaths during pregnancy | 3 | 3 (indirect) |
| Deaths within 42 days of their pregnancy | 15 | 4 (direct)<br>9 (indirect)<br>2 (incidental) |
| Deaths between 43 days and 365 days after their pregnancy | 48 | |
| Total | 66 | |

### 1.2.3 Cause of maternal death

Table 3: Cause of maternal deaths in Queensland, during pregnancy or within 42 days after their pregnancy, 2009 to 2011

| Classification | Cause of death | Number |
|---|---|---|
| Direct deaths | Thromboembolism | 1 |
| | Amniotic fluid embolism | 1 |
| | Haemolysis, elevated liver enzymes, low platelet count (HELLP) syndrome | 1 |
| | Sepsis secondary to acute cholecystitis | 1 |
| Indirect deaths | Suicide | 4 |
| | Intracerebral haemorrhage | 2 |
| | Intractable intracerebral hypertension | 1 |
| | Ruptured splenic artery aneurysm | 1 |
| | Ruptured thoracic aortic dissection | 1 |
| | Arrhythmic cardiovascular death | 1 |
| | Influenza B | 1 |
| | Homicide | 1 |
| Incidental deaths | Motor vehicle trauma | 2 |

8 Maternal Deaths Australia 2006–10. Australian Institute of Health and Welfare (AIHW) National Perinatal Statistics Unit.

Table 4: Cause of maternal deaths in Queensland, between 43 and 365 days after their pregnancy, 2009 to 2011

| Cause of death | Number |
|---|---|
| Suicide | 15 |
| Malignancy | 9 |
| Trauma - Motor vehicle trauma | 8 |
| Trauma – Hit by train | 1 |
| Homicide | 3 |
| Drug overdose / toxicity | 3 |
| Suspected accidental poisoning | 1 |
| Diabetic keto-acidosis | 1 |
| Drowning | 1 |
| Anaphylaxis complicating care for rheumatic valvular disease | 1 |
| Aspiration pneumonitis secondary to poorly controlled epilepsy | 1 |
| Hypoxic Ischemic Encephalopathy secondary to poorly controlled epilepsy | 1 |
| Asthma | 1 |
| Cerebral infarct secondary to infective endocarditis | 1 |
| Coronary thrombosis | 1 |

### 1.2.4 Avoidability

Table 5: Avoidable factors in maternal deaths in Queensland during pregnancy or within 365 days after their pregnancy 2009 to 2011

| | |
|---|---|
| Potentially avoidable—sub-optimal healthcare | 3 |
| Possibly avoidable | 2 |
| No structured follow up identified post-termination of pregnancy (post-top) | 1 |
| Inadequate maternal engagement with appropriate healthcare | 2 |
| No avoidable factors identified | 55 |
| Unable to determine | 3 |



### 1.2.5 Data collection and quality

Data regarding the maternal deaths available to the Maternal Mortality Sub-Committee, of the Council, was extremely variable, as noted in its previous report. In all cases of death of a woman within one year of ending a pregnancy, the Council chair approached the health practitioner with primary responsibility of the care of that woman, seeking case notes. While many responded well to such requests, some responded with minimal information and some refused to co-operate at all. Excellent assistance was provided by the Office of the State Coroner and the Queensland Forensic and Scientific Services.

### 1.2.6 Reporting of maternal deaths

The Maternal Mortality Sub-Committee was unable to access all data potentially relevant to some of the maternal deaths despite requests for co-operative assistance from relevant health professionals. The Council looks forward to proposed changes to the *Public Health Act 2005* in 2013 will mandate reporting by health professionals[9].

### 1.2.7 Deaths of Aboriginal and Torres Strait Islander women

- 15 out of 66 women who died during pregnancy or within one year after their pregnancy were Aboriginal and/or Torres Strait Islander women (Relative risk (RR) 4.84, 95% confidence limits 2.72, 8.61).
- 2 of the 14 women who died during pregnancy or within 42 days after their pregnancy were Aboriginal and/or Torres Strait Islander women (Aboriginal and/or Torres Strait Islander MMR = 19.1, non-Indigenous MMR = 8.1—this difference is not statistically significant.
- 13 of the 50 women who died between 43 and 365 days after their pregnancy were Aboriginal and/or Torres Strait Islander women.

9 Recommendation five, QMPQC report 2011: Legislative change to the *Public Health Act 2005* with reference to a requirement for all deaths of women during pregnancy or within one year of the end of a pregnancy being reported via the PDCT is necessary to improve the quality of information available for review of the causation of deaths and the possible presence of avoidable factors.

### 1.2.8 Suicide

Suicide is the leading cause of death in women within 42 days after their pregnancy and between 43 days and 365 days after their pregnancy. There appears to be a significant worldwide risk of maternal suicide following termination of pregnancy and, in fact, a higher risk than that following term delivery.

The potential for depression and other mental health issues at this time needs to be better appreciated. Active follow-up of these women needs to happen. Practitioners referring women for termination of pregnancy or undertaking termination of pregnancy should ensure adequate follow up for such women, especially if the procedure is undertaken for mental health concerns.

**Good practice points**

- Women with a history of serious mental illness (e.g. schizophrenia, bipolar affective disorder, schizoaffective disorder) should routinely be offered mental health follow-up for at least the first 12 months post-partum.
- Practitioners referring women for termination of pregnancy or undertaking termination of pregnancy should ensure adequate follow-up, especially if the procedure is undertaken for mental health concerns.
- Mental health screening is performed almost universally in the public healthcare sector, but less so in the private healthcare sector. Use of the EPDS in the private sector may help to identify women who warrant further follow-up.

*Beyond Blue's Clinical Practice Guidelines*[10], recommend that:

- the EPDS should be used by health professionals as a component of the assessment of all women for symptoms of depression in the antenatal period
- the EPDS should be used by health professionals as a component of the assessment of all women in the postnatal period for symptoms of depression or co-occurring depression and anxiety
- a score of 13 or more can be used for detecting symptoms of major depression in the postnatal period.



### 1.2.9 Maternal cardiac disease

There has been a substantial fall in the number of maternal deaths due to cardiovascular disease when compared to recent previous reports. It remains to be seen whether this is a consistent trend, but given the recommendations of the last report[11], and the recognised importance of maternal heart disease as a cause of death, the findings of this report are very welcome.

### 1.2.10 Hypertension in pregnancy

Recognition of the significance of and management of hypertension complicating pregnancy was a feature of several deaths.

**Good practice points**

- A rise in blood pressure during antenatal care needs careful evaluation and review. This is particularly important in women with gestational diabetes, who are an increased risk of developing pre-eclampsia.
- Hypertension in labour needs to be actively managed, even if the aetiology of the hypertension is not clearly apparent.

10 Austin M-P, Highet N and the Guidelines Expert Advisory Committee. (2011). *Clinical practice guidelines for depression and related disorders—anxiety, bipolar disorder and puerperal psychosis—in the perinatal period. A guideline for primary care health professionals*. Melbourne: beyondblue: the national depression initiative.

11 Recommendation two, QMPQC report 2011: When pregnant women present with common symptoms, such as chest pain, palpitations, syncope and shortness of breath, there should be a low threshold for considering significant cardiovascular disease and referral for specialist opinion and investigation within a clinically appropriate time frame.

### 1.2.11 Other clinical issues raised by case review

A report of this type does not allow for detailed discussion of individual case management. However, the Maternal Mortality Sub-Committee noted several areas of concern.

**Good practice points**

- Vaginal bleeding in pregnancy warrants a careful history and examination, including visualising the cervix, rather than replacing these procedures with an ultrasound scan alone.
- Post-partum thromboprophylaxis in high risk women should be continued for six weeks. The finding of ovarian vein thrombosis is an indication for full anticoagulation in the post-partum period.
- Multiple presentations post-partum need to be thoroughly assessed and reviewed at a senior level even if the pregnancy and birth were uncomplicated.

### 1.2.12 Malignant melanoma

The Maternal Mortality Sub-Committee noted a total of eight women died within one year after their pregnancy between 2004 and 2011 (three between 2009 and 2011 covered by this report). Further study of the rate and risk of malignant melanoma deaths in relation to pregnancy is being considered.

### 1.2.13 Autopsies following maternal death

Table 6: Incidence of autopsy being performed in maternal deaths, Queensland 2009 to 2011

| | Deaths | Autopsies |
|---|---|---|
| Total deaths between 2009 and 2011 | 66 | 51 (77.3%) |
| Deaths meeting ICD–10 definition of maternal death | 16 | 13 (81.3%) |
| Deaths not due to advanced malignancy | 57 | 51 (89.5%) |

The Maternal Mortality Sub-Committee noted some instances where autopsy was not performed, but where diagnosis confirmation would have been wise and where information about potential inheritable conditions may have been found.

**Good practice point**

- Autopsy should be undertaken whenever possible, even if a coronial autopsy is not ordered, because inheritable conditions may be discovered.

## 1.3 Perinatal deaths

### 1.3.1 Perinatal mortality review modus operandi

All perinatal deaths in Queensland are subject to a systematic review. Perinatal mortality data has been obtained from the PDCT and the Registry of Births Deaths and Marriages, and case summaries from hospital and regional perinatal mortality committees in Queensland. A number of local perinatal mortality committees collaborated with the Council in the perinatal mortality review process, submitting confidential case summaries and classifications.

### 1.3.2 Clinical classification

The Council has adopted the PSANZ classification system, including the PSANZ-PDC and PSANZ-NDC[12], and all perinatal deaths in Queensland are classified accordingly. The system has been shown to perform well against other contemporary systems[13]. The purpose of classifying deaths according to the PSANZ system is to identify preventable factors associated with perinatal death, through the systematic application of clinically relevant categories to large populations.

12 Chan A, King J, Flenady V, Haslam R, Tudehope D. (2004). *Classification of perinatal deaths: development of the Australian and New Zealand Classifications*. J Paediatr. Child Health. Jul; 40(7):340–7.

13 Flenady V, Frøen JF, Pinar H, Torabi R, Saastad E, Guyon G, Russell L, Charles A, Harrison C, Chauke L, Pattinson R, Koshy R, Bahrin S, Gardener G, Day K, Petersson K, Gordon A, Gilshenan K. (2009). *An evaluation of classification systems for stillbirth. BMC Pregnancy Childbirth.*9:24.

### 1.3.3 Data collection and data quality

The data used to assist in classification of perinatal deaths by the Council's Perinatal Mortality Sub-Committee was sourced from:

- MR63D perinatal data collection forms, which are completed by all maternity hospitals in Queensland and forwarded to the PDCT. The MR63D form (a potentially rich data source containing over 50 data fields) is used to supply information to the National Perinatal Epidemiology and Statistics Unit (NPESU) and can also be used for benchmarking and other research projects.
- the Medical Certificate of Cause of Perinatal Death (Forms 9 and 9A).
- The National Perinatal Death Clinical Audit Tool (NPDCAT) summaries received and discharge summaries (where available) from hospitals
- pathology reports, including autopsy and placental pathology, cytogenetics.

During the course of review of perinatal deaths, the sub-committee's ability to classify cause of death accurately was often limited due to inadequate investigation and conflicting or lacking information in the materials provided. Low autopsy rates continue to pose a major limitation.

Placental pathology, which is an essential component of investigation protocol for stillbirths and neonatal deaths, was often not performed in cases of death where this examination may have provided the only lead to reasons for the death. Despite a presumed cause of death, placental pathology should be undertaken for all stillbirths and also for births of infants at increased risk of neonatal death. Placental histopathology remains a cornerstone investigation of perinatal death and other poor pregnancy outcomes.

The overall autopsy rate has remained relatively constant at 30%. This rate is disappointingly low. Autopsy remains the gold standard investigation and appropriate counselling should be provided to all parents following a stillbirth or neonatal death about the option of a high quality autopsy[14]. Parents should be made aware that important information about the cause of death may be missed if an autopsy is not performed. Unfortunately, insufficient number of pathologists with expertise in perinatal autopsy in Queensland is an impediment to quality and reporting. Delays in receiving autopsy reports of six months or more are not uncommon in Queensland.



**Good practice point**

- Following a perinatal death, all parents should be offered the option of an autopsy examination. The Queensland Maternal and Perinatal Quality Council strongly encourages requesting placental histopathology in every case of stillbirth, neonatal death and high risk newborn according to the *PSANZ Perinatal Mortality Guidelines*[15]. Placentas should be sent to pathology fresh and un-fixed.

The need for high quality perinatal autopsies, performed by pathologists with specialised paediatric and perinatal training, and experience is emphasised. This is of particular importance at a time of potential changes in the structure and delivery of health services. The necessity for training, retaining, and supporting pathologists with expertise in perinatal autopsy procedures is highlighted. Recognition of the need for continued investment of time and resources is required for maintenance of accessible, sustainable, tertiary level post-mortem services. Perinatal post-mortem services are largely restricted to the public healthcare sector. Access to perinatal post-mortem services and out-of-pocket costs are significant barriers to bereaved parents in the private healthcare sector seeking perinatal post-mortem services.

Death certificate data are notoriously inaccurate worldwide[16] and, in Australia, it is largely attributed to the policy of completing the death certificate at the time of a perinatal death prior to full investigation and review of the death. The Perinatal Mortality Sub-Committee found the information on death certificates was often inaccurate. Common errors included administrative aspects due to lack of knowledge of the requirements and assigned cause of death. The Perinatal Mortality Sub-Committee is undertaking a detailed review of death certificates to identify areas for clinician education to improve accuracy of this information. Following review and classification of perinatal deaths, clinicians are encouraged to submit a revised death certificate where information is found to be inaccurate for re-issuing to the parents. Parents should be contacted prior to receiving a revised death certificate to inform them of this outcome.

14 Flenady V, King J, Charles A, et al. (2009). *Clinical practice guideline for perinatal mortality*. Version 2.2 April. www.psanz.org.au Accessed August 2011

15 PSANZ Clinical Practice Guideline for Perinatal Mortality, Chapter 4 – Perinatal post-mortem examination. www.stillbirthalliance.org.au/guideline1.htm

16 Kirby RS. (1993). "The coding of underlying cause of death from fetal death certificates: issues and policy considerations." Am J Public Health. 83: 1088-91

**Good practice point**

- Determining the accuracy of completion of the death certificates, and submitting amendments when required, should be a routine part of local perinatal mortality committee review of all perinatal deaths. Parents should be informed of this outcome prior to receiving a revised death certificate.

### 1.3.4 The Improving Perinatal Review and Outcomes Via Education program

The Improving Perinatal Review and Outcomes Via Education (IMPROVE) program has been well received across Queensland. Throughout the conduct of these workshops it has become clear that the program addresses a real gap in knowledge and expertise for many frontline clinicians when caring for parents following a perinatal death. Continuation of this program is crucially important to ensure optimal bereavement care and to illustrate and explain the advantages of a thorough investigation of every perinatal death, particularly autopsy, and to better equip clinicians with appropriate information and skills for counselling parents regarding their decision on autopsy.

Through one-off funding made available by the Maternity Unit, Primary, Community and Extended Care Branch, Department of Health, the program, based on the *PSANZ Perinatal Mortality Guidelines*, was made available to clinicians providing maternity care in the larger Queensland maternity hospitals.

Between January 2010 and December 2012, 18 IMPROVE workshops were conducted in Queensland:
- Mater Mothers' Hospital (3)
- Gold Coast Hospital (2)
- Ipswich Hospital (2)
- Royal Brisbane and Women's Hospital (2)
- Cairns Base Hospital
- Logan Hospital
- Mackay Base Hospital
- Roma Hospital
- Rockhampton Base Hospital
- The Townsville Hospital
- Toowoomba Hospital.

A total of 441 participants attended these workshops:
- medical staff (23%)
- midwives (63%)
- nurses (4.2%)
- other (9.8%).

In Queensland, the program is currently offered on a fee for service basis which may result in suboptimal coverage. Continuation of this program is important to ensure high quality investigation and audit of all perinatal deaths and optimal care for women, their partners and families who experience this loss.

Further information on the program can be found at **www.stillbirthalliance.org.au**

**Recommendation**

- It's strongly recommended that all frontline clinicians (medical officers, nurses and bereavement support personnel) involved in Queensland hospital maternity and newborn services attend the program to enhance optimal clinical practice around the time of a perinatal death according to the *PSANZ Perinatal Mortality Guidelines*.

### 1.3.5 National Perinatal Death Clinical Audit Tool

The Council is participating in pilot testing a new national form for reporting perinatal deaths developed by the PSANZ. The overarching purpose of the form is to improve the quality of information on perinatal deaths to enhance hospital committee review and national reporting through relevant health department committees, such as the Council. The form has been developed in collaboration with National Perinatal Statistics Unit (NPESU) and the Perinatal Maternal Mortality Review Committee (PMMRC) in New Zealand. To enable comparisons, the form is almost identical to that used by the PMMRC.

Hospital committees are asked to submit the completed form, which can be accessed on the Council website (**www.health.qld.gov.au**) following review of each perinatal death. Through a National Health and Medical Research Council (NHMRC) funded study, the form will be piloted as an online tool in 27 hospitals in Queensland and across Australia (see Appendix 2).

### 1.3.6 Definitions of perinatal deaths

Comparison with Australia-wide data needs to be undertaken carefully, as the AIHW and the Australian Bureau of Statistics (ABS) uses different perinatal death definitions in the National Perinatal Data Collection (NPDC) to those found in the Queensland legislation.

The AIHW *Australia's Mothers and Babies series* states:

> *In Australia, all fetal and neonatal deaths of at least 400 grams birthweight or, if birthweight is unavailable, a gestational age of at least 20 weeks should be registered.*

The NPDC restricts the inclusion of live births to those of at least 400 grams birthweight.

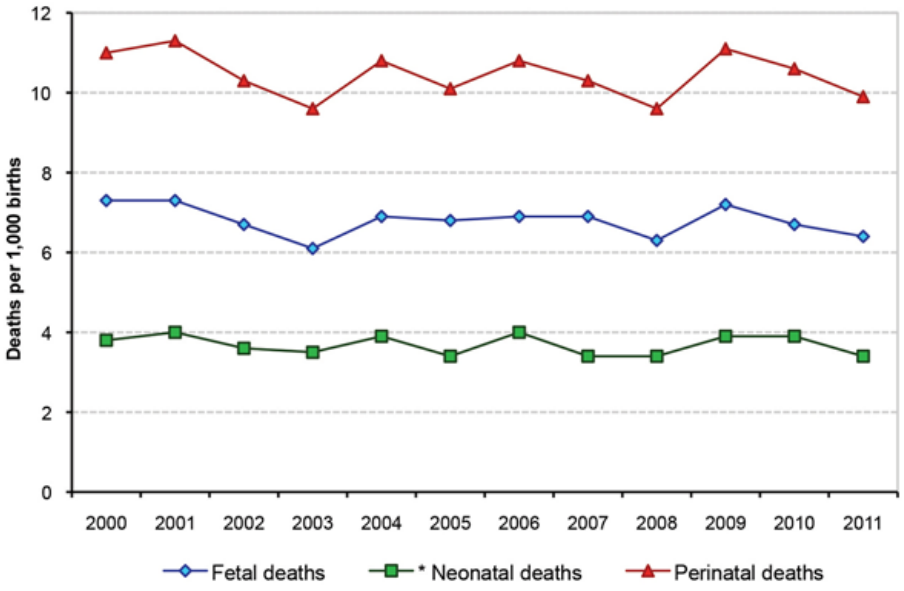
Queensland legislation applies different definitions (see Section 1.1) such that live born babies where the birthweight is less than 400 grams and/or the gestation is less than 20 weeks, and deaths of liveborn babies when the birthweight and gestational age are unknown, are included.

### 1.3.7 Perinatal mortality rates and trends

Table 7: Stillbirth, neonatal and perinatal death rates, Queensland 2009 to 2011
*(see Section 1.1 for definitions of neonatal deaths and stillbirths)*

| Year | Total births | Live births | Stillbirths | | Neonatal deaths | | Perinatal deaths | |
|---|---|---|---|---|---|---|---|---|
| | | | n | Rate (per 1,000 births) | n | Rate (per 1,000 live births) | n | Rate (per 1,000 births) |
| 2009 | 62,052 | 61,605 | 447 | 7.2 | 239 | 3.9 | 686 | 11.1 |
| 2010 | 62,032 | 61,619 | 413 | 6.7 | 242 | 3.9 | 655 | 10.6 |
| 2011 | 62,179 | 61,778 | 400 | 6.4 | 213 | 3.4 | 613 | 9.9 |
| **Total** | **186,263** | **185,002** | **1260** | **6.8** | **694** | **3.8** | **1954** | **10.5** |

Figure 1: Perinatal mortality rates, Queensland 2000 to 2011 (*neonatal mortality rates are per 1000 live births)
*see Section 1.1 for definitions of neonatal deaths and stillbirths)*




The most recent year of publication of Australia-wide data AIHW *Australia's Mothers and Babies 2010*[17] shows the Australian PNMR for 2010 was 9.3 deaths per 1000 births, with the stillbirth rate 7.4 deaths per 1000 births and the NMR 2.9 per 1000 live births.

17 Li Z, Zeki R, Hilder L & Sullivan EA. (2012). *Australia's mothers and babies 2010*. Perinatal statistics series no. 27. Cat. no. PER 57. Canberra: AIHW National Perinatal Epidemiology and Statistics Unit.

Applying the standard definition used by ABS and AIHW of all fetal and neonatal deaths of at least 400 grams birthweight or, if birthweight is unavailable, a gestational age of at least 20 weeks, and using the statistical comparator for Queensland of the remainder of Australia minus one state for which neonatal mortality data was missing:

- the PNMR for Queensland was 10.4 deaths per 1000 births versus 9.4 deaths per 1000 births (RR = 1.11, 95% confidence limits 1.01, 1.22)
- the stillbirth rate for Queensland was 6.7 deaths per 1000 births versus 6.9 deaths per 1000 births (RR = 0.96, 95% confidence limits 0.86, 1.07)
- the NMR for Queensland was 3.8 deaths per 1000 births versus 2.5 deaths per 1000 births (RR = 1.54, 95% confidence limits 1.31, 1.81).

The PNMR for public hospital and private hospital modes of healthcare delivery are seen in Table 8. The differential in rates has multiple explanations, including differences in acuity of care needed, gestation and birth weight limits, and maternal profiles (see Tables 26 to 28).

Table 8: Perinatal mortality rates by facility type, Queensland 2009 to 2011

| | Perinatal deaths | | Stillbirths | | Neonatal deaths | |
|---|---|---|---|---|---|---|
| | n | PNMR | n | SBR | n | NMR |
| Public hospital care | 1,591 | 12.2 | 1,025 | 7.9 | 566 | 4.4 |
| Private hospital care | 361 | 6.5 | 233 | 4.2 | 128 | 2.3 |
| Care mode not stated | 2 | 7.2 | 2 | 7.2 | 0 | - |
| **Total** | **1,954** | **10.5** | **1,260** | **6.8** | **694** | **3.8** |

*PNMR = perinatal mortality rate per 1000 births / SBR = stillbirth rate per 1000 births / NMR = neonatal mortality rate per 1000 live births*

### 1.3.8 PSANZ-PDC and PSANZ-NDC classification of perinatal deaths

Between 2000 and 2011, the main causes or important contributing conditions of perinatal deaths, according to the PSANZ-PDC and PSANZ-NDC classification, are shown in Tables 9 and 10, and Figures 2 to 4. Detailed sub-classifications are found in Tables 31 and 32.

The overall PNMR between 2009 and 2011 was 10.5 per 1000 births—1954 of the 186,262 babies born in this period (see Table 8). Almost two-thirds (1260) of these perinatal deaths were stillbirths (64.5%), and the remaining 694 babies (35.5%) died in the newborn period.

Tables 9 and 10 show the classification of perinatal deaths by PSANZ-PDC and PSANZ-NDC classifications (see Section 1.3.2). Tables 30 and 31 show the classifications in greater detail.

The principal PSANZ-PDC categories for perinatal deaths were congenital abnormality (26.7%), spontaneous preterm (24.6%) and unexplained antepartum death (19.7%) (see Figure 2 and Tables 9 and 10).

The most frequent categories of the PSANZ-PDC for stillbirths, accounting for almost 70% of these deaths, were unexplained antepartum death (30.6%), congenital abnormality (25.0%), and spontaneous preterm (13.9%). No obstetric antecedent was identified in 2.6% of stillbirths (see Figure 3).

Neonatal deaths were classified by both PSANZ-PDC and PSANZ -NDC. The main categories of the PSANZ-PDC were spontaneous preterm (43.9%) and congenital abnormality (29.7%) with no obstetric antecedent found in 7.1% (see Figure 4). The major categories according to the PSANZ-NDC were extreme prematurity (36.2%) and congenital abnormality (29.1%) (see Figure 5).

The major subcategories of the congenital abnormality category according to the PSANZ-PDC were, for stillbirths and neonatal deaths respectively:

- chromosomal 8% and 4%
- central nervous system 7% and 3.9%
- cardiovascular 3.2% and 7.2%.

In the majority (62.5%) of perinatal deaths assigned to the category of spontaneous preterm, chorioamnionitis was either clinically suspected or confirmed on histopathology of the placenta. In 17.5%of these perinatal deaths, either no placental histopathology was undertaken or it was unknown whether this was performed.

Of unexplained stillbirths (unexplained antepartum death), 42 (10.%) of the 385 were associated with significant placental insufficiency (see Table 30, Category 10.1) and according to other approaches to classification internationally (Froen[18], Korteweg[19]) would be classified as a placental pathology cause of death rather than unexplained. Further, in 56 (14.5%) of these apparently unexplained deaths, placental histopathology was either not performed or unknown whether it was performed.

As placental pathology is a crucially important investigation for stillbirths, it could be argued that causes in these cases should be classified as 'unclassifiable' rather than 'unexplained'.

Removing the 'unclassifiable' and the placental insufficiency groups reduces the unexplained stillbirth proportion to 22.7% (rather than 30.6%). Including an autopsy examination as part of the criteria for assignment of the unexplained antepartum stillbirth category may reduce this further.

Revisions to the PSANZ–PDC definition of the unexplained antepartum death category to clearly identify the 'true' proportion of 'unexplained' is currently being considered by the PSANZ Perinatal Mortality Group.

Further, the proportion of the 'unexplained' stillbirth group where a placental pathology report was not available at the time of classification indicates room for improvement in standards of investigation and audit of stillbirths.

Table 9: Perinatal deaths by type and PSANZ-PDC, Queensland 2009 to 2011

| | Type of perinatal death | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Stillbirth | | | Neonatal death | | | Perinatal death | | |
| **PSANZ-PDC classification** | **n** | **%** | **Rate[1]** | **n** | **%** | **Rate[2]** | **n** | **%** | **Rate[1]** |
| 1. Congenital abnormality | 315 | 25.0 | 1.7 | 206 | 29.7 | 1.1 | 521 | 26.7 | 2.8 |
| 2. Perinatal infection | 36 | 2.9 | 0.2 | 10 | 1.4 | 0.1 | 46 | 2.4 | 0.2 |
| 3. Hypertension | 35 | 2.8 | 0.2 | 12 | 1.7 | 0.1 | 47 | 2.4 | 0.3 |
| 4. Antepartum haemorrhage | 76 | 6.0 | 0.4 | 36 | 5.2 | 0.2 | 112 | 5.7 | 0.6 |
| 5. Maternal conditions | 21 | 1.7 | 0.1 | 4 | 0.6 | 0.0 | 25 | 1.3 | 0.1 |
| 6. Specific perinatal conditions | 105 | 8.3 | 0.6 | 25 | 3.6 | 0.1 | 130 | 6.7 | 0.7 |
| 7. Hypoxic peripartum deaths | 19 | 1.5 | 0.1 | 34 | 4.9 | 0.2 | 53 | 2.7 | 0.3 |
| 8. Fetal growth restriction | 60 | 4.8 | 0.3 | 13 | 1.9 | 0.1 | 73 | 3.7 | 0.4 |
| 9. Spontaneous preterm | 175 | 13.9 | 0.9 | 305 | 43.9 | 1.6 | 480 | 24.6 | 2.6 |
| 10. Unexplained antepartum death | 385 | 30.6 | 2.1 | | | 0.0 | 385 | 19.7 | 2.1 |
| 11. No obstetric antecedent | 33 | 2.6 | 0.2 | 49 | 7.1 | 0.3 | 82 | 4.2 | 0.4 |
| **Total** | **1,260** | **100** | **6.8** | **694** | **100** | **3.8** | **1954** | **100** | **10.5** |

*% = percentage | 1 = per 1000 births | 2 = per 1000 live births*

Table 10: Neonatal deaths PSANZ-NDC, Queensland 2009 to 2011

| | Neonatal deaths | | |
|---|---|---|---|
| PSANZ–NDC classification | n | % | Rate[1] |
| 1. Congenital abnormality | 202 | 29.1 | 1.1 |
| 2. Extreme prematurity | 251 | 36.2 | 1.4 |
| 3. Cardio-respiratory disorders | 68 | 9.8 | 0.4 |
| 4. Infection | 24 | 3.5 | 0.1 |
| 5. Neurological | 76 | 11.0 | 0.4 |
| 6. Gastrointestinal | 25 | 3.6 | 0.1 |
| 7. Other | 48 | 6.9 | 0.3 |
| **Total** | **694** | **100** | **3.8** |

*% = percentage | 1 = per 1000 live births*

18 Froen, J. F., Pinar H., Flenady V.J. et al. (2009). *Causes of death and associated conditions (Codac): a utilitarian approach to the classification of perinatal deaths.* BMC Pregnancy Childbirth 9: 22.

19 Korteweg, F. J., Gordijn S. J., et al. (2006). *The Tulip classification of perinatal mortality: introduction and multidisciplinary inter-rater agreement.* BJOG 113(4): 393-401.

Figure 2: Perinatal death by PSANZ-PDC classification, Queensland 2009 to 2011

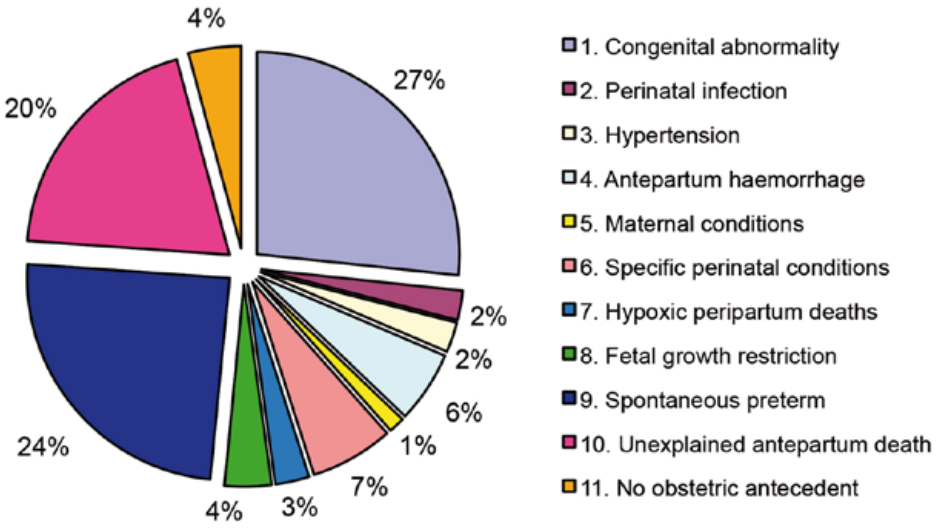



Figure 3: Stillbirths by PSANZ-PDC classification, Queensland 2009 to 2011

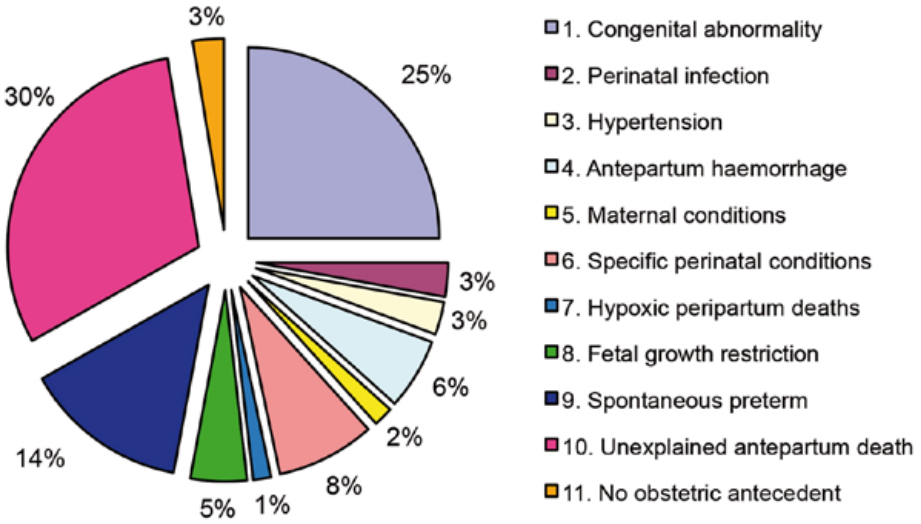



Figure 4: Neonatal deaths by PSANZ-PDC classification, Queensland 2009 to 2011

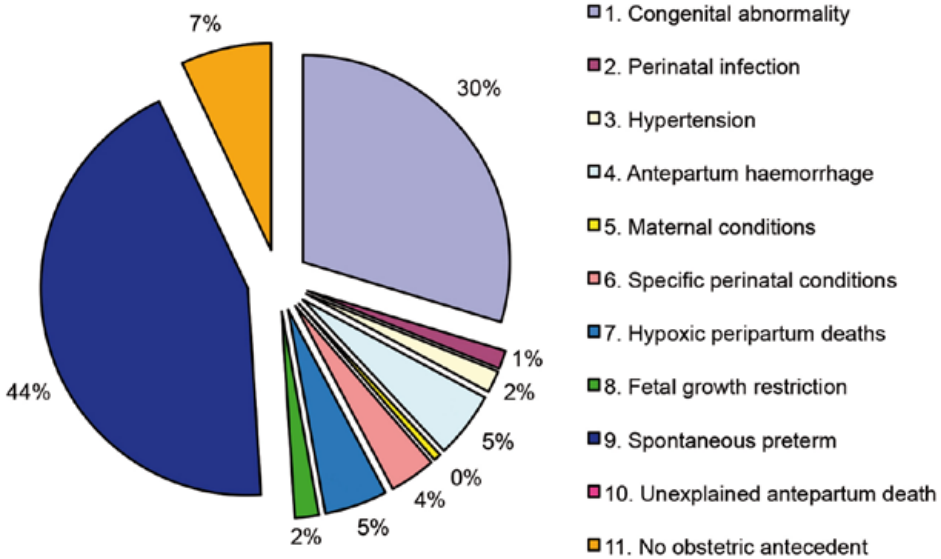
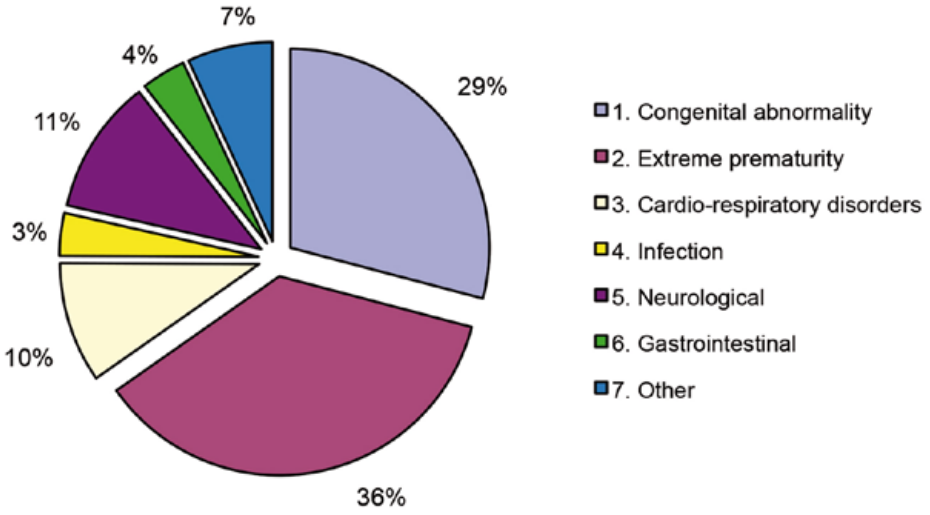


Figure 5: Neonatal deaths by PSANZ-NDC classification, Queensland 2009 to 2011




### 1.3.9 Multiple pregnancy

Multiple pregnancy was associated with a PNMR of 43.6 per 1000 births, compared with 9.4 per 1000 births for singleton pregnancies (see Tables 11 and 12). The 2009 to 2011 multiple pregnancy versus singleton pregnancy risk ratio for perinatal death: RR = 4.65, 95% confidence limits = 4.10, 5.28.

The principal conditions contributing to the excessive rate of perinatal death in multiple pregnancy are specific perinatal conditions (twin-twin transfusion), spontaneous preterm, congenital abnormality and unexplained antepartum death (PSANZ-PDC)—the principal known causes of the excessive rate of neonatal death in multiple pregnancy are extreme prematurity, congenital abnormality, cardio-respiratory and neurological (PSANZ-NDC).



Table 11: Perinatal deaths by PSANZ-PDC and plurality, Queensland 2009 to 2011

| | Plurality | | | | | | |
|---|---|---|---|---|---|---|---|
| | Singleton | | | Multiple | | | Relative risk (95% confidence limits) multiple versus singleton |
| PSANZ-PDC | n | % | Rate | n | % | Rate | |
| 1. Congenital abnormality | 494 | 29.3 | 2.7 | 27 | 10.1 | 4.4 | 1.61 (1.09, 2.37)† |
| 2. Perinatal infection | 41 | 2.4 | 0.2 | 5 | 1.9 | 0.8 | Not calculated–small cell size |
| 3. Hypertension | 46 | 2.7 | 0.3 | np | np | np | Not calculated–small cell size |
| 4. Antepartum haemorrhage | 104 | 6.2 | 0.6 | 8 | 3.0 | 1.3 | 2.26 (1.10, 4.64)† |
| 5. Maternal conditions | 24 | 1.4 | 0.1 | np | np | np | Not calculated–small cell size |
| 6. Specific perinatal conditions | 77 | 4.6 | 0.4 | 53 | 19.9 | 8.6 | 20.23 (14.27, 28.68)† |
| 7. Hypoxic peripartum deaths | 51 | 3.0 | 0.3 | np | np | np | Not calculated–small cell size |
| 8. Fetal growth restriction | 68 | 4.0 | 0.4 | 5 | 1.9 | 0.8 | 2.16 (0.87, 5.36) |
| 9. Spontaneous preterm | 359 | 21.3 | 2.0 | 121 | 45.3 | 19.7 | 9.91 (8.08, 12.16)† |
| 10. Unexplained antepartum death | 358 | 21.2 | 2.0 | 27 | 10.1 | 4.4 | 2.22 (1.50, 3.28)† |
| 11. No obstetric antecedent | 65 | 3.9 | 0.4 | 17 | 6.4 | 2.8 | 7.69 (4.51, 13.10)† |
| **Total** | **1,687** | **100** | **9.4** | **267** | **100** | **43.6** | **4.65 (4.10, 5.28)†** |

*Rate = per 1000 births | † = statistically significant | Total babies born 2009 to 2011 = 186,263, Total singletons born 2009 to 2011 = 180,135 | Total multiples born between 2009 to 2011 = 6,128, Small cell size numbers are not published = np*

Table 12: Neonatal deaths by PSANZ-NDC and plurality, Queensland 2009 to 2011

| | Plurality | | | | | | |
|---|---|---|---|---|---|---|---|
| | Singleton | | | Multiple | | | Relative risk (95% confidence limits) multiple versus singleton |
| PSANZ-NDC | n | % | Rate | n | % | Rate | |
| 1. Congenital abnormality | 181 | 32.9 | 1.0 | 21 | 14.6 | 3.5 | 3.46 (2.20, 5.43)† |
| 2. Extreme prematurity | 175 | 31.8 | 1.0 | 76 | 52.8 | 12.7 | 12.95 (9.90, 16.82)† |
| 3. Cardio-respiratory disorders | 56 | 10.2 | 0.3 | 12 | 8.3 | 2.0 | 6.39 (3.43, 11.91)† |
| 4. Infection | 18 | 3.3 | 0.1 | 6 | 4.2 | 1.0 | 9.94 (3.95, 25.02)† |
| 5. Neurological | 64 | 11.6 | 0.4 | 12 | 8.3 | 2.0 | 5.59 (3.02, 10.35)† |
| 6. Gastrointestinal | 20 | 3.6 | 0.1 | 5 | 3.5 | 0.8 | 7.45 (2.80, 19.85)† |
| 7. Other | 36 | 6.5 | 0.2 | 12 | 8.3 | 2.0 | 9.94 (5.17, 19.09)† |
| **Total** | **550** | **100** | **3.1** | **144** | **100** | **24.0** | **7.80 (6.51, 9.36)†** |

*Rate = per 1000 births | † = statistically significant | Total live babies born 2009 to 2011 = 185,002*
*Total live singletons born 2009 to 2011 = 178,997 | Total live multiples born 2009 to 2011 = 6005*

### 1.3.10 Indigenous perinatal mortality

Indigenous babies were almost twice as likely to die in the perinatal period (18.3 per 1000 births) as their non-Indigenous counter parts (10.0 per 1000 births). The 2009 to 2011 Indigenous versus non-Indigenous risk ratio for perinatal death was statistically significant: RR = 1.79, 95% confidence limits = 1.55, 2.08 (see Table 13). The rate of both stillbirth and neonatal deaths was significantly higher for Indigenous babies compared with non-Indigenous babies (9.9 per 1000 births versus 6.6 per 1000 births, and 8.3 per 1000 live births versus 3.5 per 1000 live births respectively).

Table 13: Perinatal deaths by Indigenous status, Queensland 2009 to 2011

| | Total births | Live births | Stillbirths | | Neonatal deaths | | Perinatal deaths | |
|---|---|---|---|---|---|---|---|---|
| | | | n | Rate[1] | n | Rate[2] | n | Rate[1] |
| Indigenous | 10,617 | 10,512 | 105 | 9.9 | 87 | 8.3 | 192 | 18.1 |
| Non-Indigenous | 175,601 | 174,445 | 1,156 | 6.6 | 607 | 3.5 | 1,763 | 10.0 |
| Indigenous status not stated | 45 | 45 | 0 | - | 0 | - | 0 | - |
| Relative risk for Indigenous (95% confidence limits)[3] | | | | 1.50 (1.23, 1.83) | | 2.38 (1.90, 2.98) | | 1.79 (1.55, 2.08) |

*1 = per 1000 births | 2 = per 1000 live births | 3 excludes 45 live births where the Indigenous status was not stated*

PSANZ-PDC classification of perinatal deaths indicates that spontaneous preterm birth, unexplained antepartum deaths and deaths associated with congenital abnormalities are all more likely to occur as causes of perinatal death in Indigenous babies (see Table 14). PSANZ-NDC classification of neonatal deaths indicates that Indigenous babies are more likely to die in the newborn period from extreme prematurity, congenital abnormality, cardio-respiratory disorders and 'other' (principally unknown/ undetermined) when compared with non-Indigenous babies.

Table 14: Perinatal deaths by PSANZ-PDC and Indigenous status, Queensland 2009 to 2011

| | Indigenous status | | | | | | Relative risk (95%confidence limits) Indigenous versus non-Indigenous |
|---|---|---|---|---|---|---|---|
| | Indigenous | | | Non-Indigenous | | | |
| PSANZ-PDC | n | % | Rate | n | % | Rate | |
| 1. Congenital abnormality | 40 | 20.8 | 3.8 | 481 | 27.3 | 2.7 | 1.39 (1.01, 1.92)† |
| 2. Perinatal infection | 6 | 3.1 | 0.6 | 40 | 2.3 | 0.2 | 2.51 (1.07, 5.93)† |
| 3. Hypertension | np | np | np | 43 | 2.4 | 0.2 | Not calculated–small cell size |
| 4. Antepartum haemorrhage | 11 | 5.7 | 1.0 | 101 | 5.7 | 0.6 | 1.83 (0.98, 3.40) |
| 5. Maternal conditions | np | np | np | 21 | 1.2 | 0.1 | Not calculated–small cell size |
| 6. Specific perinatal conditions | np | np | np | 127 | 7.2 | 0.7 | Not calculated–small cell size |
| 7. Hypoxic peripartum deaths | 5 | 2.6 | 0.5 | 48 | 2.7 | 0.3 | 1.75 (0.70, 4.38) |
| 8. Fetal growth restriction | 7 | 3.6 | 0.7 | 66 | 3.7 | 0.4 | 1.78 (0.82. 3.87) |
| 9. Spontaneous preterm | 70 | 36.5 | 6.7 | 410 | 23.3 | 2.3 | 2.86 (2.22, 3.68)† |
| 10. Unexplained antepartum death | 34 | 17.7 | 3.2 | 351 | 19.9 | 2.0 | 1.62 (1.14, 2.31)† |
| 11. No obstetric antecedent | 8 | 4.2 | 0.8 | 74 | 4.2 | 0.4 | 1.81 (0.87, 3.76) |
| **Total** | **192** | **100** | **18.3** | **1,762** | **100** | **10.0** | **1.83 (1.58, 2.12)†** |

*Rate = per 1000 births | † = statistically significant | Total babies born 2009 to 2011 = 186,263*
*Total Indigenous babies born 2009 to 2011 = 10,617 | Total non-Indigenous babies born 2009 to 2011 = 175, 6014*
*Indigenous status not stated = 45 | Small cell size numbers are not published = np*

Table 15: Neonatal deaths by PSANZ-NDC and Indigenous status, Queensland 2009 to 2011

| | Indigenous status | | | | | | Relative risk (95% confidence limits) Indigenous versus non-Indigenous |
|---|---|---|---|---|---|---|---|
| | Indigenous | | | Non-Indigenous | | | |
| PSANZ-NDC | n | % | Rate | n | % | Rate | |
| 1. Congenital abnormality | 22 | 25.3 | 2.1 | 180 | 29.7 | 1.0 | 2.07 (1.33, 3.21)† |
| 2. Extreme prematurity | 43 | 49.4 | 4.2 | 208 | 34.3 | 1.2 | 3.49 (2.52, 4.85)† |
| 3. Cardio-respiratory disorders | 8 | 9.2 | 0.8 | 60 | 9.9 | 0.3 | 2.25 (1.08, 4.71)† |
| 4. Infection | np | np | np | 21 | 3.5 | 0.1 | Not calculated–small cell size |
| 5. Neurological | np | np | np | 72 | 11.9 | 0.4 | Not calculated–small cell size |
| 6. Gastrointestinal | np | np | np | 24 | 4.0 | 0.1 | Not calculated–small cell size |
| 7. Other | 6 | 6.9 | 0.6 | 42 | 6.9 | 0.2 | 2.41 (1.03, 5.68)† |
| **Total** | **87** | **100** | **8.5** | **607** | **100** | **3.5** | **2.42 (1.94, 3.03)†** |

*Rate = per 1000 births / † = statistically significant / Total babies liveborn 2009 to 2011 = 185,002.*
*Total Indigenous babies liveborn 2009 to 2011 = 10,512 / Total non-Indigenous babies liveborn 2009 to 2011 = 174,445*
*Indigenous status not stated = 45 / Small cell size numbers are not published = np*

### 1.3.11 Gestation and birthweight specific perinatal mortality rates

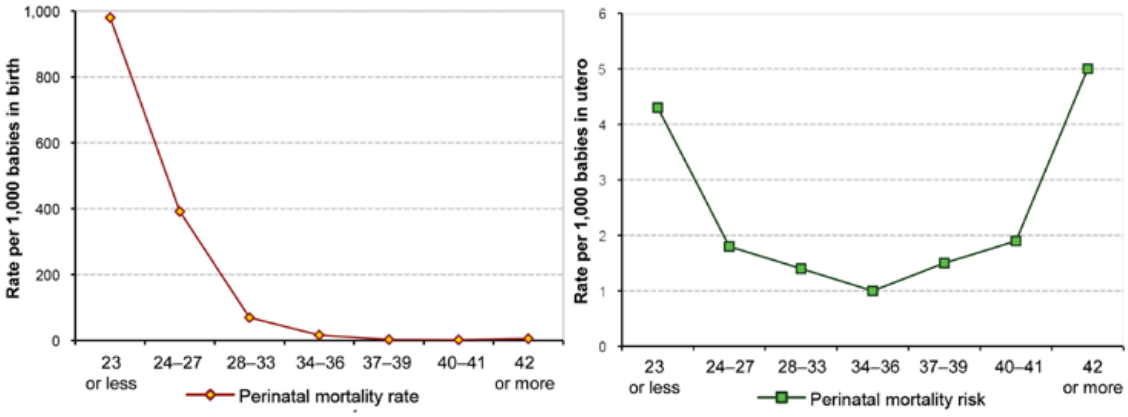
Table 16 and Figure 6 show the PNMR for gestational groups, and indicates the continuing risk of perinatal death (the 'perinatal mortality risk') to babies still in-utero at that gestation. The risk is lowest between 34 and 36 weeks gestation.

Table 16: Perinatal deaths by gestation (completed weeks), Queensland 2009 to 2011

| Gestation (weeks) | Number of perinatal deaths at this gestation | Number of babies born at this gestation | % of perinatal deaths | % of babies born | Perinatal mortality rate | Perinatal mortality risk* |
|---|---|---|---|---|---|---|
| 23 or less | 797 | 813 | 40.8 | 0.4 | 980.3 | 4.3 |
| 24–27 | 326 | 833 | 16.7 | 0.4 | 391.4 | 1.8 |
| 28–33 | 260 | 3,753 | 13.3 | 2.0 | 69.3 | 1.4 |
| 34–36 | 175 | 10,878 | 9.0 | 5.8 | 16.1 | 1.0 |
| 37–39 | 252 | 96,593 | 12.9 | 51.8 | 2.6 | 1.5 |
| 40–41 | 138 | 72,248 | 7.1 | 38.8 | 1.9 | 1.9 |
| 42 or more | 6 | 1,127 | 0.3 | 0.6 | 5.3 | 5.0 |
| Not stated | 1 | 18 | | | | |
| **Total** | **1955** | **186,263** | **100.0** | **100.0** | **10.5** | **10.5** |

*(* risk = per 1000 fetuses remaining in-utero)*

Figure 6: Perinatal mortality rates and risk* by gestation, Queensland 2009 to 2011




** risk = per 1000 fetuses remaining in utero*

The PNMR for different birthweight groups is shown in Table 17. The perinatal mortality drops significantly over 1000 grams birthweight.

Table 17: Perinatal deaths by birthweight, Queensland 2009 to 2011

| Birthweight (g) | Number of perinatal deaths in this birthweight group | Number of babies born in this birthweight group | % of perinatal deaths | % of babies born | PNMR |
|---|---|---|---|---|---|
| ‹ 500 | 685 | 695 | 35.0 | 0.4 | 3.7 |
| 500–999 | 482 | 1,198 | 24.7 | 0.6 | 2.6 |
| 1000–1499 | 140 | 2,526 | 7.2 | 1.4 | 0.8 |
| 1500–1999 | 99 | 7,554 | 5.1 | 4.1 | 0.5 |
| 2000–2499 | 126 | 27,107 | 6.4 | 14.6 | 0.7 |
| 2500–2999 | 147 | 64,678 | 7.5 | 34.7 | 0.8 |
| 3000–3499 | 133 | 58,138 | 6.8 | 31.2 | 0.7 |
| 3500–3999 | 99 | 19,820 | 5.1 | 10.6 | 0.5 |
| 4000–4499 | 23 | 3,169 | 1.2 | 1.7 | 0.1 |
| 4500–4999 | 3 | 1,014 | 0.2 | 0.5 | 0.0 |
| 5000+ | 2 | 334 | 0.1 | 0.2 | 0.0 |
| Not stated | 16 | 30 | 0.8 | 0.0 | 0.1 |
| **Total** | **1955** | **186,263** | **100** | **100** | **10.5** |

Table 18 shows the PSANZ-PDC categories for perinatal deaths by gestational age groups. At term (37 weeks or more), 75.3% of perinatal deaths were not due to congenital abnormality and can therefore be considered as potentially preventable. Of these normally formed term infants, 46.3% were unexplained stillbirths. The next largest group accounting for 16.1% of these deaths was hypoxic peripartum death which includes deaths occurring either intrapartum or in the neonatal period without major pre-existing conditions. In 12.0% of these term perinatal deaths no obstetric antecedent was identified.

Babies born at gestational ages of less than 28 weeks account for more than half of all perinatal deaths (57.4%). The rate of death drops over gestation in all PSANZ-PDC categories except unexplained antepartum death and deaths without a known obstetric antecedent, and is constant across all gestations in the PSANZ-NDC category of congenital abnormality (see Table 19).

Table 18: Perinatal deaths by PSANZ-PDC and gestational age, Queensland 2009 to 2011

| | Gestational age at birth (weeks) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | ‹28 | | | 28–36 | | | 37+ | | |
| **PSANZ–PDC classification** | **n** | **%** | **Rate** | **n** | **%** | **Rate** | **n** | **%** | **Rate** |
| 1. Congenital abnormality | 296 | 26.4 | 1.6 | 127 | 29.2 | 0.7 | 98 | 24.7 | 0.5 |
| 2. Perinatal infection | 22 | 2.0 | 0.1 | 9 | 2.1 | 0.0 | 15 | 3.8 | 0.1 |
| 3. Hypertension | 26 | 2.3 | 0.1 | 15 | 3.4 | 0.1 | 6 | 1.5 | 0.0 |
| 4. Antepartum haemorrhage | 62 | 5.5 | 0.3 | 40 | 9.2 | 0.2 | 10 | 2.5 | 0.1 |
| 5. Maternal conditions | 9 | 0.8 | 0.0 | 9 | 2.1 | 0.0 | 7 | 1.8 | 0.0 |
| 6. Specific perinatal conditions | 60 | 5.3 | 0.3 | 44 | 10.1 | 0.2 | 26 | 6.6 | 0.1 |
| 7. Hypoxic peripartum deaths | 1 | 0.1 | 0.0 | 4 | 0.9 | 0.0 | 48 | 12.1 | 0.3 |
| 8. Fetal growth restriction | 33 | 2.9 | 0.2 | 27 | 6.2 | 0.1 | 13 | 3.3 | 0.1 |
| 9. Spontaneous preterm | 453 | 40.4 | 2.4 | 26 | 6.0 | 0.1 | 0 | - | - |
| 10. Unexplained antepartum death | 123 | 11.0 | 0.7 | 124 | 28.5 | 0.7 | 138 | 34.8 | 0.7 |
| 11. No obstetric antecedent | 37 | 3.3 | 0.2 | 10 | 2.3 | 0.1 | 35 | 8.8 | 0.2 |
| **Total** | **1122** | **100** | **6.0** | **435** | **100** | **2.3** | **396** | **100** | **2.1** |

*1 case excluded in the gestational age analysis due to missing gestation data*
*Rate = per 1000 births / % = percentage of that gestational group*

Table 19: Neonatal deaths by PSANZ-NDC and gestational age, Queensland 2009 to 2011

| | Gestational age at birth (weeks) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | <28 | | | 28–36 | | | 37+ | | |
| PSANZ–NDC classification | n | % | Rate | n | % | Rate | n | % | Rate |
| 1. Congenital abnormality | 51 | 12.2 | 0.3 | 73 | 59.3 | 0.4 | 78 | 51.0 | 0.4 |
| 2. Extreme prematurity | 247 | 59.1 | 1.3 | 4 | 3.3 | 0.0 | 0 | - | - |
| 3. Cardio-respiratory disorders | 39 | 9.3 | 0.2 | 17 | 13.8 | 0.1 | 12 | 7.8 | 0.1 |
| 4. Infection | 12 | 2.9 | 0.1 | 6 | 4.9 | 0.0 | 6 | 3.9 | 0.0 |
| 5. Neurological | 30 | 7.2 | 0.2 | 11 | 8.9 | 0.1 | 35 | 22.9 | 0.2 |
| 6. Gastrointestinal | 19 | 4.5 | 0.1 | 6 | 4.9 | 0.0 | 0 | - | - |
| 7. Other | 20 | 4.8 | 0.1 | 6 | 4.9 | 0.0 | 22 | 14.4 | 0.1 |
| **Total** | **418** | **100** | **2.3** | **123** | **100** | **0.7** | **153** | **100** | **0.8** |

*1 case excluded in the gestational age analysis due to missing gestation data*
*Rate = per 1000 live births | % = percentage of that gestational group*

Two-thirds of perinatal deaths occur in the group of babies weighing less than 1500 grams (67.4%) (see Table 20). All PSANZ-PDC categories of cause of death show a decrease as birthweight increases. A similar pattern is seen for PSANZ-NDC categories of cause of neonatal death, with 67.6% of these babies weighing less than 1500g (see Table 21).

Similar to the analysis by gestational age, 76.4% (n=311) of perinatal deaths in non-low birthweight infants (› 2500 grams) occurred in infants without major congenital abnormalities. Similarly, 14.8% (n=46) of these death were assigned to the category of Hypoxic peripartum death.

Table 20: Perinatal deaths by PSANZ-PDC and birthweight, Queensland 2009 to 2011

| | Birthweight | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | ‹1500g | | | 1500–2499g | | | 2500–3999g | | | 4000+g | | |
| PSANZ–PDC classification | n | % | Rate | n | % | Rate | n | % | Rate | n | % | Rate |
| 1. Congenital abnormality | 335 | 25.6 | 1.8 | 88 | 39.1 | 0.5 | 93 | 24.5 | 0.5 | 3 | 10.7 | 0.0 |
| 2. Perinatal infection | 26 | 2.0 | 0.1 | 3 | 1.3 | 0.0 | 16 | 4.2 | 0.1 | 1 | 3.6 | 0.0 |
| 3. Hypertension | 38 | 2.9 | 0.2 | 4 | 1.8 | 0.0 | 5 | 1.3 | 0.0 | 0 | - | - |
| 4. Antepartum haemorrhage | 74 | 5.7 | 0.4 | 18 | 8.0 | 0.1 | 19 | 5.0 | 0.1 | 0 | - | - |
| 5. Maternal conditions | 12 | 0.9 | 0.1 | 2 | 0.9 | 0.0 | 6 | 1.6 | 0.0 | 4 | 14.3 | 0.0 |
| 6. Specific perinatal conditions | 84 | 6.4 | 0.5 | 12 | 5.3 | 0.1 | 25 | 6.6 | 0.1 | 4 | 14.3 | 0.0 |
| 7. Hypoxic peripartum deaths | 3 | 0.2 | 0.0 | 3 | 1.3 | 0.0 | 43 | 11.3 | 0.2 | 3 | 10.7 | 0.0 |
| 8. Fetal growth restriction | 53 | 4.1 | 0.3 | 13 | 5.8 | 0.1 | 7 | 1.8 | 0.0 | 0 | - | - |
| 9. Spontaneous preterm | 469 | 35.9 | 2.5 | 6 | 2.7 | 0.0 | 2 | 0.5 | 0.0 | 0 | - | - |
| 10. Unexplained antepartum death | 171 | 13.1 | 0.9 | 68 | 30.2 | 0.4 | 131 | 34.6 | 0.7 | 13 | 46.4 | 0.1 |
| 11. No obstetric antecedent | 42 | 3.2 | 0.2 | 8 | 3.6 | 0.0 | 32 | 8.4 | 0.2 | 0 | - | - |
| **Total** | **1307** | **100** | **7.0** | **225** | **100** | **1.2** | **379** | **100** | **2.0** | **28** | **100** | **0.2** |

*15 cases excluded in the birthweight analysis due to missing birthweight data*
*Rate = per 1000 births | % = percentage of that birthweight group*

Table 21: Neonatal deaths by PSANZ-NDC and birthweight, Queensland 2009 to 2011

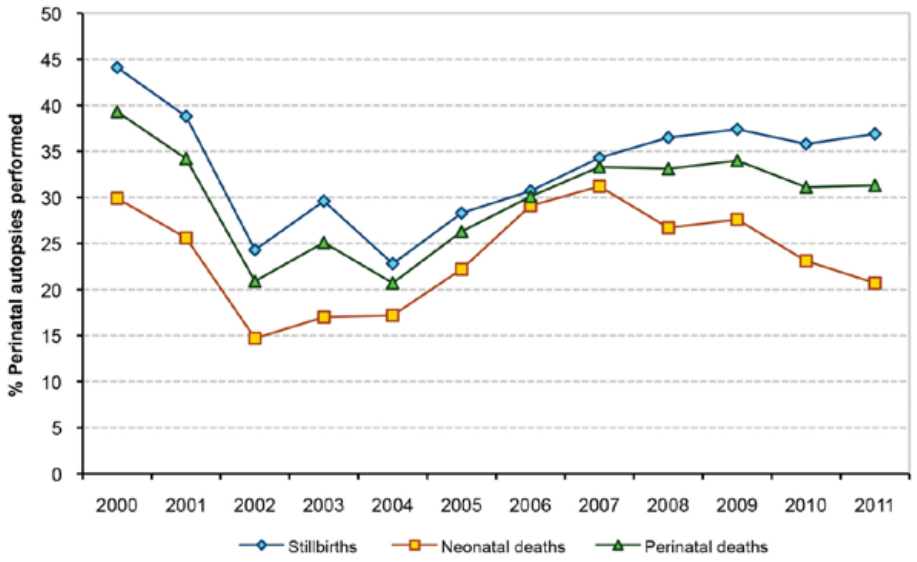
| | Birthweight | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | ‹1500g | | | 1500–2499g | | | 2500–3999g | | | 4000+g | |
| PSANZ–NDC classification | n | % | Rate | n | % | Rate | n | % | Rate | n | Rate |
| 1. Congenital abnormality | 72 | 15.4 | 0.4 | 56 | 80.0 | 0.3 | 73 | 48.3 | 0.4 | 1 | 0.01 |
| 2. Extreme prematurity | 250 | 53.4 | 1.4 | 1 | 1.4 | 0.0 | 0 | - | - | | - |
| 3. Cardio-respiratory disorders | 49 | 10.5 | 0.3 | 2 | 2.9 | 0.0 | 15 | 9.9 | 0.1 | 1 | 0.01 |
| 4. Infection | 13 | 2.8 | 0.1 | 4 | 5.7 | 0.0 | 7 | 4.6 | 0.0 | | - |
| 5. Neurological | 36 | 7.7 | 0.2 | 3 | 4.3 | 0.0 | 35 | 23.2 | 0.2 | 1 | 0.01 |
| 6. Gastrointestinal | 25 | 5.3 | 0.1 | 0 | - | - | 0 | - | - | | - |
| 7. Other | 23 | 4.9 | 0.1 | 4 | 5.7 | 0.0 | 21 | 13.9 | 0.1 | | - |
| **Total** | **468** | **100** | **2.5** | **70** | **100** | **0.4** | **151** | **100** | **0.8** | **3** | **0.02** |

*2 cases excluded in the birthweight analysis due to missing birthweight data | Rate = per 1000 live births*

### 1.3.12 Perinatal autopsies:

Just under one-third of babies dying in the perinatal period have an autopsy (32.1% between 2009 and 2011) (see Figure 7 and Table 30). The autopsy rate for stillborn babies has remained relatively constant over the last five years (34.3% to 37.4%), though the rate of neonatal death autopsy has declined in that period from 31.2% to 20.7%.

Figure 7: Perinatal autopsies by type of death, Queensland 2000 to 2011
*(see Table 30)*




## 2. Pregnancy and newborn care



In the years 2010 and 2011 in Queensland, 122,150 women gave birth to 124,211 babies—this is the primary focus of this section of the report. Where possible they are compared with the larger cohort of 658,105 women who gave birth to 669,379 babies in Queensland between 2000 and 2011. Data was provided to the PDCT by midwives, under the Perinatal Statistics provisions of the *Public Health Act 2005* (Chapter 6, Part 1, s214–228).

### 2.1 Mode of healthcare delivery

The number of women giving birth per year has risen from 48,524 in 2000 to 61,123 in 2011, an increase of 26.0% over this 12-year period (see Figure 8 and 9, and Table 34). The number of women cared for in the public healthcare sector has increased by 18.8% and the number cared for in the private healthcare sector by 44.1%—there has been little change, however from 2007–08 to the end of 2011.

Figure 8: Number of births by mode of healthcare delivery, Queensland 2000 to 2011
*(see Table 35)*

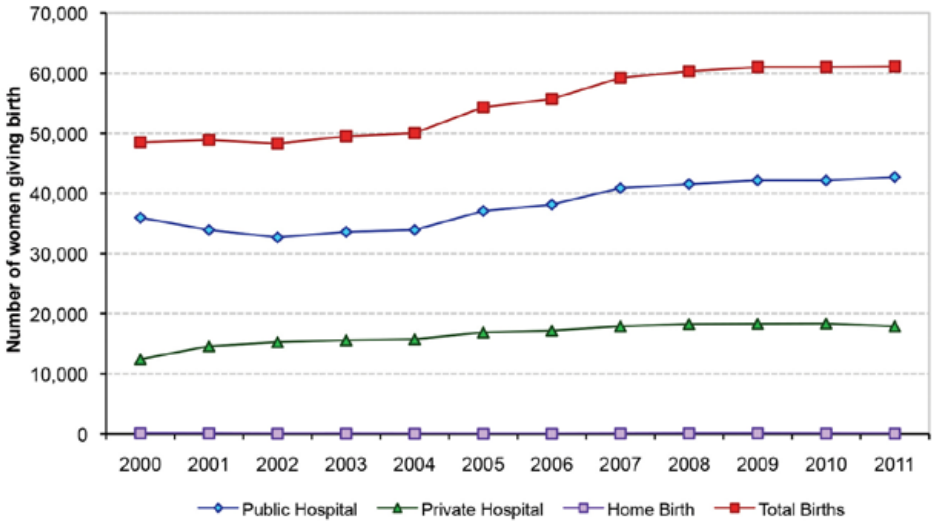
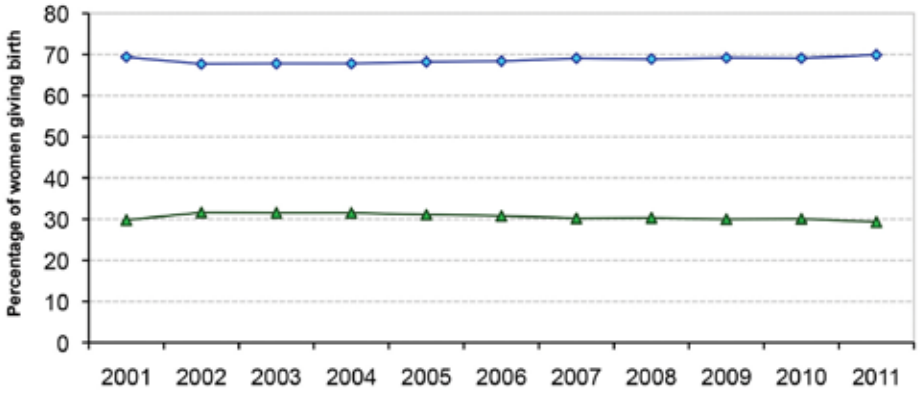


Figure 9: Percentage of women accessing public and private birth care, Queensland 2000 to 2011 *(see Table 35)*




From 2001 onwards data relating to intended place of birth and actual place of birth have been collected.

Between 2001 and 2011, 601,012 of the 609,581 (98.6%) women intended to give birth in a hospital—of these 601,012 women, 597,726 (99.5%) succeeded, while 171 gave birth at home, 14 gave birth in a birth centre and 3101 gave birth in 'other' circumstances (i.e. born before arrival).

In the same period:

- 7326 women intended to give birth in a birth centre—of these 7326 women, 5696 succeeded. Of the remaining women, 1,495 gave birth in hospital, 11 gave birth at home and 124 in 'other' circumstances
- 1197 women intended to give birth at home—of these 1197 women, 919 gave birth at home and 249 were transferred for birth elsewhere.

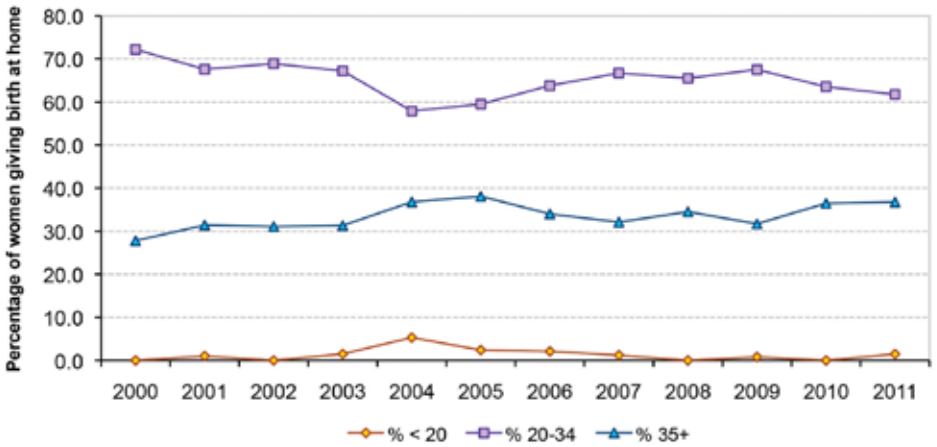
Data was incomplete for 111 women in this period.



## 2.2 Home birth

On average, 80 women per year plan to give birth at home and have done so (see Figure 10). The age profile of these women has slowly changed, with women over 35 years of age increasing from 27.8% to 36.8%.

Figure 10: Percentage of home births by maternal age group, Queensland 2000 to 2011 *(see Table 35)*

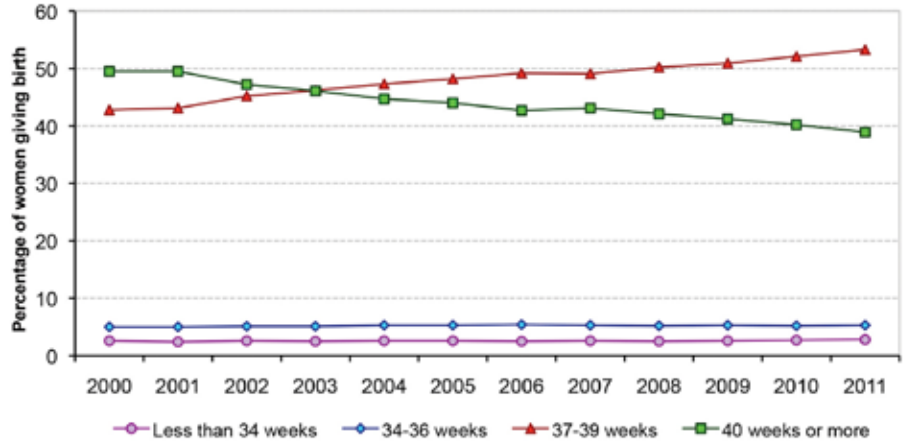



## 2.3 Gestation at birth

Between 2000 and 2011, the rate of birth at gestations 37 to 39 weeks has increased significantly, from less than 43% to more than 53% (see Figure 11 and Table 36).

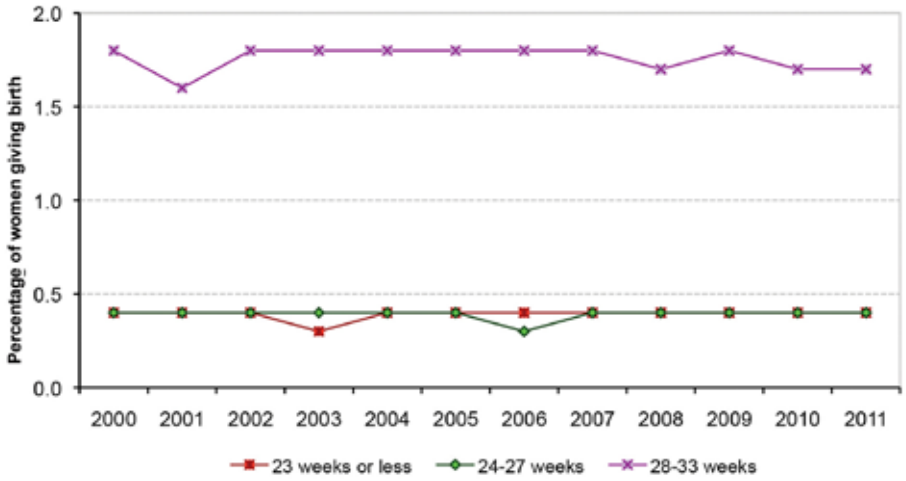
There has been a concomitant decrease in births at gestations of 40 weeks or more. Whilst it would be tempting to think that this relates to evidence suggesting that women should be given advice to end their pregnancy by 40 weeks plus 10 days, most of this decrease has been in the 40 to 41 week group, rather than the 42 weeks or more group.

Figure 11: Percentage of women giving birth by gestation, Queensland 2000 to 2011
*(see Table 36)*




There has been little change in the incidence of birth at less than 37 weeks (see Figure 12 and Table 36).

Figure 12: Percentage of women giving birth at less than 34 weeks gestation, Queensland 2000 to 2011
*(see Table 36)*




The changes in gestation at birth of the mothers are mirrored in the changes in gestation of the babies born (see Figures 13 and 14, and Table 38).

Figure 13: Percentage of babies born by gestation, Queensland 2000 to 2011
*(see Table 38)*

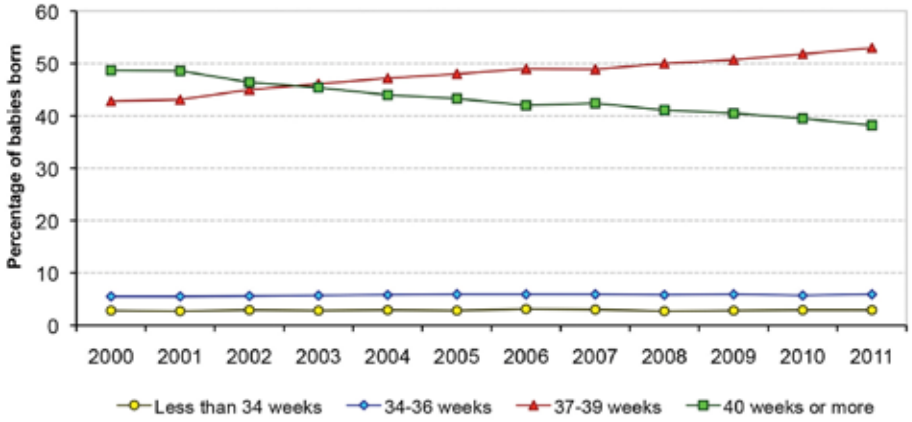
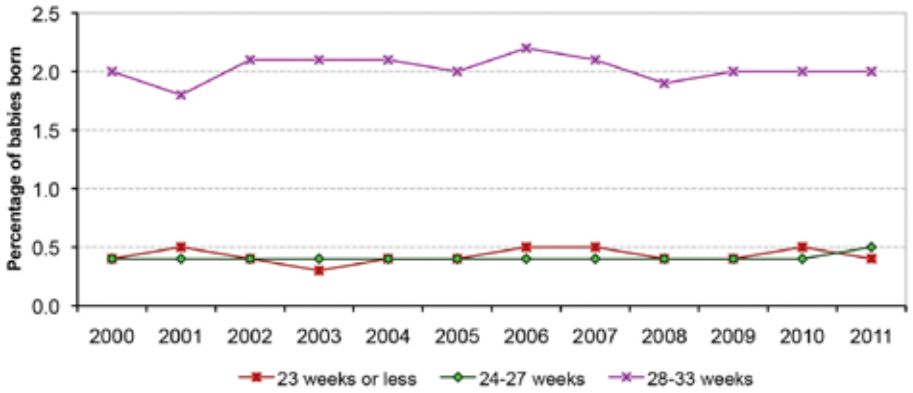
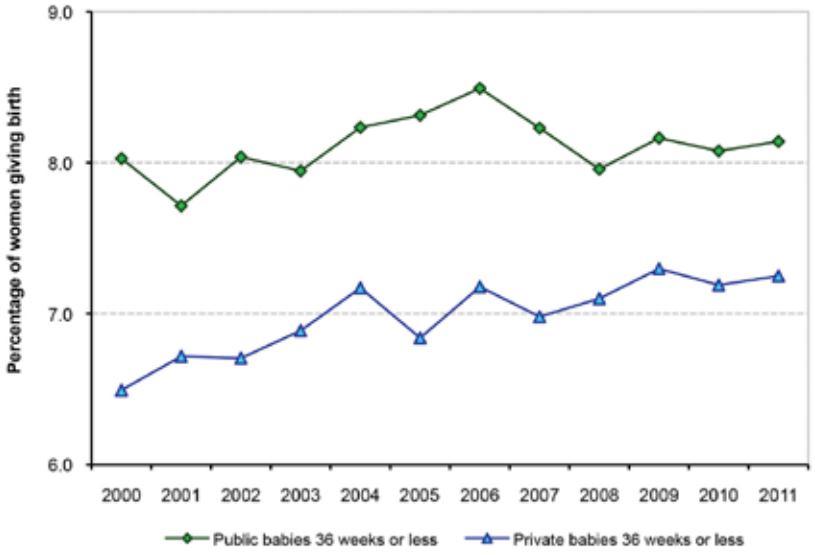


Figure 14: Percentage of babies born at 33 weeks gestation or less, Queensland 2000 to 2011 *(see Table 38)*




Though the overall rate of birth at less than 37 weeks gestation has shown little change, there has been a clear increase in the rate of birth at less than 37 weeks gestation in the private healthcare sector (see Figure 15 and Table 38).

Figure 15: Percentage of women giving birth at less than 37 weeks gestation by mode of healthcare delivery, Queensland 2000 to 2011 *(see Table 38)*




It can be seen from Figure 16 and Table 38 that the gestational pattern of births over 36 weeks gestation differs between public and private healthcare sectors, with a clear peak of birth prior to 40 weeks in the private healthcare sector.

Figure 16: Percentage of women giving birth by mode of healthcare delivery and gestation, Queensland 2000 to 2011 *(see Table 38)*

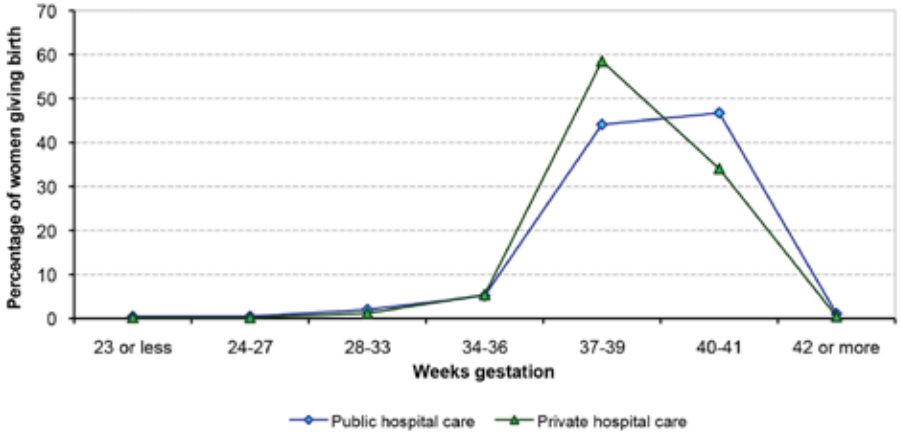


Figure 17 and Table 39 show that the difference in the gestational patterns between public and private healthcare sectors is a marked preponderance for elective caesarean section and, to a lesser degree induction of labour, in the 37 to 39 week gestation period in the private healthcare sector; the public healthcare sector pattern shows a greater preponderance of spontaneous onset of labour with a peak in the 40 to 41 week gestational period.

Figure 17: Number of women giving birth by mode of healthcare delivery, gestation, and onset of labour, Queensland 2000 to 2011
*(see Table 39)*

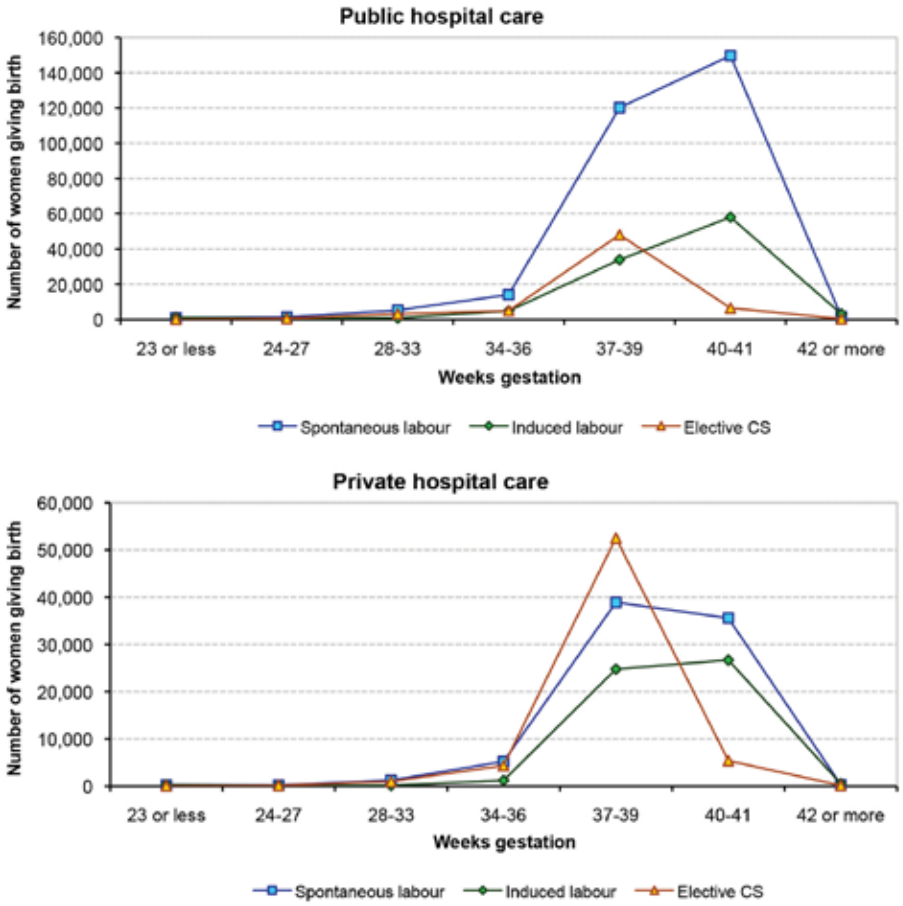



Table 42 shows that there is a significantly higher perinatal mortality for all gestations below 40 weeks in association with elective birth (i.e. induction of labour or elective caesarean section). Paradoxically there is little difference in the rate of these babies requiring care in neonatal intensive care or special care nurseries.

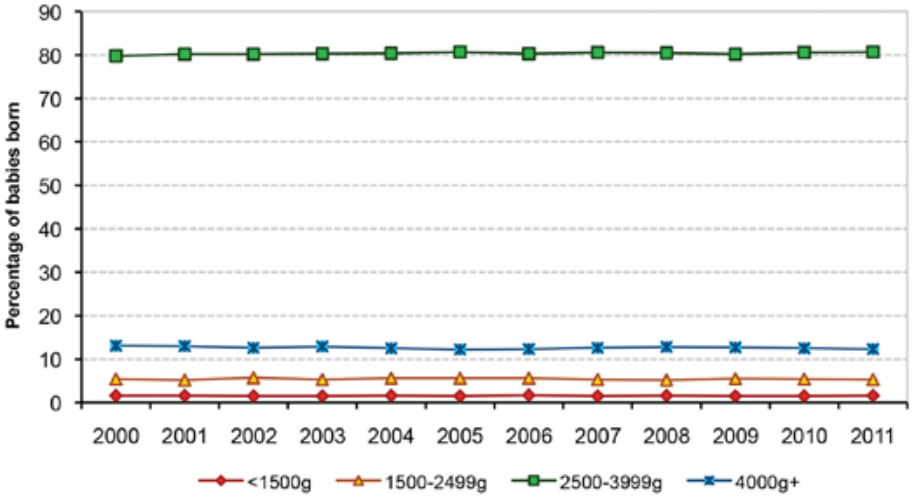
**Good practice point**

- Elective repeat caesarean section and induction of labour before 39 weeks of gestation are common, yet are associated with respiratory and other adverse neonatal outcomes. Elective intervention in pregnancy before 39 weeks of gestation should be avoided wherever possible.

## 2.4 Birthweight

Approximately 7% of babies born are low birthweight (less than 2500 grams) as shown in Figure 18 and Table 41, and this rate has not changed significantly between 2000 and 2011.

Figure 18: Distribution of birth weights, Queensland 2000 to 2011
*(see Table 41)*

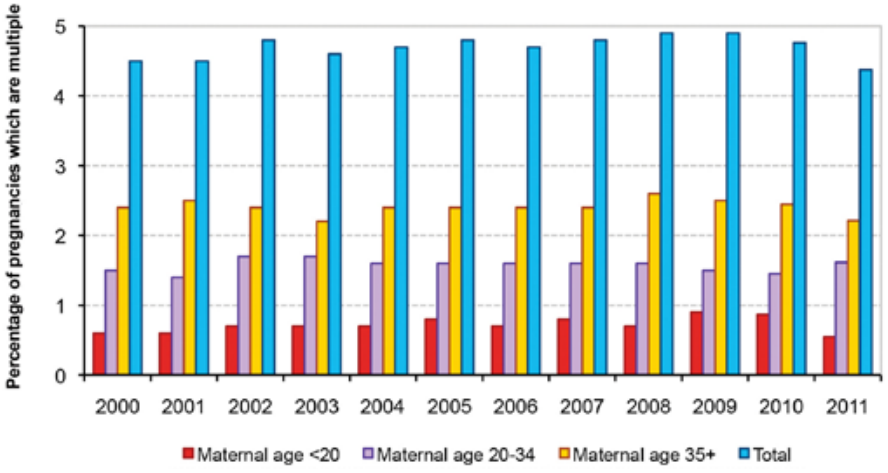



## 2.5 Multiple pregnancies

The overall rate of multiple pregnancy has varied between 1.5% and 1.8% over the period covered by this report (see Figure 19 and Table 42). The rate of multiple pregnancy increased significantly with maternal age (maternal age 35+ versus maternal age <35 risk ratio, 2000 to 2011: RR = 1.59, 95% confidence limits = 1.52, 1.66).

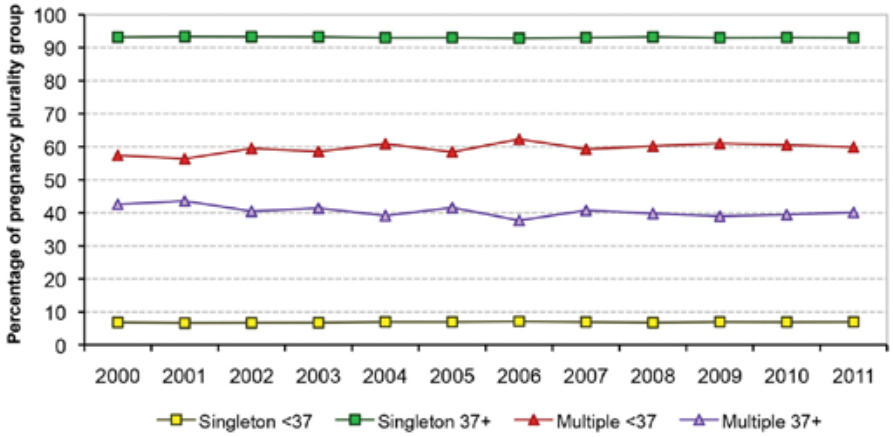


Figure 19: Percentage of multiple pregnancies by maternal age, Queensland 2000 to 2011
*(see Table 42)*




It is clear that multiple pregnancy is a powerful predictor of preterm birth, with less than 7% of singleton pregnancies ending before 37 weeks gestation, while between 56% and 62% of multiple pregnancies end before 37 weeks gestation.

Figure 20: Percentage of multiple and singleton pregnancies by gestation at birth, Queensland 2000 to 2011
*(see Table 43)*



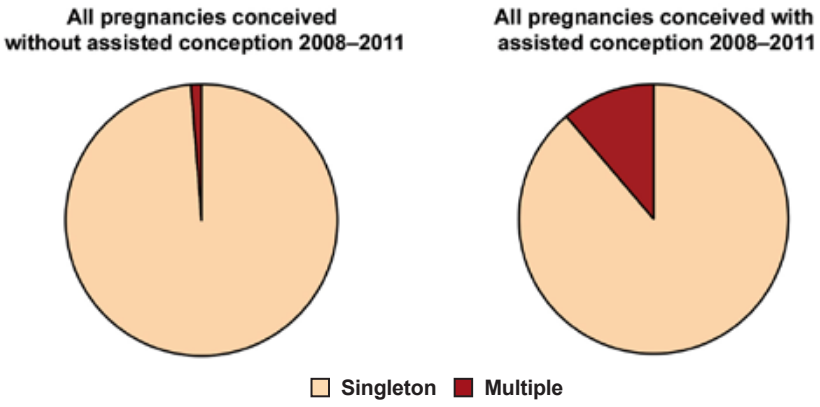

**Good practice point**

- Maternity care providers should provide clear information to women carrying multiple pregnancies regarding the risk of preterm labour, and steps that should be taken in the event that a woman carrying a multiple pregnancy suspects the onset of preterm labour.

## 2.6 Assisted conception

Approximately 4% of births in Queensland are from pregnancies conceived with the aid of assisted conception techniques. Less than 4% of singleton pregnancies have been conceived with the aid of assisted conception techniques, but 28% of multiple pregnancies have been conceived with their aid.

Figure 21: Influence of assisted conception techniques, Queensland 2008 to 2011
*(see Table 44)*

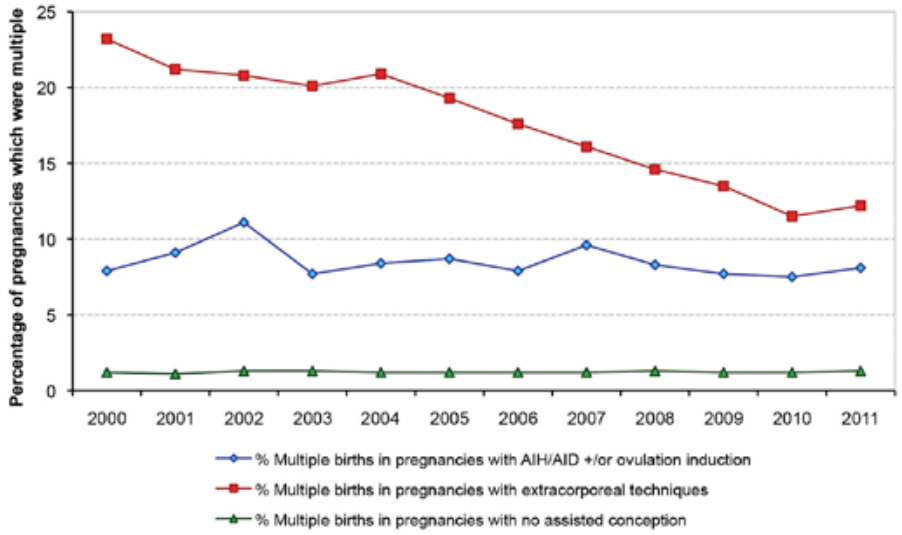



Multiple pregnancy occurs in 1.1% to 1.3% of pregnancies conceived without any identified assisted conception technique (see Figure 22 and Table 44).

The development of improved extracorporeal techniques for assisted conception (invitro fertilisation, gamete intra-fallopian transfer, intracytoplasmic sperm injection, embryo transfer or related techniques) has resulted in a steady almost 50% fall in the rate of multiple pregnancy between 2000 and 2011 in association with these techniques (23.2% to 12.2%).

The same type of improvement has not been seen in relation to the use of ovulation induction and/or artificial insemination, with the multiple pregnancy incidence persistently in the region of 8%.

Figure 22: Percentage of multiple births in pregnancies conceived with and without the use of assisted conception techniques, Queensland 2000 to 2011
*(see Table 44)*




AIH/AID +/or ovulation induction = artificial insemination and/or ovulation induction processes.
Extracorporeal techniques = invitro fertilisation, gamete intra-fallopian transfer, intracytoplasmic sperm injection, embryo transfer or related techniques.

**Good practice point**

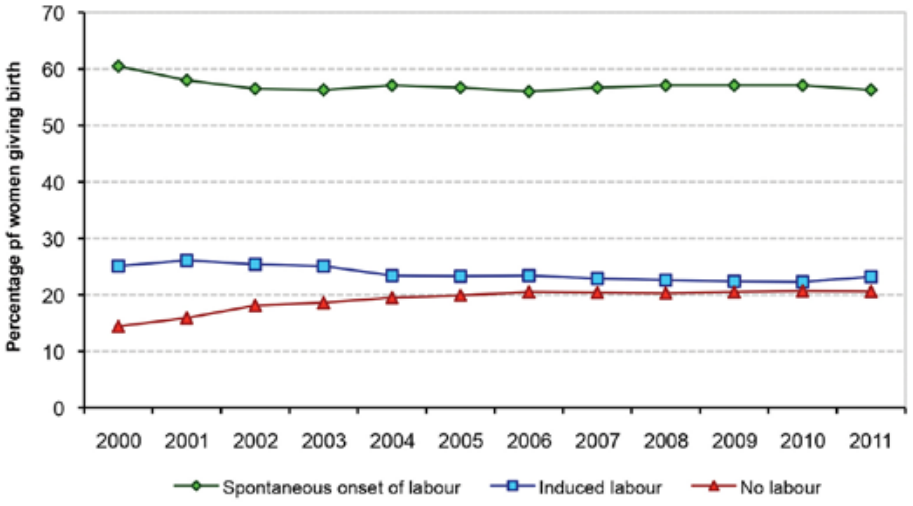
- Given the unchanging risks of multiple pregnancy occurring in association with ovulation induction and the consequent risk of adverse outcomes due to the multiple pregnancies, the same attention to technique monitoring and quality improvement as has been seen with extracorporeal techniques is recommended to those prescribing ovulation induction.



## 2.7 Onset of labour

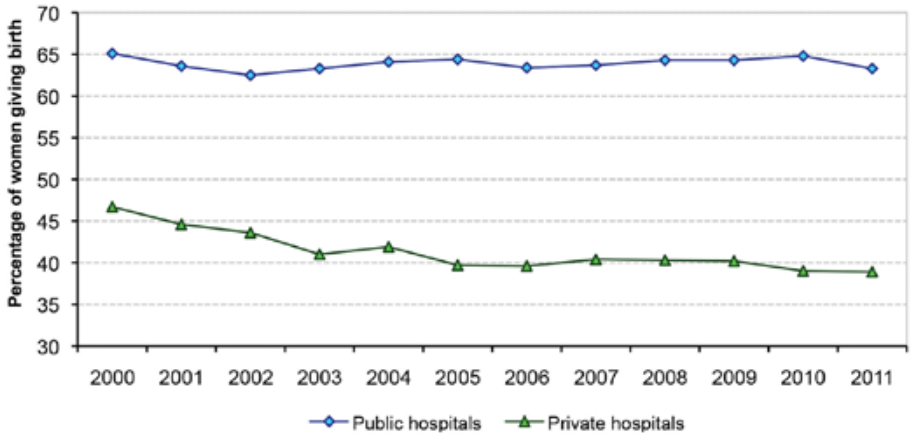
There has been little change since 2005, with pregnancies ending in spontaneous labour in less than 60% of instances (see Figure 23 and Table 46). The frequency of elective caesarean section (20% to 21%) and induction of labour (22% to 23%) are similar to each other.

Figure 23: Onset of labour, all births, Queensland 2000 to 2011
*(see Table 46)*



There is a statistically significant difference in the pattern of labour onset between public and private hospitals (see Figure 24 and Table 48). Women being cared for in the public healthcare sector labour spontaneously in 63% to 65% of pregnancies, while women being cared for in the private healthcare sector in 39% to 40% (2010 to 2011 private versus public risk ratio: RR = 0.43, 95% confidence limits = 0.43, 0.44).

Figure 24: Spontaneous onset of labour by mode of healthcare delivery, Queensland 2000 to 2011 *(see Tables 47 and 48)*




This disparity between these modes of healthcare delivery is mirrored in the rate of induction of labour (see Figure 25, and Tables 47 and 48). The private hospital care versus public hospital care risk ratio for induction of labour in 2010 to 2011: RR = 1.24, 95% confidence limits = 1.21, 1.27, and the rate of elective caesarean section (see Figure 26, and Tables 47 and 48) for private hospital care versus public hospital care risk ratio for elective caesarean section in 2010 to 2011: RR = 2.36, 95% confidence limits = 2.31, 2.41.



Figure 25: Induction of labour by mode of healthcare delivery, Queensland 2000 to 2011 *(see Tables 47 and 48)*

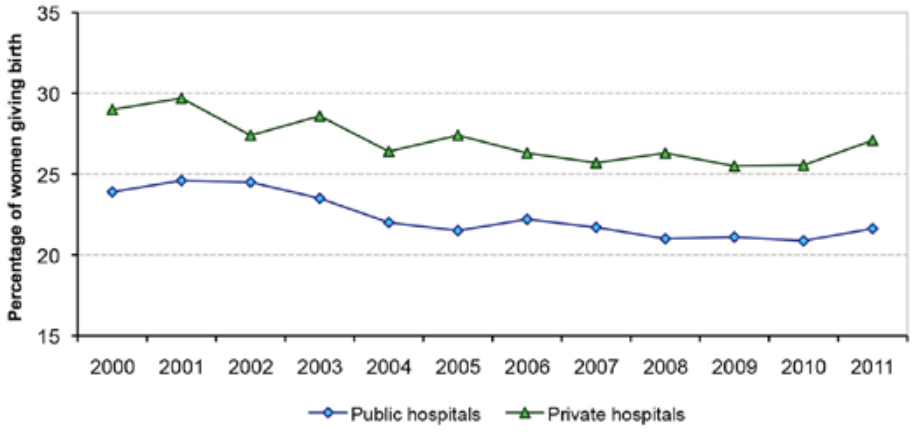
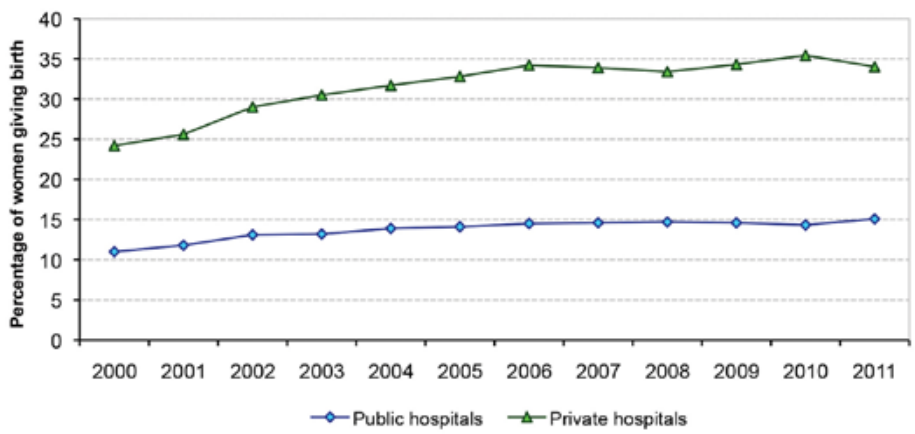


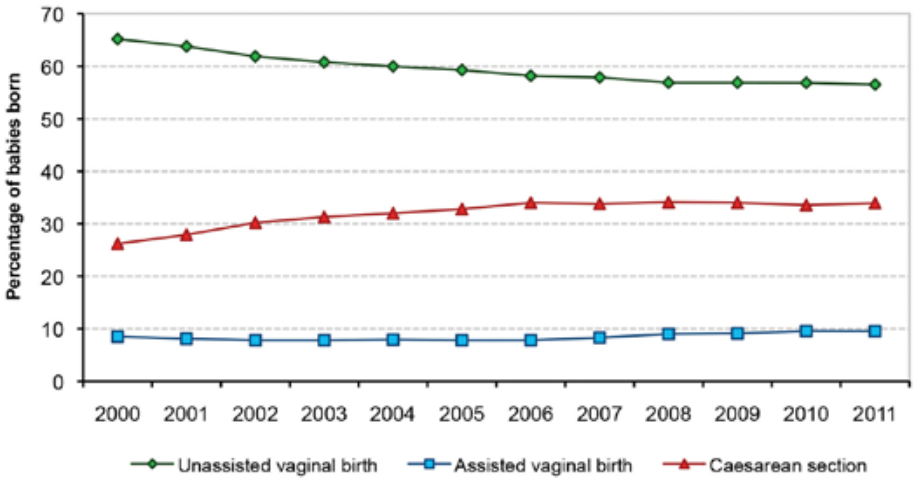

Figure 26: Elective caesarean section by mode of healthcare delivery, Queensland 2000 to 2011 *(see Tables 47 and 48)*



## 2.8 Mode of birth

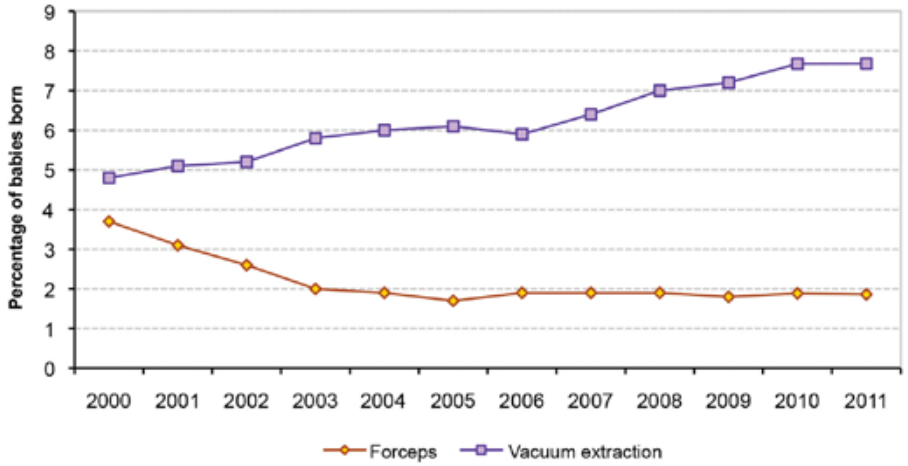
Between 2000 and 2011, the rate of unassisted vaginal birth has progressively fallen from 65% to 56%, with a concomitant rise in the rate of caesarean section birth from 26% to 34%— there has been little change in the overall rate of assisted vaginal birth (see Figure 27, and Tables 50 and 51). The rate of change appears to be slowing.

Figure 27: Mode of birth of babies, Queensland 2000 to 2011—percentage of births
*(see Tables 50 and 51)*



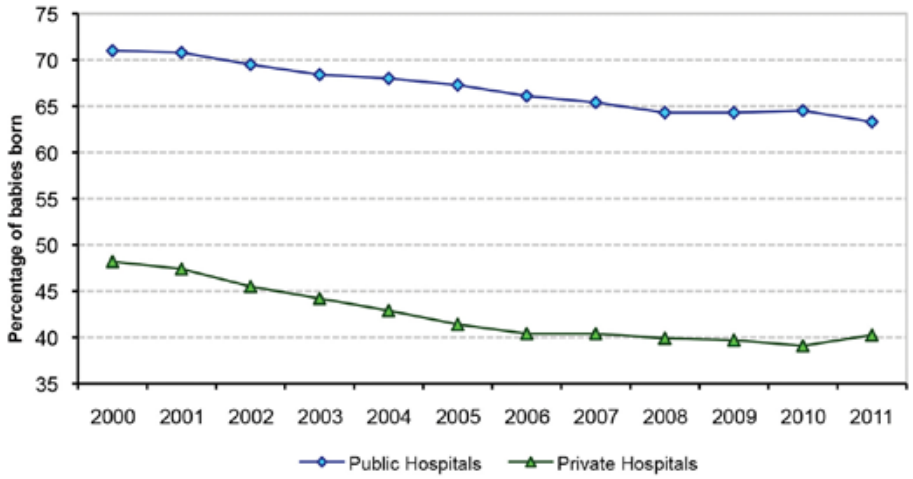

The method of assisted vaginal birth has changed significantly between 2000 and 2011, with vacuum extraction becoming the clearly favoured methodology (see Figure 28, and Tables 50 and 51).

Figure 28: Mode of assisted vaginal birth of babies, Queensland 2000 to 2011 (percentage of births)
*(see Tables 50 and 51)*



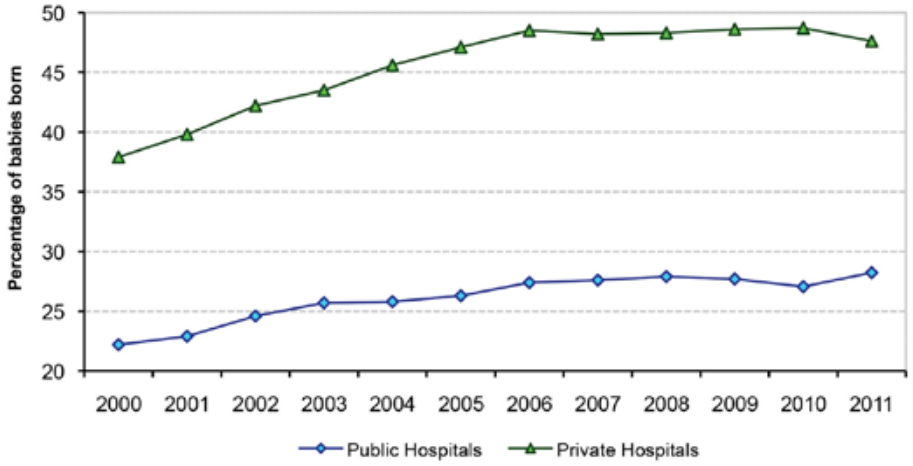

A marked disparity is seen between care in the public and private healthcare sectors, with the likelihood of a woman giving birth in the public healthcare sector having an unassisted vaginal birth being approximately 50% higher than a woman in the private healthcare sector—see Figure 29, and Tables 52 and 53 (2010 to 2011 private versus public risk ratio: RR = 0.62, 95% confidence limits = 0.61, 0.63).

Figure 29: Incidence of unassisted vaginal birth of babies by mode of healthcare delivery, Queensland 2000 to 2011 *(refer Tables 52 and 53)*



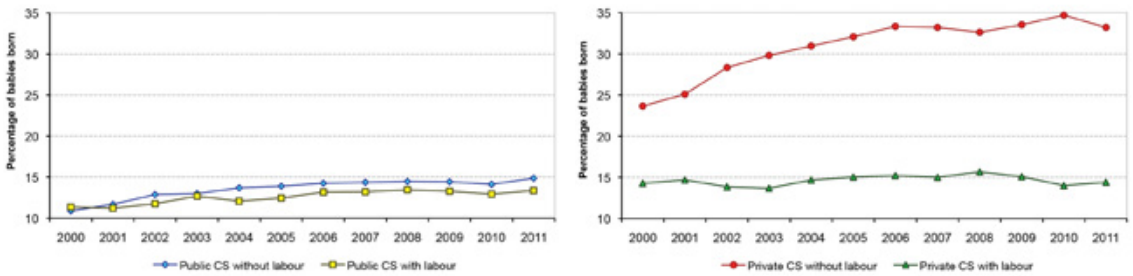

By 2010 and 2011, almost 50% of women giving birth in the private healthcare sector had a caesarean section birth, while less than one-third of women giving birth in the public healthcare sector had a caesarean section birth—see Figure 30, and Tables 52 and 53 (2010 to 2011 private versus public risk ratio RR = 1.74, 95% confidence limits = 1.72, 1.77).

Figure 30: Incidence of caesarean section birth of babies by mode of healthcare delivery, Queensland 2000 to 2011 *(see Tables 52 and 53)*



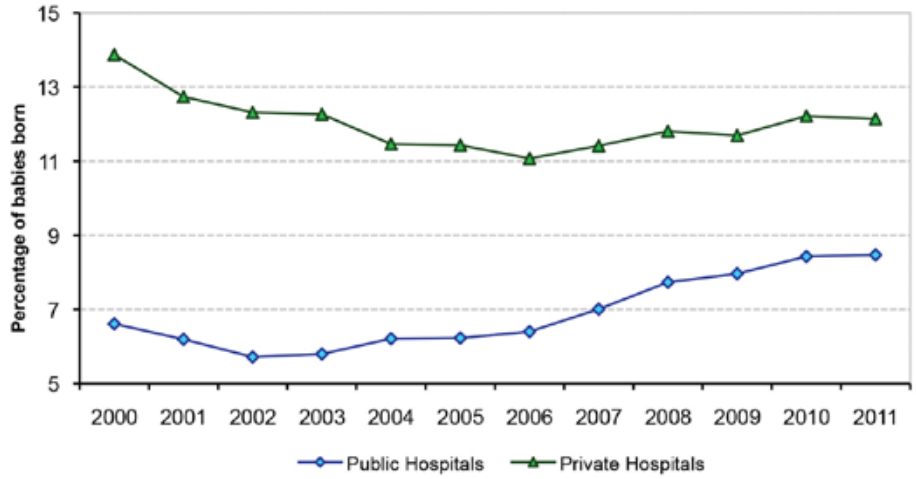

The difference in the rate of caesarean section between the two hospital systems is explained almost entirely by a highly significant preponderance of elective caesarean section (i.e. caesarean section without labour) in the private healthcare sector—see Figure 31, and Tables 54 and 55 (2010 to 2011 private versus public risk ratio for elective caesarean section RR = 2.30, 95% confidence limits = 2.28, 2.32, and the 2010 to 2011 private versus public risk ratio for non-elective caesarean section RR = 1.13, 95% confidence limits = 1.11, 1.14).

Figure 31: Incidence of caesarean section birth, before and in labour, of babies born in public and private hospitals, Queensland 2000 to 2011 *(see Tables 54 and 55)*



Assisted vaginal birth is also more frequently employed in private hospitals when compared with public hospitals—see Figure 32, and Table 52 and 53 (2010 to 2011 private versus public risk ratio: RR = 1.44, 95% confidence limits = 1.39, 1.49).

Figure 32: Incidence of assisted vaginal birth of babies by mode of healthcare delivery, Queensland 2000 to 2011 *(see Tables 52 and 53)*




Most women with breech presentations give birth by caesarean section (see Figure 33 and Table 56). The Term Breech study[20] was published in 2000 and, while the significance of the results of that study have been debated by many, the influence is clear with an obvious increase in the caesarean section rate in 2001. The rate has reduced a little to 85% to 87% in public hospitals, but remains in excess of 93% in private hospitals (2010 to 2011 private versus public risk ratio for elective caesarean section for breech presentation RR = 1.09, 95% confidence limits = 1.08, 1.09).

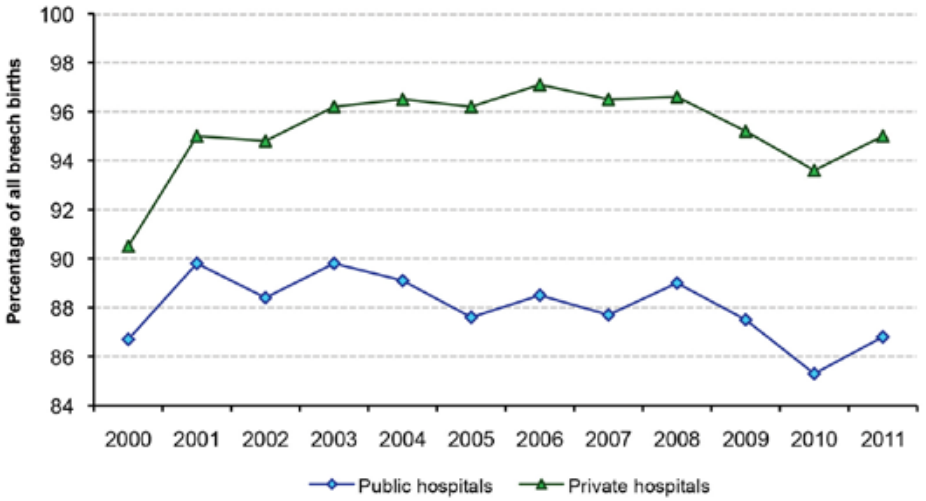


A feared consequence of these high caesarean section rates is the diminishing expertise in vaginal breech delivery. The RANZCOG recommends[21] that:

> *'while it is true that women with breech presentation at term will most often be delivered by caesarean section, management should be individualised'.*

The American College of Obstetricians and Gynecologists, in light of studies that further clarify the long-term risks of vaginal breech delivery, recommends that the decision regarding mode of delivery should depend on the experience of the health care provider[22].

Figure 33: Incidence of caesarean section birth of babies when there is a breech presentation, by mode of healthcare delivery, Queensland 2000 to 2011 *(see Table 56)*




20 Hannah ME et al. *Planned caesarean section versus planned vaginal birth for breech presentation at term: A randomised multicentre trial*. Lancet 2000; 356:1375.

21 RANZCOG statement C-Obs 11: Management of the Term Breech Presentation

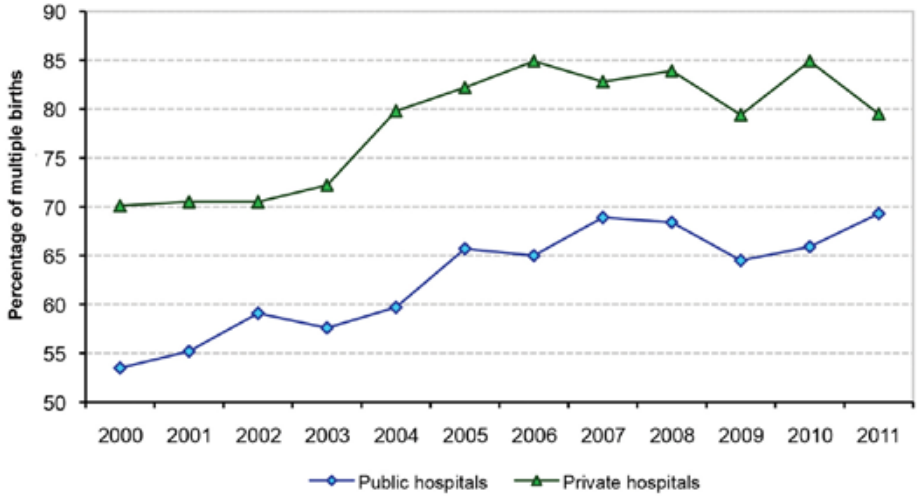
22 Mode of term singleton breech delivery. ACOG Committee Opinion No. 340. American College of Obstetricians and Gynecologists. Obstet Gynecol 2006;108:235–7.

**Recommendation**

- That the SMNCN seeks assistance from the RANZCOG and other relevant professional bodies to examine the possible development of a small number of obstetric services which retain, preserve and teach the obstetric skill of vaginal breech birth.

Women with multiple pregnancies are most likely to give birth by caesarean section, with the rate steadily increasing between 2000 and 2011—see Figure 34 and Table 57 (2010 to 2011 private versus public risk ratio for elective caesarean section for multiple pregnancy RR = 1.12, 95% confidence limits = 1.07, 1.18).

Figure 34: Incidence of caesarean section for multiple births by mode of healthcare delivery, Queensland 2000 to 2011
*(see Table 57)*

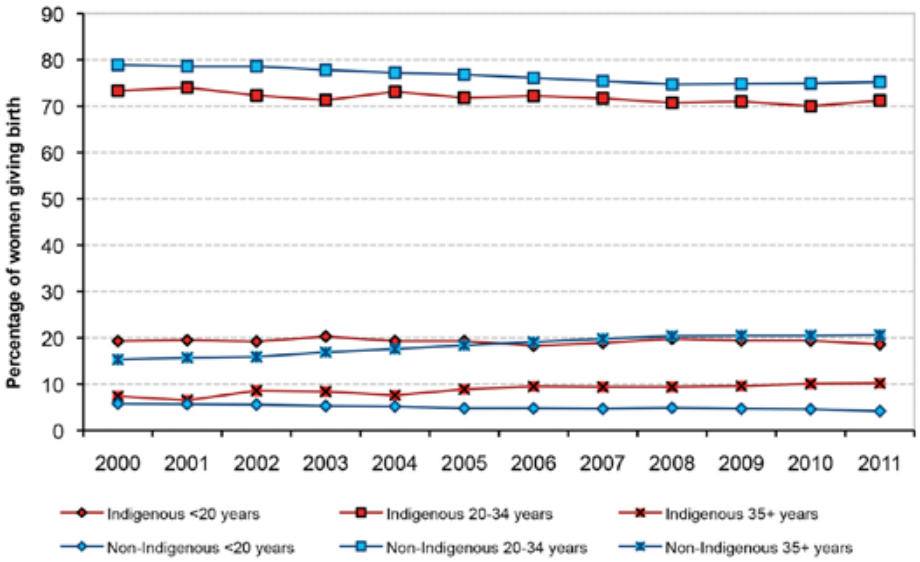



## 2.9 Indigenous mothers and their babies

Between 2009 and 2011, 10,486 Indigenous women gave birth in Queensland (5.7% of the total of 183,174 women giving birth). Of these women, 10,273 (97.9%) were cared for in the public healthcare sector, compared with 68.3% of non-Indigenous women who accessed public hospital care (see Table 58 and 59).

Just over 80% of Indigenous women giving birth are 20 or more years of age, whilst approximately 95% of non-Indigenous women giving birth are 20 or more years of age (see Figure 35, and Table 58 and 59).

Figure 35: Incidence of maternal age groups by maternal Indigenous status, Queensland 2000 to 2011
*(see Tables 58 and 59)*



As seen in Figures 36 to 39, and Tables 61 and 62, Indigenous women are more likely than non-Indigenous women to give birth at lower gestations (the Indigenous versus non-Indigenous risk ratio for birth at gestations of 33 weeks or less RR = 1.77, 95% confidence limits = 1.69, 1.86). This difference in gestational pattern has remained constant between 2000 and 2011.

Figure 36: Percentage of women giving birth, by maternal Indigenous status and gestational age, Queensland 2000 to 2011 *(see Tables 61 and 62)*

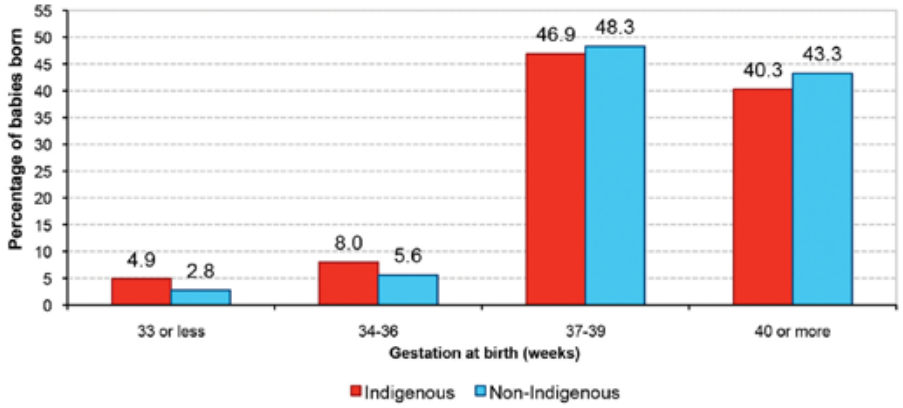



Figure 37: Incidence of women giving birth by gestational groups and maternal Indigenous status, Queensland 2000 to 2011 *(see Tables 61 and 62)*

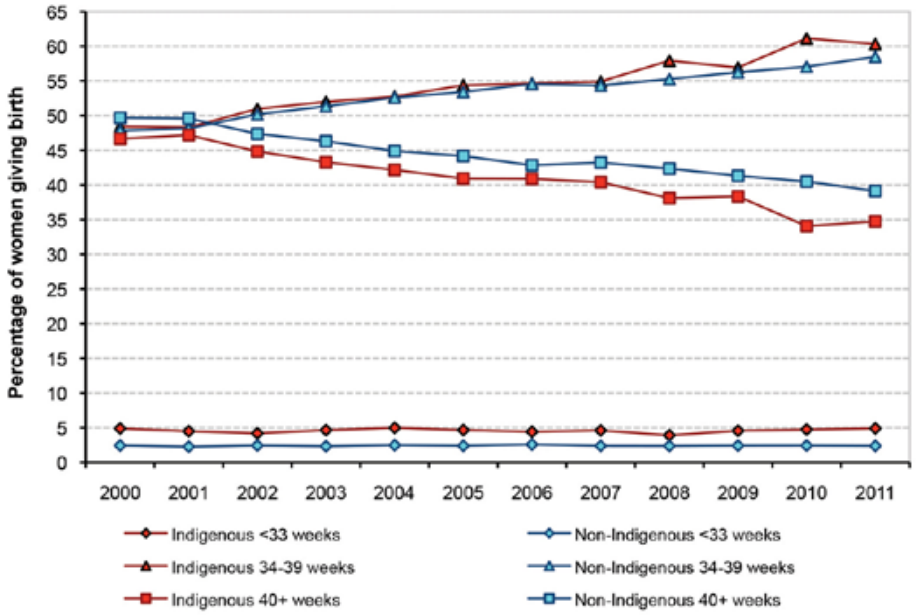



Figure 38: Incidence of birth by gestation at birth and maternal Indigenous status, Queensland 2000 to 2011 *(see Table 62)*

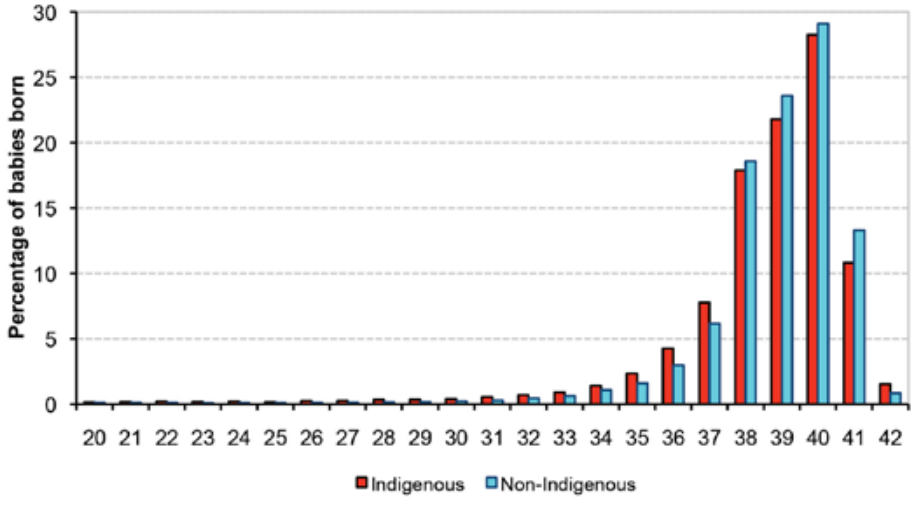
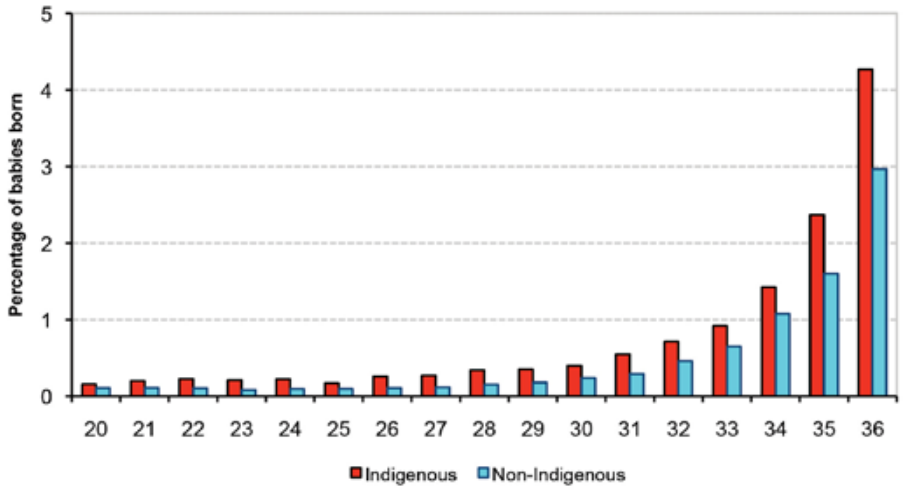
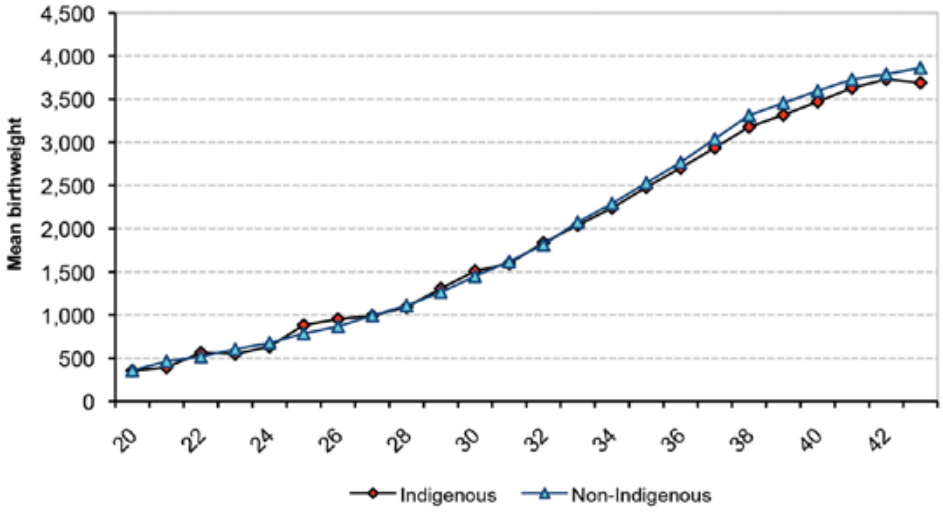


Figure 39: Incidence of birth at or below 36 weeks gestation by maternal Indigenous status, Queensland 2000 to 2011, detail from Figure 38
*(see Table 62)*



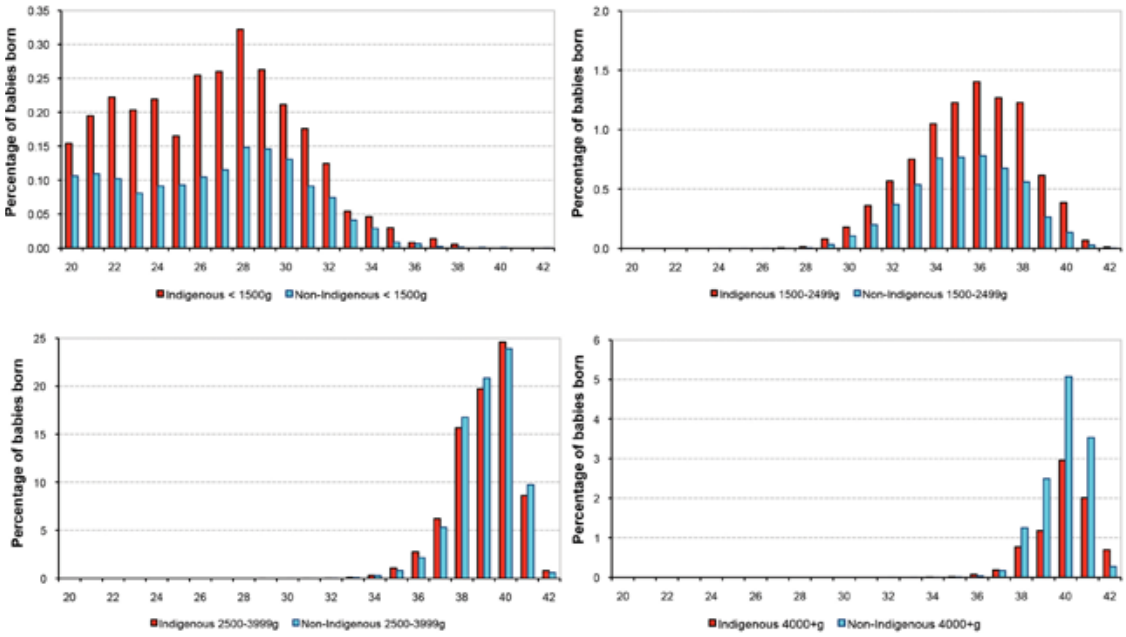

Gestational age-specific birthweights are similar for Indigenous and non-Indigenous babies (see Figure 40 and Table 62).

Figure 40: Mean birthweight by gestational age and maternal Indigenous status, Queensland 2000 to 2011
*(see Table 61 and 62)*




The different gestational patterns between Indigenous and non-Indigenous pregnancies means that the rate of low birthweight Indigenous babies being born is significantly higher than for non-Indigenous babies—see Figure 41 and Table 62 on the following page (the Indigenous versus non-Indigenous risk ratio for birthweight less than 2500 grams: RR = 1.81, 95% confidence limits = 1.76, 1.87).

Figure 41: Percentage of babies by gestation, birthweight group and maternal Indigenous status, Queensland 2000 to 2011
*(see Table 62)*




### 2.9.1 Department of Health performance indicators in Aboriginal and Torres Strait Islander health related to maternity and newborn care

In 2007, the Department of Health committed to establish measurable accountabilities, starting with key areas of chronic disease, maternal and child health. This set of statewide indicators is drawn principally from Queensland Hospital Admitted Patient Data Collection and the Queensland Perinatal Data Collection. Four indicators, reported here, relate to maternity and newborn care in public healthcare.

**Aboriginal and Torres Strait Islander women who smoked after 20 weeks gestation**

This indicator is defined as:

*the proportion of Aboriginal and Torres Strait Islander women who smoked after 20 weeks gestation.*

**Aboriginal and Torres Strait Islander women who smoked at any time during pregnancy**

This indicator is defined as:

*the proportion of Aboriginal and Torres Strait Islander women who smoked at any time during pregnancy.*

The perinatal data collection includes data items of smoking at less than 20 weeks gestation during pregnancy and smoking after 20 weeks gestation during pregnancy. The statewide data collection allowing calculation of these indicators commenced in mid–2009. Using these two data items (see Tables 63 and 64) the 2010 to 2011 rate of women who identified as Aboriginal and/or Torres Strait Islander smoking:

- at less than 20 weeks gestation during pregnancy was 51.3%
- after 20 weeks gestation during pregnancy was 45.4%.

The relevant incidence in non-Indigenous women was 14.4% and 11.6%.

**Aboriginal and Torres Strait Islander women who attended five or more antenatal visits during pregnancy**

This indicator is defined as:

*the number of Aboriginal and Torres Strait Islander women who attended at least five antenatal visits and gave birth at 32 weeks or more gestation to a live or stillborn baby as a proportion of Aboriginal and Torres Strait Islander women who gave birth at 32 weeks or more gestation resulting in at least one live born or still born baby.*

Between 2008 and 2011, 78.9% of women identifying as Aboriginal and/or Torres Strait Islander attended five or more antenatal visits (see Table 65), with an increase from 76.3% to 83.4%. The relevant rate in non-Indigenous women was 94.4%.

**Low birthweight babies (weighing less than 2500 grams at birth) born to Aboriginal and Torres Strait Islander women**

This indicator is defined as:

> *the rate of low birthweight among liveborn babies, of Aboriginal and Torres Strait Islander mothers as a proportion of liveborn babies, of Aboriginal and Torres Strait Islander mothers. Low birthweight is defined as less than 2500 grams.*

Between 2008 and 2011, 11.4% of babies of women identifying as Aboriginal and/or Torres Strait Islander (see Table 66) weighed less than 2500 grams. The relevant rate in the babies of non-Indigenous women was 6.5%.

Given the information provided in Figures 36 to 41, and Tables 61 and 62, detailed in Section 2.9 above (Indigenous mothers and their babies), it would be relevant to consider basing an indicator on gestation as well as the current indicator based on birthweight.

**Recommendation**

- That the HSU consider progressing a recommendation through the appropriate mechanisms of government to COAG, to develop an indicator relating to gestation at birth (e.g. less than 37 weeks gestation) in addition to the indicator relating to Indigenous baby birthweight. The Indigenous baby birthweight indicator may be more valuable if calculated for gestation equal to 37 or more weeks, tracking near-term intrauterine growth restriction.

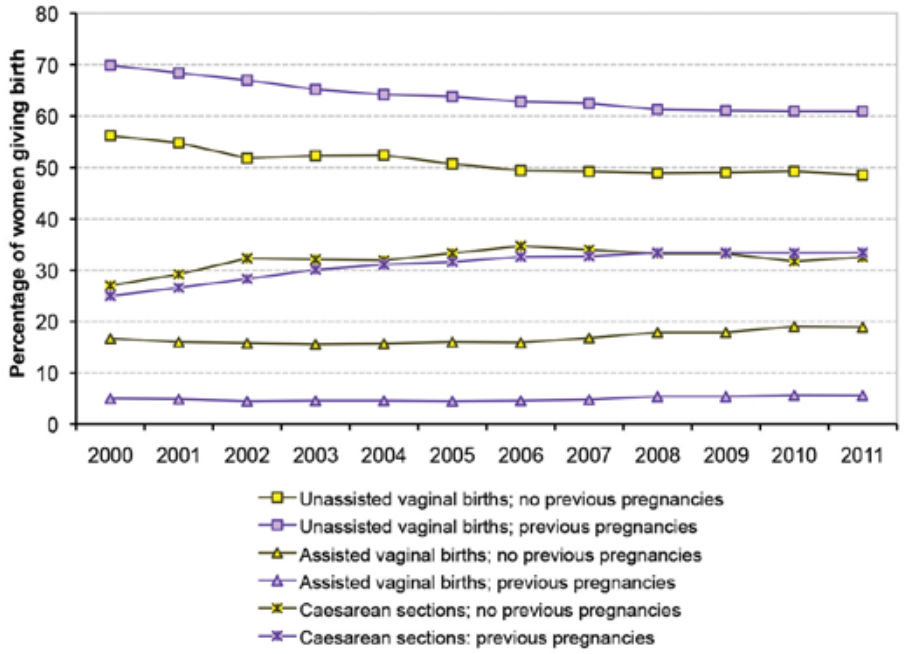
## 2.10 Influence of maternal risk factors

Risk assessment is an important element of care provision, matching likely care requirements to that available in different facilities. This section seeks to clarify the current evidence in Queensland regarding the importance of a number of the known 'risk factors' for all pregnant women.

### 2.10.1 Effect of previous pregnancy on mode of birth

Previous pregnancy (without considering the previous mode of birth) does provide a degree of prediction regarding likely mode of vaginal birth (unassisted versus assisted), but does not significantly predict the likelihood of caesarean section birth (see Figure 42, and Tables 67 and 68). Women who have had a previous pregnancy are more likely to have an unassisted vaginal birth than women who have not had a previous pregnancy (63.8% versus 50.9%). The 2000 to 2011 previous pregnancy versus no previous pregnancy risk ratio for unassisted vaginal birth: RR = 1.25, 95% confidence limits = 1.25, 1.26.

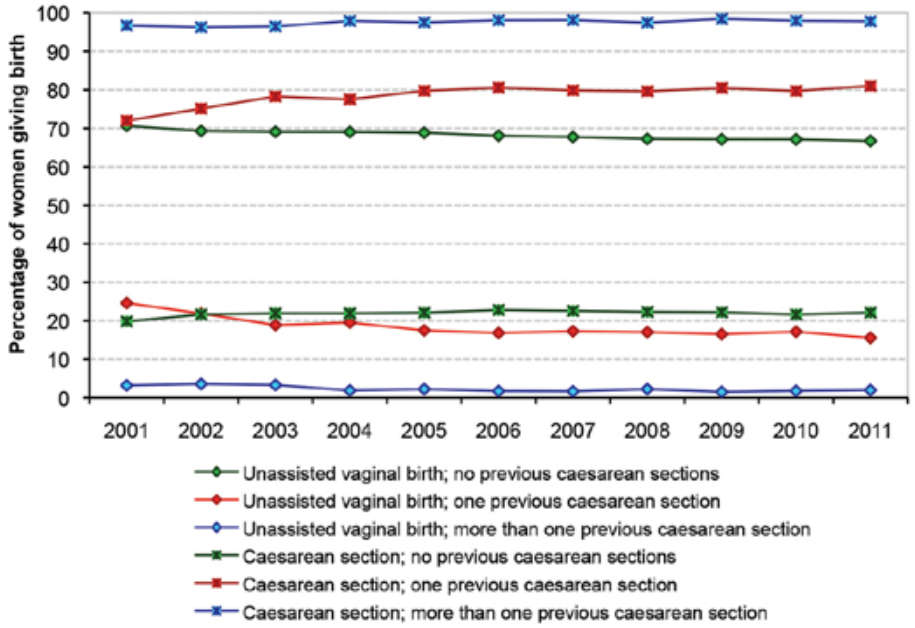
Figure 42: Incidence of mode of birth by previous pregnancy, Queensland 2000 to 2011
*(see Tables 67 and 68)*




## 2.10.2 Effect of previous caesarean section on mode of birth

Almost 78% of women who have not had a previous caesarean section give birth by the vaginal route (unassisted or assisted), compared with 21% who have had one previous caesarean section and less than 3% who have had more than one previous caesarean section—see Figure 43, and Tables 69 and 70 (2001 to 2011 one previous caesarean section versus no previous caesarean section risk ratio for vaginal birth: RR = 0.27, 95% confidence limits = 0.266, 0.274).

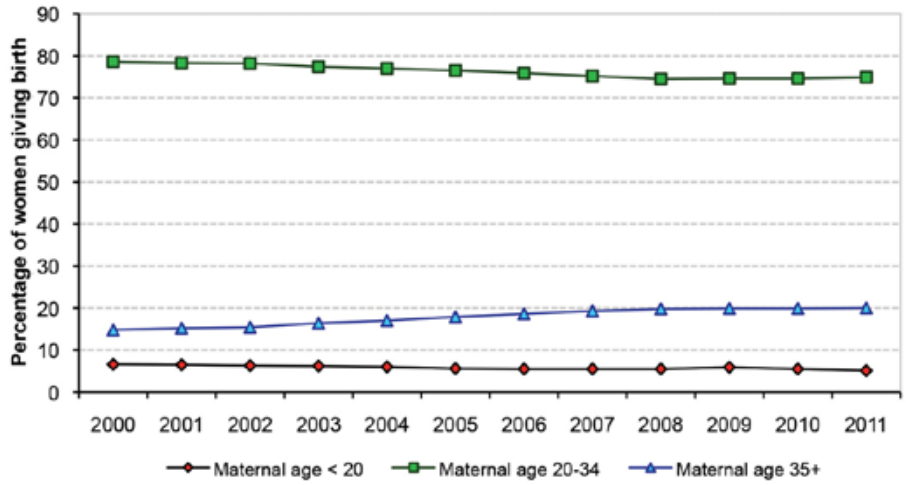
Figure 43: Incidence of mode of birth by previous caesarean sections, Queensland 2001 to 2011—number of previous caesarean sections completely collected since 2001
*(see Tables 69 and 70)*



### 2.10.3 Maternal age

Between 2000 and 2011, the rate of birth for women over the age of 35 years has increased from 15% to 20% (see Figure 44 and Table 71), with concomitant decreases in the rate of birth to women in the 20 to 34 years and less than 20 years age groups (maternal age 35 years or more 2010–2011 versus 2000–2001: RR = 1.33, 95% confidence limits = 1.30, 1.35).

Figure 44: Percentage of births by maternal age group, Queensland 2000 to 2011
*(see Table 71)*




Almost all women aged 20 years or less are cared for in the public healthcare sector, (see Figure 45 and Table 71). Approximately one-quarter of women aged 20 to 34 years and almost one-half of women aged 35 years or more are cared for in the private healthcare sector (see Figures 46 and 47, and Table 72).



Figure 45: Number of births to women less than 20 years of age by mode of healthcare delivery, Queensland 2000 to 2011
*(see Table 72)*

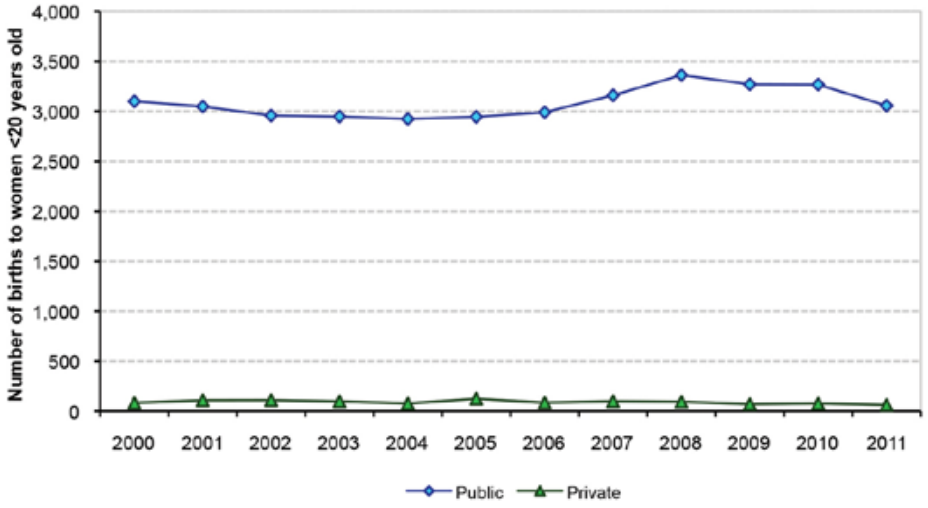


Figure 46: Number of births to women 20–34 years of age by mode of healthcare delivery, Queensland 2000 to 2011
*(see Table 72)*

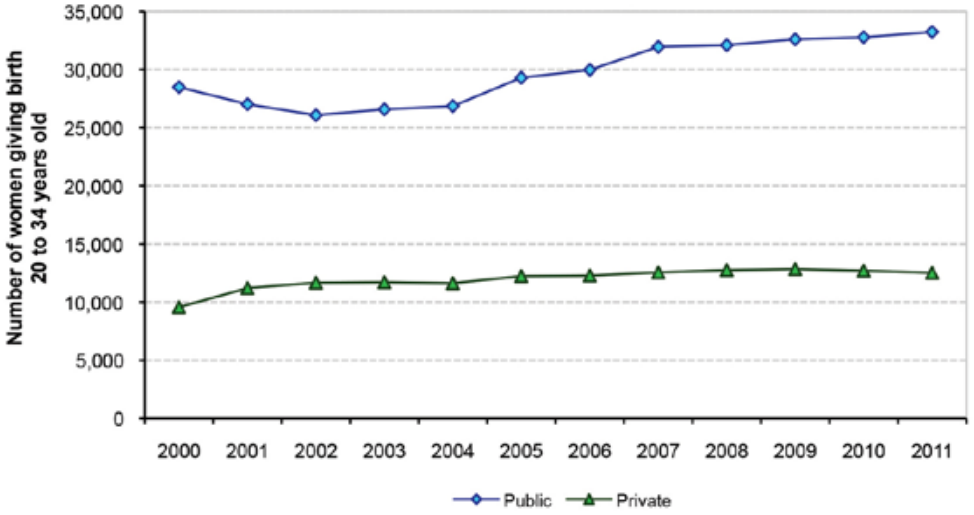
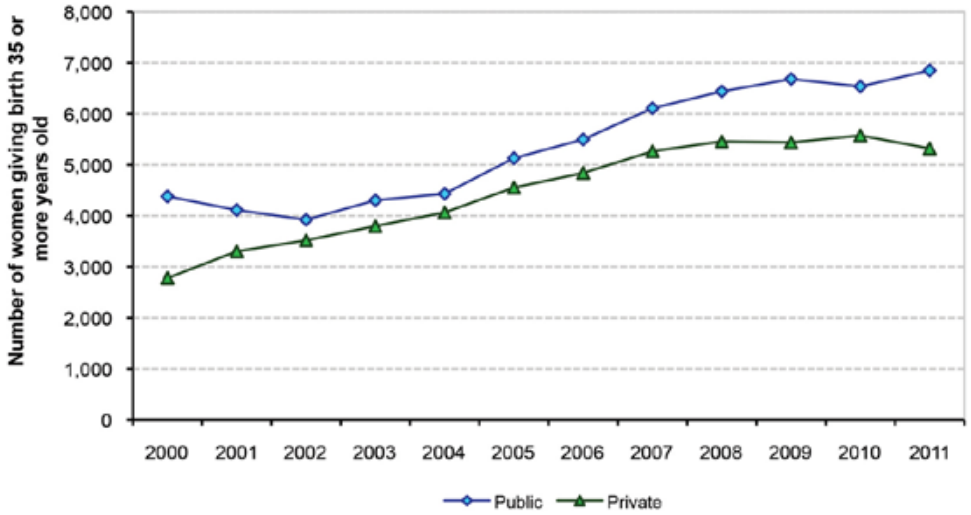
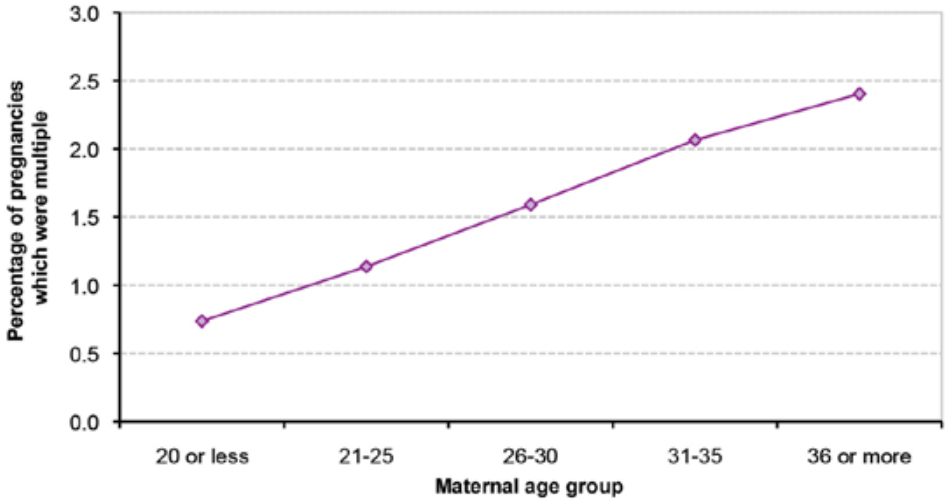



Figure 47: Number of births to women 35 or more years of age by mode of healthcare delivery, Queensland 2000 to 2011
*(refer Table 72)*



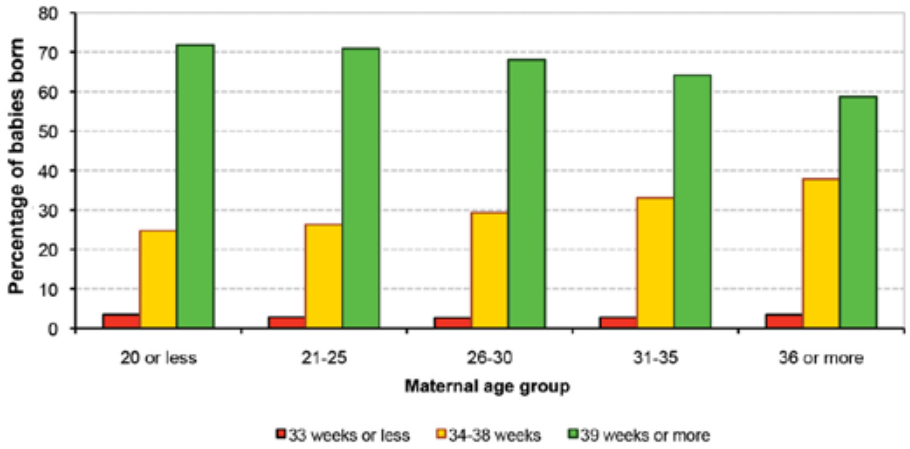

There is an almost linear increase in the rate of multiple birth as the age of women increases—see Figure 48 and Table 73 (2008 to 2011 maternal age 31 years or more versus maternal age 25 or less risk ratio for multiple pregnancy: RR = 2.15, 95% confidence limits = 2.04, 2.26). It is unclear as to how much of this difference in incidence relates to the use of assisted reproduction technologies.

Figure 48: Incidence of multiple birth by maternal age, Queensland 2008 to 2011
*(see Table 73)*



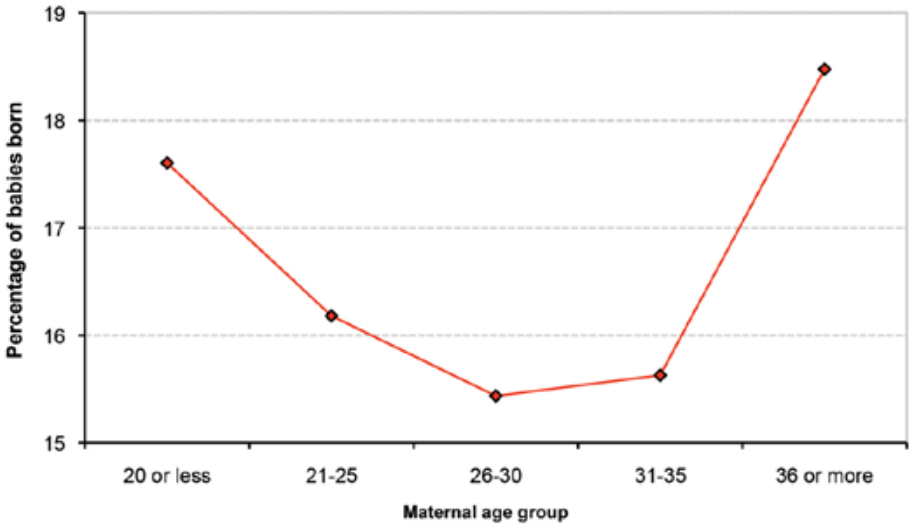

Older women are more likely than younger women to give birth between 34 and 38 weeks gestation, rather than 39 weeks or more—see Figure 49 and Table 74 (2000 to 2011, maternal age 31 years or more versus maternal age 25 or less risk ratio for birth between 34 and 38 weeks gestation: RR = 1.34, 95% confidence limits = 1.33, 1.36).

Figure 49: Percentage of babies born by maternal age and gestation, Queensland 2000 to 2011
*(see Table 74)*




Babies of women 36 or more years of age and women 20 or less years of age are most likely to need newborn care in NICU and/or a SCN—see Figure 50 and Table 75 (2000 to 2011, maternal age 36 years or more versus maternal age 35 years or less risk ratio for NICU and/or SCN care: RR = 1.16, 95% confidence limits = 1.15, 1.18, and 2000 to 2011, maternal age 20 years or less versus maternal age 21 years or more risk ratio for NICU and/or SCN care: RR = 1.09, 95% confidence limits = 1.07, 1.11).

Figure 50: Percentage of babies requiring admission to NICU or special care units by maternal age, Queensland 2000 to 2011
*(see Table 75)*




## 2.10.4 Maternal obesity

Maternal height and weight collection began in mid–2007—data and comments in this section relate to the four-year period 2008 to 2011. Overweight and obesity are defined by body mass index (BMI = kg/m$^2$).

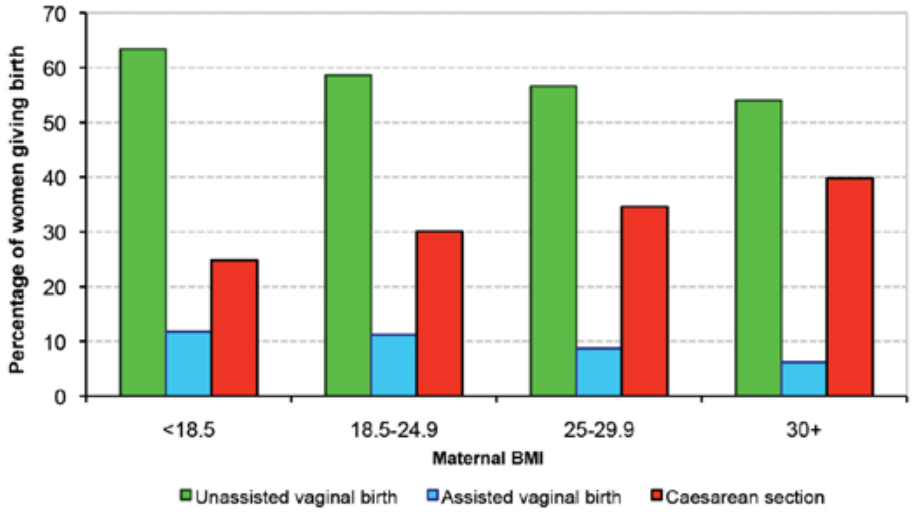
A person with a BMI of:

- 25.0–29.9 is classified as overweight
- ≥ 30.0 is classified as obese
- ‹18.5 is classified as underweight.

One in five women pregnant between 2008 and 2011 (20.9%) were obese, and a further 26.6% were overweight (see Tables 77 to 79). Women in the overweight and obese categories were more likely to be cared for in the public healthcare sector than in the private healthcare sector or homebirth (see Table 77). Women over the age of 20 years were more likely to be obese when compared with women less than 20 years of age (see Table 78).

The likelihood of a woman having a caesarean section birth increased progressively with increasing BMI (see Figure 51 and Table 79). The caesarean section rate for obese women was 39.8%, compared with 30.2% for women with a BMI considered to be within the normal range. In 2008 to 2011, the BMI 30 or more versus 18.5 to 24.9 risk ratio for caesarean section birth: RR = 1.27, 95% confidence limits = 1.25, 1.28). Both unassisted vaginal birth rate and assisted vaginal birth rate showed a concomitant progressive decrease.

Figure 51: BMI versus mode of birth, Queensland 2008 to 2011 *(see Table 79)*



Obesity does not appear to have any significant influence on gestation at birth (see Figure 52 and Table 80). Obese women are more likely to have a baby weighing more than 4000 grams when compared with lighter women, and underweight women are more likely than heavier women to have a baby weighing less than 2500 grams (see Figure 53 and Table 81).

Figure 52: BMI versus gestation at birth, Queensland 2008 to 2011 *(see Table 80)*

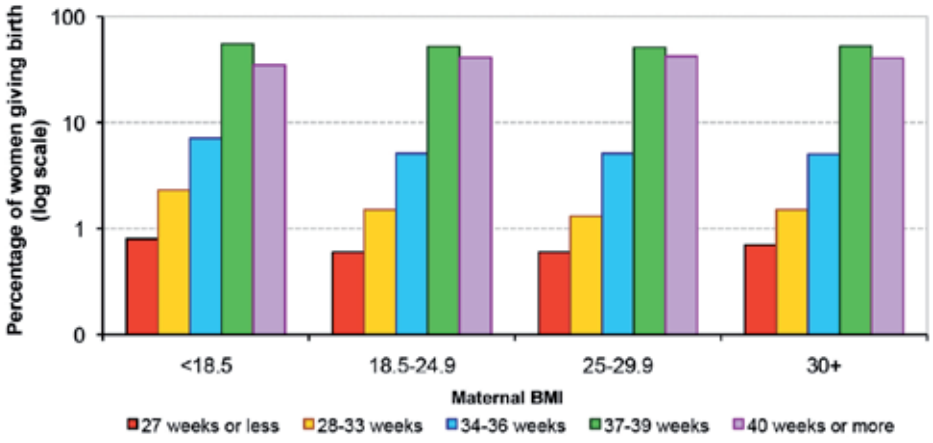
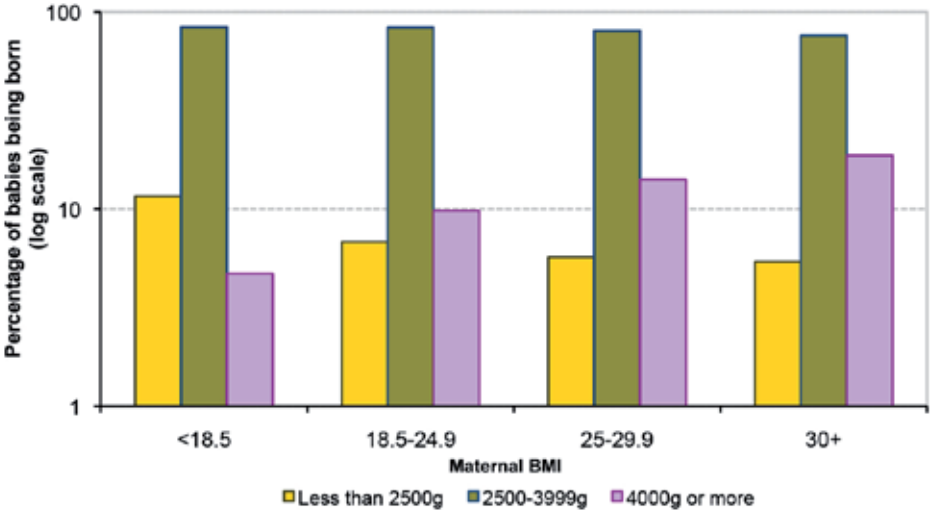
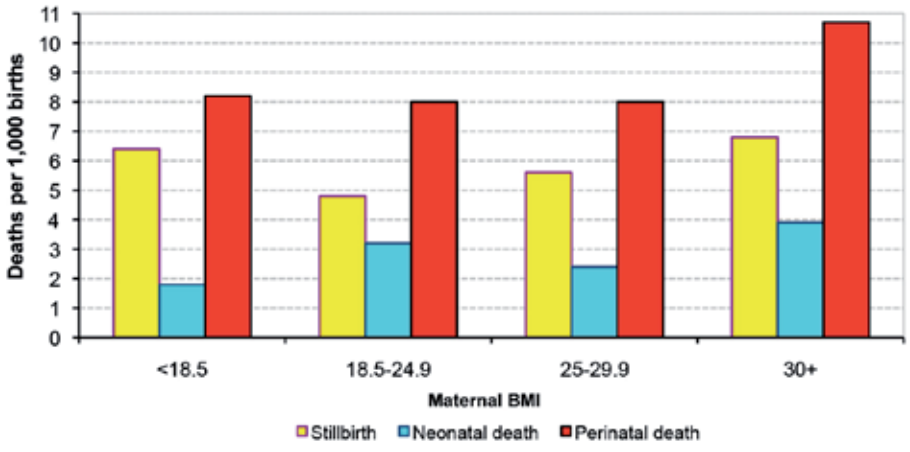



Figure 53: BMI versus birthweight, Queensland 2008 to 2011 *(see Table 81)*




Obesity is associated with an excessive incidence of perinatal death (25% more likely than in woman with a BMI less than 30 (2008 to 2011 BMI 30 or more versus BMI less than 30 risk ratio for perinatal death: RR = 1.33, 95% confidence limits = 1.21, 1.47). Both fetal death and neonatal death rates are increased in this obese group (see Figure 54 and Table 82).

Figure 54: BMI versus perinatal mortality rates (per 1,000 births), Queensland 2008 to 2011 *(see Table 82)*

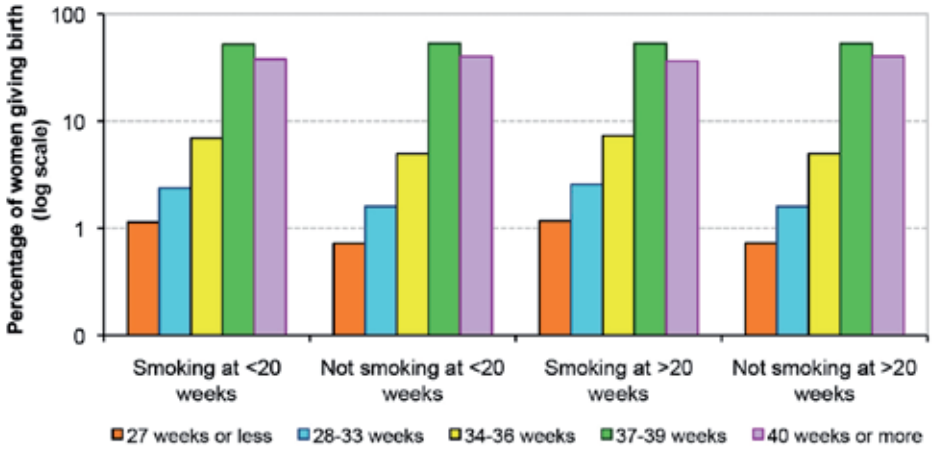


### 2.10.5 Maternal smoking

Smoking status before and after 20 weeks gestation has been collected since mid–2009. Younger women are more likely to smoke than older women (see Table 83). The rate of smoking after 20 weeks gestation is 13.6%, compared with 16.6% before 20 weeks gestation.

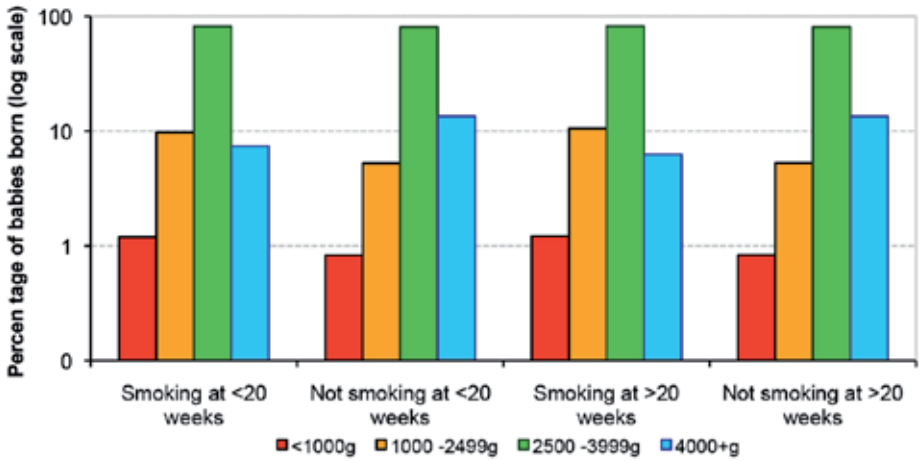
Women who smoke are more likely to give birth preterm. Smoking after 20 weeks gestation is associated with a rate of preterm birth (less than 37 weeks gestation) of 20.9%, compared with 18.1% for women who do not smoke after 20 weeks gestation—see Figure 55 and Table 84 (2010 to 2011 smoking after 20 weeks gestation versus not smoking after 20 weeks gestation risk ratio for birth at gestations less than 37 weeks: RR = 1.42, 95% confidence limits = 1.36, 1.49).

Figure 55: Smoking versus gestation, Queensland 2010 to 2011
*(see Table 84)*



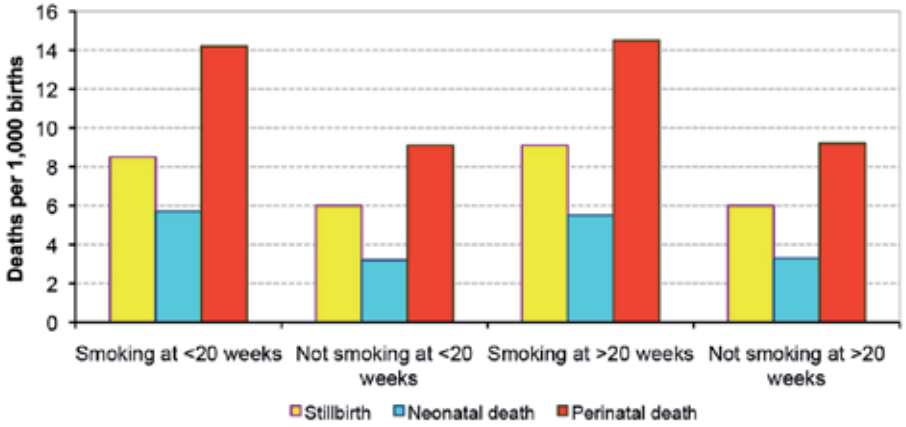

Cigarette smoking is associated with a significantly higher incidence of birth of babies with birthweight less than 2500 grams, and a lower incidence of birth of babies with birthweight 4000 grams or more—see Figure 56 and Table 85 (2010 to 2011 smoking after 20 weeks gestation versus not smoking after 20 weeks gestation risk ratio for birthweight less than 2500 grams: RR = 1.93, 95% confidence limits = 1.84, 2.02). The birthweight distribution appears similar for women who smoke before 20 weeks and those who continue to smoke after 20 weeks gestation.

Figure 56: Smoking versus birthweight, Queensland 2010 to 2011
*(refer Table 85)*




Smoking in pregnancy, whether before or after 20 weeks gestation, is associated with a more than 50% increase in the risk of perinatal death (see Figure 57 and Table 86). Women who smoke before 20 weeks gestation have a perinatal mortality rate of 14.2 per 1000 births, compared with 9.1 per 1000 births for women who do not smoke before 20 weeks gestation. The risk of perinatal death rises marginally for women who continue to smoke after 20 weeks gestation—14.5 per 1000 births (2010 to 2011 smoking after 20 weeks gestation versus not smoking after 20 weeks gestation risk ratio for perinatal death: RR = 1.57, 95% confidence limits = 1.37, 1.81).

Figure 57: Smoking versus perinatal mortality rates (per 1,000 births), Queensland 2010 to 2011
*(see Table 86)*




**Good practice point**

- Smoking cessation programs as part of routine antenatal care reduce fetal exposure to cigarette smoke, low birthweight and preterm birth, and should form part of routine antenatal care[23]. Specialised programs to assist Indigenous women to stop smoking before and during pregnancy should be prioritised.

### 2.10.6 Remoteness of residence

The Accessibility/Remoteness Index of Australia (ARIA) is an index of the accessibility of places to service centres, or conversely of remoteness of places[24]. Geographical areas are given a score (continuous between zero and15) based on the road distance to service towns of different sizes. Scores for regions are derived by averaging scores of 1 $km^2$ grid.

This section examines the relationship between remoteness classes of the primary residence of the mothers and some outcomes. The index scores can be classified into various categories—five remoteness classes are used:

- Highly accessible (ARIA score 0 to ‹0.20)—relatively unrestricted accessibility to a wide range of goods and services and opportunities for social interaction.
- Accessible (ARIA score 0.20 to ‹2.40)—some restrictions to accessibility of some goods, services and opportunities for social interaction.
- Moderately accessible (ARIA score 2.40 to ‹5.95)—significantly restricted accessibility of goods, services and opportunities for social interaction.
- Remote (ARIA score 5.95 to ‹10.5)—very restricted accessibility of goods, services and opportunities for social interaction.
- Very remote (ARIA score 10.5 to ‹15)—very little accessibility of goods, services and opportunities for social interaction.

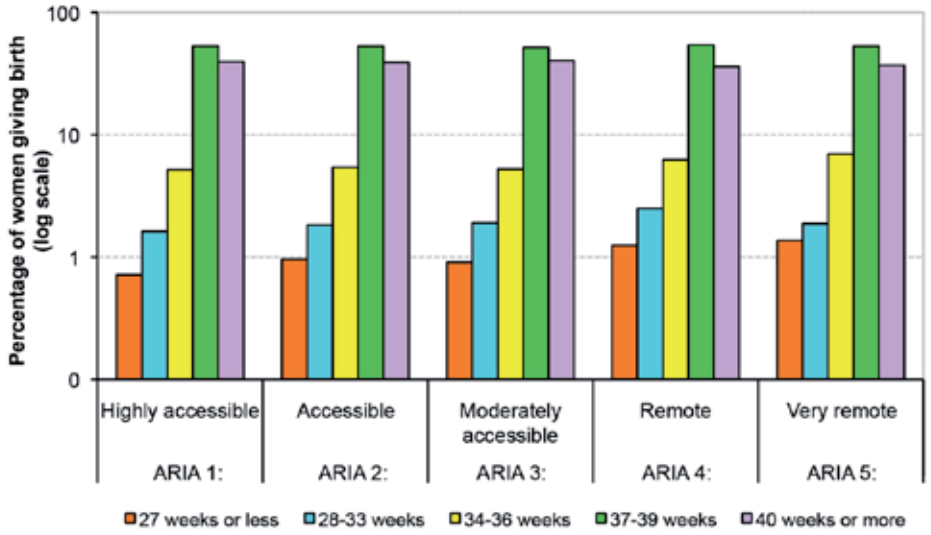
Women living in highly accessible and accessible areas (Class 1 and 2; ARIA score 0 to ‹2.40) are more likely to give birth at or after 37 weeks gestation (92.3%) than women who live in remote and very remote areas (89.9%) (Class 4 and 5; ARIA score 5.95 to ‹15) (Figure 58 and Table 87) (2010 to 2011 ARIA class 1 and 2 versus ARIA Class 4 and 5 risk ratio for birth at or after 37 weeks: RR = 1.03, 95% confidence limits = 1.02, 1.04).



23 Lumley J, Chamberlain C, Dowswell T, Oliver S, Oakley L, Watson L. Interventions for promoting smoking cessation during pregnancy. Cochrane Database of Systematic Reviews 2009, Issue 3.

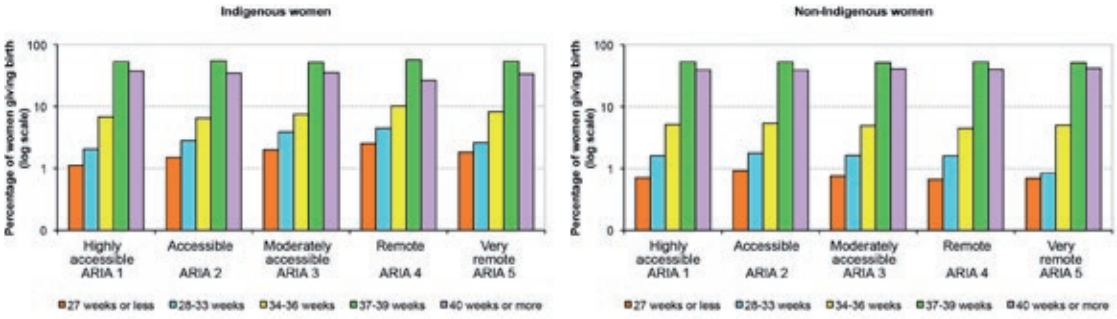
24 http://www.oesr.qld.gov.au/about-statistics/statistical-standards/national/aria.php

Figure 58: Remoteness of residence versus gestation, Queensland 2010 to 2011
*(see Table 87)*



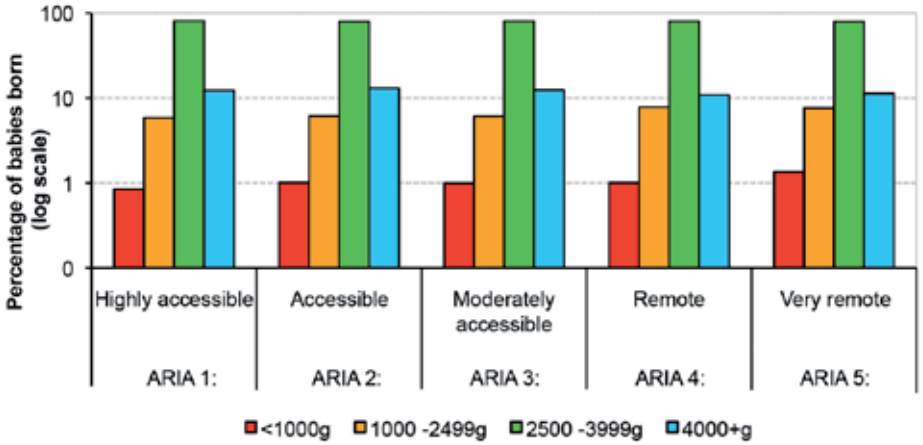

Remoteness of residence appears to have little effect on the likelihood of non-Indigenous women having a preterm birth (risk ratio confidence limits include unity), but the likelihood of preterm birth rises with remoteness for Indigenous women—see Figure 59 and Table 87 (2010 to 2011 ARIA Class 1 and 2 versus ARIA Class 4 and 5 risk ratio for birth at or after 37 weeks: RR = 1.05, 95% confidence limits = 1.02, 1.07).

Figure 59: Remoteness of residence and Indigenous status versus gestation, Queensland 2010 to 2011
*(refer Table 87)*



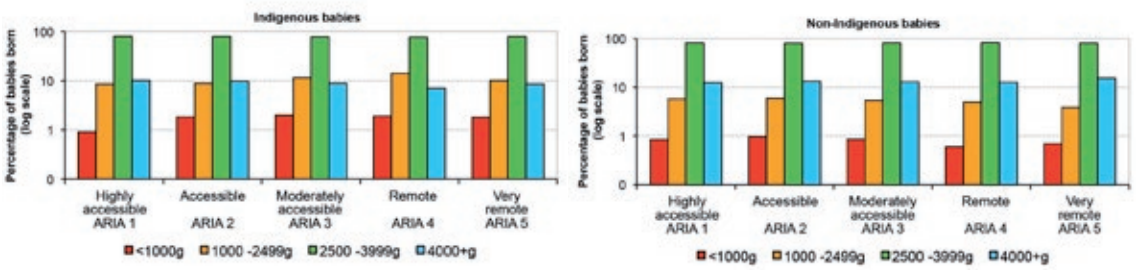

Women living in highly accessible and accessible areas (Class 1 and 2; ARIA score 0 to ‹2.40) are less likely to give birth to low birthweight babies (6.8%) than women who live in remote and very remote areas (8.9%) (Class 4 and 5; ARIA score 5.95 to ‹15)—see Figure 60 and Table 88 (2010 to 2011 ARIA class 1 and 2 versus ARIA class 4 and 5 risk ratio for birthweight ‹2500 grams: RR = 1.31, 95% confidence limits = 1.18, 1.45).

Figure 60: Remoteness of residence versus birthweight, Queensland 2010 to 2011
*(refer Table 88)*



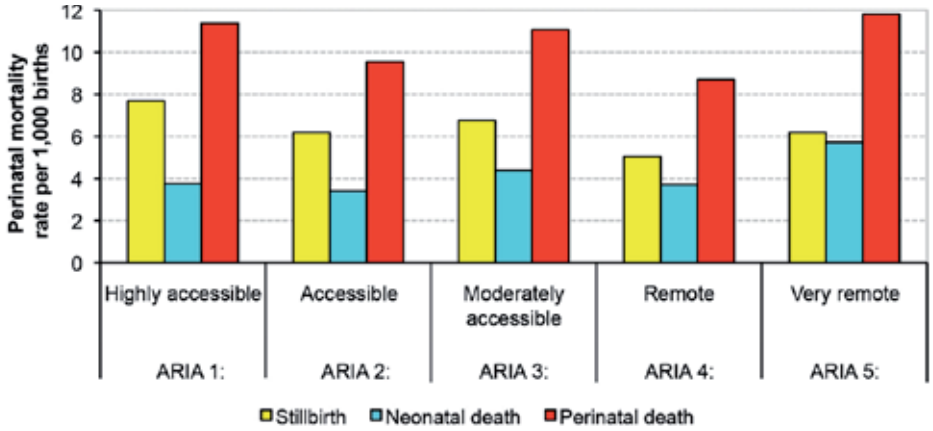
The likelihood of low birthweight birth rises with remoteness for Indigenous women—13.6% of Indigenous women who live in remote and very remote areas gave birth to low birthweight babies versus 10% of Indigenous women living in highly accessible and accessible areas—see Figure 61 and Table 88 (2010 to 2011 ARIA Class 1 and 2 versus ARIA Class 4 and 5 risk ratio for Indigenous birthweight ‹2500 grams: RR = 1.36, 95% confidence limits = 1.16, 1.60). Paradoxically, 5.2% of non-Indigenous women who live in remote and very remote areas gave birth to low birthweight babies versus 6.7% of non-Indigenous women living in highly accessible and accessible areas (2010 to 2011 ARIA Class 1 and 2 versus ARIA Class 4 and 5 risk ratio for non-Indigenous birthweight ‹2500 grams: RR = 0.78, 95% confidence limits = 0.65, 0.93).

Figure 61: Remoteness of residence and Indigenous status versus birthweight, Queensland 2010 to 2011
*(see Table 88)*




Overall, women living in highly accessible and accessible areas (Class 1 and 2; ARIA score 0 to ‹2.40) have similar perinatal mortality rates to women who live in remote and very remote areas (Class 4 and 5; ARIA score 5.95 to ‹15) 10 per 1000 births versus 10.1 per 1000 births—see Figure 62 and Table 89 (risk ratio confidence limits include unity, and hence the difference is not statistically significant).

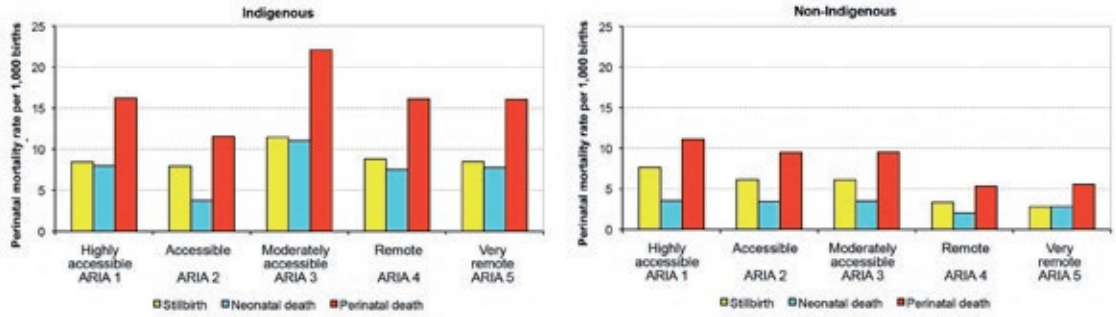
Figure 62: Remoteness of residence versus perinatal mortality rates (per 1,000 births), Queensland 2010 to 2011
*(see Table 89)*




The perinatal mortality rate for babies of Indigenous women who live in remote and very remote areas was 16.1 per 1000 births versus 13.8 per 1000 births for babies of Indigenous women living in highly accessible and accessible areas—see Figure 63 and Table 89 (risk ratio confidence limits include unity). On the other hand, babies of non-Indigenous women who live in remote and very remote areas had a lower perinatal mortality rate (5.4 per 1000 births) than babies of non-Indigenous women living in highly accessible and accessible areas (9.9 per 1000 births)—2010 to 2011 ARIA Class 4 and 5 versus ARIA Class 1 and 2 risk ratio for non-Indigenous perinatal death: RR = 0.54, 95% confidence limits = 0.31, 0.96.

Figure 63: Remoteness of residence and Indigenous status versus perinatal mortality rates (per 1,000 births), Queensland 2010 to 2011

*(see Table 89)*




## 2.10.7 Socio-economic disadvantage

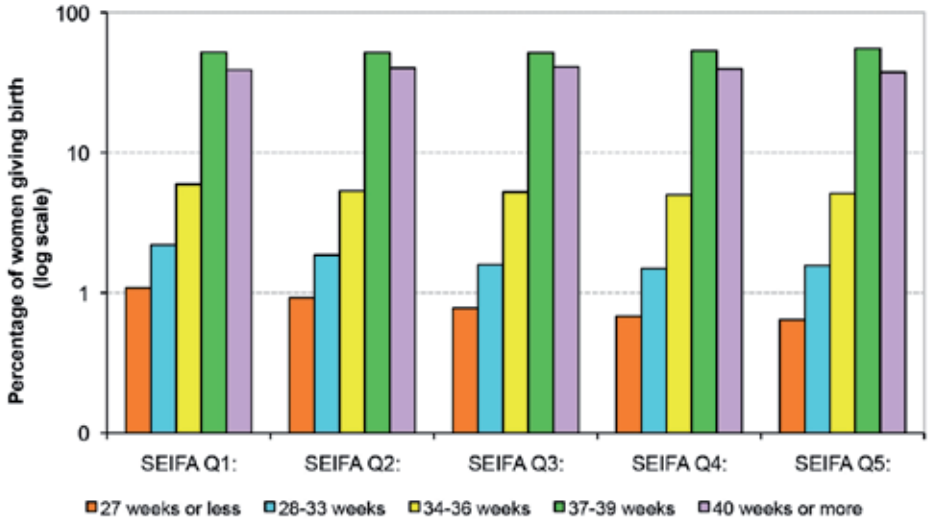
SEIFA are summary measures of a number of variables that represent different aspects of relative socio-economic disadvantage and/or advantage in a geographic area[25]. The SEIFA indexes are created by combining information collected regarding economic and social resources of people and households within an area in the five-yearly Census of Population and Housing. This section examines the index of relative socio-economic advantage and disadvantage in relation to selected outcomes. This SEIFA index ranks different geographic areas of Australia according to a 'score' that is created for the area based on characteristics of people, families and dwellings within that area. For the purposes of this report the SEIFA index of relative socio-economic advantage and disadvantage is divided into five percentage-based groups (quintiles), producing a continuum of advantage (high values–quintiles five and four) to disadvantage (low values–quintiles one and two).

Women who were in the more disadvantaged groups (SEIFA quintiles one and two) were more likely to give birth before 37 weeks gestation (8.5%) than women who were in the more advantaged groups (7.2%) (SEIFA quintiles four and five)—see Figure 64 and Table 90 (2010 to 2011 SEIFA quintiles one and two versus SEIFA quintiles four and five risk ratio for birth before 37 weeks: RR = 1.18, 95% confidence limits = 1.13, 1.24).



Figure 64: SEIFA quintile versus gestation, Queensland 2010 to 2011

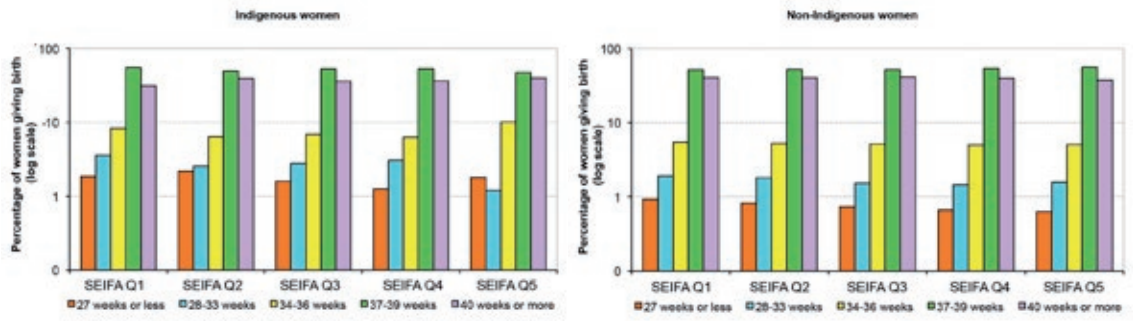
*(see Table 90)*




There is little difference in the incidence of preterm birth before 37 weeks gestation between Indigenous women in the more disadvantaged groups (12.6%) and the more advantaged groups (11.2%)—see Figure 65 and Table 91 (risk ratio confidence limits include unity). The likelihood of preterm birth rises with disadvantage for non-Indigenous women (2010 to 2011 SEIFA quintiles one and two versus SEIFA quintiles four and five risk ratio for birth before 37 weeks: RR = 1.12, 95% confidence limits = 1.07, 1.18).

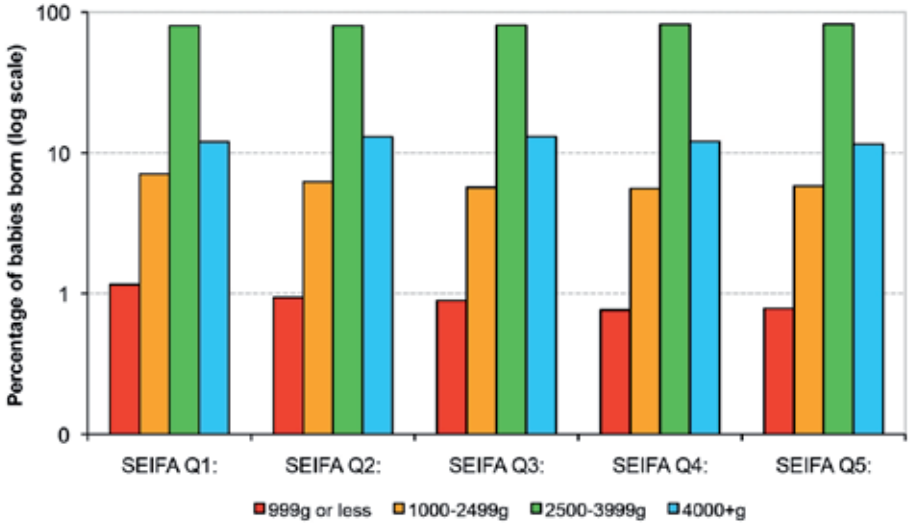
25 Australian Bureau of Statistics "2039.0 Information Paper: An Introduction to Socio-Economic Indexes for Areas (SEIFA), 2006" www.abs.gov.au/ausstats/abs@.nsf/mf/2039.0

Figure 65: SEIFA quintile and Indigenous status versus gestation, Queensland 2010 to 2011
*(see Table 91)*



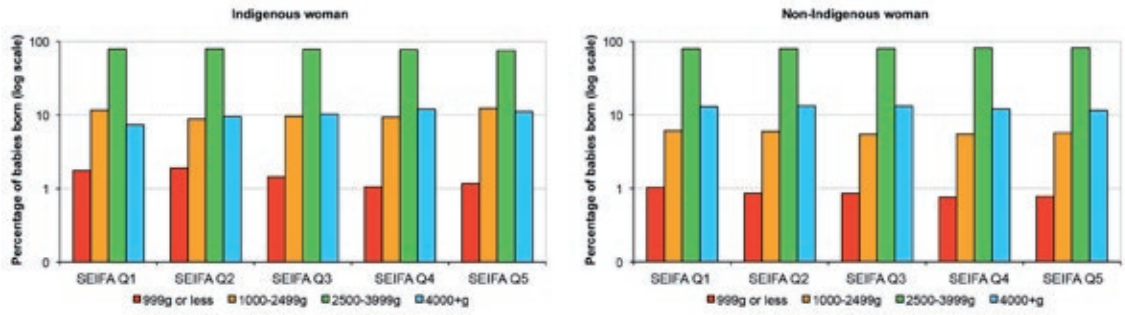

Women who are more disadvantaged (SEIFA quintiles one and two) were more likely to give birth to low birthweight babies less than 2500 grams (7.6%) than women who were more advantaged (6.4%) SEIFA quintiles four and five—see Figure 66 and Table 91 (2010 to 2011 SEIFA quintiles one and two versus SEIFA quintiles four and five risk ratio for birthweight ‹2500 grams: RR = 1.18, 95% confidence limits = 1.12, 1.23).

Figure 66: SEIFA quintile versus birthweight, Queensland 2010 to 2011
*(see Table 91)*



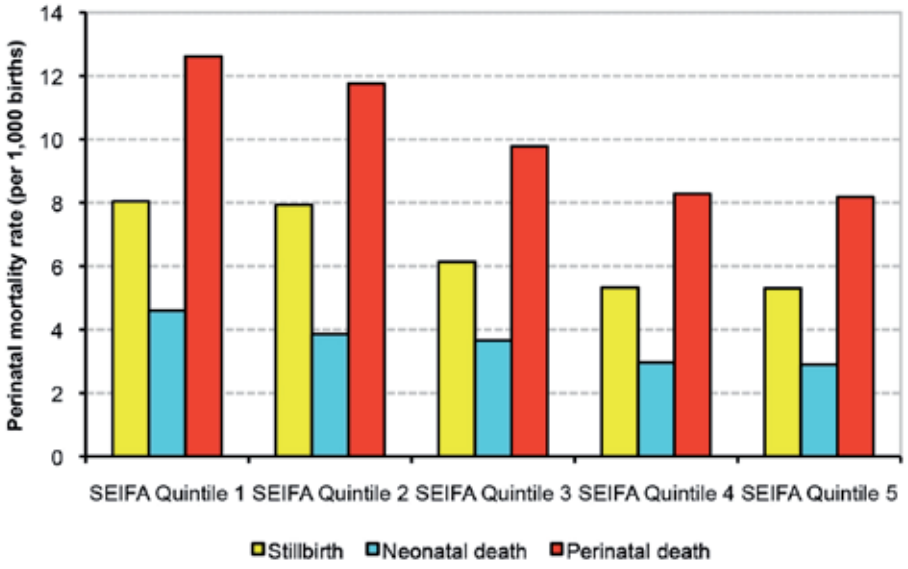

The difference in the rate of low birthweight between the more disadvantaged groups and the more advantaged groups is seen in both Indigenous and non-Indigenous babies (see Figure 67 and Table 91). Indigenous babies in the more disadvantaged groups have a rate of 12.4% of low birthweight whilst the more advantaged groups have a rate of 11.1% (risk ratio confidence limits include unity). The likelihood of low birthweight birth for non-Indigenous babies in the more disadvantaged groups is 7.0% and in the more advantaged groups is 6.3% (2010 to 2011 SEIFA quintiles one and two versus SEIFA quintiles four and five risk ratio for low birthweight birth: RR = 1.10, 95% confidence limits = 1.05, 1.16).

Figure 67: SEIFA quintile and Indigenous status versus birthweight, Queensland 2010 to 2011
*(see Table 91)*



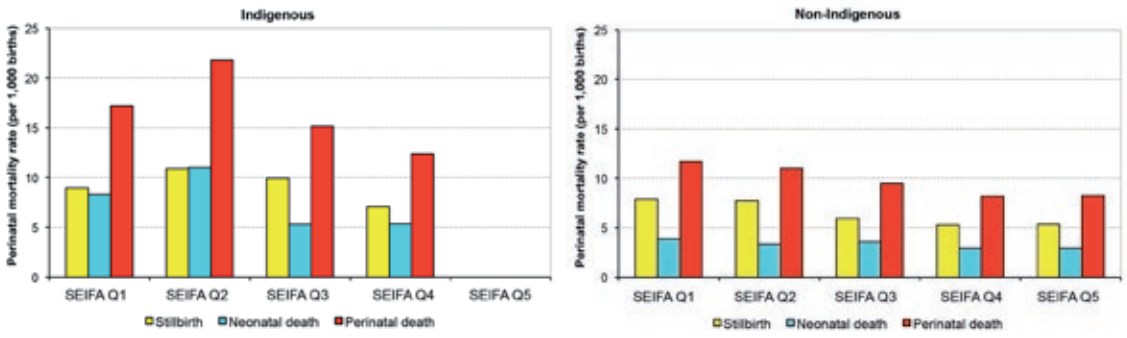
Disadvantage is associated with a significant increase in the risk of perinatal death (both stillbirth and neonatal death). Women who are more disadvantaged (SEIFA quintiles one and two) were more likely to have a perinatal death (12.1 per 1000 births) than women who were more advantaged (8.2 per 1000 births) SEIFA quintiles four and five—see Figure 68 and Table 92 (2010 to 2011 SEIFA quintiles one and two versus SEIFA quintiles four and five risk ratio for perinatal death: RR = 1.47, 95% confidence limits = 1.29, 1.67).

Figure 68: SEIFA quintile versus perinatal mortality rates (per 1,000 births), Queensland 2010 to 2011
*(see Table 92)*




The higher risk of perinatal death in the more disadvantaged groups is seen in both Indigenous and non-Indigenous babies (see Figure 69 and Table 92). Indigenous babies in the more disadvantaged groups had a perinatal mortality rate of 19.1 per 1000 births whilst the more advantaged groups had a perinatal mortality rate of 9.5 per 1000 births (risk ratio confidence limits include unity, the numbers are small in some cells). There were no perinatal deaths in the SEIFA quintile five Indigenous group, reflecting the small numbers in this group of women and babies. The likelihood of perinatal death for non-Indigenous babies in the more disadvantaged groups was 11.3 per 1000 births and in the more advantaged groups was 8.3 per 1000 births (2010 to 2011 SEIFA quintiles one and two versus SEIFA quintiles four and five risk ratio for perinatal death: RR = 1.37, 95% confidence limits = 1.19, 1.57).

Figure 69: SEIFA quintile and Indigenous status versus perinatal mortality rates (per 1,000 births), Queensland 2010 to 2011
*(refer Table 92)*




**Good practice point**

- Where maternal risk factors such as advanced maternal age, obesity and smoking are identified, clinicians should provide clear information to the woman regarding those risks and their implications. Whilst specific recommendations may be required regarding an appropriate level of facility care, such recommendations must be consistent with continuing provision of non-fragmented models of care with a defined primary care giver.

# 3. Congenital malformations

In Queensland, data is collected regarding congenital malformations during the pregnancy, birth and newborn period, up to the time of the discharge of the baby from its post-birth care period. As the perinatal data collection is unable to collect data regarding pregnancies terminated before 20 weeks gestation some of these data fields (e.g. chromosome anomalies, neural tube defects) are significantly under reported here.

Data is recorded as per the ICD–10-AM tabular list of disease. For the purposes of this report the recorded congenital malformations have been divided into anomaly groups as shown in Table 22. The detailed sub-classifications are found in Table 93.

**Table 22: Congenital malformations reported in the pregnancy and newborn period, Queensland 2010 to 2011**
*(multiple item reporting possible for each baby)*

| Anomaly group | Number of babies | % of babies |
|---|---|---|
| One or more anomalies reported | 7075 | 5.7 |
| No anomaly reported | 117,136 | 94.3 |
| Chromosome abnormalities | 219 | 0.18 |
| Neural tube defects | 81 | 0.06 |
| Other congenital malformations of nervous system | 160 | 0.13 |
| Congenital malformations of eyes, ears, face and neck | 203 | 0.16 |
| Congenital malformations of heart | 631 | 0.51 |
| Congenital malformations of vascular system | 709 | 0.57 |
| Congenital malformations of respiratory system and airways | 152 | 0.12 |
| Congenital malformations of tongue, mouth and pharynx | 857 | 0.69 |
| Congenital malformations of gastro-intestinal tract | 134 | 0.11 |
| Congenital malformations of genital organs | 780 | 0.63 |
| Congenital malformations of kidneys and urinary system | 399 | 0.32 |
| Congenital musculoskeletal deformities | 2114 | 1.71 |
| Congenital malformations of skin and breast | 1419 | 1.14 |
| Other congenital malformations, not elsewhere classified | 660 | 0.53 |

The characteristics of babies in these groups are shown in Table 23, and those of their mothers in Table 24.

**Table 23: Neonatal profiles associated with the one or more congenital malformation, Queensland 2010 to 2011**
*(Percentages are of babies within that category)*

| Neonatal characteristic | % of babies with one or more congenital anomalies |
|---|---|
| All babies born | 5.7 |
| Singleton birth | 5.7 |
| Multiple birth | 6.1 |
| Gestation 37 completed weeks or more | 5.3 |
| Gestation 34–36 completed weeks | 7.0 |
| Gestation 28–33 completed weeks | 9.3 |
| Gestation 24–27 completed weeks | 18.8 |
| Gestation 23 completed weeks or less | 38.4 |
| Birthweight 4000g or more | 4.8 |
| Birthweight 2500–3999g | 5.4 |
| Birthweight 1500–2499g | 8.0 |
| Birthweight 1000–1499g | 12.0 |
| Birthweight less than 1000g | 28.4 |
| Admitted to NICU | 7.1 |
| Admitted to SCN | 22.6 |
| No NICU or SCN admission required | 75.2 |
| Stillbirth | 33.8 |
| Neonatal death | 39.5 |
| Alive at discharge | 5.4 |

Table 24: Maternal profiles associated with the birth of babies with one or more congenital malformation, Queensland 2010 to 2011

| Maternal characteristic | % of babies of women with this maternal characteristic having one or more congenital anomalies |
|---|---|
| Maternal age <20 | 6.0 |
| Maternal age 20–34 | 5.7 |
| Maternal age 35 or more | 5.6 |
| Indigenous mother | 4.8 |
| Non-Indigenous mother | 5.7 |
| Pregnancy conceived via assisted conception | 4.7 |
| Pregnancy conceived without assisted conception | 5.7 |
| Maternal BMI <18.5 | 5.5 |
| Maternal BMI 18.5–24.9 | 5.4 |
| Maternal BMI 25–29.9 | 5.6 |
| Maternal BMI 30 or more | 6.0 |
| Maternal smoking during pregnancy | 5.7 |
| No maternal smoking during pregnancy | 5.7 |
| Maternal ARIA score highly accessible (0 to <0.20) | 7.0 |
| Maternal ARIA score accessible (0.20 to <2.40) | 3.8 |
| Maternal ARIA score moderately accessible (2.40 to <5.95) | 3.6 |
| Maternal ARIA score remote (5.95 to <10.5) | 3.5 |
| Maternal ARIA score very remote (10.5 to <15) | 3.0 |
| SEIFA 1st quintile | 6.4 |
| SEIFA 2nd quintile | 4.7 |
| SEIFA 3rd quintile | 5.9 |
| SEIFA 4th quintile | 5.4 |
| SEIFA 5th quintile | 6.8 |

Percentages are of mothers within that category
SEIFA quintiles: 1 = Lowest socioeconomic status, 5 = Highest socioeconomic status



Review of the data in Tables 23 and 24 indicates that:

- babies born to Indigenous mothers appear to have a lower incidence of congenital anomaly than babies born to non-Indigenous mothers—the reasons for differences between the two groups of babies appears complex and beyond the scope of this report to answer (2010 to 2011 the Indigenous babies versus non-Indigenous babies risk ratio for one or more congenital anomalies: RR = 0.83, 95% confidence limits = 0.75, 0.93)
- babies born to women with a high BMI has a significantly increased rate of congenital anomaly (2010 to 2011 babies born to mothers with BMI >30 versus babies born to mothers with BMI <30 risk ratio for one or more congenital anomalies: RR = 1.10, 95% confidence limits = 1.04, 1.16)
- babies born after ovulation induction and/or extracorporeal assisted conception had a lower incidence of congenital anomaly than babies born from 'natural conceptions', whereas artificial insemination appeared to be associated with an increased incidence of congenital anomaly (2010 to 2011 babies from assisted conception pregnancy versus babies from pregnancy conceived without assisted conception risk ratio for one or more congenital anomalies: incidence of one or more anomaly without assisted conception 5.7%, with ovulation induction 4.2%, with extracorporeal techniques 4.9% and with AID/AIH 7.2%. For all assisted conception versus no assisted conception RR = 0.82, 95% confidence limits = 0.72, 0.91)
- there is no significant difference in the incidence of congenital anomalies between babies born in singleton and in multiple pregnancies (2010 to 2011 babies from multiple birth versus from babies from singleton birth risk ratio for one or more congenital anomalies: RR = 1.08, 95% confidence limits = 0.96, 1.22)
- babies born in 2010 and 2011 to mothers living in highly accessible areas (ARIA score 0 to <0.20) appeared to have a higher risk of congenital anomaly compared with all other babies (babies from ARIA score 0 to <0.20 versus all other babies risk ratio for one or more congenital anomalies: RR = 1.90, 95% confidence limits = 1.80, 2.00).

However, using the broader categorisation of congenital anomalies used by the NPESU of AIHW[26], reanalysis of the data (not shown here) reveals that:

- the RR for congenital anomalies (CA) in Indigenous versus non-Indigenous is 1.12 (95% confidence limits 0.88-1.44) which suggests a slightly higher rate (though non-significant) of CAs for births to Indigenous mothers
- the RR for most disadvantaged SEIFA quintile relative to the most advantaged is 1.40 (95% confidence limits 1.14–1.71) which suggests a higher rate of CAs for births to women in the most disadvantaged quintile
- the rate of CAs to births for women in highly accessible locations is no longer higher than for other locations.

The difference in the results of these two approaches is likely related to detection or reporting rates differing between tertiary and non-tertiary hospitals particularly for minor congenital anomalies and also possibly movement of women with higher risk births to give birth in metropolitan areas.

## 3.1 Sentinel congenital heart disease in Queensland, 2007 to 2011

Congenital heart disease (CHD) is one of the most common congenital abnormalities in neonates with moderate or severe anomalies and has been reported in approximately 6 per 1000 live births[27]. The detection of severe congenital cardiac lesions using fetal echocardiography on antenatal screening was first reported in 1986[28]. Routine screening on mid-trimester scan for significant fetal cardiac lesions has been widely practiced in Queensland from the late 1990s. Early detection of major congenital heart lesions allows a planned delivery in a tertiary perinatal centre as recommended in recent CHD cohort outcome studies[29].

This report examines known cases of four sentinel cardiac anomalies during the birth admission of infants delivered in Queensland from July 2007 to June 2011:

- Hypoplastic left heart syndrome (HLHS)
- Pulmonary atresia (PA)
- Transposition of the great arteries (TGA)
- Tetralogy of Fallot (ToF).



During this period, there were 259 births with at least one of these congenital lesions of whom 236 were livebirths and 29 stillbirths (11.2%). Although tertiary delivery is recommended in infants born with these lesions, 146 were delivered in a tertiary neonatal nursery and 113 (43.6%) were born in a non-tertiary nursery. The initial admission of each infant was examined using Queensland Perinatal Data Collection (QPDC) and Queensland Hospital Admitted Patient Data Collection (QHAPDC) for reporting of the sentinel cardiac lesion as an indication of early ascertainment of significant cardiac anomaly (see Table 25). Birth admission data showed that between 13.9% (HLHS) and 27.4% (ToF) of infants with these major cardiac anomalies were not known or recorded on their birth admission. An improvement in antenatal detection rates for these significant CHD lesions and planned delivery in a tertiary neonatal nursery would be important in this high risk cohort of infants.

An amendment to the QPDC form since July 2011 has included antenatal scan results to improve ascertainment of fetal detection rates. Improved statewide notification of fetal anomaly in termination of pregnancy would also allow more precise fetal detection rates to be followed.

Table 25: Infants with sentinel cardiac anomalies born in Queensland July 2007 to June 2011 by initial admission cardiac diagnosis

| | Cases n | Cases reported at birth admission | % reported at birth admission | % not reported at birth admission |
|---|---|---|---|---|
| **HLHS** | 62 | 54 | 87.1 | 13.9 |
| **PA** | 40 | 30 | 75.0 | 25.0 |
| **TGA** | 73 | 42 | 84.9 | 15.1 |
| **TOF** | 84 | 61 | 72.6 | 27.4 |

26 Abeywardana S & Sullivan E. (2008.) *Congenital anomalies in Australia 2002–2003.* Birth anomalies series no. 3 Cat no. PER 41. Sydney: AIHW National Perinatal Statistics Unit

27 Hoffman J, Kaplan S. *The incidence of congenital heart disease*. J American College of Cardiology 2002;39:1890-1900

28 Fermon L, De Geeter B, Aubry MC, et al. *A close collaboration between obstetrician and cardiologist allows antenatal detection of severe cardiac malformations by 2D echocardiography* (abstract). Proceedings of the Second World Congress of Paediatric Cardiology. New York, 1986:10

29 Anagnostou K, Messenger L, Yates R, Kelsall W. *Outcome of infants with prenatally diagnosed congenital heart disease delivered outside specialist paediatric cardiac centres.* Arch Dis Child Fetal Neonatal Ed 2012:F1-F4, doi:10.1136/archdischild-2011-300488

# 4. Comparisons between hospital groups and their outcomes

The purpose of perinatal care indicators and measurement of outcomes of care is to improve the outcomes for mothers and babies by:

- monitoring the quality of care provision and outcomes
- allowing healthcare providers the ability to benchmark their care against others (both like facilities and different modes of healthcare delivery)
- providing information to women and their families regarding the outcomes of various care options.

The Council has chosen a small group of care indicators to examine in this publication, and would be interested in dialogue regarding potential future indicators.

In this section of the report, hospitals and other modes of healthcare delivery are grouped in clinically relevant 'hospital/facility' groupings (see Table 26). Statewide rates are also given—it should be clear that the statewide rate is an average rate, and does not represent an 'ideal' or evidence-based optimum rate. Data is for Queensland births between 2010 and 2011.

Table 26: Hospital groups for outcome comparisons

| Maternity/neonatal characteristics of hospital groups | | |
|---|---|---|
| **Group A: Specialist obstetric service with feto-maternal medicine and NICU** | | |
| • Mater Mothers' Public | • Royal Brisbane and Women's | • Townsville |
| **Group B: Specialist obstetric service and special care nursery >2000 births/year** | | |
| • Cairns | • Gold Coast | • Ipswich |
| • Logan | • Nambour | • Redland |
| **Group C: Specialist obstetric service and special care nursery <2000 births/year** | | |
| • Bundaberg | • Caboolture | • Hervey Bay |
| • Mackay | • Mount Isa | • Redcliffe |
| • Rockhampton | • Toowoomba | |
| **Group D: Rural generalist obstetric service and general nursery >250 births/year** | | |
| • Emerald | • Gladstone | • Gympie |
| • Innisfail | • Kingaroy | • Proserpine |
| **Group E: Rural generalist obstetric service or primary midwifery care model and general nursery <250 births/year** | | |
| • Atherton | • Ayr | • Biloela |
| • Charleville | • Charters Towers | • Chinchilla |
| • Cunnamulla | • Dalby | • Goondiwindi |
| • Ingham | • Longreach | • Mareeba |
| • Roma | • Stanthorpe | • St George |
| • Theodore | • Thursday Island | • Tully |
| | • Warwick | |
| **Group F: Birth centres** | | |
| • Gold Coast | • Mackay | • Royal Brisbane and Women's |
| • Toowoomba | • Townsville | |
| **Group G: Private hospital maternity services** | | |
| **Group H: Home births** | | |
| **Group X: Public facilities without maternity services** | | |

Table 27 shows the profiles of the mothers giving birth in the various facility groups. Younger women less than 20 years of age are cared for almost entirely within the public hospital maternity services, whilst older women are more likely to access private care and home birth care. Obese women and women who smoke cigarettes are less likely to be cared for in public hospital birth centres, private hospitals and at home, and women who have conceived with assisted conception options are more likely to access private hospitals. SEIFA indices show that women of lower socioeconomic status are unlikely to access public hospital birth centres and private hospitals. Women accessing private hospitals are less likely to labour spontaneously and more likely to have a caesarean section birth than women cared for in public hospital maternity services, and women being cared for in public hospital birth centres and at home almost exclusively labour spontaneously and have a spontaneous unassisted vaginal birth.

## Table 27: Maternal profiles by hospital group (%), Queensland 2010 to 2011

| Maternal profiles | Facility group | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | A | B | C | D | E | F | G | H | X | Total |
| | Specialist obstetrics, feto-maternal medicine, neonatal intensive care unit | Specialist obstetrics, special care nursery, >2000 births/year | Specialist obstetrics, special care nursery, <2000 births/ year | Non-specialist obstetrics, generalist neonatal care, >250 births/year | Non-specialist obstetrics, generalist neonatal care, <250 births/year | Birth centres | Private hospital maternity and newborn services | Home births | Public facilities without maternity services | |
| **Number of women** | 22,355 | 32,594 | 21,085 | 4,458 | 3,568 | 1,516 | 36,268 | 153 | 153 | 122,150 |
| **Maternal age** | | | | | | | | | | |
| Less than 20 years | 5.4 | 7.3 | 9.0 | 8.3 | 11.8 | 1.0 | 0.4 | 0.7 | 17.0 | **5.3** |
| 20–34 years | 76.3 | 76.8 | 77.6 | 78.5 | 76.1 | 81.4 | 69.6 | 62.7 | 73.2 | **74.8** |
| 35 or more years | 18.4 | 15.9 | 13.4 | 13.2 | 12.0 | 17.6 | 30.0 | 36.6 | 9.8 | **19.9** |
| **Maternal BMI** | | | | | | | | | | |
| Underweight (<18.5 kg/m2) | 6.2 | 4.5 | 4.4 | 4.7 | 4.6 | 4.0 | 4.5 | 5.2 | 5.2 | **4.8** |
| Normal (18.5–24.9 kg/m2) | 45.6 | 41.2 | 38.4 | 42.3 | 41.9 | 58.8 | 54.0 | 56.9 | 41.2 | **45.6** |
| Overweight (25–29.9 kg/m2) | 24.2 | 27.0 | 27.5 | 29.4 | 28.8 | 25.3 | 26.2 | 18.3 | 17.6 | **26.4** |
| Obese (30 or more kg/m2) | 19.3 | 24.8 | 28.2 | 23.3 | 23.6 | 9.8 | 14.6 | 9.2 | 13.1 | **21.0** |
| **Indigenous status** | | | | | | | | | | |
| Indigenous | 6.1 | 7.8 | 8.7 | 9.6 | 21.2 | 1.8 | 0.4 | 0 | 43.1 | **5.9** |
| Non-Indigenous | 93.9 | 92.2 | 91.3 | 90.4 | 78.8 | 98.2 | 99.6 | 100 | 56.9 | **94.1** |
| **Smoking** | | | | | | | | | | |
| Smoking before 20 weeks | 14.2 | 24.1 | 27.9 | 27.3 | 32.0 | 5.7 | 2.1 | 0.7 | 56.2 | **16.6** |
| Smoking after 20 weeks | 11.5 | 19.5 | 23.8 | 23.5 | 27.3 | 3.4 | 1.5 | 0.7 | 48.4 | **13.6** |
| **Past births*** | | | | | | | | | | |
| One or more previous births | 53.8 | 61.1 | 63.4 | 64.3 | 66.6 | 66.6 | 56.0 | 81.7 | 81.7 | **59.1** |
| No previous caesarean birth | 83.9 | 84.9 | 83.8 | 87.2 | 89.2 | 100.0 | 75.9 | 84.3 | 95.4 | **82.3** |
| One or more previous caesareans | 16.1 | 15.1 | 16.2 | 12.8 | 10.8 | 0.0 | 24.1 | 15.7 | 4.6 | **17.7** |
| No previous births | 46.2 | 38.9 | 36.6 | 35.7 | 33.4 | 33.4 | 44.0 | 18.3 | 18.3 | **40.9** |
| **Assisted conception** | | | | | | | | | | |
| Ovulation induction (+ AIH/AID)** | 0.6 | 0.4 | 0.4 | 0.3 | 0.2 | 0.3 | 2.5 | 0.0 | 0.0 | **1.1** |
| AIH/AID | 0.3 | 0.1 | 0.1 | 0.0 | 0.0 | 0.2 | 0.8 | 0.0 | 0.0 | **0.3** |
| IVF/GIFT/ICSI*** | 1.5 | 0.8 | 1.0 | 0.7 | 0.7 | 0.9 | 7.9 | 1.3 | 0.0 | **3.1** |
| **Maternal SEIFA index****** | | | | | | | | | | |
| Quintile 1 | 9.2 | 16.4 | 23.7 | 35.2 | 26.6 | 2.5 | 3.8 | 9.8 | 59.5 | **13.5** |
| Quintile 2 | 14.4 | 23.3 | 36.6 | 22.1 | 65.2 | 14.4 | 15.0 | 16.3 | 13.7 | **22.6** |
| Quintile 3 | 26.0 | 28.8 | 26.5 | 39.4 | 5.5 | 37.5 | 25.7 | 28.1 | 17.0 | **26.8** |
| Quintile 4 | 25.3 | 26.9 | 9.6 | 2.0 | 0.6 | 24.0 | 28.4 | 26.1 | 3.3 | **22.3** |
| Quintile 5 | 24.6 | 4.3 | 3.3 | 0.0 | 0.0 | 21.4 | 24.9 | 19.0 | 0.0 | **13.9** |

** Births = livebirth or stillbirth*
***AIH/AID = Artificial insemination by husband/donor*
****IVF = Invitrofertilisation, GIFT =Gamete Intra-Fallopian Transfer, ICSI = Intracytoplasmic sperm injection*
***** SEIFA index of relative socio-economic advantage and disadvantage index quintiles:*
*1 = lowest socioeconomic status, 5 = highest socioeconomic status*

Table 27: Maternal profiles by hospital group (%), Queensland 2010 to 2011 *(continued)*

| Maternal profiles | Facility group | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | A | B | C | D | E | F | G | H | X | Total |
| | Specialist obstetrics, feto-maternal medicine, neonatal intensive care unit | Specialist obstetrics, special care nursery, >2000 births/year | Specialist obstetrics, special care nursery, <2,000 births/year | Non-specialist obstetrics, generalist neonatal care, >250 births/year | Non-specialist obstetrics, generalist neonatal care, <250 births/year | Birth centres | Private hospital maternity and newborn services | Home births | Public facilities without maternity services | |
| **Complications of pregnancy** | | | | | | | | | | |
| Antepartum haemorrhage | 4.6 | 2.0 | 2.5 | 1.0 | 0.6 | 1.8 | 2.2 | 0.7 | 1.3 | **2.6** |
| Pre-eclampsia/PIH***** | 5.3 | 4.1 | 5.0 | 3.3 | 3.4 | 0.2 | 5.1 | 0.7 | 1.3 | **4.7** |
| Gestational diabetes | 6.1 | 7.4 | 7.0 | 4.7 | 3.4 | 2.0 | 4.8 | 0.7 | 2.6 | **6.0** |
| Multiple gestation | 2.4 | 1.2 | 1.1 | 0.4 | 0.2 | 0.0 | 2.2 | 0.0 | 0.0 | **1.6** |
| **Onset of labour** | | | | | | | | | | |
| Spontaneous | 60.1 | 65.1 | 61.2 | 68.8 | 73.7 | 99.5 | 39.0 | 100.0 | 100.0 | **56.6** |
| Induced | 22.5 | 21.1 | 23.2 | 18.5 | 16.1 | 0.5 | 26.3 | 0.0 | 0.0 | **22.7** |
| No labour | 17.4 | 13.8 | 15.6 | 12.7 | 10.2 | 0.0 | 34.7 | 0.0 | 0.0 | **20.6** |
| **Method of birth** | | | | | | | | | | |
| Spontaneous vaginal birth | 56.4 | 66.0 | 65.0 | 70.0 | 73.9 | 99.9 | 40.3 | 100.0 | 100.0 | **57.3** |
| Vacuum extraction birth | 9.1 | 6.7 | 6.3 | 5.7 | 5.8 | 0.1 | 9.5 | 0.0 | 0.0 | **7.8** |
| Forceps birth | 1.7 | 1.6 | 1.4 | 1.0 | 0.5 | 0.0 | 2.8 | 0.0 | 0.0 | **1.9** |
| Elective caesarean section | 17.4 | 13.8 | 15.6 | 12.7 | 10.2 | 0.0 | 34.7 | 0.0 | 0.0 | **20.6** |
| Emergency caesarean section | 15.4 | 11.8 | 11.7 | 10.5 | 9.6 | 0.0 | 12.6 | 0.0 | 0.0 | **12.4** |
| All caesarean section | 32.8 | 25.6 | 27.3 | 23.3 | 19.8 | 0.0 | 47.4 | 0.0 | 0.0 | **33.0** |
| **Regional analgesia during labour** | | | | | | | | | | |
| Epidural, combined epidural/ spinal, spinal or caudal | 50.1 | 38.5 | 40.2 | 27.6 | 23.9 | 0.2 | 67.4 | 0.0 | 0.0 | **48.1** |
| **Complications of labour and birth** | | | | | | | | | | |
| Cord prolapse | 0.3 | 0.1 | 0.1 | 0.2 | 0.1 | 0.0 | 0.1 | 0.0 | 0.0 | **0.1** |
| Fetal distress | 3.1 | 8.5 | 5.3 | 3.3 | 3.6 | 0.3 | 4.8 | 0.7 | 0.0 | **5.4** |
| Manual removal of placenta | 1.4 | 1.3 | 1.4 | 1.2 | 1.5 | 1.3 | 0.9 | 0.0 | 3.9 | **1.2** |
| Post-partum haemorrhage | 9.5 | 7.2 | 6.0 | 6.8 | 6.1 | 5.7 | 2.4 | 13.7 | 11.8 | **6.0** |
| **Perineal status ******** | | | | | | | | | | |
| Intact or grazes only | 59.9 | 57.7 | 60.0 | 56.6 | 62.1 | 47.1 | 63.1 | 54.9 | 71.9 | **60.0** |
| 1st or 2nd degree tear | 29.0 | 34.9 | 31.0 | 36.2 | 31.7 | 49.1 | 24.7 | 42.5 | 21.6 | **30.2** |
| 3rd or 4th degree tear | 1.9 | 2.0 | 1.6 | 1.8 | 1.8 | 2.4 | 0.7 | 2.6 | 0.7 | **1.5** |
| Episiotomy | 9.2 | 5.5 | 7.4 | 5.3 | 4.3 | 1.4 | 11.5 | 0.0 | 3.3 | **8.2** |

***** SEIFA index of relative socio-economic advantage and disadvantage index quintiles:*
*1 = lowest socioeconomic status, 5 = highest socioeconomic status , ***** PIH = pregnancy-induced hypertension*
******IVF = Invitrofertilisation, GIFT =Gamete Intra-Fallopian Transfer, ICSI = Intracytoplasmic sperm injection*

Table 28 shows profiles of the babies born in the facility groups. As expected by the complexity of care of many of the mothers and babies born in the Group A public hospitals, which not only provide specialist obstetric care but also the sub-specialty of feto-maternal medicine and the specialty of neonatal intensive care unit, are more likely to be preterm, of low birthweight, in poor condition at birth as measured by Apgar scores, to be admitted to specialised nursery care, and to die in the perinatal period.

A significant proportion of the 152 women (25.7%) who gave birth in public hospitals which did not have established maternity services, presented there in preterm labour and had babies that were more likely to be low birthweight, be in poor condition at birth, and to die in the perinatal period. Support for such facilities when faced with these unusual circumstances is vital to these mothers and babies. Other women present nearer to term and anecdotal evidence is that this is, at times, related to a lack of understanding by local communities of the inability of such facilities to provide effective care after a birthing service has closed.

**Recommendation**

- That the Department of Health ensures that no further rural maternity services close, and actively seeks to open/re-open rural maternity services where possible.

Table 28: Baby profiles by hospital group (%), Queensland 2010 to 2011

| Baby profiles | Facility group | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | A | B | C | D | E | F | G | H | X | Total |
| | Specialist obstetrics, feto-maternal medicine, neonatal intensive care unit | Specialist obstetrics, Special care nursery, >2000 births/year | Specialist obstetrics, Special care nursery, <2000 births/year | Non-specialist obstetrics, generalist neonatal care, >250 births/year | Non-specialist obstetrics, generalist neonatal care, <250 births/year | Birth centres | Private hospital maternity and newborn services | Home births | Public facilities without maternity services | |
| **Number of babies** | 22,916 | 32,991 | 21,330 | 4203 | 3848 | 1516 | 37,101 | 154 | 152 | 124,211 |
| **Gestational age** | | | | | | | | | | |
| Less than 28 weeks | 2.2 | 0.6 | 0.8 | 0.3 | 0.5 | 0.0 | 0.5 | 0.0 | 6.6 | 0.9 |
| 28–33 weeks | 4.8 | 1.4 | 1.4 | 0.7 | 0.6 | 0.0 | 1.5 | 0.0 | 4.6 | 2.0 |
| 34–36 weeks | 6.6 | 5.4 | 5.9 | 3.3 | 2.9 | 0.1 | 6.4 | 1.3 | 14.5 | 5.8 |
| 37–39 weeks | 45.1 | 49.8 | 50.4 | 46.9 | 48.1 | 41.5 | 62.1 | 37.0 | 44.1 | 52.4 |
| 40 or more weeks | 41.2 | 42.7 | 41.6 | 48.8 | 48.1 | 58.4 | 29.5 | 61.7 | 26.3 | 38.9 |
| **Birthweight** | | | | | | | | | | |
| Less than 1500g | 4.3 | 1.0 | 1.0 | 0.5 | 0.6 | 0.0 | 1.0 | 0.0 | 9.2 | 1.6 |
| 1500–2499g | 7.5 | 5.2 | 5.5 | 2.8 | 2.9 | 0.3 | 4.8 | 0.6 | 10.5 | 5.4 |
| 2500–3999g | 75.9 | 80.8 | 80.2 | 82.4 | 83.0 | 82.0 | 83.3 | 68.8 | 75.0 | 80.6 |
| 4000g or more | 12.3 | 13.0 | 13.3 | 14.3 | 13.5 | 17.7 | 10.8 | 29.9 | 3.9 | 12.4 |
| **Birth status** | | | | | | | | | | |
| Born alive and discharged alive | 98.1 | 99.0 | 99.0 | 99.5 | 99.4 | 100.0 | 99.4 | 100.0 | 92.8 | 99.0 |
| Stillborn | 1.08 | 0.63 | 0.79 | 0.31 | 0.36 | 0.00 | 0.42 | 0.00 | 5.92 | 0.66 |
| Born alive / died before discharge | 0.80 | 0.35 | 0.24 | 0.24 | 0.26 | 0.00 | 0.21 | 0.00 | 1.32 | 0.36 |

Table 28: Baby profiles by hospital group (%), Queensland 2010 to 2011

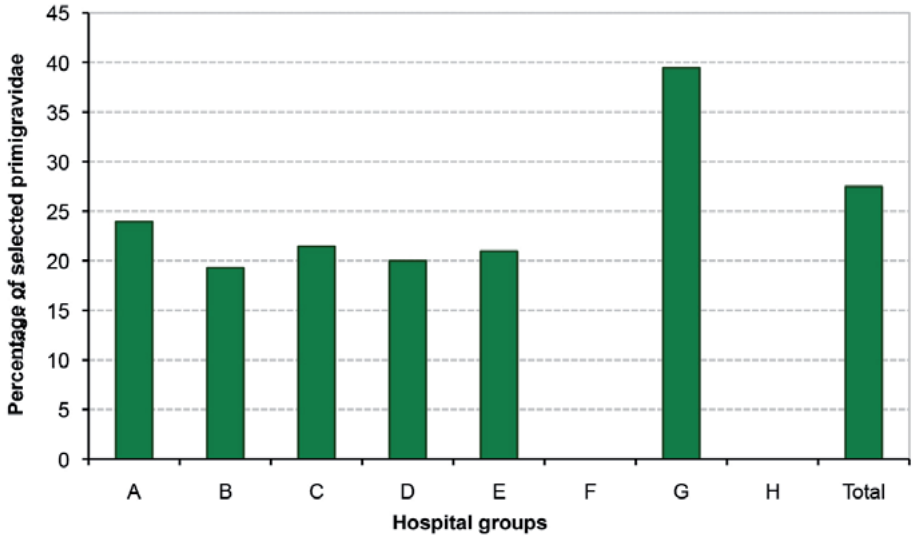
| Baby profiles | Facility group | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | A | B | C | D | E | F | G | H | X | Total |
| | Specialist obstetrics, feto-maternal medicine, neonatal intensive care unit | Specialist obstetrics, Special care nursery, >2000 births/year | Specialist obstetrics, Special care nursery, <2000 births/ year | Non-specialist obstetrics, generalist neonatal care, >250 births/year | Non-specialist obstetrics, generalist neonatal care, <250 births/year | Birth centres | Private hospital maternity and newborn services | Home births | Public facilities without maternity services | |
| **5–minute Apgar score** | | | | | | | | | | |
| 0–6 | 12.7 | 8.4 | 10.0 | 7.2 | 7.8 | 2.7 | 7.5 | 7.1 | 17.1 | 9.1 |
| 7 or more | 86.9 | 91.6 | 90.0 | 92.8 | 92.0 | 97.3 | 92.5 | 92.9 | 79.6 | 90.8 |
| **Congenital anomaly*** | | | | | | | | | | |
| Present | 10.6 | 5.5 | 6.5 | 3.7 | 2.4 | 6.5 | 2.9 | 3.2 | 3.9 | 5.7 |
| **Admission to a neonatal intensive care unit** | | | | | | | | | | |
| Yes | 9.98 | 0.20 | 0.00 | 0.00 | 0.00 | 0.00 | 1.47 | 0.00 | 0.00 | 2.33 |
| **Admission to a special care baby unit** | | | | | | | | | | |
| Yes | 22.05 | 19.24 | 20.43 | 0.00 | 0.00 | 0.00 | 11.90 | 0.00 | 0.66 | 16.24 |
| **Admission to a neonatal intensive care unit and/or a special care baby unit** | | | | | | | | | | |
| Yes | 23.68 | 19.27 | 20.43 | 0.00 | 0.00 | 0.00 | 12.16 | 0.00 | 0.66 | 16.63 |

** Diagnosed during 'birth admission'*

Figures 70 to 76, and Table 94 show seven perinatal care indicators designed to assess the outcomes of maternity and newborn care. The indicators shown in Figures 70, 71 and 75 examine women defined as 'selected primigravidae'; these are women whose age is between 20 and 34 years, who have not had previous births, who have a singleton birth in current pregnancy, who gave birth between 37 weeks + 0 days to 40 weeks + 6 days completed weeks of gestation, and whose baby presented in a standard head first flexed manner (cephalic/vertex presentation at birth). These standardised outcomes tend to allow for more valid comparisons across care groups.

Figure 70 shows the proportion of selected primigravidae having a caesarean section birth. The state average caesarean section rate for this group of women is 27.5%, with public facilities varying between 19.3% and 23.9%, and private facilities 39.4%. Group A public facilities have a higher caesarean section rate than the other public facilities, in line with the greater complexity of care required for a number of the women they care for. Selected primigravidae being cared for in private facilities are almost twice as likely to have a caesarean section birth as those in public hospitals (RR = 1.86, 95% confidence limits 1.79, 1.93).

Figure 70: Proportion (%) of selected primigravidae having a caesarean section birth, Queensland 2010 to 2011
*(see Table 94)*




The converse is seen in Figure 71, with the likelihood of an unassisted vaginal birth being 100% in women giving birth at home and virtually 100% in women giving birth in public hospital birth centres, 59.0% of women giving birth in public hospitals across the spectrum, and just 35.6% of women giving birth in private hospitals (risk ratio private hospitals versus public hospitals, RR = 0.60, 95% confidence limits 0.59, 0.62).

Figure 71: Proportion (%) of selected primigravidae achieving unassisted vaginal birth, Queensland 2010 to 2011
*(see Table 94)*

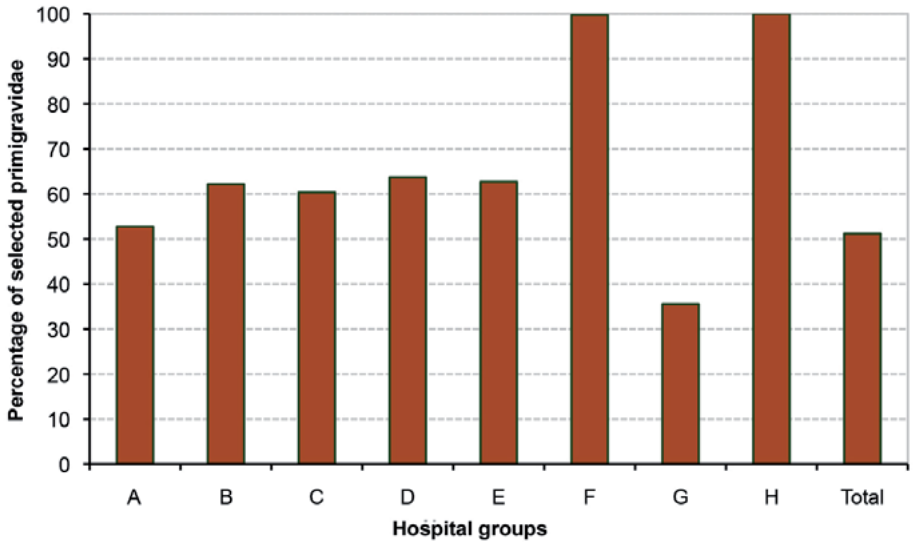


Figure 72 shows the 'elective' caesarean section rates for all women giving birth in Queensland between 2010 and 2011. Similarly to the data shown in Figure 70, this indicator shows a significantly greater likelihood of women having a caesarean section birth in the private healthcare sector (34.7%) when compared with the public healthcare sector (15.0%)—risk ratio private hospitals versus public hospitals, RR = 2.32, 95% confidence limits 2.27, 2.37.

Figure 72: Proportion (%) of caesarean sections performed without labour in all women giving birth, Queensland 2010 to 2011
*(see Table 94)*

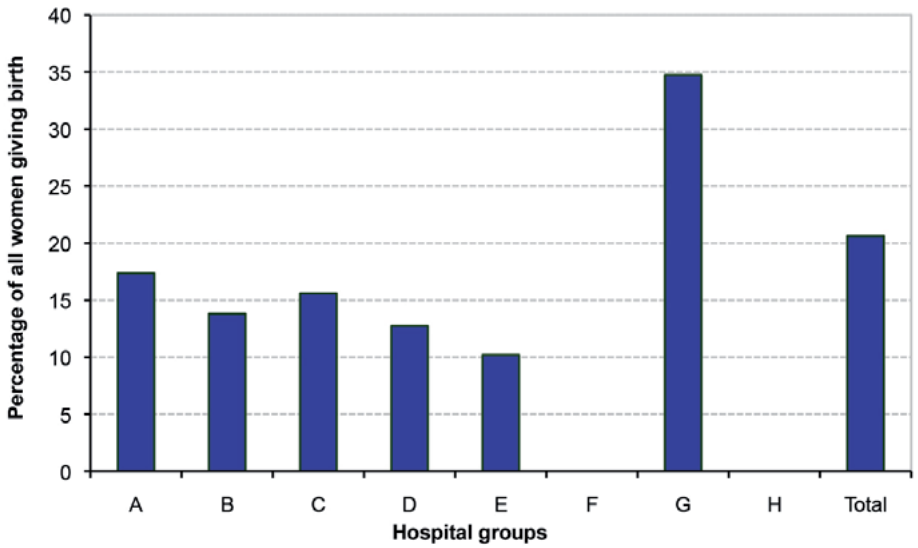
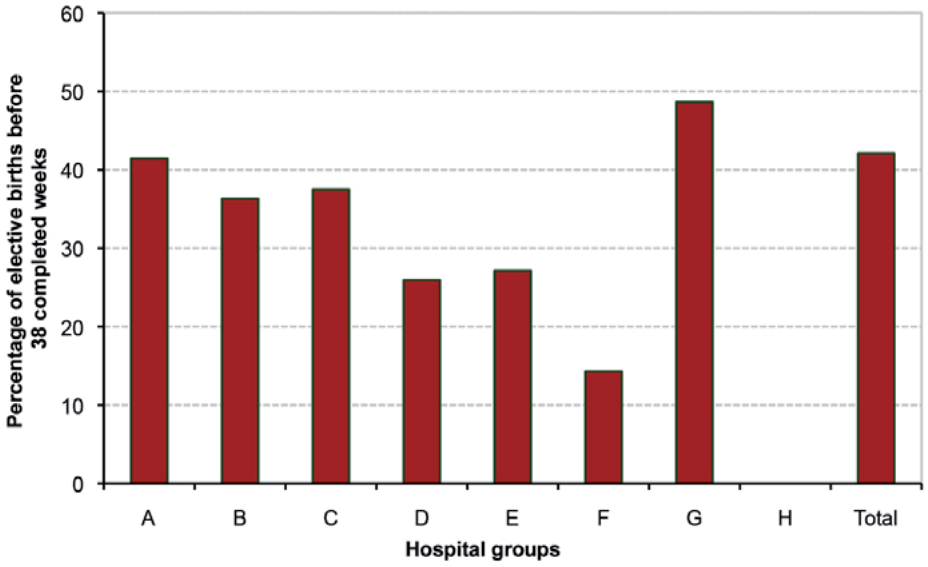



Figure 73 shows that women cared for in the private healthcare sector are less likely to labour spontaneously than women in the public healthcare sector. Within the public healthcare sector women being cared for in smaller mostly rural facilities are more likely to labour spontaneously when compared with those women being cared for in specialist obstetric services—it is likely that this difference reflects appropriate risk stratification and referral.

Figure 73: Proportion (%) of elective births (inductions of labour and caesarean sections without labour in all women giving birth) occurring before 38 completed weeks gestation, Queensland 2010 to 2011
*(see Table 94)*



The safety and appropriateness of vaginal birth after caesarean section (VBAC) is a vexed question, with evidence and opinion being divided. The indicator shown in Figure 74 examines successful VBAC in the birth immediately following a first caesarean section. All women in this category who gave birth at home had a successful VBAC, though the numbers are small and the number transferred to hospital during labour in this group is not available. The rate of VBAC in public hospitals was more than double that in private hospitals (Risk ratio public hospitals versus private hospitals, RR = 2.72, 95% confidence limits 2.51, 2.95).

Figure 74: Proportion (%) of all women giving birth whose previous pregnancy ended in a first caesarean section who achieved a vaginal birth (i.e. successful VBAC), Queensland 2010 to 2011
*(see Table 94)*

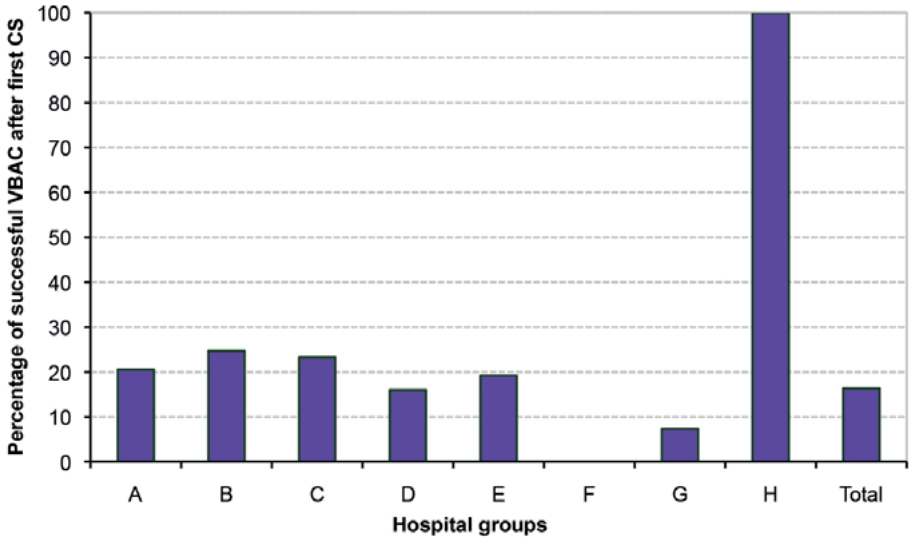



Figure 75 shows selected primigravidae who laboured spontaneously and achieved an unassisted vaginal birth without episiotomy and without third/fourth degree perineal tear (i.e. without major perineal damage). Care in public hospital birth centres and at home achieved rates almost three times that of other modes of healthcare delivery—the risk ratio for public hospital birth centre care versus the rest of the state's selected primigravidae was RR = 2.79, 95% confidence limits 2.70, 2.88, but numbers in the home birth are too small to be assessed statistically. Women cared for in the private healthcare sector achieved significantly lower rates than the rest of the state's selected primigravidae (risk ratio RR = 0.44, 95% confidence limits 0.42, 0.46)

Figure 75: Proportion (%) of selected primigravidae labouring spontaneously and achieving unassisted vaginal birth without episiotomy and without third/fourth degree perineal tear, Queensland 2010 to 2011
*(see Table 94)*

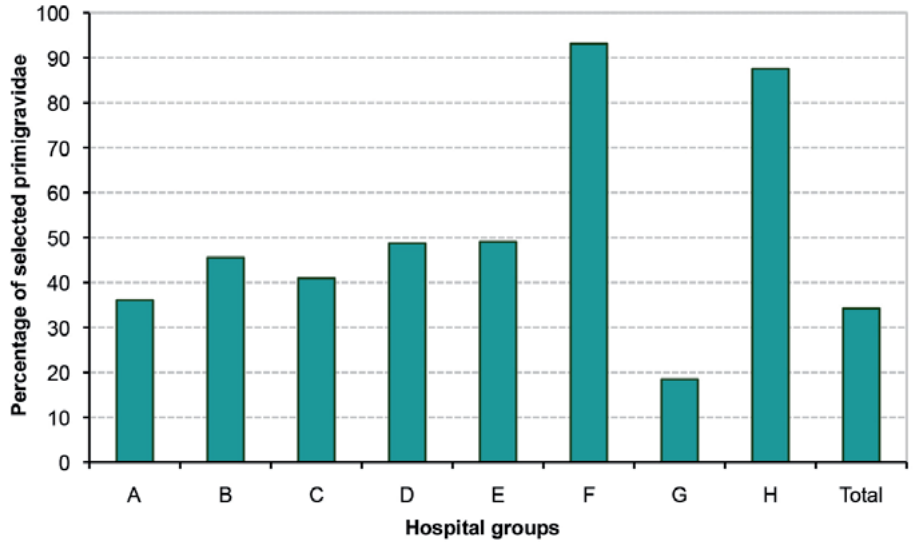
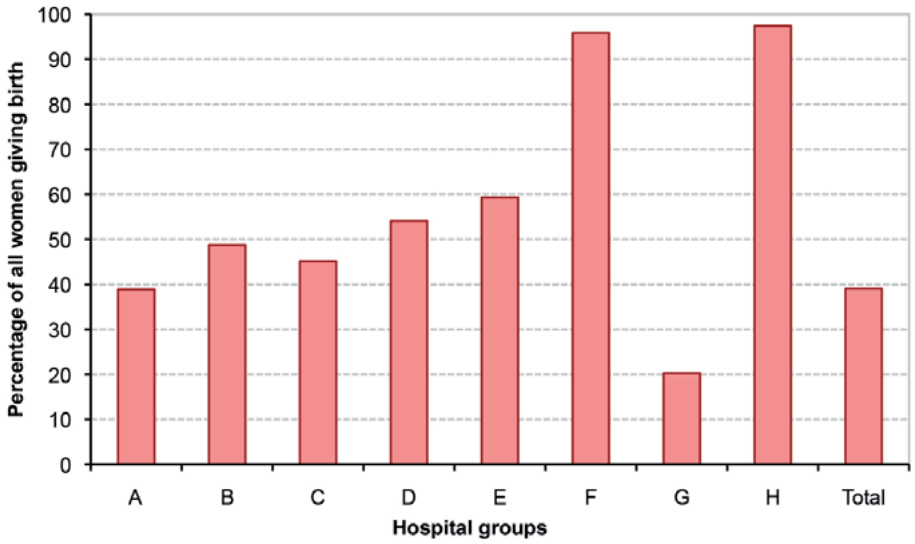


Figure 76 shows all women who laboured spontaneously and achieved an unassisted vaginal birth without major perineal damage. Similar variations to those seen in Figure 65 are found in this larger group.

Figure 76: Proportion (%) of all women giving birth labouring spontaneously and achieving unassisted vaginal birth without episiotomy and without third/fourth degree perineal tear, Queensland 2010 to 2011
*(see Table 94)*




**Good practice point**

- Maternity services are encouraged to be continuously aware of their own performance by monitoring against relevant indicators, and to readily make this information available to staff and to consumers of their care.



**Recommendation**

- That future Council reports will examine clinical indicators, such as those in this report, by individual hospital/facility.

# 5. Data tables

### Table 29: Perinatal mortality rates, Queensland 2000 to 2011

*(see Section 1.1 regarding definitions of neonatal deaths and stillbirths)*

| | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Fetal deaths** | 7.3 | 7.3 | 6.7 | 6.1 | 6.9 | 6.8 | 6.9 | 6.9 | 6.3 | 7.2 | 6.7 | 6.4 |
| **Neonatal deaths** | 3.8 | 4 | 3.6 | 3.5 | 3.9 | 3.4 | 4.0 | 3.4 | 3.4 | 3.9 | 3.9 | 3.4 |
| **Perinatal deaths** | 11 | 11.3 | 10.3 | 9.6 | 10.8 | 10.1 | 10.8 | 10.3 | 9.6 | 11.1 | 10.6 | 9.9 |

### Table 30: Perinatal autopsy rates, Queensland 2000 to 2011

| | Autopsy rates (per cent performed) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 |
| **Stillbirths** | 44.1 | 38.8 | 24.3 | 29.6 | 22.8 | 28.3 | 30.7 | 34.3 | 36.5 | 37.4 | 35.8 | 36.9 |
| **Neonatal deaths** | 29.9 | 25.6 | 14.7 | 17.0 | 17.2 | 22.2 | 29.1 | 31.2 | 26.7 | 27.6 | 23.1 | 20.7 |
| **Perinatal deaths** | 39.3 | 34.2 | 20.9 | 25.1 | 20.7 | 26.3 | 30.1 | 33.3 | 33.1 | 34.0 | 31.1 | 31.3 |

### Table 31: Perinatal deaths by detailed PSANZ-PDC classification, Queensland 2009 to 2011

| PSANZ-PDC cause of death | | | Perinatal deaths | | Stillbirths | | Neonatal deaths | |
|---|---|---|---|---|---|---|---|---|
| | | | n | % | n | % | n | % |
| **1. Congenital abnormality (including terminations for congenital abnormalities)** | | | | | | | | |
| 1.1 | Central nervous system | | 115 | 5.9 | 88 | 7.0 | 27 | 3.9 |
| 1.2 | Cardiovascular system | | 90 | 4.6 | 40 | 3.2 | 50 | 7.2 |
| 1.3 | Urinary system | | 43 | 2.2 | 22 | 1.7 | 21 | 3.0 |
| 1.4 | Gastrointestinal system | | 4 | 0.2 | 2 | 0.2 | 2 | 0.3 |
| 1.5 | Chromosomal | | 129 | 6.6 | 101 | 8.0 | 28 | 4.0 |
| 1.6 | Metabolic | | 7 | 0.4 | 1 | 0.1 | 6 | 0.9 |
| 1.7 | Multiple/non-chromosomal syndromes | | 61 | 3.1 | 31 | 2.5 | 30 | 4.3 |
| 1.8 | Other congenital abnormality | | 63 | 3.2 | 25 | 2.0 | 38 | 5.5 |
| 1.9 | Unspecified congenital abnormality | | 9 | 0.5 | 5 | 0.4 | 4 | 0.6 |
| **2. Perinatal infection** | | | | | | | | |
| 2.1 | Bacterial | | 2 | 0.1 | 1 | 0.1 | 1 | 0.1 |
| | 2.11 | Group B streptococcus | 5 | 0.3 | 4 | 0.3 | 1 | 0.1 |
| | 2.12 | E coli | 2 | 0.1 | 1 | 0.1 | 1 | 0.1 |
| | 2.13 | Listeria monocytogenes | | | | | | |
| | 2.14 | Spirochaetal e.g. syphilis | 2 | 0.1 | 2 | 0.2 | | |
| | 2.18 | Other bacterial | 8 | 0.4 | 7 | 0.6 | 1 | 0.1 |
| | 2.19 | Unspecified bacterial | 9 | 0.5 | 8 | 0.6 | 1 | 0.1 |
| 2.2 | Viral | | | | | | | |
| | 2.21 | Cytomegalovirus | 9 | 0.5 | 7 | 0.6 | 2 | 0.3 |
| | 2.22 | Parvovirus | 4 | 0.2 | 4 | 0.3 | | |
| | 2.23 | Herpes simplex virus | | | | | | |
| | 2.24 | Rubella virus | | | | | | |
| | 2.28 | Other viral | 2 | 0.1 | | | 2 | 0.3 |
| | 2.29 | Unspecified viral | | | | | | |
| 2.3 | Protozoal e.g. toxoplasma | | 1 | 0.1 | 1 | 0.1 | | |
| 2.5 | Fungal | | | | | | | |
| 2.8 | Other specified organism | | | | | | | |
| 2.9 | Other unspecified organism | | 2 | 0.1 | 1 | 0.1 | 1 | 0.1 |

Table 31: Perinatal deaths by detailed PSANZ-PDC classification, Queensland 2009 to 2011 *continued*

| PSANZ-PDC cause of death | | | Perinatal deaths | | Stillbirths | | Neonatal deaths | |
|---|---|---|---|---|---|---|---|---|
| | | | n | % | n | % | n | % |
| **3. Hypertension** | | | | | | | | |
| 3.1 | Chronic hypertension: essential | | 6 | 0.3 | 6 | 0.5 | | |
| 3.2 | Chronic hypertension: secondary e.g. renal disease | | 2 | 0.1 | 1 | 0.1 | 1 | 0.1 |
| 3.3 | Chronic hypertension: unspecified | | | | | | | |
| 3.4 | Gestational hypertension | | 2 | 0.1 | 2 | 0.2 | | |
| 3.5 | Pre-eclampsia | | 28 | 1.4 | 20 | 1.6 | 8 | 1.2 |
| | 3.51 | With laboratory evidence of thrombophilia | 8 | 0.4 | 6 | 0.5 | 2 | 0.3 |
| 3.6 | Pre-eclampsia superimposed on chronic hypertension | | | | | | | |
| | 3.61 | With laboratory evidence of thrombophilia | | | | | | |
| 3.9 | | Unspecified hypertension | 1 | 0.1 | | | 1 | 0.1 |
| **4. Antepartum haemorrhage (APH)** | | | | | | | | |
| 4.1 | Placental abruption | | 93 | 4.8 | 67 | 5.3 | 26 | 3.7 |
| | 4.11 | With laboratory evidence of thrombophilia | 2 | 0.1 | 1 | 0.1 | 1 | 0.1 |
| 4.2 | Placenta praevia | | 4 | 0.2 | 2 | 0.2 | 2 | 0.3 |
| 4.3 | Vasa praevia | | 2 | 0.1 | | | 2 | 0.3 |
| 4.8 | Other APH | | 6 | 0.3 | 3 | 0.2 | 3 | 0.4 |
| 4.9 | APH of undetermined origin | | 5 | 0.3 | 3 | 0.2 | 2 | 0.3 |
| **5. Maternal conditions** | | | | | | | | |
| 5.1 | Termination of pregnancy for maternal psychosocial indications | | | | | | | |
| 5.2 | Diabetes/gestational diabetes | | 6 | 0.3 | 6 | 0.5 | | |
| 5.3 | Maternal injury | | | | | | | |
| | 5.31 | Accidental | 1 | 0.1 | 1 | 0.1 | | |
| | 5.32 | Non-accidental | | | | | | |
| 5.4 | Maternal sepsis | | 1 | 0.1 | 1 | 0.1 | | |
| 5.5 | Lupus obstetric syndrome | | 2 | 0.1 | 2 | 0.2 | | |
| 5.6 | Obstetric cholestasis | | | | | | | |
| 5.8 | Other specified maternal conditions | | 15 | 0.8 | 11 | 0.9 | 4 | 0.6 |
| **6. Specific perinatal conditions** | | | | | | | | |
| 6.1 | Twin-twin transfusion | | 47 | 2.4 | 35 | 2.8 | 12 | 1.7 |
| 6.2 | Fetomaternal haemorrhage | | 18 | 0.9 | 17 | 1.3 | 1 | 0.1 |
| 6.3 | Antepartum cord complications (e.g. cord haemorrhage, true knot with evidence of occlusion) | | 27 | 1.4 | 26 | 2.1 | 1 | 0.1 |
| 6.4 | Uterine abnormalities e.g. bicornuate uterus, cervical incompetence | | 11 | 0.6 | 9 | 0.7 | 2 | 0.3 |
| 6.5 | Birth trauma (typically infants of ›24 weeks gestation or ›600g birthweight) | | | | | | | |
| 6.6 | Alloimmune disease | | | | | | | |
| | 6.61 | Rhesus | 3 | 0.2 | 3 | 0.2 | | |
| | 6.62 | ABO | | | | | | |
| | 6.63 | Kell | | | | | | |
| | 6.64 | Alloimmune thrombocytopenia | | | | | | |
| | 6.68 | Other | 1 | 0.1 | | | 1 | 0.1 |
| | 6.69 | Unspecified | 1 | 0.1 | 1 | 0.1 | | |
| 6.7 | Idiopathic hydrops | | 18 | 0.9 | 11 | 0.9 | 7 | 1.0 |
| 6.8 | Other specific perinatal conditions | | 4 | 0.2 | 3 | 0.2 | 1 | 0.1 |
| **7. Hypoxic peripartum death** | | | | | | | | |
| 7.1 | With intrapartum complications | | | | | | | |
| | 7.11 | Uterine rupture | 3 | 0.2 | 3 | 0.2 | | |
| | 7.12 | Cord prolapse | 1 | 0.1 | | | 1 | 0.1 |
| | 7.13 | Shoulder dystocia | 3 | 0.2 | 1 | 0.1 | 2 | 0.3 |
| | 7.18 | Other | 7 | 0.4 | 2 | 0.2 | 5 | 0.7 |
| 7.2 | Evidence of non-reassuring fetal status in a normally grown infant | | 28 | 1.4 | 9 | 0.7 | 19 | 2.7 |
| 7.3 | No intrapartum complications and no evidence of non-reassuring fetal status | | 4 | 0.2 | | | 4 | 0.6 |
| 7.9 | Unspecified hypoxic peripartum death | | 7 | 0.4 | 4 | 0.3 | 3 | 0.4 |

Table 31: Perinatal deaths by detailed PSANZ-PDC classification, Queensland 2009 to 2011 *continued*

| PSANZ-PDC cause of death | | | Perinatal deaths | | Stillbirths | | Neonatal deaths | |
|---|---|---|---|---|---|---|---|---|
| | | | n | % | n | % | n | % |
| **8. Fetal Growth Restriction (FGR)** | | | | | | | | |
| 8.1 | With evidence of reduced vascular perfusion on Doppler studies and/or placental histopathology | | 48 | 2.5 | 38 | 3.0 | 10 | 1.4 |
| 8.2 | With chronic villitis | | 2 | 0.1 | 2 | 0.2 | | |
| 8.3 | No placental pathology | | 12 | 0.6 | 11 | 0.9 | 1 | 0.1 |
| 8.4 | No examination of placenta | | | | | | | |
| 8.8 | Other specified placental pathology | | 4 | 0.2 | 3 | 0.2 | 1 | 0.1 |
| 8.9 | Unspecified or not known whether placenta examined | | 7 | 0.4 | 6 | 0.5 | 1 | 0.1 |
| **9. Spontaneous preterm (<37 weeks gestation)** | | | | | | | | |
| 9.1 | Spontaneous preterm with intact membranes, or membrane rupture <24 hours before delivery | | 2 | 0.1 | | | 2 | 0.3 |
| | 9.11 | With chorioamnionitis on placental histopathology | 140 | 7.2 | 45 | 3.6 | 95 | 13.7 |
| | 9.12 | Without chorioamnionitis on placental histopathology | 77 | 3.9 | 22 | 1.7 | 55 | 7.9 |
| | 9.13 | With clinical evidence of chorioamnionitis, no examination of placenta | 5 | 0.3 | 1 | 0.1 | 4 | 0.6 |
| | 9.17 | No clinical signs of chorioamnionitis, no examination of placenta | 10 | 0.5 | 1 | 0.1 | 9 | 1.3 |
| | 9.19 | Unspecified or not known whether placenta examined | 34 | 1.7 | 17 | 1.3 | 17 | 2.4 |
| 9.2 | Spontaneous preterm with membrane rupture >24 hours before delivery | | 1 | 0.1 | | | 1 | 0.1 |
| | 9.21 | With chorioamnionitis on placental histopathology | 130 | 6.7 | 50 | 4.0 | 80 | 11.5 |
| | 9.22 | Without chorioamnionitis on placental histopathology | 20 | 1.0 | 11 | 0.9 | 9 | 1.3 |
| | 9.23 | With clinical evidence of chorioamnionitis, no examination of placenta | 4 | 0.2 | 3 | 0.2 | 1 | 0.1 |
| | 9.27 | No clinical signs of chorioamnionitis, no examination of placenta | 4 | 0.2 | 1 | 0.1 | 3 | 0.4 |
| | 9.29 | Unspecified or not known whether placenta examined | 16 | 0.8 | 7 | 0.6 | 9 | 1.3 |
| 9.3 | Spontaneous preterm with membrane rupture of unknown duration before delivery | | | | | | | |
| | 9.31 | With chorioamnionitis on placental histopathology | 20 | 1.0 | 9 | 0.7 | 11 | 1.6 |
| | 9.32 | Without chorioamnionitis on placental histopathology | 6 | 0.3 | 1 | 0.1 | 5 | 0.7 |
| | 9.33 | With clinical evidence of chorioamnionitis, no examination of placenta | 1 | 0.1 | | | 1 | 0.1 |
| | 9.37 | No clinical signs of chorioamnionitis, no examination of placenta | 3 | 0.2 | 1 | 0.1 | 2 | 0.3 |
| | 9.39 | Unspecified or not known whether placenta examined | 7 | 0.4 | 6 | 0.5 | 1 | 0.1 |
| **10. Unexplained antepartum death** | | | | | | | | |
| 10.1 | With evidence of reduced vascular perfusion on Doppler studies and / or placental histopathology | | 42 | 2.1 | 42 | 3.3 | | |
| 10.2 | With chronic villitis | | 5 | 0.3 | 5 | 0.4 | | |
| 10.3 | No placental pathology | | 212 | 10.8 | 212 | 16.8 | | |
| 10.4 | No examination of placenta | | 17 | 0.9 | 17 | 1.3 | | |
| 10.8 | Other specified placental pathology | | 70 | 3.6 | 70 | 5.6 | | |
| 10.9 | Unspecified or not known whether placenta examined | | 39 | 2.0 | 39 | 3.1 | | |
| **11. No obstetric antecedent** | | | | | | | | |
| 11.1 | Sudden infant death syndrome (SIDS) | | 1 | 0.1 | | | 1 | 0.1 |
| | 11.11 | SIDS Category IA: Classic features of SIDS present and completely documented | 1 | 0.1 | | | 1 | 0.1 |
| | 11.12 | SIDS Category IB: Classic features of SIDS present but incompletely documented | 1 | 0.1 | | | 1 | 0.1 |
| | 11.13 | SIDS Category II: Infant deaths that meet Category I: except for one or more features | 5 | 0.3 | | | 5 | 0.7 |
| 11.2 | Postnatally acquired infection | | 3 | 0.2 | | | 3 | 0.4 |
| 11.3 | Accidental asphyxiation | | 1 | 0.1 | | | 1 | 0.1 |

Table 31: Perinatal deaths by detailed PSANZ-PDC classification, Queensland 2009 to 2011 *continued*

| PSANZ-PDC cause of death | | | Perinatal deaths | | Stillbirths | | Neonatal deaths | |
|---|---|---|---|---|---|---|---|---|
| | | | n | % | n | % | n | % |
| 11.4 | Other accident, poisoning or violence (postnatal) | | 2 | 0.1 | 1 | 0.1 | 1 | 0.1 |
| 11.8 | Other specified | | 5 | 0.3 | 1 | 0.1 | 4 | 0.6 |
| 11.9 | Unknown/undetermined | | 59 | 3.0 | 31 | 2.5 | 28 | 4.0 |
| | 11.91 | Unclassified sudden infant death | 2 | 0.1 | | | 2 | 0.3 |
| | 11.92 | Other unknown/undetermined | 2 | 0.1 | | | 2 | 0.3 |
| **Total** | | | **1955** | **100** | **1261** | **100** | **694** | **100** |

Table 32: Neonatal deaths by detailed PSANZ-PDC classification, Queensland 2009 to 2011

| PSANZ-NDC Cause of death | | | n | % |
|---|---|---|---|---|
| **1. Congenital abnormality (including terminations for congenital abnormalities)** | | | | |
| 1.1 | Central nervous system | | 24 | 3.5 |
| 1.2 | Cardiovascular system | | 47 | 6.8 |
| 1.3 | Urinary system | | 21 | 3.0 |
| 1.4 | Gastrointestinal system | | 3 | 0.4 |
| 1.5 | Chromosomal | | 26 | 3.7 |
| 1.6 | Metabolic | | 6 | 0.9 |
| 1.7 | Multiple/non chromosomal syndromes | | 32 | 4.6 |
| 1.8 | Other congenital abnormality | | | |
| | 1.81 | Musculoskeletal | 13 | 1.9 |
| | 1.82 | Respiratory | 5 | 0.7 |
| | 1.83 | Diaphragmatic hernia | 18 | 2.6 |
| | 1.84 | Haematological | 1 | 0.1 |
| | 1.85 | Tumours | 1 | 0.1 |
| | 1.88 | Other specified congenital abnormality | 2 | 0.3 |
| 1.9 | Unspecified congenital abnormality | | 3 | 0.4 |
| **2. Extreme prematurity** | | | | |
| 2.1 | Not resuscitated | | 218 | 31.4 |
| 2.2 | Unsuccessful resuscitation | | 31 | 4.5 |
| 2.9 | Unspecified or not known whether resuscitation attempted | | 2 | 0.3 |
| **3. Cardio-respiratory disorders** | | | | |
| 3.1 | Hyaline membrane disease/respiratory distress syndrome (RDS) | | 20 | 2.9 |
| 3.2 | Meconium aspiration syndrome | | 6 | 0.9 |
| 3.3 | Primary persistent pulmonary hypertension | | 5 | 0.7 |
| 3.4 | Pulmonary hypoplasia | | 16 | 2.3 |
| 3.5 | Chronic neonatal lung disease (typically, bronchopulmonary dysplasia) | | 11 | 1.6 |
| 3.6 | Pulmonary haemorrhage | | 6 | 0.9 |
| 3.7 | Pneumothorax | | | |
| 3.8 | Other | | 4 | 0.6 |
| **4. Infection** | | | | |
| 4.1 | Bacterial | | | |
| | 4.11 | Congenital bacterial | 8 | 1.2 |
| | 4.12 | Acquired bacterial | 10 | 1.4 |
| 4.2 | Viral | | 1 | 0.1 |
| | 4.21 | Congenital viral | 4 | 0.6 |
| | 4.22 | Acquired viral | | |
| 4.3 | Protozoal, e.g. toxoplasma | | | |
| 4.4 | Spirochaetal, e.g. syphilis | | | |
| 4.5 | Fungal | | 1 | 0.1 |
| 4.8 | Other | | | |
| 4.9 | Unspecified organism | | | |
| **5. Neurological** | | | | |
| 5.1 | Hypoxic ischaemic encephalopathy/perinatal asphyxia (typically infants of ›24 weeks gestation or ›600g birthweight) | | 41 | 5.9 |
| 5.2 | Intracranial haemorrhage | | 34 | 4.9 |
| 5.8 | Other | | 1 | 0.1 |

Table 32: Neonatal deaths by detailed PSANZ-PDC classification, Queensland 2009 to 2011 *continued*

| PSANZ-NDC Cause of death | | | n | % |
|---|---|---|---|---|
| **6. Gastrointestinal** | | | | |
| 6.1 | Necrotising enterocolitis | | 24 | 3.5 |
| 6.8 | Other | | 1 | 0.1 |
| **7. Other** | | | | |
| 7.1 | SIDS | | | |
| | 7.11 | SIDS Category IA: Classic features of SIDS present and completely documented | 1 | 0.1 |
| | 7.12 | SIDS Category IB: Classic features of SIDS present but incompletely documented | 1 | 0.1 |
| | 7.13 | SIDS Category II : Infant deaths that meet category I except for one or more features | 6 | 0.9 |
| 7.2 | Multisystem failure-only if unknown primary cause or trigger event | | 2 | 0.3 |
| 7.3 | Trauma | | 1 | 0.1 |
| 7.8 | Other specified | | 2 | 0.3 |
| 7.9 | Unknown/undetermined | | 31 | 4.5 |
| | 7.91 | Unclassified sudden infant death | 2 | 0.3 |
| | 7.92 | Other unknown/undetermined | 2 | 0.3 |
| **Total** | | | **694** | **100** |

## Table 33: Numbers and rates of stillbirth, neonatal death and perinatal death, by birthweight, Queensland 2000 to 2011

| | | | Stillbirths | | Neonatal deaths | | Perinatal deaths | |
|---|---|---|---|---|---|---|---|---|
| Birthweight (g) | Total births | Live births | Number | Deaths per 1,000 births | Number | Deaths per 1,000 live births | Number | Deaths per 1,000 births |
| **Less than 500** | 2,402 | 655 | 1,747 | 727.3 | 619 | 945.0 | 2,366 | 985.0 |
| **500–749** | 1,852 | 1,285 | 567 | 306.2 | 507 | 394.6 | 1,074 | 579.9 |
| **750–999** | 1,842 | 1,614 | 228 | 123.8 | 187 | 115.9 | 415 | 225.3 |
| **1,000–1,249** | 2,287 | 2,126 | 161 | 70.4 | 85 | 40.0 | 246 | 107.6 |
| **1,250–1,499** | 3,129 | 2,964 | 165 | 52.7 | 54 | 18.2 | 219 | 70.0 |
| **1,500–1,749** | 4,833 | 4,690 | 143 | 29.6 | 69 | 14.7 | 212 | 43.9 |
| **1,750–1,999** | 7,704 | 7,562 | 142 | 18.4 | 81 | 10.7 | 223 | 28.9 |
| **2,000–2,249** | 26,236 | 26,076 | 160 | 6.1 | 95 | 3.6 | 255 | 9.7 |
| **2,250–2,499** | 57,235 | 57,069 | 166 | 2.9 | 96 | 1.7 | 262 | 4.6 |
| **2500–2,999** | 117,010 | 116,682 | 328 | 2.8 | 195 | 1.7 | 523 | 4.5 |
| **3,000–3,499** | 202,415 | 202,136 | 279 | 1.4 | 168 | 0.8 | 447 | 2.2 |
| **3,500–3,999** | 172,698 | 172,526 | 172 | 1.0 | 124 | 0.7 | 296 | 1.7 |
| **4,000–4,499** | 58,875 | 58,708 | 167 | 2.8 | 136 | 2.3 | 303 | 5.1 |
| **4500 and over** | 10,752 | 10,684 | 68 | 6.3 | 41 | 3.8 | 109 | 10.1 |
| **Not stated** | 109 | 67 | 42 | | 10 | | 52 | |
| **Total** | **669,379** | **664,844** | **4,535** | **6.8** | **2,467** | **3.7** | **7,002** | **10.5** |

## Table 34: Numbers and rates of stillbirth, neonatal death and perinatal death, by gestation, Queensland 2000 to 2011

| | | | Stillbirths | | Neonatal deaths | | Perinatal deaths | |
|---|---|---|---|---|---|---|---|---|
| Gestation (weeks) | Total births | Live births | Number | Deaths per 1,000 births | Number | Deaths per 1,000 live births | Number | Deaths per 1,000 births |
| **23 or less** | 2,859 | 950 | 1,909 | 667.7 | 909 | 956.8 | 2,818 | 985.7 |
| **24–27** | 2,909 | 2,332 | 577 | 198.3 | 515 | 220.8 | 1,092 | 375.4 |
| **28–33** | 13,597 | 12,893 | 704 | 51.8 | 276 | 21.4 | 980 | 72.1 |
| **34–36** | 38,614 | 38,175 | 439 | 11.4 | 196 | 5.1 | 635 | 16.4 |
| **37–39** | 322,988 | 322,444 | 544 | 1.7 | 360 | 1.1 | 904 | 2.8 |
| **40–41** | 282,483 | 282,151 | 332 | 1.2 | 200 | 0.7 | 532 | 1.9 |
| **42 or more** | 5,860 | 5,838 | 22 | 3.8 | 11 | 1.9 | 33 | 5.6 |
| **Not stated** | 69 | 61 | 8 | | 0 | | 8 | |
| **Total** | **669,379** | **664,844** | **4,535** | **6.8** | **2,467** | **3.7** | **7,002** | **10.5** |

## Table 35: Women giving birth by mode of healthcare delivery, Queensland 2001 to 2011

*(data regarding mode of healthcare delivery was collected completely from 2001 onwards)*

| Year | Public hospital | | Private hospital | Planned home birth | Born before arrival | Data incomplete | Total women giving birth |
|---|---|---|---|---|---|---|---|
| | Maternity service | Birth centre | | | | | |
| 2000 | 35,967 (74.1%) | | 12,429 (25.6%) | 126 (0.3%) | | 2 | 48,524 |
| 2001 | 33,487 (68.5%) | 441 (0.9%) | 14,595 (29.8%) | 102 (0.2%) | 162 (0.3%) | 121 | 48,908 |
| 2002 | 32,313 (66.9%) | 382 (0.8%) | 15,280 (31.6%) | 59 (0.1%) | 165 (0.3%) | 125 | 48,324 |
| 2003 | 33,144 (66.9%) | 459 (0.9%) | 15,594 (31.5%) | 67 (0.1%) | 232 (0.5%) | 16 | 49,512 |
| 2004 | 33,480 (66.9%) | 457 (0.9%) | 15,759 (31.5%) | 55 (0.1%) | 283 (0.6%) | 17 | 50,051 |
| 2005 | 36,644 (67.4%) | 439 (0.8%) | 16,891 (31.1%) | 42 (0.1%) | 297 (0.5%) | 24 | 54,337 |
| 2006 | 37,681 (67.6%) | 472 (0.8%) | 17,188 (30.8%) | 46 (0.1%) | 300 (0.5%) | 32 | 55,719 |
| 2007 | 40,375 (68.2%) | 504 (0.9%) | 17,909 (30.2%) | 81 (0.1%) | 337 (0.6%) | 22 | 59,228 |
| 2008 | 41,125 (68.2%) | 431 (0.7%) | 18,279 (30.3%) | 110 (0.2%) | 359 (0.6%) | 24 | 60,328 |
| 2009 | 41,591 (68.2%) | 581 (1.0%) | 18,328 (30.0%) | 123 (0.2%) | 367 (0.6%) | 34 | 61,024 |
| 2010 | 41,474 (68.0%) | 691 (1.1%) | 18,362 (30.1%) | 85 (0.1%) | 415 (0.7%) | 0 | 61,027 |
| 2011 | 41,880 (68.5%) | 840 (1.4%) | 17,906 (29.3%) | 69 (0.1%) | 428 (0.7%) | 2 | 61,123 |
| Total | 449,161 (68.3%) | 5,697 (0.9%) | 198,520 (30.2%) | 965 (0.1%) | 3,345 (0.5%) | 419 | 658,105 |

## Table 36: Number and percentage of women giving birth by gestation at birth, Queensland 2000 to 2011

*(gestation not stated for 69 women)*

| Weeks / Year | 23 or less | 24–27 | 28–33 | 34–36 | 37–39 | 40–41 | 42 or more | Total |
|---|---|---|---|---|---|---|---|---|
| 2000 | 204 (0.4%) | 195 (0.4%) | 858 (1.8%) | 2,440 (5.0%) | 20,791 (42.8%) | 23,093 (47.6%) | 933 (1.9%) | 48,524 |
| 2001 | 202 (0.4%) | 193 (0.4%) | 772 (1.6%) | 2,452 (5.0%) | 21,100 (43.1%) | 23,470 (48.0%) | 718 (1.5%) | 48,908 |
| 2002 | 170 (0.4%) | 190 (0.4%) | 867 (1.8%) | 2,449 (5.1%) | 21,823 (45.2%) | 22,203 (45.9%) | 620 (1.3%) | 48,324 |
| 2003 | 154 (0.3%) | 189 (0.4%) | 880 (1.8%) | 2,542 (5.1%) | 22,899 (46.2%) | 22,354 (45.1%) | 491 (1.0%) | 49,512 |
| 2004 | 201 (0.4%) | 197 (0.4%) | 917 (1.8%) | 2,636 (5.3%) | 23,696 (47.3%) | 21,980 (43.9%) | 417 (0.8%) | 50,051 |
| 2005 | 209 (0.4%) | 211 (0.4%) | 953 (1.8%) | 2,891 (5.3%) | 26,165 (48.2%) | 23,525 (43.3%) | 379 (0.7%) | 54,337 |
| 2006 | 239 (0.4%) | 237 (0.3%) | 1,019 (1.8%) | 3,006 (5.4%) | 27,399 (49.2%) | 23,471 (42.1%) | 342 (0.6%) | 55,719 |
| 2007 | 260 (0.4%) | 185 (0.4%) | 1,041 (1.8%) | 3,157 (5.3%) | 29,059 (49.1%) | 25,101 (42.4%) | 414 (0.7%) | 59,228 |
| 2008 | 234 (0.4%) | 232 (0.4%) | 1,019 (1.7%) | 3,154 (5.2%) | 30,272 (50.2%) | 24,993 (41.4%) | 419 (0.7%) | 60,328 |
| 2009 | 248 (0.4%) | 236 (0.4%) | 1,068 (1.8%) | 3,260 (5.3%) | 31,088 (50.9%) | 24,695 (40.5%) | 422 (0.7%) | 61,024 |
| 2010 | 256 (0.4%) | 244 (0.4%) | 1,065 (1.7%) | 3,196 (5.2%) | 31,767 (52.1%) | 24,137 (39.6%) | 356 (0.6%) | 61,027 |
| 2011 | 242 (0.4%) | 258 (0.4%) | 1,050 (1.7%) | 3,261 (5.3%) | 32,551 (53.3%) | 23,406 (38.3%) | 349 (0.6%) | 61,123 |

## Table 37: Number and percentage of babies born by gestation at birth, Queensland 2000 to 2011

*(gestation not stated for 69 babies)*

| Weeks / Year | 23 or less | 24–27 | 28–33 | 34–36 | 37–39 | 40–41 | 42 or more | Total |
|---|---|---|---|---|---|---|---|---|
| 2000 | 221 (0.4%) | 219 (0.4%) | 1,002 (2.0%) | 2,723 (5.5%) | 21,104 (42.8%) | 23,105 (46.8%) | 933 (1.9%) | 49,318 |
| 2001 | 225 (0.5%) | 217 (0.4%) | 911 (1.8%) | 2,721 (5.5%) | 21,419 (43.1%) | 23,478 (47.2%) | 718 (1.4%) | 49,690 |
| 2002 | 188 (0.4%) | 218 (0.4%) | 1,039 (2.1%) | 2,764 (5.6%) | 22,156 (45.0%) | 22,209 (45.1%) | 620 (1.3%) | 49,196 |
| 2003 | 173 (0.3%) | 211 (0.4%) | 1,038 (2.1%) | 2,852 (5.7%) | 23,242 (46.1%) | 22,357 (44.4%) | 491 (1.0%) | 50,367 |
| 2004 | 216 (0.4%) | 237 (0.4%) | 1,073 (2.1%) | 2,955 (5.8%) | 24,019 (47.2%) | 21,986 (43.2%) | 417 (0.8%) | 50,910 |
| 2005 | 227 (0.4%) | 232 (0.4%) | 1,121 (2.0%) | 3,248 (5.9%) | 26,543 (48.0%) | 23,527 (42.6%) | 379 (0.7%) | 55,281 |
| 2006 | 256 (0.5%) | 275 (0.4%) | 1,233 (2.2%) | 3,362 (5.9%) | 27,761 (49.0%) | 23,473 (41.4%) | 342 (0.6%) | 56,708 |
| 2007 | 284 (0.5%) | 206 (0.4%) | 1,236 (2.1%) | 3,527 (5.9%) | 29,462 (48.9%) | 25,104 (41.7%) | 414 (0.7%) | 60,244 |
| 2008 | 256 (0.4%) | 261 (0.4%) | 1,191 (1.9%) | 3,584 (5.8%) | 30,689 (50.0%) | 24,997 (40.7%) | 419 (0.7%) | 61,402 |
| 2009 | 272 (0.4%) | 265 (0.4%) | 1,249 (2.0%) | 3,660 (5.9%) | 31,482 (50.7%) | 24,695 (39.8%) | 422 (0.7%) | 62,052 |
| 2010 | 281 (0.5%) | 271 (0.4%) | 1,267 (2.0%) | 3,557 (5.7%) | 32,150 (51.8%) | 24,144 (38.9%) | 356 (0.6%) | 62,032 |
| 2011 | 260 (0.4%) | 297 (0.5%) | 1,237 (2.0%) | 3,661 (5.9%) | 32,961 (53.0%) | 23,408 (37.6%) | 349 (0.6%) | 62,179 |

## Table 38: Number and percentage of women giving birth by gestation at birth and mode of healthcare delivery, Queensland 2000 to 2011

| | Gestation at birth (number of women) | | | | Gestation at birth (% of women in relevant care mode) | |
|---|---|---|---|---|---|---|
| Year | Public 36 weeks or less | Private 36 weeks or less | Public total | Private total | Public 36 weeks or less | Private 36 weeks or less |
| 2000 | 2,887 | 807 | 35,967 | 12,429 | 8.0 | 6.5 |
| 2001 | 2,637 | 982 | 34,186 | 14,620 | 7.7 | 6.7 |
| 2002 | 2,649 | 1,026 | 32,959 | 15,303 | 8.0 | 6.7 |
| 2003 | 2,688 | 1,075 | 33,833 | 15,610 | 7.9 | 6.9 |
| 2004 | 2,817 | 1,131 | 34,216 | 15,774 | 8.2 | 7.2 |
| 2005 | 3,107 | 1,157 | 37,374 | 16,919 | 8.3 | 6.8 |
| 2006 | 3,266 | 1,235 | 38,462 | 17,208 | 8.5 | 7.2 |
| 2007 | 3,392 | 1,251 | 41,222 | 17,924 | 8.2 | 7.0 |
| 2008 | 3,334 | 1,300 | 41,903 | 18,312 | 8.0 | 7.1 |
| 2009 | 3,473 | 1,339 | 42,550 | 18,351 | 8.2 | 7.3 |
| 2010 | 3,439 | 1,320 | 42,580 | 18,362 | 8.1 | 7.2 |
| 2011 | 3,512 | 1,298 | 43,147 | 17,906 | 8.1 | 7.2 |
| **Total** | **37,201** | **13,921** | **458,399** | **198,718** | **8.1** | **7.0** |

## Table 39: Number and percentage of babies born in public and private hospitals, by gestation at birth, mode of healthcare delivery and onset of labour/elective caesarean section, Queensland 2000 to 2011

| | Total public babies (n (% at gestation) | | | | | | Total private babies (n (% at gestation)) | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Gestation (weeks) | Spontaneous labour | | Induced labour | | Elective caesarean section | | Spontaneous labour | | Induced labour | | Elective caesarean section | |
| | n | % | n | % | n | % | n | % | n | % | n | % |
| **23 or less** | 1,103 | 48.3 | 1,134 | 49.7 | 45 | 2.0 | 296 | 51.5 | 245 | 42.6 | 34 | 5.9 |
| **24–27** | 1,516 | 61.7 | 390 | 15.9 | 552 | 22.5 | 228 | 50.9 | 94 | 21.0 | 126 | 28.1 |
| **28–33** | 5,961 | 56.7 | 845 | 8.0 | 3,699 | 35.2 | 1,646 | 53.3 | 135 | 4.4 | 1,308 | 42.3 |
| **34–36** | 15,055 | 58.1 | 5,062 | 19.5 | 5,790 | 22.3 | 5,807 | 45.7 | 1,348 | 10.6 | 5,541 | 43.6 |
| **37–39** | 120,800 | 59.0 | 34,732 | 17.0 | 49,220 | 24.0 | 39,110 | 33.2 | 25,171 | 21.3 | 53,679 | 45.5 |
| **40–41** | 149,696 | 69.9 | 58,015 | 27.1 | 6,460 | 3.0 | 35,590 | 52.6 | 26,698 | 39.5 | 5,373 | 7.9 |
| **42 or more** | 1,522 | 31.1 | 3,068 | 62.7 | 303 | 6.2 | 306 | 33.2 | 490 | 53.1 | 127 | 13.8 |
| **Not stated** | 55 | | 1 | | 5 | | 2 | | 1 | | 0 | |
| **Total** | **295,708** | **63.6** | **103,247** | **22.2** | **66,074** | **14.2** | **82,985** | **40.8** | **54,182** | **26.6** | **66,188** | **32.5** |
| **Total** | **465,029** | | | | | | **203,355** | | | | | |

*5 = gestation not stated.*
*Percentage figures are for that gestation and that mode of healthcare delivery.*

## Table 40: Incidence of admission to NICU or a SCN and PNMR (per 1,000 births) by gestation of babies born, Queensland 2000 to 2011

| Gestation (weeks) | % admitted to NICU or SCN | | | PNMR (per 1,000 births) | | |
|---|---|---|---|---|---|---|
| | Spontaneous labour | Induced labour or elective caesarean section | Total | Spontaneous labour | Induced labour or elective caesarean section | Total |
| 20 or less | 0.0 | 0.0 | 0.0 | 1,000.0 | 1,000.0 | 1,000.0 |
| 21 | 0.2 | 0.3 | 0.3 | 1,000.0 | 1,000.0 | 994.8 |
| 22 | 0.0 | 2.9 | 1.6 | 995.1 | 1,000.0 | 994.5 |
| 23 | 3.8 | 20.6 | 14.6 | 907.7 | 981.1 | 934.0 |
| 24 | 27.6 | 72.3 | 56.1 | 542.7 | 799.2 | 635.4 |
| 25 | 47.3 | 85.2 | 71.0 | 304.1 | 640.8 | 429.9 |
| 26 | 62.4 | 88.5 | 78.4 | 200.4 | 462.1 | 301.3 |
| 27 | 75.5 | 87.6 | 82.0 | 112.6 | 286.1 | 191.1 |
| 28 | 78.9 | 88.1 | 84.1 | 107.3 | 258.9 | 173.4 |
| 29 | 84.7 | 89.1 | 87.1 | 71.4 | 173.6 | 118.6 |
| 30 | 87.3 | 91.1 | 89.4 | 62.6 | 140.0 | 97.7 |
| 31 | 88.7 | 93.6 | 91.3 | 16.4 | 116.5 | 62.8 |
| 32 | 91.2 | 92.5 | 91.9 | 34.5 | 87.6 | 58.9 |
| 33 | 92.4 | 92.5 | 92.4 | 21.0 | 62.5 | 38.2 |
| 34 | 93.5 | 91.4 | 92.3 | 13.9 | 39.8 | 25.5 |
| 35 | 88.4 | 82.0 | 84.9 | 9.0 | 24.9 | 16.2 |
| 36 | 64.5 | 52.1 | 57.9 | 8.7 | 18.5 | 13.3 |
| 37 | 30.1 | 19.1 | 24.7 | 4.4 | 8.3 | 6.4 |
| 38 | 14.9 | 11.0 | 13.3 | 2.0 | 3.0 | 2.6 |
| 39 | 10.1 | 8.1 | 8.9 | 1.7 | 2.4 | 2.0 |
| 40 | 9.5 | 7.6 | 8.1 | 1.5 | 2.8 | 1.9 |
| 41 | 10.9 | 9.4 | 10.2 | 1.9 | 1.9 | 1.9 |
| 42 | 11.9 | 10.7 | 11.6 | 6.0 | 4.3 | 4.9 |
| 43 or more | 8.7 | 22.7 | 15.6 | 45.5 | 65.2 | 55.6 |
| **Total** | **18.7** | **14.4** | **16.2** | **8.0** | **13.7** | **10.4** |

## Table 41: Birthweight of babies born, Queensland 2000 to 2011

*(data incomplete for 109 babies)*

| Year | Birthweight (number of babies) | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | <1000g | | 1000–1499g | | 1500–2499g | | 2,500–3999g | | 4000+g | | Total |
| | n | % | n | % | n | % | n | % | n | % | |
| 2000 | 467 | 0.9 | 339 | 0.7 | 2,679 | 5.4 | 39,368 | 79.8 | 6,460 | 13.1 | 49,318 |
| 2001 | 440 | 0.9 | 358 | 0.7 | 2,571 | 5.2 | 39,852 | 80.2 | 6,464 | 13.0 | 49,690 |
| 2002 | 405 | 0.8 | 347 | 0.7 | 2,811 | 5.7 | 39,435 | 80.2 | 6,192 | 12.6 | 49,196 |
| 2003 | 410 | 0.8 | 364 | 0.7 | 2,683 | 5.3 | 40,428 | 80.3 | 6,473 | 12.9 | 50,367 |
| 2004 | 470 | 0.9 | 339 | 0.7 | 2,835 | 5.6 | 40,913 | 80.4 | 6,340 | 12.5 | 50,910 |
| 2005 | 461 | 0.8 | 367 | 0.7 | 3,085 | 5.6 | 44,596 | 80.7 | 6,767 | 12.2 | 55,281 |
| 2006 | 542 | 1.0 | 413 | 0.7 | 3,202 | 5.6 | 45,559 | 80.3 | 6,980 | 12.3 | 56,708 |
| 2007 | 512 | 0.8 | 414 | 0.7 | 3,183 | 5.3 | 48,556 | 80.6 | 7,561 | 12.6 | 60,244 |
| 2008 | 526 | 0.9 | 411 | 0.7 | 3,209 | 5.2 | 49,418 | 80.5 | 7,832 | 12.8 | 61,402 |
| 2009 | 571 | 0.9 | 387 | 0.6 | 3,430 | 5.5 | 49,750 | 80.2 | 7,901 | 12.7 | 62,052 |
| 2010 | 579 | 0.9 | 393 | 0.6 | 3,324 | 5.4 | 49,967 | 80.6 | 7,759 | 12.5 | 62,032 |
| 2011 | 559 | 0.9 | 418 | 0.7 | 3,326 | 5.3 | 50,206 | 80.7 | 7,663 | 12.3 | 62,179 |
| **Total** | **5,942** | **0.9** | **4550** | **0.7** | **36,338** | **5.4** | **538,048** | **80.4** | **84,392** | **12.6** | **669,379** |

## Table 42: Incidence of multiple pregnancies by maternal age, Queensland 2000 to 2011

| | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Maternal age <20 | 0.6 | 0.6 | 0.7 | 0.7 | 0.7 | 0.8 | 0.7 | 0.8 | 0.7 | 0.9 | 0.9 | 0.5 |
| Maternal age 20–34 | 1.5 | 1.4 | 1.7 | 1.7 | 1.6 | 1.6 | 1.6 | 1.6 | 1.6 | 1.5 | 1.4 | 1.6 |
| Maternal age 35+ | 2.4 | 2.5 | 2.4 | 2.2 | 2.4 | 2.4 | 2.4 | 2.4 | 2.6 | 2.5 | 2.4 | 2.2 |
| **Total** | **1.6** | **1.5** | **1.7** | **1.7** | **1.7** | **1.7** | **1.7** | **1.7** | **1.8** | **1.7** | **1.6** | **1.7** |

## Table 43: Number and percentage of multiple and singleton births (number of mothers) by gestation, Queensland 2000 to 2011 (data incomplete for 68 mothers)

| Year | Singleton <37 | | Singleton 37+ | | Twin <37 | | Twin 37+ | | Higher multiple <37 | | Higher multiple 37+ |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | n | % | n | % | n | % | n | % | n | % | n |
| **2000** | 3,260 | 6.8 | 44,493 | 93.2 | 409 | 55.9 | 323 | 44.1 | 28 | 96.6 | 1 |
| **2001** | 3,195 | 6.6 | 44,960 | 93.4 | 395 | 54.6 | 328 | 45.4 | 29 | 100 | 0 |
| **2002** | 3,176 | 6.7 | 44,306 | 93.3 | 470 | 58.0 | 340 | 42.0 | 30 | 100 | 0 |
| **2003** | 3,274 | 6.7 | 45,397 | 93.3 | 474 | 57.7 | 347 | 42.3 | 17 | 100 | 0 |
| **2004** | 3,439 | 7.0 | 45,764 | 93.0 | 497 | 60.2 | 329 | 39.8 | 15 | 100 | 0 |
| **2005** | 3,727 | 7.0 | 49,687 | 93.0 | 514 | 57.4 | 382 | 42.6 | 23 | 100 | 0 |
| **2006** | 3,900 | 7.1 | 50,848 | 92.9 | 577 | 61.3 | 364 | 38.7 | 24 | 100 | 0 |
| **2007** | 4,052 | 7.0 | 54,168 | 93.0 | 572 | 58.5 | 406 | 41.5 | 19 | 100 | 0 |
| **2008** | 4,002 | 6.8 | 55,263 | 93.2 | 621 | 59.6 | 421 | 40.4 | 16 | 100 | 0 |
| **2009** | 4,197 | 7.0 | 55,812 | 93.0 | 596 | 60.3 | 392 | 39.7 | 19 | 95.0 | 1 |
| **2010** | 4,164 | 6.9 | 55,871 | 93.1 | 579 | 59.9 | 388 | 40.1 | 18 | 94.7 | 1 |
| **2011** | 4,196 | 7.0 | 55,894 | 93.0 | 589 | 58.8 | 412 | 41.2 | 26 | 100 | 0 |
| **Total** | **44,582** | **6.9** | **602,463** | **93.1** | **6,293** | **58.7** | **4,432** | **41.3** | **264** | **98.9** | **3** |



## Table 44: Number and percentage of singleton and multiple births (number of mothers) in pregnancies conceived with and without the use of assisted conception techniques, Queensland 2008 to 2011

| Year | AIH/AID +/or ovulation induction | | | | Extracorporeal techniques | | | | No assisted conception technique identified | | | | Total pregnancies |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Singleton | | Multiple | | Singleton | | Multiple | | Singleton | | Multiple | | |
| | n | % | n | % | n | % | n | % | n | % | n | % | n |
| **2000** | 574 | 92.1 | 49 | 7.9 | 447 | 76.8 | 135 | 23.2 | 46,741 | 98.8 | 578 | 1.2 | 48,524 |
| **2001** | 602 | 90.9 | 60 | 9.1 | 613 | 78.8 | 165 | 21.2 | 46,941 | 98.9 | 527 | 1.1 | 48,908 |
| **2002** | 559 | 88.9 | 70 | 11.1 | 659 | 79.2 | 173 | 20.8 | 46,266 | 98.7 | 597 | 1.3 | 48,324 |
| **2003** | 577 | 92.3 | 48 | 7.7 | 726 | 79.9 | 183 | 20.1 | 47,371 | 98.7 | 607 | 1.3 | 49,512 |
| **2004** | 658 | 91.6 | 60 | 8.4 | 793 | 79.1 | 209 | 20.9 | 47,759 | 98.8 | 572 | 1.2 | 50,051 |
| **2005** | 653 | 91.3 | 62 | 8.7 | 877 | 80.7 | 210 | 19.3 | 51,888 | 98.8 | 647 | 1.2 | 54,337 |
| **2006** | 666 | 92.1 | 57 | 7.9 | 1,136 | 82.4 | 242 | 17.6 | 52,952 | 98.8 | 666 | 1.2 | 55,719 |
| **2007** | 653 | 90.4 | 69 | 9.6 | 1,192 | 83.9 | 229 | 16.1 | 56,386 | 98.8 | 699 | 1.2 | 59,228 |
| **2008** | 743 | 91.7 | 67 | 8.3 | 1,335 | 85.4 | 228 | 14.6 | 57,192 | 98.7 | 763 | 1.3 | 60,328 |
| **2009** | 770 | 92.3 | 64 | 7.7 | 1,426 | 86.5 | 222 | 13.5 | 57,820 | 98.8 | 722 | 1.2 | 61,024 |
| **2010** | 766 | 92.5 | 62 | 7.5 | 1,673 | 88.5 | 218 | 11.5 | 57,602 | 98.8 | 706 | 1.2 | 61,027 |
| **2011** | 808 | 91.9 | 71 | 8.1 | 1,631 | 87.8 | 226 | 12.2 | 57,657 | 98.7 | 730 | 1.3 | 61,123 |
| **Total** | **8,029** | **91.6** | **739** | **8.4** | **12,508** | **83.7** | **2,440** | **16.3** | **626,575** | **98.8** | **7,814** | **1.2** | **658,105** |

*AIH/AID +/or ovulation induction = artificial insemination and/or ovulation induction processes; extracorporeal techniques = invitro fertilisation, gamete intra-fallopian transfer, intracytoplasmic sperm injection, embryo transfer or related techniques.*

Table 45: Number and percentage of babies born by use of assisted conception techniques and need for care in NICU or a SCN, Queensland 2008 to 2011
*(data incomplete = 12)*

| | Number of babies born | | | Percentage of babies born | |
|---|---|---|---|---|---|
| | SCN/NICU admission | No SCN/NICU admission | All babies | SCN/NICU admission | No SCN/NICU admission |
| Singleton without assisted conception | 33,857 | 196,399 | 230,256 | 14.7 | 85.3 |
| Multiple without assisted conception | 3,667 | 2,207 | 5,874 | 62.4 | 37.6 |
| Singleton with assisted conception | 1,402 | 7,755 | 9,157 | 15.3 | 84.7 |
| Multiple with assisted conception | 1,612 | 754 | 2,366 | 68.1 | 31.9 |
| All without assisted conception | 37,524 | 198,606 | 236,130 | 15.9 | 84.1 |
| All with assisted conception | 3,014 | 8,509 | 11,523 | 26.2 | 73.8 |
| All singletons | 35,259 | 204,154 | 239,413 | 14.7 | 85.3 |
| All multiples | 5,279 | 2,961 | 8,240 | 64.1 | 35.9 |

Table 46: Number and percentage of women giving birth by onset of labour, Queensland 2000 to 2011
*(data incomplete for 11 mothers)*

| Year | Spontaneous onset of labour | Induced labour | No labour (i.e. elective caesarean section) |
|---|---|---|---|
| 2000 | **29,342** (60.5%) | **12,200** (25.1%) | **6,980** (14.4%) |
| 2001 | **28,358** (58.0%) | **12,752** (26.1%) | **7,798** (15.9%) |
| 2002 | **27,315** (56.5%) | **12,261** (25.4%) | **8,747** (18.1%) |
| 2003 | **27,868** (56.3%) | **12,422** (25.1%) | **9,220** (18.6%) |
| 2004 | **28,603** (57.1%) | **11,699** (23.4%) | **9,749** (19.5%) |
| 2005 | **30,828** (56.7%) | **12,687** (23.3%) | **10,822** (19.9%) |
| 2006 | **31,230** (56.0%) | **13,048** (23.4%) | **11,439** (20.5%) |
| 2007 | **33,584** (56.7%) | **13,553** (22.9%) | **12,091** (20.4%) |
| 2008 | **34,441** (57.1%) | **13,615** (22.6%) | **12,270** (20.3%) |
| 2009 | **34,841** (57.1%) | **13,661** (22.4%) | **12,522** (20.5%) |
| 2010 | **34,840** (57.1%) | **13,579** (22.3%) | **12,608** (20.7%) |
| 2011 | **34,346** (56.3%) | **14,180** (23.2%) | **12,595** (20.6%) |
| Total | **375,596** (57.1%) | **155,657** (23.7%) | **126,841** (19.3%) |

Table 47: Number of women giving birth by onset of labour and mode of healthcare delivery, Queensland 2000 to 2011
*(no labour implies elective caesarean section)*

| | Onset of labour: public hospitals | | | Onset of labour: private hospitals | | | Onset of labour: home birth | | Data incomplete |
|---|---|---|---|---|---|---|---|---|---|
| Year | Spontaneous | Induced | No labour | Spontaneous | Induced | No Labour | Spontaneous | Induced | |
| 2000 | 23,406 | 8,591 | 3,969 | 5,809 | 3,609 | 3,011 | 125 | | 4 |
| 2001 | 21,731 | 8,406 | 4,049 | 6,525 | 4,346 | 3,749 | 102 | | 0 |
| 2002 | 20,587 | 8,063 | 4,308 | 6,666 | 4,198 | 4,439 | 61 | | 2 |
| 2003 | 21,408 | 7,962 | 4,462 | 6,394 | 4,458 | 4,758 | 65 | 2 | 3 |
| 2004 | 21,935 | 7,531 | 4,750 | 6,608 | 4,167 | 4,999 | 57 | | 4 |
| 2005 | 24,061 | 8,043 | 5,270 | 6,723 | 4,644 | 5,552 | 42 | | 2 |
| 2006 | 24,371 | 8,528 | 5,562 | 6,811 | 4,520 | 5,877 | 47 | | 3 |
| 2007 | 26,269 | 8,942 | 6,011 | 7,234 | 4,611 | 6,079 | 81 | | 1 |
| 2008 | 26,956 | 8,795 | 6,152 | 7,374 | 4,820 | 6,118 | 110 | | 3 |
| 2009 | 27,349 | 8,979 | 6,222 | 7,369 | 4,682 | 6,300 | 123 | | 0 |
| 2010 | 27,593 | 8,887 | 6,100 | 7,162 | 4,692 | 6,508 | 85 | | 2 |
| 2011 | 27,312 | 9,330 | 6,504 | 6,966 | 4,850 | 6,090 | 68 | | 3 |
| Total | **292,978** | **102,057** | **63,359** | **81,641** | **53,597** | **63,480** | **966** | | **27** |

## Table 48: Incidence of women giving birth by onset of labour and mode of healthcare delivery, Queensland 2000 to 2011

*(no labour implies elective caesarean section)*

| | % onset of labour in public hospitals | | | % onset of labour in private hospitals | | | % onset of labour in home birth | |
|---|---|---|---|---|---|---|---|---|
| Year | Spontaneous | Induced | No labour | Spontaneous | Induced | No labour | Spontaneous | Induced |
| 2000 | 65.1 | 23.9 | 11.0 | 46.7 | 29.0 | 24.2 | 100 | 0 |
| 2001 | 63.6 | 24.6 | 11.8 | 44.6 | 29.7 | 25.6 | 100 | 0 |
| 2002 | 62.5 | 24.5 | 13.1 | 43.6 | 27.4 | 29.0 | 100 | 0 |
| 2003 | 63.3 | 23.5 | 13.2 | 41.0 | 28.6 | 30.5 | 97 | 3 |
| 2004 | 64.1 | 22.0 | 13.9 | 41.9 | 26.4 | 31.7 | 100 | 0 |
| 2005 | 64.4 | 21.5 | 14.1 | 39.7 | 27.4 | 32.8 | 100 | 0 |
| 2006 | 63.4 | 22.2 | 14.5 | 39.6 | 26.3 | 34.2 | 100 | 0 |
| 2007 | 63.7 | 21.7 | 14.6 | 40.4 | 25.7 | 33.9 | 100 | 0 |
| 2008 | 64.3 | 21.0 | 14.7 | 40.3 | 26.3 | 33.4 | 100 | 0 |
| 2009 | 64.3 | 21.1 | 14.6 | 40.2 | 25.5 | 34.3 | 100 | 0 |
| 2010 | 64.8 | 20.9 | 14.3 | 39.0 | 25.6 | 35.4 | 100 | 0 |
| 2011 | 63.3 | 21.6 | 15.1 | 38.9 | 27.1 | 34.0 | 100 | 0 |
| **Total** | **63.9** | **22.3** | **13.8** | **41.1** | **27.0** | **31.9** | **100** | **0** |

## Table 49: Number of women giving birth by onset of labour, gestational group and mode of healthcare delivery, Queensland 2000 to 2011

*(no labour implies elective caesarean section)*

| Gestation (weeks) | Total women giving birth in public hospitals | | | | | | Total women giving birth in private hospitals | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Spontaneous labour | | Induced labour | | No labour | | Spontaneous labour | | Induced labour | | No labour | |
| | n | % | n | % | n | % | n | % | n | % | n | % |
| 23 or less | 975 | 45.9 | 1,105 | 52.0 | 43 | 2.0 | 226 | 45.7 | 236 | 47.8 | 32 | 6.5 |
| 24–27 | 1,317 | 60.2 | 377 | 17.2 | 493 | 22.5 | 181 | 48.0 | 93 | 24.7 | 103 | 27.3 |
| 28–33 | 5,215 | 56.9 | 816 | 8.9 | 3,136 | 34.2 | 1,230 | 52.6 | 128 | 5.5 | 981 | 41.9 |
| 34–36 | 14,021 | 59.1 | 4,793 | 20.2 | 4,908 | 20.7 | 5,200 | 48.5 | 1,185 | 11.1 | 4,326 | 40.4 |
| 37–39 | 120,195 | 59.5 | 33,897 | 16.8 | 48,015 | 23.8 | 38,917 | 33.5 | 24,771 | 21.3 | 52,540 | 45.2 |
| 40–41 | 149,679 | 69.9 | 58,000 | 27.1 | 6,456 | 3.0 | 35,579 | 52.6 | 26,693 | 39.5 | 5,371 | 7.9 |
| 42 or more | 1,522 | 31.1 | 3,068 | 62.7 | 303 | 6.2 | 306 | 33.2 | 490 | 53.1 | 127 | 13.8 |
| Not stated | 54 | | 1 | | 5 | | 2 | | 1 | | 0 | |
| **Total** | **292,978** | **63.9** | **102,057** | **22.3** | **63,359** | **13.8** | **81,641** | **41.1** | **53,597** | **27.0** | **63,480** | **31.9** |
| **Total** | **458,394** | | | | | | **198,718** | | | | | |

*% = percentage of women in that mode of healthcare delivery at that gestation*

## Table 50 Number of babies born by birth mode, Queensland 2000 to 2011

| Year | Unassisted vaginal birth | Caesarean section | Forceps | Vacuum extraction | Data incomplete | Total |
|---|---|---|---|---|---|---|
| 2000 | 32,163 | 12,940 | 1,819 | 2,354 | 42 | 49,318 |
| 2001 | 31,706 | 13,879 | 1,529 | 2,515 | 61 | 49,690 |
| 2002 | 30,445 | 14,852 | 1,262 | 2,577 | 60 | 49,196 |
| 2003 | 30,623 | 15,761 | 1,004 | 2,942 | 37 | 50,367 |
| 2004 | 30,570 | 16,309 | 949 | 3,055 | 27 | 50,910 |
| 2005 | 32,754 | 18,148 | 947 | 3,391 | 41 | 55,281 |
| 2006 | 32,980 | 19,266 | 1,096 | 3,353 | 13 | 56,708 |
| 2007 | 34,852 | 20,368 | 1,174 | 3,849 | 1 | 60,244 |
| 2008 | 34,962 | 20,935 | 1,184 | 4,320 | 1 | 61,402 |
| 2009 | 35,332 | 21,088 | 1,140 | 4,492 | 0 | 62,052 |
| 2010 | 35,278 | 20,822 | 1,170 | 4,762 | 0 | 62,032 |
| 2011 | 35,157 | 21,088 | 1,158 | 4,775 | 1 | 62,179 |
| **Total** | **396,822** | **215,456** | **14,432** | **42,385** | **284** | **669,379** |

## Table 51: Percentage of babies born by birth mode, Queensland 2000 to 2011

| Year | Percentage of babies born | | | | |
|---|---|---|---|---|---|
| | Unassisted vaginal birth | Caesarean section | Forceps | Vacuum extraction | All assisted vaginal birth |
| 2000 | 65.2 | 26.2 | 3.7 | 4.8 | 8.5 |
| 2001 | 63.8 | 27.9 | 3.1 | 5.1 | 8.1 |
| 2002 | 61.9 | 30.2 | 2.6 | 5.2 | 7.8 |
| 2003 | 60.8 | 31.3 | 2.0 | 5.8 | 7.8 |
| 2004 | 60.0 | 32.0 | 1.9 | 6.0 | 7.9 |
| 2005 | 59.3 | 32.8 | 1.7 | 6.1 | 7.8 |
| 2006 | 58.2 | 34.0 | 1.9 | 5.9 | 7.8 |
| 2007 | 57.9 | 33.8 | 1.9 | 6.4 | 8.3 |
| 2008 | 56.9 | 34.1 | 1.9 | 7.0 | 9.0 |
| 2009 | 56.9 | 34.0 | 1.8 | 7.2 | 9.1 |
| 2010 | 56.9 | 33.6 | 1.9 | 7.7 | 9.6 |
| 2011 | 56.5 | 33.9 | 1.9 | 7.7 | 9.5 |
| **Total** | **59.3** | **32.2** | **2.2** | **6.3** | **8.5** |

## Table 52: Number of babies born by birth mode and mode of healthcare delivery, Queensland 2000 to 2011

| Year | Public hospital | | | | Private hospital | | | |
|---|---|---|---|---|---|---|---|---|
| | Unassisted vaginal birth | Caesarean section | Forceps | Vacuum extraction | Unassisted vaginal birth | Caesarean section | Forceps | Vacuum extraction |
| 2000 | 25,906 | 8,111 | 912 | 1,496 | 6,129 | 4,829 | 907 | 858 |
| 2001 | 24,521 | 7,936 | 676 | 1,467 | 7,082 | 5,943 | 853 | 1,048 |
| 2002 | 23,258 | 8,242 | 520 | 1,390 | 7,125 | 6,610 | 742 | 1,187 |
| 2003 | 23,499 | 8,819 | 382 | 1,607 | 7,056 | 6,942 | 622 | 1,335 |
| 2004 | 23,580 | 8,939 | 429 | 1,724 | 6,929 | 7,370 | 520 | 1,331 |
| 2005 | 25,539 | 9,993 | 464 | 1,896 | 7,171 | 8,155 | 483 | 1,495 |
| 2006 | 25,813 | 10,705 | 557 | 1,940 | 7,119 | 8,561 | 539 | 1,413 |
| 2007 | 27,379 | 11,540 | 648 | 2,285 | 7,392 | 8,827 | 526 | 1,564 |
| 2008 | 27,361 | 11,877 | 658 | 2,631 | 7,489 | 9,058 | 526 | 1,689 |
| 2009 | 27,751 | 11,953 | 612 | 2,823 | 7,458 | 9,135 | 528 | 1,669 |
| 2010 | 27,862 | 11,685 | 645 | 2,995 | 7,331 | 9,137 | 525 | 1,767 |
| 2011 | 27,705 | 12,355 | 649 | 3,058 | 7,383 | 8,732 | 509 | 1,717 |
| **Total** | **310,174** | **122,155** | **7,152** | **25,312** | **85,664** | **93,299** | **7,280** | **17,073** |

## Table 53: Percentage of babies born by birth mode and mode of healthcare delivery, Queensland 2000 to 2011

| Year | % in public hospitals | | | | % in private hospitals | | | |
|---|---|---|---|---|---|---|---|---|
| | Unassisted vaginal birth | Caesarean section | Forceps | Vacuum extraction | Unassisted vaginal birth | Caesarean section | Forceps | Vacuum extraction |
| 2000 | 71 | 22.2 | 2.5 | 4.1 | 48.2 | 37.9 | 7.1 | 6.7 |
| 2001 | 70.8 | 22.9 | 2 | 4.2 | 47.4 | 39.8 | 5.7 | 7 |
| 2002 | 69.5 | 24.6 | 1.6 | 4.2 | 45.5 | 42.2 | 4.7 | 7.6 |
| 2003 | 68.4 | 25.7 | 1.1 | 4.7 | 44.2 | 43.5 | 3.9 | 8.4 |
| 2004 | 68 | 25.8 | 1.2 | 5 | 42.9 | 45.6 | 3.2 | 8.2 |
| 2005 | 67.3 | 26.3 | 1.2 | 5 | 41.4 | 47.1 | 2.8 | 8.6 |
| 2006 | 66.1 | 27.4 | 1.4 | 5 | 40.4 | 48.5 | 3.1 | 8 |
| 2007 | 65.4 | 27.6 | 1.5 | 5.5 | 40.4 | 48.2 | 2.9 | 8.5 |
| 2008 | 64.3 | 27.9 | 1.5 | 6.2 | 39.9 | 48.3 | 2.8 | 9 |
| 2009 | 64.3 | 27.7 | 1.4 | 6.5 | 39.7 | 48.6 | 2.8 | 8.9 |
| 2010 | 64.5 | 27.1 | 1.5 | 6.9 | 39.1 | 48.7 | 2.8 | 9.4 |
| 2011 | 63.3 | 28.2 | 1.5 | 7.0 | 40.3 | 47.6 | 2.8 | 9.4 |
| **Total** | **66.7** | **26.3** | **1.5** | **5.4** | **42.1** | **45.9** | **3.6** | **8.4** |

## Table 54: Number of babies born by caesarean section with and without labour by mode of healthcare delivery, Queensland 2000 to 2011

| | Public hospitals | | | Private hospitals | | |
|---|---|---|---|---|---|---|
| Year | Total births | Caesarean section without labour | Caesarean section with labour | Total births | Caesarean section without labour | Caesarean section with labour |
| 2000 | 36,463 | 3,969 | 4,142 | 12,727 | 3,011 | 1,818 |
| 2001 | 34,654 | 4,049 | 3,887 | 14,933 | 3,749 | 2,194 |
| 2002 | 33,463 | 4,308 | 3,934 | 15,671 | 4,439 | 2,171 |
| 2003 | 34,336 | 4,462 | 4,357 | 15,962 | 4,758 | 2,184 |
| 2004 | 34,695 | 4,750 | 4,189 | 16,153 | 4,999 | 2,371 |
| 2005 | 37,925 | 5,270 | 4,723 | 17,312 | 5,552 | 2,603 |
| 2006 | 39,024 | 5,562 | 5,143 | 17,635 | 5,877 | 2,684 |
| 2007 | 41,853 | 6,011 | 5,529 | 18,309 | 6,079 | 2,748 |
| 2008 | 42,527 | 6,152 | 5,725 | 18,762 | 6,118 | 2,940 |
| 2009 | 43,139 | 6,222 | 5,731 | 18,790 | 6,300 | 2,835 |
| 2010 | 43,187 | 6,100 | 5,585 | 18,760 | 6,508 | 2,629 |
| 2011 | 43,768 | 6,504 | 5,851 | 18,341 | 6,090 | 2,642 |
| **Total** | **465,034** | **63,359** | **58,796** | **203,355** | **63,480** | **29,819** |

## Table 55: Percentage of babies born by caesarean section with and without labour by mode of healthcare delivery, Queensland 2000 to 2011

| | % in public hospitals | | % in private hospitals | |
|---|---|---|---|---|
| Year | Caesarean section without labour | Caesarean section with labour | Caesarean section without labour | Caesarean section with labour |
| 2000 | 10.9 | 11.4 | 23.7 | 14.3 |
| 2001 | 11.7 | 11.2 | 25.1 | 14.7 |
| 2002 | 12.9 | 11.8 | 28.3 | 13.9 |
| 2003 | 13.0 | 12.7 | 29.8 | 13.7 |
| 2004 | 13.7 | 12.1 | 30.9 | 14.7 |
| 2005 | 13.9 | 12.5 | 32.1 | 15.0 |
| 2006 | 14.3 | 13.2 | 33.3 | 15.2 |
| 2007 | 14.4 | 13.2 | 33.2 | 15.0 |
| 2008 | 14.5 | 13.5 | 32.6 | 15.7 |
| 2009 | 14.4 | 13.3 | 33.5 | 15.1 |
| 2010 | 14.1 | 12.9 | 34.7 | 14.0 |
| 2011 | 14.9 | 13.4 | 33.2 | 14.4 |
| **Total** | **13.6** | **12.6** | **31.2** | **14.7** |

*Risk ratio = 1.75 (95% confidence limits 1.74, 1.76) of all caesarean sections public vs private hospitals*
*Risk ratio = 2.30 (95% confidence limits 2.28, 2.32) of caesarean sections without labour public vs private hospitals*
*Risk ratio = 1.13 (95% confidence limits 1.10, 1.14) of caesarean sections with labour public vs private hospitals*

## Table 56: Number and percentage of caesarean section births in breech presentation by mode of healthcare delivery, Queensland 2000 to 2011

| Year | Public hospital breech presentation | | | Private hospital breech presentation | | | All hospital breech presentation | | |
|---|---|---|---|---|---|---|---|---|---|
| | Caesarean section births | Total births | % caesarean sections | Caesarean section births | Total births | % caesarean sections | Caesarean section births | Total births | % caesarean sections |
| 2000 | 1,381 | 1,593 | 86.7 | 570 | 630 | 90.5 | 1,951 | 2,223 | 87.8 |
| 2001 | 1,265 | 1,408 | 89.8 | 697 | 734 | 95.0 | 1,962 | 2,142 | 91.6 |
| 2002 | 1,266 | 1,432 | 88.4 | 764 | 806 | 94.8 | 2,030 | 2,238 | 90.7 |
| 2003 | 1,324 | 1,475 | 89.8 | 853 | 887 | 96.2 | 2,177 | 2,362 | 92.2 |
| 2004 | 1,264 | 1,419 | 89.1 | 789 | 818 | 96.5 | 2,053 | 2,237 | 91.8 |
| 2005 | 1,443 | 1,647 | 87.6 | 844 | 877 | 96.2 | 2,287 | 2,524 | 90.6 |
| 2006 | 1,399 | 1,581 | 88.5 | 911 | 938 | 97.1 | 2,310 | 2,519 | 91.7 |
| 2007 | 1,459 | 1,664 | 87.7 | 967 | 1,002 | 96.5 | 2,426 | 2,666 | 91.0 |
| 2008 | 1,538 | 1,728 | 89.0 | 856 | 886 | 96.6 | 2,394 | 2,614 | 91.6 |
| 2009 | 1,488 | 1,700 | 87.5 | 877 | 921 | 95.2 | 2,365 | 2,621 | 90.2 |
| 2010 | 1,571 | 1,841 | 85.3 | 976 | 1,043 | 93.6 | 2,547 | 2,884 | 88.3 |
| 2011 | 1,659 | 1,911 | 86.8 | 1,000 | 1,053 | 95.0 | 2,659 | 2,964 | 89.7 |
| **Total** | **17,057** | **19,399** | **87.9** | **10,104** | **10,595** | **95.4** | **27,161** | **29,994** | **90.6** |

*Risk ratio = 1.09 (95% confidence limits 1.08, 1.09) of caesarean sections in breech presentation private versus public hospitals*

## Table 57: Number and incidence of caesarean sections in women having multiple births, Queensland 2008 to 2011

| Year | Public hospital multiple pregnancies | | | Private hospital multiple pregnancies | | | All multiple pregnancies | | |
|---|---|---|---|---|---|---|---|---|---|
| | Caesarean section | Total multiples | % caesarean sections | Caesarean section | Total multiples | % caesarean sections | Caesarean section | Total multiples | % caesarean sections |
| 2000 | 259 | 484 | 53.5 | 195 | 278 | 70.1 | 454 | 762 | 59.6 |
| 2001 | 250 | 453 | 55.2 | 210 | 298 | 70.5 | 460 | 751 | 61.3 |
| 2002 | 290 | 491 | 59.1 | 246 | 349 | 70.5 | 536 | 840 | 63.8 |
| 2003 | 284 | 493 | 57.6 | 249 | 345 | 72.2 | 533 | 838 | 63.6 |
| 2004 | 280 | 469 | 59.7 | 296 | 371 | 79.8 | 576 | 840 | 68.6 |
| 2005 | 353 | 537 | 65.7 | 314 | 382 | 82.2 | 667 | 919 | 72.6 |
| 2006 | 357 | 549 | 65.0 | 353 | 416 | 84.9 | 710 | 965 | 73.6 |
| 2007 | 427 | 620 | 68.9 | 312 | 377 | 82.8 | 739 | 997 | 74.1 |
| 2008 | 422 | 617 | 68.4 | 370 | 441 | 83.9 | 792 | 1,058 | 74.9 |
| 2009 | 375 | 581 | 64.5 | 339 | 427 | 79.4 | 714 | 1,008 | 70.8 |
| 2010 | 392 | 595 | 65.9 | 332 | 391 | 84.9 | 724 | 986 | 73.4 |
| 2011 | 417 | 602 | 69.3 | 338 | 425 | 79.5 | 755 | 1,027 | 73.5 |
| **Total** | **4,106** | **6,491** | **63.3** | **3,554** | **4,500** | **79.0** | **7,660** | **10,991** | **69.7** |

*Risk ratio = 1.25 (95% confidence limits 1.22, 1.28) of caesarean sections in multiple pregnancies private versus public hospitals*

Table 58: Number of women giving birth by Indigenous status and maternal age group, Queensland 2000 to 2011

| | Maternal age: Indigenous women | | | | Maternal age: non-Indigenous women | | | | Incomplete data | Total |
|---|---|---|---|---|---|---|---|---|---|---|
| Year | <20 | 20–34 | 35+ | Total | <20 | 20–34 | 35+ | Total | | |
| 2000 | 541 | 2,052 | 208 | 2,801 | 2,642 | 36,087 | 6,985 | 45,714 | 9 | 48,524 |
| 2001 | 525 | 1,993 | 175 | 2,693 | 2,633 | 36,304 | 7,270 | 46,207 | 8 | 48,908 |
| 2002 | 522 | 1,966 | 233 | 2,721 | 2,544 | 35,822 | 7,227 | 45,593 | 10 | 48,324 |
| 2003 | 581 | 2,038 | 241 | 2,860 | 2,464 | 36,299 | 7,881 | 46,644 | 8 | 49,512 |
| 2004 | 533 | 2,023 | 211 | 2,767 | 2,470 | 36,505 | 8,305 | 47,280 | 4 | 50,051 |
| 2005 | 592 | 2,203 | 274 | 3,069 | 2,477 | 39,360 | 9,428 | 51,265 | 3 | 54,337 |
| 2006 | 537 | 2,121 | 279 | 2,937 | 2,538 | 40,155 | 10,075 | 52,768 | 14 | 55,719 |
| 2007 | 599 | 2,273 | 298 | 3,170 | 2,658 | 42,261 | 11,099 | 56,018 | 40 | 59,228 |
| 2008 | 669 | 2,386 | 318 | 3,373 | 2,787 | 42,520 | 11,611 | 56,918 | 37 | 60,328 |
| 2009 | 645 | 2,366 | 321 | 3,332 | 2,691 | 43,140 | 11,837 | 57,668 | 24 | 61,024 |
| 2010 | 698 | 2,453 | 354 | 3,505 | 2,646 | 43,083 | 11,788 | 57,517 | 5 | 61,027 |
| 2011 | 679 | 2,598 | 372 | 3,649 | 2,440 | 43,199 | 11,821 | 57,460 | 14 | 61,123 |
| **Total** | **7,121** | **26,472** | **3,284** | **36,877** | **30,990** | **474,735** | **115,327** | **621,052** | **176** | **658,105** |

Table 59: Percentage of women giving birth by Indigenous status and maternal age group, Queensland 2000 to 2011

| | Maternal age: Indigenous women | | | Maternal age: Non-Indigenous women | | |
|---|---|---|---|---|---|---|
| Year | <20 | 20–34 | 35+ | <20 | 20–34 | 35+ |
| 2000 | 19.3 | 73.3 | 7.4 | 5.8 | 78.9 | 15.3 |
| 2001 | 19.5 | 74.0 | 6.5 | 5.7 | 78.6 | 15.7 |
| 2002 | 19.2 | 72.3 | 8.6 | 5.6 | 78.6 | 15.9 |
| 2003 | 20.3 | 71.3 | 8.4 | 5.3 | 77.8 | 16.9 |
| 2004 | 19.3 | 73.1 | 7.6 | 5.2 | 77.2 | 17.6 |
| 2005 | 19.3 | 71.8 | 8.9 | 4.8 | 76.8 | 18.4 |
| 2006 | 18.3 | 72.2 | 9.5 | 4.8 | 76.1 | 19.1 |
| 2007 | 18.9 | 71.7 | 9.4 | 4.7 | 75.4 | 19.8 |
| 2008 | 19.8 | 70.7 | 9.4 | 4.9 | 74.7 | 20.4 |
| 2009 | 19.4 | 71.0 | 9.6 | 4.7 | 74.8 | 20.5 |
| 2010 | 19.4 | 70.0 | 10.1 | 4.6 | 74.9 | 20.5 |
| 2011 | 18.6 | 71.2 | 10.2 | 4.2 | 75.2 | 20.6 |
| **Total** | **19.3** | **71.8** | **8.9** | **5.0** | **76.4** | **18.6** |

Table 60: Number and percentage of women giving birth by Indigenous status and mode of healthcare delivery, Queensland 2000 to 2011

| | Indigenous | | Non-Indigenous | | | |
|---|---|---|---|---|---|---|
| Year | Public hospital care | Total | Public hospital care | Total | % Public care of Indigenous women | % Public care of non-Indigenous women |
| 2000 | 2,749 | 2,801 | 33,211 | 45,714 | 98.1 | 72.6 |
| 2001 | 2,641 | 2,693 | 31,537 | 46,207 | 98.1 | 68.3 |
| 2002 | 2,664 | 2,721 | 30,286 | 45,593 | 97.9 | 66.4 |
| 2003 | 2,793 | 2,860 | 31,034 | 46,644 | 97.7 | 66.5 |
| 2004 | 2,711 | 2,767 | 31,503 | 47,280 | 98.0 | 66.6 |
| 2005 | 3,011 | 3,069 | 34,361 | 51,265 | 98.1 | 67.0 |
| 2006 | 2,885 | 2,937 | 35,566 | 52,768 | 98.2 | 67.4 |
| 2007 | 3,105 | 3,170 | 38,078 | 56,018 | 97.9 | 68.0 |
| 2008 | 3,298 | 3,373 | 38,571 | 56,918 | 97.8 | 67.8 |
| 2009 | 3,258 | 3,332 | 39,269 | 57,668 | 97.8 | 68.1 |
| 2010 | 3,452 | 3,505 | 39,124 | 57,517 | 98.5 | 68.0 |
| 2011 | 3,563 | 3,649 | 39,570 | 57,460 | 97.6 | 68.9 |
| **Total** | **36,130** | **36,877** | **422,110** | **621,052** | **98.0** | **68.0** |

## Table 61: Birthweight (number (n), mean and standard deviation (SD)) by Indigenous status and gestation, Queensland 2000 to 2011

*(data incomplete: n = 69, gestation <20: n = 36, gestation >43: = 11)*

| | Gestation | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 |
|---|---|---|---|---|---|---|---|---|---|
| Indigenous | n | 57 | 72 | 83 | 75 | 81 | 62 | 95 | 98 |
| | Mean | 355.3 | 393.4 | 564.2 | 549.7 | 632.6 | 884.1 | 952.9 | 992.8 |
| | SD | 93.0 | 75.8 | 1,055.7 | 127.5 | 176.1 | 1,192.7 | 950.8 | 206.1 |
| Non-Indigenous | n | 675 | 696 | 649 | 514 | 580 | 592 | 664 | 733 |
| | Mean | 358.9 | 463.8 | 518.4 | 604.2 | 677.4 | 785.3 | 867.8 | 993.3 |
| | SD | 665.7 | 896.2 | 759.4 | 745.1 | 694.2 | 683.9 | 404.0 | 529.8 |

| | Gestation | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 |
|---|---|---|---|---|---|---|---|---|---|
| Indigenous | n | 124 | 127 | 145 | 199 | 262 | 334 | 520 | 864 |
| | Mean | 1,092.4 | 1,307.8 | 1,510.0 | 1,596.8 | 1,836.4 | 2,039.1 | 2,238.9 | 2,479.6 |
| | SD | 259.9 | 301.7 | 771.5 | 284.9 | 787.7 | 412.1 | 463.6 | 464.5 |
| Non-Indigenous | n | 964 | 1,121 | 1,492 | 1,837 | 2,887 | 4,090 | 6,798 | 10,112 |
| | Mean | 1,109.4 | 1,264.0 | 1,450.1 | 1,619.4 | 1,812.9 | 2,074.6 | 2,288.9 | 2,528.5 |
| | SD | 488.2 | 293.1 | 441.1 | 362.8 | 362.5 | 466.7 | 449.9 | 439.6 |

| | Gestation | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 |
|---|---|---|---|---|---|---|---|---|---|
| Indigenous | n | 1559 | 2853 | 6613 | 8100 | 10518 | 4017 | 422 | 11 |
| | Mean | 2,702.2 | 2,935.9 | 3,177.7 | 3,317.1 | 3,470.4 | 3,629.5 | 3,730.0 | 3,690.1 |
| | SD | 475.8 | 487.4 | 512.0 | 459.2 | 462.7 | 480.6 | 526.2 | 385.2 |
| Non-Indigenous | n | 18,744 | 38,940 | 117,382 | 149,030 | 183,827 | 84,053 | 5,345 | 68 |
| | Mean | 2,766.9 | 3,039.8 | 3,313.0 | 3,455.6 | 3,596.3 | 3,729.0 | 3,789.9 | 3,862.6 |
| | SD | 456.2 | 472.3 | 457.4 | 437.4 | 440.2 | 446.0 | 477.3 | 946.4 |

## Table 62: Percentage of babies born by Indigenous status, gestation and birthweight, Queensland 2000 to 2011



| | Indigenous | | | | | Non-Indigenous | | | | | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Gestation | < 1.500g | 1.500–2.499g | 2.500–3.999g | 4.000+g | Total | < 1.500g | 1.500–2.499g | 2.500–3.999g | 4.000+g | Total | |
| 20 | 0.15 | 0 | 0 | 0 | 0.15 | 0.11 | 0 | 0 | 0 | 0.11 | 0.11 |
| 21 | 0.19 | 0 | 0 | 0 | 0.19 | 0.11 | 0 | 0 | 0 | 0.11 | 0.11 |
| 22 | 0.22 | 0 | 0 | 0 | 0.22 | 0.10 | 0 | 0 | 0 | 0.10 | 0.11 |
| 23 | 0.20 | 0 | 0 | 0 | 0.20 | 0.08 | 0 | 0 | 0 | 0.08 | 0.09 |
| 24 | 0.22 | 0 | 0 | 0 | 0.22 | 0.09 | 0 | 0 | 0 | 0.09 | 0.10 |
| 25 | 0.17 | 0 | 0 | 0 | 0.17 | 0.09 | 0 | 0 | 0 | 0.09 | 0.10 |
| 26 | 0.25 | 0 | 0 | 0 | 0.25 | 0.10 | 0 | 0 | 0 | 0.10 | 0.11 |
| 27 | 0.26 | 0.01 | 0 | 0 | 0.27 | 0.12 | 0 | 0 | 0 | 0.12 | 0.12 |
| 28 | 0.32 | 0.01 | 0 | 0 | 0.34 | 0.15 | 0 | 0 | 0 | 0.15 | 0.16 |
| 29 | 0.26 | 0.08 | 0 | 0 | 0.34 | 0.15 | 0.03 | 0 | 0 | 0.18 | 0.19 |
| 30 | 0.21 | 0.18 | 0 | 0 | 0.39 | 0.13 | 0.10 | 0 | 0 | 0.24 | 0.24 |
| 31 | 0.18 | 0.36 | 0 | 0 | 0.54 | 0.09 | 0.20 | 0 | 0 | 0.29 | 0.30 |
| 32 | 0.12 | 0.57 | 0.01 | 0 | 0.70 | 0.07 | 0.37 | 0.01 | 0 | 0.46 | 0.47 |
| 33 | 0.05 | 0.75 | 0.10 | 0 | 0.90 | 0.04 | 0.54 | 0.07 | 0 | 0.65 | 0.66 |
| 34 | 0.05 | 1.05 | 0.30 | 0.01 | 1.40 | 0.03 | 0.76 | 0.29 | 0 | 1.08 | 1.09 |
| 35 | 0.03 | 1.23 | 1.06 | 0.02 | 2.34 | 0.01 | 0.77 | 0.82 | 0.01 | 1.60 | 1.64 |
| 36 | 0.01 | 1.40 | 2.74 | 0.07 | 4.22 | 0.01 | 0.78 | 2.15 | 0.03 | 2.97 | 3.04 |
| 37 | 0.01 | 1.27 | 6.21 | 0.19 | 7.67 | 0 | 0.67 | 5.32 | 0.17 | 6.16 | 6.25 |
| 38 | 0.01 | 1.23 | 15.66 | 0.77 | 17.66 | 0 | 0.56 | 16.77 | 1.25 | 18.58 | 18.53 |
| 39 | 0 | 0.61 | 19.73 | 1.17 | 21.52 | 0 | 0.26 | 20.83 | 2.49 | 23.59 | 23.48 |
| 40 | 0 | 0.38 | 24.57 | 2.95 | 27.91 | 0 | 0.13 | 23.90 | 5.07 | 29.10 | 29.03 |
| 41 | 0 | 0.07 | 8.61 | 2.01 | 10.68 | 0 | 0.03 | 9.75 | 3.53 | 13.30 | 13.16 |
| 42 | 0 | 0.01 | 0.81 | 0.70 | 1.51 | 0 | 0 | 0.57 | 0.27 | 0.85 | 0.88 |
| 43 | 0 | 0 | 0.10 | 0.06 | 0.17 | 0 | 0 | 0.01 | 0 | 0.01 | 0.02 |
| 44 | 0 | 0 | 0 | 0.01 | 0.02 | 0 | 0 | 0 | 0 | 0 | 0 |
| 45 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total | 2.93 | 9.20 | 79.92 | 7.96 | 100 | 1.48 | 5.21 | 80.48 | 12.83 | 100 | 100 |

Table 63: Percentage of women smoking at less than 20 weeks gestation during pregnancy by Indigenous status, Queensland 2010 to 2011
*(data collection for this item commenced mid–2009)*

| | Indigenous status | | |
|---|---|---|---|
| Year | Identifies as Aboriginal and/or Torres Strait Islander | Does not identify as Aboriginal and/or Torres Strait Islander | All women giving birth |
| 2010 | 53.2 | 14.9 | 17.1 |
| 2011 | 49.5 | 13.8 | 16.0 |
| **Total** | **51.3** | **14.4** | **16.6** |

Table 64: Percentage of women smoking after 20 weeks gestation during pregnancy by Indigenous status, Queensland 2010 to 2011
*(data collection for this item commenced mid–2009)*

| | Indigenous Status | | |
|---|---|---|---|
| Year | Identifies as Aboriginal and/or Torres Strait Islander | Does not identify as Aboriginal and/or Torres Strait Islander | All women giving birth |
| 2010 | 46.0 | 12.0 | 13.9 |
| 2011 | 44.8 | 11.3 | 13.3 |
| **Total** | **45.4** | **11.6** | **13.6** |

Table 65: Percentage of women attending five or more antenatal visits during pregnancy by Indigenous status, Queensland 2008 to 2011

| | Indigenous Status | | |
|---|---|---|---|
| Year | Identifies as Aboriginal and/or Torres Strait Islander | Does not identify as Aboriginal and/or Torres Strait Islander | All women giving birth |
| 2008 | 76.3 | 93.5 | 92.5 |
| 2009 | 77.8 | 94.2 | 93.3 |
| 2010 | 77.7 | 94.5 | 93.5 |
| 2011 | 83.4 | 95.3 | 94.6 |
| **Total** | **78.9** | **94.4** | **93.5** |

Table 66: Percentage of babies born with birthweight less than 2500 grams by Indigenous status, Queensland 2008 to 2011

| | Indigenous Status | | |
|---|---|---|---|
| Year | Identifies as Aboriginal and/or Torres Strait Islander | Does not identify as Aboriginal and/or Torres Strait Islander | All women giving birth |
| 2008 | 10.9 % | 6.5 % | 6.8 % |
| 2009 | 11.6 % | 6.8 % | 7.1 % |
| 2010 | 12.1 % | 6.6 % | 6.9 % |
| 2011 | 12.0 % | 6.6 % | 6.9 % |
| **Total** | **11.4 %** | **6.5 %** | **6.6 %** |

*Risk ratio = 1.76 (95% confidence limits 1.68, 1.85) of Indigenous vs non-Indigenous birthweight less than 2500g*

## Table 67: Number of women giving birth by mode of birth and previous pregnancy, Queensland 2000 to 2011

*(data incomplete: n = 195)*

| Year | No previous pregnancies | | | Previous pregnancies | | |
|---|---|---|---|---|---|---|
| | Unassisted vaginal birth | Assisted vaginal birth | Caesarean section | Unassisted vaginal birth | Assisted vaginal birth | Caesarean section |
| 2000 | 8,196 | 2,435 | 3,943 | 23,712 | 1,699 | 8,497 |
| 2001 | 8,019 | 2,334 | 4,269 | 23,457 | 1,663 | 9,107 |
| 2002 | 7,426 | 2,264 | 4,638 | 22,783 | 1,528 | 9,625 |
| 2003 | 7,758 | 2,319 | 4,760 | 22,622 | 1,586 | 10,432 |
| 2004 | 7,865 | 2,348 | 4,785 | 22,489 | 1,626 | 10,911 |
| 2005 | 8,169 | 2,575 | 5,358 | 24,395 | 1,723 | 12,077 |
| 2006 | 8,124 | 2,624 | 5,709 | 24,661 | 1,791 | 12,797 |
| 2007 | 8,691 | 2,973 | 6,012 | 25,963 | 2,007 | 13,581 |
| 2008 | 8,665 | 3,163 | 5,876 | 26,111 | 2,282 | 14,230 |
| 2009 | 8,888 | 3,247 | 6,018 | 26,212 | 2,336 | 14,322 |
| 2010 | 8,969 | 3,471 | 5,775 | 26,108 | 2,421 | 14,283 |
| 2011 | 8,924 | 3,481 | 5,982 | 26,106 | 2,404 | 14,310 |
| **Total** | **99,694** | **33,234** | **63,125** | **294,619** | **23,066** | **144,172** |

## Table 68: Incidence of mode of birth by previous pregnancy, Queensland 2000 to 2011

| Year | % of unassisted vaginal births | | % of assisted vaginal births | | % of caesarean sections | |
|---|---|---|---|---|---|---|
| | No previous pregnancies | Previous pregnancies | No previous pregnancies | Previous pregnancies | No previous pregnancies | Previous pregnancies |
| 2000 | 56.2 | 69.9 | 16.7 | 5.0 | 27.0 | 25.0 |
| 2001 | 54.8 | 68.4 | 16.0 | 4.9 | 29.2 | 26.6 |
| 2002 | 51.8 | 67.0 | 15.8 | 4.5 | 32.3 | 28.3 |
| 2003 | 52.3 | 65.2 | 15.6 | 4.6 | 32.1 | 30.1 |
| 2004 | 52.4 | 64.2 | 15.7 | 4.6 | 31.9 | 31.1 |
| 2005 | 50.7 | 63.8 | 16.0 | 4.5 | 33.3 | 31.6 |
| 2006 | 49.4 | 62.8 | 15.9 | 4.6 | 34.7 | 32.6 |
| 2007 | 49.2 | 62.5 | 16.8 | 4.8 | 34.0 | 32.7 |
| 2008 | 48.9 | 61.3 | 17.9 | 5.4 | 33.2 | 33.4 |
| 2009 | 49.0 | 61.1 | 17.9 | 5.4 | 33.2 | 33.4 |
| 2010 | 49.2 | 61.0 | 19.1 | 5.7 | 31.7 | 33.4 |
| 2011 | 48.5 | 61.0 | 18.9 | 5.6 | 32.5 | 33.4 |
| **Total** | **50.9** | **63.8** | **17.0** | **5.0** | **32.2** | **31.2** |
| **Total** | **59.9** | | **8.5** | | **31.5** | |

## Table 69: Number of women giving birth by mode of birth and previous caesarean section, Queensland 2001 to 2011

*(data incomplete: n = 3,876)*

| Year | No previous caesarean sections | | |
|---|---|---|---|
| | Unassisted vaginal birth | Assisted vaginal birth | Caesarean section |
| 2001 | 27,263 | 3,671 | 7,654 |
| 2002 | 27,194 | 3,550 | 8,489 |
| 2003 | 28,684 | 3,717 | 9,109 |
| 2004 | 29,091 | 3,789 | 9,240 |
| 2005 | 31,316 | 4,102 | 10,062 |
| 2006 | 31,510 | 4,217 | 10,558 |
| 2007 | 33,256 | 4,744 | 11,084 |
| 2008 | 33,277 | 5,150 | 11,050 |
| 2009 | 33,664 | 5,323 | 11,145 |
| 2010 | 33,630 | 5,631 | 10,833 |
| 2011 | 33,636 | 5,608 | 11,166 |
| **Total** | **342,521** | **49,502** | **110,390** |

Table 69: Number of women giving birth by mode of birth and previous caesarean section, Queensland 2001 to 2011 *(data incomplete: n = 3,876)*
*continued*

| Year | One previous caesarean section | | |
|---|---|---|---|
| | Unassisted vaginal birth | Assisted vaginal birth | Caesarean section |
| 2001 | 1,155 | 160 | 3,379 |
| 2002 | 1,149 | 157 | 3,944 |
| 2003 | 1,083 | 162 | 4,488 |
| 2004 | 1,225 | 182 | 4,858 |
| 2005 | 1,199 | 188 | 5,465 |
| 2006 | 1,223 | 188 | 5,849 |
| 2007 | 1,341 | 220 | 6,194 |
| 2008 | 1,383 | 268 | 6,458 |
| 2009 | 1,366 | 247 | 6,648 |
| 2010 | 1,395 | 254 | 6,481 |
| 2011 | 1,253 | 272 | 6,523 |
| **Total** | **13,772** | **2,298** | **60,287** |

| Year | More than one previous caesarean section | | |
|---|---|---|---|
| | Unassisted vaginal birth | Assisted vaginal birth | Caesarean section |
| 2001 | 42 | 1 | 1,263 |
| 2002 | 49 | 2 | 1,320 |
| 2003 | 49 | 3 | 1,427 |
| 2004 | 31 | 3 | 1,599 |
| 2005 | 44 | 4 | 1,905 |
| 2006 | 37 | 4 | 2,091 |
| 2007 | 39 | 5 | 2,300 |
| 2008 | 59 | 7 | 2,556 |
| 2009 | 39 | 1 | 2,527 |
| 2010 | 50 | 7 | 2,744 |
| 2011 | 53 | 5 | 2,604 |
| **Total** | **492** | **42** | **22,336** |



Table 70: Percentage of mode of birth by previous caesarean section, Queensland 2001 to 2011

| Year | % unassisted vaginal birth | | | % caesarean section | | |
|---|---|---|---|---|---|---|
| | No previous caesarean sections | One previous caesarean section | More than one previous caesarean section | No previous caesarean sections | One previous caesarean section | More than one previous caesarean section |
| 2001 | 70.7 | 24.6 | 3.2 | 19.8 | 72.0 | 96.7 |
| 2002 | 69.3 | 21.9 | 3.6 | 21.6 | 75.1 | 96.3 |
| 2003 | 69.1 | 18.9 | 3.3 | 21.9 | 78.3 | 96.5 |
| 2004 | 69.1 | 19.6 | 1.9 | 21.9 | 77.5 | 97.9 |
| 2005 | 68.9 | 17.5 | 2.3 | 22.1 | 79.8 | 97.5 |
| 2006 | 68.1 | 16.8 | 1.7 | 22.8 | 80.6 | 98.1 |
| 2007 | 67.8 | 17.3 | 1.7 | 22.6 | 79.9 | 98.1 |
| 2008 | 67.3 | 17.1 | 2.3 | 22.3 | 79.6 | 97.5 |
| 2009 | 67.2 | 16.5 | 1.5 | 22.2 | 80.5 | 98.4 |
| 2010 | 67.1 | 17.2 | 1.8 | 21.6 | 79.7 | 98.0 |
| 2011 | 66.7 | 15.6 | 2.0 | 22.2 | 81.1 | 97.8 |
| **Total** | **68.2** | **18.0** | **2.2** | **22.0** | **79.0** | **97.7** |

Table 71: Births by maternal age, Queensland 2000 to 2011

| Year | Maternal age < 20 | Maternal age 20–34 | Maternal age 35+ | Total |
|---|---|---|---|---|
| 2000 | **3,183** (6.6%) | **38,147** (78.6%) | **7,194** (14.8%) | **48,524** |
| 2001 | **3,158** (6.5%) | **38,303** (78.3%) | **7,447** (15.2%) | **48,908** |
| 2002 | **3,067** (6.3%) | **37,795** (78.2%) | **7,462** (15.4%) | **48,324** |
| 2003 | **3,046** (6.2%) | **38,342** (77.4%) | **8,124** (16.4%) | **49,512** |
| 2004 | **3,003** (6.0%) | **38,528** (77.0%) | **8,520** (17.0%) | **50,051** |
| 2005 | **3,069** (5.6%) | **41,566** (76.5%) | **9,702** (17.9%) | **54,337** |
| 2006 | **3,076** (5.5%) | **42,289** (75.9%) | **10,354** (18.6%) | **55,719** |
| 2007 | **3,260** (5.5%) | **44,564** (75.2%) | **11,404** (19.3%) | **59,228** |
| 2008 | **3,456** (5.5%) | **44,934** (74.5%) | **11,938** (19.8%) | **60,328** |
| 2009 | **3,340** (5.9%) | **45,523** (74.6%) | **12,161** (19.9%) | **61,024** |
| 2010 | **3,344** (5.5%) | **45,539** (74.6%) | **12,144** (19.9%) | **61,027** |
| 2011 | **3,120** (5.1%) | **45,806** (74.9%) | **12,197** (20.0%) | **61,123** |
| Total | **38,122** (5.8%) | **501,336** (76.2%) | **118,647** (18.0%) | **658,105** |

Table 72: Number of women giving birth by maternal age group and mode of healthcare delivery, Queensland 2000 to 2011

*(np = not published, data incomplete: n = 19)*

| | Maternal age <20 | | | Maternal age 20–34 | | | Maternal age 35+ | | |
|---|---|---|---|---|---|---|---|---|---|
| Year | Public | Private | Home birth | Public | Private | Home birth | Public | Private | Home birth |
| 2000 | 3,100 | 83 | np | 28,487 | 9,567 | 91 | 4,380 | 2,779 | 35 |
| 2001 | 3,048 | 109 | np | 27,025 | 11,209 | 69 | 4,113 | 3,302 | 32 |
| 2002 | 2,957 | 110 | np | 26,079 | 11,674 | 42 | 3,923 | 3,519 | 19 |
| 2003 | 2,947 | 98 | np | 26,583 | 11,714 | 45 | 4,303 | 3,798 | 21 |
| 2004 | 2,923 | 77 | np | 26,861 | 11,631 | 33 | 4,432 | 4,066 | 21 |
| 2005 | 2,944 | 124 | np | 29,299 | 12,241 | 25 | 5,131 | 4,554 | 16 |
| 2006 | 2,990 | 85 | np | 29,974 | 12,283 | 30 | 5,498 | 4,840 | 16 |
| 2007 | 3,160 | 99 | np | 31,951 | 12,559 | 54 | 6,111 | 5,266 | 26 |
| 2008 | 3,362 | 94 | np | 32,100 | 12,759 | 72 | 6,441 | 5,459 | 38 |
| 2009 | 3,269 | 70 | np | 32,598 | 12,842 | 83 | 6,683 | 5,439 | 39 |
| 2010 | 3,267 | 77 | np | 32,775 | 12,710 | 54 | 6,538 | 5,575 | 31 |
| 2011 | 3,056 | 62 | np | 33,239 | 12,524 | 42 | 6,852 | 5,320 | 25 |
| **Total** | **37,023** | **1,088** | **2** | **356,971** | **143,713** | **640** | **64,405** | **53,917** | **319** |
| **% of age group** | **97.1** | **2.9** | **-** | **71.2** | **28.7** | **0.1** | **54.3** | **45.4** | **0.3** |
| **% of care mode** | **8.1** | **0.6** | **-** | **77.9** | **72.3** | **66.6** | **14.0** | **27.1** | **33.4** |

Table 73: Number of women giving birth by maternal age group and plurality, Queensland 2000 to 2011

| Maternal age | Pregnancy plurality | | | | | |
|---|---|---|---|---|---|---|
| | Singleton | Twins | higher multiple | % Twins | % higher multiple | % all multiple |
| 20 or less | 56,079 | 412 | 4 | 0.7 | 0.01 | 0.7 |
| 21–25 | 127,096 | 1,444 | 17 | 1.1 | 0.01 | 1.1 |
| 26–30 | 198,049 | 3,126 | 75 | 1.6 | 0.04 | 1.6 |
| 31–35 | 178,502 | 3,655 | 108 | 2.0 | 0.06 | 2.1 |
| 36 or more | 87,386 | 2,089 | 63 | 2.3 | 0.07 | 2.4 |
| **Total** | **647,112** | **10,726** | **267** | **1.6** | **0.04** | **1.7** |

Table 74: Number and percentage of babies born by maternal age group and gestation at birth, Queensland 2000 to 2011
*(data incomplete: n = 69)*

| Maternal age | Gestation at birth | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 33 weeks or less | | 34–38 weeks | | 39 weeks or more | | Total | |
| | n | % | n | % | n | % | n | % |
| 20 or less | 1,984 | 0.3 | 14,075 | 2.1 | 40,835 | 6.1 | 56,915 | 8.5 |
| 21–25 | 3,642 | 0.5 | 34,151 | 5.1 | 92,230 | 13.8 | 130,036 | 19.4 |
| 26–30 | 5,436 | 0.8 | 59,889 | 9.0 | 139,194 | 20.8 | 204,536 | 30.6 |
| 31–35 | 5,142 | 0.8 | 61,580 | 9.2 | 119,406 | 17.8 | 186,138 | 27.8 |
| 36 or more | 3,161 | 0.5 | 34,745 | 5.2 | 53,840 | 8.0 | 91,754 | 13.7 |
| **Total** | **19,365** | **2.9** | **204,440** | **30.5** | **445,505** | **66.6** | **669,379** | **100** |

Table 75: Number of babies born by maternal age group and need for admission to NICU or SCN, Queensland 2000 to 2011

| Maternal age | Babies requiring NICU/SCN admission | | | |
|---|---|---|---|---|
| | NICU/SCN | | No NICU/SCN | |
| | n | % | n | % |
| 20 or less | 10,019 | 17.6 | 46,896 | 82.4 |
| 21–25 | 21,042 | 16.2 | 108,994 | 83.8 |
| 26–30 | 31,573 | 15.4 | 172,963 | 84.6 |
| 31–35 | 29,092 | 15.6 | 157,046 | 84.4 |
| 36 or more | 16,952 | 18.5 | 74,802 | 81.5 |
| **Total** | **108,678** | **16.2** | **560,701** | **83.8** |

Table 76: Number and percentage of births by maternal age and gestation at birth, Queensland 2000 to 2011 *(data incomplete: n = 68, percentages are of total in each age group for that year)*

| Maternal age | Gestation | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | Total No and % |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| <20 | 23 weeks or less | 25 | 22 | 16 | 12 | 21 | 21 | 17 | 19 | 21 | 18 | 16 | 13 | **221** |
| | | 0.8 | 0.7 | 0.5 | 0.4 | 0.7 | 0.7 | 0.6 | 0.6 | 0.6 | 0.5 | 0.5 | 0.4 | **0.6** |
| | 24–27 weeks | 15 | 23 | 12 | 16 | 13 | 20 | 27 | 20 | 25 | 15 | 26 | 23 | **235** |
| | | 0.5 | 0.7 | 0.4 | 0.5 | 0.4 | 0.7 | 0.9 | 0.6 | 0.7 | 0.4 | 0.8 | 0.7 | **0.6** |
| | 28–33 weeks | 87 | 52 | 58 | 65 | 75 | 59 | 57 | 80 | 80 | 86 | 77 | 70 | **846** |
| | | 2.7 | 1.6 | 1.9 | 2.1 | 2.5 | 1.9 | 1.9 | 2.5 | 2.3 | 2.6 | 2.3 | 2.2 | **2.2** |
| | 34–36 weeks | 194 | 182 | 164 | 189 | 164 | 188 | 182 | 188 | 191 | 178 | 196 | 172 | **2,188** |
| | | 6.1 | 5.8 | 5.4 | 6.2 | 5.5 | 6.1 | 5.9 | 5.8 | 5.5 | 5.3 | 5.9 | 5.5 | **5.7** |
| | 37–39 weeks | 1,113 | 1,136 | 1,157 | 1,203 | 1,148 | 1,219 | 1,236 | 1,261 | 1,415 | 1,395 | 1,466 | 1,416 | **15,165** |
| | | 35.0 | 36.0 | 37.7 | 39.5 | 38.3 | 39.7 | 40.2 | 38.7 | 40.9 | 41.8 | 43.8 | 45.4 | **39.8** |
| | 40–41 weeks | 1,672 | 1,691 | 1,596 | 1,521 | 1,553 | 1,526 | 1,527 | 1,656 | 1,700 | 1,625 | 1,545 | 1,412 | **19,024** |
| | | 52.6 | 53.5 | 52.1 | 50.0 | 51.7 | 49.7 | 49.7 | 50.8 | 49.2 | 48.7 | 46.2 | 45.3 | **49.9** |
| | 42 weeks or more | 72 | 52 | 62 | 39 | 27 | 35 | 29 | 33 | 24 | 20 | 18 | 14 | **425** |
| | | 2.3 | 1.6 | 2.0 | 1.3 | 0.9 | 1.1 | 0.9 | 1.0 | 0.7 | 0.6 | 0.5 | 0.4 | **1.1** |
| 20–34 | 23 weeks or less | 130 | 148 | 116 | 120 | 143 | 143 | 170 | 195 | 161 | 185 | 168 | 170 | **1,849** |
| | | 0.3 | 0.4 | 0.3 | 0.3 | 0.4 | 0.3 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | **0.4** |
| | 24–27 weeks | 147 | 135 | 147 | 137 | 137 | 137 | 169 | 129 | 163 | 173 | 170 | 170 | **1,814** |
| | | 0.4 | 0.4 | 0.4 | 0.4 | 0.4 | 0.3 | 0.4 | 0.3 | 0.4 | 0.4 | 0.4 | 0.4 | **0.4** |
| | 28–33 weeks | 614 | 568 | 657 | 640 | 676 | 720 | 773 | 734 | 723 | 735 | 758 | 747 | **8,345** |
| | | 1.6 | 1.5 | 1.7 | 1.7 | 1.8 | 1.7 | 1.8 | 1.6 | 1.6 | 1.6 | 1.7 | 1.6 | **1.7** |
| | 34–36 weeks | 1,856 | 1,819 | 1,855 | 1,906 | 1,979 | 2,095 | 2,189 | 2,317 | 2,263 | 2,376 | 2,276 | 2,321 | **25,252** |
| | | 4.9 | 4.7 | 4.9 | 5.0 | 5.1 | 5.0 | 5.2 | 5.2 | 5.0 | 5.2 | 5.0 | 5.1 | **5.0** |
| | 37–39 weeks | 16,093 | 16,205 | 16,739 | 17,365 | 17,972 | 19,674 | 20,400 | 21,397 | 22,160 | 22,664 | 23,213 | 23,916 | **237,798** |
| | | 42.2 | 42.3 | 44.3 | 45.3 | 46.7 | 47.3 | 48.2 | 48.0 | 49.3 | 49.8 | 51.0 | 52.2 | **47.4** |
| | 40–41 weeks | 18,590 | 18,860 | 17,788 | 17,792 | 17,311 | 18,519 | 18,337 | 19,500 | 19,163 | 19,074 | 18,685 | 18,201 | **221,820** |
| | | 48.7 | 49.2 | 47.1 | 46.4 | 44.9 | 44.6 | 43.4 | 43.8 | 42.7 | 41.9 | 41.0 | 39.7 | **44.2** |
| | 42 weeks or more | 713 | 567 | 493 | 381 | 305 | 275 | 246 | 284 | 297 | 314 | 264 | 279 | **4,418** |
| | | 1.9 | 1.5 | 1.3 | 1.0 | 0.8 | 0.7 | 0.6 | 0.6 | 0.7 | 0.7 | 0.6 | 0.6 | **0.9** |
| 35+ | 23 weeks or less | 49 | 32 | 38 | 22 | 37 | 45 | 52 | 46 | 52 | 45 | 72 | 59 | **549** |
| | | 0.7 | 0.4 | 0.5 | 0.3 | 0.4 | 0.5 | 0.5 | 0.4 | 0.4 | 0.4 | 0.6 | 0.5 | **0.5** |
| | 24–27 weeks | 33 | 35 | 31 | 36 | 47 | 54 | 41 | 36 | 44 | 48 | 48 | 65 | **518** |
| | | 0.5 | 0.5 | 0.4 | 0.4 | 0.6 | 0.6 | 0.4 | 0.3 | 0.4 | 0.4 | 0.4 | 0.5 | **0.4** |
| | 28–33 weeks | 157 | 152 | 152 | 175 | 166 | 174 | 189 | 227 | 216 | 247 | 230 | 233 | **2,318** |
| | | 2.2 | 2.0 | 2.0 | 2.2 | 1.9 | 1.8 | 1.8 | 2.0 | 1.8 | 2.0 | 1.9 | 1.9 | **2.0** |
| | 34–36 weeks | 390 | 451 | 430 | 447 | 493 | 608 | 635 | 652 | 700 | 706 | 724 | 768 | **7,004** |
| | | 5.4 | 6.1 | 5.8 | 5.5 | 5.8 | 6.3 | 6.1 | 5.7 | 5.9 | 5.8 | 6.0 | 6.3 | **5.9** |
| | 37–39 weeks | 3,585 | 3,759 | 3,927 | 4,331 | 4,576 | 5,272 | 5,763 | 6,401 | 6,697 | 7,029 | 7,088 | 7,219 | **65,647** |
| | | 49.8 | 50.5 | 52.6 | 53.3 | 53.7 | 54.3 | 55.7 | 56.1 | 56.1 | 57.8 | 58.4 | 59.2 | **55.3** |
| | 40–41 weeks | 2,831 | 2,919 | 2,819 | 3,041 | 3,116 | 3,480 | 3,607 | 3,945 | 4,130 | 3,996 | 3,907 | 3,793 | **41,584** |
| | | 39.4 | 39.2 | 37.8 | 37.4 | 36.6 | 35.9 | 34.8 | 34.6 | 34.6 | 32.9 | 32.2 | 31.1 | **35.1** |
| | 42 weeks or more | 148 | 99 | 65 | 71 | 85 | 69 | 67 | 97 | 98 | 88 | 74 | 56 | **1,017** |
| | | 2.1 | 1.3 | 0.9 | 0.9 | 1.0 | 0.7 | 0.6 | 0.9 | 0.8 | 0.7 | 0.6 | 0.5 | **0.9** |

## Table 77: Correlation of (BMI of women giving birth with mode of healthcare delivery, Queensland 2008 to 2011

| | Maternal BMI <18.5 | | | Maternal BMI 18.5–24.9 | | | Maternal BMI 25–29.9 | | | Maternal BMI 30+ | | | BMI not stated |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Care Mode | Public | Private | Home birth | Public | Private | Hom birth | Public | Private | Home birth | Public | Private | Home birth | |
| 2008 | 1,637 | 818 | 6 | 16,053 | 9,772 | 61 | 11,345 | 4,696 | 23 | 9,844 | 2,631 | 13 | 3,428 |
| 2009 | 1,753 | 762 | 6 | 16,870 | 9,971 | 74 | 11,646 | 4,748 | 26 | 10,194 | 2,629 | 6 | 2,338 |
| 2010 | 1,818 | 802 | 5 | 17,429 | 9,785 | 50 | 11,562 | 4,842 | 15 | 10,446 | 2,763 | 8 | 1,502 |
| 2011 | 2,399 | 830 | 3 | 18,643 | 9,804 | 37 | 11,205 | 4,653 | 13 | 9,927 | 2,543 | 6 | 1,060 |
| **Total** | **7,607** | **3,212** | **20** | **68,995** | **39,332** | **222** | **45,758** | **18,939** | **77** | **40,411** | **10,566** | **33** | **8,328** |
| % of care group | 4.7 | 4.5 | 5.7 | 42.4 | 54.6 | 63.1 | 28.1 | 26.3 | 21.9 | 24.8 | 14.7 | 9.4 | |
| % of total | 4.5 | | | 44.6 | | | 26.6 | | | 20.9 | | | 3.4 |

*Maternal height and weight detail data collection commenced mid–2007*
*Data incomplete: n = 8,328*

## Table 78: Correlation of BMI of women giving birth with maternal age, Queensland 2008 to 2011

| | Maternal BMI <18.5 | | | Maternal BMI 18.5–24.9 | | | Maternal BMI 25–29.9 | | | Maternal BMI 30+ | | | BMI not stated |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Maternal Age | Age <20 | Age 20–34 | Age 35+ | Age <20 | Age 20–34 | Age 35+ | Age <20 | Age 20–34 | Age 35+ | Age <20 | Age 20–34 | Age 35+ | |
| 2008 | 233 | 1,876 | 352 | 1,565 | 19,195 | 5,127 | 839 | 11,983 | 3,242 | 482 | 9,413 | 2,593 | 3,428 |
| 2009 | 273 | 1,908 | 340 | 1,520 | 20,003 | 5,392 | 831 | 12,205 | 3,384 | 514 | 9,744 | 2,571 | 2,338 |
| 2010 | 284 | 2,004 | 337 | 1,582 | 20,285 | 5,397 | 827 | 12,202 | 3,390 | 542 | 9,938 | 2,737 | 1,502 |
| 2011 | 355 | 2,467 | 410 | 1,491 | 21,369 | 5,625 | 710 | 11,783 | 3,378 | 464 | 9,445 | 2,567 | 1,060 |
| **Total** | **1,145** | **8,255** | **1,439** | **6,158** | **80,852** | **21,541** | **3,207** | **48,173** | **13,394** | **2,002** | **38,540** | **10,468** | **8,328** |
| % of age group | 9.2 | 4.7 | 3.1 | 49.2 | 46.0 | 46.0 | 25.6 | 27.4 | 28.6 | 16.0 | 21.9 | 22.3 | 9.2 |
| % of total | 4.5 | | | 44.6 | | | 26.6 | | | 20.9 | | | 3.4 |

*Data incomplete: n = 8,328*

## Table 79: Correlation of BMI of women giving birth with mode of birth, Queensland 2008 to 2011

| | Maternal BMI <18.5 | | | Maternal BMI 18.5–24.9 | | | Maternal BMI 25–29.9 | | | Maternal BMI 30+ | | | BMI Not stated |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Birth Mode | UVB | AVB | CS | UVB | AVB | CS | UVB | AVB | CS | UVB | AVB | CS | |
| 2008 | 1,514 | 283 | 664 | 15,144 | 2,841 | 7,901 | 9,312 | 1,353 | 5,399 | 6,664 | 779 | 5,045 | 3,428 |
| 2009 | 1,575 | 319 | 627 | 15,809 | 2,935 | 8,171 | 9,272 | 1,422 | 5,726 | 7,014 | 756 | 5,059 | 2,338 |
| 2010 | 1,709 | 306 | 610 | 16,085 | 3,154 | 8,025 | 9,196 | 1,483 | 5,740 | 7,172 | 855 | 5,190 | 1,502 |
| 2011 | 2,075 | 372 | 785 | 16,599 | 3,273 | 8,612 | 8,918 | 1,409 | 5,544 | 6,691 | 772 | 5,013 | 1,060 |
| **Total** | 6,873 | 1,280 | 2,686 | 63,637 | 12,203 | 32,709 | 36,698 | 5,667 | 22,409 | 27,541 | 3,162 | 20,307 | 8,328 |
| % of BMI group | 63.4 | 11.8 | 24.8 | 58.6 | 11.2 | 30.1 | 56.6 | 8.7 | 34.6 | 54.0 | 6.2 | 39.8 | |
| % of total | 4.5 | | | 44.6 | | | 26.6 | | | 20.9 | | | 3.4 |

*UVB = unassisted vaginal birth; AVB = assisted vaginal birth; CS = caesarean section; Data incomplete: n = 8,328*

## Table 80: Correlation of BMI of women giving birth with gestation at birth, Queensland 2008 to 2011

| | Maternal BMI <18.5 | | | | | Maternal BMI 18.5–24.9 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Gestation | ≤27 | 28–33 | 34–36 | 37–39 | 40+ | ≤27 | 28–33 | 34–36 | 37–39 | 40+ |
| 2008 | 16 | 55 | 172 | 1,338 | 880 | 137 | 353 | 1,313 | 13,073 | 11,011 |
| 2009 | 19 | 49 | 164 | 1,389 | 900 | 168 | 393 | 1,384 | 13,857 | 11,113 |
| 2010 | 27 | 74 | 190 | 1,441 | 893 | 165 | 420 | 1,387 | 14,243 | 11,049 |
| 2011 | 23 | 70 | 243 | 1,793 | 1,103 | 176 | 441 | 1,463 | 15,135 | 11,270 |
| **Total** | **85** | **248** | **769** | **5,961** | **3,776** | **646** | **1,607** | **5,547** | **56,308** | **44,443** |
| **% of BMI group** | **0.8** | **2.3** | **7.1** | **55.0** | **34.8** | **0.6** | **1.5** | **5.1** | **51.9** | **40.9** |
| **% of total** | **4.5** | | | | | **44.6** | | | | |

| | Maternal BMI 25–29.9 | | | | | Maternal BMI 30+ | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Gestation | ≤27 | 28-33 | 34-36 | 37-39 | 40+ | ≤27 | 28-33 | 34-36 | 37-39 | 40+ |
| 2008 | 84 | 194 | 754 | 7,893 | 7,139 | 69 | 174 | 632 | 6,424 | 5,189 |
| 2009 | 84 | 233 | 851 | 8,268 | 6,984 | 84 | 191 | 664 | 6,571 | 5,319 |
| 2010 | 93 | 208 | 837 | 8,502 | 6,779 | 103 | 209 | 647 | 6,918 | 5,340 |
| 2011 | 103 | 236 | 840 | 8,355 | 6,337 | 89 | 207 | 608 | 6,808 | 4,764 |
| **Total** | **364** | **871** | **3,282** | **33,018** | **27,239** | **345** | **781** | **2,551** | **26,721** | **20,612** |
| **% of BMI group** | **0.6** | **1.3** | **5.1** | **51.0** | **42.0** | **0.7** | **1.5** | **5.0** | **52.4** | **40.4** |
| **% of total** | **26.6** | | | | | **20.9** | | | | |

*Data incomplete: n = 8,328*

## Table 81: Correlation of BMI of women giving birth with birthweight of their babies, Queensland 2008 to 2011

| | Maternal BMI <18.5 | | | | Maternal BMI 18.5–24.9 | | | |
|---|---|---|---|---|---|---|---|---|
| Birthweight (g) | Less than 1000 | 1000–2499 | 2500–3999 | 4,000 or more | Less than 1000 | 1000–2499 | 2500–3999 | 4000 or more |
| 2008 | 21 | 262 | 2,106 | 110 | 161 | 1,547 | 21,997 | 2,602 |
| 2009 | 20 | 257 | 2,130 | 143 | 211 | 1,676 | 22,663 | 2,765 |
| 2010 | 33 | 318 | 2,172 | 135 | 188 | 1,657 | 23,240 | 2,621 |
| 2011 | 25 | 332 | 2,782 | 131 | 209 | 1,771 | 24,127 | 2,844 |
| **Total** | **99** | **1,169** | **9,190** | **519** | **769** | **6,651** | **92,027** | **10,832** |
| **% of BMI group** | **0.9** | **10.6** | **83.7** | **4.7** | **0.7** | **6.0** | **83.4** | **9.8** |
| **% of total** | **4.5** | | | | **44.6** | | | |

| | Maternal BMI 25–29.9 | | | | Maternal BMI 30+ | | | |
|---|---|---|---|---|---|---|---|---|
| Birthweight (g) | Less than 1000 | 1000–2499 | 2500–3999 | 4000 or more | Less than 1000 | 1000–2499 | 2500–3999 | 4000 or more |
| 2008 | 92 | 755 | 13,138 | 2,354 | 88 | 554 | 9,673 | 2,405 |
| 2009 | 96 | 910 | 13,403 | 2,318 | 100 | 609 | 9,912 | 2,429 |
| 2010 | 109 | 817 | 13,385 | 2,348 | 116 | 628 | 10,165 | 2,514 |
| 2011 | 107 | 840 | 12,923 | 2,285 | 100 | 613 | 9,647 | 2,331 |
| **Total** | 404 | 3,322 | 52,849 | 9,305 | 404 | 2,404 | 39,397 | 9,679 |
| **% of BMI group** | **0.6** | **5.0** | **80.2** | **14.1** | **0.8** | **4.6** | **75.9** | **18.7** |
| **% of total** | **26.6** | | | | **20.9** | | | |

*data incomplete: n = 8,643*

## Table 82: Correlation of body mass index (BMI) of women giving birth with perinatal outcome, Queensland 2008 to 2011

| | Maternal BMI <18.5 | | | Maternal BMI 18.5–24.9 | | | Maternal BMI 25–29.9 | | | Maternal BMI 30+ | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Perinatal outcome | Alive | SB | NND | Alive | SB | NND | Alive | SB | NND | Alive | SB | NND |
| 2008 | 993.6 | 6.4 | 0.0 | 993.4 | 4.0 | 2.6 | 993.0 | 5.0 | 2.0 | 990.3 | 6.3 | 3.4 |
| 2009 | 993.3 | 4.3 | 2.4 | 991.3 | 5.5 | 3.3 | 991.2 | 6.2 | 2.6 | 988.4 | 7.4 | 4.3 |
| 2010 | 989.8 | 8.3 | 1.9 | 991.6 | 3.4 | 3.4 | 991.3 | 5.9 | 2.8 | 988.7 | 6.6 | 4.7 |
| 2011 | 990.8 | 6.4 | 2.8 | 991.8 | 4.7 | 3.4 | 992.7 | 5.1 | 2.2 | 990.0 | 6.8 | 3.2 |
| **Total** | **991.8** | **6.4** | **1.8** | **992.0** | **4.8** | **3.2** | **992.0** | **5.6** | **2.4** | **989.3** | **6.8** | **3.9** |
| **PNMR** | | **8.2** | | | **8.0** | | | **8.0** | | | **10.7** | |

*Alive = alive at discharge per 1,000 babies; SB = stillborn per 1000 babies; NND = neonatal death per 1000 liveborn babies*
*PNMR = perinatal deaths per 1000 babies*

## Table 83: Correlation (%) of cigarette smoking status of women giving birth with maternal age, Queensland 2008 to 2011

*(smoking status data before and after 20 weeks has been collected since July 2009)*

| | Smoking at <20 weeks | | | Smoking at >20 weeks | | |
|---|---|---|---|---|---|---|
| Maternal age | Age <20 | Age 20–34 | Age 35+ | Age <20 | Age 20–34 | Age 35+ |
| 2010 | 40.4 | 17.4 | 10.9 | 31.8 | 14.1 | 9.3 |
| 2011 | 37.1 | 16.0 | 10.7 | 30.4 | 13.3 | 9.1 |
| **Total** | **38.8** | **16.7** | **10.8** | **31.1** | **13.7** | **9.2** |

## Table 84: Correlation (%) of cigarette smoking status of women giving birth with gestation at birth, Queensland 2008 to 2011

*(smoking status data before and after 20 weeks has been collected since July 2009)*

| | Smoking at <20 weeks | | | | | Not smoking at <20 weeks | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Gestation | ≤27 | 28–33 | 34–36 | 37–39 | 40+ | ≤27 | 28–33 | 34–36 | 37–39 | 40+ |
| 2010 | 1.1 | 2.5 | 6.9 | 51.6 | 37.9 | 0.7 | 1.6 | 4.9 | 52.2 | 40.6 |
| 2011 | 1.1 | 2.2 | 7.0 | 52.2 | 37.4 | 0.7 | 1.6 | 5.0 | 53.5 | 39.2 |
| **Total** | **1.1** | **2.4** | **6.9** | **51.9** | **37.7** | **0.7** | **1.6** | **5.0** | **52.8** | **39.9** |

| | Smoking at >20 weeks | | | | | Not smoking at >20 weeks | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Gestation | ≤27 | 28–33 | 34–36 | 37–39 | 40+ | ≤27 | 28–33 | 34–36 | 37–39 | 40+ |
| 2010 | 1.2 | 2.7 | 7.3 | 52.6 | 36.3 | 0.7 | 1.6 | 4.9 | 52.0 | 40.8 |
| 2011 | 1.2 | 2.4 | 7.3 | 53.0 | 36.1 | 0.7 | 1.6 | 5.0 | 53.3 | 39.3 |
| **Total** | **1.2** | **2.6** | **7.3** | **52.8** | **36.2** | **0.7** | **1.6** | **5.0** | **52.7** | **40.1** |

## Table 85: Correlation (%) of cigarette smoking status of women giving birth with birthweight, Queensland 2008 to 2011

*(smoking status data before and after 20 weeks has been collected since July 2009)*

| | Smoking at <20 weeks | | | | Not smoking at <20 weeks | | | |
|---|---|---|---|---|---|---|---|---|
| Birthweight (g) | Less than 1,000 | 1,000–2,499 | 2,500–3,999 | 4,000 or more | Less than 1,000 | 1,000–2,499 | 2,500–3,999 | 4,000 or more |
| 2010 | 1.2 | 9.8 | 81.6 | 7.4 | 0.9 | 5.2 | 80.4 | 13.6 |
| 2011 | 1.1 | 9.7 | 81.7 | 7.4 | 0.8 | 5.3 | 80.6 | 13.3 |
| **Total** | **1.2** | **9.7** | **81.7** | **7.4** | **0.8** | **5.2** | **80.5** | **13.4** |

| | Smoking at >20 weeks | | | | Not smoking at >20 weeks | | | |
|---|---|---|---|---|---|---|---|---|
| Birthweight (g) | Less than 1000 | 1000–2499 | 2500–3999 | 4000 or more | Less than 1000 | 1000–2499 | 2500–3999 | 4000 or more |
| 2010 | 1.3 | 10.5 | 81.8 | 6.3 | 0.8 | 5.2 | 80.4 | 13.5 |
| 2011 | 1.1 | 10.5 | 82.2 | 6.2 | 0.8 | 5.3 | 80.6 | 13.3 |
| **Total** | **1.2** | **10.5** | **82.0** | **6.3** | **0.8** | **5.3** | **80.5** | **13.4** |

## Table 86: Correlation of cigarette smoking status of women giving birth with perinatal outcome, Queensland 2008 to 2011

*(smoking status data before and after 20 weeks has been collected since July 2009)*

| | Smoking at <20 weeks | | | Not smoking at <20 weeks | | |
|---|---|---|---|---|---|---|
| Perinatal outcome | Alive | SB | NND | Alive | SB | NND |
| 2010 | 985.5 | 8.7 | 5.8 | 990.5 | 6.0 | 3.5 |
| 2011 | 986.1 | 8.3 | 5.6 | 991.2 | 5.9 | 2.9 |
| **Total** | **985.8** | **8.5** | **5.7** | **990.9** | **6.0** | **3.2** |
| **PNMR** | **14.2** | | | **9.1** | | |

| | Smoking at >20 weeks | | | Not smoking at >20 weeks | | |
|---|---|---|---|---|---|---|
| Perinatal outcome | Alive | SB | NND | Alive | SB | NND |
| 2010 | 985.4 | 9.1 | 5.6 | 990.4 | 6.1 | 3.5 |
| 2011 | 985.6 | 9.1 | 5.3 | 991.2 | 5.8 | 3.0 |
| **Total** | **985.5** | **9.1** | **5.5** | **990.8** | **6.0** | **3.3** |
| **PNMR** | **14.5** | | | **9.2** | | |

*Alive = alive at discharge; SB = stillborn; NND = neonatal death; PNMR = perinatal deaths per 1000 babies*

## Table 87: Correlation of remoteness class of women giving birth with gestation at birth and Indigenous status, Queensland 2010 to 2011

| | | ARIA 1: highly accessible | | | | | ARIA 2: accessible | | | | | ARIA 3: moderately accessible | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Gestation | | ≤27 | 28–33 | 34–36 | 37–39 | 40+ | ≤27 | 28–33 | 34–36 | 37–39 | 40+ | ≤27 | 28–33 | 34–36 | 37–39 | 40+ |
| Year | Indigenous status | | | | | | | | | | | | | | | |
| 2010 | Indigenous | 1.1 | 2.2 | 6.0 | 54.0 | 36.7 | 1.9 | 3.2 | 6.2 | 54.5 | 34.2 | 1.8 | 3.6 | 8.2 | 51.6 | 34.8 |
| | Non-Indigenous | 0.7 | 1.6 | 5.1 | 52.5 | 40.1 | 1.0 | 1.8 | 5.3 | 51.7 | 40.2 | 0.7 | 1.7 | 4.9 | 50.4 | 42.3 |
| 2011 | Indigenous | 1.1 | 1.9 | 7.4 | 51.8 | 37.8 | 1.1 | 2.4 | 6.8 | 54.8 | 34.9 | 2.2 | 4.1 | 6.7 | 51.6 | 35.4 |
| | Non-Indigenous | 0.7 | 1.6 | 5.2 | 53.3 | 39.2 | 0.9 | 1.7 | 5.4 | 53.7 | 38.3 | 0.8 | 1.6 | 5.0 | 52.8 | 39.8 |
| **Total** | **Indigenous** | **1.1** | **2.0** | **6.8** | **52.8** | **37.3** | **1.5** | **2.8** | **6.5** | **54.6** | **34.6** | **2.0** | **3.9** | **7.5** | **51.6** | **35.1** |
| | **Non-Indigenous** | **0.7** | **1.6** | **5.1** | **52.9** | **39.7** | **0.9** | **1.8** | **5.4** | **52.7** | **39.3** | **0.8** | **1.6** | **4.9** | **51.6** | **41.1** |
| **Total** | **All** | **0.7** | **1.6** | **5.2** | **52.9** | **39.6** | **1.0** | **1.8** | **5.4** | **52.8** | **39.0** | **0.9** | **1.9** | **5.2** | **51.6** | **40.3** |

| | | ARIA 4: remote | | | | | ARIA 5: very remote | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Gestation | | ≤27 | 28–33 | 34–36 | 37–39 | 40+ | ≤27 | 28–33 | 34–36 | 37–39 | 40+ |
| Year | Indigenous status | | | | | | | | | | |
| 2010 | Indigenous | 2.4 | 4.7 | 10.6 | 56.3 | 26.0 | 1.9 | 1.3 | 8.8 | 54.0 | 33.9 |
| | Non-Indigenous | 0.3 | 1.9 | 4.5 | 53.3 | 40.0 | 0.5 | 0.3 | 4.4 | 47.5 | 47.3 |
| 2011 | Indigenous | 2.7 | 4.2 | 9.6 | 57.1 | 26.4 | 1.7 | 3.9 | 7.7 | 53.7 | 33.0 |
| | Non-Indigenous | 1.1 | 1.3 | 4.5 | 52.2 | 40.9 | 0.9 | 1.4 | 5.7 | 55.3 | 36.8 |
| **Total** | **Indigenous** | **2.5** | **4.5** | **10.1** | **56.7** | **26.2** | **1.8** | **2.6** | **8.3** | **53.8** | **33.5** |
| | **Non-Indigenous** | **0.7** | **1.6** | **4.5** | **52.8** | **40.5** | **0.7** | **0.8** | **5.0** | **51.3** | **42.1** |
| **Total** | **All** | **1.2** | **2.5** | **6.2** | **54.0** | **36.0** | **1.4** | **1.9** | **6.9** | **52.8** | **37.0** |

*Percentages are of ARIA/Indigenous status groups.*
*Remoteness classes:*
*1. Highly accessible (major cities of Australia; ARIA score 0 to <0.20)*
*2. Accessible (inner regional Australia: ARIA score 0.20 to <2.40)*
*3. Moderately accessible (outer regional Australia; ARIA score 2.40 to <5.95)*
*4. Remote (remote Australia; ARIA score 5.95 to <10.5)*
*5. Very remote (very remote Australia; ARIA score 10.5 to <15)*
*Interstate, overseas, data incomplete: n = 100*

## Table 88:Correlation of remoteness class of women giving birth with birthweight of their babies and Indigenous status, Queensland 2010 to 2011

| | | ARIA 1: highly accessible | | | | ARIA 2: accessible | | | | ARIA 3: moderately accessible | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Birthweight (g) | | 999 or less | 1000–2499 | 2500–3999 | 4000 or more | 999 or less | 1000–2499 | 2500–3999 | 4000 or more | 999 or less | 1000–2499 | 2500–3999 | 4000 or more |
| Year | Indigenous status | | | | | | | | | | | | |
| 2010 | Indigenous | 1.1 | 7.6 | 80.7 | 10.6 | 2.4 | 9.6 | 79.9 | 8.1 | 1.9 | 11.7 | 77.9 | 8.6 |
| | Non-Indigenous | 0.8 | 5.7 | 81.0 | 12.4 | 1.0 | 6.0 | 79.7 | 13.2 | 0.9 | 5.5 | 80.5 | 13.2 |
| 2011 | Indigenous | 0.8 | 9.3 | 80.1 | 9.8 | 1.3 | 8.0 | 79.2 | 11.5 | 2.1 | 11.3 | 77.6 | 8.9 |
| | Non-Indigenous | 0.8 | 5.9 | 81.1 | 12.2 | 0.9 | 5.9 | 80.0 | 13.2 | 0.8 | 5.2 | 81.3 | 12.7 |
| **Total** | **Indigenous** | **0.9** | **8.5** | **80.4** | **10.2** | **1.8** | **8.8** | **79.5** | **9.8** | **2.0** | **11.5** | **77.7** | **8.8** |
| | **Non-Indigenous** | **0.8** | **5.8** | **81.0** | **12.3** | **1.0** | **6.0** | **79.8** | **13.2** | **0.9** | **5.3** | **80.9** | **12.9** |
| **Total** | **All** | **0.8** | **5.9** | **81.0** | **12.3** | **1.0** | **6.1** | **79.8** | **13.1** | **1.0** | **6.1** | **80.5** | **12.4** |

| | | ARIA 4: remote | | | | ARIA 5: very remote | | | |
|---|---|---|---|---|---|---|---|---|---|
| Birthweight (g) | | 999 or less | 1000–2499 | 2500–3999 | 4000 or more | 999 or less | 1000–2499 | 2500–3999 | 4000 or more |
| Year | Indigenous status | | | | | | | | |
| 2010 | Indigenous | 2.0 | 14.2 | 77.1 | 6.7 | 2.1 | 8.9 | 80.8 | 8.3 |
| | Non-Indigenous | 0.3 | 5.4 | 81.0 | 13.3 | 0.5 | 4.6 | 78.7 | 16.1 |
| 2011 | Indigenous | 1.8 | 14.3 | 76.5 | 7.4 | 1.5 | 11.6 | 78.2 | 8.7 |
| | Non-Indigenous | 0.9 | 4.4 | 82.8 | 11.8 | 0.8 | 3.1 | 81.4 | 14.7 |
| **Total** | **Indigenous** | **1.9** | **14.2** | **76.8** | **7.0** | **1.8** | **10.2** | **79.5** | **8.5** |
| | **Non-Indigenous** | **0.6** | **4.9** | **81.9** | **12.6** | **0.7** | **3.9** | **80.0** | **15.4** |
| **Total** | **All** | **1.0** | **7.8** | **80.3** | **10.9** | **1.3** | **7.6** | **79.7** | **11.3** |

*Percentages are of ARIA/Indigenous status groups.*
*Remoteness classes:*
*1. Highly accessible (major cities of Australia; ARIA score 0 to <0.20)*
*2. Accessible (inner regional Australia: ARIA score 0.20 to <2.40)*
*3. Moderately accessible (outer regional Australia; ARIA score 2.40 to <5.95)*
*4. Remote (remote Australia; ARIA score 5.95 to <10.5)*
*5. Very remote (very remote Australia; ARIA score 10.5 to <15))*
*Interstate, overseas, data incomplete: n = 89*

## Table 89: Correlation of remoteness class of women giving birth with perinatal outcome and Indigenous status, Queensland 2010 to 2011

| | ARIA 1: highly accessible | | | | ARIA 2: accessible | | | | ARIA 3: moderately accessible | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Perinatal outcome | Alive | SBR | NMR | PNMR | Alive | SBR | NMR | PNMR | Alive | SBR | NMR | PNMR |
| Indigenous | 983.8 | 8.5 | 8.0 | 16.2 | 988.4 | 7.9 | 3.7 | 11.6 | 977.9 | 11.5 | 11.0 | 22.1 |
| Non-Indigenous | 988.9 | 7.6 | 3.5 | 11.1 | 990.5 | 6.1 | 3.4 | 9.5 | 990.5 | 6.1 | 3.5 | 9.5 |
| **Total** | **988.6** | **7.7** | **3.8** | **11.4** | **990.5** | **6.2** | **3.4** | **9.5** | **988.9** | **6.8** | **4.4** | **11.1** |

| | ARIA 4: remote | | | | ARIA 5: very remote | | | |
|---|---|---|---|---|---|---|---|---|
| Perinatal outcome | Alive | SBR | NMR | PNMR | Alive | SBR | NMR | PNMR |
| Indigenous | 983.9 | 8.8 | 7.5 | 16.1 | 983.9 | 8.5 | 7.8 | 16.1 |
| Non-Indigenous | 994.7 | 3.3 | 2.0 | 5.3 | 994.5 | 2.8 | 2.8 | 5.5 |
| **Total** | **991.3** | **5.0** | **3.7** | **8.7** | **988.2** | **6.2** | **5.7** | **11.8** |

*Rates are calculated within ARIA/Indigenous status groups.*
*Alive = alive at discharge, SBR = stillbirth rate per 1000 babies,*
*NMR = neonatal mortality rate per 1000 liveborn babies, PNMR = perinatal deaths per 1000 babies.*
*Remoteness classes:*
*1. Highly accessible (major cities of Australia; ARIA score 0 to <0.20)*
*2. Accessible (inner regional Australia: ARIA score 0.20 to <2.40)*
*3. Moderately accessible (outer regional Australia; ARIA score 2.40 to <5.95)*
*4. Remote (remote Australia; ARIA score 5.95 to <10.5)*
*5. Very remote (very remote Australia; ARIA score 10.5 to <15)*

## Table 90: Correlation of socio-economic status of women giving birth with gestation at birth and Indigenous status, Queensland 2010 to 2011 *(percentages are of SEIFA/Indigenous status groups)*

| | | SEIFA index quintile 1 | | | | | SEIFA index quintile 2 | | | | | SEIFA index quintile 3 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Gestation | | ≤27 | 28–33 | 34–36 | 37–39 | 40+ | ≤27 | 28–33 | 34–36 | 37–39 | 40+ | ≤27 | 28–33 | 34–36 | 37–39 | 40+ |
| Year | Indigenous status | | | | | | | | | | | | | | | |
| 2010 | Indigenous | 1.7 | 3.2 | 9.1 | 54.6 | 31.4 | 2.7 | 2.7 | 5.9 | 47.9 | 40.9 | 1.8 | 2.4 | 6.7 | 52.5 | 36.7 |
| | Non-Indigenous | 0.9 | 2.0 | 5.3 | 50.1 | 41.7 | 0.9 | 1.8 | 5.2 | 50.8 | 41.4 | 0.7 | 1.6 | 5.1 | 50.8 | 41.8 |
| 2011 | Indigenous | 2.0 | 4.0 | 7.5 | 55.3 | 31.1 | 1.7 | 2.4 | 6.9 | 51.4 | 37.7 | 1.5 | 3.1 | 7.1 | 53.2 | 35.2 |
| | Non-Indigenous | 0.9 | 1.8 | 5.7 | 52.7 | 38.9 | 0.8 | 1.9 | 5.3 | 53.1 | 38.9 | 0.7 | 1.5 | 5.2 | 52.3 | 40.3 |
| **Total** | **Indigenous** | **1.9** | **3.6** | **8.3** | **55.0** | **31.3** | **2.2** | **2.5** | **6.4** | **49.6** | **39.3** | **1.6** | **2.8** | **6.9** | **52.9** | **35.9** |
| | **Non-Indigenous** | **0.9** | **1.9** | **5.5** | **51.4** | **40.3** | **0.8** | **1.8** | **5.3** | **52.0** | **40.2** | **0.7** | **1.5** | **5.1** | **51.5** | **41.1** |
| **Total** | **All** | **1.1** | **2.2** | **5.9** | **52.0** | **38.8** | **0.9** | **1.9** | **5.3** | **51.8** | **40.1** | **0.8** | **1.6** | **5.2** | **51.6** | **40.8** |

| | | SEIFA index quintile 4 | | | | | SEIFA index quintile 5 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Gestation | | ≤27 | 28–33 | 34–36 | 37–39 | 40+ | ≤27 | 28–33 | 34–36 | 37–39 | 40+ |
| Year | Indigenous status | | | | | | | | | | |
| 2010 | Indigenous | 1.5 | 3.3 | 5.9 | 54.8 | 34.6 | 2.7 | 1.4 | 9.5 | 50.0 | 36.5 |
| | Non-Indigenous | 0.7 | 1.5 | 4.8 | 53.1 | 39.9 | 0.6 | 1.6 | 5.2 | 55.6 | 37.0 |
| 2011 | Indigenous | 1.1 | 2.8 | 6.7 | 51.4 | 38.0 | 1.1 | 1.1 | 10.6 | 44.7 | 42.6 |
| | Non-Indigenous | 0.7 | 1.4 | 5.1 | 53.7 | 39.1 | 0.7 | 1.5 | 4.9 | 55.1 | 37.8 |
| **Total** | **Indigenous** | **1.3** | **3.1** | **6.3** | **53.1** | **36.3** | **1.8** | **1.2** | **10.1** | **47.0** | **39.9** |
| | **Non-Indigenous** | **0.7** | **1.5** | **5.0** | **53.4** | **39.5** | **0.6** | **1.6** | **5.1** | **55.4** | **37.4** |
| **Total** | **All** | **0.7** | **1.5** | **5.0** | **53.4** | **39.5** | **0.6** | **1.6** | **5.1** | **55.3** | **37.4** |

*Data incomplete: n = 1,105*
*SEIFA index of relative socio-economic advantage and disadvantage index quintiles:*
*1 = lowest socioeconomic status, 5 = highest socioeconomic status*



## Table 91: Correlation of socio-economic status of women giving birth with birthweight and Indigenous status, Queensland 2010 to 2011 *(percentages are of SEIFA/Indigenous status groups)*

| | | SEIFA index quintile 1 | | | | SEIFA index quintile 2 | | | | SEIFA index quintile 3 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Birthweight (g) | | 999 or less | 1000–2499 | 2500–3999 | 4000 or more | 999 or less | 1000–2499 | 2500–3999 | 4000 or more | 999 or less | 1000–2499 | 2500–3999 | 4000 or more |
| Year | Indigenous status | | | | | | | | | | | | |
| 2010 | Indigenous | 1.9 | 11.6 | 79.4 | 7.1 | 1.8 | 9.1 | 79.6 | 9.5 | 1.9 | 9.5 | 79.0 | 9.6 |
| | Non-Indigenous | 1.1 | 6.4 | 79.8 | 12.7 | 0.9 | 6.1 | 79.4 | 13.7 | 0.9 | 5.5 | 80.4 | 13.2 |
| 2011 | Indigenous | 1.6 | 11.8 | 79.0 | 7.6 | 2.0 | 8.7 | 79.8 | 9.5 | 1.1 | 9.7 | 78.2 | 10.9 |
| | Non-Indigenous | 1.0 | 5.9 | 80.1 | 13.1 | 0.9 | 6.0 | 80.4 | 12.8 | 0.9 | 5.4 | 80.6 | 13.1 |
| **Total** | **Indigenous** | **1.8** | **11.7** | **79.2** | **7.3** | **1.9** | **8.9** | **79.7** | **9.5** | **1.5** | **9.6** | **78.6** | **10.3** |
| | **Non-Indigenous** | **1.0** | **6.1** | **79.9** | **12.9** | **0.9** | **6.0** | **79.9** | **13.2** | **0.9** | **5.5** | **80.5** | **13.2** |
| **Total** | **All** | **1.2** | **7.1** | **79.8** | **12.0** | **0.9** | **6.2** | **79.9** | **13.0** | **0.9** | **5.7** | **80.4** | **13.0** |

| | | SEIFA index quintile 4 | | | | SEIFA index quintile 5 | | | |
|---|---|---|---|---|---|---|---|---|---|
| Birthweight (g) | | 999 or less | 1000–2499 | 2500–3999 | 4000 or more | 999 or less | 1000–2499 | 2500–3999 | 4000 or more |
| Year | Indigenous status | | | | | | | | |
| 2010 | Indigenous | 1.4 | 8.2 | 79.2 | 11.1 | 2.7 | 8.1 | 78.4 | 10.8 |
| | Non-Indigenous | 0.8 | 5.2 | 81.9 | 12.1 | 0.7 | 5.8 | 81.9 | 11.6 |
| 2011 | Indigenous | 0.7 | 10.5 | 75.9 | 12.9 | 0.0 | 15.6 | 72.9 | 11.5 |
| | Non-Indigenous | 0.7 | 5.7 | 81.6 | 11.9 | 0.8 | 5.7 | 82.0 | 11.5 |
| **Total** | **Indigenous** | **1.1** | **9.4** | **77.5** | **12.0** | **1.2** | **12.4** | **75.3** | **11.2** |
| | **Non-Indigenous** | **0.8** | **5.5** | **81.7** | **12.0** | **0.8** | **5.7** | **82.0** | **11.5** |
| **Total** | **All** | **0.8** | **5.6** | **81.7** | **12.0** | **0.8** | **5.8** | **81.9** | **11.5** |

*Data incomplete: n = 1,256*
*SEIFA index of relative socio-economic advantage and disadvantage index quintiles:*
*1 = lowest socioeconomic status, 5 = highest socioeconomic status*

## Table 92: Correlation of socio-economic status of women giving birth with perinatal outcome and Indigenous status, Queensland 2010 to 2011 (rates are calculated within SEIFA/Indigenous status groups)

| | SEIFA index quintile 1 | | | | SEIFA index quintile 2 | | | | SEIFA index quintile 3 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Perinatal outcome** | **Alive** | **SBR** | **NMR** | **PNMR** | **Alive** | **SBR** | **NMR** | **PNMR** | **Alive** | **SBR** | **NMR** | **PNMR** |
| **Indigenous** | 982.8 | 9.0 | 8.3 | 17.2 | 978.2 | 10.9 | 11.0 | 21.8 | 984.8 | 9.9 | 5.3 | 15.2 |
| **Non-Indigenous** | 988.3 | 7.9 | 3.9 | 11.7 | 989.0 | 7.7 | 3.3 | 11.0 | 990.5 | 5.9 | 3.6 | 9.5 |
| **Total** | **987.4** | **8.0** | **4.6** | **12.6** | **988.2** | **7.9** | **3.9** | **11.8** | **990.2** | **6.1** | **3.7** | **9.8** |

| | SEIFA index quintile 4 | | | | SEIFA index quintile 5 | | | |
|---|---|---|---|---|---|---|---|---|
| **Perinatal outcome** | **Alive** | **SBR** | **NMR** | **PNMR** | **Alive** | **SBR** | **NMR** | **PNMR** |
| **Indigenous** | 987.6 | 7.1 | 5.3 | 12.4 | 1,000.0 | 0.0 | 0.0 | 0.0 |
| **Non-Indigenous** | 991.8 | 5.3 | 2.9 | 8.2 | 991.7 | 5.4 | 2.9 | 8.3 |
| **Total** | **991.7** | **5.3** | **3.0** | **8.3** | **991.8** | **5.3** | **2.9** | **8.2** |

*Alive = alive at discharge, SBR = stillbirth rate per 1000 babies*
*NMR = neonatal mortality rate per 1000 liveborn babies, PNMR = perinatal deaths per 1000 babies*
*SEIFA index of relative socio-economic advantage and disadvantage index quintiles:*
*1 = lowest socioeconomic status, 5 = highest socioeconomic status*

## Table 93: ICD–10 detail of anomaly groups used in this report
*(reporting is from the pregnancy and newborn period only)*

| ICD–10 code | Anomaly description |
|---|---|
| **Chromosome abnormalities** | |
| Q90 | Down's syndrome |
| Q91 | Edwards' syndrome and Patau's syndrome |
| Q92 | Other trisomies and partial trisomies of the autosomes, not elsewhere classified |
| Q93 | Monosomies and deletions from the autosomes, not elsewhere classified |
| Q95 | Balanced rearrangements and structural markers, not elsewhere classified |
| Q96 | Turner's syndrome |
| Q97 | Other female sex chromosome abnormalities, not elsewhere classified |
| Q98 | Other male sex chromosome abnormalities, not elsewhere classified |
| Q99 | Other chromosome abnormalities, not elsewhere classified |
| **Neural tube defects** | |
| Q00 | Anencephaly and similar malformations |
| Q01 | Encephalocele |
| Q05 | Spina bifida |
| **Other congenital malformations of nervous system** | |
| Q02 | Microcephaly |
| Q03 | Congenital hydrocephalus |
| Q04 | Other congenital malformations of brain |
| Q06 | Other congenital malformations of spinal cord |
| Q07 | Other congenital malformations of nervous system |
| **Congenital malformations of eyes, ears, face and neck** | |
| Q10 | Congenital malformations of eyelid, lacrimal apparatus and orbit |
| Q11 | Anophthalmos, microphthalmos and macrophthalmos |
| Q12 | Congenital lens malformations |
| Q13 | Congenital malformations of anterior segment of eye |
| Q14 | Congenital malformations of posterior segment of eye |
| Q15 | Other congenital malformations of eye |
| Q16 | Congenital malformations of ear causing impairment of hearing |
| Q17 | Other congenital malformations of ear |
| Q18 | Other congenital malformations of face and neck |

Table 93: ICD–10 detail of anomaly groups used in this report *continued*

| | |
|---|---|
| **Congenital malformations of heart** | |
| Q20 | Congenital malformations of cardiac chambers and connections |
| Q21 | Congenital malformations of cardiac septa |
| Q22 | Congenital malformations of pulmonary and tricuspid valves |
| Q23 | Congenital malformations of aortic and mitral valves |
| Q24 | Other congenital malformations of heart |
| **Congenital malformations of vascular system** | |
| Q25 | Congenital malformations of great arteries |
| Q26 | Congenital malformations of great veins |
| Q27 | Other congenital malformations of peripheral vascular system |
| Q28 | Other congenital malformations of circulatory system |
| **Congenital malformations of respiratory system and airways** | |
| Q30 | Congenital malformations of nose |
| Q31 | Congenital malformations of larynx |
| Q32 | Congenital malformations of trachea and bronchus |
| Q33 | Congenital malformations of lung |
| Q34 | Other congenital malformations of respiratory system |
| **Congenital malformations of tongue, mouth and pharynx** | |
| Q35 | Cleft palate |
| Q36 | Cleft lip |
| Q38 | Other congenital malformations of tongue, mouth and pharynx |
| **Congenital malformations of gastro-intestinal tract** | |
| Q39 | Congenital malformations of oesophagus |
| Q40 | Other congenital malformations of upper alimentary tract |
| Q41 | Congenital absence, atresia and stenosis of small intestine |
| Q42 | Congenital absence, atresia and stenosis of large intestine |
| Q43 | Other congenital malformations of intestine |
| Q44 | Congenital malformations of gallbladder, bile ducts and liver |
| Q45 | Other congenital malformations of digestive system |
| **Congenital malformations of genital organs** | |
| Q50 | Congenital malformations of ovaries, fallopian tubes and broad ligaments |
| Q51 | Congenital malformations of uterus and cervix |
| Q52 | Other congenital malformations of female genitalia |
| Q53 | Undescended testicle |
| Q54 | Hypospadias |
| Q55 | Other congenital malformations of male genital organs |
| Q56 | Indeterminate sex and pseudohermaphroditism |
| **Congenital malformations of kidneys and urinary system** | |
| Q60 | Renal agenesis and other reduction defects of kidney |
| Q61 | Cystic kidney disease |
| Q62 | Congenital obstructive defects of renal pelvis and congenital malformations of ureter |
| Q63 | Other congenital malformations of kidney |
| Q64 | Other congenital malformations of urinary system |

Table 93: ICD–10 detail of anomaly groups used in this report *continued*

| | |
|---|---|
| **Congenital musculoskeletal deformities** | |
| Q65 | Congenital deformities of hip |
| Q66 | Congenital deformities of feet |
| Q67 | Congenital musculoskeletal deformities of head, face, spine and chest |
| Q68 | Other congenital musculoskeletal deformities |
| Q69 | Polydactyly |
| Q70 | Syndactyly |
| Q71 | Reduction defects of upper limb |
| Q72 | Reduction defects of lower limb |
| Q73 | Reduction defects of unspecified limb |
| Q74 | Other congenital malformations of limb(s) |
| Q75 | Other congenital malformations of skull and face bones |
| Q76 | Congenital malformations of spine and bony thorax |
| Q77 | Osteochondrodysplasia with defects of growth of tubular bones and spine |
| Q78 | Other osteochondrodysplasias |
| Q79 | Congenital malformations of the musculoskeletal system, not elsewhere classified |
| **Congenital malformations of skin and breast** | |
| Q80 | Congenital ichthyosis |
| Q81 | Epidermolysis bullosa |
| Q82 | Other congenital malformations of skin |
| Q83 | Congenital malformations of breast |
| Q84 | Other congenital malformations of integument |
| **Other congenital malformations, not elsewhere classified** | |
| Q85 | Phakomatoses, not elsewhere classified |
| Q86 | Congenital malformation syndromes due to known exogenous causes, not elsewhere classified |
| Q87 | Other specified congenital malformation syndromes affecting multiple systems |
| Q89 | Other congenital malformations, not elsewhere classified |

Table 94: Perinatal care indicators by hospital group, Queensland 2010 to 2011

| Perinatal care indicators | Facility group | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | A | B | C | D | E | F | G | H | Total |
| | Specialist obstetrics, feto-maternal medicine, neonatal intensive care unit | Specialist obstetrics, special care nursery, >2000 births/year | Specialist obstetrics, special care nursery, <2000 births/year | Non-specialist obstetrics, generalist neonatal care, >250 births/year | Non-specialist obstetrics, generalist neonatal care, <250 births/year | Birth centres | Private hospital maternity and newborn services | Home births | |
| **Proportion (%) of selected primigravidae having a caesarean section birth*** | | | | | | | | | |
| | 23.9 | 19.3 | 21.4 | 20.0 | 21.0 | NR | 39.4 | NR | 27.5 |
| **Proportion (%) of selected primigravidae achieving unassisted vaginal birth*** | | | | | | | | | |
| | 52.7 | 62.1 | 60.3 | 63.7 | 62.7 | 99.7 | 35.6 | 100.0 | 51.2 |
| **Proportion (%) of caesarean sections performed without labour in all women giving birth** | | | | | | | | | |
| | 17.4 | 13.8 | 15.6 | 12.7 | 10.2 | NR | 34.7 | NR | 20.6 |
| **Proportion (%) of elective births (inductions of labour and caesarean sections without labour in all women giving birth) occurring before 38 completed weeks gestation** | | | | | | | | | |
| | 41.5 | 36.3 | 37.5 | 26.0 | 27.1 | 14.3 | 48.7 | NR | 42.1 |
| **Proportion (%) of all women giving birth whose previous pregnancy ended in a first caesarean section who achieved a vaginal birth (i.e. successful VBAC)** | | | | | | | | | |
| | 20.6 | 24.7 | 23.3 | 16.0 | 19.2 | NR | 7.4 | 100.0 | 16.4 |
| **Proportion (%) of selected primigravidae labouring spontaneously and achieving unassisted vaginal birth without episiotomy and without third/fourth degree perineal tear*** | | | | | | | | | |
| | 36.1 | 45.5 | 40.9 | 48.7 | 49.1 | 93.1 | 18.5 | 87.5 | 34.2 |
| **Proportion (%) of all women giving birth labouring spontaneously and achieving unassisted vaginal birth without episiotomy and without third/fourth degree perineal tear** | | | | | | | | | |
| | 38.9 | 48.7 | 45.1 | 54.1 | 59.3 | 95.8 | 20.3 | 97.4 | 39.1 |

** Selected primigravida = mothers age group 20–34 years, no previous births, singleton birth in current pregnancy, 37 weeks + 0 days to 40 weeks + 6 days completed weeks of gestation, cephalic/vertex presentation at birth (NR = not relevant)*

## 6. Data sources used in this report

Pregnancy, birth and neonatal data collected between 2000 and 2011 was sourced from the PDCT and prepared by Ms Vesna Dunne, Principal Statistical Output Officer Health Statistics Unit, Department of Health. This data was further analysed and collated by Professor Michael Humphrey, Chair of the Council.

Previous reports by this Council and the Queensland Council on Obstetric and Paediatric Morbidity and Mortality (QCOPMM) were sources of data regarding maternal and perinatal deaths between 1988 and 2003, as were AIHW reports on maternal deaths in Australia.

# Appendix 1:
## IMPROVE program

Perinatal Mortaltiy Group
www.psanz.com.au

www.stillbirthalliance.org.au

The Perinatal Society of Australia and New Zealand (PSANZ) has developed *Clinical Practice Guidelines for Perinatal Mortality* to improve standards in clinical practice around the time of a perinatal deaths. The Australian and New Zealand Stillbirth Alliance (ANZSA) in collaboration with the PSANZ Perinatal Mortality Group has developed the IMPROVE educational program for maternity healthcare professionals to enhance the uptake of these guidelines. IMPROVE uses the *Structured, clinical, objective, referenced, problem-orientated, integrated and organised (SCORPIO) educational model* designed for skills training (ref) which involves small groups of learners rotating around six interactive learning stations that are each facilitated by an experienced educator.

**IMPROVE includes:**

- a short introductory lecture
- six learning stations
- formative assessment.

(Workshops are four hours in duration and are delivered by trained educators).

**Learning stations:**

- Communicating with parents about perinatal autopsy.
- Autopsy and placental examination.
- Investigation of perinatal deaths.
- Examination of babies who die in the perinatal period.
- Audit and classification of perinatal deaths.
- Psychological and social aspects of perinatal bereavement.

**Who should attend?**

The workshops are designed for healthcare professionals, including

- obstetricians
- midwives
- neonatal nurses
- neonatologists
- pathologists
- bereavement specialists
- social workers
- or those interested from a policy or public health perspective.

IMPROVE workshops provide an opportunity for participants to understand the guidelines in an interactive way.

**IMPROVE program materials**

A booklet of program materials is provided for each participant covering key aspects of the guidelines and other relevant documentation specific to that region. A certificate of completion is provided at the end of the program. This activity is endorsed with four MidPlus points from the Australian College of Midwives. Eligible fellows of RANZCOG can claim three Continuing Professional Development points in the Practice Review and Clinical Risk Management category and one meeting point.

**Queensland IMPROVE**

To date, IMPROVE has trained over 1200 healthcare professionals across Australia and New Zealand.

In Queensland, the program is overseen by the Perinatal Mortality Sub-Committee of the Council For further information contact Vicki Flenady, vflenady@mmri.mater.org.au

**To arrange an IMPROVE workshop contact the national IMPROVE coordinator:**

IMPROVE coordinator
ANZSA Coordinating Centre
Translating Research Into Practice Centre
Mater Medical Research Institute
T: +61 7 3163 2119
E: info@stillbirthalliance.org.au

# Appendix 2:
## Investigating the causes of stillbirth: a NHMRC funded study

### Background

Stillbirth is a common adverse pregnancy outcome which can have devastating long-term effects. Stillbirth rates have not decreased in over 20 years. Many stillbirths are not appropriately investigated resulting in erroneous data on causation and lack of focus for prevention strategies—up to one-third are classified as unexplained.

Inadequate investigation of stillbirths is driven by a lack of evidence for test performance and costs. National guidelines from the Perinatal Society of Australia and New Zealand (PSANZ) recommend a comprehensive approach to investigating all stillbirths, including autopsy examination. However, uptake into practice is low due to clinician uncertainty about the benefits and consent is also a major limiting factor. This specifically relates to autopsy; an expensive and an intrusive procedure for parents.

While autopsy is deemed the gold standard investigation, there is limited data on its value across the spectrum of stillbirths and autopsy rates have declined below the recommended rate in many regions in Australia. The loss of important information when an autopsy is not performed can affect the quality of future pregnancy counselling and impede further reduction in the incidence of stillbirth.

The Australian and New Zealand Stillbirth Alliance (ANZSA) (www.stillbirthalliance.org.au) has received an NHMRC project grant for a detailed study on investigation of stillbirths which aims to address the call for better data on the causes of stillbirths from the NHMRC maternity services review and *The Lancet Stillbirth Series*[30].

### Study aims

The large scale prospective cohort study across maternity hospitals in Australia, including singleton stillbirths, will identify causes of stillbirths in a large well-investigated cohort and improve the quality of data on stillbirths across Australia through identifying a cost-effective, evidence-based approach to stillbirth investigations. Following investigation, and multidisciplinary review at the hospital according to national guidelines, data will be submitted to the main coordinating centre. We are planning to include data from clinical audit of 900 stillbirths across at least 20 Tertiary and Level 2 hospitals over a three-year study period. Cost-effectiveness analysis will be undertaken comparing a comprehensive versus selective approach according to presenting scenario.

The study also provides the opportunity of piloting the National Perinatal Clinical Audit Tool which, in Queensland, is supported by the Queensland Maternal Perinatal Quality Council and the Perinatal Data Collection Unit.

### Study procedure at hospitals

Prior to commencement of the study, an educational program 'Improving perinatal mortality review and outcomes via education' (IMPROVE)[31] will be provided for staff at participating hospitals. The program covers all aspects of the *PSANZ Perinatal Mortality Guidelines*[32] and has a major focus on investigation and audit of stillbirths. We ask that all key staff (targeting senior midwives and registrars) caring for women around the time of a stillbirth attend the IMPROVE workshop and that investigation, audit and classification is conducted according to the guidelines as routine for all stillbirths, including completion of the recommended case summary form. This form will be available as a web-based application for the purposes of this study. Following local mortality committee review, hospitals are asked to submit the case summary form electronically to the main coordinating centre at the Mater Medical Research Institute. Individual hospital reports can be obtained from the database for submitted cases in order to assist hospitals with their routine mortality audit reporting. Human Research Ethics review has allowed a waiver of the need for consent from parents due to the audit nature of the study. Each stillbirth will be assigned a unique study indentifier prior to electronic submission, allowing for cases to be submitted with de-identified data. This dataset will also have all names and addresses relating to the case removed and date of birth replaced with year of birth.

30 The Lancet Stillbirth Series is available free at: www.lancet.com/series/stillbirth
31 Refer to the ANZSA website for more details: www.stillbirthalliance.org.au/education.htm
32 *PSANZ Perinatal Mortality Guidelines* Chapter 2 under *Perinatal Mortality Group* on the PSANZ website: www.psanz.org.au

For further information contact:

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T: (07) 3163 1592
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**Participating Queensland facilities and lead clinicians:**

- Cairns Base Hospital, Philippa Cuttance
- Gold Coast Hospital, Anne Sneddon
- Ipswich Hospital, Kassam Mahomed
- Mater Mothers' Hospital, Glenn Gardener, Dr Lucy Cooke and Trish Wilson
- Logan Hospital, Janet Draper
- Nambour Hospital, Ted Weaver
- Royal Brisbane and Women's Hospital, Yogesh Chadha
- Toowoomba Hospital, Bronwyn Brabrook and Linda Brook
- Townsville Hospital, David Watson and Anne-Marie Lawrence

# Appendix 3:
## Statewide maternity and neonatal clinical network (SMNCN)

The Council has a close working relationship with the SMNCN and views that body as the peak clinical body in Queensland for maternity and newborn care. The *Queensland Maternity and Neonatal Clinical Guidelines Program* (QMNCPG), established by Queensland clinicians, and working also in close partnership with both the SMNCN and the Council, has an effective program of developing clinical guidelines with further work progressing on implementation and evaluation of health outcomes and healthcare research. Guidelines may be accessed at **www.health.qld.gov.au**

Table 95: Clinical Practice Guidelines published by QMNCGP as at June 2013

| **Maternity clinical guideline titles** |
|---|
| Early pregnancy loss |
| Early onset Group B streptococcal disease |
| Hypertensive disorders of pregnancy |
| Induction of labour |
| Intrapartum fetal surveillance |
| Normal birth |
| Obesity |
| Perineal care |
| Preterm labour |
| Primary postpartum haemorrhage |
| Stillbirth care |
| Therapeutic termination of pregnancy |
| Vaginal birth after caesarean section |
| Venous thromboembolism prophylaxis |
| **Newborn clinical guideline titles** |
| Breastfeeding initiation |
| Examination of the newborn |
| Hypoglycaemia - neonatal |
| Hypoxic ischaemic encephalopathy |
| Jaundice - neonatal |
| Neonatal abstinence syndrome |
| Respiratory distress and the administration of Continuous Positive Airways Pressure (CPAP |
| Neonatal hypoglycaemia |
| Seizures - neonatal |
| Stabilisation for retrieval - neonatal |
| Term small for gestational age baby |
| **Operational framework titles** |
| Maternity shared care |
| Non-urgent referral for antenatal care |

# Appendix 4:
## Australasian maternity outcomes surveillance system (AMOSS)

The *Queensland Maternal and Perinatal Quality Council 2011 report* noted that:

> *examination of issues relating to severe maternal morbidity is challenging due to definitional and reporting issues. Council believes that the current AMOSS, which is a national program studying rare and serious conditions complicating pregnancy and childbirth, is the most effective means of such review at this time.*

The AMOSS is described as:

> *a national surveillance mechanism designed to study a variety of rare or serious conditions in pregnancy, childbirth and the post natal phase. Through translating the findings from these studies into reliable evidence-based practice, the aim of AMOSS is to improve the safety and quality of maternity care in Australia and New Zealand.*

The AMOSS objectives are to:

- improve the knowledge of rare obstetric disorders and their management in Australia
- develop and implement a national network of collaborators
- undertake national research of rare obstetric disorders evident during pregnancy and puerperium
- translate research findings into policy, clinical guidelines and education resources for the multidisciplinary workforce.

The flexibility of the AMOSS design allows the project to respond rapidly to emergent issues. The Influenza H1N1 outbreak in 2009 is a case in point, where findings from the AMOSS study allowed care modification and risk reduction for pregnant women by the time that this infection reached the northern hemisphere in significant numbers.

The projects undertaken by AMOSS to date are shown in Table 91. The Queensland Maternal and Perinatal Quality Council is supportive of the AMOSS project and its methodologies, looks forward to the outcomes of the studies as they are completed, and hopes that clinical lessons learned from the AMOSS projects will improve outcomes for pregnant women and their babies.



Table 96: AMOSS projects commenced in the period 2009 to 2012

| |
|---|
| Influenza H1N1 with Intensive Care Admission |
| Morbid obesity (body mass index ›50) |
| Influenza A with intensive care admission |
| Eclampsia |
| Placenta accreta |
| Peripartum hysterectomy |
| Antenatal pulmonary embolism |
| Amniotic fluid embolism |
| Rheumatic heart disease |
| Gestational breast cancer |
| Vasa praevia |

# Appendix 5:
## Membership of the Queensland Maternal and Perinatal Quality Council, 2011–2013

| Queensland Maternal and Perinatal Quality Council | |
|---|---|
| Professor Michael Humphrey (Chair) | Clinical Advisor, Office of Rural and Remote Health<br>Senior Medical Coordinator (Obstetrics), Retrieval Services Queensland |
| Professor Leonie Callaway | Staff Specialist, Internal and Obstetric Medicine, Royal Brisbane and Women's Hospital<br>Professor and Head, Northern Academic Cluster, School of Medicine, The University of Queensland |
| Associate Professor Robert Cincotta (to February 2012) | Director, Queensland Ultrasound for Women |
| Cheryl Clayton | Director of Clinical Services, Mater Private Hospital, Redland |
| Professor Paul Colditz | Director, Perinatal Research Centre, The University of Queensland |
| Helen Coxhead (to November 2012) | Midwifery Unit Manager, The Townsville Hospital |
| Associate Professor Vicki Flenady | Director, Translating Research Into Practice Centre<br>Program Head, Mothers' and Babies Theme, Mater Medical Research Institute |
| Rebecca Jenkinson | Nominee, Queensland Consumer Council |
| Associate Professor Rebecca Kimble | Clinical Director, Obstetric Services, Royal Brisbane and Women's Hospital |
| Professor Sue Kildea | Director, Midwifery Research Unit, Australian Catholic University and Mater Mothers' Hospital Mater Medical Research Institute (MMRI |
| Dr David Knight | Director, Neonatology, Mater Mother's Hospital |
| Jonelle Mayers (to December 2012) | Nurse Unit Manager, Special Care Baby Unit, Cairns Base Hospital |
| Dr Ian Mottarelly | Senior Medical Officer, Gympie Hospital |
| Associate Professor Julie McGaughran | Director, Genetic Health Queensland |
| Dr Diane Payton | Staff Anatomical Pathologist, Pathology Queensland |
| Dr Peter Schmidt | Senior Medical Officer, Paediatrics, Gold Coast Hospital |
| Dr Renuka Sekar | Staff Specialist Obstetrics—Maternal and Fetal Medicine, Royal Brisbane and Women's Hospital |
| Dr Mary Sidebotham (to April 2013) | Lecturer, B Mid. School of Nursing and Midwifery, Griffith University |
| Dr Nikki Whelan | Obstetrician and Gynaecologist (Private Practice), Brisbane |

| Maternal Mortality Sub-Committee | |
|---|---|
| Dr Nikki Whelan (Chair) | Obstetrician and Gynaecologist (Private Practice), Brisbane |
| Professor Leonie Callaway | Staff Specialist, Internal and Obstetric Medicine, Royal Brisbane and Women's Hospital |
| Dr Robert Cardwell (consulting member) | Deputy Medical Director (Southern Operations), Retrieval Services Queensland<br>Staff Specialist, Emergency Medicine, Royal Brisbane and Women's Hospital |
| Associate Professor Rob Cincotta (consulting member) | Director, Queensland Ultrasound for Women |
| Helen Coxhead (to November 2012) | Manager, Midwifery Unit, Townsville Hospital |
| Dr Nathan Milne | Forensic Pathologist, Forensic and Scientific Services |
| Dr Ian Mottarelly | Senior Medical Officer, Gympie Hospital |
| Dr Peter Harms | Director, Anaesthesia, Mater Mothers' Hospital, Mater Health Services |
| Dr Mary Sidebotham (to April 2013) | Lecturer, B Mid. School of Nursing and Midwifery, Griffith University |
| Dr William Parsonage | Staff Specialist, Cardiology, Royal Brisbane and Women's Hospital |
| Dr Sally Matheson | Staff Psychiatrist, Consultation Liaison Psychiatry, Royal Brisbane and Women's Hospital |
| Dr Rebecca Williams | Forensic Pathologist, Forensic and Scientific Services |

| Perinatal Mortality Sub-Committee | |
|---|---|
| Associate Professor Vicki Flenady (Co-chair) | Director, Translating Research Into Practice Centre<br>Program Head, Mothers' and Babies Theme. Mater Medical Research Institute |
| Joanne Ellerington | Principal Data Collections Officer, Health Statistics Unit, Department of Health |
| Dr David Cartwright | Director, Neonatology, Royal Brisbane and Women's Hospital |
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| Paul Gardiner (to May 2013) | IMPROVE Coordinator |
| Rebecca Jenkinson | Nominee, Queensland Consumer Council |
| Dr David Knight | Director, Neonatology, Mater Health Services |
| Dr Helen Liley | Senior Staff Specialist, Neonatology, Mater Health Services |
| Dr Rohan Lourie | Consultant Pathologist, Mater Health Services |
| Dr Kassam Mahomed | Senior Staff Specialist, Ipswich Hospital |
| Melanie McKenzie | Nominee, Queensland Consumer Council |
| Dr Diane Payton | Staff Anatomical Pathologist, Pathology Queensland |
| Teresa Walsh | Caseload Midwife |
| Dr Nikki Whelan | Consultant Obstetrician Gynaecologist |
| Dr Paul Woodgate | Senior Staff Specialist, Neonatology, Mater Health Services |

| Congenital Anomaly Sub-Committee | |
|---|---|
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| Dr Diane Payton | Staff Anatomical Pathologist, Pathology Queensland |
| Dr Renuka Sekar | Staff Specialist Obstetrics—Maternal and Fetal Medicine, Royal Brisbane and Women's Hospital |

| Editorial Sub-Committee | |
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| Secretariat | |
|---|---|
| Andrea Chitakis | Clinical Access and Redesign Unit, Health Service and Clinical Innovation Division, Department of Health |

## Abbreviations

| | |
|---|---|
| ABS | Australian Bureau of Statistics |
| AID | Artificial insemination - donor |
| AIH | Artificial insemination - husband |
| AIHW | Australian Institute of Health and Welfare |
| AMOSS | Australasian Maternity Outcomes Surveillance System |
| ANZSA | Australian and New Zealand Stillbirth Alliance |
| ARIA | Accessibility/Remoteness Index of Australia |
| BMI | body mass index |
| CA | congenital anomaly |
| CHD | congenital heart disease |
| COAG | Council of Australian Governments |
| EPDS | Edinburgh Postnatal Depression Score |
| FGR | Fetal growth restriction |
| g | gram |
| HELLP | Haemolysis, elevated liver enzymes, low platelet count |
| HLHS | Hypoplastic Left Heart Syndrome |
| ICD-10 | International Classification of Diseases, version 10 |
| IMPROVE | IMproving Perinatal Review and Outcomes Via Education |
| MMR | maternal mortality ratio |
| NHMRC | National Health and Medical Research Council |
| NICU | neonatal intensive care unit |
| NMR | Neonatal mortality rate |
| NPDC | National Perinatal Data Collection |
| NPDCAT | National Perinatal Death Clinical Audit Tool |
| NPESU | (AIHW) National Perinatal Epidemiology and Statistics Unit |
| PA | Pulmonary Atresia |
| PDCT | Perinatal Data Collection Team |
| PMMRC | Perinatal Maternal Mortality Review Committee, New Zealand |
| PNMR | Perinatal mortality rate |
| PSANZ | Perinatal Society of Australia and New Zealand |
| PSANZ-NDC | Perinatal Society of Australia and New Zealand Neonatal Death Classification |
| PSANZ-PDC | Perinatal Society of Australia and New Zealand Perinatal Death Classification |
| QCOPMM | Queensland Council on Obstetric and Paediatric Morbidity and Mortality |
| QMNCPG | Queensland Maternity and Neonatal Clinical Guidelines Program |
| QMPQC | Queensland Maternal and Perinatal Quality Council (also noted as ‘the Council’) |
| QHAPDC | Queensland Hospital Admitted Patient Data Collection |
| QPDC | Queensland Perinatal Data Collection |
| RANZCOG | Royal Australian and New Zealand College of Obstetricians and Gynaecologists |
| RR | relative risk |
| SBR | Stillbirth rate |
| SCN | special care nursery |
| SEIFA | Socio-economic Indexes for Areas |
| SIDS | Sudden infant death syndrome |
| SMNCN | Statewide Maternity and Neonatal Clinical Network |
| TGA | Transposition of the Great Arteries |
| ToF | Tetralogy of Fallot |
| top | termination of pregnancy |
| VBAC | Vaginal birth after caesarean section |
| WHO | World Health Organization |

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# Maternal and Perinatal Mortality and Morbidity in Queensland

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