

Maternal and Perinatal Mortality and Morbidity in Queensland

Queensland Maternal and Perinatal Quality Council Report 2011



Maternal and Perinatal Mortality and Morbidity in Queensland

Queensland Maternal and Perinatal Quality Council Report 2011

Contact details for further information

All correspondence should be addressed to:
The Secretariat
Queensland Maternal and Perinatal Quality Council
Maternity Unit, Primary, Community and Extended Care Branch
Queensland Health
GPO Box 48
BRISBANE QLD 4001
Ph: (07) 3235 9460
Email: QMPQC@health.qld.gov.au

Report author:

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

ISBN 978-1-921707-40-7

© State of Queensland (Queensland Health) 2011



This work is licensed under a Creative Commons Attribution Non-Commercial No Derivatives 2.5 Australia licence. In essence, you are free to copy and communicate the work in its current form for non-commercial purposes, as long as you attribute Queensland Maternal and Perinatal Quality Council, Queensland Health and abide by the licence terms. You may not alter or adapt the work in any way. To view a copy of this licence, visit <http://creativecommons.org/licenses/by-nc-nd/2.5/au/>.

For permissions beyond the scope of this licence contact: Intellectual Property Officer, Queensland Health, GPO Box 48, Brisbane Qld 4001, email ip_officer@health.qld.gov.au, phone (07) 3234 1479.

Preface

The Queensland Maternal and Perinatal Quality Council was established pursuant to, and functions under, the quality assurance provisions of sections 30-38 of the *Health Services Act 1991*, which provides members with legislative protection and enables the Council to undertake confidential enquiries into maternal and perinatal morbidity and mortality. The primary purpose of the Council is to provide advice and make recommendations to the Director-General and the Minister for Health, through the Patient Safety and Quality Executive Committee, on matters relating to statewide and facility-specific morbidity and mortality.

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

- reviews maternal deaths in the period 2004 to 2008 in Queensland
- reviews perinatal deaths in the period 2000 to 2009 in Queensland
- examines pregnancy and newborn outcomes in the decade 2000 to 2009 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 Unit (PDCU)
- Health Statistics Centre (HSC)
- Australian Institute of Health and Welfare (AIHW)
- Registry of Births, Deaths and Marriages
- Office of the State Coroner.

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 the Council's key findings.

Queensland 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, and I hope you find it interesting and informative.

Dr Michael Daly
Acting Chief Executive Officer
Centre for Healthcare Improvement



Contents

page

Preface	1
List of figures	3
List of tables	4
Introduction	6
Executive summary	7
Recommendations	9
Maternal mortality	9
Perinatal mortality	9
Pregnancy outcomes	10
1.0 Maternal and perinatal mortality	10
1.1 Definitions	10
1.2 Maternal deaths	11
1.2.1 Maternal mortality ratio (MMR)	11
1.2.2 Classification of cause of maternal deaths 2004 to 2008	12
1.2.3 Cause of maternal death	12
1.2.4 Avoidability	13
1.2.5 Data collection and quality	13
1.2.6 Cardiovascular disease	14
1.2.7 Suicide	14
1.2.8 Autopsies following maternal death	16
1.3 Perinatal deaths	16
1.3.1 Perinatal mortality review modus operandi	16
1.3.2 Clinical classification	16
1.3.3 Data collection and data quality	16
1.3.4 Perinatal mortality rates and trends	17
1.3.5 PSANZ Perinatal Death Classification (PSANZ-PDC and PSANZ-NDC) of perinatal deaths	19
1.3.6 Multiple pregnancy	22
1.3.7 Indigenous perinatal mortality	22
1.3.8 Gestational age and birth weight specific perinatal mortality rates	23
1.3.9 Perinatal autopsies	27
2.0 Pregnancy and newborn care	28
2.1 Care mode	28
2.2 Home birth	29
2.3 Maternal age	29
2.4 Gestation at birth	33
2.5 Birth weight	38
2.6 Multiple pregnancies	39
2.7 Assisted conception	40
2.8 Onset of labour	42
2.9 Mode of birth	45
2.10 Effect of previous pregnancy on mode of birth	49
2.11 Effect of previous caesarean section on mode of birth	50
2.12 Indigenous mothers and their babies	50
3.0 Ad hoc reviews	55
3.1 Indigenous maternity and newborn indicators	55
3.2 Maternity and neonatal care incidents	57
4.0 Statewide Maternity and Neonatal Clinical Network	60
4.1 Queensland Maternity and Neonatal Clinical Guidelines Program	60
Data tables	62
Data sources used in this report	86
Membership of the Queensland Maternal and Perinatal Quality Council 2009 to 2010	87
Acknowledgments	88

List of figures

page

Figure 1: Perinatal mortality rates, Queensland 1988 to 2009	18
Figure 2: Perinatal death by PSANZ-PDC classification, Queensland 2000 to 2008	20
Figure 3: Stillbirths by PSANZ-PDC classification, Queensland 2000 to 2008	20
Figure 4: Neonatal deaths by PSANZ-PDC classification, Queensland 2000 to 2008	21
Figure 5: Perinatal, stillbirth and neonatal mortality rates by gestation, Queensland 2000 to 2008.....	24
Figure 6: Perinatal, stillbirth and neonatal mortality rates by birth weight, Queensland 2000 to 2008.....	25
Figure 7: Perinatal autopsies by type of death, Queensland 2000 to 2008	27
Figure 8: Number of births in Queensland 2000 to 2009, by care provider	28
Figure 9: Percentage of women accessing Public and Private birth care Queensland 2000 to 2009.....	28
Figure 10: Percentage of home births Queensland 2000 to 2009, by maternal age group	29
Figure 11: Number of births in Queensland 2000 to 2009 by maternal age	30
Figure 12: Percentage of births in Queensland 2000 to 2009 by maternal age group	30
Figure 13: Number of births to women less than 20 years of age by care provider, Queensland 2000 to 2009.....	30
Figure 14: Number of births to women 20-34 years of age by care provider, Queensland 2000 to 2009.....	31
Figure 15: Number of births to women 35 or more years of age by care provider, Queensland 2000 to 2009	31
Figure 16: Incidence of multiple birth by maternal age, Queensland 2008 to 2009	31
Figure 17: Incidence of birth of babies weighing less than 1500g by maternal age, Queensland 2000 to 2009	32
Figure 18: Incidence of birth at or before 36 weeks gestation by maternal age, Queensland 2000 to 2009	32
Figure 19: Incidence of birth of babies requiring admission to a neonatal intensive care unit (NICU) or a special care nursery (SCN) by maternal age, Queensland 2000 to 2009	32
Figure 20: Percentage of women giving birth in Queensland 2000 to 2009 at gestations of 36 weeks or more.....	33
Figure 21: Percentage of women giving birth in Queensland 2000 to 2009 at gestations less than 36 weeks	33
Figure 22: Percentage of babies born at 36 weeks or more in Queensland 2000 to 2009 by gestation	34
Figure 23: Percentage of babies born at less than 36 weeks gestation in Queensland 2000 to 2009.....	34
Figure 24: Number of babies born at less than 37 weeks gestation in Queensland 2000 to 2009 by mode of care.....	35
Figure 25: Number of babies born at less than 37 weeks gestation in Queensland 2000 to 2009 by maternal age.....	35
Figure 26: Percentage of women giving birth in Queensland 2001 to 2009 by previous pregnancy	36
Figure 27: Percentage of babies born in Queensland 2000 to 2009 by mode of care and gestation	36
Figure 28: Number of babies born in Queensland 2000 to 2009 by mode of care, gestation and onset of labour.....	37
Figure 29: Percentage of babies weighing 2,500g or more born in Queensland 2000 to 2009 by birth weight group	38
Figure 30: Percentage of low birth weight babies born in Queensland 2000 to 2009 by birth weight group.....	38
Figure 31: Percentage of multiple pregnancies in Queensland 2000 to 2009 by maternal age.....	39
Figure 32: Percentage of multiple and singleton pregnancies in Queensland 2000 to 2009 by gestation at birth	39
Figure 33: Percentage of multiple births in pregnancies conceived with and without the use of assisted conception techniques in Queensland 2000 to 2009.....	40
Figure 34: Influence of assisted conception techniques in Queensland 2008 to 2009	40
Figure 35: Influence of assisted conception techniques and multiple pregnancy in Queensland 2008 to 2009 on low birth weight births and need for neonatal intensive care unit (NICU) or special care nursery (SCN) admission	41
Figure 36: Incidence of birth weight categories 2,500g or more of babies born in singleton pregnancies conceived with assisted conception and without assisted conception.....	41
Figure 37: Incidence of birth weight categories less than 2,500g of babies born in singleton pregnancies conceived with assisted conception and without assisted conception.....	42
Figure 38: Onset of labour, all births, Queensland 2000 to 2009	42
Figure 39: Spontaneous onset of labour by care mode, Queensland 2000 to 2009	43
Figure 40: Induction of labour by care mode, Queensland 2000 to 2009	43
Figure 41: Elective caesarean section by care mode, Queensland 2000 to 2009	44
Figure 42: Onset of labour / elective caesarean section by gestation and care mode, Queensland 2000 to 2009	44
Figure 43: Mode of birth of babies born in Queensland 2000 to 2009 (percentage of births)	45
Figure 44: Mode of assisted vaginal birth of babies born in Queensland 2000 to 2009 (percentage of births).....	45
Figure 45: Incidence of unassisted vaginal birth of babies born in Queensland 2000 to 2009 by care provider.....	46
Figure 46: Incidence of caesarean section birth of babies born in Queensland 2000 to 2009 by care provider	46

Figure 47: Incidence of caesarean section birth, before and in labour, of babies born in Queensland 2000 to 2009 in Public and Private hospitals.....	47
Figure 48: Incidence of assisted vaginal birth of babies born in Queensland 2000 to 2009 by care provider	47
Figure 49: Incidence of assisted vaginal birth, by forceps and vacuum extraction, of babies born in Queensland 2000 to 2009 by care provider (percentage of births)	48
Figure 50: Incidence of caesarean section birth of babies born in Queensland 2000 to 2009, when there is a breech presentation, by care provider	48
Figure 51: Incidence of caesarean section for multiple births of babies born in Queensland 2000 to 2009 by careprovider	49
Figure 52: Incidence of mode of birth in Queensland 2000 to 2009 by previous pregnancy	49
Figure 53: Incidence of mode of birth in Queensland 2001to 2009 by previous caesarean sections	50
Figure 54: Incidence of maternal age groups in Queensland 2000 to 2009 by maternal Indigenous status	51
Figure 55: Percentage of women giving birth in Queensland 2000 to 2009, by maternal Indigenous status and gestational age	51
Figure 56: Incidence of women giving birth at and below 36 weeks gestation in Queensland 2000 to 2009 by maternal Indigenous status.....	52
Figure 57: Incidence of birth in Queensland 2000 to 2009 by gestation at birth and maternal Indigenous status.....	52
Figure 58: Incidence of birth at or below 36 weeks gestation in Queensland 2000 to 2009 by maternal Indigenous status	53
Figure 59: Percentage of babies weighing less than 1,500g in Queensland 2000 to 2009 by gestation and maternal Indigenous status	53
Figure 60: Percentage of babies weighing between 1,500g and 2,499g in Queensland 2000 to 2009 by gestation and maternal Indigenous status	54
Figure 61: Percentage of babies weighing between 2,500g and 3,999g in Queensland 2000 to 2009 by gestation and maternal Indigenous status	54
Figure 62: Percentage of babies weighing 4,000g or more in Queensland 2000 to 2009 by gestation and maternal Indigenous status	54

List of tables

page

Table 1: Classification of maternal deaths in Queensland 2004 to 2008	12
Table 2: Cause of maternal deaths in Queensland, during pregnancy or within 42 days of the end of pregnancy, 2004 to 2008	12
Table 3: Cause of maternal deaths in Queensland, between 42 and 365 days of the end of pregnancy, 2004 to 2008	13
Table 4: Avoidable factors in maternal deaths in Queensland, during pregnancy or within 42 days of the end of pregnancy, 2004 to 2008	13
Table 5: Suicidal deaths from the United Kingdom Confidential Enquiry into Maternal and Child Health.....	15
Table 6: Incidence of autopsy being performed in maternal deaths Queensland 2004 to 2008.....	16
Table 7: Stillbirth, neonatal and perinatal death rates, Queensland 2009	17
Table 8: Perinatal mortality rates by facility type, Queensland 2000 to 2008	18
Table 9: Perinatal deaths by type and PSANZ PDC, Queensland 2000 to 2008	19
Table 10: Neonatal deaths PSANZ NDC, Queensland 2000 to 2008.....	19
Table 11: Perinatal deaths by PSANZ PDC and plurality, Queensland 2000 to 2008	22
Table 12: Perinatal deaths by Indigenous status, Queensland 2000 to 2008	22
Table 13: Perinatal deaths by PSANZ PDC and Indigenous status, Queensland 2000 to 2008	23
Table 14: Perinatal deaths by gestation, Queensland 2000 to 2008	23
Table 15: Perinatal deaths by birth weight, Queensland 2000 to 2008	24
Table 16: Perinatal deaths by PSANZ-PDC and gestational age, Queensland 2000 to 2008	26
Table 17: Neonatal deaths by PSANZ-PDC and gestational age, Queensland 2000 to 2008.....	26
Table 18: Perinatal deaths by PSANZ-PDC and birth weight, Queensland 2000 to 2008	26
Table 19: Neonatal deaths by PSANZ-NDC and birth weight, Queensland 2000 to 2008	27
Table 20: Summary of strategies being implemented in Queensland Health maternity / neonatal services to address Aboriginal and Torres Strait Islander maternity / newborn health key performance indicators.....	56
Table 21: Recommendations from Root Cause Analyses (RCAs) and Human Error and Patient Safety (HEAPS) analyses, relating to PRIME CI reported incidents from maternity and neonatal services in 2008.....	57
Table 22: Clinical Practice Guidelines published by Queensland Maternity and Neonatal Clinical Guidelines Program as at October 2011.	61
Table 23: Perinatal mortality rates, Queensland 1988 to 2009	62
Table 24: Perinatal deaths by PSANZ PDC and plurality, Queensland 2000 to 2008	62
Table 25: Perinatal autopsy rates, Queensland 2000 to 2009	62
Table 26: Perinatal deaths by detailed PSANZ PDC classification, Queensland 2000 to 2008	63
Table 27: Neonatal deaths by detailed PSANZ NDC classification, Queensland 2000 to 2008	66

Maternal and Perinatal Mortality and Morbidity in Queensland

Table 28: Births in Queensland 2000 to 2009 by care provider.....	67
Table 29: Home births in Queensland 2000 to 2009, by maternal age.....	67
Table 30: Births in Queensland 2000 to 2009 by maternal age.....	68
Table 31: Number of births in Queensland 2000 to 2009 by maternal age group and care provider	68
Table 32: Number of births in Queensland 2000 to 2009 by maternal age group and plurality.....	68
Table 33: Number of low birth weight babies born in Queensland 2000 to 2009 by maternal age group.....	68
Table 34: Number of babies born in Queensland 2000 to 2009 by maternal age group and gestation at birth	68
Table 35: Number of babies born in Queensland 2000 to 2009 by maternal age group and need for admission to a Neonatal Intensive Care Unit or a Special Care Nursery.....	69
Table 36: Number of women giving birth in Queensland 2000 to 2009 by gestation at birth	69
Table 37: Percentage of women giving birth in Queensland 2000 to 2009 by gestation at birth	69
Table 38: Number of babies born in Queensland 2000 to 2009 by gestation at birth	69
Table 39: Percentage of babies born in Queensland 2000 to 2009 by gestation at birth.....	70
Table 40: Number and percentage of babies born in Queensland 2000 to 2009 by gestation at birth and mode of care.....	70
Table 41: Number and percentage of babies born in Queensland 2000 to 2009 by gestation at birth and maternal age	71
Table 42: Number and women giving birth in Queensland 2001 to 2009 by gestation at birth and previous pregnancy	71
Table 43: Number and percentage of babies born in Queensland Public and Private hospitals 2000 to 2009 by gestation at birth, care mode and onset of labour / elective caesarean section.....	72
Table 44: Incidence of admission to Neonatal Intensive Care Unit (NICU) or a special care nursery (SCN) and perinatal mortality rate (per 1,000 births) by gestation, babies born in Queensland 2000 to 2009	73
Table 45: Birth weight of babies born in Queensland 2000 to 2009	73
Table 46: Number and percentage of pregnancies which were multiple in Queensland 2000 to 2009	74
Table 47: Number of multiple pregnancies in Queensland 2000 to 2009 by maternal age	74
Table 48: Percentage of multiple pregnancies in Queensland 2000 to 2009 by maternal age.....	74
Table 49: Percentage of multiple and singleton births in Queensland 2000 to 2009 by gestation	75
Table 50: Numbers of singleton and multiple births in pregnancies conceived with and without the use of assisted conception techniques in Queensland 2000 to 2009	75
Table 51: Percentage of multiple births in pregnancies conceived with and without the use of assisted conception techniques in Queensland 2000 to 2009	75
Table 52: Number of babies born in Queensland 2000 to 2009 by use of assisted conception techniques and birth weight	76
Table 53: Number and percentage of babies born in Queensland 2000 to 2009 by use of assisted conception techniques and need for care in a Neonatal Intensive Care Unit (NICU) or a Special Care Nursery (SCN)	76
Table 54: Number of babies born in singleton pregnancies only, conceived with assisted conception and without assisted conception in Queensland 2000 to 2009 by birth weight category.	76
Table 55: Incidence of babies born in singleton pregnancies only, conceived with assisted conception and without assisted conception in Queensland 2000 to 2009 by birth weight category.....	77
Table 56: Number and percentage of women giving birth by onset of labour, Queensland 2000 to 2009.....	77
Table 57: Number of women giving birth by onset of labour and care mode, Queensland 2000 to 2009	77
Table 58: Incidence of women giving birth, by onset of labour and care mode, Queensland 2000 to 2009	78
Table 59: Number of women giving birth, by onset of labour, gestational group and care mode, Queensland 2000 to 2009	78
Table 60: Number of babies born, by birth mode, Queensland 2000 to 2009.....	78
Table 61: Percentage of babies born, by birth mode, Queensland 2000 to 2009.....	79
Table 62: Number of babies born, by birth mode and care provider, Queensland 2000 to 2009	79
Table 63: Percentage of babies born, by birth mode and care provider, Queensland 2000 to 2009.....	79
Table 64: Number of babies born by caesarean section with and without labour, by care mode, Queensland 2000 to 2009	80
Table 65: Percentage of babies born by caesarean section with and without labour, by care mode, Queensland 2000 to 2009....	80
Table 66: Number and percentage of caesarean section births in breech presentation, by care mode, Queensland 2000 to 2009.....	80
Table 67: Number and incidence of caesarean sections in women having multiple births, Queensland 2000 to 2009	81
Table 68: Number of births by mode of birth and previous pregnancy in Queensland 2000 to 2009	81
Table 69: Incidence of mode of birth by previous pregnancy in Queensland 2000 to 2009	81
Table 70: Number of births, by mode of birth and previous caesarean section, in Queensland 2001 to 2009.....	82
Table 71: Percentage of mode of birth, by previous caesarean section, in Queensland 2001 to 2009	82
Table 72: Number of women giving birth in Queensland 2000 to 2009 by Indigenous status and maternal age group	83
Table 73: Percentage of women giving birth in Queensland 2000 to 2009 by Indigenous status and maternal age group.....	83
Table 74: Number and percentage of women giving birth in Queensland 2000 to 2009 by Indigenous status and mode of care ..	83
Table 75: Number of babies born in Queensland 2000 to 2009 by Indigenous status, gestation and birth weight.....	84
Table 76: Percentage of babies born in Queensland 2000 to 2009 by Indigenous status, gestation and birth weight	85
Table 77: Numbers and rates of stillbirth, neonatal death and perinatal death, Queensland 2000 to 2009, by birth weight.....	85
Table 78: Numbers and rates of stillbirth, neonatal death and perinatal death, Queensland 2000 to 2009, by gestation	86

Introduction

The Queensland Maternal and Perinatal Quality Council (QMPQC) reconvened in 2009 after a period of inactivity. In its 2010 report, Council reviewed statewide data from 1988 to 2007 to provide a snapshot of the position for that time, providing a basis upon which to move forward.

The purpose of the Queensland Maternal and Perinatal Quality 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 Private Hospitals Association of Queensland). Terms of Reference of the Queensland Maternal and Perinatal Quality Council can be found at: http://www.health.qld.gov.au/maternity/docs/qmpqc_tor_oct10.pdf

The purpose of this report is to examine the management of pregnancies, births and newborns in Queensland, including maternal deaths and perinatal deaths and apparent risk factors for such events, and to attempt to identify areas of maternal and neonatal care where service providers might focus attention to prevent future deaths and adverse outcomes.

This report examines:

- Maternal deaths in the period 2004 to 2008
- Perinatal deaths in the decade 2000 to 2009
- Statewide maternity and neonatal data in the decade 2000 to 2009.

Issues relating to screening for and diagnosis and management of congenital anomalies are the subject of consideration by Council. Integrity and quality of data relating to congenital anomalies, and how these data relate to service provision, are difficult issues, and Council hopes to report on issues such as screening quality in subsequent years.

Equally, examination of issues relating to severe maternal morbidity is challenging due to definitional and reporting issues. Council believes that the current Australian Maternity Outcomes Surveillance System (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.

I wish to acknowledge the commitment of Council members, and those who support them, to improving maternal and perinatal outcomes. I trust that clinicians 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

Executive summary

Maternal mortality

- In the five year period 2004 to 2008, during which 279,663 women gave birth in Queensland, there were 82 deaths of women within one year of the end of a pregnancy.
- Thirty-nine (39) of the 82 deaths met the World Health Organisation (WHO) definition of a maternal death¹. To allow for comparison with other Australian jurisdictions, the five maternal deaths from 2003, consistent with the same maternal death definition, are included in the maternal mortality ratio calculations.
- The maternal mortality ratio in the period 2003 to 2005 was 13.6 per 100,000 confinements, and the maternal mortality ratio in the period 2006 to 2008 was 8.4 per 100,000 confinements.
- The major causes of direct maternal death were thromboembolism and amniotic fluid embolism, and the most common causes of indirect maternal deaths related to suicide and pulmonary hypertension. Suicide, malignancy and motor vehicle trauma were the most prominent causes in maternal deaths between 42 and 365 days after the end of a pregnancy.
- Significant difficulties were encountered gathering data regarding maternal deaths and understanding the presence of possible avoidable factors, due to poor quality of data related to lack of legislated requirement for practitioners to cooperatively report deaths and due to the absence of autopsy information in a number of cases.

Perinatal mortality

- In 2009, the most recently reported period for Queensland, there were 686 perinatal deaths giving an overall rate of 11.1 per 1000 births. Perinatal deaths comprised 447 (65.2%) stillbirths, a rate of 7.2 per 1,000 and 239 (34.8%) neonatal deaths, a rate of 3.9 per 1,000 live births.
- During the 1990s there was a slight trend towards a reduction in the perinatal mortality rates (due to a reduction in neonatal death rates). However, there has been no improvement during the decade 2000 to 2009, and the stillbirth rate has not reduced during these two decades.
- This report includes more detailed analyses of 5,021 perinatal deaths over the period 2000 to 2008 made up of 3,270 stillbirths and 1,751 neonatal. The total births during this period was 483,116, giving perinatal, stillbirth and neonatal death rates of 10.4, 6.8, and 3.6 per 1,000 births respectively.
- The perinatal mortality, stillbirth and neonatal death rate for women birthing in Private hospitals remains lower than for women in Public hospitals; 6.8 v 11.9 per 1,000; 4.8 v 7.6; and 2.1 v 4.3 respectively.
- The majority of perinatal deaths (79.0%) occurred in the 8.6% of births born at or before 36 weeks gestation and 55.5% of deaths in the 0.9% of births at or before 28 weeks.
- The main conditions contributing to perinatal deaths classified according to the PSANZ-PDC classification of perinatal deaths over the period 2000 to 2008 were *Congenital anomaly* (22.6%) and *Spontaneous preterm* (23.3%). Other important categories were *Specific perinatal conditions* (7.5%) and *Antepartum haemorrhage* (7.2%).
- *Unexplained* stillbirths accounted for 19.9% of all perinatal deaths and 30.5% of stillbirths with a rate of 2.1 per 1,000 births. In 5% of cases potentially contributory or causal placental pathology was identified and in almost 8% no placental pathology report was available (either unknown if performed or not performed).
- Over the period 2000 to 2008 there were 26,391 babies born to Indigenous women. In this cohort there were 497 perinatal deaths made up of 306 stillbirths and 191 neonatal deaths, giving perinatal mortality, stillbirth and neonatal death rates for Indigenous women of 18.8, 11.6, and 7.3 per 1000 births respectively. This compares unfavorably with rates for non-Indigenous women of 10.1, 6.6, and 3.5 respectively.
- The perinatal death category accounting for most of the increased perinatal mortality in Indigenous populations was *Spontaneous preterm*, which was almost three times more frequent than in the non-Indigenous population. Other important contributors to this disparity were *Antepartum haemorrhage* and *Hypertension*.

1 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, and excluding deaths from accidental or incidental causes.

- The perinatal mortality rate for multiple births was 38.8 per 1,000 births compared with the rate for singletons of 9.3/1000. The perinatal death classifications accounting for most of the increased perinatal mortality in multiples were *Specific perinatal conditions* (largely twin-twin transfusion syndrome) and *Spontaneous preterm*.

Pregnancy outcomes 2000 to 2009

- 535,955 women gave birth to 545,168 babies in Queensland in the decade 2000 to 2009. Approximately 70% of women gave birth in Public hospitals and 30% in Private hospitals; 816 women had a planned home birth.
- The incidence of birth to women aged 35 years or more increased from 14.8% to 19.9%. Low birth weight birth, preterm birth, multiple birth and birth of babies requiring neonatal intensive care or special care nursery admission were all higher for this group when compared with younger women.
- Though the incidence of birth at gestations less than 36 weeks remained reasonably constant (approximately 5%), there was a noticeable increase in the incidence of birth in the gestational age group 36 to 38 weeks (late preterm births). Birth in the gestational period 36 to 38 weeks (both spontaneous and planned) is associated with an incidence of perinatal death and of needing Neonatal Intensive Care or Special Care Nursery admission.
- Women in Private hospital care had a higher incidence of giving birth to a baby in the 36 to 39 week gestational period, compared with women in Public hospital care, relating almost entirely to the high elective caesarean section rate in Private care.
- Preterm birth (before 37 weeks gestation) occurred in 59.5% of multiple pregnancies, compared with 7.3% of singleton pregnancies.
- Pregnancies conceived with the aid of assisted conception techniques were 13.8 times more likely to be multiple than those conceived without such technologies. Babies born from such pregnancies are more likely to be of low birth weight and to need neonatal intensive care or special care nursery admission.
- During the decade 2000 to 2009 56% to 58% of women laboured spontaneously, induction of labour decreased from 25.1% to 22.4%, and caesarean section without labour increased from 14.4% to 20.5%.
- The pattern of labour onset was quite different between Public hospital and Private hospital care. Spontaneous onset of labour decreased significantly in Private hospitals while remaining relatively constant at approximately 64% in Public hospitals. Caesarean section without labour increased from 11.0% to 14.6% in Public hospitals and from 24.2% to 34.3% in Private hospitals.
- The incidence of unassisted vaginal birth decreased significantly from 65.2% to 56.9%. The increasing incidence of caesarean section birth has been more obvious in the setting of Private hospital care (37.9% to 48.6%), when compared with Public hospital care (22.2% to 27.7%).
- Women who have previously had one or more pregnancies were more likely to have an unassisted vaginal birth and less likely to have an assisted vaginal birth, when compared with women who have not previously had a pregnancy; the rising caesarean section rate in both groups of women was similar.
- Highlighting the critical nature of the decision to perform a “first” caesarean section, women who had not had a previous caesarean section had a 78.5% to 80% likelihood of having an unassisted vaginal birth and 14% to 16% likelihood of a caesarean section birth; in contrast, while women who had had one or more previous caesarean sections had a 15% to 23% likelihood of having a vaginal birth and a 77% to 85% likelihood of a caesarean section birth.
- Indigenous mothers (29,723; 5.5% of 535,955) gave birth to 29,798 babies in this decade. Indigenous women were significantly more likely to give birth at gestations less than 37 weeks, but the incidence of pre-term birth (36 weeks or less) dropped from 13.1% to 11.6%.
- The pattern of birth weight to gestation is different for Indigenous and non-Indigenous babies, with Indigenous babies being smaller for gestational age than non-Indigenous babies. Maternal age and Indigenous status, as well as gestational age are shown to significantly influence on the birth weight of babies.

Recommendations

The Queensland Maternal and Perinatal Quality Council recommends that:

Maternal mortality

1. Mental health service providers develop processes to heighten awareness of the need to fully engage with women identified in pregnancy as being at risk of significant mental health disorders. The risk of suicidal ideation in women with new mental health symptomatology must not be ignored. *[Refer to section 1.2.7]*
2. 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. *[Refer to section 1.2.6]*
3. Coronial autopsy is strongly recommended in the case of death of any woman who dies during pregnancy or within one year of the end of a pregnancy, other than those who die due to a clearly diagnosed terminal malignancy. *[Refer to section 1.2.8]*
4. In the event of sudden cardiac death, autopsy is essential and arrangements should be made for cardiac tissue to be examined by a pathologist with a specific interest in cardiac pathology where initial findings are negative. Pathologists and clinicians should be aware of the emerging role for molecular autopsy in cases of possible arrhythmic death. *[Refer to section 1.2.6]*
5. Legislative change to the Public Health Act, 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 Perinatal Data Collection Unit, is necessary to improve the quality of information available for review of the causation of deaths and the possible presence of avoidable factors. *[Refer to section 1.2.5]*

Perinatal mortality

6. Every perinatal death should be subject to a comprehensive investigation that includes review by a local or regional multi-disciplinary clinical committee, leading to classification of the cause of death according to the PSANZ Classification system. These committees should consider the need for practice improvement initiatives aimed at reducing the incidence of potentially avoidable perinatal deaths. *[Refer to section 1.3.3]*
7. Higher rates of stillbirth and neonatal deaths for Indigenous women remain a concern. Implementation and adequate evaluation of programs to address the disparity between Indigenous and non-Indigenous perinatal mortality outcomes are required. *[Refer to section 1.3.7]*
8. Following review and classification of a perinatal death, a revised death certificate should be submitted, if necessary. *[Refer to section 1.3.3]*
9. Following a stillbirth or neonatal death, all parents should be provided the option of a high quality perinatal autopsy. Whenever possible, counselling on the option of a perinatal autopsy should be provided by a senior clinician who has developed rapport with the parents. *[Refer to section 1.3.9]*
10. When perinatal autopsies are requested, placental pathology and a clinical case summary must be included to ensure that the report is complete. Placental pathology should be undertaken in the case of all stillbirths and high risk newborns. *[Refer to section 1.3.9]*
11. There is currently an insufficient number of pathologists with expertise in perinatal autopsy, and this is an impediment to quality and reporting. Steps to rectify this are urgently required. *[Refer to section 1.3.9]*
12. To ensure best practice in all maternity hospitals, educational programs as exemplified by the IMPROVE (IMproving Perinatal Review and Outcomes Via Education) program developed by the Perinatal Society of Australia and New Zealand, should be undertaken as part of routine in-service education. *[Refer to section 1.3.3]*

Pregnancy outcomes

13. Maternity services consult with local and statewide Indigenous health groups to develop and implement programs, such as those described in the booklet “Successful Initiatives in Aboriginal and Torres Strait Islander Health”, with the aim of eliminating the difference between Indigenous and non-Indigenous pregnancy and newborn outcomes. *[Refer to section 3.1]*
14. Strategies be developed to halt the continuing rise in the incidence of elective caesarean section in both Public and Private health services, as this change in practice does not appear to be associated with significant benefit to mother or baby. *[Refer to section 2.8 and 2.9]*
15. Instigation of clinical policies which minimise elective intervention in pregnancy in the absence of serious fetal or maternal risk prior to 39 weeks gestation, to reverse the increasing incidence of planned birth in the gestational period 36 to 38 weeks. *[Refer to section 2.4]*

1.0 Maternal and perinatal mortality

1.1 Definitions

The Queensland Maternal and Perinatal Quality Council uses the following definitions.

Fetal deaths (= stillbirth): Defined by the Registration of Births, Deaths and Marriages Act as a child whose heart has not beaten after it has been completely expelled or extracted from its mother and who is either of not less than 20 weeks gestation, or of not less than 400g by weight at birth.

Livebirths: Defined by the Registration of Births, Deaths and Marriages Act as a child whose heart has beaten after it has been completely expelled or extracted from its mother.

Mothers: 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 Organisation (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. The definitions used in this report include, in addition to the WHO definition, incidental deaths and deaths occurring more than 42 days after termination of the pregnancy, when their origin and illness related to the pregnancy².

Maternal mortality ratio: The maternal mortality ratio is defined as:

$$\frac{\text{Number of maternal deaths}}{\text{Number of mothers}} \times 100,000$$

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 maternal mortality ratio.

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.

² Maternal Mortality Working Party, NHMRC. Report on Maternal Deaths in Australia 1991-93. Canberra: NHMRC.



1.2 Maternal deaths

Prior to this report, due to the cessation of QMPQC activity in 2005, the reviewed and published maternal death data has only been available in Queensland from 1988 to 2003 inclusive.

This report reviews 82 maternal deaths (including late maternal deaths) which occurred in Queensland in the years 2004 to 2008. An extensive case ascertainment exercise, which was undertaken by the Perinatal Data Collection Unit, Health Statistics Centre, Queensland Health, is acknowledged by this Council, along with excellent collaboration and cooperation by the Registrar of Births, Deaths and Marriages, the State Coroner, and the Forensic Pathology Service of Queensland Health. This effective ascertainment exercise may contribute to an apparently high maternal mortality ratio; it is a feature of most maternal mortality reports that there is concern regarding whether or not all maternal deaths are known.

Collection of data regarding these deaths was a difficult exercise due to the:

- time between deaths and the collection of data (due to the period of QMPQC inactivity); and
- lack of legislation in Queensland supporting reporting of maternal deaths, which allowed some practitioners to not cooperate with requests for clinical information by the QMPQC chairperson.

1.2.1 Maternal mortality ratio (MMR)

Thirty-nine (39) of the 82 deaths were consistent with the ICD-10 definition of maternal death (death of a woman while pregnant or within 42 days of the 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, but not from accidental or incidental causes), and so contribute to the calculation of the maternal mortality ratio.

To allow for comparison with other Australian jurisdictions, the five maternal deaths from 2003, consistent with the ICD-10 maternal death definition (in a total of 49,512 mothers), are included in the following maternal mortality ratio calculations.³

In Queensland in 2003 to 2005 there were 21 direct and indirect deaths amongst 153,900 mothers, giving a maternal mortality ratio (MMR) of 13.6 per 100,000 women giving birth (i.e. one woman died for every 7,329 mothers). The maternal mortality ratio in Australia in 2003 to 2005 was 8.4 per 100,000 women giving birth.⁴

In the following triennium, 2006 to 2008 there were 13 direct and indirect deaths amongst 175,275 Queensland mothers, giving a maternal mortality ratio (MMR) of 7.4 per 100,000 women giving birth (i.e. one woman died for every 13,483 mothers). The maternal mortality ratio for Australia for this period is not yet published.

The difference in maternal mortality ratios between 2006 to 2008 and 2003 to 2005 is statistically significantly different: Odds ratio 0.54 (95% CI 0.27, 1.09).

3 Maternal and Perinatal Morbidity and Mortality in Queensland 2002 and 2003. Report of the Queensland Maternal and Perinatal Quality Council December 2005.

4 Sullivan EA, Hall B & King JF. 2007. Maternal deaths in Australia 2003-2005. Maternal deaths series no 3. Cat no PER42. Sydney: AIHW national Perinatal Statistics Unit.

1.2.2 Classification of cause of maternal deaths 2004 to 2008

The Maternal Mortality Sub-Committee examined 11 deaths which occurred during the course of pregnancy and 28 within 42 days of the woman giving birth or the pregnancy ending. A further 43 deaths (late maternal deaths) which occurred between 43 days and 365 days of the end of the pregnancy were also reviewed.

Maternal death timing	Total	Classification
Deaths during pregnancy	11	3 Direct 6 Indirect 2 Incidental
Deaths within 42 days of end of pregnancy	28	11 Direct 9 Indirect 8 Incidental
Deaths between 43 days and 365 days of end of pregnancy	43	
Total	82	

Table 1: Classification of maternal deaths in Queensland 2004 to 2008

1.2.3 Cause of maternal death

Review of the available data regarding the 39 maternal deaths which occurred during pregnancy or within 0-42 days post-partum showed the most common causes of direct maternal death to be thromboembolism (4), amniotic fluid embolism (3) and haemorrhage related to abnormal placentation (2). Suicide (4) and pulmonary hypertension (2) were the most common causes of indirect maternal death, and malignancy and motor vehicle trauma the most common causes of incidental maternal death in this period.

Classification	Cause of death	Number
Direct deaths	Thromboembolism	4
	Amniotic fluid embolism	3
	Haemorrhage – placenta accreta / increta	2
	Haemorrhage – ruptured ectopic pregnancy	1
	Peripartum cardiomyopathy	1
	Air embolism	1
	Death associated with anaesthesia	1
	Chorioamnionitis	1
Indirect deaths	Suicide	4
	Pulmonary hypertension	2
	Cardiac disease – viral myocarditis	1
	Acute bacterial endocarditis	1
	Acute myocardial infarction	1
	Cardiorespiratory arrest ?arrhythmia	1
	Cardiorespiratory arrest uncertain origin	1
	Bronchopneumonia	1
	Subarachnoid haemorrhage – ruptured berry aneurysm	1
	Malignancy	1
	Septicaemia	1
Incidental deaths	Malignancy	4
	Motor vehicle trauma	3
	Haemorrhage – ruptured splenic artery aneurysm	1
	Cerebral abscess	1
	Brainstem haemorrhage and sepsis consequent on multiple sclerosis	1

Table 2: Cause of maternal deaths in Queensland, during pregnancy or within 42 days of the end of pregnancy, 2004 to 2008

Suicide (11) was the most prominent cause of death in the 43 women who died more than 42 days and less than one year after giving birth, followed by malignancy (8), motor vehicle trauma (4), cardiomyopathy (3) and myocarditis (2), and homicide (2).

Cause of death	Number
Suicide	11
Malignancy	8
Motor vehicle trauma	4
Cardiomyopathy	3
Myocarditis	2
Homicide	2
Drug overdose	1
Aspiration: drug toxicity	1
Intracerebral haemorrhage	1
Sub-arachnoid haemorrhage	1
Severe brain injury	1
Acute bronchopneumonia	1
Suppurative bronchitis asthma	1
Pulmonary thromboembolism	1
Bacterial septicaemia	1
Sepsis: lymphocytic hypophysitis	1
Small intestine infarction	1
Sudden unexplained death	1
Unknown	1

Table 3: Cause of maternal deaths in Queensland, between 42 and 365 days of the end of pregnancy, 2004 to 2008

1.2.4 Avoidability

Review of the 39 ICD-10 maternal deaths suggested that there may have been avoidable factors present in 10. The poor quality of data available to the committee did not allow for better definition of these factors.

Avoidable factors noted	2
Possibly avoidable	5
Potentially avoidable	3
No avoidable factors noted	28
Unable to determine	1

Table 4: Avoidable factors in maternal deaths in Queensland, during pregnancy or within 42 days of the end of pregnancy, 2004 to 2008

1.2.5 Data collection and quality

Significant difficulties were encountered gathering data regarding maternal deaths, and understanding the presence of possible avoidable factors due to poor quality of data related to lack of legislated requirement for practitioners to cooperatively report deaths and due to the absence of autopsy information in a number of cases.

Complete ascertainment of maternal deaths is a problem in all jurisdictions. A tick box now exists on all death certificates to indicate if a woman was pregnant or pregnant within six weeks of the time of her death, and another box identifies women who were pregnant between six weeks and twelve months prior to their death. It is hoped that this change will improve the detection rate of maternal deaths as medical officers become more familiar with these items.

Access to adequate case details is variable. Medical details are mostly gained from the maternal mortality death reporting form.

More detailed information is warranted in some cases and can be best accessed by thorough examination of the hospital medical record. This allows clinical conditions and management to be reviewed and potentially avoidable factors identified. Broad recommendations for practice can then be made available to all relevant institutions.

It is also apparent that knowledge of social and environmental issues is useful in determining why care was not accessed at an appropriate time. It is, therefore, planned that this degree of data will be available for future reports.

Though there is extensive legislated data collection regarding perinatal outcomes by the Perinatal Data Collection Unit the same is not the case for maternal outcomes (particularly maternal deaths). Legislative change, 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 Perinatal Data Collection Unit is necessary to improve the quality of information available for review of the causation of deaths, and the possible presence of avoidable factors. Revision of the relevant section of the Public Health Act relating to the Perinatal Data Collection is recommended.⁵

1.2.6 Cardiovascular disease

Cardiovascular disease remains a significant cause of indirect maternal mortality amongst women in Queensland.

In a number of cases women died of undiagnosed cardiovascular disease. Diagnosis can be challenging because cardiovascular disease is relatively rare in women of child bearing age and the index of suspicion may be low when young women present with common symptoms such as chest pain, palpitations, syncope and shortness of breath. Furthermore, some of these symptoms, such as isolated palpitations and mild shortness of breath are common during normal pregnancy.

In some cases, the committee identified that limitations in access to specialist cardiology opinion and simple cardiac investigations such as echocardiography may also have contributed to the failure to diagnose significant cardiac lesions. All pregnant women should have access to such investigations within a clinically appropriate time frame. Efforts to increase awareness of cardiac disease amongst clinicians caring for pregnant women and provision of multidisciplinary tertiary services for management of pregnancies at high risk of materno-fetal complication due to cardiovascular disease are also likely to be of benefit.

Post-mortem examination is critically important to delineate the cause of death where cardiac disease is a possibility given that several conditions that can cause sudden cardiac death have an inherited basis. Where initial autopsy findings are negative, arrangements should be made for cardiac tissue to be examined by a pathologist with a specific interest in cardiac pathology. Finally, there is an emerging role for molecular autopsy in cases of possible arrhythmic death and consideration should be given to this, as well as referral of family members to a cardiac genetics service for further management.

1.2.7 Suicide

Amongst the 82 deaths reviewed within this report there were 19 women who died as a result of suicide, homicide or as a result of mixed drug toxicity. Fifteen (15) of these deaths were recorded as suicides and fourteen (14) of these fifteen (15) women had died by hanging. The women in this sub-group ranged in age from 19 to 40 but the number of younger women was notable (7 were 21 or younger). Seventeen (17) of the women who died within this group were reported to have had a previous history of mental health disorders including alcohol and drug dependency, depression and anxiety disorders and a smaller number of women were receiving treatment for major psychotic disorders. Seven women had a previous history of self harm or had previously expressed suicidal ideation. A small number of women were under the care of mental health services at the time of their death.

It is of significance that one third of the women who died of suicide were Indigenous and eight of these women lived in regional/rural locations. Both of these factors are known to be associated with a higher risk of death by suicide.

⁵ Public Health Act 2005 (Queensland) Chapter 6, Part 1, Sections 214-228

Despite a lack of available information in a number of the cases reviewed in this five year period, it was possible to ascertain that many of these women experienced considerable difficulties in their lives. Twelve of these women were known to have a dependence on drugs and alcohol and a number were reported to be victims of domestic violence. While the association between suicide and disadvantage and low socio economic status is apparent (as it is in the general population), there was a significant number of women who committed suicide with no previous risk factors identified. The paucity of clinical information in some cases precludes detailed comments on this subgroup of deaths but it would appear that attempts had been made by care providers to support a number of the women through alcohol and drug dependency. However, it was not possible to determine whether care provision was adequate in all cases.

Suicide as a leading cause of maternal mortality was highlighted in the UK enquiry into maternal deaths in 1997 and was the leading cause of death over two triennial reports between 1997 and 2002. Despite an increase in surveillance of women with known psychiatric illness and specialist education of professionals involved in the care of childbearing women, the numbers of deaths by suicide in the UK has remained constant and suicide remains a significant cause of death (Table 5).⁶ The authors of the Saving Mothers' Lives Report make specific recommendations around the detection and management of psychiatric disorders in pregnancy and the puerperium, highlighting the need for the early involvement of appropriately trained specialists in the care of women with known psychotic disorders. The report also highlights the association between social vulnerability, substance abuse and the involvement of child protection services and maternal suicide.

The number of deaths within Queensland is at least comparable to those reported in the United Kingdom Enquiry and should prompt a response amongst maternity service providers in Queensland.

Method of suicide	1997 to 99	2000 to 02	2003 to 05	2006 to 09 (up to 6 months)	All
Hanging	10	8	14	9	41
Jumping from a height	5	4	4	9	22
Cut throat	4	1	0	1	6
Intentional road accident	1	2	0	0	3
Self-immolation	1	1	2	3	7
Drowning	1	1	2	2	6
Gunshot	1	0	0	0	1
Railway track	0	0	1	0	1
Carbon monoxide				1	1
Ingestion of bleach				1	1
Overdose of prescribed drugs	3	9	9	3	24
Total	26	26	32	29	113

Table 5: Suicidal deaths from the United Kingdom Confidential Enquiry into Maternal and Child Health.
(Adapted from [www.pmmrc.health.govt.nz/moh.nsf/pagescm/7489/\\$File/why-mothers-die.pdf](http://www.pmmrc.health.govt.nz/moh.nsf/pagescm/7489/$File/why-mothers-die.pdf))

There has been an increased surveillance of women in the antenatal and immediate postnatal period with the introduction of routine screening for depression and appropriate referral patterns for women known to be at risk of suffering from a depressive illness. The introduction of universal screening of all women presenting to Queensland Health for maternity care, using the Edinburgh Depression Score (EPDS), the Safe Start Psychosocial Assessment tool, the Domestic Violence Identification (DVI) Assessment tool and the Antenatal Alcohol and Drug Screening tool, is seen as a very important initiative to assist with identification of women at risk, and the use of such tools is recommended in all maternity care spheres. The development and use of clear referral pathways to specialist mental health services for those women detected to be at risk is equally important and recommended.

With an improvement in reporting systems to this enquiry in the future it may be possible to offer deeper analysis of cases of suicide in future reports to determine if there are any system failures and identify areas where improvements could be made.

⁶ "Saving Mothers' Lives. Reviewing maternal deaths to make motherhood safer: 2006–2008". The Eighth Report of the Confidential Enquiries into Maternal Deaths in the United Kingdom. BJOG Volume 118, Supplement 1, March 2011.

1.2.8 Autopsies following maternal death

Some women, who die during or up to one year following pregnancy, die of clearly delineated disease such as metastatic malignancy. In these circumstances, it is reasonable to not proceed to an autopsy. However, many women die from medical conditions that are not clearly delineated. For example, women with asthma, thromboembolic disease and cardiomyopathy might all present with dyspnoea. Unless medical conditions are clearly delineated, autopsy is strongly recommended. In a number of cases reviewed, the reasons for maternal death were not entirely clear, and a maternal autopsy would have assisted in clarifying the cause of death.

	Deaths	Autopsies
Total deaths in the period 2004 to 2008	82	57
Deaths meeting ICD-10 definition of maternal death	39	34
Deaths not due to advanced malignancy	69	57

Table 6: Incidence of autopsy being performed in maternal deaths Queensland 2004 to 2008

There were several forensic pathology reviews where the clinical information and the decision to not proceed with coronial autopsy appeared to be dissonant. A close working relationship between the forensic pathology team and clinicians needs to be encouraged.

1.3 Perinatal deaths

Whilst this section of the report reviews all perinatal deaths in the decade 2000 to 2009 where possible, classification of perinatal deaths is only complete for the period 2000 to 2008. The “catch up” work on this element, a result of the five years of QMPQC inactivity, is a major ongoing function of the Perinatal Mortality Sub-Committee of QMPQC, in collaboration with the staff of the Perinatal Data Collection Unit (PDCU), Health Statistics Centre, Queensland Health.

1.3.1 Perinatal mortality review modus operandi

All perinatal deaths in Queensland are subject to a systematic review. Perinatal mortality data have been obtained from the Perinatal Data Collection Unit, Health Statistics Centre, Queensland Health, 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 collaborate with the Council in the perinatal mortality review process, submitting confidential case summaries and classifications.

1.3.2 Clinical classification

The QMPQC has adopted the Perinatal Society of Australia and New Zealand classification system including the Perinatal Death Classification (PSANZ-PDC) and, in addition for neonatal deaths, the PSANZ Neonatal Death Classification (PSANZ-NDC)⁷, and all perinatal deaths in Queensland are classified accordingly. The system has been shown to perform well against other contemporary systems⁸. 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.

1.3.3 Data collection and data quality

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

- MR63d forms, which are completed by all maternity hospitals in Queensland and forwarded to the Perinatal Data Collection Unit (Queensland Health). 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.

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

8 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. An evaluation of classification systems for stillbirth. *BMC Pregnancy Childbirth.* 2009; 9:24.

- The Medical Certificate of Cause of Perinatal Death (Forms 9 and 9A).
- Perinatal mortality confidential case 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 accurately classify 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.

Even with advancements in investigative techniques such as Magnetic Resonance Imaging (MRI), 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.⁹ 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.

Death certificate (DC) data are notoriously inaccurate worldwide¹⁰ 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 that 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 Sub-Committee is planning a detailed review of death certificates to identify areas for clinician education to improve accuracy of this information. However, until death certificate cause of death is based on the results of investigation and review of the death by an appropriate committee, the cause of perinatal deaths based on death certificate will not be reliable. 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 the revised DC to inform them of this outcome.

Through one-off funding made available by the Maternity Unit, Primary, Community and Extended Care Branch, Queensland Health, the educational program IMPROVE (IMproving Perinatal Review and Outcomes Via Education) (www.stillbirthalliance.org.au), based on the PSANZ Perinatal Mortality Guidelines, has been made available to clinicians providing maternity care in the larger Queensland maternity hospitals. With ongoing support for IMPROVE, the quality of investigation and review of death data will be greatly enhanced. Ideally, this program should be incorporated into routine educational programs for clinicians caring for women and their families around the time of a perinatal death and is being explored by the QMPQC in collaboration with key partners in both Public and Private sectors.

1.3.4 Perinatal mortality rates and trends

The perinatal mortality rate in Queensland for 2009 was 11.0 per 1,000 total births, made up of a stillbirth rate of 7.2 per 1,000 total births and a neonatal mortality rate of 3.9 per 1,000 live births. The stillbirth component of 65.7% of perinatal deaths was similar to previous years (Table 7).

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)
62,050	61,603	447	7.2	239	3.9	686	11.1

Table 7: Stillbirth, neonatal and perinatal death rates, Queensland 2009

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

10 Kirby RS. The coding of underlying cause of death from fetal death certificates: issues and policy considerations. *Am J Public Health.* 1993; 83: 1088-91.

Over the past two decades 1988 to 2009, subsequent to a general trend to a reduction in overall perinatal mortality until the early 2000s, there has been virtually no change in either the stillbirth or neonatal death rate. The reduction seen earlier in this period was due to a steady decline in neonatal mortality. The stillbirth rate has not shown any improvement over this 21 year period (Figure 1).

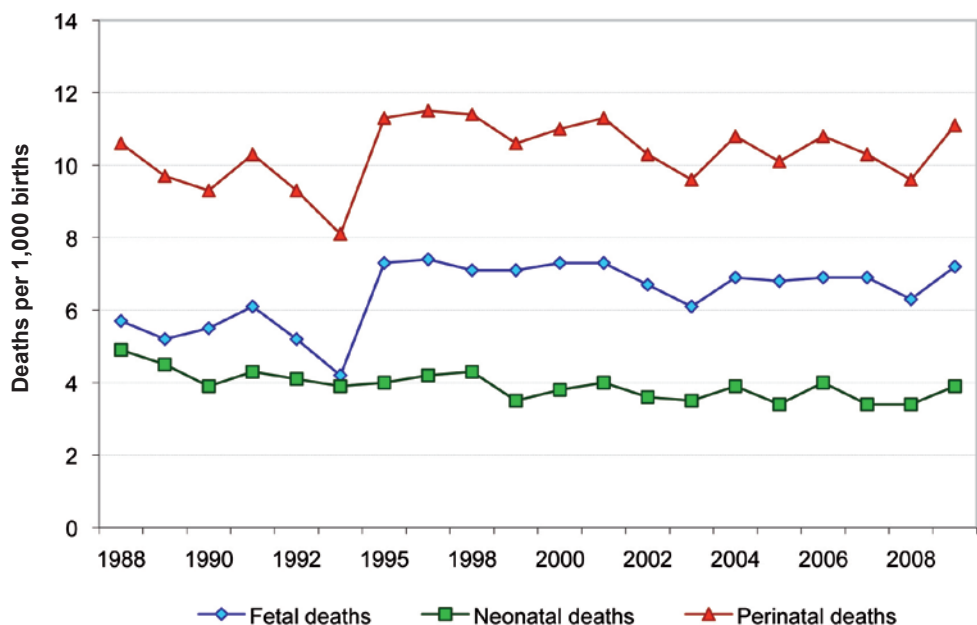


Figure 1: Perinatal mortality rates, Queensland 1988 to 2009

The perinatal mortality, stillbirth and neonatal death rate for women birthing in Private hospitals remains lower than for women in Public hospitals; 6.8 v 11.9/1000; 4.8 v 7.6; and 2.1 v 4.3 respectively. The reasons for the difference are not well understood, however the different demographic profiles of women is thought to play an important role and the influence of standards of care on this outcome requires further consideration.

	Perinatal deaths		Stillbirths		Neonatal deaths	
	n	PNMR	n	SBR	n	NMR
Public hospital care	3,998	11.9	2,560	7.6	1,438	4.3
Private hospital care	1,009	6.8	701	4.8	308	2.1
Home birth	4	5.8	2	2.9	2	2.9
Care mode not stated	10		7		3	
Total	5,021	100	3,270	100	1,751	100

Table 8: Perinatal mortality rates by facility type, Queensland 2000 to 2008
(PNMR = perinatal mortality rate per 1,000 births, SBR = stillbirth rate per 1,000 births, NMR = neonatal mortality rate per 1,000 live births)

1.3.5 PSANZ Perinatal Death Classification (PSANZ-PDC and PSANZ-NDC) of perinatal deaths

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 for the period 2000 to 2008. Detailed sub-classifications are found in Tables 26 and 27.

PSANZ-PDC classification	Type of Perinatal Death								
	Stillbirth			Neonatal Death			Total		
	n	%	Rate ¹	n	%	Rate ²	n	%	Rate ¹
1. Congenital abnormality	665	20.3	1.4	507	29	1.1	1,172	23.3	2.4
2. Perinatal infection	77	2.4	0.2	44	2.5	0.1	121	2.4	0.3
3. Hypertension	88	2.7	0.2	50	2.9	0.1	138	2.7	0.3
4. Antepartum haemorrhage	235	7.2	0.5	127	7.3	0.3	362	7.2	0.7
5. Maternal conditions	189	5.8	0.4	33	1.9	0.1	222	4.4	0.5
6. Specific perinatal conditions	281	8.6	0.6	94	5.4	0.2	375	7.5	0.8
7. Hypoxic peripartum deaths	64	2	0.1	91	5.2	0.2	155	3.1	0.3
8. Fetal growth restriction	164	5	0.3	30	1.7	0.1	194	3.9	0.4
9. Spontaneous preterm	468	14.3	1	668	38.1	1.4	1,136	22.6	2.4
10. Unexplained antepartum death	998	30.5	2.1		0		1,002	20.0	2.1
11. No obstetric antecedent	40	1.2	0.1	103	5.9	0.2	143	2.8	0.3
Not classified	1			4			1		
Total	3,270	100	6.8	1,751	100	3.7	5,021	100	10.4

Table 9: Perinatal deaths by type and PSANZ PDC, Queensland 2000 to 2008
(1 = per 1,000 births; 2 = per 1,000 live births)

PSANZ-NDC classification	Neonatal Deaths		
	n	%	Rate ¹
1. Congenital abnormality	511	29.2	1.1
2. Extreme prematurity	569	32.5	1.2
Not resuscitated	502	28.7	1.1
Unsuccessful resuscitation	63	3.6	0.1
Resuscitation not specified	4	0.2	0.0
3. Cardio-respiratory disorders	208	11.9	0.4
4. Infection	129	7.4	0.3
5. Neurological	179	10.2	0.4
6. Gastrointestinal	51	2.9	0.1
7. Other	100	5.7	0.2
Not classified	4		
Total	1,751	100.0	3.7

Table 10: Neonatal deaths PSANZ NDC, Queensland 2000 to 2008
(1 = per 1,000 live births)

The most frequent causes of perinatal death in the years 2000 to 2008 were *Congenital anomaly* (23.3%), *Spontaneous preterm* (22.6%) and *Unexplained antepartum death* (20.0%) (Figure 2).

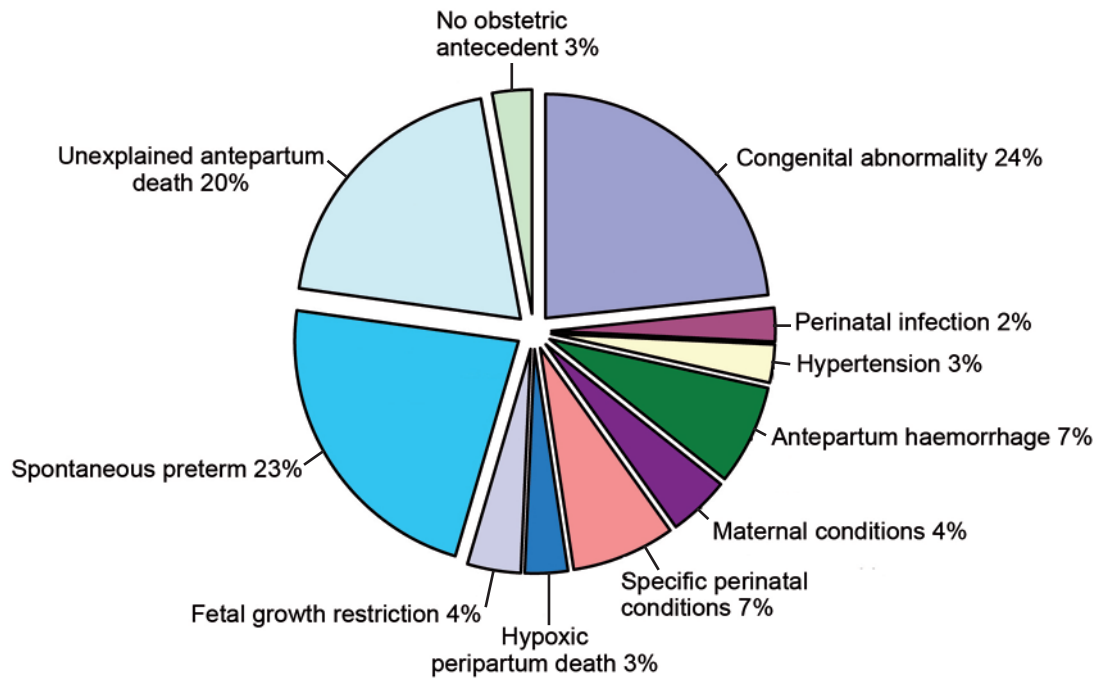


Figure 2: Perinatal death by PSANZ-PDC classification, Queensland 2000 to 2008 (n=5021)

Stillbirths were most frequently classified as being *Unexplained antepartum deaths* (30.5%), and *Congenital abnormality* (20.3%), *Spontaneous preterm* (14.3%), *Specific perinatal conditions* (8.6%) and *Antepartum haemorrhage* were the other major classified categories of cause of death (7.2%) (Figure 3).

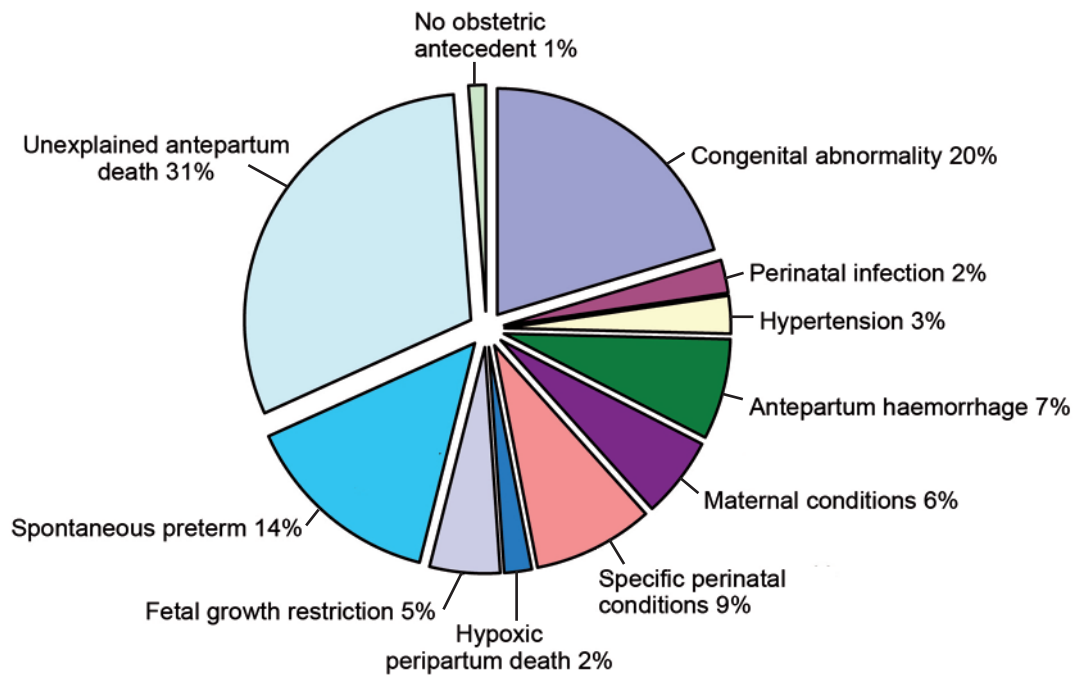


Figure 3: Stillbirths by PSANZ-PDC classification, Queensland 2000 to 2008 (n=3270)

The main conditions associated with neonatal deaths were *Spontaneous preterm* (38.1%) and *Congenital abnormality* (29%).

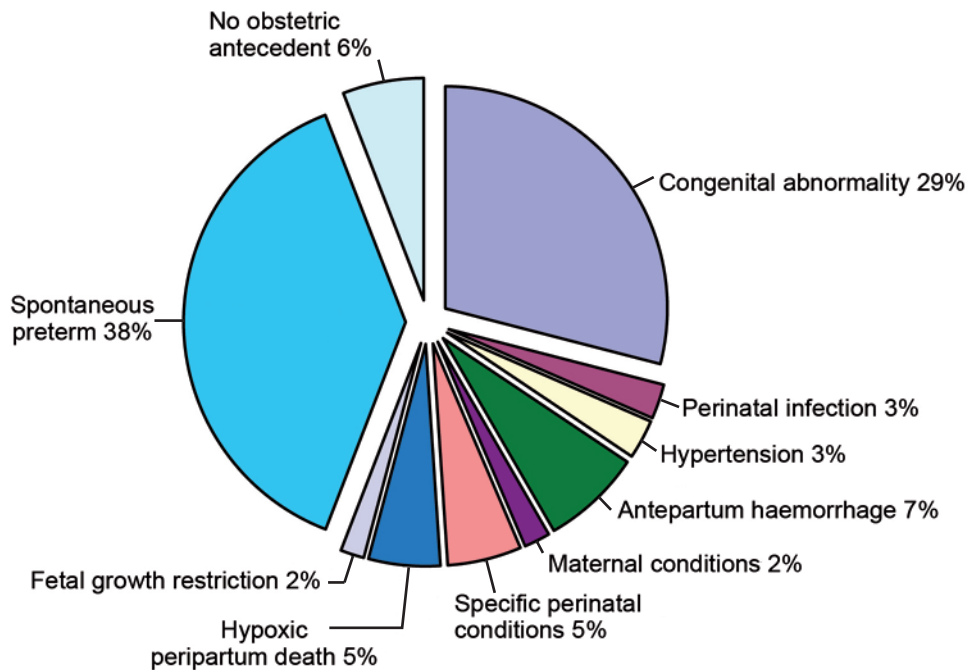


Figure 4: Neonatal deaths by PSANZ-PDC classification, Queensland 2000 to 2008 (n=1751)

Congenital abnormality

Of the 1,172 perinatal deaths classified as due to congenital abnormalities, there were 665 stillbirths and 506 neonatal deaths. Overall, congenital abnormalities contributed 23.3% of all perinatal deaths, (2.4 per 1,000 total births) and 20.3% and 29.0% respectively of all stillbirths and neonatal deaths. The leading types of congenital abnormality were chromosomal (n=253), central nervous system (CNS) (n=252), cardiovascular system (n=184), and other multiple congenital abnormality (n=166). 80% of perinatal death due to congenital abnormalities occurred prior to 37 weeks gestation and 60% prior to 28 weeks.

Spontaneous preterm

Of the 1,136 (22.6%) perinatal deaths assigned to the category of spontaneous preterm, 14.3% were stillbirths and 38.1% were neonatal deaths. Chorioamnionitis was identified in almost 50% of these deaths and in a further 14% it was unknown whether placental pathology was undertaken. Thirty-eight per cent (38%) of these deaths occurred prior to 28 weeks gestation.

Unexplained antepartum stillbirth

There were 998 antepartum stillbirths classified as unexplained, making up 20% of perinatal deaths and 30.5% of all stillbirths. The overall rate of unexplained stillbirth is 2.1 per 1,000 births, which is approximately 4 or 5 times greater than the rate of Sudden Infant Death Syndrome¹¹. In 5% of cases potentially contributory or causal placental pathology was identified and in almost 8% no placental report was available (either unknown if performed or not performed). Autopsy rates were not analysed by PSANZ category; however previous reports have shown the autopsy rate for unexplained stillbirths to be 62%.¹² It is likely that the contribution of unexplained stillbirths is an overestimate due to inadequate investigation.¹³

11 Australian Bureau of Statistics. Deaths Australia, November 2008. Vol. Catalogue No. 3302.0 – 2007 Canberra: Australian Bureau of Statistics; 2010.

12 Maternal and perinatal mortality in Queensland 2000, Report of the Queensland Maternal and Perinatal Quality Council, June 2003.

13 Flenady V, Middleton P, Smith GC, Duke W, Erwich JJ, Khong TY, Neilson J, Ezzati M, Koopmans L, Ellwood D, Fretts R, Frøen FJ, for The Lancet's Stillbirths Series steering committee. Stillbirth: the way forward in high-income countries. *Lancet*. 2011 May 14; 377(9778):1703-17.

The final paper in *The Lancet's* stillbirth series¹⁴ makes a strong call for improved data quality for stillbirths and Queensland Health is addressing this need through clinician education on the guidelines from the Perinatal Society of Australia and New Zealand, with the IMPROVE (IMproving Perinatal Review and Outcomes Via Education) program.

1.3.6 Multiple pregnancy

The perinatal mortality rate for babies born in multiple pregnancies was 38.8 per 1,000 births compared with the rate for singletons of 9.3 per 1,000 births. The categories accounting for the higher perinatal mortality rates in multiple pregnancy were *Specific perinatal conditions* (largely made up of Twin-Twin Transfusion Syndrome) (Relative risk (RR) 6.21, 95% Confidence Interval (CI) 5.16-7.47) and *Spontaneous preterm* (RR 1.94, 95% CI 1.72-2.17) (Table 11).

PSANZ-PDC	Plurality						Relative Risk (95% CI)
	Singleton			Multiple			
	n	%	Rate	n	%	Rate	
1. Congenital abnormality	1,097	25.2	2.3	75	12.0	4.6	0.47 (0.38, 0.59) †
2. Perinatal infection	115	2.6	0.2	6	1.0	0.4	0.36 (0.16, 0.82) †
3. Hypertension	118	2.7	0.3	20	3.2	1.2	1.18 (0.74, 1.88)
4. Antepartum haemorrhage	325	7.5	0.7	37	5.9	2.3	0.79 (0.57, 1.10)
5. Maternal conditions	214	4.9	0.5	8	1.3	0.5	0.26 (0.13, 0.52) †
6. Specific perinatal conditions	198	4.5	0.4	177	28.2	11.0	6.21 (5.16, 7.47) †
7. Hypoxic peripartum deaths	148	3.4	0.3	7	1.1	0.4	0.33 (0.15, 0.70) †
8. Fetal growth restriction	173	4.0	0.4	21	3.3	1.3	0.84 (0.54, 1.32)
9. Spontaneous preterm	888	20.4	1.9	248	39.6	15.3	1.94 (1.72, 2.17) †
10. Unexplained antepartum death	949	21.8	2.0	53	8.5	3.3	0.39 (0.30, 0.50) †
11. No Obstetric antecedent	128	2.9	0.3	15	2.4	0.9	0.81 (0.48, 1.38)
Not Classified	1						
Total	4,354	100.0	9.3	627	100.0	38.8	

Table 11: Perinatal deaths by PSANZ PDC and plurality, Queensland 2000 to 2008
(Rate = per 1,000 births, † = statistically significant) (Total babies born 2000 to 2008 = 483,116.
Total singletons born 2000 to 2008 = 466,959. Total multiples born 2000 to 2008 = 16,157)

1.3.7 Indigenous perinatal mortality

In the period 2000 to 2008 in Queensland there were 26,391 births to Indigenous women and 497 perinatal deaths made up of 306 stillbirths and 191 neonatal deaths, giving perinatal mortality, stillbirth and neonatal death rates for Indigenous women of 18.8, 11.6, and 7.3 per 1000 births respectively. This compares unfavorably with rates for non-Indigenous women of 10.1, 6.6, and 3.5 respectively (Table 12).

	Total Births	Live Births	Stillbirths		Neonatal Deaths		Perinatal Deaths	
			n	Rate ¹	n	Rate ²	n	Rate ¹
Indigenous	26,391	26,085	306	11.6	191	7.3	497	18.8
Non-Indigenous ³	448,407	445,447	2,960	6.6	1,557	3.5	4,517	10.1
Relative risk for Indigenous (95% confidence interval)				1.76 (1.56, 1.98)		2.10 (1.80, 2.43)		1.87 (1.71, 2.05)

Table 12: Perinatal deaths by Indigenous status, Queensland 2000 to 2008
(1 = per 1,000 births; 2 = per 1,000 live births, 3: excludes 10 live births where the Indigenous status was not stated)

The perinatal death classification accounting for most of the increased perinatal mortality in Indigenous populations was *Spontaneous preterm*, which was almost three times more frequent than in the non-Indigenous population (RR 2.69 (95% CI 2.27, 3.18) occurring at a rate of 5.9/1000 births. Other important contributors to this disparity were *Hypertension* and deaths where *No obstetric antecedent* was identified (Table 13).

14 Goldenberg RL, McClure EM, Bhutta ZA, Belizan JM, Reddy UM, Rubens CE, Mabeya H, Flenady V, Darmstadt G, for The Lancet's Stillbirths Series steering committee. Stillbirths: the vision for 2020. *Lancet*. 2011 May 21; 377(9779):1798-1805.

A recent meta-analysis showed that, when controlling for confounders (such as medical conditions), the risk of stillbirth is similar for Indigenous and non-Indigenous women, highlighting that the excess in these deaths for Indigenous women is potentially preventable.¹⁵

PSANZ-PDC	Indigenous status						Relative Risk (95% CI)
	Non-Indigenous			Indigenous			
	n	%	Rate	n	%	Rate	
1. Congenital abnormality	1,090	24.1	2.4	81	16.3	3.1	1.26 (1.01, 1.58) †
2. Perinatal infection	107	2.4	0.2	14	2.8	0.5	2.22 (1.27, 3.88) †
3. Hypertension	109	2.4	0.2	29	5.8	1.1	4.52 (3.00, 6.81) †
4. Antepartum haemorrhage	329	7.3	0.7	33	6.6	1.3	1.70 (1.19, 2.44) †
5. Maternal conditions	199	4.4	0.4	23	4.6	0.9	1.96 (1.28, 3.02) †
6. Specific perinatal conditions	347	7.7	0.8	27	5.4	1.0	1.32 (0.89, 1.96)
7. Hypoxic peripartum deaths	148	3.3	0.3	7	1.4	0.3	0.80 (0.38, 1.72)
8. Fetal growth restriction	175	3.9	0.4	18	3.6	0.7	1.75 (1.08, 2.84) †
9. Spontaneous preterm	981	21.7	2.2	155	31.2	5.9	2.69 (2.27, 3.18) †
10. Unexplained antepartum death	910	20.1	2.0	86	17.3	3.3	1.61 (1.29, 2.00) †
11. No obstetric antecedent	119	2.6	0.3	23	4.6	0.9	3.28 (2.10, 5.13) †
Not classified	3	0.1	0.0	1	0.2	0.0	
Total	4,517	100.0	10.1	497	100.0	18.8	1.87 (1.71, 2.05)

Table 13: Perinatal deaths by PSANZ PDC and Indigenous status, Queensland 2000 to 2008

(Rate = per 1,000 births, † = statistically significant) (Total babies born 2000 to 2008 = 483,116. Total Indigenous babies born 2000 to 2008 = 26,391, Total non-Indigenous babies born 2000 to 2008 = 448,407, Indigenous status not stated = 133)

1.3.8 Gestational age and birth weight specific perinatal mortality rates

Seventy-nine per cent (79.0%) of perinatal deaths occur in the 8.6% of births which occur at or before 36 weeks gestation, and 55.5% occur in the 0.9% of births which occur before 28 weeks (Table 14).

Births at term (37-41 weeks) made up 90% of births and 20% of all perinatal deaths. Over this period there were 4,733 births (1% of all births) and 27 perinatal deaths at 42 weeks or more gestation giving a perinatal mortality rate of 5.7/1000 in this group compared with 2.3/1000 for births at 37-41 weeks. Using the more appropriate denominator of the number of ongoing pregnancies to calculate risk at each gestational age week clearly reveals the increased risk of perinatal death after 41 weeks¹⁶ and induction of labour for women beyond 41 weeks gestation reduces this risk.¹⁷

Gestation (weeks)	Number of perinatal deaths at this gestation	Number of babies born at this gestation	Percentage of perinatal deaths	Percentage of babies born	Perinatal mortality rate
< 22	1,057	1,057	21.1	0.2	1,000.0
22-23	964	989	19.2	0.2	974.7
24-25	486	913	9.7	0.2	532.3
26-27	280	1,163	5.6	0.2	240.8
28-29	242	1,716	4.8	0.4	141.0
30-32	347	4,979	6.9	1.0	69.7
33-36	589	30,885	11.7	6.4	19.1
37-41	1,022	436,631	20.4	90.4	2.3
42 +	27	4,733	0.5	1.0	5.7
Not stated	7	50			
Total	5,021	483,116	100.0	100.0	10.4

Table 14: Perinatal deaths by gestation, Queensland 2000 to 2008

- 15 Flenady V, Koopmans L, Middleton P, Frøen FJ, Smith GC, Gibbons K, Coory M, Gordon A, Ellwood D, McIntyre HD, Fretts R, Ezzati M. Major risk factors for stillbirth in high-income countries: a systematic review and meta-analysis. *Lancet*. 2011 Apr 16; 377(9774):1331-40.
- 16 Yudkin PL, Wood L, Redman CW. Risk of unexplained stillbirth at different gestational ages. *Lancet*. 1987 May 23;329(8543):1192-4.
- 17 Gülmezoglu AM, Crowther CA, Middleton P. Induction of labour for improving birth outcomes for women at or beyond term. *Cochrane Database of Systematic Reviews* 2006, Issue 4. Art. No.: CD004945. DOI: 10.1002/14651858.CD004945.pub2.

The perinatal mortality rate, and its constituent stillbirth and neonatal mortality rates are seen to reach a nadir at 37-41 weeks gestation (Figure 4).

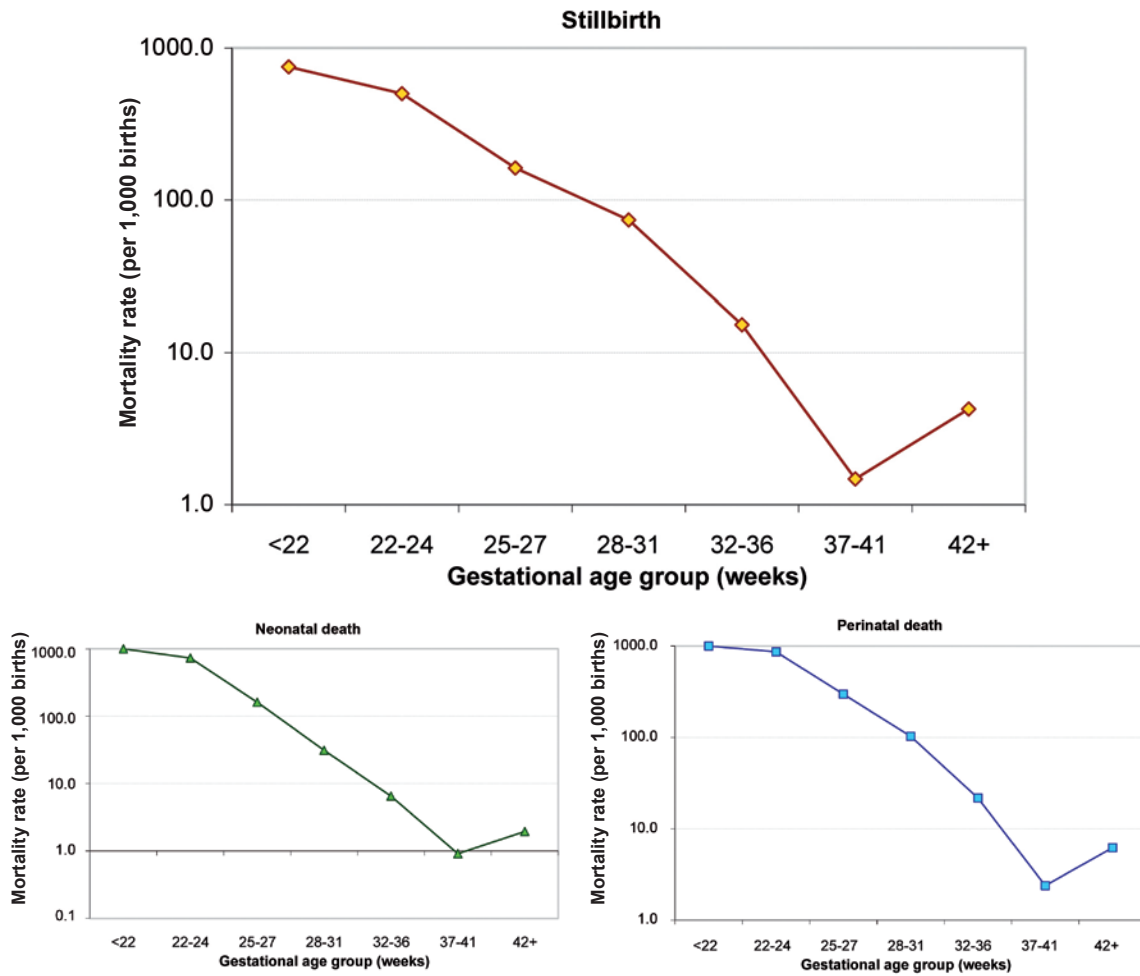


Figure 5: Perinatal, stillbirth and neonatal mortality rates by gestation, Queensland 2000 to 2008 (logarithmic scale)

Seventy-seven per cent (77.1%) of perinatal deaths occur in the 7.0% of births where birth weight is less than 2,500g, and 64.5% where the birth weight is less than 1,500g (1.6% of babies born) (Table 15).

Birth weight (g)	Number of perinatal deaths in this birth weight group	Number of babies born in this birth weight group	Percentage of perinatal deaths	Percentage of babies born	Perinatal mortality rate
< 500	1,681	1,707	33.5	0.4	984.8
500-999	1,200	2,526	23.9	0.5	475.1
1000-1499	359	3,352	7.1	0.7	107.1
1500-1999	315	6,715	6.3	1.4	46.9
2000-2499	315	19,543	6.3	4.0	16.1
2500-2999	412	69,365	8.2	14.4	5.9
3000-3499	360	167,681	7.2	34.7	2.1
3500-3999	237	151,079	4.7	31.3	1.6
4000-4499	79	51,842	1.6	10.7	1.5
4500-4999	20	8,376	0.4	1.7	2.4
5000+	7	851	0.1	0.2	8.2
Not stated	36	79			
Total	5,021	483,116	100	100	10.4

Table 15: Perinatal deaths by birth weight, Queensland 2000 to 2008

In a similar fashion to the changes seen with perinatal mortality rate in relation to gestation, the perinatal mortality rate and its constituent stillbirth and neonatal mortality rates are seen to reach a nadir at 3,500 to 4,000g (Figure 5).

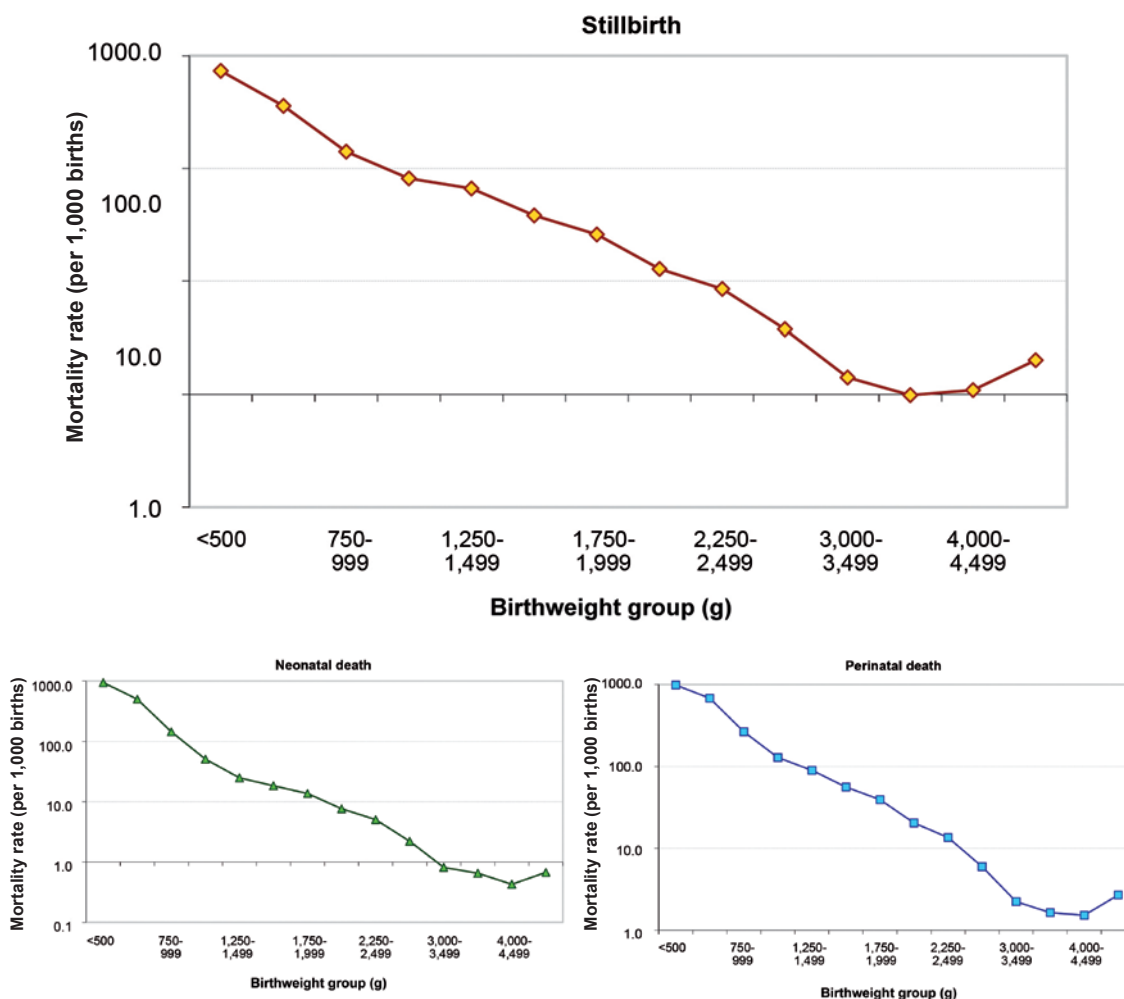


Figure 6: Perinatal, stillbirth and neonatal mortality rates by birth weight, Queensland 2000 to 2008 (logarithmic scale)

The major classifications of cause of perinatal death and neonatal death are shown in tables 16 and 17, related to gestation at birth, and according to birth weight in Tables 18 and 19.

Congenital abnormality was an important contributor to perinatal death across all gestational age and birth weight groups examined. The contribution of *Unexplained* stillbirth increased with increasing gestation contributing 35.4% to all perinatal deaths at 37 weeks or more. The category of *Hypoxic peripartum death* made up 11.8% of deaths at 37 weeks or more gestation.

The main cause of neonatal deaths according to the PSANZ-NDC was *Extreme prematurity*, making up almost one-third of all neonatal deaths and almost 60% of those less than 28 weeks. The majority (49%) of these deaths were not actively resuscitated. *Cardio-respiratory conditions* (mainly Respiratory Distress Syndrome) were most prominent in the <28 week group making up 17% of deaths in this gestational age group.

The contribution of *Neurological* conditions increased with increasing gestation contributing 24% to neonatal deaths occurring for infants born at 37 weeks or more. These deaths were mainly due to the clinical picture of hypoxic ischemic encephalopathy and further examination into the factors surrounding these deaths is required. Another important contributor to neonatal deaths was *Infection* (mostly acquired bacterial); making up 7.4% of all deaths and 8.1% of those at 37 weeks or more.

Of the 100 (5.7%) of neonatal deaths classified in the *Other* category, 27 deaths were attributed to SIDS, two to unclassified sudden infant death and a further 38 were classified as other, unknown or undetermined.

PSANZ –PDC classification	Gestational age at birth (weeks)							
	<28		28-36		37+		Total	
	n	%	n	%	n	%	n	%
1. Congenital abnormality	637	22.9	303	25.7	231	22	1,172	23.3
2. Perinatal infection	59	2.1	33	2.8	29	2.8	121	2.4
3. Hypertension	77	2.8	52	4.4	8	0.8	138	2.7
4. Antepartum haemorrhage	215	7.7	102	8.7	45	4.3	362	7.2
5. Maternal conditions	122	4.4	57	4.8	42	4	222	4.4
6. Specific perinatal conditions	215	7.7	102	8.7	58	5.5	375	7.5
7. Hypoxic peripartum deaths	5	0.2	25	2.1	124	11.8	155	3.1
8. Fetal growth restriction	66	2.4	77	6.5	51	4.9	194	3.9
9. Spontaneous preterm	1,069	38.4	65	5.5	2	0.2	1,136	22.6
10. Unexplained antepartum death	286	10.3	343	29.1	371	35.4	1,002	20
11. No obstetric antecedent	35	1.3	19	1.6	88	8.4	143	2.8
Not classified	1						1	
Total	2,787	100	1,178	100	1,049	100	5,021	100
Rate per 1,000 births	676.1		31.3		2.4		10.4	

Table 16: Perinatal deaths by PSANZ-PDC and gestational age, Queensland 2000 to 2008
(7 cases excluded in the gestational age analysis due to missing gestation data)

PSANZ –NDC classification	Gestational age at birth (weeks)							
	<28		28-36		37+		Total	
	n	%	n	%	n	%	n	%
1. Congenital abnormality	124	12.3	193	55.5	194	49.2	511	29.2
2. Extreme prematurity	560	55.5	9	2.6	0	0.0	569	32.5
Not resuscitated	494	49.0	8	2.3	0	0.0	502	28.7
Unsuccessful resuscitation	62	6.1	1	0.3	0	0.0	63	3.6
Resuscitation not specified	4	0.4	0	0.0	0	0.0	4	0.2
3. Cardio-respiratory disorders	166	16.5	27	7.8	15	3.8	208	11.9
4. Infection	63	6.2	34	9.8	32	8.1	129	7.4
5. Neurological	39	3.9	45	12.9	95	24.1	179	10.2
6. Gastrointestinal	32	3.2	14	4.0	5	1.3	51	2.9
7. Other	24	2.4	26	7.5	50	12.7	100	5.7
Not classified	1		0		3		4	
Total	1,009	100.0	348	100.0	394	100.0	1,751	100.0
Rate per 1,000 live births	430.6		9.5		0.9		3.7	

Table 17: Neonatal deaths by PSANZ-PDC and gestational age, Queensland 2000 to 2008

PSANZ-PDC	Birth Weight (g)							
	<1000		1000-2499		2500+		Total	
	n	%	n	%	n	%	n	%
1. Congenital abnormality	651	22.6	286	27.9	235	21.1	1,172	23.3
2. Perinatal infection	58	2	25	2.4	38	3.4	121	2.4
3. Hypertension	90	3.1	40	3.9	8	0.7	138	2.7
4. Antepartum haemorrhage	206	7.2	102	10	54	4.8	362	7.2
5. Maternal conditions	121	4.2	42	4.1	59	5.3	222	4.4
6. Specific perinatal conditions	226	7.8	74	7.2	75	6.7	375	7.5
7. Hypoxic peripartum deaths	4	0.1	20	2	131	11.7	155	3.1
8. Fetal growth restriction	105	3.6	62	6	27	2.4	194	3.9
9. Spontaneous preterm	1,046	36.3	85	8.3	5	0.4	1,136	22.6
10. Unexplained antepartum death	341	11.8	263	25.7	398	35.7	1,002	20
11. No obstetric antecedent	33	1.1	25	2.4	85	7.6	143	2.8
Not classified			1				1	
Total	2,881	100	1,025	100	1,115	100	5,021	100
Rate per 1,000 births	680.6		34.6		2.5		10.4	

Table 18: Perinatal deaths by PSANZ-PDC and birth weight, Queensland 2000 to 2008

PSANZ –NDC classification	Birth Weight (g)								
	<1000		1000-2499		2500+		Birth weight not specified	Total	
	n	%	n	%	n	%		n	%
1. Congenital abnormality	127	12.7	186	54.9	196	48.8	2	511	29.2
2. Extreme prematurity	556	55.5	11	3.2			2	569	32.5
Not resuscitated	496	49.5	5	1.5				502	28.7
Unsuccessful resuscitation	57	5.7	6	1.8				63	3.6
Resuscitation not specified	3	0.3		0.0				4	0.2
3. Cardio-respiratory disorders	159	15.9	33	9.7	16	4.0		208	11.9
4. Infection	66	6.6	28	8.3	33	8.2	2	129	7.4
5. Neurological	35	3.5	42	12.4	100	24.9	2	179	10.2
6. Gastrointestinal	31	3.1	16	4.7	4	1.0		51	2.9
7. Other	26	2.6	23	6.8	51	12.7		100	5.7
Not classified	2				2	0.5		4	
Total	1,002	100.0	339	100.0	402	100.0	8	1,751	100.0
Rate per 1,000 live births	425.8		11.7		0.9			3.7	

Table 19: Neonatal deaths by PSANZ-NDC and birth weight, Queensland 2000 to 2008

1.3.9 Perinatal autopsies

Autopsy rates for perinatal deaths over the period 2000 to 2009 are shown in Figure 7 and Table 25. Following a decline from 37.3% in 2000 to a very low rate of 20.7% in 2004 there was a steady increase to 33.8% in 2009. However, while it is encouraging to see the stillbirth autopsy rate continue to increase to 37.4% in 2009, over more recent times the neonatal death rate has declined to 24.5% in 2009 from 31.2% in 2007. Autopsy remains the gold standard investigation for perinatal deaths¹⁸ and while an optimal autopsy rate is unclear, the Royal College of Obstetricians and Gynaecologists, and the Royal College of Pathologists has recommended a rate of 75%¹⁹.

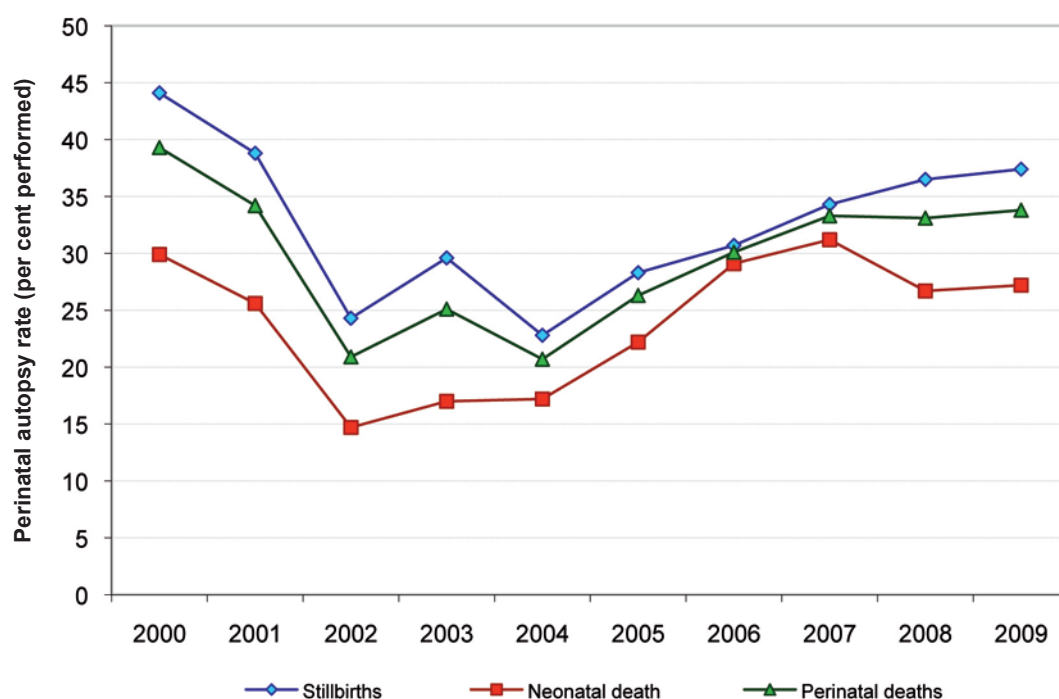


Figure 7: Perinatal autopsies by type of death, Queensland 2000 to 2008

18 Khong TY. Pathology investigations. In: Facchinetti F, Dekker GA, Baronciani D, Saade G, eds. Stillbirth: Understanding and management. London: Informa Healthcare; 2009:91-96.
 19 Royal College of Pathologists. Guidelines of Autopsy Practise: Report of a working group of the Royal College of Pathologists London: Royal College of Pathologists; 2002.

2.0 Pregnancy and newborn care

2.1 Care mode

Over the decade 2000 to 2009, 535,955 women gave birth to 545,168 babies in Queensland. During this period, the total number of births per year increased by 25.8%; there was an 18.3% increase in Public hospital births and 47.6% increase in Private hospital births (Figure 8, Table 28).

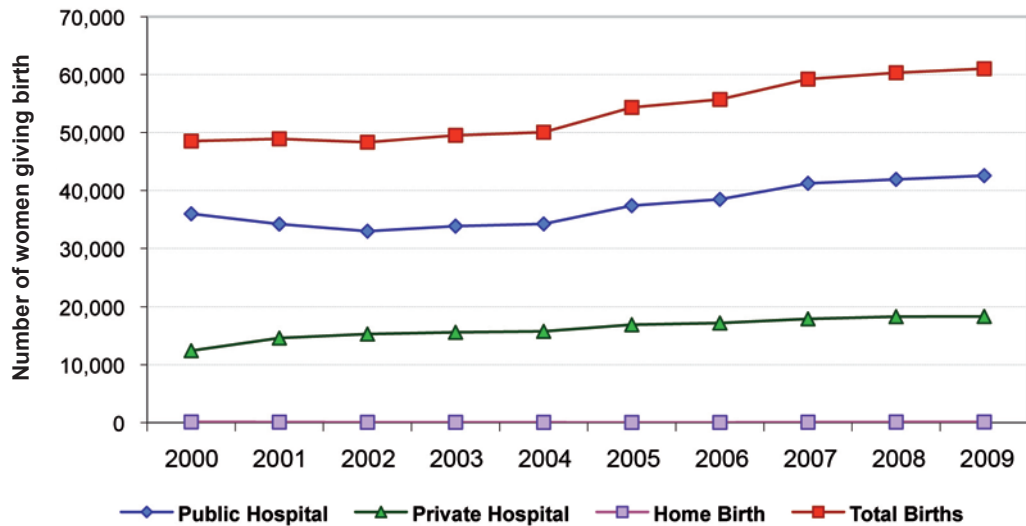


Figure 8: Number of births in Queensland 2000 to 2009, by care provider (refer Table 28)

The increasing uptake of Private versus Public hospital care by women between 1988 and 2007, as noted in the 2010 report, has not persisted. Public hospital care is relatively stable at approximately 70% of women giving birth and Private hospital care relatively stable at approximately 30% of women giving birth (Figure 9, Table 28).

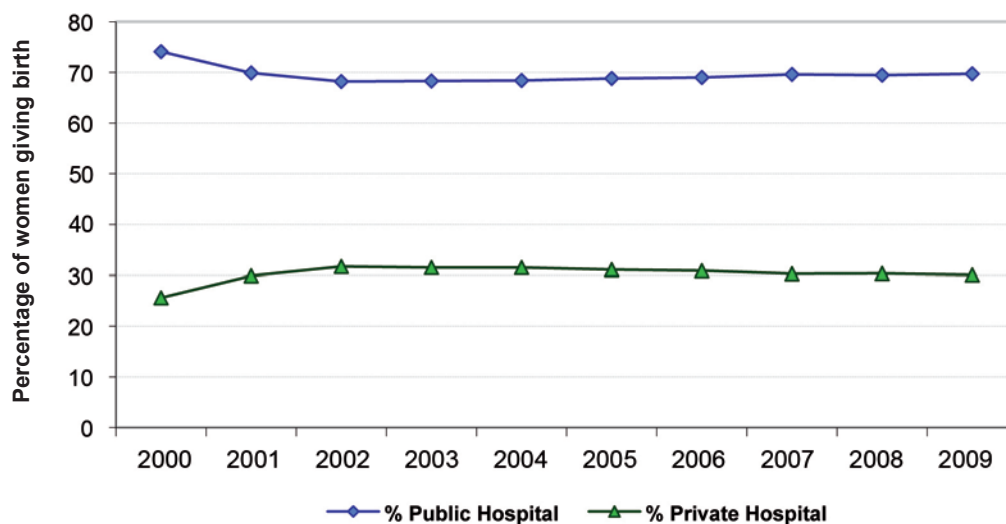


Figure 9: Percentage of women accessing Public and Private birth care Queensland 2000 to 2009 (refer Table 28)

From 2000 onwards data relating to intended place of birth and actual place of birth have been collected, with data collection from 2001 onwards being complete.

In the nine years from 2001 to 2009, 481,198 of the 487,431 (98.7%) women intended to give birth in a hospital; 478,691 of the 486,402 (98.4%) women who intended to give birth in hospital achieved that aim, with 170 giving birth at home, 13 giving birth in a Birth Centre, and the remaining 2324 (0.5%) giving birth in “other” circumstances (i.e. “Born before arrival”).

In the same period, 5,226 women intended to give birth in a Birth Centre (1.1%); 4,166 (79.7%) achieved that aim, with 964 (18.4%) giving birth in hospital, 11 giving birth at home, and 85 in “other” circumstances.

2.2 Home birth

Eight hundred and sixteen (816) women are recorded as having a planned home birth between 2000 and 2009 (Tables 28 and 29). This number represents 0.15% of the total births in Queensland in that period. The number of home births per year continues to fluctuate widely, (Table 28). For most of the period 65-70% percentage of the women giving birth at home were in the age group 20 to 34 years, and 30-35% were in the 35 years and over age group (Figure 10, Table 29).

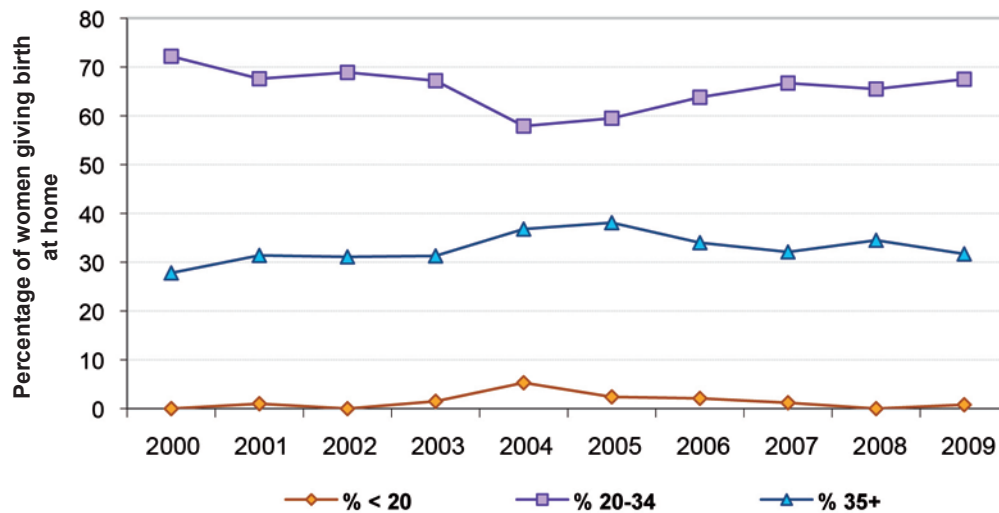


Figure 10: Percentage of home births Queensland 2000 to 2009, by maternal age group (refer Table 28)

In both 2008 and 2009 approximately 78% of women who intended to have a home birth achieved this aim (110 of 141 in 2008 and 123 of 158 in 2009).

2.3 Maternal age

The majority of births (409,991 of 535,955; 76.6%) were to women aged 20-34 years (Figure 11, Table 30). However, the percentage of women 35 years or more giving birth continues to increase significantly, from 14.8% to 19.9% during this decade (35+ vs <35; odds ratio 1.43; 95% confidence limits 1.39, 1.48)(Figure 12, Table 30).

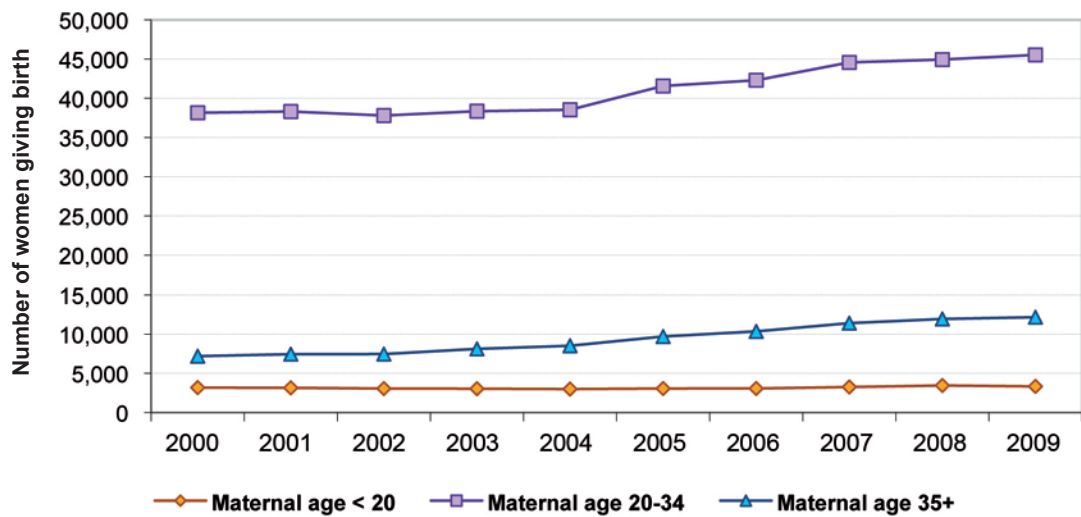


Figure 11: Number of births in Queensland 2000 to 2009 by maternal age (refer Table 30)

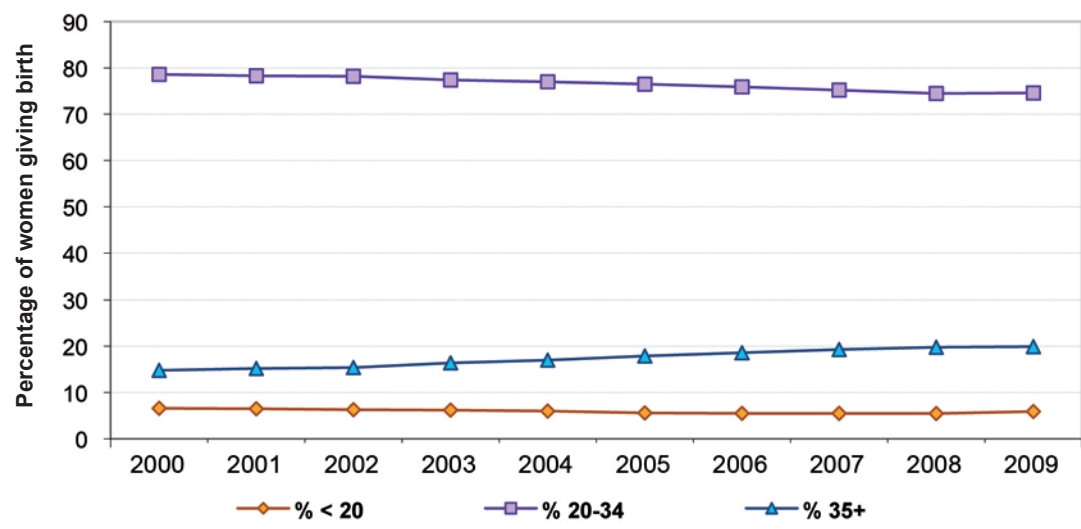


Figure 12: Percentage of births in Queensland 2000 to 2009 by maternal age group (refer table 30)

The majority of women aged less than 20 years (30,700 of 31,658, 97.0%) gave birth in Public hospitals during this decade. In contrast, 290,957 women aged 20-34 years (70.1% of 409,980) and 51,015 women aged 35 or more (54.1% of 94,300) gave birth in Public hospitals (Figures 13 to 15, Table 31).

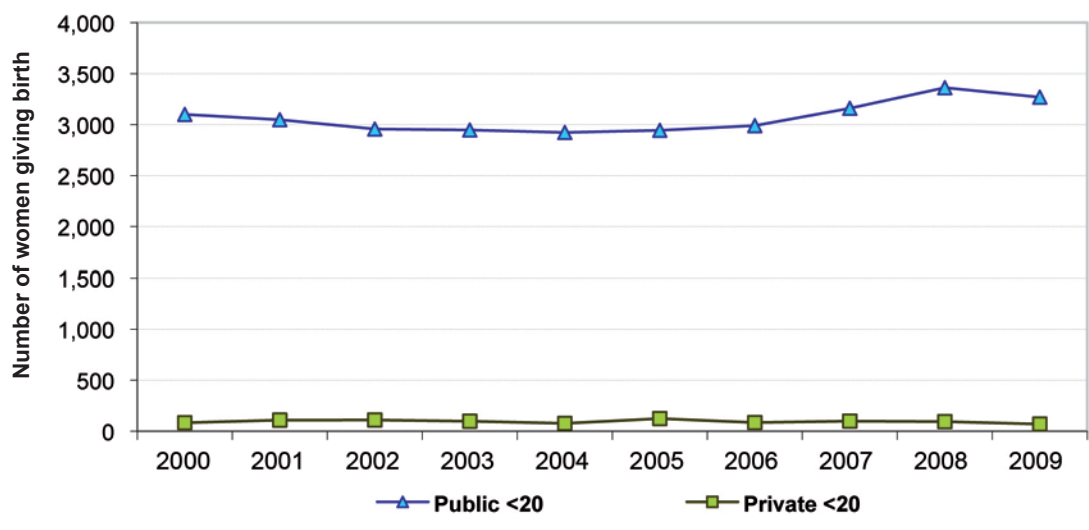


Figure 13: Number of births to women less than 20 years of age by care provider, Queensland 2000 to 2009 (refer Table 31)

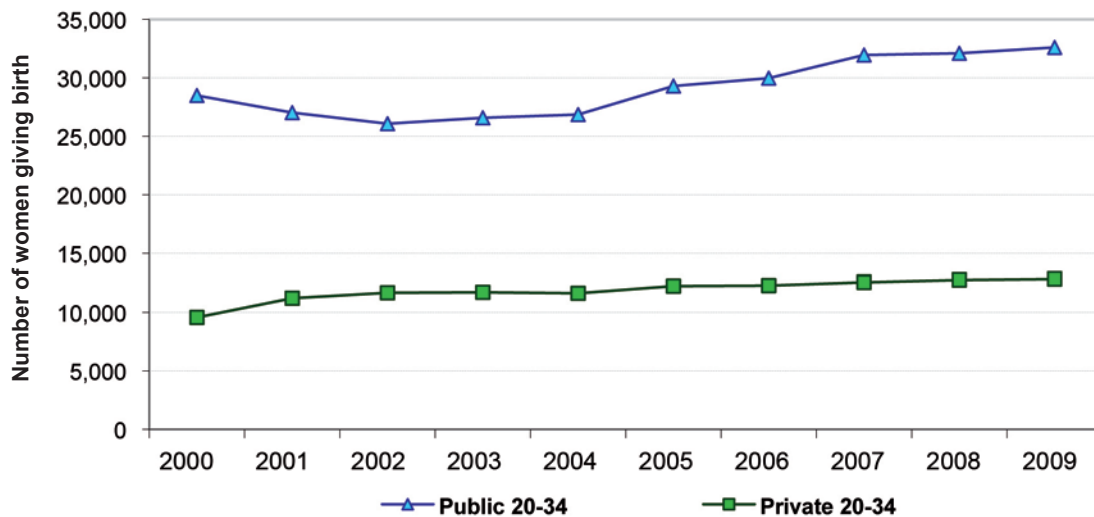


Figure 14: Number of births to women 20-34 years of age by care provider, Queensland 2000 to 2009 (refer Table 31)

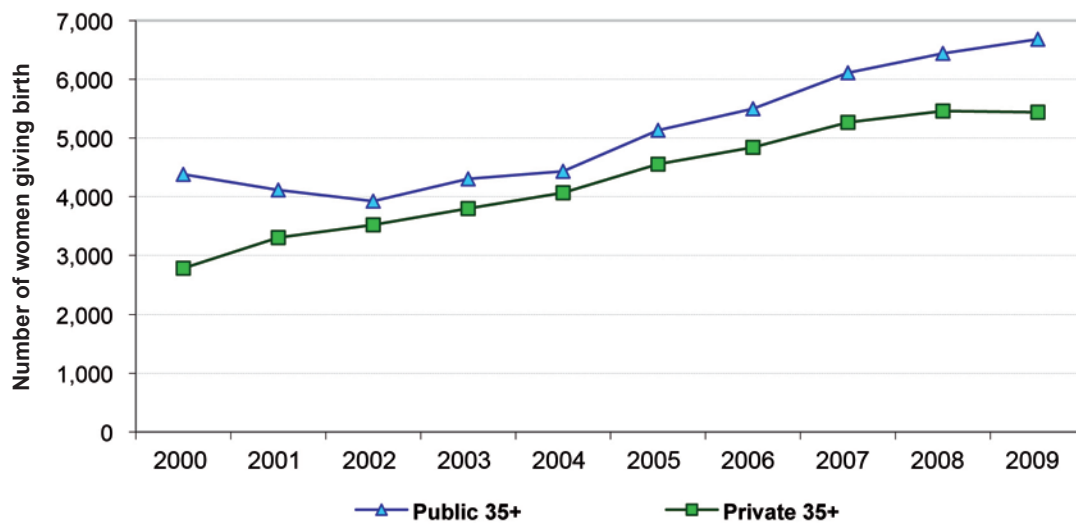


Figure 15: Number of births to women 35 or more years of age by care provider, Queensland 2000 to 2009 (refer Table 31)

The incidence of multiple birth is seen to increase with maternal age (Figure 16, Table 32).

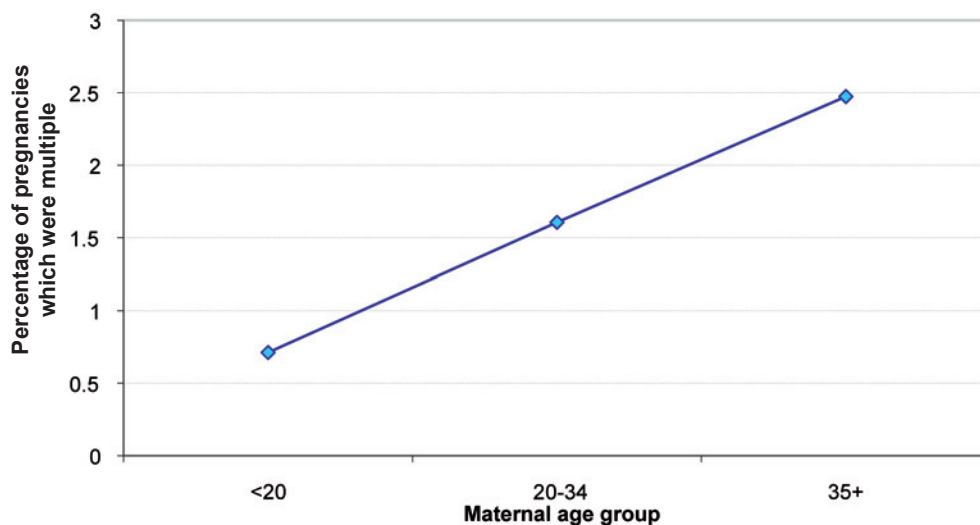


Figure 16: Incidence of multiple birth by maternal age, Queensland 2008 to 2009 (refer Table 32)

The incidence of low birth weight births, birth at 36 weeks gestation or less, and birth of babies requiring admission to a Neonatal Intensive Care Unit (NICU) or a Special Care Nursery (SCN) was lowest in women giving birth at a maternal age of 20 to 34 years (Figures 17 to 19, Tables 33 to 35).

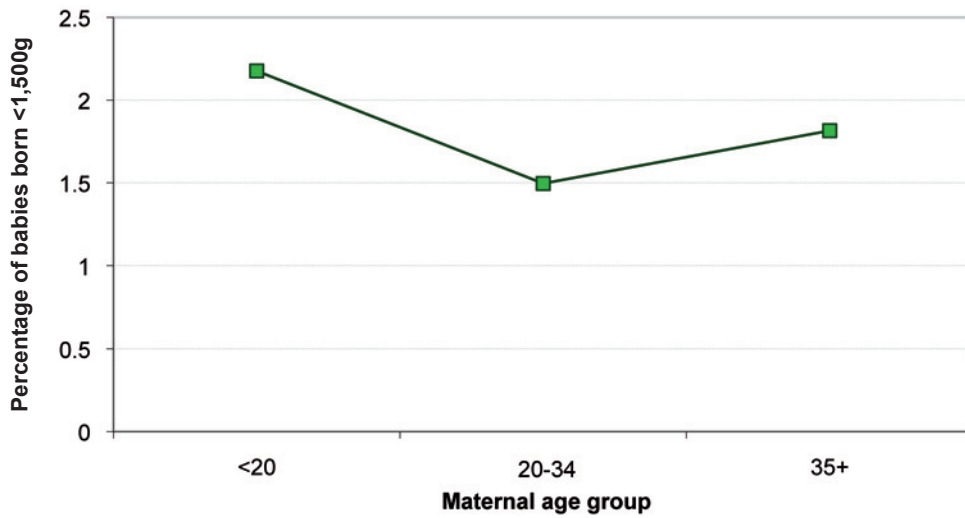


Figure 17: Incidence of birth of babies weighing less than 1500g by maternal age, Queensland 2000 to 2009 (refer Table 33)

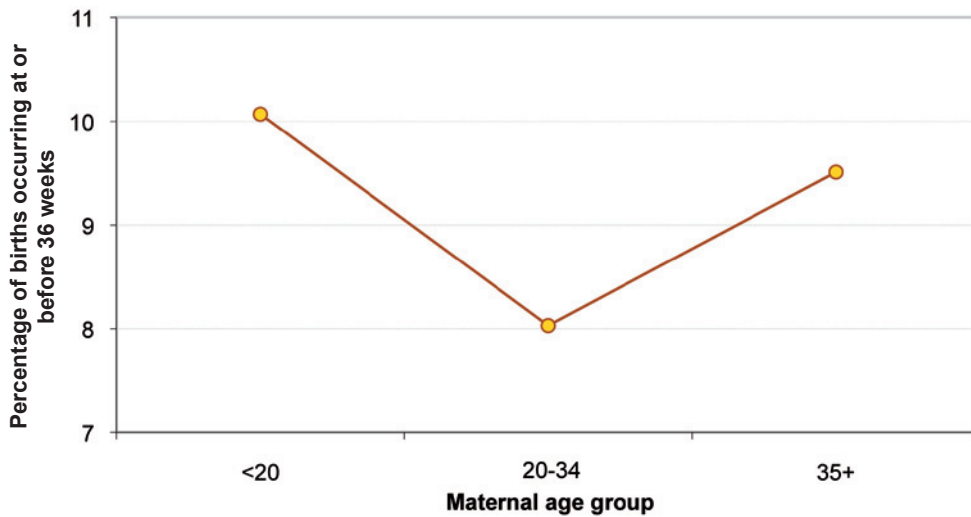


Figure 18: Incidence of birth at or before 36 weeks gestation by maternal age, Queensland 2000 to 2009 (refer Table 34)

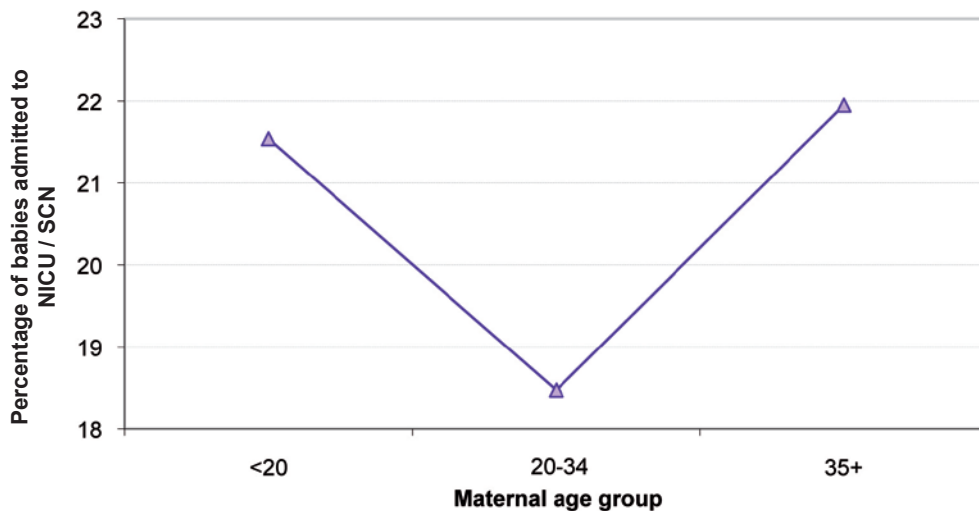


Figure 19: Incidence of birth of babies requiring admission to a neonatal intensive care unit (NICU) or a special care nursery (SCN) by maternal age, Queensland 2000 to 2009 (refer Table 35)

2.4 Gestation at birth

In the decade 2000 to 2009, 26,630 women (5.0%) gave birth at less than 36 weeks gestation (Tables 36 and 37). Though this overall incidence of pre-36 week birth remained relatively constant, there was a noticeable increase in the 36-38 week cohort, and an associated decrease in the 39+ week cohort in this time period (Figures 20 and 21, Tables 36 and 37). The trend to a reduction in pregnancies proceeding past 41 weeks gestation, noted in the 2010 report of this Council, continued to be seen.

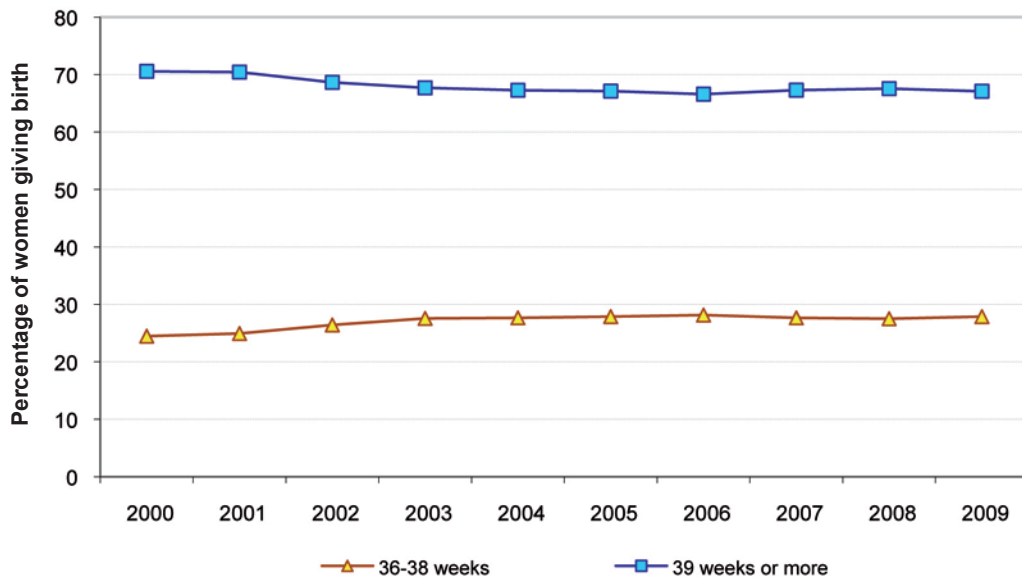


Figure 20: Percentage of women giving birth in Queensland 2000 to 2009 at gestations of 36 weeks or more (refer Tables 37)

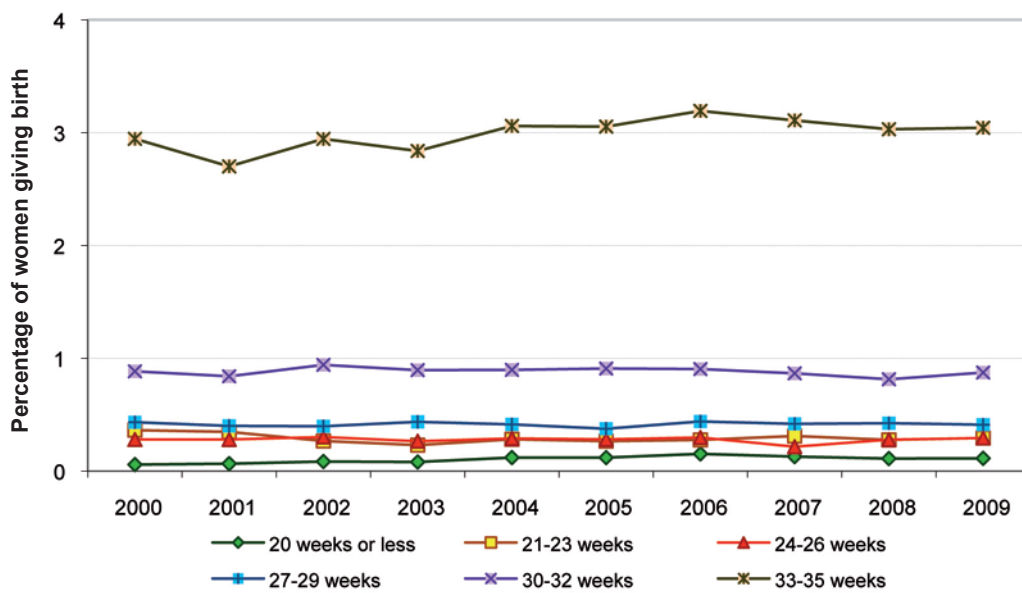


Figure 21: Percentage of women giving birth in Queensland 2000 to 2009 at gestations less than 36 weeks (refer Tables 37)

Consistent with the changes seen in Figure 13, the distribution of babies born at 36 weeks gestation or more has seen some change over the decade; 515,462 of the 545,168 (94.4%) babies were born in this gestational cohort, but there was an increase in the percentage born between 36 and 38 weeks and a reduction in the more mature group born at 39 weeks or more (39+ vs 36-38; odds ratio 1.20; 95% confidence limits 1.17, 1.23) (Figure 22, Table 38 and 39).

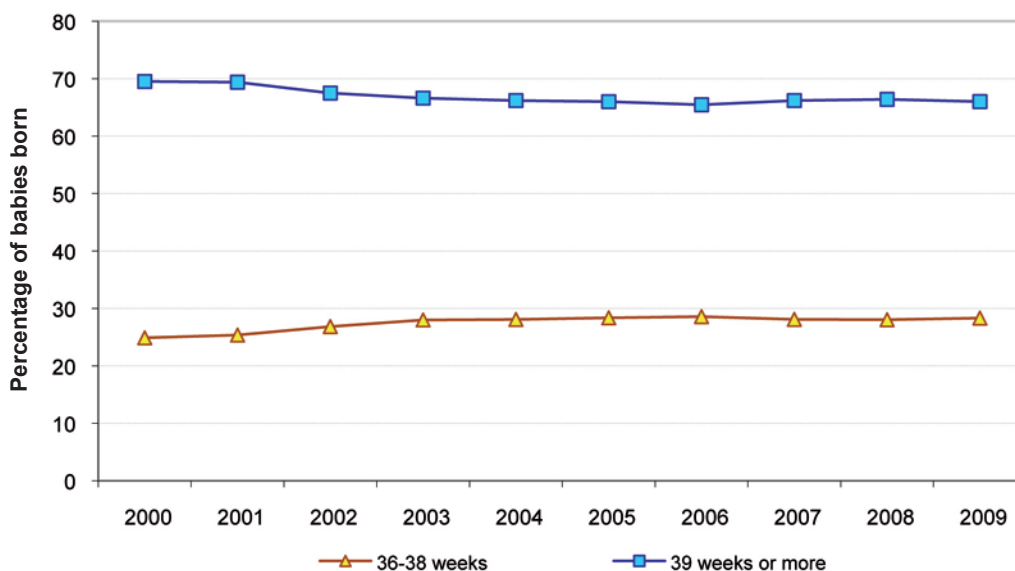


Figure 22: Percentage of babies born at 36 weeks or more in Queensland 2000 to 2009 by gestation (refer Table 39)

The gestational distribution of babies being born at less than 36 weeks gestation has remained stable throughout most of the decade (Figure 23, Table 39).

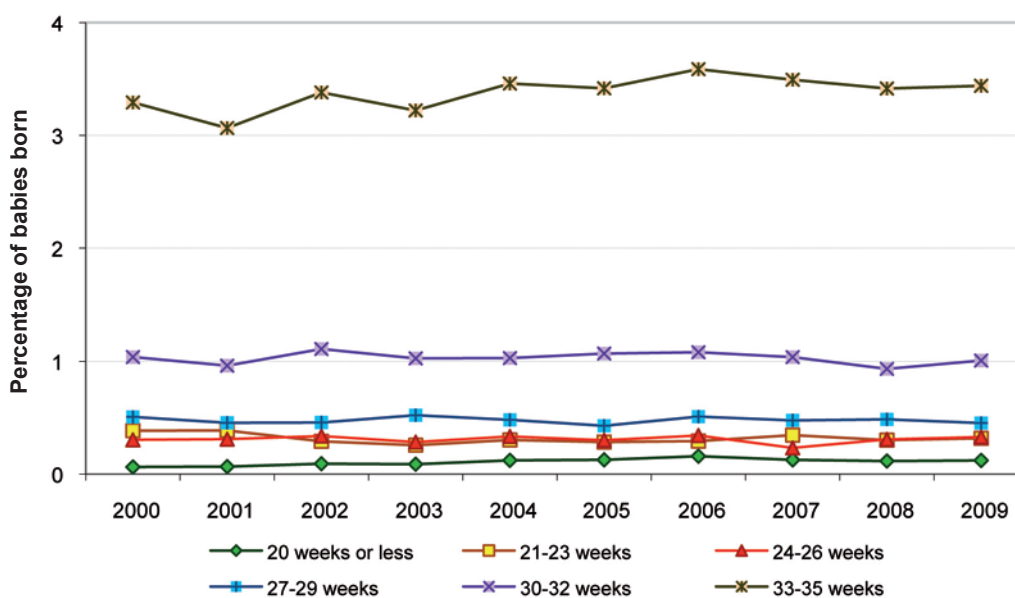


Figure 23: Percentage of babies born at less than 36 weeks gestation in Queensland 2000 to 2009 (refer Table 39)

The incidence of birth at gestations less than 37 weeks was lower in Private hospitals than Public hospitals over this decade (Figure 24, Table 40), consistent with the higher level of neonatal care available within the Public hospital system. Whilst the incidence of birth at less than 37 weeks remained relatively stable in the Public hospitals, it was seen to rise from 6.5% to 7.3% in Private hospitals in this period.

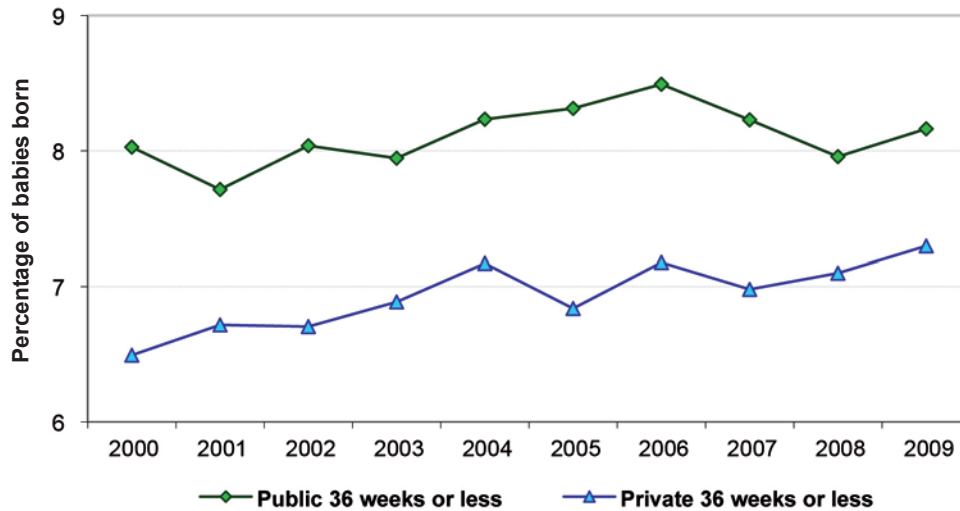


Figure 24: Percentage of babies born at less than 37 weeks gestation in Queensland 2000 to 2009 by mode of care (refer Table 40)

Women in the age group 20 to 34 years of age had a higher incidence of birth occurring in the gestational period 37 to 41 weeks, when compared with their older and younger counterparts (Figure 25, Table 41). It is not clear whether there is adequate community awareness of these differential outcomes in the community.

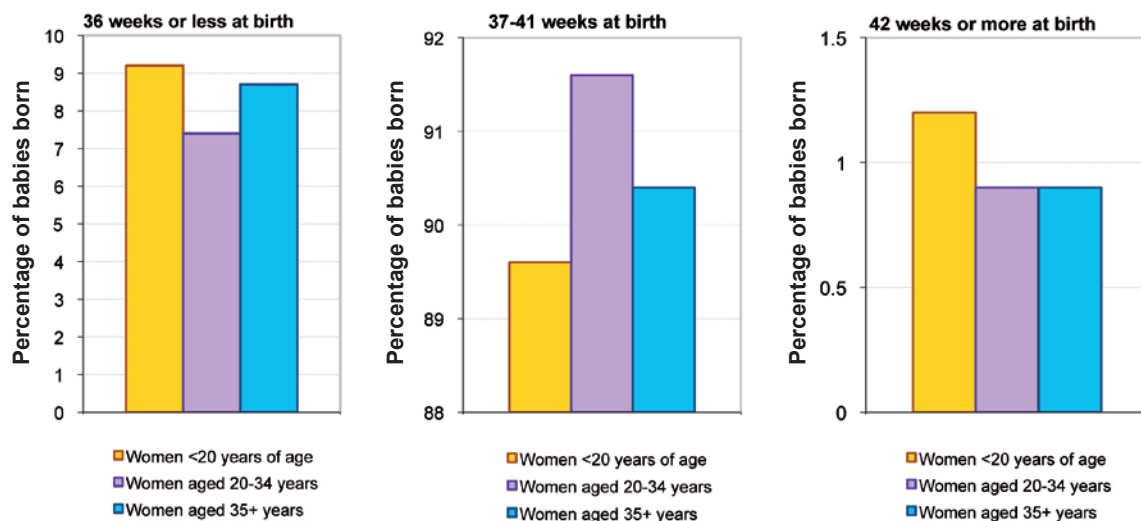


Figure 25: Percentage of babies born at less than 37 weeks gestation in Queensland 2000 to 2009 by maternal age (refer Table 41)

Women having their first birth were more likely to give birth to their babies close to term (40 weeks); women who had given birth previously had an increased incidence of giving birth to their babies in the period 37 to 39 weeks gestation (Figure 26, Table 42). This data was not available for the year 2000.

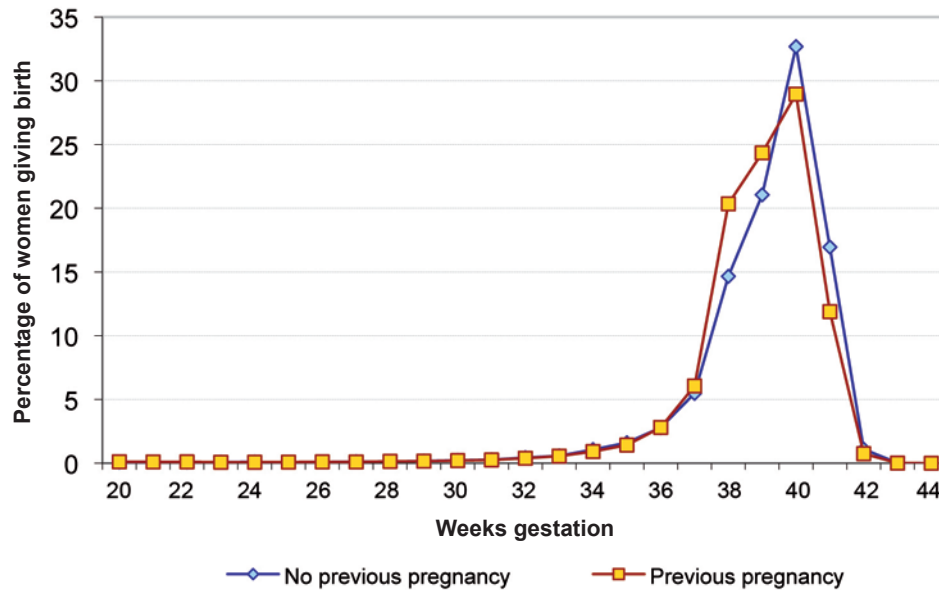


Figure 26: Percentage of women giving birth in Queensland 2001 to 2009 by previous pregnancy (refer Table 42)

Women in Private hospital care had an increased incidence of giving birth to a baby in the 36 to 39 week gestational period when compared with women in Public hospital care (Figure 27, Table 43). This difference relates almost entirely to the high elective caesarean section rate in Private care and the strong likelihood that such elective caesarean sections are performed prior to 39 weeks gestation (Figure 28, Table 43).

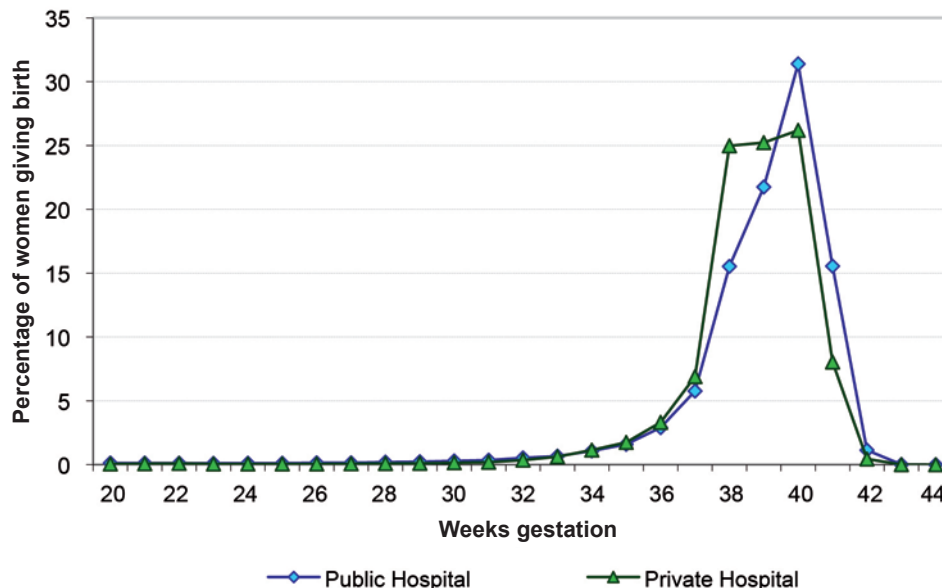


Figure 27: Percentage of babies born in Queensland 2000 to 2009 by mode of care and gestation (refer Table 43)

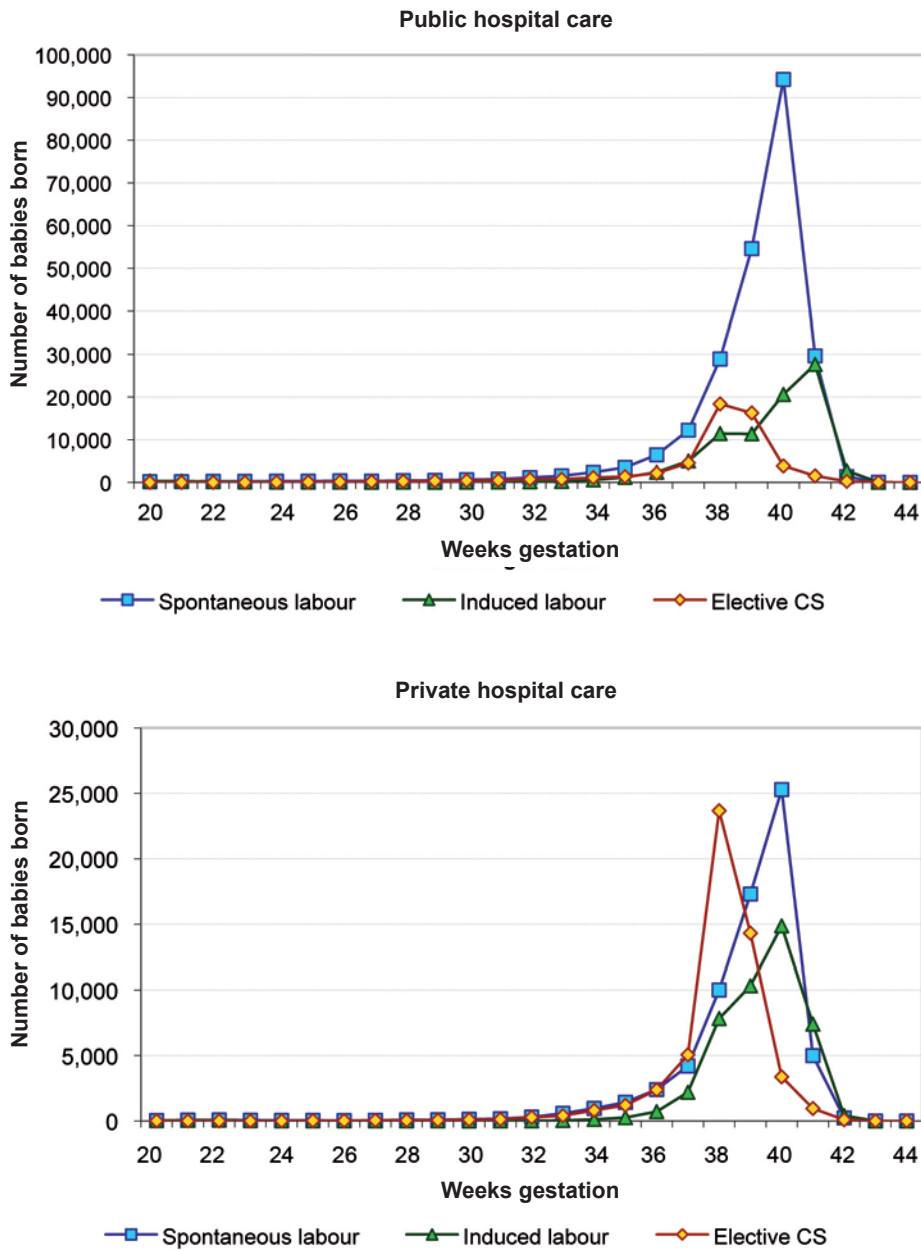


Figure 28: Number of babies born in Queensland 2000 to 2009 by mode of care, gestation, and onset of labour (refer Table 43)

Babies born at 36-38 weeks gestation are almost 2.5 times more likely to require admission to a neonatal intensive care unit or a special care nursery than babies born at 39 weeks or more (20.8% compared with 8.7%) and more than 2 times as likely to die in the perinatal period (4.75 perinatal deaths per 1,000 births compared with 2.05 perinatal deaths per 1,000 births) (Table 44). The higher incidence of need for neonatal intensive care unit or a special care nursery admission and of perinatal death is most marked in babies born electively (elective caesarean section or induced labour).

2.5 Birth weight

The distribution of birth weights remained constant over this decade, with 80.3% of the babies born in this period weighing 2,500 to 3,999g (Figure 29, Table 45). Seven per cent (7.0%) of the babies weighed less than 2,500g (1.6% less than 1500g and 5.4% between 1,500 and 2,499g) (Figure 30, Table 45). Babies weighing 4,000g or more made up 12.7% of the cohort. These data do not support a belief in some sectors of the maternity health care community that birth weights in Queensland are increasing.

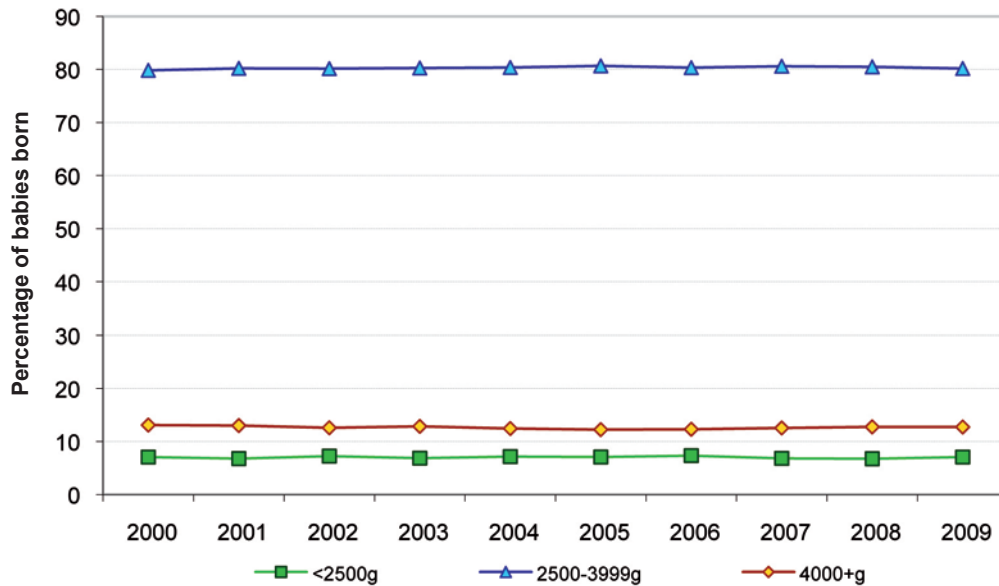


Figure 29: Percentage of babies weighing 2,500g or more born in Queensland 2000 to 2009 by birth weight group (refer Table 45)

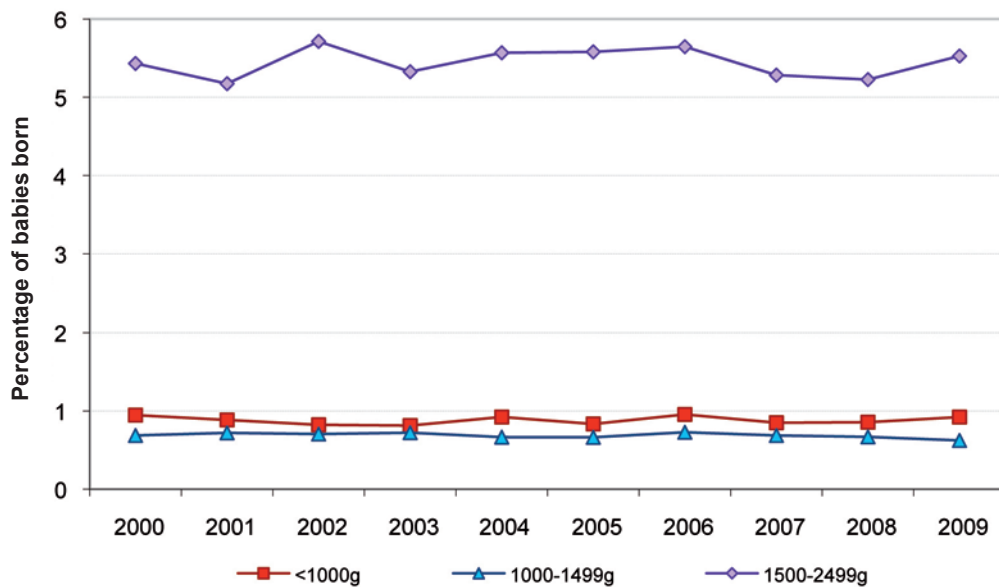


Figure 30: Percentage of low birth weight babies born in Queensland 2000 to 2009 by birth weight group (refer Table 45)

2.6 Multiple pregnancies

Eight thousand, nine hundred and eighty women (8,980) had multiple pregnancies during this decade (1.7% of 535,955 pregnancies) (Table 46). There was a clear age differential in the incidence of multiple pregnancy, with 2.4% of pregnancies in women over the age of 35 being multiple, compared with 1.6% in women aged 20 to 34, and 0.7% in women aged less than 20 (Figure 31, Tables 47 and 48).

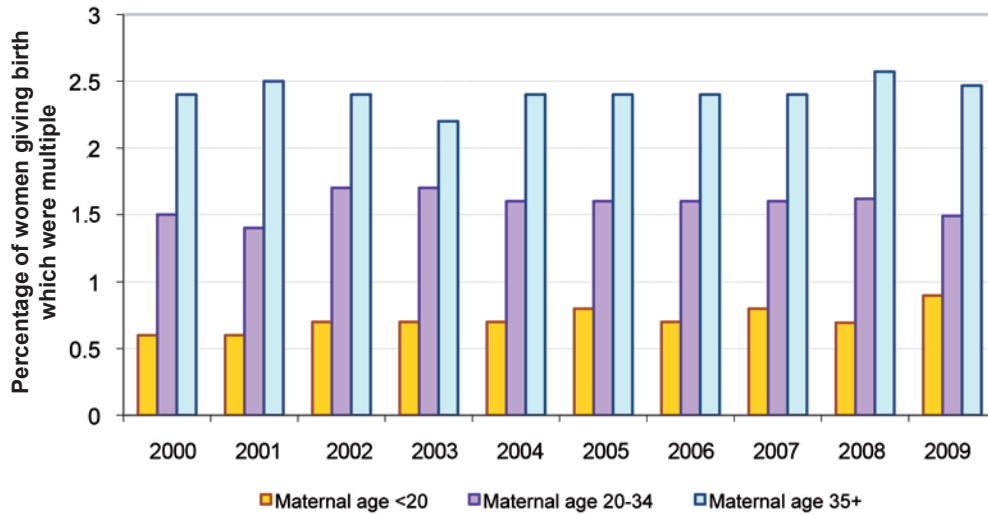


Figure 31: Percentage of multiple pregnancies in Queensland 2000 to 2009 by maternal age (refer Table 48)

Preterm birth remains a major issue in multiple pregnancies, with 59.5% of multiple births occurring before 37 weeks gestation, while only 7.3% of singleton births occur before 37 weeks (Figure 32, Table 49). This difference has remained stable over the decade.

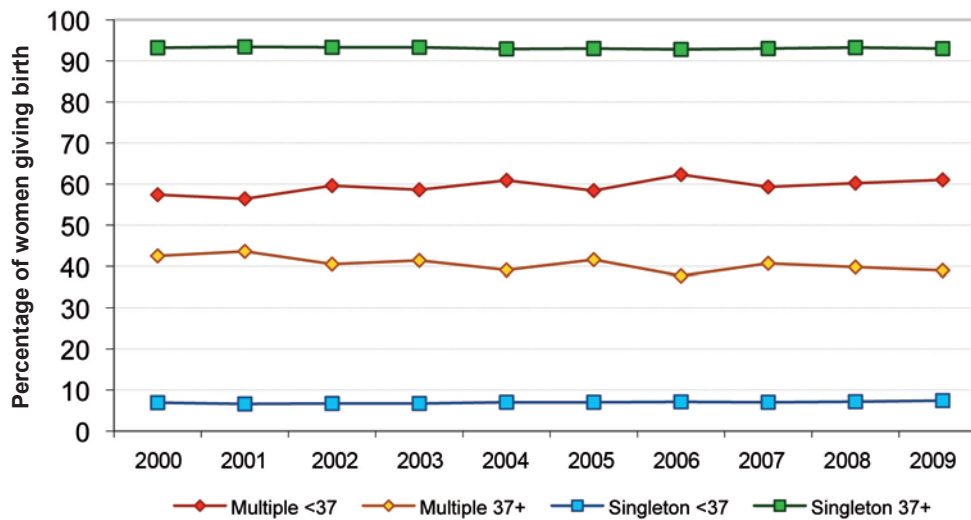


Figure 32: Percentage of multiple and singleton pregnancies in Queensland 2000 to 2009 by gestation at birth (refer Table 49)

2.7 Assisted conception

The influence of assisted conception techniques on the incidence of multiple pregnancies remains marked, with 13.8 times as many pregnancies conceived with the aid of such technologies being multiple when compared with pregnancies not conceived with such technologies (Figure 33, Table 50).

Over this period, 8.6% of pregnancies conceived with the aid of AIH/AID +/- or ovulation induction and 17.8% of pregnancies conceived with the aid of extracorporeal techniques were multiple, compared with 1.2% of pregnancies conceived without the assistance of any reproductive technologies (Figure 33, Tables 50 and 51). The incidence of multiple pregnancy in pregnancies conceived with the aid of extracorporeal techniques has decreased by more than 40% over this decade, from 23.2% to 13.5%.²⁰

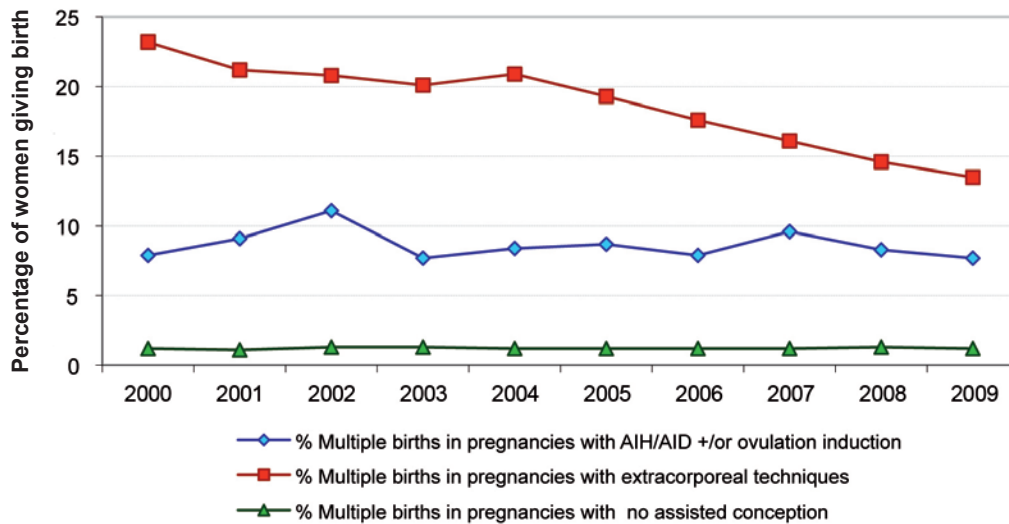


Figure 33: Percentage of multiple births in pregnancies conceived with and without the use of assisted conception techniques in Queensland 2000 to 2009 (refer Table 51). [AIH/AID +/- or ovulation induction = artificial insemination and/or ovulation induction processes; extracorporeal techniques = invitro fertilisation, gamete intra-fallopian transfer, intracytoplasmic sperm injection, embryo transfer or related techniques.]

When compared with pregnancies conceived without the aid of assisted conception techniques, pregnancies conceived with the aid of assisted conception techniques are more likely to be multiple, and the babies born from such pregnancies are more likely to be of low birth weight and need Neonatal Intensive Care Unit (NICU) and/or Special Care Nursery (SCN) admission (Figures 34 and 35, Table 50 to 53). Data shown in these figures and tables is from 2008 and 2009 only.

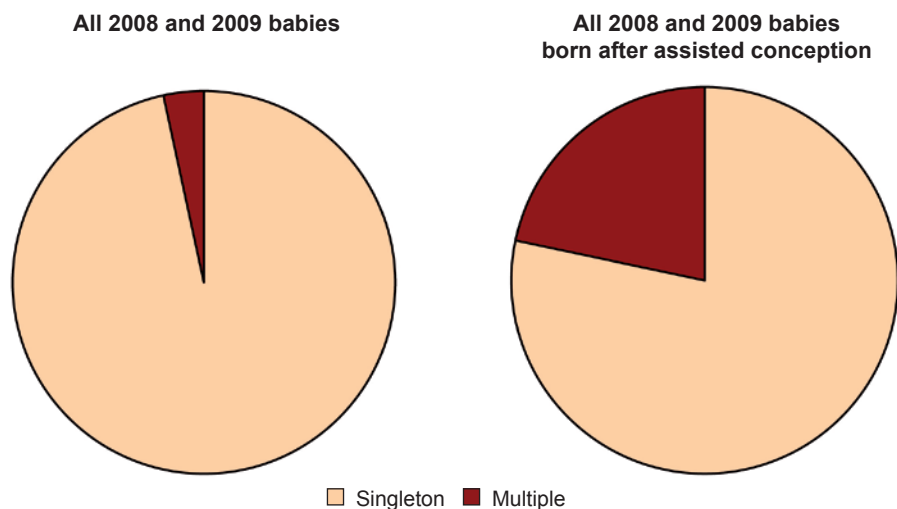


Figure 34: Influence of assisted conception techniques in Queensland 2008 to 2009 (refer Tables 50 and 51)

²⁰ The data collection techniques have combined artificial insemination techniques with ovulation induction techniques since 1999, so they are combined in this report. In-vitro fertilisation and related extracorporeal techniques are also combined. The data field is a multiple reporting field and only the first reported method is able to be extracted.

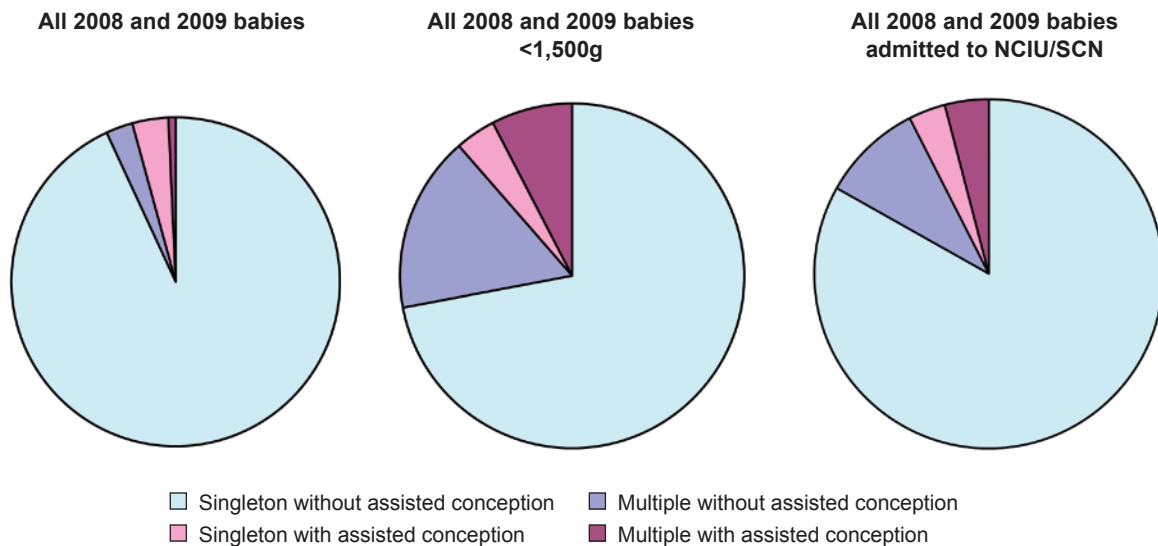


Figure 35: Influence of assisted conception techniques and multiple pregnancy in Queensland 2008 to 2009 on low birth weight births and need for neonatal intensive care unit (NICU) or special care nursery (SCN) admission (refer Table 53)

When the influence of multiple pregnancy is removed and only singleton births from pregnancies conceived with and without the aid of assisted conception techniques are examined, the incidence of babies born with birth weight between 2,500g and 3,999g are found to be equivalent in the two groups (Figure 36, Tables 54 and 55). Though there are differences in the incidence of birth weight less than 2,500g (Figure 37, Tables 54 and 55) and 4,000g or more (Figure 36, Tables 54 and 55), these differences are small when compared with the overall differences found in the total number of assisted conception pregnancies. Thus, the majority of the difference in the incidence of low birth weight babies in pregnancies conceived with the aid of assisted conception techniques relates to the high incidence of multiple pregnancies with assisted conception techniques.

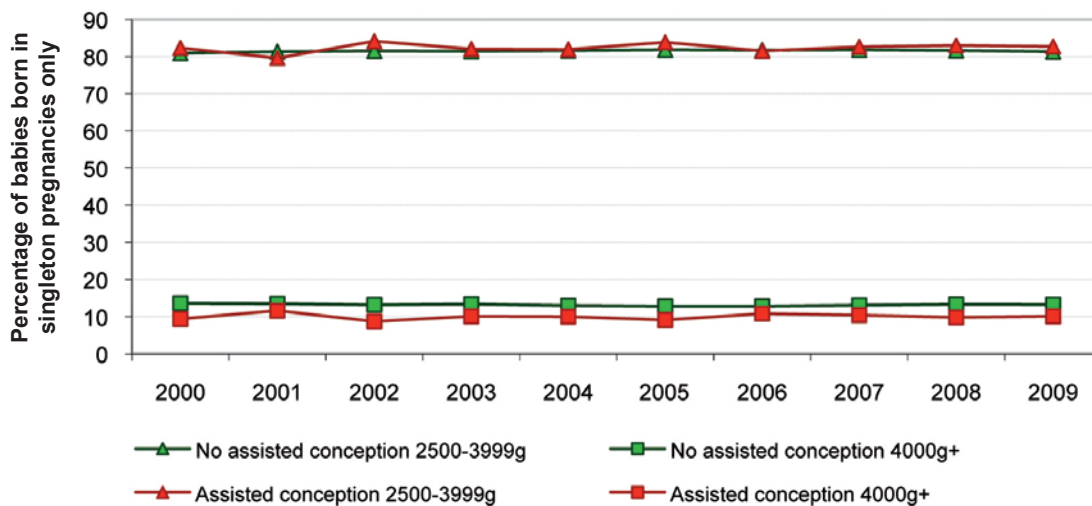


Figure 36: Incidence of birth weight categories 2,500g or more of babies born in singleton pregnancies conceived with assisted conception and without assisted conception (refer Tables 54 and 55)

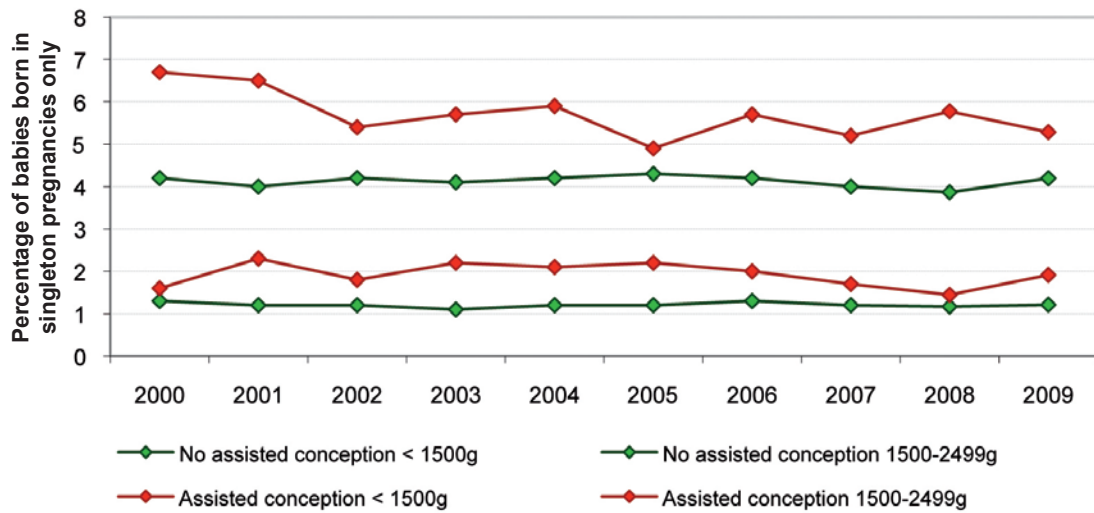


Figure 37: Incidence of birth weight categories less than 2,500g of babies born in singleton pregnancies conceived with assisted conception and without assisted conception (refer Tables 54 and 55)

2.8 Onset of labour

During the decade 2000 to 2009 56% to 58% of women laboured spontaneously (Figure 38, Table 56). The incidence of induction of labour has decreased over this period of time from 25.1% to 22.4%, while the incidence of elective caesarean section without labour increased significantly, from 14.4% to 20.5% (Odds ratio 1.54, 95% Confidence limits 1.49, 1.59).

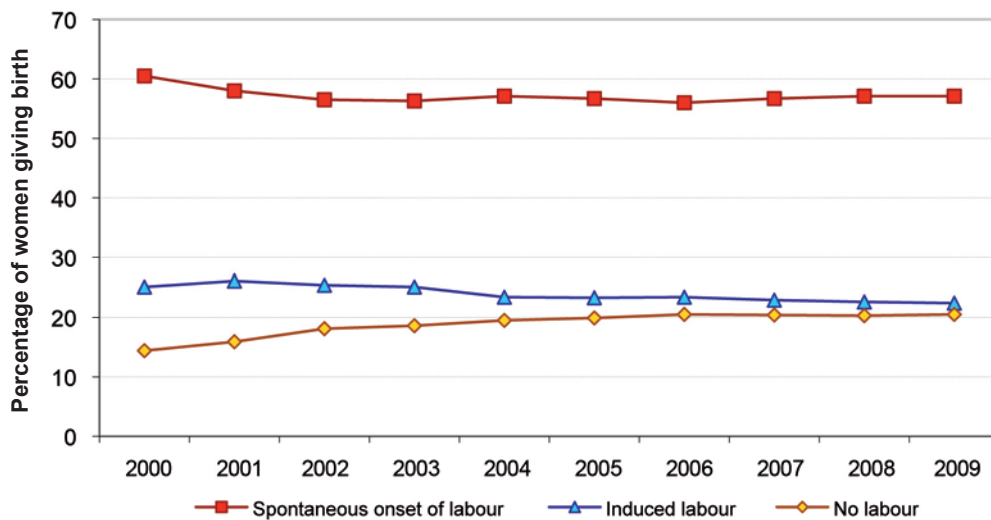


Figure 38: Onset of labour, all births, Queensland 2000 to 2009 (refer Table 56)

The incidence of spontaneous onset of labour has decreased significantly from 46.7% to 40.2% in Private hospitals (spontaneous onset of labour vs rest; Odds ratio 0.76, 95% Confidence limits 0.73, 0.80), while remaining relatively constant at approximately 64% in Public hospitals (Figure 39, Tables 57 and 58). Labour remains at or near 100% spontaneous in onset in home births.

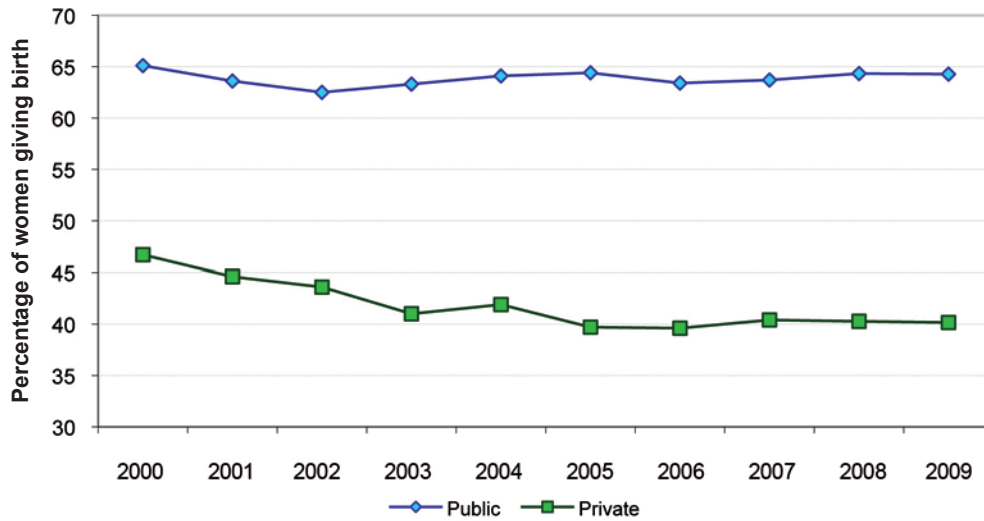


Figure 39: Spontaneous onset of labour by care mode, Queensland 2000 to 2009
(refer Tables 57 and 58)

The incidence of induction of labour has decreased significantly in both Public and Private hospitals over this period (Public Hospitals: Induction of labour vs rest; Odds ratio 0.85, 95% Confidence limits 0.82, 0.88; Private Hospitals: Induction of labour vs rest; Odds ratio 0.84, 95% Confidence limits 0.80, 0.88) (Figure 40, Tables 57 and 58).

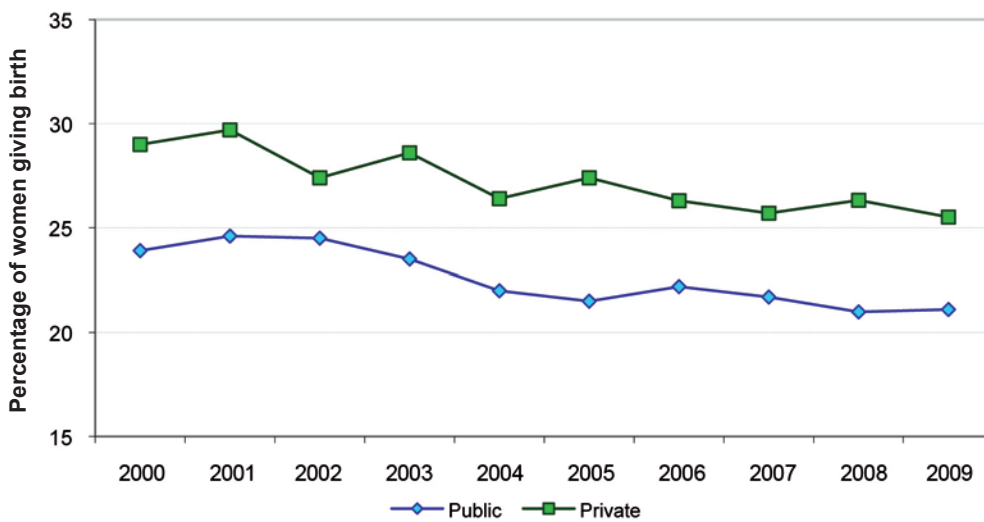


Figure 40: Induction of labour by care mode, Queensland 2000 to 2009
(refer Tables 57 and 58)

The incidence of elective caesarean section birth has increased significantly during this period (from 11.0% to 14.6%) in Public hospitals (elective caesarean section vs rest; Odds ratio 1.38, 95% Confidence limits 1.32, 1.44), and highly significantly (from 24.2% to 34.3%) in Private hospitals (elective caesarean section vs rest; Odds ratio 1.64, 95% Confidence limits 1.55, 1.72) (Figure 41, Tables 57 and 58).

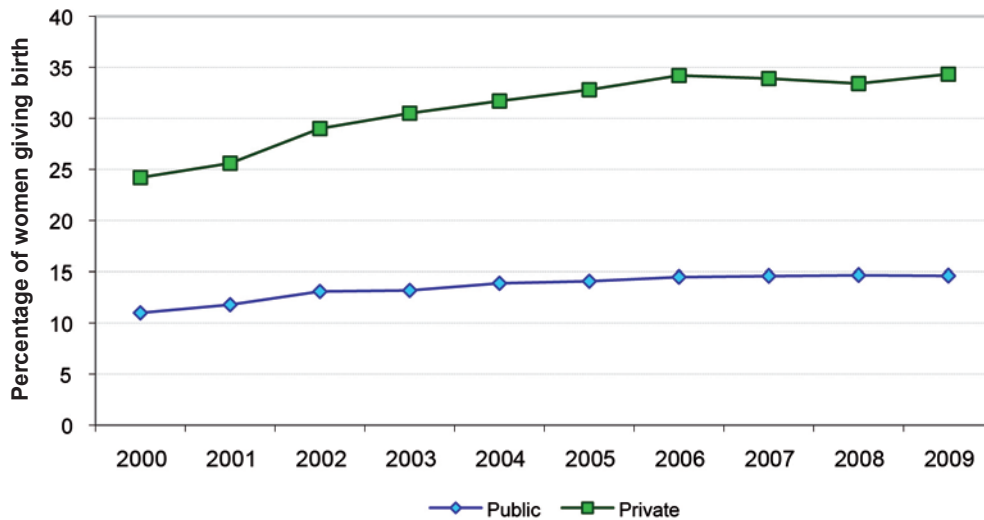


Figure 41: Elective caesarean section by care mode, Queensland 2000 to 2009 (refer Tables 57 and 58)

The pattern of labour onset, in relation to gestation, is quite different between Public hospital and Private hospital care (Figure 42, Table 59). At all gestations the proportion of women having elective caesarean section (ie caesarean section without labour) in Private hospitals is significantly higher than the percentage of women having elective caesarean section in Public hospitals. The clinical reasons for this variation are unclear, with particular reference to more preterm gestations when intervention should occur in a facility with a neonatal intensive care unit.

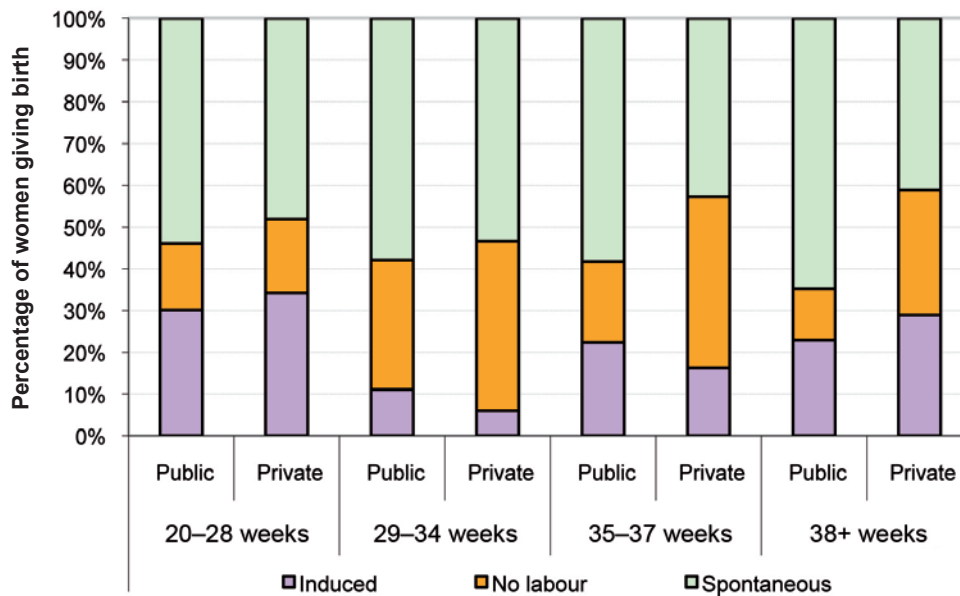


Figure 42: Onset of labour / elective caesarean section by gestation and care mode, Queensland 2000 to 2009 (refer Table 59)

2.9 Mode of birth

The incidence of unassisted vaginal birth has decreased significantly in Queensland over this decade, from 65.2% to 56.9% (unassisted vaginal birth vs rest; Odds ratio 0.71, 95% Confidence limits 0.69, 0.72) (Figure 43, Tables 60 and 61). During this period, the incidence of assisted vaginal birth (forceps assistance and vacuum extraction) has remained relatively constant between 7.8% and 9.1%, while the incidence of caesarean section has increased significantly from 26.2% to 34.0% (Caesarean section vs rest; Odds ratio 1.45, 95% Confidence limits 1.41, 1.49).

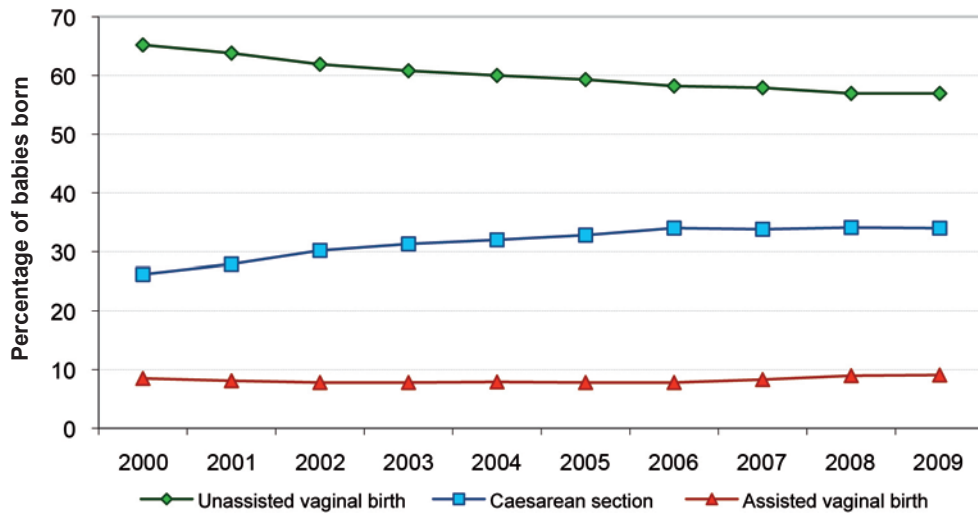


Figure 43: Mode of birth of babies born in Queensland 2000 to 2009 (percentage of births) (refer Tables 60 and 61)

The techniques employed for assisted vaginal birth have continued to diverge, with vacuum extraction the preferred option for the majority of cases (Figure 44, Tables 60 and 61).

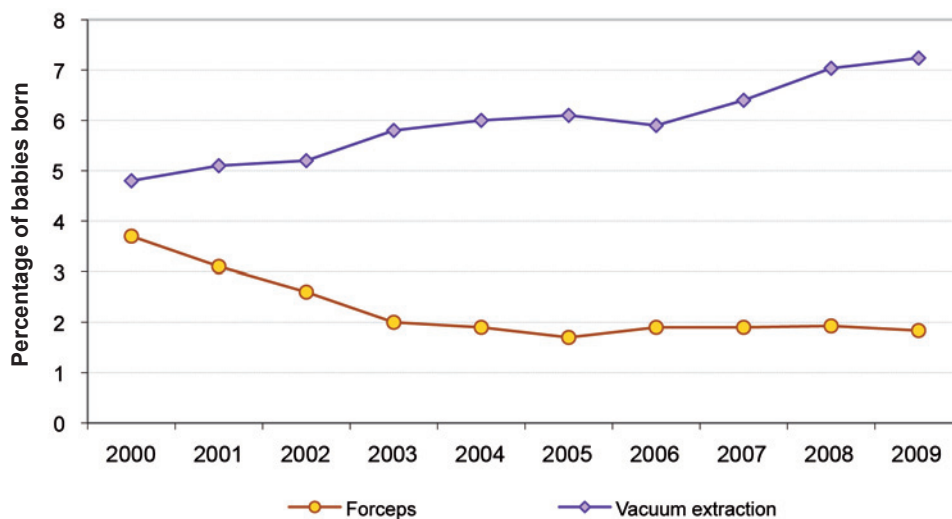


Figure 44: Mode of assisted vaginal birth of babies born in Queensland 2000 to 2009 (percentage of births) (refer Tables 60 and 61)

The decline in the incidence of unassisted vaginal birth has been most obvious in the setting of Private hospital care (48.2% to 39.7%), when compared with Public hospital care (71.0% to 64.3%) (Figure 45, tables 62 and 63). The decline is statistically significant in both care modes (Private hospital care unassisted vaginal birth vs rest; Odds ratio 0.71, 95% Confidence limits 0.68, 0.74; Public hospital care unassisted vaginal birth vs rest; Odds ratio 0.73, 95% Confidence limits 0.71, 0.75).

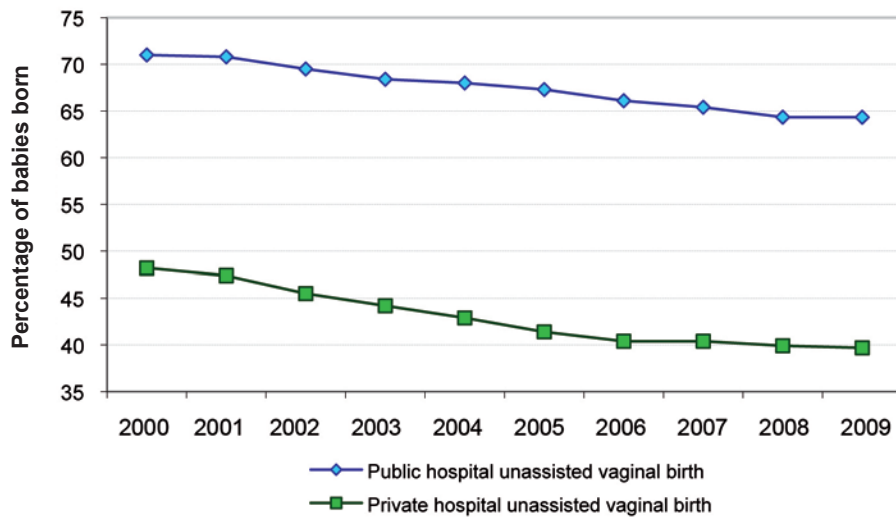


Figure 45: Incidence of unassisted vaginal birth of babies born in Queensland 2000 to 2009 by care provider (refer Tables 62 and 63)

The increasing incidence of caesarean section birth has been more obvious in the setting of Private hospital care (37.9% to 48.6%), when compared with Public hospital care (22.2% to 27.7%) (Figure 46, tables 62 and 63). Again, the change is statistically significant in both care modes (Private hospital caesarean section vs rest Odds ratio 1.55, 95% Confidence limits 1.48, 1.62; Public hospital caesarean section vs rest Odds ratio 1.34, 95% Confidence limits 1.30, 1.48).

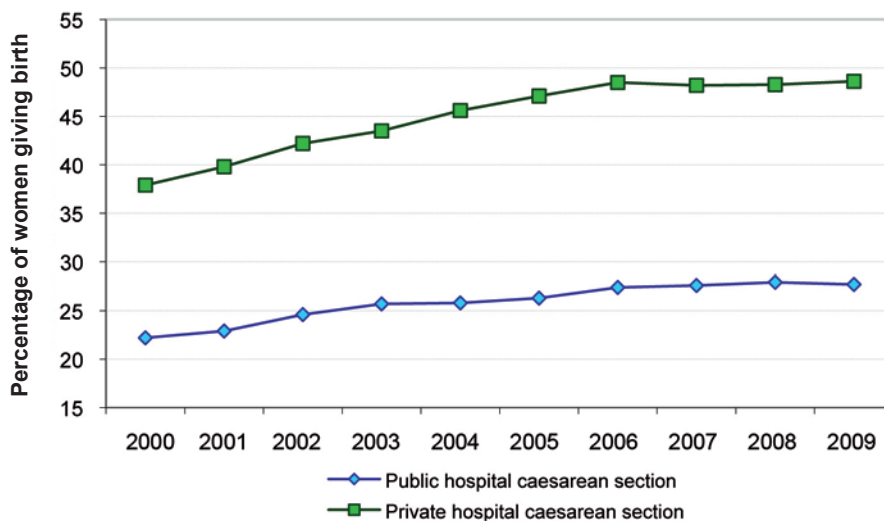


Figure 46: Incidence of caesarean section birth of babies born in Queensland 2000 to 2009 by care provider (refer Tables 62 and 63)

There has been an increase in the incidence of both elective (without labour) and non-elective (with labour) caesarean section in both the Public and Private sectors. The stand out change has been the large increase in the incidence of elective caesarean section before labour in the Private sector (an increase over the period 2000 to 2009, from 24.2% to 33.5% of all births; Odds ratio 1.56, 95% Confidence limits 1.50, 1.66) (Figure 47, Tables 64 and 65).

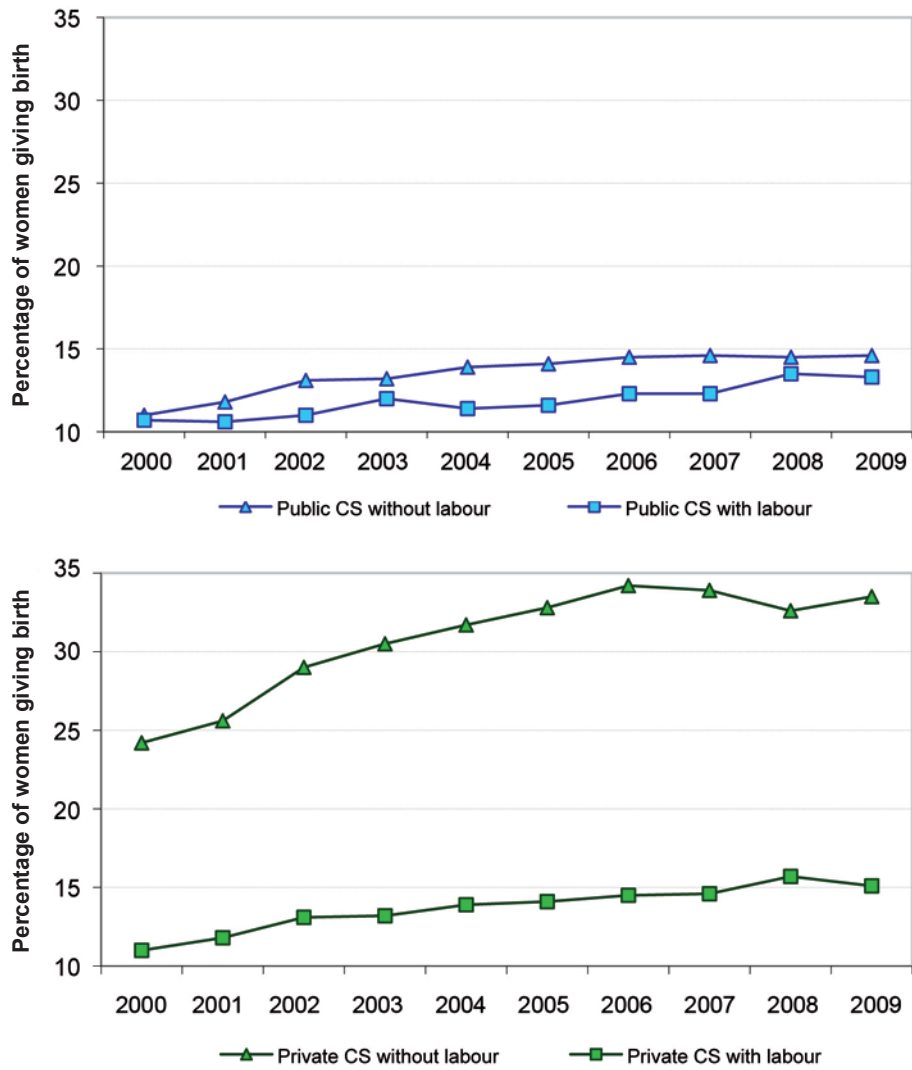


Figure 47: Incidence of caesarean section birth, before and in labour, of babies born in Queensland 2000 to 2009 in Public and Private hospitals (refer Tables 64 and 65)

The incidence of assisted vaginal birth has increased in Public hospitals (6.65% to 8.0%) whilst decreasing in the Private hospital care mode (13.9% to 11.7%) (Figure 48, Tables 62 and 63).

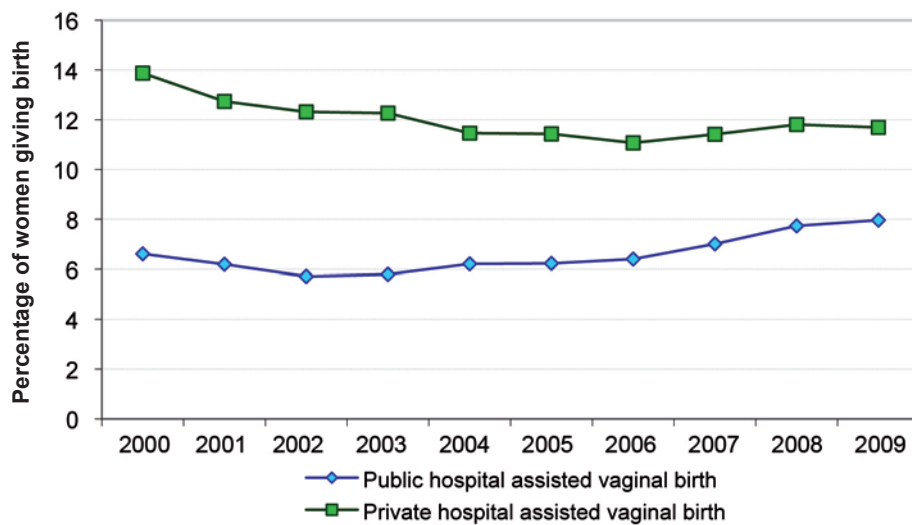


Figure 48: Incidence of assisted vaginal birth of babies born in Queensland 2000 to 2009 by care provider (refer Tables 62 and 63)

The change in the incidence of assisted vaginal birth has been a combination of a fall in the use of obstetric forceps and a rise in the use of vacuum extraction (Figure 49, Tables 62 and 63).

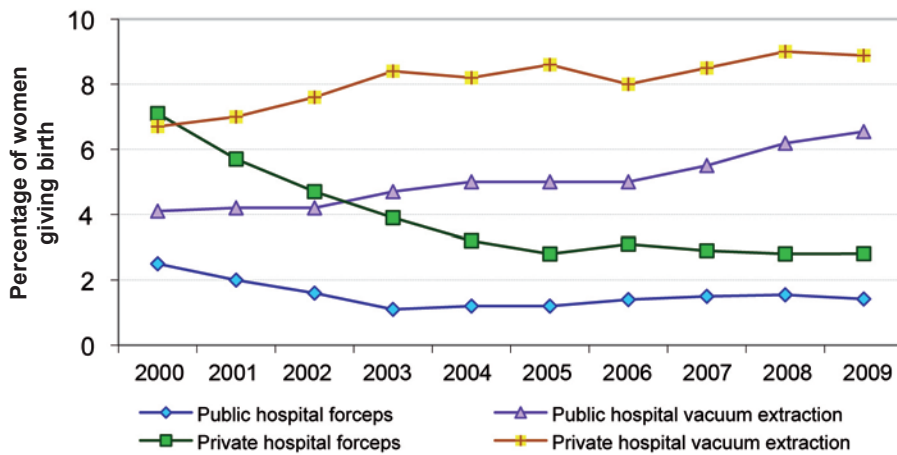


Figure 49: Incidence of assisted vaginal birth, by forceps and vacuum extraction, of babies born in Queensland 2000 to 2009 by care provider (percentage of births) (refer Tables 62 and 63)

Approximately 90% of women with a breech presentation had caesarean section births during this decade (86.7% to 89.8% in Public hospitals and 90.5% to 97.1% in Private hospitals) (Figure 50, Table 66).

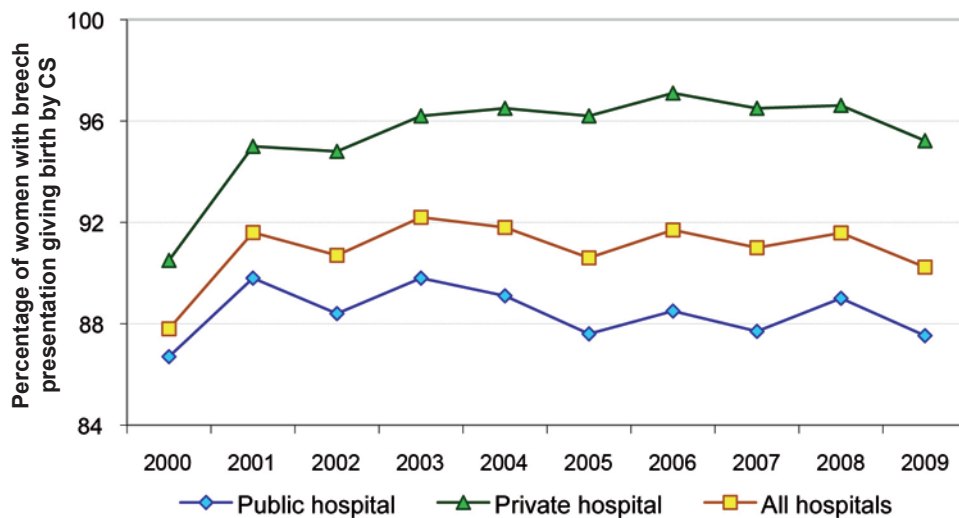


Figure 50: Incidence of caesarean section birth of babies born in Queensland 2000 to 2009, when there is a breech presentation, by care provider (refer Table 66)

There has been a steady rise in caesarean section birth in multiple pregnancies, with the increase in both Public hospitals and Private hospitals being of the order of 15 percentage points (Public hospital care caesarean section vs Public hospital care non-caesarean section Odds ratio 1.58, 95% Confidence limits 1.24, 2.02; Private hospital care caesarean section vs Private hospital care non-caesarean section Odds ratio 1.64, 95% Confidence limits 1.16, 2.32) (Figure 51, Table 67).

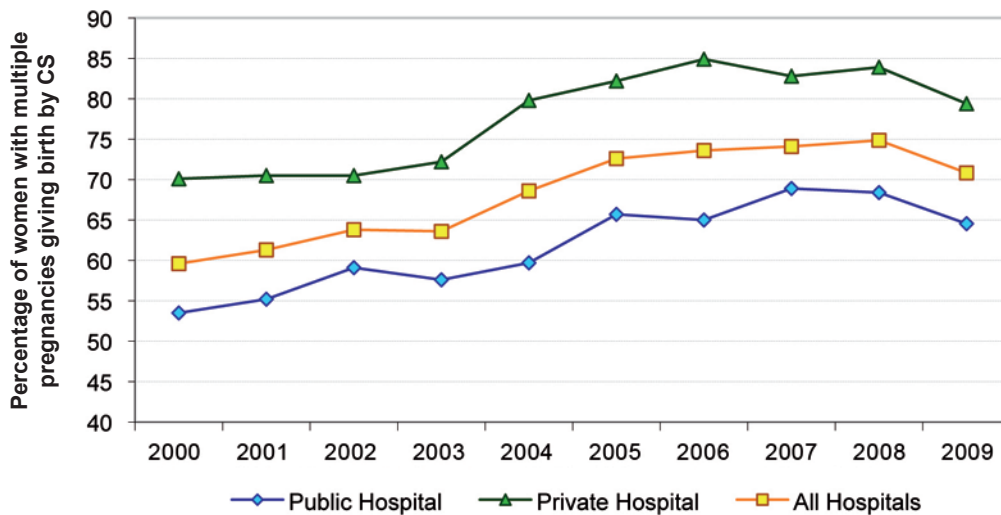


Figure 51: Incidence of caesarean section for multiple births of babies born in Queensland 2000 to 2009 by careprovider (refer Table 67)

2.10 Effect of previous pregnancy on mode of birth

Mode of vaginal birth (unassisted versus assisted) was affected by whether or not a woman has previously had one or more pregnancies resulting in a birth, but the incidence of caesarean section was not so affected (Figure 52, Tables 68 and 69). Women who have previously had one or more pregnancies were more likely to have an unassisted vaginal birth by approximately 13 percentage points, when compared with women who have not previously had a pregnancy, and less likely to have an assisted vaginal birth by a similar margin. Overall, the incidence of vaginal birth (unassisted and assisted) fell significantly. The rising caesarean section rate in both groups of women was similar.

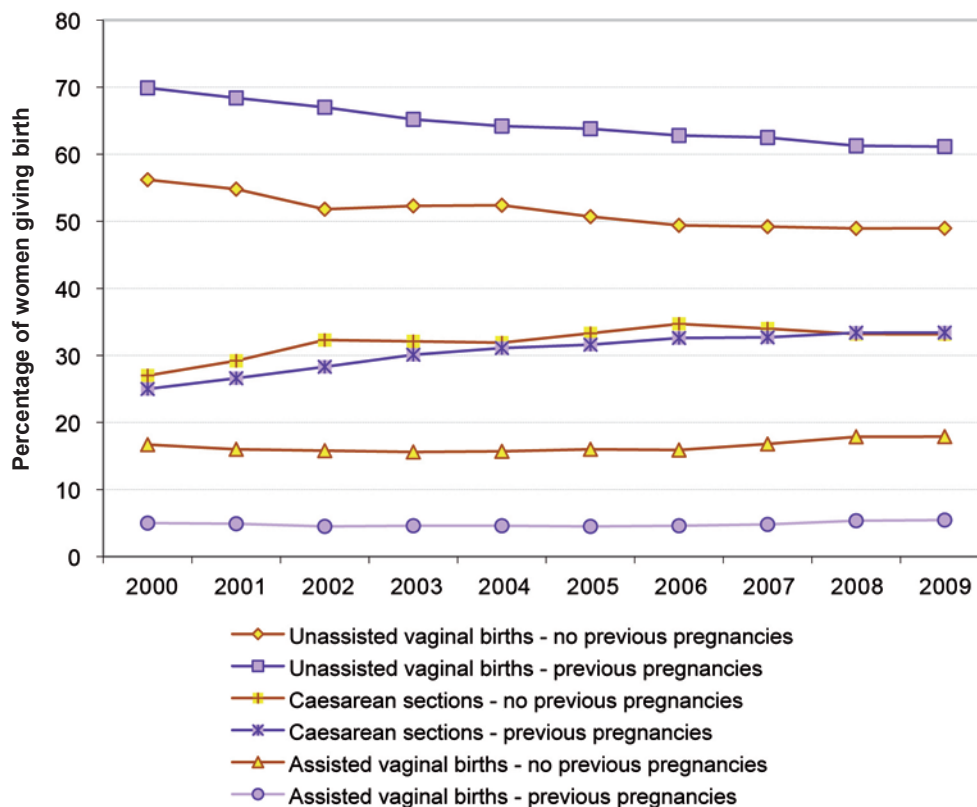


Figure 52: Incidence of mode of birth in Queensland 2000 to 2009 by previous pregnancy (refer Tables 68 and 69)

2.11 Effect of previous caesarean section on mode of birth

Mode of previous birth data has been collected since mid-2000, so full year data is available for the nine years 2001 to 2009. These data show that, in relation to future birth outcomes, the decision to undertake a first caesarean section is a crucial event in a woman's reproductive career. Women who had not had a previous caesarean section had a 78.5% to 80% likelihood of having an unassisted vaginal birth (slowly dropping by 2.5 percentage points over the period 2001 to 2009) and 14% to 16% likelihood of a caesarean section birth (Figure 53, Tables 70 and 71).

In contrast, women who had one or more previous caesarean sections had a 15% to 23% likelihood of having a vaginal birth (unassisted and assisted), dropping significantly over the period 2001 to 2009 (Odds ratio 0.62, 95% Confidence limits 0.52, 0.67), and rising incidence of 77% to 85% over this period of the likelihood of a caesarean section birth (Odds ratio 1.62, 95% Confidence limits 1.50, 1.76).

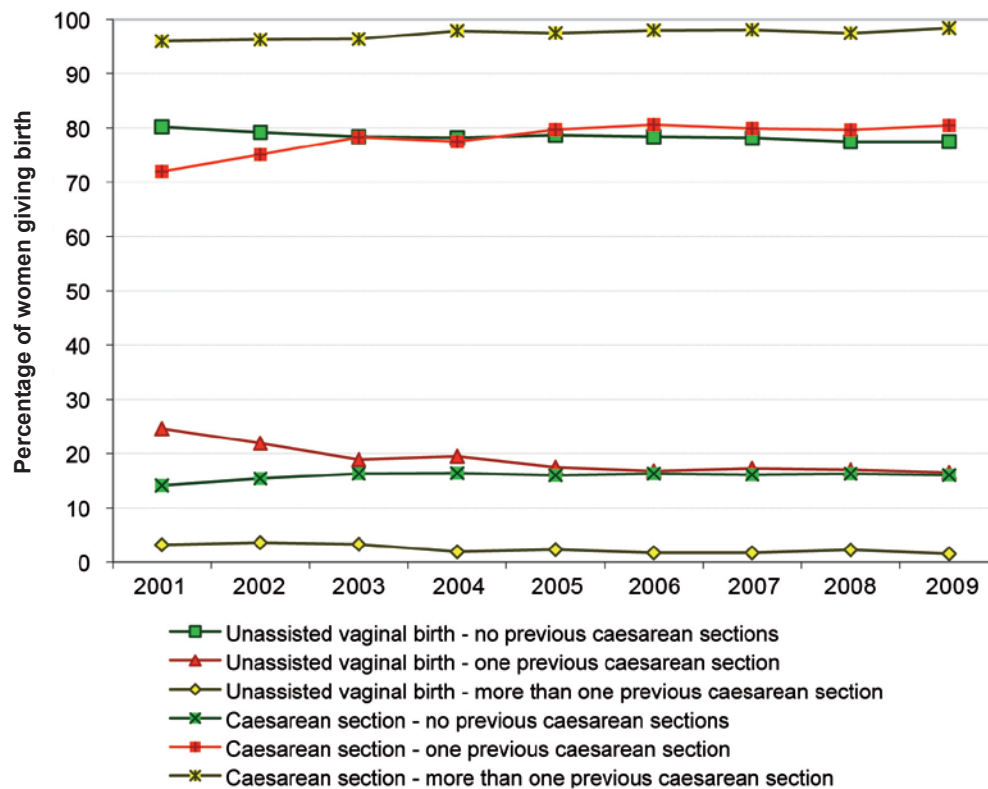


Figure 53: Incidence of mode of birth in Queensland 2001 to 2009 by previous caesarean sections (refer Tables 70 and 71)

2.12 Indigenous mothers and their babies

Indigenous mothers made up 5.5% of the 2000 to 2009 birthing cohort (29,723 of 535,955) and these women gave birth to 29,798 of the 545,168 babies in that period. During this period there was a constant difference in age distribution, with Indigenous mothers more likely to be less than 20 years of age (Figure 54, Table 72 and 73).

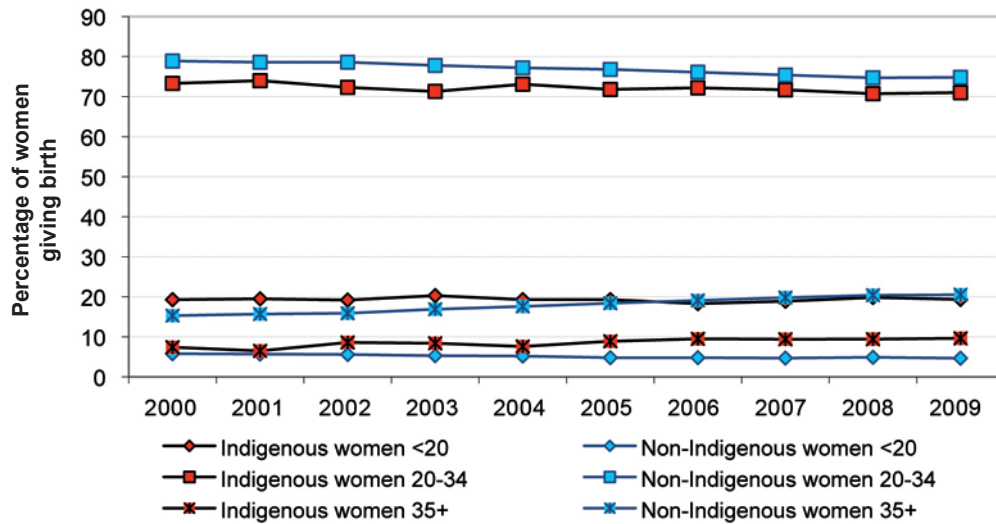


Figure 54: Incidence of maternal age groups in Queensland 2000 to 2009 by maternal Indigenous status (refer Tables 72 and 73)

Ninety-eight per cent (98%) (range 97.7% – 98.2% over the decade) of Indigenous women were cared for in the Public hospital system in Queensland, while 67.9% (range 66.4% – 72.6% over the decade) of non-Indigenous women received Public hospital maternity care (Table 74).

Indigenous women were significantly more likely to give birth at gestations less than 37 weeks (12.5% of Indigenous women versus 7.5% of non-Indigenous women; odds ratio 1.71; 95% confidence limits 1.65, 1.77) and less likely to give birth in the gestational period 37 to 41 weeks (86.5% of Indigenous women versus 91.6% of non-Indigenous women; odds ratio 0.59; 95% confidence limits 0.57, 0.61). The difference at 42 weeks or more was less obvious but also statistically significant (1.3% of Indigenous versus 0.9% of non-Indigenous women; odds ratio 1.44; 95% confidence limits 1.30, 1.60) (Figure 55, Table 75 and 76).

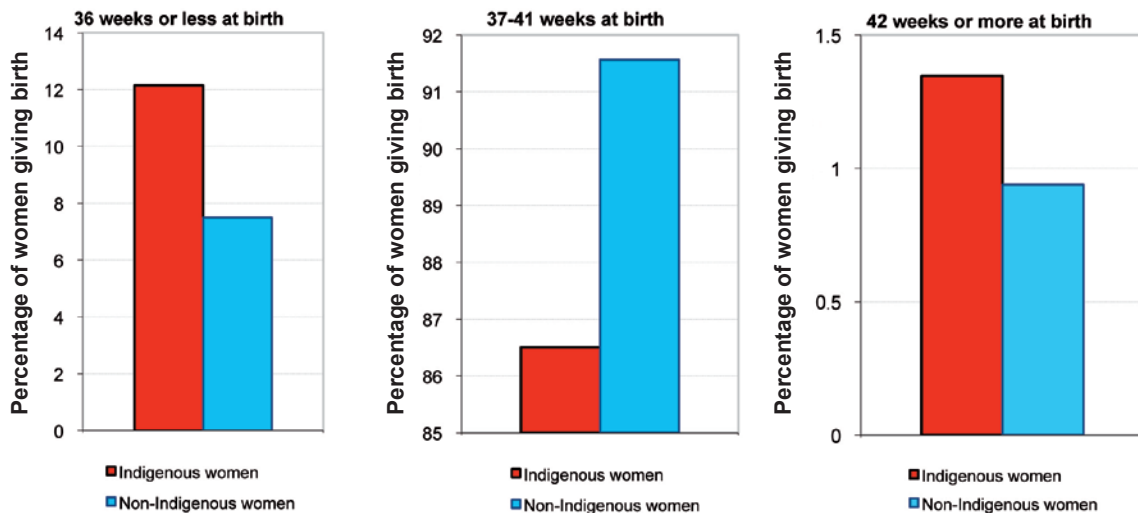


Figure 55: Percentage of women giving birth in Queensland 2000 to 2009, by maternal Indigenous status and gestational age (refer Table 75 and 76)

Over this decade, the incidence of pre-term birth (36 weeks or less) in Indigenous women has dropped from 13.1% to 11.6% (Figure 56, Table 75 and 76).

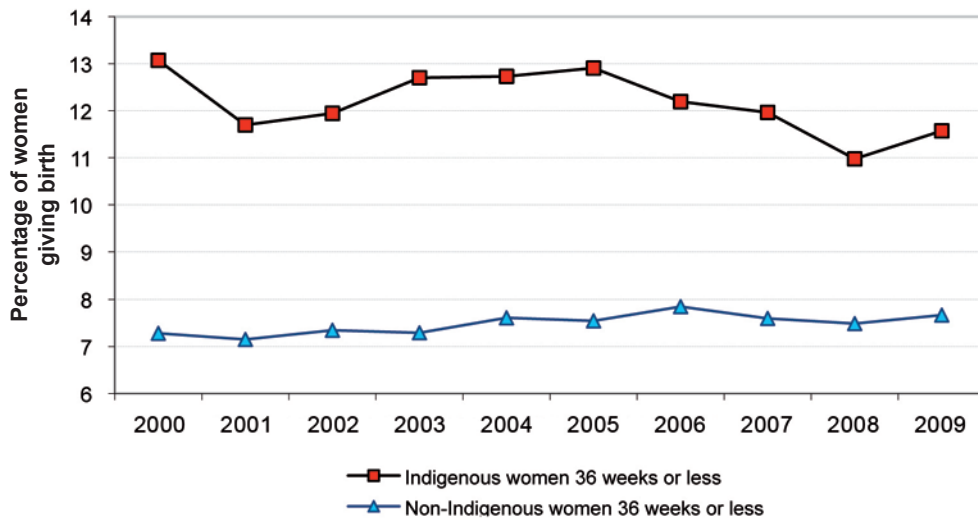


Figure 56: Incidence of women giving birth at and below 36 weeks gestation in Queensland 2000 to 2009 by maternal Indigenous status (refer Tables 75 and 76)

Figures 57 and 58 detail the changing incidence of gestation in Indigenous and non-Indigenous births, with Indigenous babies being more likely to be born preterm (less than 37 weeks and non-Indigenous babies being more likely to be born near term (38 weeks and more) (Tables 75 and 76).

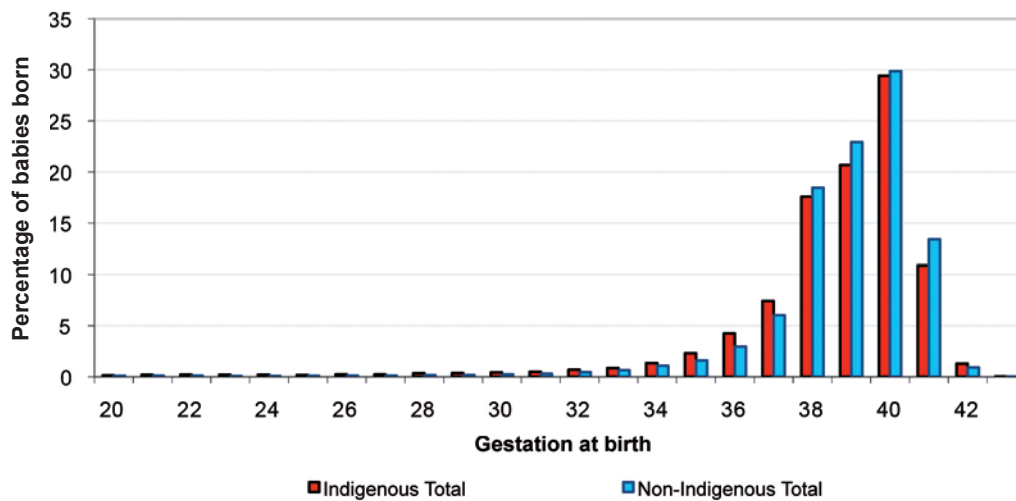


Figure 57: Incidence of birth in Queensland 2000 to 2009 by gestation at birth and maternal Indigenous status (refer Tables 75 and 76)

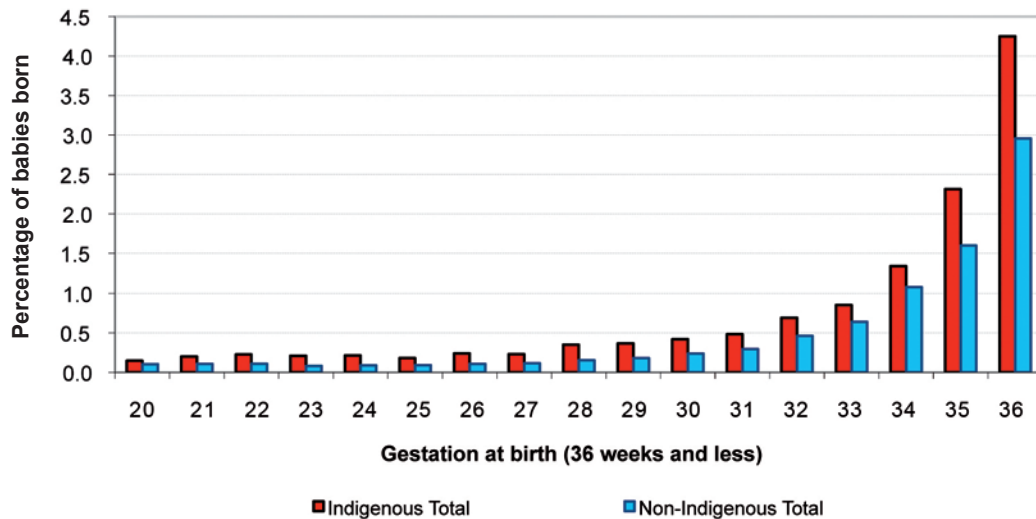


Figure 58: Incidence of birth at or below 36 weeks gestation in Queensland 2000 to 2009 by maternal Indigenous status (refer Tables 75 and 76)

The pattern of birth weight to gestation is different for Indigenous and non-Indigenous babies, with Indigenous babies being smaller for gestational age than non-Indigenous babies. Figures 59 to 62 show analysis of these data for the years 2000 to 2009 (Tables 75 and 76).

Linear regression analysis of birth weight data for the decade 2000 to 2009 shows that maternal age and Indigenous status, as well as gestational age, have a statistically significant influence on the birth weight of babies (maternal age: Regression coefficient [B statistic] 20.31; 95% Confidence limits 11.88, 28.74; $p < 0.001$) (Indigenous status: Regression coefficient [B statistic] -32.95; 95% Confidence limits -47.51, -18.39; $p < 0.001$) (gestation: Regression coefficient [B statistic] 1136.92; 95% Confidence limits 1128.62, 1145.19; $p < 0.001$).

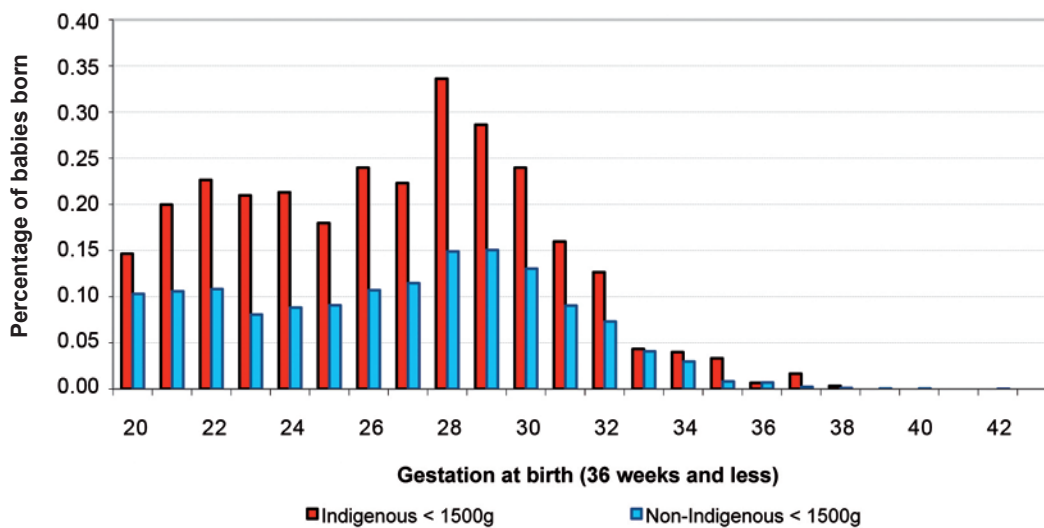


Figure 59: Percentage of babies weighing less than 1,500g in Queensland 2000 to 2009 by gestation and maternal Indigenous status (refer Table 75 and 76)

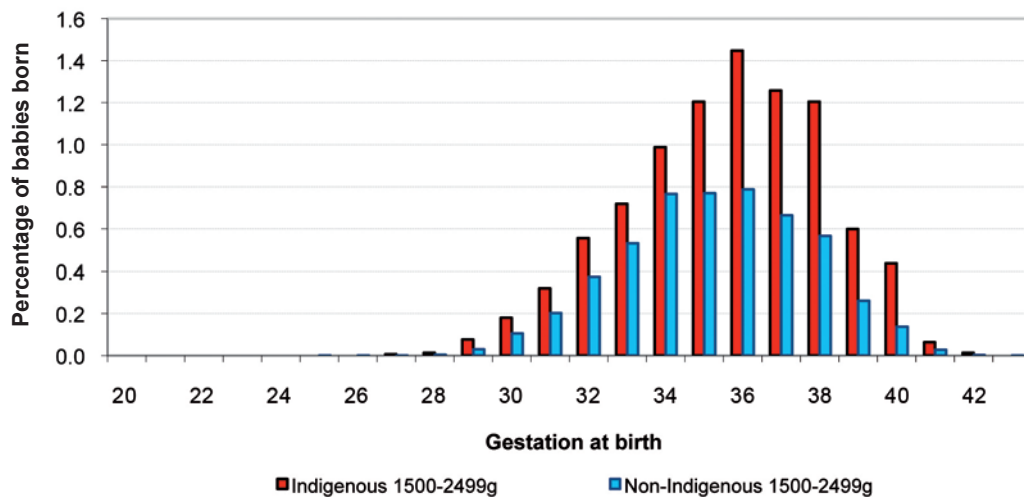


Figure 60: Percentage of babies weighing between 1,500g and 2,499g in Queensland 2000 to 2009 by gestation and maternal Indigenous status (refer Table 75 and 76)

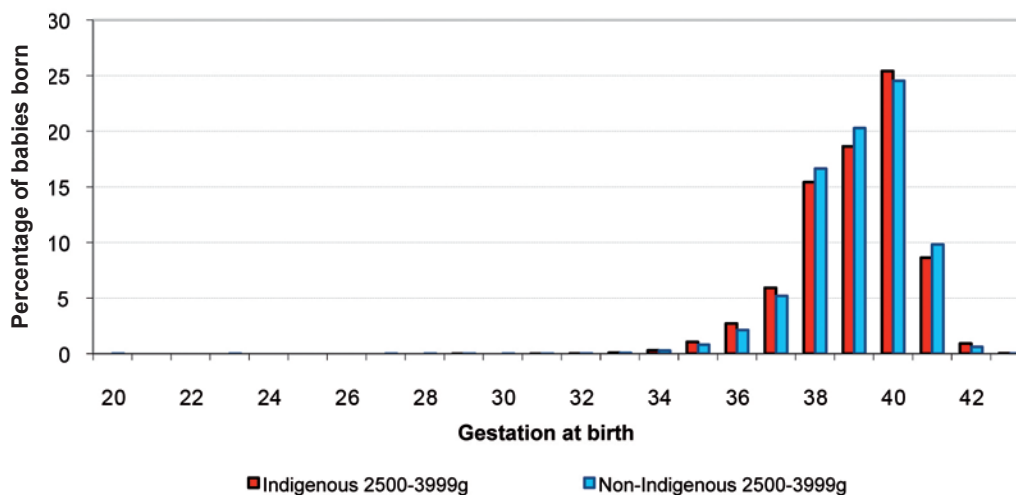


Figure 61: Percentage of babies weighing between 2,500g and 3,999g in Queensland 2000 to 2009 by gestation and maternal Indigenous status (refer Table 75 and 76)

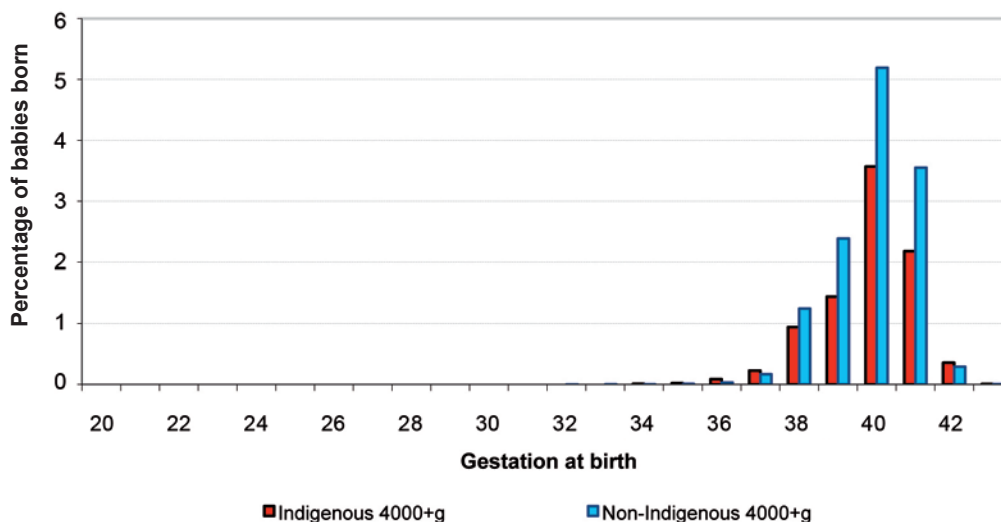


Figure 62: Percentage of babies weighing 4,000g or more in Queensland 2000 to 2009 by gestation and maternal Indigenous status (refer Table 75 and 76)

3.0 Ad hoc reviews

3.1 Indigenous maternity and newborn indicators

Council is concerned about the continuing high incidence of adverse outcomes of pregnancies to Indigenous women when compared with non-Indigenous women.

In 2007 the Executive Management Team of Queensland Health endorsed eight Key Performance Indicators (KPIs) for Aboriginal and Torres Strait Islander health, four of which relate to maternal and newborn health:

- the proportion of women who give birth who have five or more antenatal visits during pregnancy
- the proportion of live birth, singleton babies born weighing less than 2,500 grams
- the proportion of pregnant women who smoked at any time during pregnancy
- the proportion of pregnant women who had quit smoking by 20 weeks gestation.

Initiatives to implement the eight KPIs are reviewed in the Queensland Health Aboriginal and Torres Strait Islander Health Branch publication “Successful Initiatives in Aboriginal and Torres Strait Islander Health” (<http://qheps.health.qld.gov.au/atsihb/docs/successfulinitiative.pdf>).

Two of these Aboriginal and Torres Strait Islander maternity/newborn health key performance indicators are part of the Queensland Health suite of district Tier 1 KPIs:

- KPI 5a – Indigenous antenatal visits
The percentage of Aboriginal and Torres Strait Islander women who attended at least five antenatal visits and give birth at 32 weeks or more.
- KPI 5b – Indigenous low birth weights
The percentage of live born, singleton, low birth weight (<2500g) babies born to Aboriginal and Torres Strait Islander women.

The Queensland Health Tier 1 KPIs are an agreed set of measures by which the Department will monitor progress towards achieving its objectives. They are designed to provide a cross-section of performance against the strategic objectives articulated in the Strategic Plan. These KPIs and their associated targets are a key component of Executive (Tier 1) Performance Agreements. Targets were individualised for each district by the Performance and Accountability Division of Queensland Health.

Council sought information from all health service districts regarding strategies which have been implemented to move towards their targets, with the aim of assisting maternity and newborn care providers with “distributed learnings”. All District CEOs were asked to provide a brief statement to QMPQC KPIs 5a and 5b, with reference to Council wishing to review the steps that have occurred in those districts which have led to performance on or better than target, and steps which are being taken in districts where performance is unfavourable to target.

Partnership programs with local Aboriginal and Torres Strait Islander health organisations figure prominently in many of the strategies being implemented. Table 20 provides summary information of strategies being actively pursued by a number of districts, and maternity services are strongly advised to follow such examples.

General measures
<ul style="list-style-type: none"> • Inclusion of specific maternal and neonatal elements in a district “Close the Gap” plan. • Increased employment of Aboriginal and Torres Strait Islander people by the health service district and other measures to improve the cultural competence of the organisation as a whole, with a focus on all Indigenous women’s health issues. • Identification of training that supports women’s health nurses and women’s Aboriginal and Torres Strait Islander health workers; provision of support to health workers to undertake Cert IV maternal and child health training and qualification. • Partnerships with USQ, UQ and QUT to support Nursing/Midwifery training; SARAS policy implemented to support Queensland Health staff to upgrade qualifications. • Increased number of Nursing Cadetships offered in partnership with the Office of the Chief Nursing Officer; Bachelor of Midwifery Indigenous Pilot Program; Indigenous Mentoring program with a number of Senior Nursing Staff identified as “Mentors”. • Investment in partnerships with local Indigenous community controlled health organisations, including review of formal Memoranda of Understanding; development and implementation of an Aboriginal and Torres Strait Islander Partnership Advisory Council (A&TSI PAC) Action Plan. • Improve rates of identification of Aboriginal and Torres Strait Islander status at patient registration. • Indigenous consumer representative on maternity reference groups. • Creation of culturally welcoming spaces including the commissioning of ‘Birthing Place’ artwork for maternity units, creation of Indigenous healing gardens, Indigenous murals and artwork at the entrances to hospitals and health centres, and Aboriginal and Torres Strait Islander flags in prominent positions.
Specific pregnancy measures
<ul style="list-style-type: none"> • Development of Aboriginal and Torres Strait Islander maternal and infant care services through the use of ‘Close the Gap’ funding, primarily providing antenatal, postnatal and early childhood care and incorporating flexible service delivery to breakdown barriers to health care access currently experienced by Aboriginal and Torres Strait Islander women. • Investigation of Ferret system to improve patient tracking and recall. • Development of continuity model of care based on caseload model specifically for Aboriginal and Torres Strait Islander women. “Known midwife” caseload management and Midwifery Group Practice as alternative models of care, with the one-on-one approach allows the maternity team to focus on the specific needs of the client, including health, diabetes, and drug and alcohol habits. • Outreach midwifery antenatal booking-in visits to Indigenous community controlled health organisations. • Medical and midwifery outreach programs (including ultrasound) to remote/isolated communities. • Structured home visitation for Aboriginal and Torres Strait Islander mothers and their children. • Hospital doctors, GPs and health care providers strongly encouraged to refer pregnant women for early booking-in visits. • Public hospital maternity units to notify GP practices and midwife/child health nurses of client’s chosen model of care when client presents for booking. • Risk assessments with regard to smoking, alcohol and other drugs and women being able to access an ATODS worker at the clinic or on referral. • Brief intervention and treatment and referral options offered routinely to all pregnant women identified as smokers or with alcohol/drug issues at each antenatal visit. Smoking cessation programs specifically designed for the needs of pregnant Aboriginal and Torres Strait women. • Early identification of pregnant women with low and high BMI’s and with pre-existing conditions (e.g. anaemia, diabetes, etc.) so that nutrition education, brief intervention and referral to dietician can be provided. • Implementation of models of care which involves multi-disciplinary team case conferencing of all new booking-in women, with use of telehealth to case conference the outreach centres. • Working with local Aboriginal and Torres Strait Islander Family Support Services to improve early parenting and antenatal information via education sessions for youth. • Regular Indigenous Mums and Bubs group offering education and support for expectant and new mothers. • Regular monitoring of pregnancy and birth outcome data from the Queensland Perinatal Data Collection. • All women with low birth weight infants closely followed-up by the Child Health Nurse.

Table 20: Summary of strategies being implemented in Queensland Health maternity / neonatal services to address Aboriginal and Torres Strait Islander maternity / newborn health key performance indicators 5a and 5b

3.2 Maternity and neonatal care incidents

As part of the Council's quality agenda, it sought to provide maternity and neonatal clinicians with a summary of the recommendations which have arisen from reviews of clinical incidents across Queensland Health in 2008, so that all may learn from such examination of incidents.

Information was sourced from the Queensland Health Patient Safety Centre regarding the recommendations which arose from reviews of Reported Incidents entered into the PRIME CI database between 01.01.2008 and 31.12.2008. These reviews were either Root Cause Analyses (RCAs) or Human Error and Patient Safety (HEAPS) analyses. The Queensland Health Clinical Incident Management Implementation Standard defines both the use and implementation of Root Cause Analysis (systematic process for analysing serious incidents whereby factors that contributed to an incident are identified) and HEAPS analysis (a six-part tool to examine less serious incidents relating to factors involved in the incident). Both tools provide recommendations, when appropriate, to minimise the risk of similar events occurring in the future.

The information in the report is de-identified for staff and patients, and was provided to QMPQC under the exemption Section 62(H) of Health Services Act 1991 for the purpose of "evaluating, managing, monitoring or planning health services". The information in this report was provided to Public and Private maternity and neonatal care providers as a "distributed learning" in February 2010.

Analogous group	Recommendations
Improved / increased access to training	That further training is required in the following – Interpretation of "reactive cardiotocograph (CTG)", early and late decelerations, differentiation of baseline (maternal / fetal) and management of loss of contact.
	The district will consider seeking support of the Maternity Crisis Resource Management Program held at the Skills Development Centre. This opportunity will increase the number of staff in obstetrics and midwifery trained and competent in CTG application and interpretation.
	The district as a matter of priority will work with Obstetric and Birthing service to standardise and update policy and procedure documents relating to maternity assessment, use and interpretation and reporting of CTGs.
	O&G team education regarding the implications of hyperstimulation and poor beat to beat variability as interpreted from CTG traces.
	O&G team education regarding interpreting CTG traces.
	Midwifery team education regarding the implications of hyperstimulation and poor beat to beat variability.
	Staff training regarding the indications for and using a fetal lactate instrument.
	The Statewide Maternity and Neonatal Clinical Network to develop and distribute statewide neonatal hypoglycaemia management guidelines. The neonatal hypoglycaemia management guidelines will define 'infants at risk' and provide guidance on timeliness of medical review and prompt correction of neonatal hypoglycaemia.
	A regular multidisciplinary emergency skills training scenario to be incorporated into the maternity units in-service program with at least one training session per year on emergency, stabilisation and transfer of sick neonates utilising the referral centre paediatric neonate nurse educator.
Improved/increased access to training (continued)	All outlying facility medical officers including general practitioners employed by the facility to attend the following training programs and for new staff this is to take place within a year of commencement: a) Neonatal resuscitation program b) Maternity Emergency Crisis Resource Management (MaCRM) and where possible according to course availability c) Paediatric Emergency Crisis Resource Management (PeCRM).
Competency in neonatal resuscitation training	A consistent approach to education, training and competency testing of Neonatal resuscitation be implemented in the District to meet the standard set down by the American neonatal resuscitation guidelines.
	Implementation of a neonatal resuscitation training program be introduced and mandatory for all staff within the Family Unit.
	Neonatal resuscitation skills for MO and midwives together with refresher training to be put in place.
	Implement scenario based neonatal resuscitation training program, managing the sick neonate for the first hour of the critical event.

Table 21: Recommendations from Root Cause Analyses (RCAs) and Human Error and Patient Safety (HEAPS) analyses, relating to PRIME CI reported incidents from maternity and neonatal services in 2008.
(continued over the page)

Analogous group	Recommendations
Issues relating to practice guidelines and policies	That the requirement for routine urinalysis and actions taken for abnormal urinalysis findings will be reviewed.
	The district as a matter of priority will work with Obstetric and Birthing service to standardise and update policy and procedure documents relating to maternity assessment, use and interpretation and reporting of CTG's.
	Updating of Guidelines for the use of Prostaglandin PGE2 GEL: <ul style="list-style-type: none"> • High-risk patients should be induced during the day with continued CTG monitoring. • Non-reassuring CTG antenatally with no established labour would be unsuitable for Prostaglandin.
	Updating of the CTG rating sticker to incorporate clinical risk and actions based on the RCOG guidelines including when abnormal CTG are reviewed by Senior Registrar and when a fetal pH/lactate is indicated.
	A fetal lactate instrument is the preferred instrument of measurement and is recommended to be purchased for the district.
	Development of policy/procedure for arterial and venous cord pH/lactate sampling and implementation plan.
	The Queensland Health Safe Infant Care to reduce the risk of Sudden Infant Death Syndrome: 2005 policy is implemented immediately.
	Documentation provided to Neonatal Clinical Guidelines Project and project team have confirmed that mental health drugs will be added to the Neonatal hypoglycaemia clinical guidelines as a possible cause of hypoglycaemia.
	Identify the maternity risk assessment tool to be used and the way in which the risk assessment is to be linked to the dynamic service capability of facilities within the district.
	The use of the RBWH neonatal hypoglycaemia management guidelines until statewide neonatal hypoglycaemia management guidelines are developed.
	Need to look at services/information with primary carers and community health that the issue of obesity in pregnant women.
	That the equipment used for CTG monitoring be reviewed for accessory equipment requirements to suit bariatric patients.
	Emergency Department (ED) develop, implement and educate staff regarding ED treatment guideline for obstetric presentations.
Issues relating to practice guidelines and policies (continued)	That 'Management of preterm prelabour rupture of membranes' procedures for facilities in the district be reviewed to include antibiotic prophylaxis for Group B Streptococcus in individuals without labour and while pending vaginal pathology swab results'.
	Potential for the facility to review the fetal monitoring policy procedure with regard to the frequency of CTG monitoring of women of < than 37 weeks gestation.
	A benchmarked standardised proforma will be developed and completed at the time of identifying maternal risks.
	Development of a policy to identify the process of induction including a guide for induction; this policy should address identification of risk, make reference to evidence based processes (e.g. the bishop score and identify what monitoring should be completed following induction).
	The development of a policy that identifies the appropriate levels of monitoring over the course of labour and delivery.
	Development of a policy regarding pain management.
	VBAC protocol needs to be reviewed and updated.
Issues relating to investigation of perinatal deaths	That autopsy reporting for stillbirths to include reference to investigation of other recommended routine stillbirth pathology results (in this case, Kleihauer test).
	That Auslab reports clearly indicate that investigations are for stillbirth.
	A process to be developed and implemented to label all placentas prior to placing in the refrigerator.
	Discussion with MO to consider/encourage discussions with families for autopsy as a possibility.

Table 21 (continued): Recommendations from Root Cause Analyses (RCAs) and Human Error and Patient Safety (HEAPS) analyses, relating to PRIME CI reported incidents from maternity and neonatal services in 2008

Analogous group	Recommendations
Mental health issues	Identify the referral pathways to the mental health consultation and liaison team for those women receiving SSRIs deemed “at risk” following appropriate risk assessment during pregnancy.
	The Statewide Maternity and Neonatal Clinical Network to provide guidelines for all obstetric health service providers regarding SSRIs in pregnancy.
	Patient Safety Centre advocate for an alert/advisory to be distributed that will link obstetricians, neonatologists and psychiatrists to the Royal Australian and New Zealand College of Psychiatrists publication “Guidance on the use of SSRIs and Venlafaxine (SNRI) in late pregnancy”.
Neonatal retrieval issues	The process for documentation of the assessment and telephone advice provided through QNETS be identified and formalised.
	Request to Queensland Neonatal, paediatric and high risk obstetric Emergency Transfer Service (QNETS) to recirculate statement on access to neonatal clinical advice as per QNETS operational procedure.
Issues relating to management of diabetes/gestational diabetes in pregnancy	Clinics for high risk pregnancies who are required to see obstetricians, physician, dietician and diabetes educators, may require long duration visits at the hospital, increasing likelihood that education and holistic care/consistency approaches is reduced.
	It is difficult to track how a patient with Gestational Diabetes is controlling their BGLs, as we are currently reliant on the patient to keep a diary and to bring that diary to each clinic presentation. This is problematic at times for some patients.
	Implementation of the guidelines in the care of pregnant women with diabetes.
	All diabetic women who are pregnant to be referred to Telehealth sessions.
Issues relating to management of diabetes / gestational diabetes in pregnancy (continued)	It is recommended that the district consider review of contemporary technology options for improved monitoring of BGLs at home to support optimal management.
	Education for Registrar/PHO regarding diabetes treatment and care for pregnant women.
	SMPU is requested to include neonatal/paediatric hypoglycaemia management guidelines in documentation developed as part of the next phase of the Standardisation of QH Blood Glucose Record and Insulin Order Forms project.
Clinical Services Capability Framework issues	That maternity facilities review admission criteria within level 2 maternity services, ‘Admission of Maternity Patients’ or similar procedures in accordance with the Queensland Health Clinical Services Capability Framework v 2.0 document.
	That maternity facilities ensure that service level capability is promulgated through facility scope of practice correspondence and staff training, to effectively translate into clinicians being aware of the level of pregnancy risk able to be admitted and managed at level 2 maternity services.
	That the Queensland Health Planning and Coordination Unit responsible for development of the Queensland Health Clinical Service Capability Framework v 2.0 be requested to review the criteria and escalation processes within neonatal service levels to accurately guide facility and clinician management of patient risk.
Emergency Caesarean section issues	The current classification of urgency of Caesarean section process be mapped.
	Develop and implement a standardised emergency response process to life threatening maternal and fetal situations.
	Emergency Caesarean Category system to be developed into a workplace instruction with version control.
	Laminated table of the emergency Caesarean category system to be placed in OT and Birth Suite.
Neonatal drug dosage issues	That a vaginal examination in Theatre before commencing LUSCS for failure to progress near full dilatation be considered.
	The poster of the correct dosages for neonatal medications and IV fluids to be reviewed and updated on annual basis through the Patient Safety Rounds.
	Obtain a poster obtained from RCH of the correct dosages for neonatal medications and IV fluids to be clearly available on Nursery and Labour Ward walls for staff to access.
	Neonatal Intensive Care Unit staff specialists to develop a framework for the introduction of new treatment modalities within the unit. This framework will include reference to nebulised medications as well as other medical treatments.

Table 21 (continued): Recommendations from Root Cause Analyses (RCAs) and Human Error and Patient Safety (HEAPS) analyses, relating to PRIME CI reported incidents from maternity and neonatal services in 2008

Analogous group	Recommendations
Process issues	RBWH Women's and Newborn services formalise and advertise Statewide Centre for Fetal Diagnosis referral process for complex/urgent cases.
	Current referral centre paediatric orientation booklet to be updated with correct procedure for dealing with neonatal emergency in an outlying facility.
Clinical handover issues	All maternity unit medical officer workplace protocols, emergency workplace protocols and the model of care documents to be reviewed and amended to reflect clear identification and delineation of medical officer and midwifery roles and responsibilities with particular reference as to when responsibility for clinical care is to be handed over from midwives to medical officers.
Clinical handover issues (continued)	O&G team standardise the telephone handover process to ensure that all relevant information is discussed. Ideally the RCA team feels that bedside clinical handover for patients in the labour ward should occur.
	Develop and implement of a "Rounding initiative" for senior clinical staff assessing compliance with policy/processes/documentation and parental understanding of safe infant care and sleeping.
Maternal obesity issues	That the equipment used for CTG monitoring be reviewed for accessory equipment requirements to suit bariatric patients.
	It is recommended that the district research the availability of CTG equipment specifically designed for bariatric patients.

Table 21 (continued): Recommendations from Root Cause Analyses (RCAs) and Human Error and Patient Safety (HEAPS) analyses, relating to PRIME CI reported incidents from maternity and neonatal services in 2008

4.0 Statewide Maternity and Neonatal Clinical Network

The Queensland Maternal and Perinatal Quality Council has a close working relationship with the Statewide Maternity and Neonatal Clinical Network (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 QMPQC, has an effective program of development of clinical guidelines with further work progressing on implementation and evaluation of health outcomes and healthcare research.

4.1 Queensland Maternity and Neonatal Clinical Guidelines Program

The Queensland (formerly Statewide) Maternity and Neonatal Clinical Guidelines Program (the Program) was established at the end of 2008 in response to clinician demand for a statewide approach to guideline development. Clinical guidelines improve patient outcomes by promoting evidence based clinical care and reducing inappropriate variation in clinical practice. As at June 2011, 18 clinical guidelines have been published, and a further 10 are currently in development.

(Refer to www.health.qld.gov.au/qcg/html/publications.asp).

Prioritisation of guideline development has been driven primarily by the Queensland Statewide Maternity and Neonatal Clinical Network. Additionally, emerging clinical issues have prompted requests for guideline development from other Queensland Health business units, including the Office of the Chief Nurse, Access Improvement Service, and Primary Community and Extended Care Branch.

Guideline development follows a robust methodology that has successfully engaged a large number of consumers and clinicians across the state. All guidelines are endorsed by the Statewide Maternity and Neonatal Clinical Network and the Patient Safety and Quality Executive Committee for use in Queensland Health facilities. The National Health and Medical Research Council (NHMRC) has listed all Program guidelines on its Guideline Portal.

The development of clinical guidelines is an essential first step toward translating evidence into best clinical practice. The Program recognises the requirement for implementation strategies and is currently piloting accompanying education and auditing tools at three sites in Queensland.

Guideline Title
Early onset Group B streptococcal disease
Intrapartum fetal surveillance
Hypertensive disorders of pregnancy
Obesity
Vaginal birth after caesarean section
Primary postpartum haemorrhage
Venous thromboembolism prophylaxis
Preterm labour
Breastfeeding initiation
Neonatal abstinence syndrome
Hypoxic ischaemic encephalopathy
Neonatal hypoglycaemia
Neonatal resuscitation
Neonatal jaundice
Neonatal respiratory distress and the administration of Continuous Positive Airway Pressure (CPAP)
Examination of the newborn
Term small for gestational age baby
Stillbirth care
Early pregnancy loss
Induction of labour

Table 22: Clinical Practice Guidelines published by Queensland Maternity and Neonatal Clinical Guidelines Program as at October 2011



Data tables

	1988	1989	1990	1991	1992	1993	1994 to 1996 ²¹	1997	1998	1999
Fetal deaths	5.7	5.2	5.5	6.1	5.2	4.2	7.3	7.4	7.1	7.1
Neonatal deaths	4.9	4.5	3.9	4.3	4.1	3.9	4	4.2	4.3	3.5
Perinatal deaths	10.6	9.7	9.3	10.3	9.3	8.1	11.3	11.5	11.4	10.6

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Fetal deaths	7.3	7.3	6.7	6.1	6.9	6.8	6.9	6.9	6.3	7.2
Neonatal deaths	3.8	4	3.6	3.5	3.9	3.4	4	3.4	3.4	3.9
Perinatal deaths	11	11.3	10.3	9.6	10.8	10.1	10.8	10.3	9.6	11.1

Table 23: Perinatal mortality rates, Queensland 1988 to 2009

PSANZ-PDC	Plurality						Relative Risk (95% CI)
	Singleton			Multiple			
	n	%	Rate	n	%	Rate	
1. Congenital abnormality	1,097	25.2	2.3	75	12.0	4.6	0.47 (0.38, 0.59) †
2. Perinatal infection	115	2.6	0.2	6	1.0	0.4	0.36 (0.16, 0.82) †
3. Hypertension	118	2.7	0.3	20	3.2	1.2	1.18 (0.74, 1.88)
4. Antepartum haemorrhage	325	7.5	0.7	37	5.9	2.3	0.79 (0.57, 1.10)
5. Maternal conditions	214	4.9	0.5	8	1.3	0.5	0.26 (0.13, 0.52) †
6. Specific perinatal conditions	198	4.5	0.4	177	28.2	11.0	6.21 (5.16, 7.47) †
7. Hypoxic peripartum deaths	148	3.4	0.3	7	1.1	0.4	0.33 (0.15, 0.70) †
8. Fetal growth restriction	173	4.0	0.4	21	3.3	1.3	0.84 (0.54, 1.32)
9. Spontaneous preterm	888	20.4	1.9	248	39.6	15.3	1.94 (1.72, 2.17) †
10. Unexplained antepartum death	949	21.8	2.0	53	8.5	3.3	0.39 (0.30, 0.50) †
11. No Obstetric antecedent	128	2.9	0.3	15	2.4	0.9	0.81 (0.48, 1.38)
Not Classified	1						
Total	4,354	100.0	9.3	627	100.0	38.8	

Table 24: Perinatal deaths by PSANZ PDC and plurality, Queensland 2000 to 2008

(Rate = per 1,000 births, † = statistically significant) (Total babies born 2000 to 2008 = 483,116. Total singletons born 2000 to 2008 = 466,959. Total multiples born 2000 to 2008 = 16,157)

	Autopsy rates (per cent performed)										
	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	Total
Stillbirths	44.1	38.8	24.3	29.6	22.8	28.3	30.7	34.3	36.5	37.4	32.9
Neonatal death	29.9	25.6	14.7	17.0	17.2	22.2	29.1	31.2	26.7	27.2	24.5
Perinatal deaths	39.3	34.2	20.9	25.1	20.7	26.3	30.1	33.3	33.1	33.8	30.3
	Autopsy rates (numbers)										
Stillbirth autopsy	158	141	80	91	79	106	120	143	140	167	1,225
Stillbirth total	358	363	329	307	347	375	391	417	384	447	3,718
Neonatal death autopsy	55	51	26	30	34	41	65	63	55	65	485
Neonatal death total	184	199	177	176	198	185	223	202	206	239	1,989
Perinatal death autopsy	213	192	106	121	113	147	185	206	195	232	1,710
Perinatal death total	542	562	506	483	545	506	614	619	590	686	5,707

Table 25: Perinatal autopsy rates, Queensland 2000 to 2009

21 Data only published for triennium 1994 to 1996.

PSANZ-PDC Cause of death		Perinatal deaths		Stillbirths		Neonatal deaths	
		n	%	n	%	n	%
1	Congenital abnormality (including terminations for congenital abnormalities)	1,172	23.3	665	20.3	507	29.0
1.1	Central nervous system	252	5.0	165	5.0	87	5.0
1.2	Cardiovascular system	184	3.7	69	2.1	115	6.6
1.3	Urinary system	99	2.0	53	1.6	46	2.6
1.4	Gastrointestinal system	28	0.6	13	0.4	15	0.9
1.5	Chromosomal	253	5.0	182	5.6	71	4.1
1.6	Metabolic	18	0.4	3	0.1	15	0.9
1.7	Multiple/non chromosomal syndromes	166	3.3	104	3.2	62	3.5
1.8	Other congenital abnormality	147	2.9	56	1.7	91	5.2
1.9	Unspecified congenital abnormality	25	0.5	20	0.6	5	0.3
2	Perinatal infection	121	2.4	77	2.4	44	2.5
2.1	Bacterial	6	0.1	1	0.0	5	0.3
	2.11 Group B Streptococcus	31	0.6	18	0.6	13	0.7
	2.12 E coli	11	0.2	5	0.2	6	0.3
	2.13 Listeria monocytogenes	1	0.0	1	0.0	0	0.0
	2.14 Spirochaetal e.g. Syphilis	1	0.0		0.0	1	0.1
	2.18 Other bacterial	12	0.2	6	0.2	6	0.3
	2.19 Unspecified bacterial	8	0.2	6	0.2	2	0.1
2.2	Viral		0.0		0.0	0	0.0
	2.21 Cytomegalovirus	19	0.4	17	0.5	2	0.1
	2.22 Parvovirus	12	0.2	10	0.3	2	0.1
	2.23 Herpes simplex virus	5	0.1		0.0	5	0.3
	2.24 Rubella virus		0.0		0.0	0	0.0
	2.28 Other viral	2	0.0	2	0.1	0	0.0
	2.29 Unspecified viral	1	0.0	1	0.0	0	0.0
2.3	Protozoal e.g. Toxoplasma	4	0.1	3	0.1	1	0.1
2.5	Fungal	1	0.0		0.0	1	0.1
2.8	Other specified organism	2	0.0	2	0.1	0	0.0
2.9	Other unspecified organism	5	0.1	5	0.2	0	0.0
3	Hypertension	138	2.7	88	2.7	50	2.9
3.1	Chronic hypertension: essential	13	0.3	7	0.2	6	0.3
3.2	Chronic hypertension: secondary, e.g. renal disease	3	0.1	1	0.0	2	0.1
3.3	Chronic hypertension: unspecified	1	0.0	1	0.0	0	0.0
3.4	Gestational hypertension	5	0.1	4	0.1	1	0.1
3.5	Pre-eclampsia	93	1.9	58	1.8	35	2.0
	3.51 With laboratory evidence of thrombophilia	5	0.1	4	0.1	1	0.1
3.6	Pre-eclampsia superimposed on chronic hypertension	15	0.3	10	0.3	5	0.3
	3.61 With laboratory evidence of thrombophilia		0.0		0.0	0	0.0
3.9	Unspecified hypertension	3	0.1	3	0.1	0	0.0
4	Antepartum haemorrhage (APH)	362	7.2	235	7.2	127	7.3
4.1	Placental abruption	273	5.4	190	5.8	83	4.7
	4.11 With laboratory evidence of thrombophilia	1	0.0	1	0.0	0	0.0
4.2	Placenta praevia	20	0.4	7	0.2	13	0.7
4.3	Vasa praevia	8	0.2	6	0.2	2	0.1
4.8	Other APH	19	0.4	11	0.3	8	0.5
4.9	APH of undetermined origin	41	0.8	20	0.6	21	1.2

Table 26: Perinatal deaths by detailed PSANZ PDC classification, Queensland 2000 to 2008 (continued over page)

PSANZ-PDC Cause of death		Perinatal deaths		Stillbirths		Neonatal deaths	
		n	%	n	%	n	%
5	Maternal conditions	222	4.4	189	5.8	33	1.9
5.1	Termination of pregnancy for maternal psychosocial indications	81	1.6	76	2.3	5	0.3
5.2	Diabetes / Gestational diabetes	54	1.1	51	1.6	3	0.2
5.3	Maternal injury	1	0.0	1	0.0	0	0.0
	5.31 Accidental	11	0.2	9	0.3	2	0.1
	5.32 Non-accidental	4	0.1	3	0.1	1	0.1
5.4	Maternal sepsis	6	0.1	5	0.2	1	0.1
5.5	Lupus obstetric syndrome	2	0.0	1	0.0	1	0.1
5.6	Obstetric cholestasis	2	0.0	2	0.1	0	0.0
5.8	Other specified maternal conditions	61	1.2	41	1.3	20	1.1
6	Specific perinatal conditions	375	7.5	281	8.6	94	5.4
6.1	Twin-twin transfusion	154	3.1	106	3.2	48	2.7
6.2	Fetomaternal haemorrhage	36	0.7	35	1.1	1	0.1
6.3	Antepartum cord complications (e.g. cord haemorrhage; true knot with evidence of occlusion)	64	1.3	62	1.9	2	0.1
6.4	Uterine abnormalities, e.g. bicornuate uterus, cervical incompetence	56	1.1	29	0.9	27	1.5
6.5	Birth trauma (typically infants of >24 weeks gestation or >600g birth weight)	2	0.0		0.0	2	0.1
6.6	Alloimmune disease	4	0.1	2	0.1	2	0.1
	6.61 Rhesus		0.0		0.0	0	0.0
	6.62 ABO	1	0.0	1	0.0	0	0.0
	6.63 Kell		0.0		0.0	0	0.0
	6.64 Alloimmune thrombocytopenia		0.0		0.0	0	0.0
	6.68 Other	1	0.0		0.0	1	0.1
	6.69 Unspecified		0.0		0.0	0	0.0
6.7	Idiopathic hydrops	31	0.6	23	0.7	8	0.5
6.8	Other specific perinatal conditions	26	0.5	23	0.7	3	0.2
7	Hypoxic peripartum death	155	3.1	64	2.0	91	5.2
7.1	With intrapartum complications	24	0.5	13	0.4	11	0.6
	7.11 Uterine rupture	7	0.1	4	0.1	3	0.2
	7.12 Cord prolapse	8	0.2	3	0.1	5	0.3
	7.13 Shoulder dystocia	3	0.1		0.0	3	0.2
	7.18 Other	17	0.3	6	0.2	11	0.6
7.2	Evidence of non-reassuring fetal status in a normally grown infant	57	1.1	20	0.6	37	2.1
7.3	No intrapartum complications and no evidence of non-reassuring fetal status.	10	0.2	5	0.2	5	0.3
7.9	Unspecified hypoxic peripartum death	29	0.6	13	0.4	16	0.9
8	Fetal Growth Restriction (FGR)	194	3.9	164	5.0	30	1.7
8.1	With evidence of reduced vascular perfusion on Doppler studies and /or placental histopathology	108	2.2	93	2.8	15	0.9
8.2	With chronic villitis	5	0.1	3	0.1	2	0.1
8.3	No placental pathology	46	0.9	38	1.2	8	0.5
8.4	No examination of placenta	9	0.2	8	0.2	1	0.1
8.8	Other specified placental pathology	15	0.3	14	0.4	1	0.1
8.9	Unspecified or not known whether placenta examined	11	0.2	8	0.2	3	0.2

Table 26 (continued): Perinatal deaths by detailed PSANZ PDC classification, Queensland 2000 to 2008

PSANZ-PDC Cause of death		Perinatal deaths		Stillbirths		Neonatal deaths	
		n	%	n	%	n	%
9	Spontaneous preterm (<37 weeks gestation)	1,136	22.6	468	14.3	668	38.1
9.1	Spontaneous preterm with intact membranes, or membrane rupture <24 hours before delivery	4	0.1	2	0.1	2	0.1
	9.11 With chorioamnionitis on placental histopathology	250	5.0	89	2.7	161	9.2
	9.12 Without chorioamnionitis on placental histopathology	192	3.8	67	2.0	125	7.1
	9.13 With clinical evidence of chorioamnionitis, no examination of placenta	59	1.2	15	0.5	44	2.5
	9.17 No clinical signs of chorioamnionitis, no examination of placenta	21	0.4	9	0.3	12	0.7
	9.19 Unspecified or not known whether placenta examined	89	1.8	36	1.1	53	3.0
9.2	Spontaneous preterm with membrane rupture >24 hours before delivery	2	0.0	1	0.0	1	0.1
	9.21 With chorioamnionitis on placental histopathology	268	5.3	132	4.1	136	7.7
	9.22 Without chorioamnionitis on placental histopathology	56	1.1	17	0.5	39	2.2
	9.23 With clinical evidence of chorioamnionitis, no examination of placenta	22	0.4	7	0.2	15	0.9
	9.27 No clinical signs of chorioamnionitis, no examination of placenta	5	0.1	3	0.1	2	0.1
	9.29 Unspecified or not known whether placenta examined	28	0.6	13	0.4	15	0.9
9.3	Spontaneous preterm with membrane rupture of unknown duration before delivery	1	0.0		0.0	1	0.1
	9.31 With chorioamnionitis on placental histopathology	48	1.0	32	1.0	16	0.9
	9.32 Without chorioamnionitis on placental histopathology	30	0.6	14	0.4	16	0.9
	9.33 With clinical evidence of chorioamnionitis, no examination of placenta	9	0.2	4	0.1	5	0.3
	9.37 No clinical signs of chorioamnionitis, no examination of placenta	4	0.1	3	0.1	1	0.1
	9.39 Unspecified or not known whether placenta examined	48	1.0	24	0.7	24	1.4
10	Unexplained antepartum death	998	19.9	998	30.5	0	0.0
10.1	With evidence of reduced vascular perfusion on Doppler studies and / or placental histopathology	137	2.7	137	4.2	0	0.0
10.2	With chronic villitis	15	0.3	15	0.5	0	0.0
10.3	No placental pathology	566	11.3	566	17.3	0	0.0
10.7	No examination of placenta	76	1.5	76	2.3	0	0.0
10.8	Other specified placental pathology	56	1.1	56	1.7	0	0.0
10.9	Unspecified or not known whether placenta examined	148	2.9	148	4.5	0	0.0
11	No obstetric antecedent	143	2.8	40	1.2	103	5.9
11.1	Sudden Infant Death Syndrome (SIDS)	3	0.1		0.0	3	0.2
	11.11 SIDS Category IA: Classic features of SIDS present and completely documented.	2	0.0		0.0	2	0.1
	11.12 SIDS Category IB: Classic features of SIDS present but incompletely documented.	6	0.1		0.0	6	0.3
	11.13 SIDS Category II: Infant deaths that meet Category I except for one or more features.	9	0.2		0.0	9	0.5
11.2	Postnatally acquired infection	10	0.2		0.0	10	0.6
11.3	Accidental asphyxiation	8	0.2		0.0	8	0.5
11.4	Other accident, poisoning or violence (postnatal)	6	0.1	3	0.1	3	0.2
11.8	Other specified	12	0.2	1	0.0	11	0.6
11.9	Unknown / undetermined	60	1.2	31	0.9	29	1.7
	11.91 Unclassified Sudden Infant Death	1	0.0		0.0	1	0.1
	11.92 Other Unknown / undetermined	26	0.5	5	0.2	21	1.2
Not stated		5	0.1	1	0.0	4	0.2
Total		5,021	100.0	3,270	100.0	1,751	100.0

Table 26 (continued): Perinatal deaths by detailed PSANZ PDC classification, Queensland 2000 to 2008

PSANZ-NDC Cause of death		n	%
1	Congenital abnormality (including terminations for congenital abnormalities)	511	29.2
1.1	Central nervous system	89	5.1
1.2	Cardiovascular system	120	6.9
1.3	Urinary system	47	2.7
1.4	Gastrointestinal system	15	0.9
1.5	Chromosomal	69	3.9
1.6	Metabolic	17	1.0
1.7	Multiple/non chromosomal syndromes	60	3.4
1.8	Other congenital abnormality	55	3.1
	1.81 Musculoskeletal	10	0.6
	1.82 Respiratory	4	0.2
	1.83 Diaphragmatic hernia	12	0.7
	1.84 Haematological	1	0.1
	1.85 Tumours	4	0.2
	1.88 Other specified congenital abnormality	4	0.2
1.9	Unspecified congenital abnormality	4	0.2
2	Extreme prematurity	569	32.4
2.1	Not resuscitated	502	28.6
2.2	Unsuccessful resuscitation	63	3.6
2.9	Unspecified or not known whether resuscitation attempted	4	0.2
3	Cardio-respiratory disorders	208	11.9
3.1	Hyaline membrane disease / Respiratory distress syndrome (RDS)	134	7.7
3.2	Meconium aspiration syndrome	3	0.2
3.3	Primary persistent pulmonary hypertension	6	0.3
3.4	Pulmonary hypoplasia	39	2.2
3.5	Chronic neonatal lung disease (typically, bronchopulmonary dysplasia)	9	0.5
3.8	Other	17	1.0
4	Infection	129	7.4
4.1	Bacterial	3	0.2
	4.11 Congenital bacterial	38	2.2
	4.12 Acquired bacterial	69	3.9
4.2	Viral		
	4.21 Congenital viral	5	0.3
	4.22 Acquired viral	4	0.2
4.3	Protozoal, e.g. Toxoplasma		
4.4	Spirochaetal, e.g. Syphilis	1	0.1
4.5	Fungal	2	0.1
4.8	Other	1	0.1
4.9	Unspecified organism	6	0.3
5	Neurological	179	10.2
5.1	Hypoxic ischaemic encephalopathy / Perinatal asphyxia (typically infants of >24 weeks gestation or >600g birth weight)	132	7.5
5.2	Intracranial haemorrhage	43	2.5
5.8	Other	4	0.2
6	Gastrointestinal	51	2.9
6.1	Necrotising enterocolitis	40	2.3
6.8	Other	11	0.6

Table 27: Neonatal deaths by detailed PSANZ NDC classification, Queensland 2000 to 2008 (continued next page)

PSANZ-NDC Cause of death			n	%
7	Other		100	5.7
7.1	Sudden Infant Death Syndrome (SIDS)		2	0.1
	7.11	SIDS Category IA: Classic features of SIDS present and completely documented.	3	0.2
	7.12	SIDS Category IB: Classic features of SIDS present but incompletely documented.	8	0.5
	7.13	SIDS Category II : Infant deaths that meet category I except for one or more features.	14	0.8
7.2	Multisystem failure-only if unknown primary cause or trigger event.		8	0.5
7.3	Trauma		7	0.4
7.8	Other specified		17	1.0
7.9	Unknown/Undetermined		33	1.8
	7.91	Unclassified Sudden Infant Death	2	0.1
	7.92	Other Unknown/Undetermined	6	0.3
Not stated			4	
Total			1,751	100.0

Table 27 (continued): Neonatal deaths by detailed PSANZ NDC classification, Queensland 2000 to 2008

Year	Public Hospital	Private Hospital	Home Birth	Data incomplete	Total Births	% Public Hospital	% Private Hospital	% Home Birth
2000	35,967	12,429	126	2	48,524	74.1	25.6	0.3
2001	34,186	14,620	102		48,908	69.9	29.9	0.2
2002	32,959	15,303	61	1	48,324	68.2	31.7	0.1
2003	33,833	15,610	67	2	49,512	68.3	31.5	0.1
2004	34,216	15,774	57	4	50,051	68.4	31.5	0.1
2005	37,374	16,919	42	2	54,337	68.8	31.1	0.1
2006	38,462	17,208	47	2	55,719	69	30.9	0.1
2007	41,222	17,924	81	1	59,228	69.6	30.3	0.1
2008	41,903	18,312	110	3	60,328	69.5	30.4	0.2
2009	42,550	18,351	123		61,024	69.7	30.1	0.2
Total	372,672	162,450	816	17	535,955	69.5	30.3	0.2

Table 28: Births in Queensland 2000 to 2009 by care provider

Year	Maternal age < 20	Maternal age 20-34	Maternal age 35+	Total	% < 20	% 20-34	% 35+
2000		91	35	126	0	72.2	27.8
2001	1	69	32	102	1	67.6	31.4
2002		42	19	61	0	68.9	31.1
2003	1	45	21	67	1.5	67.2	31.3
2004	3	33	21	57	5.3	57.9	36.8
2005	1	25	16	42	2.4	59.5	38.1
2006	1	30	16	47	2.1	63.8	34
2007	1	54	26	81	1.2	66.7	32.1
2008		72	38	110	0	65.5	34.5
2009	1	83	39	123	0.8	67.5	31.7
Total	9	544	263	816	1.4	65.7	32.9

Table 29: Home births in Queensland 2000 to 2009, by maternal age

Year	Maternal age < 20	Maternal age 20-34	Maternal age 35+	Total	% < 20	% 20-34	% 35+
2000	3,183	38,147	7,194	48,524	6.6	78.6	14.8
2001	3,158	38,303	7,447	48,908	6.5	78.3	15.2
2002	3,067	37,795	7,462	48,324	6.3	78.2	15.4
2003	3,046	38,342	8,124	49,512	6.2	77.4	16.4
2004	3,003	38,528	8,520	50,051	6.0	77.0	17.0
2005	3,069	41,566	9,702	54,337	5.6	76.5	17.9
2006	3,076	42,289	10,354	55,719	5.5	75.9	18.6
2007	3,260	44,564	11,404	59,228	5.5	75.2	19.3
2008	3,456	44,934	11,938	60,328	5.5	74.5	19.8
2009	3,340	45,523	12,161	61,024	5.9	74.6	19.9
Total	31,658	409,991	94,306	535,955	6.0	76.6	17.4

Table 30: Births in Queensland 2000 to 2009 by maternal age

Year	Maternal age <20			Maternal age 20-34			Maternal age 35+			Data incomplete
	Public	Private	Homebirth	Public	Private	Homebirth	Public	Private	Homebirth	
2000	3,100	83	0	28,487	9,567	91	4,380	2,779	35	2
2001	3,048	109	1	27,025	11,209	69	4,113	3,302	32	0
2002	2,957	110	0	26,079	11,674	42	3,923	3,519	19	1
2003	2,947	98	1	26,583	11,714	45	4,303	3,798	21	2
2004	2,923	77	3	26,861	11,631	33	4,432	4,066	21	4
2005	2,944	124	1	29,299	12,241	25	5,131	4,554	16	2
2006	2,990	85	1	29,974	12,283	30	5,498	4,840	16	2
2007	3,160	99	1	31,951	12,559	54	6,111	5,266	26	1
2008	3,362	94	0	32,100	12,759	72	6,441	5,459	38	3
2009	3,269	70	1	32,598	12,842	83	6,683	5,439	39	0
Total	30,700	949	9	290,957	118,479	544	51,015	43,022	263	17

Table 31: Number of births in Queensland 2000 to 2009 by maternal age group and care provider

Maternal age	Pregnancy plurality		
	Singleton	Multiple	% Multiple
<20	31,434	224	0.7
20-34	403,512	6,479	1.6
35+	92,029	2,277	2.5
Total	526,975	8,980	1.7

Table 32: Number of births in Queensland 2000 to 2009 by maternal age group and plurality

Maternal age	Low birth weight babies		
	<1500g	1500+g	% <1500g
<20	679	31,204	2.2
20-34	6,142	410,492	1.5
35+	1,723	94,928	1.8
Total	8,544	536,624	1.6

Table 33: Number of low birth weight babies born in Queensland 2000 to 2009 by maternal age group

Maternal age	Gestation at birth		
	36 weeks or less	37 weeks or more	% 36 weeks or less
<20	2,897	28,761	10.1
20-34	30,480	379,511	8.0
35+	8,190	86,116	9.5
Total	41,567	494,388	8.4

Table 34: Number of babies born in Queensland 2000 to 2009 by maternal age group and gestation at birth

Maternal age	Babies requiring NICU/SCN admission		
	NICU/SCN	No NICU/SCN	% NICU/SCN
<20	5,656	26,257	21.5
20-34	64,970	351,664	18.5
35+	17,398	79,253	22.0
Total	88,024	457,174	19.3

Table 35: Number of babies born in Queensland 2000 to 2009 by maternal age group and need for admission to a Neonatal Intensive Care Unit or a Special Care Nursery

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	Total
20 weeks or less	28	32	41	40	60	65	85	76	67	69	563
21-23 weeks	176	170	129	114	141	144	154	184	167	179	1,558
24-26 weeks	136	137	146	131	145	153	166	128	168	179	1,489
27-29 weeks	210	196	192	216	207	204	245	248	256	251	2,225
30-32 weeks	429	411	455	443	449	494	504	513	491	533	4,722
33-35 weeks	1,429	1,321	1,423	1,405	1,531	1,659	1,779	1,841	1,828	1,857	16,073
36-38 weeks	11,874	12,194	12,768	13,645	13,843	15,145	15,681	16,380	16,596	17,009	145,135
39 weeks or more	34,232	34,446	33,168	33,515	33,668	36,469	37,099	39,847	40,750	40,940	364,134
Total	48,514	48,907	48,322	49,509	50,044	54,333	55,713	59,217	60,323	61,017	535,899

Table 36: Number of women giving birth in Queensland 2000 to 2009 by gestation at birth (gestation not stated for 56 women)

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	Total
20 weeks or less	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.1	0.1	0.1	0.1
21-23 weeks	0.4	0.3	0.3	0.2	0.3	0.3	0.3	0.3	0.3	0.3	0.3
24-26 weeks	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.2	0.3	0.3	0.3
27-29 weeks	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
30-32 weeks	0.9	0.8	0.9	0.9	0.9	0.9	0.9	0.9	0.8	0.9	0.9
33-35 weeks	2.9	2.7	2.9	2.8	3.1	3.1	3.2	3.1	3.0	3.0	3.0
36-38 weeks	24.5	24.9	26.4	27.6	27.7	27.9	28.1	27.7	27.5	27.9	27.1
39 weeks or more	70.6	70.4	68.6	67.7	67.3	67.1	66.6	67.3	67.6	67.1	67.9

Table 37: Percentage of women giving birth in Queensland 2000 to 2009 by gestation at birth

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	Total
20 weeks or less	31	33	45	44	62	70	90	76	71	75	597
21-23 weeks	190	192	143	129	154	157	166	208	185	197	1,721
24-26 weeks	150	154	166	143	170	166	194	140	189	204	1,676
27-29 weeks	250	226	225	263	245	237	289	287	298	281	2,601
30-32 weeks	512	478	546	517	524	591	613	625	573	625	5,604
33-35 weeks	1,623	1,523	1,663	1,622	1,761	1,889	2,034	2,104	2,097	2,134	18,450
36-38 weeks	12,274	12,607	13,206	14,099	14,296	15,684	16,203	16,926	17,218	17,575	150,088
39 weeks or more	34,277	34,476	33,200	33,547	33,691	36,483	37,113	39,867	40,766	40,954	364,374
Total	49,307	49,689	49,194	50,364	50,903	55,277	56,702	60,233	61,397	62,045	545,111

Table 38: Number of babies born in Queensland 2000 to 2009 by gestation at birth (gestation not stated for 57 babies)

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	Total
20 weeks or less	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.1	0.1	0.1	0.1
21-23 weeks	0.4	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
24-26 weeks	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.2	0.3	0.3	0.3
27-29 weeks	0.5	0.5	0.5	0.5	0.5	0.4	0.5	0.5	0.5	0.5	0.5
30-32 weeks	1.0	1.0	1.1	1.0	1.0	1.1	1.1	1.0	0.9	1.0	1.0
33-35 weeks	3.3	3.1	3.4	3.2	3.5	3.4	3.6	3.5	3.4	3.4	3.4
36-38 weeks	24.9	25.4	26.8	28.0	28.1	28.4	28.6	28.1	28.0	28.3	27.5
39 weeks or more	69.5	69.4	67.5	66.6	66.2	66.0	65.5	66.2	66.4	66.0	66.8

Table 39: Percentage of babies born in Queensland 2000 to 2009 by gestation at birth

Year	Gestation at birth (number of women)				Gestation at birth (percentage of women)	
	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
Total	30,250	11,303	372,672	162,450	8.1	7.0

Table 40: Number and percentage of babies born in Queensland 2000 to 2009 by gestation at birth and mode of care



Year	Gestation at birth (number of women)									DI*	Total
	Women <20 years of age			Women aged 20-34 years			Women aged 35+ years				
	36 weeks or less	37-41 weeks	42 weeks or more	36 weeks or less	37-41 weeks	42 weeks or more	36 weeks or less	37-41 weeks	42 weeks or more		
2000	321	2,785	72	2,747	34,683	713	629	6,416	148	10	48,524
2001	279	2,827	52	2,670	35,065	567	670	6,678	99	1	48,908
2002	250	2,753	62	2,775	34,527	493	651	6,746	65	2	48,324
2003	282	2,724	39	2,803	35,157	381	680	7,372	71	3	49,512
2004	273	2,701	27	2,935	35,283	305	743	7,692	85	7	50,051
2005	288	2,745	35	3,095	38,193	275	881	8,752	69	4	54,337
2006	283	2,763	29	3,301	38,737	246	917	9,370	67	6	55,719
2007	307	2,917	33	3,375	40,897	284	961	10,346	97	11	59,228
2008	317	3,115	24	3,310	41,323	297	1,012	10,827	98	5	60,328
2009	297	3,020	20	3,469	41,738	314	1,046	11,025	88	7	61,024
Total	2,897	28,350	393	30,480	375,603	3,875	8,190	85,224	887	56	535,955

Year	Gestation at birth (percentage of women)								
	Women <20 years of age			Women aged 20-34 years			Women aged 35+ years		
	36 weeks or less	37-41 weeks	42 weeks or more	36 weeks or less	37-41 weeks	42 weeks or more	36 weeks or less	37-41 weeks	42 weeks or more
2000	10.1	87.6	2.3	7.2	90.9	1.9	8.7	89.2	2.1
2001	8.8	89.5	1.6	7.0	91.5	1.5	9.0	89.7	1.3
2002	8.2	89.8	2.0	7.3	91.4	1.3	8.7	90.4	0.9
2003	9.3	89.5	1.3	7.3	91.7	1.0	8.4	90.8	0.9
2004	9.1	90.0	0.9	7.6	91.6	0.8	8.7	90.3	1.0
2005	9.4	89.5	1.1	7.4	91.9	0.7	9.1	90.2	0.7
2006	9.2	89.9	0.9	7.8	91.6	0.6	8.9	90.5	0.6
2007	9.4	89.6	1.0	7.6	91.8	0.6	8.4	90.7	0.9
2008	9.2	90.1	0.7	7.4	92.0	0.7	8.5	90.7	0.8
2009	8.9	90.5	0.6	7.6	91.7	0.7	8.6	90.7	0.7
Total	9.2	89.6	1.2	7.4	91.6	0.9	8.7	90.4	0.9

Table 41: Number and percentage of babies born in Queensland 2000 to 2009 by gestation at birth and maternal age (* DI = data incomplete)

Gestation at birth (weeks)	20	21	22	23	24	25	26	27	28	29	30	31	32	33
No previous pregnancy (n)	125	145	126	131	139	121	147	171	201	252	329	401	627	840
No previous pregnancy (%)	0.09	0.10	0.09	0.09	0.10	0.08	0.10	0.12	0.14	0.17	0.23	0.28	0.43	0.58
Previous pregnancies (n)	395	356	364	260	280	300	366	346	494	551	713	879	1344	1,905
Previous pregnancies (%)	0.12	0.10	0.11	0.08	0.08	0.09	0.11	0.10	0.14	0.16	0.21	0.26	0.39	0.56

Gestation at birth (weeks)	34	35	36	37	38	39	40	41	42	43	44
No previous pregnancy (n)	1,547	2,331	4,043	7,940	21,242	30,510	47,351	24,563	1,593	23	1
No previous pregnancy (%)	1.07	1.61	2.79	5.48	14.66	21.06	32.68	16.95	1.10	0.02	0.00
Previous pregnancies (n)	3,141	4,880	9,605	20,749	69,682	83,378	99,159	40,719	2,562	39	4
Previous pregnancies (%)	0.92	1.42	2.80	6.06	20.35	24.35	28.95	11.89	0.75	0.01	0.00

Table 42: Number and women giving birth in Queensland 2001 to 2009 by gestation at birth and previous pregnancy (Data incomplete for 46 and 15 gave birth at less than 20 weeks)

Gestation at birth (weeks)	20	21	22	23	24	25	26	27	28	29	30	31	32	33
Total Private babies (n)	86	129	160	94	76	92	83	117	153	172	244	317	596	226
Elective CS (n)	3	2	1	1	6	7	10	9	7	21	22	73	74	184
Induced labour (n)	8	6	6	2	4	5	6	6	3	3	2	3	1	11
Spontaneous labour (n)	11	19	13	10	15	14	9	13	24	21	34	40	59	141
Elective CS (%)	0.01	0.01	0.00	0.00	0.02	0.02	0.03	0.02	0.02	0.06	0.06	0.19	0.20	0.49
Induced labour (%)	0.02	0.02	0.02	0.01	0.01	0.01	0.02	0.02	0.01	0.01	0.01	0.01	0.00	0.03
Spontaneous labour (%)	0.03	0.05	0.03	0.03	0.04	0.04	0.02	0.03	0.06	0.06	0.09	0.11	0.16	0.38
Total Public babies (n)	491	480	467	390	442	436	545	548	744	867	1,104	1,343	1,999	2518
Elective CS (n)	2	1	1	1	12	13	36	30	61	75	75	93	170	186
Induced labour (n)	80	82	49	30	29	13	16	18	20	13	12	24	31	49
Spontaneous labour (n)	35	42	53	64	62	67	77	56	88	122	145	155	238	335
Elective CS (%)	0.00	0.00	0.00	0.00	0.01	0.02	0.04	0.04	0.07	0.09	0.09	0.11	0.20	0.22
Induced labour (%)	0.09	0.10	0.06	0.04	0.03	0.02	0.02	0.02	0.02	0.02	0.01	0.03	0.04	0.06
Spontaneous labour (%)	0.04	0.05	0.06	0.07	0.07	0.08	0.09	0.07	0.10	0.14	0.17	0.18	0.28	0.39

Gestation at birth (weeks)	34	35	36	37	38	39	40	41	42	43	44	31	32	33
Total Private babies (n)	428	693	1,346	2,815	9,800	10,020	8,778	2,806	139	1	1	317	596	226
Elective CS (n)	292	605	1323	5712	3634	702	235	24	1	1	0	73	74	184
Induced labour (n)	23	63	175	502	1,680	2,387	3,070	1,559	65	0	0	3	1	11
Spontaneous labour (n)	221	338	566	990	2,408	3,999	5,006	1,012	50	0	1	40	59	141
Elective CS (%)	0.78	1.61	3.52	15.21	9.68	1.87	0.63	0.06	0.00	0.00	0.00	0.19	0.20	0.49
Induced labour (%)	0.06	0.17	0.47	1.34	4.47	6.36	8.18	4.15	0.17	0.00	0.00	0.01	0.00	0.03
Spontaneous labour (%)	0.59	0.90	1.51	2.64	6.41	10.65	13.33	2.69	0.13	0.00	0.00	0.11	0.16	0.38
Total Public babies (n)	4,067	6,030	10,983	21,804	58,701	82,221	118,683	58,783	4,296	62	6	1,343	1,999	2518
Elective CS (n)	268	337	512	1,081	3,742	4,973	819	365	47	2	0	93	170	186
Induced labour (n)	128	229	496	1,100	2,574	2,610	3,680	6,268	421	3	1	24	31	49
Spontaneous labour (n)	507	845	1,451	2,961	6,881	13,546	20,229	6,592	210	8	0	155	238	335
Elective CS (%)	0.31	0.39	0.60	1.26	4.37	5.81	0.96	0.43	0.05	0.00	0.00	0.11	0.20	0.22
Induced labour (%)	0.15	0.27	0.58	1.28	3.01	3.05	4.30	7.32	0.49	0.00	0.00	0.03	0.04	0.06
Spontaneous labour (%)	0.59	0.99	1.69	3.46	8.03	15.82	23.62	7.70	0.25	0.01	0.00	0.18	0.28	0.39

Table 43: Number and percentage of babies born in Queensland Public and Private hospitals 2000 to 2009 by gestation at birth, care mode and onset of labour / elective caesarean section

Gestation (weeks)	Percentage admitted to NICU or SCN			Perinatal mortality rate (per 1,000 births)		
	Spontaneous labour	Induced labour or Elective C Section	Total	Spontaneous labour	Induced labour or Elective C Section	Total
20	0.0	0.0	0.0	1,000.0	1,000.0	1,000.0
21	0.4	0.3	0.3	1,000.0	1,000.0	1,000.0
22	3.4	0.0	1.9	994.3	1,000.0	996.8
23	18.6	2.9	13.0	922.8	988.4	946.3
24	72.4	25.0	56.3	552.3	818.2	642.3
25	85.1	47.4	71.4	312.5	640.6	431.8
26	88.1	63.6	78.7	198.5	443.5	293.0
27	87.7	75.8	82.3	114.2	290.8	195.5
28	87.4	78.0	83.3	110.7	263.4	177.3
29	88.9	86.0	87.6	77.5	163.5	116.5
30	90.6	88.1	89.5	66.3	136.1	97.1
31	93.5	89.2	91.5	14.3	113.5	59.6
32	92.1	90.7	91.5	34.3	88.3	58.6
33	92.5	92.0	92.2	22.7	66.6	40.8
34	90.9	93.3	92.0	13.5	39.0	24.8
35	81.7	88.1	84.6	8.9	25.5	16.3
36	52.0	64.4	57.7	8.9	18.9	13.6
37	19.4	30.3	24.9	4.3	8.9	6.6
38	10.9	15.0	13.4	2.0	3.1	2.7
39	8.2	10.0	8.9	1.8	2.6	2.1
40	7.5	9.3	8.0	1.6	2.7	1.9
41	9.2	10.7	10.0	2.1	1.8	2.0
42	10.8	11.6	11.4	6.2	4.9	5.3
43+	50.0	11.6	13.6	6.7	4.4	6.2

Table 44: Incidence of admission to Neonatal Intensive Care Unit (NICU) or a special care nursery (SCN) and perinatal mortality rate (per 1,000 births) by gestation, babies born in Queensland 2000 to 2009

Year	Birth weight (number of babies)						Birth weight (percentage of babies)					
	<1000g	1000-1499g	1500-2499g	2500-3999g	4000+g	Total	<1000g	1000-1499g	1500-2499g	<2500g	2500-3999g	4000+g
2000	467	339	2,679	39,368	6,465	49,318	0.9	0.7	5.4	7.1	79.8	13.1
2001	440	358	2,571	39,852	6,469	49,690	0.9	0.7	5.2	6.8	80.2	13.0
2002	405	347	2,811	39,435	6,198	49,196	0.8	0.7	5.7	7.2	80.2	12.6
2003	410	364	2,683	40,428	6,482	50,367	0.8	0.7	5.3	6.9	80.3	12.9
2004	470	339	2,835	40,913	6,353	50,910	0.9	0.7	5.6	7.2	80.4	12.5
2005	461	367	3,085	44,596	6,772	55,281	0.8	0.7	5.6	7.1	80.7	12.3
2006	542	413	3,202	45,559	6,992	56,708	1.0	0.7	5.6	7.3	80.3	12.3
2007	512	414	3,183	48,556	7,579	60,244	0.8	0.7	5.3	6.8	80.6	12.6
2008	526	411	3,209	49,418	7,838	61,402	0.9	0.7	5.2	6.8	80.5	12.8
2009	572	387	3,430	49,750	7,913	62,052	0.9	0.6	5.5	7.1	80.2	12.8
Total	4,805	3,739	29,688	437,875	69,061	545,168	0.9	0.7	5.4	7.0	80.3	12.7

Table 45: Birth weight of babies born in Queensland 2000 to 2009

Year	Singleton pregnancies	Twin pregnancies	Other multiple pregnancies	% multiple pregnancies
2000	47,762	733	29	1.6
2001	48,156	723	29	1.5
2002	47,484	810	30	1.7
2003	48,674	821	17	1.7
2004	49,210	826	15	1.7
2005	53,418	896	23	1.7
2006	54,754	941	24	1.7
2007	58,231	978	19	1.7
2008	59,270	1,042	16	1.8
2009	60,016	988	20	1.7
Total	526,975	8,758	222	1.7

Table 46: Number and percentage of pregnancies which were multiple in Queensland 2000 to 2009

Year	Maternal age <20			Maternal age 20-34			Maternal age 35+			Data incomplete
	Singleton	Twin	Other multiple	Singleton	Twin	Other multiple	Singleton	Twin	Other multiple	
2000	3,165	18	0	37,575	553	19	7,022	162	10	30
2001	3,140	18	0	37,755	525	23	7,261	180	6	18
2002	3,044	23	0	37,157	618	20	7,283	169	10	32
2003	3,024	22	0	37,703	627	12	7,947	172	5	15
2004	2,983	20	0	37,912	608	8	8,315	198	7	21
2005	3,045	24	0	40,900	652	14	9,473	220	9	27
2006	3,056	20	0	41,597	672	20	10,101	249	4	12
2007	3,235	25	0	43,861	688	15	11,135	265	4	12
2008	3,432	24	0	44,207	717	10	11,631	301	6	0
2009	3,310	29	0	44,845	665	13	11,861	294	6	0
Total	31,434	223	0	403,512	6,325	154	92,029	2,210	67	167

Table 47: Number of multiple pregnancies in Queensland 2000 to 2009 by maternal age

Year	% Multiple pregnancies		
	Maternal age <20	Maternal age 20-34	Maternal age 35+
2000	0.6	1.5	2.4
2001	0.6	1.4	2.5
2002	0.7	1.7	2.4
2003	0.7	1.7	2.2
2004	0.7	1.6	2.4
2005	0.8	1.6	2.4
2006	0.7	1.6	2.4
2007	0.8	1.6	2.4
2008	0.7	1.6	2.6
2009	0.9	1.5	2.5
Total	0.7	1.6	2.4

Table 48: Percentage of multiple pregnancies in Queensland 2000 to 2009 by maternal age

Year	Multiple <37	Multiple 37+	Singleton <37	Singleton 37+
2000	57.4	42.5	6.9	93.2
2001	56.4	43.6	6.6	93.4
2002	59.6	40.5	6.7	93.3
2003	58.6	41.4	6.7	93.3
2004	60.9	39.1	7.0	92.9
2005	58.4	41.6	7.0	93.0
2006	62.3	37.7	7.1	92.8
2007	59.3	40.7	7.0	93.0
2008	60.2	39.8	7.1	93.2
2009	61.0	39.0	7.4	93.0
Total	59.5	40.5	7.3	93.1

Table 49: Percentage of multiple and singleton births in Queensland 2000 to 2009 by gestation

Year	AIH/AID +/- or ovulation induction		Extracorporeal techniques		No assisted conception technique identified		Total pregnancies
	Singleton	Multiple	Singleton	Multiple	Singleton	Multiple	
2000	574	49	447	135	46,741	578	48,524
2001	602	60	613	165	46,941	527	48,908
2002	559	70	659	173	46,266	597	48,324
2003	577	48	726	183	47,371	607	49,512
2004	658	60	793	209	47,759	572	50,051
2005	653	62	877	210	51,888	647	54,337
2006	666	57	1,136	242	52,952	666	55,719
2007	653	69	1,192	229	56,386	699	59,228
2008	743	67	1,335	228	57,192	763	60,328
2009	770	64	1,426	222	57,820	722	61,024
Total	6,455	606	9,204	1,996	511,316	6,378	535,955

Table 50: Numbers of singleton and multiple births in pregnancies conceived with and without the use of assisted conception techniques in Queensland 2000 to 2009. [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.]

Year	% Multiple births in pregnancies with AIH/AID +/- or ovulation induction	% Multiple births in pregnancies with extracorporeal techniques	% Multiple births in pregnancies with no assisted conception
2000	7.9	23.2	1.2
2001	9.1	21.2	1.1
2002	11.1	20.8	1.3
2003	7.7	20.1	1.3
2004	8.4	20.9	1.2
2005	8.7	19.3	1.2
2006	7.9	17.6	1.2
2007	9.6	16.1	1.2
2008	8.3	14.6	1.3
2009	7.7	13.5	1.2
Total	8.6	17.8	1.2

Table 51: Percentage of multiple births in pregnancies conceived with and without the use of assisted conception techniques in Queensland 2000 to 2009. [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.]

	Number of babies born			
	<1500g	1500-2499g	2500+g	All babies
Singleton without Assisted Conception	1,367	4,636	108,974	114,977
Multiple without Assisted Conception	312	1,229	1,440	2,981
Singleton with Assisted Conception	72	236	3,972	4,280
Multiple with Assisted Conception	144	538	503	1,185

Table 52: Number of babies born in Queensland 2000 to 2009 by use of assisted conception techniques and birth weight

	Number of babies born				Percentage of babies born		
	SCN / NICU Admission	No SCN / NICU Admission	Data incomplete	All babies	SCN / NICU Admission	No SCN / NICU Admission	All babies
Singleton without Assisted Conception	16,536	98,454	15	115,005	83.2	95.0	93.2
Multiple without Assisted Conception	1,860	1,122	0	2,982	9.4	1.1	2.4
Singleton with Assisted Conception	681	3,600	0	4,281	3.4	3.5	3.5
Multiple with Assisted Conception	809	377	0	1,186	4.1	0.4	0.9

Table 53: Number and percentage of babies born in Queensland 2000 to 2009 by use of assisted conception techniques and need for care in a Neonatal Intensive Care Unit (NICU) or a Special Care Nursery (SCN)

Year	No assisted conception				Assisted conception				Data incomplete	Total babies
	< 1,500g	1,500-2,499g	2,500-3,999g	4,000g+	< 1,500g	1,500-2,499g	2,500-3,999g	4,000g+		
2000	595	1,962	37,806	6,362	16	69	846	97	9	47,762
2001	583	1,856	38,173	6,323	28	79	968	141	5	48,156
2002	532	1,956	37,686	6,084	22	66	1,025	106	7	47,484
2003	537	1,946	38,538	6,341	29	74	1,069	132	8	48,674
2004	575	2,001	38,974	6,193	31	86	1,190	146	14	49,210
2005	600	2,212	42,439	6,627	33	75	1,284	140	8	53,418
2006	673	2,231	43,246	6,785	36	103	1,469	194	17	54,754
2007	659	2,230	46,112	7,365	32	96	1,526	193	18	58,231
2008	668	2,211	46,680	7,627	30	120	1,724	204	6	59,270
2009	700	2,425	47,005	7,674	42	116	1,815	222	17	60,016
Total	6,122	21,030	416,659	67,381	299	884	12,916	1,575	109	526,975

Table 54: Number of babies born in singleton pregnancies only, conceived with assisted conception and without assisted conception in Queensland 2000 to 2009 by birth weight category

Year	No assisted conception (%)				Assisted conception (%)			
	< 1,500g	1,500-2,499g	2,500-3,999g	4,000g+	< 1,500g	1,500-2,499g	2,500-3,999g	4,000g+
2000	1.3	4.2	80.9	13.6	1.6	6.7	82.3	9.4
2001	1.2	4.0	81.3	13.5	2.3	6.5	79.6	11.6
2002	1.2	4.2	81.5	13.2	1.8	5.4	84.1	8.7
2003	1.1	4.1	81.4	13.4	2.2	5.7	82.0	10.1
2004	1.2	4.2	81.6	13.0	2.1	5.9	81.9	10.0
2005	1.2	4.3	81.8	12.8	2.2	4.9	83.8	9.1
2006	1.3	4.2	81.7	12.8	2.0	5.7	81.5	10.8
2007	1.2	4.0	81.8	13.1	1.7	5.2	82.6	10.4
2008	1.2	3.9	81.6	13.3	1.4	5.8	83.0	9.8
2009	1.2	4.2	81.3	13.3	1.9	5.3	82.7	10.1
Total	1.2	4.1	81.5	13.2	1.9	5.6	82.4	10.0

Table 55: Incidence of babies born in singleton pregnancies only, conceived with assisted conception and without assisted conception in Queensland 2000 to 2009 by birth weight category

Year	Spontaneous onset of labour	Induced labour	No labour (ie elective caesarean section)	Data incomplete	% Spontaneous onset of labour	% Induced labour	% No labour
2000	29,342	12,200	6,980	2	60.5	25.1	14.4
2001	28,358	12,752	7,798	0	58.0	26.1	15.9
2002	27,315	12,261	8,747	1	56.5	25.4	18.1
2003	27,868	12,422	9,220	2	56.3	25.1	18.6
2004	28,603	11,699	9,749	0	57.1	23.4	19.5
2005	30,828	12,687	10,822	0	56.7	23.3	19.9
2006	31,230	13,048	11,439	2	56.0	23.4	20.5
2007	33,584	13,553	12,091	0	56.7	22.9	20.4
2008	34,441	13,615	12,270	2	57.1	22.6	20.3
2009	34,841	13,661	12,522	0	57.1	22.4	20.5
Total	306,410	127,898	101,638	9			

Table 56: Number and percentage of women giving birth by onset of labour, Queensland 2000 to 2009

Year	Onset of labour Public Hospitals			Onset of labour Private Hospitals			Onset of labour Home birth		Data incomplete
	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
Total	238,073	83,840	50,755	67,513	44,055	50,882	813	2	22

Table 57: Number of women giving birth by onset of labour and care mode, Queensland 2000 to 2009 (No labour implies elective caesarean section)

Year	% Onset of labour in Public Hospitals			% Onset of labour in Private Hospitals			% Onset of labour in home birth	
	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

Table 58: Incidence of women giving birth, by onset of labour and care mode, Queensland 2000 to 2009 (No labour implies elective caesarean section)

	20-28 weeks		29-34 weeks		35-37 weeks		38+ weeks	
	Public	Private	Public	Private	Public	Private	Public	Private
Induced	1,236	282	1,156	196	8,110	2,871	73,330	40,704
No labour	653	146	3,234	1,344	7,052	7,255	39,810	42,137
Spontaneous	2,215	398	6,066	1,767	21,268	7,561	208,473	57,785
Total	4,104	826	10,456	3,307	36,430	17,687	321,613	140,626

Table 59: Number of women giving birth, by onset of labour, gestational group and care mode, Queensland 2000 to 2009 (No labour implies elective caesarean section)

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
Total	326,387	173,546	12,104	32,848	283	545,168

Table 60: Number of babies born, by birth mode, Queensland 2000 to 2009

Year	Percentage of babies born				
	Unassisted vaginal birth	Caesarean section	Forceps	Vacuum extraction	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
Total	59.9	31.8	2.2	6.0	8.2

Table 61: Percentage of babies born, by birth mode, Queensland 2000 to 2009

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
Total	254,607	98,115	5,858	19,259	70,950	75,430	6,246	13,589

Table 62: Number of babies born, by birth mode and care provider, Queensland 2000 to 2009

Year	Public Hospital				Private Hospital			
	Unassisted vaginal birth	Caesarean section	Forceps	Vacuum extraction	Unassisted vaginal birth	Caesarean section	Forceps	Vacuum extraction
2000	71.0	22.2	2.5	4.1	48.2	37.9	7.1	6.7
2001	70.8	22.9	2.0	4.2	47.4	39.8	5.7	7.0
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	68.0	25.8	1.2	5.0	42.9	45.6	3.2	8.2
2005	67.3	26.3	1.2	5.0	41.4	47.1	2.8	8.6
2006	66.1	27.4	1.4	5.0	40.4	48.5	3.1	8.0
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	9.0
2009	64.3	27.7	1.4	6.5	39.7	48.6	2.8	8.9
Total	67.4	26.0	1.6	5.1	42.7	45.4	3.8	8.2

Table 63: Percentage of babies born, by birth mode and care provider, Queensland 2000 to 2009

Year	Public Hospitals			Private Hospitals		
	Total births	CS without labour	CS with labour	Total births	CS without labour	CS with labour
2000	35,967	3,965	3,861	12,429	3,009	1,605
2001	34,186	4,048	3,613	14,620	3,749	1,966
2002	32,959	4,307	3,616	15,303	4,438	1,903
2003	33,833	4,461	4,049	15,610	4,756	1,926
2004	34,216	4,747	3,885	15,774	4,998	2,067
2005	37,374	5,270	4,337	16,919	5,549	2,280
2006	38,462	5,561	4,750	17,208	5,877	2,318
2007	41,222	6,011	5,075	17,924	6,079	2,427
2008	42,527	6,152	5,725	18,762	6,118	2,940
2009	43,139	6,300	5,731	18,790	6,300	2,835
Total	373,885	50,822	44,642	163,339	50,873	22,267

Table 64: Number of babies born by caesarean section with and without labour, by care mode, Queensland 2000 to 2009

Year	Public		Private	
	CS without labour	CS with labour	CS without labour	CS with labour
2000	11.0	10.7	24.2	11.0
2001	11.8	10.6	25.6	11.8
2002	13.1	11.0	29.0	13.1
2003	13.2	12.0	30.5	13.2
2004	13.9	11.4	31.7	13.9
2005	14.1	11.6	32.8	14.1
2006	14.5	12.3	34.2	14.5
2007	14.6	12.3	33.9	14.6
2008	14.5	13.5	32.6	15.7
2009	14.6	13.3	33.5	15.1

Table 65: Percentage of babies born by caesarean section with and without labour, by care mode, Queensland 2000 to 2009

Year	Public hospital breech presentation			Private hospital breech presentation			All hospital breech presentation		
	Caesarean Section Birth	Total Births	% Caesarean Sections	Caesarean Section Birth	Total Births	% Caesarean Sections	Caesarean Section Birth	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
Total	13,827	15,647	88.4	8,128	8,499	95.6	21,955	24,146	90.9

Table 66: Number and percentage of caesarean section births in breech presentation, by care mode, Queensland 2000 to 2009

Year	Public Hospital Multiple Pregnancies		Private Hospital Multiple Pregnancies		All Multiple Pregnancies		% Caesarean sections		
	Caesarean section	Total	Caesarean section	Total	Caesarean section	Total	Public Hospital	Private Hospital	All Hospitals
2000	259	484	195	278	454	762	53.5	70.1	59.6
2001	250	453	210	298	460	751	55.2	70.5	61.3
2002	290	491	246	349	536	840	59.1	70.5	63.8
2003	284	493	249	345	533	838	57.6	72.2	63.6
2004	280	469	296	371	576	840	59.7	79.8	68.6
2005	353	537	314	382	667	919	65.7	82.2	72.6
2006	357	549	353	416	710	965	65.0	84.9	73.6
2007	427	620	312	377	739	997	68.9	82.8	74.1
2008	422	617	370	441	792	1,058	68.4	83.9	74.9
2009	375	581	339	427	714	1,008	64.5	79.4	70.8
Total	3,297	5,294	2,884	3,684	6,181	8,978	62.3	78.3	68.8

Table 67: Number and incidence of caesarean sections in women having multiple births, Queensland 2000 to 2009

Year	No previous pregnancies			Previous pregnancies			Data incomplete
	Unassisted vaginal birth	Caesarean section	Assisted vaginal birth	Unassisted vaginal birth	Caesarean section	Assisted vaginal birth	
2000	8,196	3,943	2,435	23,712	8,497	1,699	44
2001	8,019	4,269	2,334	23,457	9,107	1,663	59
2002	7,426	4,638	2,264	22,783	9,625	1,528	60
2003	7,758	4,760	2,319	22,622	10,432	1,586	35
2004	7,865	4,785	2,348	22,489	10,911	1,626	27
2005	8,169	5,358	2,575	24,395	12,077	1,723	40
2006	8,124	5,709	2,624	24,661	12,797	1,791	13
2007	8,691	6,012	2,973	25,963	13,581	2,007	1
2008	8,665	5,876	3,163	26,111	14,230	2,282	1
2009	8,888	6,018	3,247	26,212	14,322	2,336	1
Total	81,801	51,368	26,282	242,405	115,579	18,241	281

Table 68: Number of births by mode of birth and previous pregnancy in Queensland 2000 to 2009

Year	% Unassisted vaginal births		% Caesarean sections		% Assisted vaginal births	
	No previous pregnancies	Previous pregnancies	No previous pregnancies	Previous pregnancies	No previous pregnancies	Previous pregnancies
2000	56.2	69.9	27.0	25.0	16.7	5.0
2001	54.8	68.4	29.2	26.6	16.0	4.9
2002	51.8	67.0	32.3	28.3	15.8	4.5
2003	52.3	65.2	32.1	30.1	15.6	4.6
2004	52.4	64.2	31.9	31.1	15.7	4.6
2005	50.7	63.8	33.3	31.6	16.0	4.5
2006	49.4	62.8	34.7	32.6	15.9	4.6
2007	49.2	62.5	34.0	32.7	16.8	4.8
2008	48.9	61.3	33.2	33.4	17.9	5.4
2009	49.0	61.1	33.2	33.4	17.9	5.4
Total	51.3	64.4	32.2	30.7	16.5	4.8

Table 69: Incidence of mode of birth by previous pregnancy in Queensland 2000 to 2009

Year	No previous caesarean sections			One previous caesarean section		
	Unassisted vaginal birth	Caesarean section	Assisted vaginal birth	Unassisted vaginal birth	Caesarean section	Assisted vaginal birth
2001	19,244	3,385	1,337	1,155	3,379	160
2002	19,768	3,850	1,286	1,149	3,944	157
2003	20,926	4,349	1,398	1,083	4,488	162
2004	21,226	4,454	1,441	1,225	4,858	182
2005	23,147	4,703	1,527	1,199	5,465	188
2006	23,386	4,849	1,593	1,223	5,849	188
2007	24,565	5,072	1,771	1,341	6,194	220
2008	24,612	5,174	1,987	1,383	6,458	268
2009	24,775	5,127	2,076	1,366	6,648	247
Total	201,649	40,963	14,416	11,124	47,283	1,772

Year	More than one previous caesarean section			Data incomplete
	Unassisted vaginal birth	Caesarean section	Assisted vaginal birth	
2001	42	1,263	1	46
2002	49	1,320	2	45
2003	49	1,427	3	30
2004	31	1,599	3	24
2005	44	1,905	4	32
2006	37	2,091	4	9
2007	39	2,300	5	1
2008	59	2,556	7	119
2009	39	2,527	1	64
Total	389	16,988	30	370

Table 70: Number of births, by mode of birth and previous caesarean section, in Queensland 2001 to 2009

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	80.2	24.6	3.2	14.1	72.0	96.0
2002	79.2	21.9	3.6	15.4	75.1	96.3
2003	78.4	18.9	3.3	16.3	78.3	96.4
2004	78.2	19.5	1.9	16.4	77.5	97.9
2005	78.7	17.5	2.3	16.0	79.7	97.5
2006	78.4	16.8	1.7	16.3	80.6	98.0
2007	78.2	17.3	1.7	16.1	79.9	98.1
2008	77.5	17.1	2.3	16.3	79.6	97.5
2009	77.5	16.5	1.5	16.0	80.5	98.4
Total	78.5	18.5	2.2	15.9	78.6	97.6

Table 71: Percentage of mode of birth, by previous caesarean section, in Queensland 2001 to 2009

Year	Maternal age; Indigenous women				Maternal age; Non-Indigenous women				Incomplete data	Total
	<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
Total	5,744	21,421	2,558	29,723	25,904	388,453	91,718	506,075	157	535,955

Table 72: Number of women giving birth in Queensland 2000 to 2009 by Indigenous status and maternal age group

Year	Indigenous women			Non-Indigenous women		
	<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
Total	19.3	72.1	8.6	5.1	76.8	18.1

Table 73: Percentage of women giving birth in Queensland 2000 to 2009 by Indigenous status and maternal age group

Year	Indigenous		Non-Indigenous		% Public care of Indigenous women	% Public care of Non-Indigenous women
	Public hospital care	Total	Public hospital care	Total		
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
Total	29,115	29,723	343,416	506,075	98.0	67.9

Table 74: Number and percentage of women giving birth in Queensland 2000 to 2009 by Indigenous status and mode of care

Gestation (weeks)	Indigenous					Non-Indigenous					
	< 1500g	1500-2499g	2500-3999g	4000+g	Total	< 1500g	1500-2499g	2500-3999g	4000+g	Total	Total
20	44	0	0	0	44	530	0	1	0	531	575
21	60	0	0	0	60	545	0	0	0	545	605
22	68	0	0	0	68	557	0	0	0	557	625
23	63	0	0	0	63	415	0	1	0	416	479
24	64	0	0	0	64	454	0	0	0	454	518
25	54	0	0	0	54	467	2	0	0	469	523
26	72	0	0	0	72	551	2	0	0	553	625
27	67	2	0	0	69	590	2	1	0	593	662
28	101	4	0	0	105	767	20	1	0	788	893
29	86	23	1	0	110	775	153	1	0	929	1,039
30	72	54	0	0	126	671	542	6	0	1,219	1,345
31	48	96	1	0	145	465	1,042	6	0	1,513	1,658
32	38	167	3	0	208	376	1,928	69	3	2,376	2,584
33	13	216	27	0	256	210	2,736	340	6	3,292	3,548
34	12	297	90	3	402	153	3,942	1,456	6	5,557	5,959
35	10	362	317	6	695	42	3,962	4,182	44	8,230	8,925
36	2	435	814	26	1,277	36	4,055	10,964	158	15,213	16,490
37	5	378	1,780	68	2,231	12	3,419	26,753	860	31,044	33,275
38	1	362	4,633	283	5,279	6	2,916	85,653	6,409	94,984	100,263
39	0	180	5,600	433	6,213	3	1,344	104,401	12,291	118,039	124,252
40	0	131	7,635	1,072	8,838	3	709	126,317	26,722	153,751	162,589
41	0	19	2,593	654	3,266	0	143	50,579	18,278	69,000	72,266
42	0	4	277	107	388	1	13	3,170	1,497	4,681	5,069
43	0	0	9	2	11	0	1	38	22	61	72
44	0	0	1	0	1	0	0	1	5	6	7
45	0	0	0	0	0	0	0	1	0	1	1
Total	880	2,730	23,781	2,654	30,045	7,629	26,931	413,941	6,6301	514,802	544,847

Table 75: Number of babies born in Queensland 2000 to 2009 by Indigenous status, gestation and birth weight
(Data incomplete: n = 302 Gestation <20: n = 19)



Gestation (weeks)	% of Indigenous Babies					% of Non-Indigenous Babies					% All Babies
	< 1500g	1500-2499g	2500-3999g	4000+g	Total	< 1500g	1500-2499g	2500-3999g	4000+g	Total	
20	0.1	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.1	0.1
21	0.2	0.0	0.0	0.0	0.2	0.1	0.0	0.0	0.0	0.1	0.1
22	0.2	0.0	0.0	0.0	0.2	0.1	0.0	0.0	0.0	0.1	0.1
23	0.2	0.0	0.0	0.0	0.2	0.1	0.0	0.0	0.0	0.1	0.1
24	0.2	0.0	0.0	0.0	0.2	0.1	0.0	0.0	0.0	0.1	0.1
25	0.2	0.0	0.0	0.0	0.2	0.1	0.0	0.0	0.0	0.1	0.1
26	0.2	0.0	0.0	0.0	0.2	0.1	0.0	0.0	0.0	0.1	0.1
27	0.2	0.0	0.0	0.0	0.2	0.1	0.0	0.0	0.0	0.1	0.1
28	0.3	0.0	0.0	0.0	0.3	0.1	0.0	0.0	0.0	0.2	0.2
29	0.3	0.1	0.0	0.0	0.4	0.2	0.0	0.0	0.0	0.2	0.2
30	0.2	0.2	0.0	0.0	0.4	0.1	0.1	0.0	0.0	0.2	0.2
31	0.2	0.3	0.0	0.0	0.5	0.1	0.2	0.0	0.0	0.3	0.3
32	0.1	0.6	0.0	0.0	0.7	0.1	0.4	0.0	0.0	0.5	0.5
33	0.0	0.7	0.1	0.0	0.9	0.0	0.5	0.1	0.0	0.6	0.7
34	0.0	1.0	0.3	0.0	1.3	0.0	0.8	0.3	0.0	1.1	1.1
35	0.0	1.2	1.1	0.0	2.3	0.0	0.8	0.8	0.0	1.6	1.6
36	0.0	1.4	2.7	0.1	4.3	0.0	0.8	2.1	0.0	3.0	3.0
37	0.0	1.3	5.9	0.2	7.4	0.0	0.7	5.2	0.2	6.0	6.1
38	0.0	1.2	15.4	0.9	17.6	0.0	0.6	16.6	1.2	18.5	18.4
39	0.0	0.6	18.6	1.4	20.7	0.0	0.3	20.3	2.4	22.9	22.8
40	0.0	0.4	25.4	3.6	29.4	0.0	0.1	24.5	5.2	29.9	29.8
41	0.0	0.1	8.6	2.2	10.9	0.0	0.0	9.8	3.6	13.4	13.3
42	0.0	0.0	0.9	0.4	1.3	0.0	0.0	0.6	0.3	0.9	0.9
43	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
44	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total	2.9	9.1	79.2	8.8	100.0	1.5	5.2	80.4	12.9	100.0	100.0

Table 76: Percentage of babies born in Queensland 2000 to 2009 by Indigenous status, gestation and birth weight

Birth weight (g)	Total births	Live births	Stillbirths		Neonatal deaths		Perinatal deaths	
			Number	Deaths per 1,000 births	Number	Deaths per 1,000 live births	Number	Deaths per 1,000 births
Less than 500	1,922	511	1,411	734.1	483	945.2	1,894	985.4
500-749	1,493	957	536	359.0	479	500.5	1,015	679.8
750-999	1,390	1,194	196	141.0	172	144.1	368	264.7
1,000-1,249	1,630	1,497	133	81.6	76	50.8	209	128.2
1,250-1,499	2,109	1,969	140	66.4	49	24.9	189	89.6
1,500-1,749	3,056	2,939	117	38.3	54	18.4	171	56.0
1,750-1,999	4,508	4,391	117	26.0	60	13.7	177	39.3
2,000-2,249	7,948	7,846	102	12.8	60	7.6	162	20.4
2,250-2,499	14,176	14,055	121	8.5	71	5.1	192	13.5
2,500-2,999	78,184	77,890	294	3.8	172	2.2	466	6.0
3,000-3,499	189,300	189,032	268	1.4	154	0.8	422	2.2
3,500-3,999	170,391	170,223	168	1.0	111	0.7	279	1.6
4,000-4,499	58,547	58,483	64	1.1	25	0.4	89	1.5
4,500 and over	10,423	10,402	21	2.0	7	0.7	28	2.7
Not stated	91	61	30	na	16	na	46	na
Total	545,168	541,450	3,718	6.8	1,989	3.7	5,707	10.5

Table 77: Numbers and rates of stillbirth, neonatal death and perinatal death, Queensland 2000 to 2009, by birth weight

Gestation (weeks)	Total births	Live births	Stillbirths		Neonatal deaths		Perinatal deaths	
			Number	Deaths per 1,000 births	Number	Deaths per 1,000 live births	Number	Deaths per 1,000 births
Less than 22	1,206	299	907	752.1	299	1,000.0	1,206	1,000.0
22-24	1,632	814	818	501.2	595	731.0	1,413	865.8
25-27	1,821	1,525	296	162.5	246	161.3	542	297.6
28-31	4,945	4,579	366	74.0	143	31.2	509	102.9
32-36	37,544	36,971	573	15.3	241	6.5	814	21.7
37-41	492,808	492,079	729	1.5	448	0.9	1,177	2.4
42 or more	5,155	5,133	22	4.3	10	1.9	32	6.2
Not stated	57	50	7	122.8	7	140.0	14	245.6
Total	545,168	541,450	3,718	6.8	1,989	3.7	5,707	10.5

Table 78: Numbers and rates of stillbirth, neonatal death and perinatal death, Queensland 2000 to 2009, by gestation

Data sources used in this report

Pregnancy, birth and neonatal data for the 10 year period 2000 to 2009 was sourced from the Queensland Health Perinatal Data Collection and prepared by Ms Vesna Dunne, Principal Statistical Output Officer, Statistical Output and Library Services, Health Statistics Centre, Queensland Health. This data was further analysed and collated by Professor Michael Humphrey, Chair, Queensland Maternal and Perinatal Quality Council.

Previous reports by the Queensland Maternal and Perinatal Quality Council and Queensland Council on Obstetric and Paediatric Morbidity and Mortality (QCOPMM) were sources of data regarding maternal and perinatal deaths from 1988 to 2003, as were Australian Institute of Health and Welfare (AIHW) reports on Maternal Deaths in Australia.



Membership of the Queensland Maternal and Perinatal Quality Council 2009 to 2010

Queensland Maternal and Perinatal Quality Council	
Professor Michael Humphrey (Chair)	Clinical Advisor, Office of Rural and Remote Health Senior Medical Coordinator (Obstetrics), Retrieval Services Queensland
Associate Professor Leonie Callaway	Staff Specialist, Internal and Obstetric Medicine, Royal Brisbane and Women's Hospital
Associate Professor Robert Cincotta	Director, Queensland Ultrasound for Women
Ms Cheryl Clayton	Director of Clinical Services, Mater Private Hospital Redland
Professor Paul Colditz	Director, Perinatal Research Centre, The University of Queensland
Ms Helen Coxhead	Midwifery Unit Manager, The Townsville Hospital
Associate Professor Vicki Flenady	Director, Translating Research Into Practice (TRIP) Centre; Program Head, Mothers' and Babies Theme, Mater Medical Research Institute
Associate Professor Rebecca Kimble	Clinical Director, Obstetric Services, Royal Brisbane and Women's Hospital
Dr David Knight	Director, Neonatology, Mater Mother's Hospital
Ms Heather Lee	Indigenous Child Health Coordinator, The Townsville Hospital
Ms Jonelle Mayers (from February 2011)	Nurse Unit Manager, Special Care Baby Unit, Cairns Base Hospital
Dr Ian Mottareilly	Senior Medical Officer, Gympie Hospital
Dr Peter Schmidt	Senior Medical Officer, Paediatrics, The Gold Coast Hospital
Dr Mary Sidebotham	Lecturer, B Mid. School of Nursing and Midwifery, Griffith University
Ms Jacqueline Smith (until December 2010)	Neonatal Nurse Practitioner, The Townsville Hospital
Dr Nikki Whelan	Obstetrician and Gynaecologist (Private Practice), Brisbane
Ms Lauren Williams	Nominee, Queensland Consumer Council

Maternal Mortality Sub-Committee	
Dr Nikki Whelan (Chair)	Obstetrician and Gynaecologist (Private Practice), Brisbane
Associate Professor Leonie Callaway	Staff Specialist, Internal and Obstetric Medicine, Royal Brisbane and Women's Hospital
Associate Professor Rob Cincotta	Director, Queensland Ultrasound for Women
Ms Helen Coxhead	Manager, Midwifery Unit, Townsville Hospital
Dr Ian Mottareilly	Senior Medical Officer, Gympie Hospital
Dr Peter Harms (consulting member)	Director, Anaesthesia, Mater Mothers' Hospital, Mater Health Services
Dr Mary Sidebotham	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

Perinatal Mortality Sub-Committee	
Associate Professor Vicki Flenady (Chair)	Director, Translating Research Into Practice (TRIP) Centre; Program Head, Mothers' and Babies Theme. Mater Medical Research Institute
Ms Joanne Bunney	Principal Data Collections Officer, Health Statistics Centre, Queensland Health
Dr David Cartwright	Director, Neonatology, Royal Brisbane and Women's Hospital
Dr Lucy Cooke	Staff Specialist, Neonatology, Mater Health Services
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
Dr Diane Payton	Staff Anatomical Pathologist, Pathology Queensland
Ms Teresa Walsh	Caseload Midwife
Dr Nikki Whelan	Consultant Obstetrician Gynaecologist

Congenital Anomaly Sub-Committee	
Professor Paul Colditz (Chair)	Professor, Perinatal Medicine, University of Queensland
Ms Joanne Bunney	Principal Data Collections Officer, Health Statistics Centre, Queensland Health
Associate Professor Rob Cincotta	Maternal Fetal Medicine Specialist, Mater Health Services & Director, Queensland Ultrasound for Women
Dr Timothy Donovan	Senior Medical Officer, Neonatology, Royal Brisbane and Women's Hospital
Associate Professor Julie McGaughran	Director, Genetic Health Queensland
Dr Diane Payton	Staff Anatomical Pathologist, Pathology Queensland
Dr Renuka Sekar	Staff Specialist Obstetrics – Maternal and Fetal Medicine, Royal Brisbane and Women's Hospital

Acknowledgments

Secretariat: Ms Carolyn James and Ms Andrea Chitakis, Maternity Unit, Primary, Community and Extended Care Branch, Queensland Health.

Council acknowledges and thanks the clinicians who have participated in hospital committee perinatal mortality review and classification. We also thank the Perinatal Data Collection Unit, in particular Joanne Bunney and Colleen Morris, for their support in perinatal death review and reporting and in performing a major case ascertainment exercise relating to maternal deaths, and Ms Vesna Dunne, Health Statistics Centre, for assistance with data retrieval.

The support of the following individuals is acknowledged:

Mr Peter Brockett, Senior Lawyer, Legal Unit, Queensland Health.

Ms Sue Cornes, Senior Director, Health Statistics Centre, Queensland Health.

Ms Corelle Davies, A/Executive Director, Primary, Community and Extended Care Branch, Queensland Health.

Dr Jillann Farmer, Director, Patient Safety and Quality Improvement Service

Ms Lucy Fisher, Executive Director, Private Hospitals Association of Qld Inc.

Ms Terri Price, Director Primary, Community and Extended Care Branch, Queensland Health.

Dr John Wakefield, Executive Director, Patient Safety and Quality Improvement Service.

Professor Michael Ward, Commissioner, Health Quality and Complaints Commission.

Maternal and Perinatal Mortality and Morbidity in Queensland
Queensland Maternal and Perinatal Quality Council Report 2011

Queensland Health

